THE EARLY DILMUN SETTLEMENT AT SAAR
Series titles
London-Bahrain Archaeological Expedition
Saar Excavation Report 1
The Dilmun Temple at Saar
Harriet Crawford, Robert Killick and Jane Moon
ISBN 0-7103-0487-0
(Kegan Paul International 1997)

London-Bahrain Archaeological Expedition
Saar Excavation Report 2
Early Dilmun Seals from Saar
Harriet Crawford
(Archaeology International 2001)
THE

EARLY DILMUN

SETTLEMENT

AT SAAR

Edited by
Robert Killick and Jane Moon

THE KINGDOM OF BAHRAIN
MINISTRY OF INFORMATION
CULTURE & NATIONAL HERITAGE
DIRECTORATE OF ARCHAEOLOGY
AND HERITAGE

London-Bahrain Archaeological Expedition
Institute of Archaeology
University College London
Dating back to the dawn of recorded history, the settlement at Saar is one of the most significant features of Bahrain's ancient heritage. As a centre of the Dilmun civilization, which dominated the region in the third millennium BC, Saar reveals much about this lost world: its people, their society and culture, and how they interacted with the people around them.

During the course of ten seasons of excavation, the London-Bahrain Archaeological Expedition was able to discover many of Saar's secrets. Thanks to the skill and dedication of the team, we now have a much deeper understanding of Bahrain's ancient history and its place within the unfolding development of human civilization. Truly, the discoveries at Saar have placed Bahrain on the world archaeological map.

Dr Muhammed Abdul Ghaffar Abdulla
Minister of Information & Minister of State for Foreign Affairs
Kingdom of Bahrain
This volume is the third (and last) in the series of printed reports about the excavations at Saar by the London-Bahrain Archaeological Expedition. The first volume, published in 1997, describes the excavation of the temple (*The Dilmun Temple at Saar*), and the second, published in 2001, is devoted to a study of the seals and sealings (*Early Dilmun Seals from Saar*). Here, we present the results of the excavation of all the other buildings in the settlement, comprising over 60 individual buildings, together with their contents.

After the introduction (Chapter 1), the first section of the book describes the buildings: the building sequence (Chapter 2); a building-by-building description (Chapter 3); and a delineation of typical plans and installations (Chapter 4). This is followed by chapters on the main classes of finds from the buildings: household utensils, tools and ornaments (Chapter 5); pottery (Chapters 6 and 7); animal bones (Chapter 8); and a specialized one on metal objects (Chapter 9). A final section presents the result of a micromorphological study (Chapter 10) and of geological investigations in the area around Saar (Chapter 11). The last chapter presents an overview of the social and economic organization of the settlement (Chapter 12).

The above scheme follows that of traditional scientific archaeological reports, which works well, but the book diverges from the standard model in two important ways.

Firstly, as in earlier volumes, we have made extensive use of illustrations, of colour photographs and graphics. This reflects our belief that archaeological excavation is a very visual medium and should be reported as such, with equal weight given to illustration and text. Secondly, we have stripped out some of the minutiae of archaeological reporting normally found in such volumes, believing that this is of no interest to any but the most dedicated researcher and that most of it is, in any case, better presented electronically. In Chapter 3, for example, we have simplified the building plans and restricted our account of the excavation of each building to a summary of the main features, and in Chapter 5 only a representative sample of the small finds is discussed and illustrated.

Those requiring more detail than presented here are referred to the Saar excavation archive and, in particular, to the electronic components of the archive (see Appendix 2). As well as the paper records, the archive includes a site Geographical Information System and a finds database. These electronic materials will shortly be in the public domain and will allow researchers to manipulate easily the Saar data. They will, for example, be able to examine the contents of each building in turn and to carry out their own spatial analysis of the buildings and their installations.

For this reason, we prefer to think of this book as not, in any sense, a ‘final report’. It is, instead, our hope that other researchers will make full use of the Saar archive to pursue their own avenues of research, expanding (and correcting where necessary) what is presented in this volume.

Robert Killick and Jane Moon
Acknowledgements

The excavations at Saar by the London-Bahrain Archaeological Expedition began on 3rd March 1990, they finished, ten years later, on 13th May 1999. Over that long period, we gained many friends in Bahrain and sadly lost one or two along the way to the ravages of time and chance. A large number of people gave their support to the project, by donating their time, placing their skills at our service, or providing direct financial support. In the Roll of Honour printed in our first volume, covering the period 1990–1995, two hundred and thirty four names appear. We have updated that list and it is printed in Appendix 1 of this volume. Every person appearing there made a valuable, material contribution to the success of the project and our warmest thanks goes to each and every one of them. I hope that they will all consider this volume as compensation, in some small measure, for their efforts.

Inevitably, some deserve special acknowledgement, but where to start? This is quite easy for us: with our Bahraini colleagues, who ensured that working in Bahrain was always a pleasure as well as a privilege. And so we would like to thank all the staff who worked at the National Museum of Bahrain during the 1990s, particularly Dr Abdulla Yateem, Shaikha Nayla al-Khalifa, Khalid al-Sendi, and AbdulAziz Soweileh. Time and time again, through their positive response to the countless demands we made upon their time and resources, they demonstrated a deep, genuine commitment to our project. At ministerial level, we also received wonderful support from HE Mohammed al-Mutawwar, Minister of Cabinet Affairs and Information, from the previous Minister of Information, the late Tarig AlMoayed, and from the late Yusuf al-Shirawi, former Minister of Industry and Development.

The project would not have got off the ground in 1990 without the support of the late Shaikh Isa bin Sulman al-Khalifa, Amir of Bahrain. Shaikh Isa agreed subsequently to become Patron of the London-Bahrain Archaeological Expedition, a typically kind and generous act that opened many doors for us. He is remembered with affection.

Shaikh Mohammed bin Sulman Al-Khalifa responded positively to our request to excavate on his land, which includes much of the Saar settlement.

Sir John Shepherd, Ambassador to Bahrain between 1988 and 1991, also provided critical support during the start-up phase of the project. He championed our cause at home and abroad, extracting funds from the Foreign and Commonwealth Office in London and not hesitating to do likewise from the business community on Bahrain. The support of his successors, Mr Hugh Tunnell and, in turn, Mr Ian Lewty was equally vital.

Although, by and large, the annual cycles of excavation and research passed by unaffected by the wider currents in the world, the Gulf War of 1991, corresponding to our second campaign at Saar, was a particularly difficult year. The magnificent philanthropy of Mr John Samuels rescued our finances at that time, and his friendship is recalled with affection.

We spent £1.5 million sterling at Saar over the lifetime of the project. All this money had to be raised by us and by our supporters. That it was, is due solely to the generosity and vision of the many individuals and businesses in Bahrain who saw that we were engaged in our enterprise not only for academic reasons but because we believed in and worked hard to realise the educational, cultural and indeed economic benefits for Bahrain that were inherent in the project.

All the companies and institutions that provided financial support, or help-in-kind, are also listed in Appendix 1. Our grateful thanks to them all. As with individuals, there are some who deserve special mention, either for the longevity or for the scale of their support. Among the institutions we must mention, above all, The British Academy which generously provided annual support from start to finish, and the Institute of Archaeology, University College London which gave its academic imprimatur to the project. The Ministry of Cabinet Affairs and Information, State of Bahrain, also provided substantial financial support, particularly during the last two years of the project.

Of our many corporate supporters, our especial thanks to the following: Alba, Al Ahli Commercial Bank, Bapco, Batelco, Citibank, Caltex, Philip Morris, Standard Chartered Bank and United Gulf Bank.

It is also appropriate here to acknowledge the immense contribution made by our staff. They too are listed in Appendix 1 but that roll call is an inadequate tribute. We were very fortunate to have a dedicated core of staff who returned year after year to Bahrain, providing us with much needed continuity. And so we would like to thank in particular the following (and I hope they all know how much we owe to them): Marcus Woodburn, Assistant Director and Photographer 1990–1995; Alison Hicks, Site Supervisor 1991, Senior Site Supervisor 1992–1998, Assistant Director 1999; Dan Barrett, Architect and GIS Manager 1993–1999; Robyn Stocks, Finds Manager 1993, and 1995–1999; and Shahina Farid, Site Supervisor 1991, Senior Site Supervisor 1992–1996. It was a pleasure to work with them all.


From 1990 to 1995, we were most fortunate to have Dr Harriet Crawford as Co-director at Saar. She played a crucial role in setting up the project, providing an academic impetus that resulted in the publication of a volume on the seals and sealings from the excavations. Our debt to Harriet, in fact, stretches back further than probably any of us would now care to recall, but it is a pleasure to acknowledge it here.

Every year we were fortunate to work with our Bahraini colleagues from the Department of Antiquities. Many returned year-on-year, and all were delightful and skilled companions in the field. They are also all listed at the back of this volume, but we should
mention here by name Mustafa Ibrahim Salman, Abdulla Hassan Yahya, Mohammed Jaffar Essa, and Ali Umran Yousif.

Our work at Saar was about much more than excavation—we ran at the same time an extensive fund-raising and media awareness campaign, a full programme of educational visits for state and private schools, and a volunteering programme, as well as many other PR events. This would not have been possible without the support of our non-digging staff and volunteers. David Phillips, fund-raising consultant to the Saar Project, gave us the professional direction to achieve our fund-raising goals; the extent of his success can be measured by the fact that our budget quadrupled under his guidance. Fiona al-Rowaiei, our administrator through the most hectic phases of the project, was wonderfully efficient, as was Hilary Towns and Shelagh Jordan who later occupied the same post.

For many years we had a fantastic group of volunteers working at Saar. It was solely due to their efforts that we kept up-to-date in vital areas of processing archaeological materials (dry-sieving, sorting flot residues, marking pottery and so on). In addition, it was only with their help that we were able to provide our large numbers of visitors and educational groups with guided tours of the excavations.

We were also fortunate to have the assistance in recruiting local labour of Mr Hussain Haider from the Saar Cultural and Sports Club. We became, in fact, the first excavation in recent times to employ Bahraini workmen, a practice which subsequently spread. Our thanks to all those who laboured on our behalf.

If an army marches on its stomach, so too does an archaeological excavation and the fact that staff were nothing but complimentary to the chef shows both how spoilt and how fortunate they were to have the culinary skills of Gladys Pereira always on hand. Our more adventurous visitors to the excavations would always time their visits to coincide with the nine o’clock curried breakfast.

Finally, but by no means least of all, we would like to record here our thanks to the people of the Kingdom of Bahrain, unfailingly courteous and overwhelmingly hospitable, they are worthy successors to the heritage of Dilmun. We have only good memories of life on modern Dilmun.

Robert Killick
Jane Moon
17th October 2004
Contents

Foreword .................................................................................................................................................................v

Preface ......................................................................................................................................................................vi

Acknowledgements ....................................................................................................................................................vii

Contents ...................................................................................................................................................................ix

Chapter 1 Saar, Dilmun and the London–Bahrain Archaeological Expedition ......................................................1

by Robert Killick and Jane Moon

Research background ..................................................................................................................................................1

Looking for Saar .....................................................................................................................................................2

Archaeological remains in the Saar area ...................................................................................................................2

The extent of the Saar settlement ............................................................................................................................6

Dating ......................................................................................................................................................................6

Chapter 2 The archaeological sequence ...............................................................................................................7

by Robert Killick

The archaeological sequence at Saar .....................................................................................................................7

Northern Quarter ...................................................................................................................................................11

Eastern Quarter ....................................................................................................................................................12

Southern Quarter ..................................................................................................................................................15

Central Quarter ....................................................................................................................................................18

Western Quarter ...................................................................................................................................................19

Southeastern Quarter ..........................................................................................................................................21

Summary of stratigraphy .......................................................................................................................................21

Chapter 3 Individual buildings in detail ..............................................................................................................25

by Robert Killick

Introduction .............................................................................................................................................................25

Block A .....................................................................................................................................................................26

Building 202 ........................................................................................................................................................27

Building 203 ........................................................................................................................................................28

Building 204 ........................................................................................................................................................30

Building 205 ........................................................................................................................................................31

Block B .....................................................................................................................................................................32

Building 208 ........................................................................................................................................................33

Building 209 ........................................................................................................................................................35

Building 353 ........................................................................................................................................................38

Building 352 ........................................................................................................................................................39

Block C .....................................................................................................................................................................40

Buildings 228 and 229 ..........................................................................................................................................41

Building 220 ........................................................................................................................................................42

Buildings 221 and 223 ..........................................................................................................................................46

Building 224 ........................................................................................................................................................47

Building 225 ........................................................................................................................................................48

Building 226 ........................................................................................................................................................54
<table>
<thead>
<tr>
<th>Block</th>
<th>Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Building 222, 64, 63, 65, 500</td>
</tr>
<tr>
<td>E</td>
<td>Building 60, 61, 66 and 67</td>
</tr>
<tr>
<td>F</td>
<td>Building 62, 55, 56, 58, 57</td>
</tr>
<tr>
<td>G</td>
<td>Building 100, 102, 104</td>
</tr>
<tr>
<td>H</td>
<td>Building 101, 103, 105, 107-109, 111 and 113, 150 and 151 on the southern edge</td>
</tr>
<tr>
<td>I</td>
<td>Building 50, 51, 52, 53, 54</td>
</tr>
<tr>
<td>JE</td>
<td>Building 200, 210, 211</td>
</tr>
<tr>
<td>JN</td>
<td>Building 7, 13</td>
</tr>
<tr>
<td>JS</td>
<td>Building 9, 10, 11, 12</td>
</tr>
<tr>
<td>KN</td>
<td>Building 14, 5, 8</td>
</tr>
<tr>
<td>KS</td>
<td>Building 1, 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block</th>
<th>Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Building 60, 61, 66 and 67</td>
</tr>
<tr>
<td>F</td>
<td>Building 62, 55, 56, 58, 57</td>
</tr>
<tr>
<td>G</td>
<td>Building 100, 102, 104, 106 and 108</td>
</tr>
<tr>
<td>H</td>
<td>Building 101, 103, 105, 107-109, 111 and 113, 150 and 151 on the southern edge</td>
</tr>
<tr>
<td>I</td>
<td>Building 50, 51, 52, 53, 54</td>
</tr>
<tr>
<td>JE</td>
<td>Building 200, 210, 211</td>
</tr>
<tr>
<td>JN</td>
<td>Building 7, 13</td>
</tr>
<tr>
<td>JS</td>
<td>Building 9, 10, 11, 12</td>
</tr>
<tr>
<td>KN</td>
<td>Building 14, 5, 8</td>
</tr>
<tr>
<td>KS</td>
<td>Building 1, 2</td>
</tr>
</tbody>
</table>

| Building 222 | 56 |
| Building 64   | 58 |
| Building 63   | 60 |
| Building 65   | 61 |
| Building 500  | 62 |
| Building 60   | 64 |
| Building 61   | 66 |
| Buildings 66 and 67 | 67 |
| Building 62   | 69 |
| Building 55   | 70 |
| Building 56   | 72 |
| Building 58   | 74 |
| Building 57   | 75 |
| Building 100  | 77 |
| Building 102  | 79 |
| Building 104  | 80 |
| Buildings 106, 108 and 110 | 83 |
| Building 101  | 85 |
| Buildings 103, 105, 107, 109, 111 and 113 | 85 |
| Buildings 150 and 151 on the southern edge | 85 |
| Building 50   | 87 |
| Building 51   | 88 |
| Building 52   | 90 |
| Building 53   | 91 |
| Building 54   | 94 |
| Building 200  | 98 |
| Building 210  | 100 |
| Building 211  | 102 |
| Building 7    | 103 |
| Building 13   | 107 |
| Building 9    | 110 |
| Building 10   | 111 |
| Building 11   | 112 |
| Building 12   | 113 |
| Building 14   | 114 |
| Building 5    | 117 |
| Building 8    | 118 |
| Building 1    | 121 |
| Building 2    | 121 |
Chapter 8 Animal bone finds and their relevance to the ecology and economy of Saar ........................................ 293

_by Margarethe Uerpmann and Hans-Peter Uerpmann_

Introduction............................................................................................................................... 293
Vertebrate remains from particular buildings at Saar............................................................... 293
Fish remains ........................................................................................................................... 296
Remains of amphibians and reptiles ..................................................................................... 300
Bird remains .......................................................................................................................... 301
Remains of wild mammals .................................................................................................... 302
Domestic animals .................................................................................................................. 304
Domestic animal economy at Saar ....................................................................................... 306
Concluding remarks ............................................................................................................ 307

Chapter 9 Archaeometallurgical studies .................................................................................. 309

_by Lloyd Weeks and Ken Collerson_

Compositional analyses ........................................................................................................ 309
Lead isotope analysis ........................................................................................................... 318
Summary ............................................................................................................................... 322

Chapter 10 Domestic space at Saar: the microstratigraphic evidence ....................................... 325

_by Wendy Matthews and Charles French_

Introduction .......................................................................................................................... 325
Methodology ......................................................................................................................... 325
Micromorphology .................................................................................................................. 327
Contextual analysis .............................................................................................................. 331
Site formation processes, traces of uses, and concepts of domestic space ......................... 337
Conclusions .......................................................................................................................... 337

Chapter 11 Geological investigations ....................................................................................... 339

_by Peter Bush, Graham Evans and Emily Glover_

Introduction .......................................................................................................................... 339
Geological investigations ..................................................................................................... 339
Description of sub-surface samples ...................................................................................... 340
Discussion of borehole and excavation data ......................................................................... 342
Sea-level changes .................................................................................................................. 342
Conclusion ............................................................................................................................. 345

Chapter 12 Social and economic organization .......................................................................... 347

_by Robert Killick and Jane Moon_

Saar and the Dilmun polity ...................................................................................................... 347
Households at Saar ............................................................................................................... 347
Activities and occupations .................................................................................................. 348
Bibliography .......................................................................................................................... 353

Appendix 1 Corporate and institutional support, individual supporters, staff and volunteers ....... 361
Appendix 2 The Saar archive ................................................................................................ 365
Appendix 3 C14 determinations from Saar .......................................................................... 367
Chapter 1  Saar, Dilmun and the London–Bahrain Archaeological Expedition
Robert Killick and Jane Moon

Research background

The London–Bahrain Archaeological Expedition was formed in 1989 with a single objective: to contribute to the archaeology of the Arabian Gulf by excavating a settlement of the so-called Early Dilmun period in Bahrain. Up until then our understanding of the country at this early time had depended largely on robbed tombs and apparently isolated religious sites, and lacked information on how the island’s people interacted with their environment and their neighbours, how they harnessed the resources to which they had access, what they ate, how their society worked — in short, how they actually lived. To understand the importance of this objective requires some background on the place, the period, and the state of relevant archaeological research.

In the years between 2500 and 1500 BC, Bahrain became the centre of an innovative and independent trading nation. The people living in Bahrain at that time have not left us any written records, but there are many references to the place in the cuneiform documents of ancient Babylonia, now southern Iraq, where the country was known as Dilmun. In fact, the name Dilmun appears in some of the oldest written documents in the world, dating to about 3200 BC (Nissen 1985). The term seems originally to have applied to a larger area which included part of the Eastern Province of Saudi Arabia, but by the beginning of the second millennium, Bahrain had become its political and economic nexus.

Dilmun/Bahrain was strategically located between the head of the Gulf and the straits of Hormuz at the southern end. It was in an excellent position to serve as a middleman: buying raw materials such as copper from Oman and hardwoods from the Indus Valley and trading them on to the consumers in the cities and states of southern Iraq. Exotic and luxury items were traded too, while textiles and foodstuffs travelled in the other direction (Crawford 1973), and many of these goods were bought and sold in the markets of Dilmun, bringing about great prosperity. Dilmun’s safe anchorages and ample supplies of freshwater provided additional attractions to those plying their trade up and down an otherwise waterless and inhospitable stretch of this maritime trade route.

Written evidence referring to trade during the early second millennium — the period when Bahrain’s prosperity reached its zenith — is not extensive, but the business records of some merchants have survived. One such, by name of Ea-Nasir, was based in Ur, in southern Iraq, and traded with Dilmun on behalf of a local syndicate. His main business was in copper, and his business methods included plenty of sharp practice (Potts 1988: 121–2).

The most notable feature of the archaeological heritage of Dilmun at this time is the extensive burial mounds, sometimes labelled as the world’s largest ancient cemetery. These were among the first of the island’s antiquities to attract attention from travellers with an archaeological bent (Potts 1990a: 209). As late as 1947, however, their date and significance were poorly understood, and Geoffrey Bibby was probably not the only visitor to be told they were Portuguese (1970: 23). Once the most significant feature of the Bahrain landscape, the mound-fields have all but disappeared, though the few small groups that remain continue to exercise fascination over visitors to the island. Indeed, from photographs taken when it was still possible to get lost in these ‘forests’ of tumuli, it is easy to sympathize with the early (and some later) researchers who imagined they must represent the graves of foreigners brought to Bahrain for burial: there seemed to be more than the local population of an island the size of Bahrain would have needed (Potts 1990a: 214–5). Estimates of actual numbers vary, but a figure that has gained recent acceptance is that of 172,000 mounds, of which perhaps 78% are single adult interments (Larsen 1983: 45; Potts 1990a: 215). Research has suggested that a population of no more than 18,000 souls could in fact easily require so many tombs over a five hundred year period (Frohlich 1983: 60 and table 6; Larsen 1983: 45–7).

Marked differences in the sizes of some of these tombs suggested some form of social differentiation. At A’ali, in the centre of the island, there still survives a large group of monumental mounds, up to 12 m in height. Although, inevitably, they have been robbed, these graves must once have been magnificent. They have two-storey chambers with a floor and ceiling of huge slabs of stone, and the contents were probably rich too (Frifelt 1986). There were also several particularly high mounds, also built with two storeys, among those of the Saar mound-field, some excavated in 1998 by a team from the Bahrain National Museum (Fig. 1.5).
The sheer number of graves had puzzled researchers, but there was another problem too. If the people now buried in them had lived on Bahrain, where were the remains of their settlements? Only one settlement site was generally known, Qala’at al-Bahrain, a large site on the north coast of Bahrain which has its origins in the third millennium, grew to be a large walled city in the second, and was occupied into Islamic times. A fourteenth-century Arab fort, later expanded by the Portuguese, covers much of the central part of the archaeological site, so remains of the earliest periods are deeply buried and all but inaccessible to the Danish (and later French) archaeologists who have worked there since the 1950s. Excavations elsewhere revealed temples and sacred springs, but no houses: at Barbar, a large monumental temple was found, thought to have links with those of southern Iraq (Mortensen 1986); at Diraz, a small shrine with a columned entrance (Roaf 2003); and at Umm es-Sejjur, a structure interpreted as a sacred well or spring (Bibby 1970: 81–5, Konishi 1994).

In 1989, therefore, when the Expedition was formed, information about habitation sites, as opposed to sacred or burial sites, was elusive. Several surveys had been conducted over the years, but only one was published (Larsen 1983), and though potential Early Dilmun settlement sites were indicated, rapid changes in the Bahrain landscape made it hard to locate them. An extensive rescue programme had been conducted in association with the building of new towns and road systems in the 1970s and 1980s, but these again dealt mainly with burial sites.

**Looking for Saar**

The stated research objective, to investigate a settlement, dictated the sort of archaeological site that we needed to find. Obviously, it had to be a settlement site containing remains of the Early Dilmun period, but it was vital that these remains were easily accessible, and not covered in a great depth of later deposit. To understand how a settlement works requires thorough excavation of a significant portion of the site, not just piecemeal soundings or sampling, and that is not possible if the buildings are covered with later remains that have to be excavated and preserved first. In addition—and this was harder to predict—there had to be a sufficient depth of archaeological deposit to offer at least the hope of recovering environmental data, as such information is critical to recreating vital aspects of how the inhabitants lived and worked.

Although published information was inadequate, we were fortunate in the generous co-operation of colleagues with extensive knowledge of the island, particularly those from the Bahrain National Museum, who assisted us in visiting and appraising potential sites. These included the area between the temple at Diraz and Umm es-Sejjur, but extensive modern-day disturbances suggested that too much of any possible Dilmun settlement here had already been lost. There were clear signs of settlement in the vicinity of the Barbar temple, but it was hard to assess the date and depth of the deposits and here, too, date-palm cultivation had reworked much of the ground. Near Saar, however, archaeologists working on the excavation of a burial complex had identified a settlement with pottery of the right date. In 1983 and 1985 preliminary work at the site, as yet unpublished, uncovered a temple and some other buildings, from which it was possible to ascertain not only that the Early Dilmun deposits lay right on the surface, but also that they were undisturbed, and substantial. Ancient Saar, as the site became known, met our criteria perfectly.

Two further unexcavated Early Dilmun settlements survive to our knowledge, one just south of Saar, extending over an estimated 40,000 sq.m, making it perhaps twice the size of the Saar set-

**Archaeological remains in the Saar area**

The eastern flank of the Saar ridge, which runs due south from the modern village of Saar for approximately 8 km, is home to several archaeological sites and monuments (Fig. 1.3). These have been described in the report on the Saar Temple (Saar Report 1: 18–20), and are only summarized here or updated where appropriate. Beginning from the south and working northwards they comprise:

- an extensive Early Dilmun settlement, as yet unexcavated (no.1 on Fig. 1.3);
- a cemetery with interlocking graves, called here the Southern Burial Complex and elsewhere sometimes referred to as the ‘Honeycomb Cemetery’ (no.3 on Fig. 1.3, and Fig. 1.6). Excavated and published;
- a Late Dilmun, possible Sassanian, building constructed over part of the earlier cemetery (no.5 on Figs. 1.3, and Fig. 1.7). Excavated but unpublished;
- a second cemetery, called here the Northern Burial Complex, with a mix of larger interlocking graves and stand-alone

![Fig. 1.2 Early Dilmun sites in Bahrain](image-url)
drum burials on the periphery (no.2 on Fig. 1.3, and Fig. 1.7). Since the report on the temple appeared this cemetery has been partly excavated by a team of Jordanian archaeologists. The results have yet to be published, but it should be noted that many graves were intact, contrary to what was suggested in our earlier report (Saar Report 1: 19);• the Saar settlement itself (no.1 on Figs. 1.3). Identified by survey in 1977 (Ibrahim 1982: 3), first excavated in 1983 and 1985, and then by us from 1990 to 1999;• Islamic occupation nearer to Saar village, as suggested by pottery collected and examined by Marcus Woodburn in 1992 (nos. 6 and 7 on Fig. 1.3);To this list should be added the main Saar mound-field which stretched to the west, and originally covered much of the Saar ridge behind the settlement. Very little of it is now left. The National Museum of Bahrain excavated some graves prior to their demolition for modern housing, but these remain unpublished.

Together the remains in the area of Saar constitute a unique heritage resource for Bahrain and it is to be hoped that they are preserved from further destruction.
Fig. 1.4 The Early Dilmun settlement at Saar from the air, taken in 1993 (S)

- Southern Burial Complex
- Northern Burial Complex
- The Saar Temple
- Main Street
- Block A
- The on-site offices of the Expedition
Fig. 1.5 Two-tier Early Dilmun burials along the southwestern edge of the Saar mound-field

Fig. 1.6 Part of the Southern Burial Complex

Fig. 1.7 The Northern Burial Complex
The extent of the Saar settlement

The settlement at Saar is located on a small but prominent eastern outcrop of the main limestone ridge which provides about the only natural elevation in the northern part of Bahrain (Fig. 1.8). From this spur there is an uninterrupted view eastwards towards Tubli Bay, 7 km away, and southwards to A’ali. Immediately west of the settlement, and on the highest part of the ridge, is the Saar burial field. To the north today, towards Barbar, Diraz and the north coast, the view is of a sprawl of housing, but prior to modern development it was an area occupied by relict sand-dunes (see Chapter 10).

The settlement itself runs along the outcrop northwest to southeast, for a minimum distance of 230 m. To the west, the limit of the settlement is demarcated by the appearance of bedrock on the surface. To the north, the results of test excavations showed that the settlement did not continue beyond the natural dropping off of the contours in this area, while to the east the flat plain formed a natural limit. Only to the southeast do the limits of the settlement remain unknown. Here, fragmentary stretches of wall belonging to buildings on the south side of the main road of the settlement (Main Street) were traced as far as a modern boundary wall, beyond which we could not continue. The line of the road seems to be dropping off the ridge at this point, and it is tempting to speculate that it then continues to curve round to the south, skirting the ridge and the burial complexes, before linking up with the neighbouring Dilmun settlement (see Fig. 1.3).

Bearing in mind the above, the maximum possible extent of the Saar settlement is about 23,000 sq.m (2.3 hectares). This assumes that all of the available area was utilized, though the southern ridge has suffered severely from erosion so it is not clear how much of the area upslope of the street was actually built upon. A more conservative estimate is 15,000 sq.m, based on the limits of visible remains on the surface. Of this area, we have excavated approximately 7,500 sq.m, somewhere between one third of the settlement (if the higher figure is used) and one half (if the lower); in either case a sufficient amount to retrieve a major part of the overall plan of the settlement.

Even at the early stage of excavations shown in Fig 1.4, the main elements of the settlement are already clearly visible: Main Street running up from the southeastern outskirts; the temple in the centre, at the crossroads of the settlement; and the characteristic two- and three-roomed buildings, constructed in rows (e.g. Block A). Between 1990 and 1999, over 80 buildings were investigated by the Expedition. These are described in detail in Chapter 3.

Dating

The dating of the settlement depends on comparison of the pottery from Saar with that from Qala’at al-Bahrain. This topic is discussed in detail in Chapter 6 and the chronological information summarised in Table 6.1. On this basis, the settlement at Saar lasted for approximately 300 years, beginning in 2050 BC and finishing by 1750 BC.

Eight C14 determinations were obtained from carbonised material from the settlement. Detailed information on these is given in Appendix 3. In general they confirm, but do not improve the accuracy of the dates suggested by the comparison of the pottery.

Fig. 1.8 Location and extent of the Saar settlement

Fig. 1.9 The plain to the east of the settlement (E)
The archaeological sequence at Saar

A total of 84 building numbers have been assigned to the archaeological remains found within the Saar settlement. Of these structures, 68 were excavated at least to the highest floor sequence and, in many cases, to the bottom of the latest phase of walling. The remainder were identified in plan only, or were excavated by the previous expedition and not investigated further by us. A building number was assigned where a group of areas or rooms could be seen to be separate from neighbouring units. The distinction is a horizontal one, although in one or two cases we did excavate superimposed buildings which were then given separate numbers. In five cases the number refers to single stand-alone buildings: a temple (Bldg 201), a well (Bldg 500), a large kiln (Bldg 36) and two circular structures towards the southeastern limit of the settlement (Bldgs 150 and 151).

In working out the relationships between these buildings and their relative dating we have employed what might be called the classical stratigraphic method. A sequence of building phases, block levels and site levels has been established based solely on the relationships between the archaeological units (otherwise contexts) observed in the soil. The pottery sequence, as articulated fully in the last two years of the project, has not influenced the construction of the stratigraphic sequence (even where potential conflicts are seen to be separate from neighbouring units. The distinction is a horizontal one, although in one or two cases we did excavate superimposed buildings which were then given separate numbers. In five cases the number refers to single stand-alone buildings: a temple (Bldg 201), a well (Bldg 500), a large kiln (Bldg 36) and two circular structures towards the southeastern limit of the settlement (Bldgs 150 and 151).

In working out the relationships between these buildings and their relative dating we have employed what might be called the classical stratigraphic method. A sequence of building phases, block levels and site levels has been established based solely on the relationships between the archaeological units (otherwise contexts) observed in the soil. The pottery sequence, as articulated fully in the last two years of the project, has not influenced the construction of the stratigraphic sequence (even where potential conflicts have arisen). Other artefact classes, such as metalwork, seals and softstone have not yielded chronological information that could be applied *intra* site. The samples have been either too small or too homogeneous to see the fine distinctions that would be valuable in looking at developments between phases and levels.

Normally it is not possible to rely solely on stratigraphy to establish synchronisms across an entire site. Buildings excavated in different areas may never be linked up in excavation so that there is no direct relationship between them, or where there is linkage, open areas such as streets and yards may intervene and make it impossible to follow the stratigraphy with any confidence. In such cases, it is necessary to fall back on comparing the artefacts from the different buildings in order to establish a chronological relationship. This is particularly true of multi-period urban sites.

At Saar, the nature of the settlement worked in our favour: the buildings are not spread out, but cluster together in rows sharing walls, with groups of buildings separated from one another by narrow alleyways and small squares. This has allowed us to establish clear relationships between buildings in the same row. Initially, each building has been divided into phases, each phase reflecting alterations such as a major re-laying of the floors or remodelling of the walls. Where the term ‘building phase’ is used in this book it always refers to a single building.

Neighbouring buildings often share walls. By looking at the floor sequences either side of these, connected both with the original wall and with any rebuilds, it is possible to chart relationships throughout a group of connected buildings and to establish a sequence of what we have called ‘block levels’.

Chapter 2 The archaeological sequence

Robert Killick

The definition of a block used here is a row or group of buildings with shared walls that is either separated from its neighbours on all sides by open spaces (i.e. streets or squares), or is on a different orientation. Most blocks at Saar conform to this definition, but sometimes the definition is applied a little more arbitrarily. The settlement at Saar has been split into twenty blocks (Fig. 2.1).

Once block levels had been worked out, there remained the problem of how to establish links between the different blocks. The main soil matrix within the Saar deposits, particularly in open areas, was wind-blown sand, and initially it seemed that this was going to make it difficult to trace specific horizons from one side of an open space to the other. However, when the trenches dug across the streets and squares were left open for a couple of days, the erosional force of the wind quickly scattered the sections, removing the softest deposits and highlighting lenses of mortar. The mortar lenses associated with the construction and rebuilds of buildings proved particularly useful in establishing the sequence across the open spaces.

Sixteen trenches were dug between blocks specifically to provide stratigraphic linkages (Fig. 2.1). Some trenches were dug well below the existing buildings to examine the earliest phases of the settlement. As a result, only the buildings in the southeastern outskirts of the settlement remain stratigraphically isolated. The information obtained from this work has allowed us to define four site levels, the largest and coarsest units in our stratigraphic scheme, by grouping together individual block levels across the settlement.

The first of these, Site Level 1, refers to all wall fragments and archaeological deposits that predate the construction of the blocks of buildings. Site Level 2 refers to the construction and first use of the buildings. Both these site levels were subject to only very limited investigation, since they mostly lay below later buildings and were therefore not accessible. Site Level 3 refers to the rebuilding of the blocks, an event that was consistently detected across much of the settlement. This is the main excavated site level, and nearly all the buildings with a complete plan belong to it. A few buildings and deposits were stratigraphically later than the above and have been assigned to Site Level 4. The designation (and limitations) of the site levels are discussed in more detail at the end of this chapter.

Finally, the settlement has been divided into ‘quarters’ defined by the street pattern, and labels attached to the open spaces (for example, Saar Square and Janabiyah Street). The use of the term ‘quarter’ is a geographical one and not meant to imply any functional variation. The street labels are for descriptive purposes only.

The detailed phasing of buildings and blocks is described below (Chapter 3). Here we are concerned with establishing the integrity of our major divisions (site levels), as established through the series of excavations in the open areas between the building blocks, starting arbitrarily with the Northern Quarter, and moving clockwise around the central area of the settlement. Buildings at the periphery (Southeastern Quarter) are left to last as they are isolated stratigraphically.
the early Dilmun settlement at Saar
Fig. 2.1 The Saar settlement, with the divisions into blocks and quarters, and the location of the sections excavated across the open spaces.
Fig. 2.2 The central part of the Saar settlement, showing the division into quarters and blocks, as followed in this volume (SW). Some buildings in the Southern and Western Quarters were excavated subsequent to this photograph.
Northern Quarter

Excavation across Temple Road linked Bldg 224 of the Northern Quarter with Bldg 64 of the Eastern Quarter. At the bottom of the section, there was a series of occupation deposits interspersed with sand and ashy plaster, in total 80 cm deep. These predated the appearance of the excavated building blocks and are therefore assigned to Site Level 1.

The construction horizon of Bldg 64 can be identified in the section, with its primary wall set within a deposit of crushed mortar, possibly foundation packing (Fig. 2.5). Wind-blown sand and lenses of grey and black sand then accumulated in the road before Bldg 224 was constructed on the north side. The construction horizon is very clear in the section, with a spread of mortar running across the entire width of the road. This mortar is so consistent that it may represent a deliberately laid street surface.

There is no way of measuring accurately the time lapse between the construction of Bldgs 64 and 224. The ‘in-between’ deposit in the road, some 20 cm deep, could have formed as a result of building activities related to finishing off Bldg 64, so that the construction of Bldg 224 may have begun immediately afterwards. Alternatively, the deposit may represent a gradual process of deposition in the road, taking place perhaps over a few months or years. Whatever the case, with regard to the overall occupational sequence, little separates these two buildings. They are for the most part contemporary and, in the context of our broader descriptive classes, both can be assigned to Site Level 2, representing the first appearance of building blocks in this area.

Following the construction of Bldg 224, the road level rose by some 50 cm. Within the sand in the road were thin horizontal lenses of occupation indicating a continual and gradual process at work, rather than a single depositional act. The sand gradually rose above the level of the original entrance into the building which then had to be rebuilt. Dipping lenses of sand and two stones near the doorway mark a further attempt to keep the sand out. However, the battle was inevitably lost and a major rebuild of Bldg 224 ensued: the interior floor level was raised by dumping a 75 cm thick deposit of sand over the floor. This was accompanied by the removal of the existing roofing material, the building up of the walls and then re-roofing. The event is also documented in the main south wall of Bldg 224 where blocked-in holes for roof beams were noted. This rebuild marks the division between Site Levels 2 and 3.

Bldg 64 on the south side was then renovated. This event is poorly represented in the main section where it is visible only as a thin mortar line in the road, but in the adjoining south section the rebuilds of both Bldg 64 and its neighbour to the east, Bldg 63, are clearly shown (Fig. 2.3). Shortly thereafter, further modifications were made to the doorway of Bldg 224, necessitated again by rising sand. Two external steps were added stepping down from the road into the doorway, and two internal ones constructed on the floor of the building (Fig. 2.4).

Theoretically, the renovation of Bldg 64 and final adjustments to the doorway of Bldg 224 could have been allocated a separate site level number, but we have opted instead to keep them within Site Level 3, in keeping with the broad sweep of this tier of classification.
Eastern Quarter

The Eastern Quarter is defined as all buildings south of Temple Road and east of Main Street, stretching as far south as Bldg 57. Two alleyways divide this quarter into three separate blocks (Blocks D, E and F). One building (Bldg 65) and the well (Bldg 500) are also sited in this quarter but are peripheral to our pursuit of stratigraphic links.

Internal links

Linkages between the three separate elements of this quarter are provided by excavations across the two dividing alleyways. The first of these, across Alleyway 3 between Blocks D and E, revealed unexcavated phases of Bldgs 222 and 60, represented in this section only by robber trenches (Fig. 2.6). We have assumed that this underlying early build to Bldg 222 corresponds roughly to the early build noted along the north frontage of the same block (in Bldgs 63 and 64). Walls belonging to this early phase of Bldg 60 were also found in the section across Main Street (Fig. 2.8). Both early builds are assigned to Site Level 2.

Bldg 222 on the north side was then rebuilt first, as indicated by the threshold and doorway on the north side of the section. Homogeneous sand and the act of robbing out the original wall of Bldg 60 have obscured what was happening on the south side at this time, but our interpretation is that the original phase of the building was still in use. When the time did come to renovate Bldg 60, the associated construction horizon across the alleyway lay some 15cm above the threshold height of Bldg 222. Unfortunately, layers immediately above this threshold were cut away when the interior of the building had been excavated some years before. Nevertheless, it is suggested that by the time Bldg 60 was rebuilt, Bldg 222 may have been close to abandonment.

The section across Alleyway 4 shows the relationship between Bldg 61 of Block E and Bldg 62 of Block F. Excavation within the latter showed that it was a single-phase building of relatively short duration, which was not renovated along with the others in Block F. Hence, it is assigned to Level 2. On the other hand, Bldg 61 as excavated belongs to Level 3. How this situation is reflected in the section is ambiguous. It should be noted, however, that the rebuild sequence of the walls of Bldg 61 is not clear in section, and that there is at least some variation in height between the highest floor levels of the respective buildings.

Links between Eastern and Central Quarters

To link the Eastern and Central Quarters a trench was excavated diagonally across Main Street from the entrance to Bldg 211 of Block J on the west side of the street to the entrance of Bldg 60 of Block E on the east. The resulting section covers most of the occupational sequence of the Saar settlement (Fig. 2.8).

At the very bottom at the eastern end, the corner of a building jutted out (Fig. 2.9). This building predates the construction of the later blocks and the creation of Main Street itself and is therefore assigned to Site Level 1. It extended for at least 1.2m beyond the eastern line of the later street, and was overlain firstly by a layer of rubble and then by a layer of occupation into which the walls of the first phases of Bldgs 60 and 61 had been set.

The earliest phases of these buildings (Site Level 2), dating to the initial construction of Block E, are represented by the surviving partition wall between the buildings and extensive robber trenches which removed the street frontage. This robbed-out horizon mirrors that noted for the north and south sides of the block, in the sections across Alleyways 3 and 4 respectively.

The removal of the walls makes it difficult to synchronise exactly the construction of Block E with that of Block JE on the west side. The base of the robber trench that removed the front wall of Bldg 60 (and which must correspond quite closely to the base of the original wall) lies within 10cm of the same absolute height as the base of the wall of Bldg 211, and the layers in the street between the two run horizontally. The last street surface associated with the lower build of Block E is a layer of mortar which runs from the western lip of the robber trench across the street at a level corresponding to the second threshold in Bldg 211. This threshold is only visible in the section as a thin line of mortar but was clearly articulated in excavation. Therefore, within the context of our coarser divisions the view is taken that the construction and first use of both blocks can be dated to Level 2.

Block E was then rebuilt (Level 3), a process also visible in the sections across Alleyways 3 and 4. A mortar horizon associated with the construction of the new doorway for the rebuilt house spread across the street and ran up to a substantial higher threshold of Bldg 211. A step was subsequently added to this top threshold.
Fig. 2.8 Section 3 across Main Street, linking the Eastern and Central Quarters

Fig. 2.9 The Site Level 1 wall is in the foreground, with the Level 2 cross-wall between Bldgs 56 and 57 above

Fig. 2.10 Location of Section 3 across Main Street
The relationship between the Eastern and Southern Quarters was established in a section excavated across Main Street between Bldgs 52 and 53 of Block I and Bldgs 56 and 57 of Block F (Fig. 2.11). Bedrock was reached at the bottom, at an absolute depth of 8.50 m. This compares with 8.80 m below the temple showing that there was little slope between the two prior to human habitation. Overlying bedrock was a thick layer of black sand (Site Level 1), on top of which buildings on both side of the street were constructed, to the west Bldg 52, and to the east Bldg 57 (Site Level 2).

Subsequent street horizons against Bldg 52 on the west side were made up of sand, mortar and occupation lenses in contrast to the homogeneous sand next to Bldg 57.

Bldg 52 was then demolished and Bldg 53 rebuilt encroaching over the old walls, as noted in excavation and clearly shown in section (Fig. 2.12). A mortar layer associated with this event ran across the street and up to Bldg 57 at a level that corresponds to a rebuild of Bldg 57 and a rebuild (or possible construction) of Bldg 56 to the north (Fig. 2.13). This building activity on both sides of the street is assigned to Site Level 3.

Following further depositions of mortar and sand in Main Street, a porch was added to the façade of Bldg 56, perhaps, though unproven stratigraphically, contemporary with the latest phase of the two buildings on the east side. These events have also been subsumed under Site Level 3.
Southern Quarter

The Southern Quarter of the settlement is bounded to the north by Janabiyah Street and an associated square, to the east by Main Street, and to the west by an open area marking the true edge of the settlement. The southern boundary is to some extent artificial, represented by the edge of the excavated area. The quarter has been subdivided into three separate blocks: Block I, a row of buildings along Main Street; Block L, a row of buildings along Janabiyah Street; and Block M, a disparate set of buildings around the south side of Janabiyah Square including a free standing gypsum kiln (Bldg 36). The section linking this quarter with the buildings of the Eastern Quarter has been discussed above. A further three sections were excavated, one an internal one within the quarter (Section 8), linking Bldgs 50 and 51 of Block I with Bldgs 35 and 36 of Block M, and two across Janabiyah Street to link with the Central Quarter (Sections 9 and 10).

Internal link between Blocks I and M

Excavation across the middle of Janabiyah Square demonstrated the relationship between the gypsum kiln (Bldg 36) and Bldg 35 at the western end and Bldgs 50 and 51 at the eastern end. The upper sand horizons over part of this area had been previously excavated.

At the eastern end a narrow band of ashy sand underlay all the excavated buildings and is accordingly assigned to Site Level 1 (Fig. 2.14). The earliest phase of Bldg 51 was built over this sand, with a construction horizon at 9 m suggesting that it was close in time to that of Block E (at 9.2 m) and Block JE (at 9.3 m up by the door into Main Street).

Between 15 and 30 cm of grey sand built up against the boundary wall of Bldg 51 before Bldg 48 was constructed, running at an oblique angle through the section (see Fig. 3.231 for location of Bldg 48). These phases of Bldgs 48 and 51 were otherwise contemporary with an external occupation horizon connecting them. Within this horizon was a plastered sunken pit or basin (Fig. 2.15).
West of Bldg 48, a stretch of cut-down wall provided a link, in
cavation, but not in section, to the lower phase of Bldg 35 of
Block M. All these phases are considered contemporary and
placed within Site Level 2.
Bldg 48 was then demolished and Bldg 51 at the eastern end
rebuilt, indicated by a distinctive bulge in the wall (Fig. 2.16). Grey
plaster lenses sloped down from the wall face and two more plas-
tered basins can be seen cutting through the earlier example. At the
western end, Bldg 35 underwent a major rebuild at roughly the same
time. This event is not shown in section, but was established by ex-
cavation (Fig. 2.18). These events are assigned to Site Level 3.

Fig. 2.15 Superimposed basins in section across Janabiyah Square

For the first time in any of the sections examined so far, a dis-
tinct building phase subsequent to Site Level 3 is evident. At the
eastern end, the alleyway linking Janabiyah Square to Main Street
was enlarged by demolishing Bldg 49 (see below) and constructing
Bldg 50 against the north wall of Bldg 51. The northwestern wall of
Bldg 51 was reused and rebuilt. At the western end, Bldg 36, iden-
tified as a gypsum kiln, was also constructed, by which time neigh-
bouring Bldg 35 was unoccupied. Both these events are placed in
Site Level 4, though it should be noted that no direct link was
established between them.

Links between Southern and Central Quarters

Janabiyah Street: eastern end
The section across the eastern end of Janabiyah Street was only
evacated to the base of latest walls, so that information about the
early phases of the buildings is absent (though this is provided by
the other sections and to some extent by excavation).
The earliest event is the construction of a wall belonging to
Bldg 49 set upon a mortar raft (Fig. 2.17). Bldg 49 is known only
from excavation of this section and its presence here shows that
at this time Janabiyah Street became quite narrow where it joined
Main Street. It is possible that Bldg 49 had an earlier build corre-
sponding to that noted for other buildings in the vicinity.
This was followed by a rebuild to the southern wall of Bldg 211,
set on its own raft of mortar. These phases of Bldgs 211 and 46 are
considered contemporary. On the basis of our previous discussion
of the section across Main Street, which also included Bldg 211
(see Fig. 2.8), both are placed within Site Level 3.
Subsequently Bldg 49 fell into disuse or was demolished, an
event marked in the section by a layer of rubble, and it was only
after this that Bldg 50 was constructed, its wall sitting on the de-
bris of the earlier building. A layer of black sand associated with
Bldg 50 ran across the section and over the robbed-out wall of
Bldg 211, indicating that this building too was by now dilapidated.
This last point is not shown in section, but was noted during the
evacation of the building.
Bldg 50 has already been assigned to Site Level 4 on the basis
of the internal linkage between Blocks I and M of the Central
Quarter and it can be seen that the same applies here. This closes
satisfactorily the stratigraphic circle which includes the Eastern,
Southern and Central Quarters, as shown in the sections across
Main Street.

Janabiyah Square: western end
A second link was established between the Southern and Central
Quarters by excavating across the western end of Janabiyah Square
between Bldg 33 of Block L and Bldgs 4 and 9 of Block KS
(Fig. 2.19). In excavation Bldg 4 had a construction phase and a
rebuild phase.
The earliest event was the construction of Bldg 4 on the north
side. This is best illustrated in the photograph of the north section
where the lower build of the wall is visible (Fig. 2.20). To the east of
this wall, a robber trench indicates the presence of another building
of this early phase. The depth of the robber trench suggests that
the construction horizon of this building may be matched approxi-
ately to the construction of Bldg 33 on the south side. The con-
struction of Bldg 4 and of Bldg 33 are both placed in Site Level 2.
One major rebuild was observed during the excavation of Bldg 4.
This was visible in the street wall and represented in section by the
threshold in the doorway of the building (Fig. 2.20). On the south
side, Bldg 33 did not appear to have undergone any major rebuild,
but had a sequence of three superimposed thresholds in the door-
way (Fig. 2.21). The third threshold in the sequence corresponded to
the Bldg 4 rebuild. These events are assigned to Site Level 3.
Subsequently, a stretch of street wall on the north side of the
street was robbed out and Bldg 9 constructed over it. The evidence
of excavation (where Bldg 9 was built over Bldg 10 of the Central
Quarter) and of the section suggests that Bldg 9 was a late con-
struction, built at a time when many other buildings in the area
were at least partly abandoned. An external surface linked Bldg 9
with the use of Bldg 36, the gypsum kiln, to the east. Accordingly
it is placed in Site Level 4.

Fig. 2.16 Section across Janabiyah Square with the wall of Bldg 50
abutting the rebuilt phase of neighbouring Bldg 51 (indicated by the
bulge in the wall)
Fig. 2.17 Section 8 across Janabiyah Square, linking Bldg 50 of the Southern Quarter with Bldg 211 of the Central Quarter

Fig. 2.18 The lower phase of Bldg 35 is in the foreground (Site Level 2), with the rebuild behind (Level 3) and the high curving wall of the gypsum kiln (Bldg 36) on the right (Site Level 4)

Fig. 2.19 Section 10 across the western end of Janabiyah Street, linking Bldg 9 of the Central Quarter with Bldg 33 of the Southern Quarter

Fig. 2.20 Bldg 9 was a late construction against the eastern wall of Bldg 4, as shown by the height of the latest threshold of Bldg 4 vis-à-vis the base of Bldg 9

Fig. 2.21 The sequence of three thresholds in the doorway of Bldg 33
Central Quarter

The Central Quarter makes up the largest single block of buildings in the settlement. It is bounded on the north side by the alleyway that runs along the south side of the temple and on into Saar Square, on the east by Main Street, on the south by Janabiyah Street, and on the west by an open area that forms the outskirts of the settlement in this area. From the layout, there appears to be a clear division into an eastern half (Blocks JE, JB and JC) and a western half (Blocks KS and KN), indicated by the offset in the line of the buildings along the streets and by the uninterrupted wall dividing the two.

The Central Quarter is a large area to connect stratigraphically. Two sections excavated against the main dividing wall both indicated a lower and upper phase to the associated buildings. By and large, however, the buildings in this quarter were not excavated below their latest phase, so its early history cannot be determined with much confidence.

The links between the Central Quarter and its neighbours to the east and south have already been discussed. Two excavations to the north, one across Saar Square and one slightly further east across South Alley were undertaken to establish links with the Northern Quarter.

Link between Central and Northern Quarters

In the section across Saar Square, some 85 cm of deposit, mostly clean sand, lay below the earliest walls identified (Fig. 2.22). Bedrock was not reached. These pre-building levels have been assigned to Site Level 1. We are here quite close to the ‘core’ of the settlement where there is the deepest accumulation of cultural material pre-dating identified buildings, as illustrated by the sounding within the temple where there was over 1.5m between bedrock and the earliest wall.

Bldg 5 with its lowest threshold was then constructed and the mortar horizon associated with this event can be traced northwards where it is a good half-metre below the wall of Bldg 303. Although we undercut the wall of Bldg 303 in an attempt to find an earlier, perhaps robbed-out precursor, we were not successful. This earliest phase of Bldg 5 is assigned to Site Level 2.

Another threshold was then inserted into the doorway of Bldg 5. The section next to the door is interrupted by a later pit, but as interpreted this phase still predates the construction of Bldg 303 on the north side. This is followed by a major rebuild of Bldg 5 in which the doorway was blocked. This was accompanied by other internal changes that were noted in the excavation of the building. There is at this point no single continuous horizon running across the square, but our interpretation is that the south wall of Bldg 303 was constructed simultaneously or a short while after. For the purposes of our broader divisions both have been assigned to Site Level 3.

The second link across South Alley, between Bldgs 7 and 207, mirrored the sequence above. There was definite evidence on the north side for an underlying earlier phase of Bldg 207 (Site Level 2): the main wall of this early phase had been robbed out but the cross-wall survived (Fig. 2.23). The existence of this lower phase here is a point in favour of presupposing one for Bldg 303. On the south side, as the sand in the alleyway built up, the original doorway into Bldg 7 became unusable and was blocked up, an event corresponding to the rebuild of Bldg 207. These events are assigned to Site Level 3.
Western Quarter

The Western Quarter comprises all those buildings which are arranged around Diraz Square. The quarter is delimited on the east side by Main Road, to the south by South Alley, with an open area stretching along the west side of the block and marking the limit of settlement. It includes the row of buildings to the rear of the temple (Block P), Blocks Q and R along the west side, and Blocks A and B on the east side. The temple is also included in this quarter, to a certain extent arbitrarily but mainly because the only building it is directly linked to is Bldg 206 of Block P.

Three sections were excavated to investigate the links between the different blocks that make up this quarter: one across the southern end of Diraz Square between Bldgs 207 and 300 (Section 13), a second across the main part of the square, between Bldgs 300 and 203 (Section 15), and the third across the alleyway which separates Block A from the temple (Section 14).

External links with the Southern Quarter have been discussed above. A single section across Main Road was excavated to examine its relationship to the Northern Quarter (Section 16).

Internal link between Blocks P and Q

In excavation it was clear that Bldg 300 was abandoned by the time neighbouring buildings and blocks underwent the major rebuild that divides Site Levels 2 and 3. The section across the southern end of Diraz Square also suggested this (Fig. 2.24). The earliest event in the section is the construction of the southeastern wall of Bldg 300 (Site Level 2), set into an earlier deposit of occupation. Subsequently, layers of sand and mortar lenses accumulated against this wall, and Bldg 300 was occupied for sufficient time to allow a sequence of thresholds to build up in the main door. A thick deposit of sand levelling on the south side accompanied the rebuild to Bldg 207 and the upstanding phase of Bldg 303 (both assigned to Site Level 3). Associated with the build-up of deposits in Diraz Square at this time were three pits, indicating that this part of the square was a work area, as also suggested by the presence of a plastered sunken pit within the excavated area of the trench.

Internal link between Blocks Q and A

Some 55 cm of occupation predated the construction horizon for Building 300, as represented by the lowest threshold shown on the west side of the section which had been set within a foundation trench filled with hard mortar (Fig. 2.25). A narrow band of crusty sand built up against this threshold. The threshold was then replaced by a higher one which seems to have had an additional external step. The process of sand building up in the square continued, necessitating a third and final threshold in the doorway. This was laid over a bedding of mortar that was traced across the square and underlay a deposit of mortar 40 cm deep on the eastern side. This mortar horizon was associated with the rebuilding of Bldg 203 on the east side, with its door threshold visible in section, and also with the excavated phase of neighbouring Bldg 202 (Level 3). A higher threshold was added later to Bldg 203. Consequently Bldg 300 is placed entirely within Site Level 2, with the later Bldg 202 assigned to Site Level 3.

Fig. 2.24 Section 13 at the southern end of Diraz Square, linking Bldg 207 with Bldg 300

Fig. 2.25 Section 15 across Diraz Square linking Bldgs 300 and 203 of the Western Quarter
Internal link between the temple and Block A

The internal development of the temple has been described elsewhere (Saar Report 1). The original construction (Phases 1–2) was followed by one major rebuild (Phase 3) and subsequent minor developments (Phases 4–6). The section across North Alley established the relationship of Bldg 202 to the phases of the temple (Fig. 2.27).

About 80 cm of clean sand accumulated in the alleyway against the original build of the temple. Above this wall was the foundation raft associated with the main rebuilding of the temple walls. Lenses of mortar running across the alleyway show that Bldg 202 was constructed slightly before the temple renovation was undertaken. The building does not appear to have any early phase: there is no walling, nor sign of a robber trench, and nothing in the street deposits to indicate an underlying building. This is a curious anomaly as it bucks the trend noted elsewhere for the street and block pattern to remain constant. The initial construction of the temple is assigned to Site Level 2, with the temple rebuild and construction of Bldg 202 in Site Level 3.

Link between Western and Northern Quarters

The final link in our chain, bringing us full circle, is the section across Main Road linking the Western Quarter to the Northern Quarter (Fig. 2.28).

At the base of the section connecting Bldgs 202 and 220 was a cut-down wall which predated the construction of the excavated building blocks (and therefore assigned to Site Level 1). It was sealed by a layer of black sand above which Bldg 220 was then constructed on the east side. This building has a long occupational history, but the section does not provide any additional information on this. A thick layer of clean sand accumulated in the road against Bldg 220. The sand matrix was essentially clean wind-blown sand devoid of traces of human activity, mirroring the equivalent deposit seen in the section across North Alley. On the western side, this section confirms the absence of an early version of Bldg 202 as noted above.

From the section alone it is not possible to link the construction of Bldg 202 directly to a particular phase of Bldg 220. However, by working anticlockwise from Bldg 302 to the temple to Bldg 220, it is possible to observe a correspondence with Phase 4 of that building. Rather neatly, that phase is the one in which Bldg 220 underwent its major rebuild, and one that was assigned to Site Level 3.

What is also not shown in the section is the subsequent demolition of Bldg 220 and the construction of two buildings (Bldgs 221 and 223) over the infilled remains. These correspond with the latest phase of the temple, and in common with other buildings that postdate the rebuilt blocks have been assigned to Site Level 4.
Southeastern Quarter

The Southeastern Quarter, towards the outer edge of the settlement, is stratigraphically isolated from the rest of the excavated blocks. The gap on the plan of the settlement (Fig. 2.1) between it and the buildings to the north is artificial. Excavation between demonstrated that Main Street was continuous, with a row of buildings on either side. This area was subsequently eroded by the course of a wadi and only one building phase survived, just above bedrock and possible equivalent to Site Level 2 elsewhere (Fig. 2.29).

The Southeastern Quarter is made up of a single row of buildings on either side of Main Street (Blocks G and H). The internal sequence in the excavated buildings seemed to mirror that noted for the other blocks: an initial foundation, with the buildings undergoing one period of rebuilding. In some buildings there is evidence for a further period of use. Limited excavation in Main Street against the outside wall of Bldg 109 illustrates the construction and rebuild sequence (Fig. 2.30).

Consequently, in broad terms, the initial construction of the area may be placed within Site Level 2. It is clear that Site Level 1 does not really exist this far south, as would be expected anyway from the topography of the settlement. The relative shallowness of the Site Level 2 deposits might also suggest that the buildings of the Southeastern Quarter were founded significantly later than those closer to the centre of the settlement, but other factors, such as differing rates of sand deposition at this sheltered southern end, might also have had a significant impact. Without a direct stratigraphic link, and with no variation in assemblage, such synchronisms must remain inexact.

Summary of stratigraphy

The broadest division of our classification system (site levels) should reflect major markers in the history of the settlement. On this basis, and following the examination of the street sections, a division into four site levels is proposed.

The main reference point is the establishment of the building blocks, the temple and the street pattern of the settlement. Below this point we can see that a different pattern of buildings existed. The evidence is minimal and fragmentary since excavations did not generally proceed below the extant buildings but, most importantly, it does shows that both the temple and Main Street were innovations. Therefore, all occupation and wall fragments underlying the establishment of the building blocks and street pattern have been assigned to Level 1.

Level 1 walls were found in the street section between Blocks E and J, underlying the temple, southwest of the temple in Diraz Square and at the southwest end of Block C. There were no Level 1 structures below Blocks F, G, H and I, nor below the northeastern end of Blocks C and D. In each of these cases, bedrock lay directly below Level 2 buildings, with minimal deposits in between. Although bedrock was not reached in Blocks K, L and M, circumstantial evidence suggests the same applies to these blocks.

Therefore Level 1, as defined, is restricted to the central area of the site and corresponds as might be expected to those areas with the greatest depth of deposit (Fig. 2.31). There are two qualifying comments. In the temple, deposits associated with the Level 1 wall and substantial occupation horizons below have both been conflated into Site Level 1 (Saar Report 1: 24 and [125]). Secondly, it cannot be demonstrated that all Level 1 deposits are contemporary; the association is that they all predate the blocks.

Site Level 2 represents the foundation of the temple and of nearly all the blocks, i.e. Blocks A to F, I to J, the eastern ends of K and L, and P and Q. It is assumed (but not proven stratigraphically) that Blocks G and H were also founded at some point within Site Level 2.

Where construction levels were reached, the street sections showed that the blocks were constructed quite close together in time. For example, between the construction of Block D and that of Block C 20 cm of sand had accumulated in Temple Road, while only 10 cm of grey occupation separated the construction of Block K from that of Block L. We do not know what time-span is represented by these deposits. Our interpretation, however, is that Site Level 2 represents a period of redevelopment and rapid expansion of the settlement.

By and large, the Level 2 blocks each underwent one major rebuild, as opposed to minor episodes of reflooring or small architectural adjustments.
This is true not only of the buildings grouped around the temple, but even of those in the Southeastern Quarter. These rebuilds have been assigned to Site Level 3. The nature and extent of the Level 3 rebuilds vary from block to block. Generally, they respect the earlier house and block boundaries. Some buildings however, were not rebuilt but left abandoned (e.g. Bldgs 62, 226 and 300), and elsewhere new buildings with a radically different plan appear (such as Bldg 53). It is a natural consequence of the way buildings were constructed in rows with shared walls that major rebuilds had to be done across a block at the same time, and although the rebuilds to different blocks did not start from exactly the same archaeological horizon, the difference is generally of the same order of magnitude as in Level 1. It should be noted however that it is an oversimplification to place all these rebuilds into Level 3 and, by doing so, we are disguising what is a more complicated process of redevelopment that was probably both ongoing and piecemeal.

The street sections also demonstrated that there were some buildings in the settlement that postdated Level 3: the kiln (Bldg 36) and Bldg 50 in the Central Quarter, and Bldg 9 on the opposite side of Janabiyah Street. To this list, may be added Bldgs 221 and 223 constructed above the abandoned remains of Bldg 220 of Block C, and the final phase of the temple. These are assigned to Site Level 4. Many other buildings contain occupation horizons and sometimes minor construction that appear to postdate the latest main phase of occupation (i.e. Level 3). Nevertheless, Level 4 is viewed primarily as a period of contraction within the settlement. Again, the relationship between these scattered Level 4 horizons again cannot be determined exactly. The association is that they all postdate the Level 3 rebuilds.

The results of tying in the street sections with individual building phases, block levels and site levels are given in Table 2.2. Although this looks complicated, what it actually shows is that nearly every building that we excavated in entirety at Saar (as opposed to the incomplete plans of underlying buildings or phases) is contemporary and within Site Level 3. Consequently, most of the building plans illustrated in the next chapter are also contemporary, and it is worth bearing this in mind should the complexities of phases and levels appear to be confusing.

### Relationship to the pottery sequence

Site Levels 1–4 are markers that relate solely to the developmental history of the buildings and not to seriations of other components in the archaeological assemblage. In particular, they must be distinguished from the ceramic divisions suggested by the pottery seriation. The ceramic divisions are referred to in this volume as Pottery Periods 1–4, also from bottom to top (see Chapter 6). The theoretical relationship between Site Levels 1–4 and Pottery Periods 1–4 is shown on Table 2.1. The actual relationship is less clear-cut, with Pottery Period 2 and 3 material appearing in both Site Level 2 and 3. In spite of this, the temptation to tinker with either the stratigraphy or the seriation has been resisted.

<table>
<thead>
<tr>
<th>Site Level</th>
<th>Pottery Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>not seriated</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>not seriated</td>
</tr>
</tbody>
</table>

Table 2.1 Theoretical relationship between site levels and pottery periods

![Fig. 2.31 Hypothetical extent of central part of the settlement in Site Levels 1–3](image-url)
### Table 2.2 Relationship between site levels, block levels and building phases, arranged by settlement quarter

(‘+’ indicates the presence of wall fragments predating the construction of the blocks)
Chapter 3  Individual buildings in detail

Robert Killick

Introduction

The buildings in the Saar settlement are described in this chapter block-by-block, starting with Block A north of the temple, moving clockwise (and usually alphabetically) around the settlement down the east side of Main Street, back up the western side, through the Central and Western Quarters, and finishing at Block N on the western side of Diraz Square. For each block, a plan of the main excavated block level is provided, together with a small schematic diagram showing the location of each block within the settlement and a short summary of the main characteristics of the block, including its development. Individual buildings in a block are then described in sequence starting at one end and finishing at the other. As far as possible this usually follows a logical numbering sequence, e.g. the buildings of Block A are described from south to north as Bldgs 202, 203, 204 and 205.

One of the main difficulties of writing an archaeological report in this electronic age is to decide how much material to include in a published report such as this one. This is a particular problem in describing the excavation of the buildings at Saar, where the similarity of buildings, installations and finds lends itself to the recital of repetitive detail, even when the text is reduced to a minimum.

The solution adopted here is to provide the reader with two ways of reading through this chapter. For each building, a short summary of the main characteristics and history is given at the start in a shaded box. For most readers’ purposes, navigating from box to box will provide sufficient information on the excavated buildings (supplemented, of course, by the illustrations).

The text after each box provides a second level of description, focusing in more detail on the architecture, phasing and domestic installations. This, it is hoped, will meet most of the requirements of those readers with a particular interest in the subject. There remains material for which there was still no space or which is better presented electronically. The location and distribution of household objects in each building, for example, are mentioned only in passim and are not described systematically. As mentioned in the preface to this volume, this information is stored electronically, and will be found in the site database and GIS (see Appendix 2).

All the building plans are at the same scale (1:150) which was chosen to allow individual buildings and blocks to fit across the page (hence the large format of the book). Inevitably at this scale some of the finer details of the buildings and installations are not visible and, to compensate for this, extensive photographic coverage has been included for each building. Detailed floor and installation plans form part of the Saar paper archive.

Finally, it should be noted that the terminology used in this chapter sometimes pre-empts that of Chapter 4, particularly where ‘standard’ plans and installations are mentioned. Fortunately, the remarkable degree of similarity in building form and installation type at Saar is, on the whole, self-evident.

Fig. 3.1  The central part of the settlement (SW)
Block A, part of the Western Quarter, lies directly north of the temple. It is a row of four buildings lining the eastern side of Diraz Square (Bldgs 202–5), though the first three of these share a common enclosed space making the architectural division into separate buildings less clear than usual. The block lines Main Road to the east, North Alley to the south, and Diraz Square to the west. On the north side it is abutted by the walls of Bldg 208 of Block B. The block presents a blank façade on the eastern side where it fronts Main Road, showing that the orientation of the buildings was not in this direction but to the opposite side out into Diraz Square. Access to all buildings was only from this square: none of the buildings had a rear access.

The earliest levels of Block A were exposed in the sections across the street, but were in general not excavated within the buildings. The exception to this is Area 229 of Bldg 202. The limited evidence from the street sections presents a mixed picture of the block at this time: precursors of the northeast and southeast perimeter walls of the block were not identified, while on the southwest side, there was some evidence for an early phase of Bldg 203, but not of Bldg 202. This earliest material has been assigned to Level A1.

The succeeding level (Level A2) is the main excavated level of the block. Bldg 202 at this time was a two-roomed unit with an outer room that forms a dog-leg around an inner room. It did not contain any cooking installations. In this level Bldg 202 also shared a common rear yard with Bldgs 203 and 204, one that was subsequently partitioned off in such a way that Bldg 202 had exclusive use of one part, while Bldgs 203 and 204 retained the shared use of the rest. Bldg 203 had two rooms not arranged in quite the same pattern as normal, as well as access to the yard. In the outer room, Area 228, was a suite of cooking installations. Bldg 204 had a more normal arrangement of outer and inner room, and Bldg 205 at the north end of the block was a self-contained three-roomed unit with outer room, inner room and rear yard.

Subsequently, there was evidence of temporary re-use of the buildings, particularly in the shared rear yards of Bldgs 204 and 205 (Level A3).
Building 202

Bldg 202 is the southern-most unit of Block A. The building was partly excavated by the previous expedition and our work was restricted to completing the excavation of each room down to the latest floor. Thus it only has one excavated phase, though the sections across both North Alley and Main Road did not reveal any antecedents to the main walls of the building.

It has three distinct areas. The entrance from Diraz Square leads into a long, narrow room (Area 246) which jinks around an inner room in the eastern corner (Area 225). A doorway leads out into a third area at the rear. This yard was originally shared with Bldgs 203 and 204, but was subsequently and rather awkwardly partitioned (Area 227).

In its final form at least (Phase 1.2), there was an absence of any cooking installations in the building. This contrasts with the other buildings in the block, and suggests Bldg 202 was not functioning as an entirely separate household at this time.

Phase 1

The building was entered from Diraz Square through a door at the western end. The lowest floor (Phase 1.1) was a compacted sandy floor with ashy patches, sinking down in the middle where there was more activity. In the southwest corner the floor had a deposit of calcified vegetal material heaped over it, concealing a large storage jar set into the floor. In Phase 1.1, a semicircular plastered basin lay further inside the main room and, next to the door into the inner room (Area 225), a low stone ledge similar to examples from other buildings (e.g. Bldgs 53, 56, 100, and 204).

By the time the floor was replastered (Phase 1.2) the storage jar was no longer used. During this phase, a short stretch of stone wall or bench appears immediately inside the doorway. It was crudely built and survived to a height of 50 cm. It is in an odd position for such a feature and there are no good parallels in other buildings. The inner room (Area 225) was empty of features. Over the western half of this room was a deposit of decayed vegetal matter (in retrospect perhaps collapsed ceiling material). The rear yard was shared with the neighbouring buildings, but in the final phase of occupation (Phase 1.2) it was divided by a narrow curving wall. The part assigned to Bldg 202 (Area 227) was devoid of installations, in contrast to those parts allocated to Bldgs 203 and 204. It is to be hoped that this curious partitioning of a common space was the result of a benign event (such as the division of an inheritance), rather than the result of a un-neighbourly quarrel.
Building 203

Bldg 203 lies in mid-terrace, sharing common walls with Bldg 202 to the south and Bldg 204 to the north. In the main excavated phase (Phase 2) it had two rooms (Areas 228 and 229) and a shared rear yard (Area 231) which was subsequently divided up.

The outer room contained a range of domestic installations including a tannur, hearths with cooking pot supports, and a bench-and-basin. Following a re-laying of the floors in Phase 2.2, the inner room too appears to have been used for food preparation. Although the rear yard was subsequently partitioned, access still remained between Bldgs 203 and 204.

The building had an early phase (Phase 1) which was investigated only in the inner room. Here, the cooking installations were preserved in excellent condition (Fig. 3.9). The plan itself is fragmentary and difficult to interpret, but it is clear that it was significantly different from that of Phase 2.

Apart from the problem of understanding how the shared rear space worked, the Phase 2 building is a typical one for Saar, with a range of installations commonly found in other buildings.

Phase 1

In Phase 1 Area 229 was not an enclosed room but had openings on both the southwest and northwest sides. As excavated this leaves a free-standing block along one side. This seems an unlikely occurrence, and may be explained as being a remnant of earlier walls that have been partly robbed out and rebuilt. A group of domestic installations lay along the southeast wall: a cooking pot support and hearth, located closest to the doorway in the southwest corner; an adjacent semicircular hearth; and a raised plastered oval. One of the cones of the cooking pot support had fallen off its setting but was otherwise intact. In the eastern corner of the room was a rectangular area of flat-topped stones, perhaps a workbench or stand. The plan of the rest of the building in this phase remains unknown.

Phase 2

Bldg 203 had three distinct areas in this phase: an outer room (Area 228), an inner room (Area 229) and a shared rear yard (Area 231). Entrance to the building was from Diraz Square through a doorway with neatly-plastered doorjambs which led into the outer room (Area 228). The neck of a pottery vessel had been set into the wall to the south of the door. Presumably it was part of the door equipment, perhaps the fixture for a bolt or bar. Along the southwest wall was a rectangular bench-and-basin which had been replastered three times, a semicircular hearth with...
two settings for jar supports, a horseshoe-shaped jar support and hearth made up of stone and plaster and, in the corner, a tannur with a stone surround and cylindrical pottery lining.

In Area 229 at the end of Phase 1, the doorway in the southwest wall was blocked off, the floor level raised and a threshold and new section of wall added on the northwest side to form an enclosed room. Within the room on the northwest wall was a square stone bench with an oval indentation in the top. A stone bench or jar stand, with a complete pot set within it, lay along the south wall. Within the fill of the pot were seven fragments of seal impressions and copper fragments (Saar Report 2: 85, sealing 1622:04). A hollow in the top of the bench may have been the setting for another vessel.

The floor of the inner room was replastered (Phase 2.2), and superimposed over the Phase 2.1 jar stand was a semicircular area of rough stone built as an emplacement for a large grindstone. A second grinding stone lay on top.

The rear yard was divided up at this time (Phase 2.2), and the part assigned to Bldg 203 became a small confined area which was still linked to Bldg 204. It contained a plastered sunken basin. The floor of the yard slumped down considerably into the south corner where it stopped abruptly, giving way to an irregular-shaped depression filled with clean sand. Traces of scorching and concentrations of ashy material in this same area suggest that this may have originally been a fire-pit.

**Phase 3**

Above the sand blown into Area 231 after the abandonment of the building were four circular hearths and a layer of occupation debris, attesting to a temporary and ephemeral use of this area prior to the final collapse of the walls.
Building 204

Bldg 204 is also in the middle of Block A. It has an outer room (Area 233) and an inner one (Area 234), as well as access to part of the shared rear yard (Area 232). It was excavated only to the latest floor (Phase 1.1). A curious and partial rebuild of the wall in the north corner of the rear yard suggested a later reoccupation of the building (Phase 1.2). The outer room was a busy work area, containing a suite of domestic installations used for food preparation and cooking. The inner room, with a clean plaster floor and the remnant of only a single installation, served perhaps as a storage area.

Phase 1

During Phase 1, the outer room had several domestic installations crammed into the available space. Inside the entrance from Diraz Square, immediately on the left, was a rectangular bench-and-basin. The basin was made from a re-used jar and covered with two coats of gypsum plaster. Next to the door into the inner room (Area 234) was a cooking pot support made of plastered cones, with a semicircular hearth in front. Both were constructed up against the side of a tannur.

The cooking pot support had three cones, one against the southern face of the tannur, one against the wall, and the third free-standing. These formed a support behind the semicircular hearth, which had a baked base and raised plastered rim.

On the right of the entrance into the inner room was a low ledge made up of a single plastered stone and, next to it, an area of flat stones. Scorching of the stones indicated a localised fire. Two further groups of stones were found, one along the eastern wall and one in the southeast corner, both laid to form flat surfaces. Scattered on the floor around the group of stones in the southeast corner were six pieces of worked stone. In the northern half of the room there was a fire-pit with heavily scorched sides and base. The main floor had a hard grey surface, which had worn through next to the doorways, and had been patched several times near the basin where it had perhaps suffered water damage. Given the presence of so many domestic installations, it is not surprising that the main floor was dirty and had a lot of refuse on it, concentrated particularly in the northeast corner. In contrast, the floor in the inner room was clean and devoid of features, except for an area of grey plaster which lipped up to a circular feature that had been removed subsequently.

In the western corner of the rear yard (Area 232) there was a plastered sunken basin. This appears to have had a secondary use as a rubbish dump since its fill included deposits of soft, fine lenses of ash with burnt bone, shell, and redeposited tannur fragments. Two shallow depressions were noted in the floor, perhaps settings for storage jars.

Phase 2

Bldg 204 had two horizons post-dating the Phase 1 occupation. In the rear yard there was a single burnt scoop in the sand, and in the outer room a deposit of ash mixed with bone (Phase 2.1). Subsequently, the rear yard was used for temporary cooking activities (Phase 2.2): there were two scoops of burnt sand, one lined with broken plaster fragments, and one stone-lined hearth. Associated with this late horizon was a T-shaped section of wall in the north corner. This sat on sand and had no associated flooring, but its position and alignment suggests it is a rebuild of the underlying Phase 1 wall and represents a late though ephemeral reoccupation of at least part of Bldg 204.
Building 205

Bldg 205 lies at the northwest end of Block A. It is a three-roomed building, with outer room (Area 236), inner room (Area 235) and enclosed yard (Area 237). The rear yard has a small alcove in the southeast corner. In Phase 1, mostly unexcavated, the internal arrangement of rooms differed slightly from the excavated Phase 2 plan, with the cross-walls located further to the northeast.

Bldg 205 was one of two buildings where micromorphological analysis was carried out (see Chapter 10). This work highlighted the main activities that were carried out in each area (Table 10.4), as well as indicating which areas were roofed (Area 235, possibly Area 236 with a light roof, but not Area 237).

Following the main phase of occupation, there were several episodes of re-use of the rear yard, characterised by temporary fires and dumps of ash, and an odd rebuild to part of the northeast wall.

Phase 1

A thick deposit of sand underlay the Phase 2 floors. Limited excavation through this sand demonstrated that there were earlier floors below. The inner and outer rooms (Areas 235 and 236) were completely filled with this sand packing, but while it ran against the main external walls of the building it continued beneath the cross-wall separating the outer room and the rear yard (Areas 236 and 237). So while the external limits of the building did not alter between Phases 1 and 2, the internal division was slightly different, with the outer room originally being larger and the rear yard correspondingly smaller. A stub of walling on the northwest wall of the rear yard, and a buttress, possibly a doorjamb, on the southeast wall, indicate the original position of the Phase 1 cross-wall.

Phase 2

At the end of Phase 1, a layer of sand was put down inside the building and a new cross-wall constructed separating the outer room (Area 236) from the rear yard (Area 237). In the outer room, just inside the doorway from Diraz Square, was a bench-and-basin. The oval basin was so heavily replastered (a total of five layers of gypsum plaster were noted) that by the end of its life its original size had been reduced by almost a half. Micromorphological analysis showed an arc of water-splashed material surrounding this installation, confirming that its function was the storage and distribution of water. Around the corner, next to the door into the inner room, was a semicircular hearth with a raised plastered lip. A layer of packing was subsequently added to the room and a new floor laid down (Phase 2.2). An additional feature in the room in this phase was an oval pit with a fill of grey ash and fine charcoal.

The inner room (Area 235) was devoid of installations. The main floor (Phase 2.1) was built up of laminations of gypsum mortar, and scattered on it were eight stone tools and a carnelian bead. This room also had a second floor.

Within the Phase 2 rebuild horizon of the rear yard (Area 237), there was a square stone basin, perhaps used to mix the plaster or mortar needed in the renovations. If so, an area of gypsum plaster found on the north side may represent material slopped out of the basin during the mixing of materials.

The main floor in the yard was heavily eroded, surviving intact only against the western wall of the room. A large grindstone had been set into the floor next to the door. Against the southeast wall there was a plastered sunken basin and, within the alcove in this wall, there was a second basin that had been re-lined three times. A low-lying rectangular bench or work surface, no more than 15 cm high, lay in the southeast corner.

Phase 3

Following the initial abandonment of the building, there were several episodes of temporary re-use, characterised by dumps of burnt material interleaved with deposits of wind-blown sand. In the rear yard the eastern wall collapsed, and sealing the wall tumble was a succession of dumped occupational debris (Phases 3.1 and 3.2). After a period of further sand infilling, a new section of walling was constructed at the eastern end of the rear yard (Phase 3.3). This was slightly offset from the Phase 2 wall, but on the same orientation, respecting the earlier line of Main Road.
Block B, part of the Western Quarter, lies on the edge of the town immediately north of Block A and contains four buildings along the northern edge of Diraz Square (Bldgs 208, 209, 353, 352, from east to west). It shares walls with Block A to the southeast and Block R to the southwest so the delineation of Block B is more arbitrary than usual, but is defined as those buildings to which there is access along the north side of Diraz Square. The northern limit of Block B corresponds to the limit of settlement in this area. Excavation only 10 m north of the block revealed sloping bedrock underlying 90 cm of wind-blown sand and no anthropogenic deposits.

The main excavated level of the block (Level B2) corresponds to the main excavated level of Block A (Level A2); they are linked by shared walls, and common external surfaces in Diraz Square. There was evidence for an earlier block level (Level B1) in all buildings, but this was only investigated in detail in Bldg 208 at the eastern end, and to a lesser degree, Bldg 209. Evidence for activity post-dating the main level of occupation was quite clear in Bldg 353, where some of the walls were broken down and the building used as a ‘walk-through’ (Level B3).

Of the buildings in the block, Bldgs 208 and 209 show obvious similarities and are both interesting for the way the inner rooms (Areas 244 and 246) have been built out beyond the line of the main wall and doorway. Bldg 209 has an extra yard (Area 247), with a wide opening at the northwest end where, in its latest phase (Phase 2.3), there was a concentration of plastered basins. At the western end, Bldg 352 has a typical two-room plan, while neighbouring Bldg 303 is a variation on this theme, with the inner room lying behind and at right angles to the outer one.
Building 208

Bldg 208 has three rooms arranged in a row, with external doors at both the north and south ends. During Phase 1, a narrow passage at the north end (Area 245) led into the main room of the building (Area 242). In the north corner there was a door into the inner room (Area 246), and in the south corner another door into the third room (Area 238), from where it was possible to exit into Diraz Square. In Phase 2, new floors were put down, the installations in the central room remodelled, and the door into Diraz Square blocked off.

Phase 1

Entrance into the main room (Area 242) was from the northwest; the doorway here was obstructed by a low plastered bench or work platform, 10 cm high, with a scorched rectangular pit in front. From the position of the doorsocket it can be seen that the door swung inwards into the room, but the location of the platform would have prevented it from swinging back completely. A semicircular hearth lay next to the platform. The proximity of the hearth to the other features, as well as scorch marks in the pit, suggest that these features made up a suite of installations for food preparation and cooking. A rectangular niche had been built into the southwest wall. In the southeast corner, a single plastered stone may have been part of a cooking pot support. Careful examination of the surrounding floor failed to reveal any evidence for the existence of other supports, though they may have been destroyed by a later robbing out of the adjacent main wall of the building.

The earliest floor in the main room, which was the primary one for this phase, was hard and smooth, with little occupational debris overlying it. The inner room (Area 246) was completely devoid of all features in this phase. Its floor was compact and hard, but very uneven with irregular pitting and severely eroded, which may have been the result of water damage.

In the southern room (Area 238), a sunken plastered pit or basin was set into the floor along the south wall. This was a large feature sunk to a depth of 62 cm below the floor. In the north corner of the room was a tannur. In this phase, the socket for the door between the two rooms was within Area 242.

Fig. 3.19 External passage at north end of Bldg 208 (SE)

Fig. 3.20 Phase 1

Fig. 3.21 Bldgs 208 and 209 (SW)
Phase 2
In Phase 2 the entire building was refloored (Phase 2.1). The door in the southwest corner into Diraz Square was blocked off during this phase and the doorsocket between the southern and main rooms (Areas 238 and 242) was switched from the north to the south side of the doorway. This may have been an entirely functional procedure or might reflect some change in use of the rooms. At the same time, the northeast wall of the building was supported by the construction of a narrow buttress stretching along the internal face of the wall. The Phase 2.1 floor was the same throughout and was made up of a series of very fine plaster laminations.

In Area 238, the sunken plastered pit and tannur remained in use and no new features were introduced. In the main room, however, the installations were replaced by a different set. A fragment of the plastered edge of a semicircular hearth lay above the earlier example. This was partly destroyed by a subsequent pit. South of the niche in the southwest wall was a hearth made up of three single stones forming three sides of a square, with the fourth side remaining open. A large amount of shell and pottery was found on the floor, as well as some lumps of clay of similar composition to that used for sealings, two copper objects including a fish-hook, and stone tools.

The floor extended into Area 246 where artefacts still in position included a plaster lid and a frit bead. Out in the passageway (Area 245) there was also a robust surface, indicating that, although external, the area was sheltered and protected from the elements by the closeness of the house walls. This surface sloped down from north to south and contained a circular pit, 10 cm in diameter, possibly a post hole.

---

Fig. 3.22 Niche in southwest wall of Area 242 (SW)

Fig. 3.23 Tannur in Area 228 (N)

Fig. 3.24 Phase 2.1

Fig. 3.25 Plastered pit in Area 238 (SE)
Building 209

Bldg 209 lies adjacent and parallel to Bldg 208. It had four distinct areas: a central room (Area 241) with a small room off its north side (Area 244), a second room to the southeast (Area 240), and a long yard along the southwest edge of the building (Area 247). Area 247 is puzzling since in Phase 1 it appears to have been entirely open at the northern end unless, that is, it was protected by some more temporary structure such as a barasti fence. In this phase the building also had, unusually, two entrances at the south end, one of which was subsequently blocked off.

The building was then remodelled, an action perhaps in part necessitated by the rising sand in Diraz Square (Phase 2). One of the entrances into Diraz Square was blocked off and the other fitted with a deep threshold. The door into the northern room (Area 244) was sealed up. In the long yard, the cooking installations were not rebuilt, indicating a change in the function of the room. At the end of this phase (Phase 2.3) a group of plastered basins or pits appeared at the northern end of the building, clustered around the northern edge of Area 247.

Post-occupation layers (Phase 3) were present in the form of patches of burnt sand and three installations built high up within the wind-blown deposits.

Fig. 3.26 Blocked door in Area 241 (SE)

Fig. 3.27 Phase 1.1

Fig. 3.28 Phase 2.1
Phase 1

Only the long yard (Area 247) was excavated in its entirety down to the floor level of this phase. In the middle of the room there was a rectangular fire-pit lined with grey plaster. The sides and base to the hearth were heavily scorched and the fill was entirely of ash and charcoal. On either side of this installation was a rectangular post hole, perhaps holding the supports for a timber frame used to suspend vessels or food over the fire. A sunken plastered basin lay close to the southwest wall.

The yard was refloored (Phase 1.2) and new installations constructed: a circular hearth with an inverted jar rim serving as a support for a cooking vessel, a rectangular pit next to it and, in the southeast corner, a tannur.

In the other rooms of Bldg 209, selective excavation was undertaken at critical wall junctions to establish key relationships between the main walls of the building. The exact plan of the building in this phase is uncertain, but there appears to be several differences from Phase 1. There was originally a second entrance between Areas 240 and 241. It seems very odd to have two entrances here and odder still that one could be shut off but not the other. The western doorway has proper jambs and a doorsocket while the one at the east is a simple opening. The eastern entrance is also much wider (1.3 m); perhaps it served a different function and could be shut off with a temporary partition when not required. There was also an external doorway in Area 240, subsequently blocked, which went out into Diraz Square.

Phase 2

The inhabitants of the building, like their neighbours, had to cope with the problems caused by rising levels of sand in Diraz Square. In Bldg 208, the solution was to no longer use the door into Diraz Square. The inhabitants of Bldg 209 also blocked off one of the problem doorways, but raised the level of the other by inserting a new threshold. This allowed them to continue using the door, though it was still necessary to step down into the building. A well-preserved plastered street surface in Diraz Square ran up to the newly-blocked doorway. At the northern end of Block B, the...
rise in external levels was much less (as noted elsewhere in the settlement) so that major alterations were not necessary.

Other changes in circulation (and room function) took place during this phase. The long yard was given a new floor that was completely free of installations. Internally, the southwest door between Areas 241 and 240 was blocked, while the door between Area 240 and 247 was enlarged by demolishing the southern door-jamb.

The southeast room (Area 240) contained a cooking pot support and a semicircular hearth located next to one another in the northwest corner of the room, and a sunken plastered pit by the entrance into the central room.

The central room (Area 241) also had a new floor. The large amount of occupational debris recovered from the floor surface suggests that this area was the focus of domestic activity in the building during this phase. Positioned against the main western wall was a semicircular hearth, and by the eastern wall a fragment of a plastered basin with a stone surround. The same floor continued into the northern room where it was in excellent condition and completely clean.

The floors in all areas except Area 244 were renewed for a second time (Phase 2.2). Access to this room was blocked off, an act for which there is no apparent reason. The last floor was in pristine condition and there were no visible structural problems.

Further development within this phase consisted of another re-flooring of the central room with a hard plaster surface (Phase 2.3). In the southern room (Area 240) a thin layer of sand sat over the Phase 2.2 floor, and built on this against the northwest wall was a plastered bench-and-basin.

The floor of the yard (Area 247) was also replastered. This was heavily eroded and had survived only as isolated patches throughout the area. Set within the niche caused by the kink in the east wall was a bench-and-basin. To the north, the floor surface extended outside (Area 248), where there were three plastered pits or basins clustered around the entrance into the long yard, and two more on the northwest corner of the building. All of these had thick linings of hard white plaster. Such a concentration of features outside a building seems unusual, though this is qualified by the fact that, by and large, areas outside buildings were less systematically investigated than the buildings themselves.
Building 353

Bldg 353 is a two-roomed unit. An entrance in the northwest corner of Diraz Square leads into an outer room running the length of the building. The inner room lies at right angles, built around the shared wall with Bldg 352 to the southwest. Bldg 353 has three phases: the earliest is largely unexcavated, in the second phase it was a two-roomed unit, and by the third it was partly abandoned and used as a walk-through.

Phase 1

Material pre-dating the excavated building phase was observed in the robber trench which removed part of the main northwest wall. Here an earlier doorway was preserved, which provided access out into the open area to the north. A precursor of the wall that divided Area 703 from 704 could not be identified in the sides of the robber trench, so possibly the stone from this wall had been removed before rebuilding (as happened elsewhere).

Tacked on to the northwest wall of the building was a single rectangular room (Area 709). Access to this room was from the northern side, and there was no internal communication between this room and either Bldg 353 or its neighbour Bldg 352.

Phase 2

At the end of Phase 1, a levelling deposit of sand was put down and new floors laid. The wall which divided Area 704 from 703 was constructed at this time. In the outer room (Area 703), there was a bench-and-basin next to the internal doorway and, on the wall opposite, a semicircular hearth. A circular plastered pit lay in the northeast corner. In the inner room (Area 704) there was also a small plastered pit.

Subsequently the rooms were replastered (Phase 2.2) and the bench-and-basin rebuilt. The semicircular hearth was demolished and not replaced. Close to the bench-and-basin were fragments of a plaster rim, the remnant of a destroyed installation. In Area 709, the later robbing out of the walls had resulted in the layers of this phase eroding out and spilling northwards down the slope. There were two features in the room: a pit in the centre with two linings of hard plaster, and a fire-pit. It is not clear if this area still functioned as a room in this phase or whether it was already partially robbed on the north side.

Phase 3

Part of the main southwest wall of the building was pulled down. This happened soon after the end of Phase 2 as floor material from the neighbouring building then eroded through the gap, spilling directly over the Phase 2.2 floor.
Building 352

Bldg 352 is tucked into the northwest corner of Diraz Square. The plan of its earliest phase was not investigated (Phase 1), though a blocked doorway in the southern corner shows that it differed from the succeeding Phase 2 plan. In Phase 1 there was a third room (Area 705) on the north side, with its own external doorway. Because of the robbing out of walls, it is not clear if there was any internal communication between this area and the other rooms of the building.

In Phase 2, the entrance to the building was from Diraz Square. This led into an outer room (Area 701), with an inner room in the southern corner (Area 700). No rear doorway was identified. The room to the north was not rebuilt in Phase 2. Subsequently, the northeast wall of the building was broken down and the outer room used as a rubbish dump (Phase 3).

Phase 1

Phase 1 of Bldg 352 is known only from limited excavations inside the building carried out to investigate key wall junctions. This work showed that there was originally a doorway, subsequently blocked, in the southern corner of the building. In addition, the northwest wall of the building stopped and turned to the northeast just beyond the line of the later wall of the inner room. To the north, there was a single room with an external door (Area 709), similar to Area 709 of Bldg 353. So quite clearly there were substantial differences between the Phase 1 and Phase 2 building.

Phase 2

During the Phase 2 rebuild the door in the southern corner was blocked off. The room to the north (Area 705) was abandoned at this time: its walls were robbed out and the robber trench backfilled prior to the construction of the new northwest wall for the outer room (Area 701). In Phase 2, Bldg 352 has an outer room (Area 701) and an inner room (Area 700). Inside the external door, on the left, was a bench-and-basin. This was the only installation present in the room. A substantial buttress was added against the corner of the inner room to improve the support for the roof beams. From the outer room, a door led into the inner room (Area 700), which was also empty of installations in this phase.

The rooms were then refloored (Phase 2.2). In the outer room, the bench-and-basin was rebuilt and an additional substantial stone basin constructed against the buttress on the south wall of the inner room. Next to it in the floor was a circular depression, perhaps a setting for a jar. In Diraz Square, a plastered surface sloped down to the door of Bldgs 353 and, further east, to the door of Bldg 209, providing a firm stratigraphic link between these buildings during this phase.

Phase 3

During this phase, a section of the main southeast wall of the building was broken down so that there was now access into Bldg 353. Heaps of ash accumulated over the floor of the outer room and it is not clear whether this should be ascribed to continuing occupation of the building or to activity associated with a gradual disuse. The picture that emerges of the building at this time is that the area served as a track connecting Diraz Square to the open land to the north. Trampled areas were traced over the demolished wall of Area 701 up through Area 705, as well as through adjacent Area 709.
Block C makes up the entire Northern Quarter of the town, and is located opposite the temple at the junction of Main Road and Temple Road. At its southwest end is one of the deepest architectural sequences excavated at Saar. This includes, at the bottom of the sequence, a fragment of wall found in the section across Main Road which predates the construction of the block (assigned to Level C1) and, at the top, two buildings (Bldgs 221 and 223 of Level C5) which were built after the collapse of the surrounding buildings.

Level C2 represents the construction and first use of the excavated buildings. Not all buildings were excavated to this level, but the evidence suggests that while the perimeter of the block did not differ much from succeeding levels, the internal arrangement of rooms, particularly in Bldgs 224 and 225, may not have been the same. At the western end, Bldg 220 was formerly two separate buildings (Bldgs 228 and 229; see opposite), hence its unusual feature of having two doorways and two separate inner rooms along the Temple Road side. Adjacent to Bldg 220 was a three-roomed building (Bldg 224), and then two smaller ones (Bldgs 225 and 226). A connecting doorway joined Bldg 225 with 226. Since the internal plan of the former is unknown at this level, the significance of this is difficult to interpret.

Bldgs 225 and 226 jut out into the street narrowing the width of Temple Road at this point. Although superficially this might suggest that Bldg 225 and 226 were subsequently tacked on to the block, it is quite clear from the section across Temple Road that Bldg 225 at least is original to the construction of Block C (see Fig. 2.5).

All the buildings in the row were rebuilt (Level C3) except for Bldg 226. An examination of the rebuilds in the party walls suggests that this happened simultaneously across the block. In this
Fig. 3.40 Phase 1

level, Bldg 220 had a yard and enclosed room added at the rear, the inner room of Bldg 224 was switched to the front of the building, and access between Bldg 225 and 226 blocked off and the latter left derelict. In Bldgs 220 and 224, there was a relatively long sequence of floors associated with this level.

The buildings were subsequently abandoned gradually (Level C4). Part of Bldg 225 was utilized as a cooking area, while some areas of Bldg 220 were also still in use. A further period of abandonment occurred before the late construction of two buildings, Bldgs 221 and 222, on the site where Bldg 220 had been previously (Level C5). This coincides with the latest period of use of the temple, when five stone structures were built in the street outside. Otherwise, by this time most of the surrounding buildings, including also those of Block D, were disused and partly filled in with sand.

Block C appeared to be close to the edge of settlement in this part of the town. To determine if there were any further buildings to the north, a 10 m trench was cut directly north of Block C, beyond Bldg 220. Several occupation horizons were identified in a sand matrix. Each displayed similar characteristics: black, charcoal sand was predominant, containing decayed vegetal matter and fragments of pot, shell and bone. Within the deposits were crusty sand lenses, perhaps areas of trampling. No walls or plastered surfaces were found. Excavation eastwards beyond Bldg 226 also failed to reveal any further buildings.

Buildings 228 and 229

Bldgs 228 and 229 lie below Bldg 220. The plan of the latter building, with two doors both at the front and rear as well as a pair of inner rooms, suggested that there had originally been two separate buildings. This was also indicated by the ragged nature of the outer face of the wall to the west of the door into Area 311, indicating where an original partition wall had perhaps been demolished.

Limited excavation confirmed the presence of a robber trench and of two separate buildings. The floors of the buildings were not excavated. The section of the robber trench showed that there had been only a single associated floor running up to the robbed-out wall. This floor was 3 cm thick and sat upon a 30 cm deposit of sand infilling which represented the construction horizon of the buildings.

Both buildings had an outer and inner room. It is also clear that they shared a common area at the rear (Area 329). Whether this area was enclosed or not is unknown.

With only a single associated surface, these two buildings existed as separate entities for a relatively short time. The partition wall between them was then demolished in what appears to have been a localised event that was not accompanied by remodelling elsewhere in the building. This is indicated by the compact nature of the flooring sequence at this point. The merged building was assigned a new building number (Bldg 220), and is described overleaf.
Building 220

Bldg 220 is an amalgamation of two, formerly separate, buildings. As such, it has two front entrances, two rear entrances and two separate inner rooms. The main area of activity was the single outer area (Area 310) which, in addition to a standard suite of installations, was notable for the presence of groups of stake-holes across the eastern half. While the plan of the rear of the building remains unknown, excavations in the street outside suggest that there was at least a partially enclosed rear yard. In the succeeding phase (Phase 2), the building was extensively renovated and an additional room added to the rear (Area 315). The inner rooms at the front of the building served different purposes: one was used for the preparation food, the other for storage. A period of partial use (Phase 2.5) preceded the collapse and infilling of the building (Phase 3).

Phase 1

Bldg 220 had at least three separate areas during Phase 1: a single outer room (Area 310) running around two separate inner rooms (Areas 309 and 311). It was connected by doorways to a fourth area at the rear, which was not excavated to this phase.

Just inside the southwest doorway was part of the stone superstructure of a bench-and-basin. It had been partly destroyed by the robbing out of the wall of the inner room and by the construction of a later version directly above it. On the opposite side of the passage, a semicircular installation with a shallow rim of brown plaster may have been another jar support.

The most interesting feature of the outer room was the bustling activity in the eastern half. Here there was a circular hearth, a basin fragment, a tannur and an array of 86 stake-holes. Most of the stake-holes were circular, up to 4 cm in diameter, and with a maximum depth of 20 cm. They were cut straight down, tapering at the bottom to form a concave base. Two examples were triangular, presumably cut by palm fronds. Although some of the stake-holes appear to cluster together, for example the cluster along the eastern wall, there is no observable pattern within the clusters, though there seem to be several close pairs.

It is difficult to find a single explanation for the presence and distribution of these holes in the floor. They may not all, of course, have necessarily served the same function or have been strictly contemporary. Some groups may represent a repeated event, one pole, for example, repeatedly thrust into the floor in a slightly different place at the end of a day’s work. Some of them clearly ob-

---

Fig. 3.41 Bldg 220 Phase 1 (S)

Fig. 3.42 Phase 1

Fig. 3.43 Stake-holes in plaster floor (SW)
structured the doorway into the inner room, another puzzling aspect of their distribution.

In the eastern half of the outer room, a new floor was subsequently laid (Phase 1.2) to level up the underlying floor, which sloped down from west to east. This was accompanied by the construction of a new doorsocket inside the eastern door into the street. This floor did not extend into the western part of the room, but stopped in an abrupt line. At this point, there was a 17 cm discrepancy between the height of the new floor to the east and the old one to the west. Apart from needing to level off the floor, this reflooring may also have been necessary due to different rates of sand deposition outside the two entrances to the building. It is clear from the steps constructed against the more easterly and lower door that the sand was deeper in this area, so that a partial reflooring of the internal floor may have been necessary to improve access into the building.

Phase 2

Bldg 220 went through the same major phase of rebuilding as the two other buildings in the block still occupied at this time (Bldgs 224 and 225). The external walls of the building were rebuilt, as clearly seen in the wall shared with Bldg 224, its neighbour to the east. Internally, there were some minor modifications to the limits of one of the inner rooms (Area 311) and to the rear wall of the outer room (Area 310), but the major change was to the north. Here, the wall fronting Main Road was extended further north to create a large possibly enclosed yard (Area 314) with an inner room (Area 315).

The first steps in the renovations of the building were the demolition and robbing out of the Phase 1 rear wall of Area 310 and of the Phase 1 northwest wall of the inner room, Area 311.
The rubble from the destruction of the latter wall was spread over the last Phase 1 surface, and then further levelling deposits, including a deep deposit of sand, filled in all the rooms at the front of the building. The walls of the building were then built up, by and large, on the same lines as the Phase 2 walls, but with the following major modifications: the inner room (Area 311) was shortened by moving its northwest wall, taking away the kink in the old wall, and part of the northwest wall of the outer room was moved (Area 310). The effect of shifting the latter wall was to bring it into line both with the rear wall of Area 310 and with the partition wall of Bldg 224 to the northeast. This in effect allowed the builders to 'build through' a single wall. This is clearly seen in the southwest face of the wall separating Bldg 220 and Bldg 224.

New thresholds and doorsockets were also added to all the rooms. In the main northeast wall of the building, adjacent to the door into Temple Road, were two small niches one above the other. The lower of the niches had a plastered circular setting protruding from its rear face while the upper niche was partially lined with stone.

New installations appear in the inner rooms. In Area 311, an L-shaped stone platform was constructed at the rear of the room. A grinding stone found on top of it, together with six stone tools lying nearby on the floor, show that the room was being used for food preparation. This is very unusual: installations are rarely found in the inner rooms, although there are exceptions (Bldg 207, for example). Where they do occur, it is usually a result of re-use of the building. In the case of Bldg 220 we can speculate that the inhabitants used the inner room in this fashion because they had not one, but two inner rooms at their disposal. In the other inner room, Area 309, there were no installations, but thirteen seal impressions found on the floor show that, by contrast, it was used for storage. In the outer room, another basin was built over the Phase 1 example, illustrating the continuity between the phases. Apart from a rectangular pit with scorched sides, there were no hearths or ovens in this area.

Subsequently, several thin plaster lenses were laid down in the outer room (Phase 2.2), and there was a concentration of debris scattered along the eastern edge of the floor. In the southwest corner was a group of stone tools and a small area of stones that may have been a low platform. Both inner rooms were free of installations and debris at this time. A new plaster rim was added to the basin in the passageway out into the street and, at this level, there was a clear rectangular cut on the south side of the basin showing where the stonework of the attached bench had been robbed out.

A further sequence of floors (Phase 2.3) lay above the occupation deposit of the Phase 2.2 sequence. It was also made up of numerous thin lenses of grey plaster representing successive partial refloorings rather than a single episode. Rather than renovate yet again the existing basin in the passageway, perhaps now impractical because of rising floor levels, a new one was built in exactly the same position. To the north of the basin lay a small rectangular pit, with an uneven bottom containing a deeper circular depression. There was no trace of burning and its function is not known. Further to the northeast, the plaster scar from a circular hearth was just visible in the floor surface. The feature itself had been removed when the floor was covered over. Next to the door out into Area 314 a few rough-set stones indicate where the floor was reinforced, perhaps serving as a step up to the threshold. A second group of stones lying to the east formed a small work area or perhaps a support of some description. During Phase 2.3, both inner rooms were devoid of installations.

In the outer room there was a final floor sequence (Phase 2.4) prior to the abandonment of the building. The floor deposits comprised a sequence of thin plaster lenses, interspersed with sand, some fairly clean as if wind-blown and others grey in colour indicating occupation horizons. Adjacent to the northeast wall of the building the plaster lenses faded, leaving only the sandy occupation deposits. In the centre of the room was a hearth, directly over the one of the earlier phase. Roughly oval in plan, the plaster forming the rim merged gradually into the surrounding ground surface. Next to the door into the inner room (Area 309) was a large stone slab, perhaps a work surface, although it did not display any signs of wear and tear. The uppermost floor in the inner room, Area 311, was a skim of grey plaster. In the back part of the room, the surface became a trampled sand horizon, with the stones of the earlier platform protruding through the surface and making it very uneven. Ten seal impressions from the floor show that this room was now used as storage.

To the rear, the plan of Area 314 during Phase 2 is problematic. It was not possible to establish the northern limits of this area. A small segment of wall return in the northwest corner indicates where the limit may have been, but the wall was cut away by a later pit and, in spite of detailed examination, no further traces were found. Similarly, the eastern limit could not be identified: excavation next to the northwest corner of neighbouring Bldg 224, where a wall or robber trench might have been expected, produced a sequence of intact surfaces.

The rectangular room along the western edge (Area 315) was used for cooking. It contained a tannur which had been built on the earliest floor of the room, a circular basin lined with a hard white plaster, and fragments of what was possibly a second basin. The room was re-surfaced twice and, by the end, the installations were no longer in use.
In the large yard (Area 314), the earliest floor (Phase 2.1) was exposed only in the southern half. There were two associated features: a double bin (or basin) against the walls of Area 315 and the remnants of a circular basin that was flattened when the floor went out of use. It is possible that the features against the north wall of Area 315, comprising a rectangular bin and a circular hearth, had their origins in this phase since excavation stopped at Phase 2.2 in this room.

A sequence of undulating occupation deposits interspersed with fragments of floors subsequently spread over Area 314 (Phases 2.2–2.5). Many of these were only partially excavated. Lying in an area of clean sand within these deposits were the articulated skeletons of five sheep, including one lamb. It could not be established stratigraphically whether these sheep were contemporary with the buildings or whether they had been cut in from a higher level, as they were lying within clean sand which also lay above and below them. However, even if intrusive, there is no reason to think that they were not buried within the lifetime of the settlement.

The last surfaces in Area 314 associated with the occupation of Bldg 220 were found only in the southeast corner (Phase 2.5). Here there was also a cooking pot support and the remnants of a possible pot stand or bench. It is possible that by this stage the northern part of the building, including Area 315, was already in ruins, as indicated by the presence of dumps of burnt material to the north, interspersed with areas of stone rubble.

Phase 3

Bldg 220 suffered from severe robbing of its walls. Robber trenches were cut from different levels so that it appears that the robbing was a repeated activity. Some walls were robbed quite soon after the abandonment of the rooms, while others were robbed later when walls had already collapsed. Within the demolition deposits were the occasional finds thrown into the building as rubbish, including a complete animal skull, a bitumen basket and a clay figurine.

Subsequently, the area filled in with sand, which still contained the occasional item including one complete pot, two seals and some stone tools. It should be noted that the northeast wall of the building, which was shared with Bldg 224, was still upstanding. A sand layer up to 1 m thick finally covered Bldg 220: perhaps some of this was deliberate infilling. It is extraordinary that two further buildings should then be built above, providing the longest building sequence in the settlement (see Bldgs 221 and 223 overleaf).
Buildings 221 and 223

Bldgs 221 and 223 were built over the site of the earlier Bldg 220 and separated from that building by a layer of sand infilling. As such they were some of the highest extant structures on the site, constructed at a time when most of the buildings in the immediate vicinity had already disappeared. Certainly Blocks C and D were no longer upstanding, and Blocks A and B to the southwest had also fallen into disrepair by this time. The temple, however, was still in use: the five circular structures dating to Phase 6 were set at a comparable height in the sand to the walls of Bldg 221.

Although late in the sequence, both buildings adhered to the common plan of outer and inner room, though Bldg 221 had been excavated by the previous expedition and was only partially preserved.

Phase 1

The southwest half of Bldg 221 was largely missing, though given its standard shape the plan of the building can be reconstructed with confidence as a two-roomed building, with an outer room and an inner one. The main door was probably in the southeast wall. However, the relevant section of wall had been cut away by a curious late feature: a series of limestone blocks, roughly hewn, set side-on to line a rectangular hollow filled with clean sand. The appearance of the feature suggested that it might have been a grave, although its alignment is incorrect for one dating to the Islamic period. There was a second doorway at the rear of the building.

Only a single floor surface was left in the outer room (Area 301). Given the history of its neighbour, Bldg 223, it is unlikely that there were ever any higher surfaces. In the eastern half the floor was a thin plaster layer, but elsewhere it degenerated into a trampled sandy horizon. A thin deposit of charcoally sand, evidence of occupation activity, lay in patches above it.

The outer room contained three installations. Abutting the wall of the inner room was a semicircular hearth and, next to it, part of a plaster-lined basin. Both the basin and the oven were badly eroded, having been left open to the elements for a considerable period. On the opposite wall was a rectangular bench with a plastered trough at one end.

No floor or installations survived in the inner room (Area 300). To the rear of the building there was a single occupation horizon of grey ash and sand. Immediately overlying the single floor of the outer room was a deposit of eroded mortar and stones formed during the collapse and erosion of the building.

Bldg 223 was also a two-roomed building, sharing a common wall with Bldg 221. Interestingly, to the east its boundary largely incorporated the walls of the earlier and deeper structure, Bldg 220. In the north corner, where this early wall kinked and leaned in, a small section of new walling was inserted.

The main door of the building was in the southeast wall, leading via a step into the outer room (Area 303). The threshold had been constructed out of a single stone block. Immediately inside the entrance on the left hand side was part of a stone bench-and-basin. There was a fragmentary floor along the eastern edge of the room. In the northwest corner only, this sat above a layer of black sand which had been thrown into the corner to provide a flat bedding for the floor, presumably where the underlying sand had dipped down. A weight of Indus Valley type was recovered from this collapse deposit immediately above the floor. No surfaces or installations survived in the inner room (Area 302).
**Building 224**

Bldg 224 is sandwiched between Bldg 220 to the southwest and Bldg 225 to the northeast. Two phases were distinguished in excavation. The latest (Phase 2) was extensively excavated and corresponded to the major rebuild of the buildings on each side (Phase 2 of Bldgs 220 and Bldg 225). The key stratigraphic linkages are the floors on both sides of the rebuilds in the party walls separating Bldg 224 from its neighbours.

Part of the building plan of the preceding phase (Phase 1) was recovered, but associated deposits were left unexcavated. The reason for this was the precarious nature of the southwest wall of the building, which stood 3 m high by the end of the excavations and leaned dangerously inward. The plan of the earlier phase was not clear. The internal walls of the building had been robbed out, presumably when the building was rebuilt. As reconstructed, it appears to have been an unusually large two-roomed building, but it is possible that the inner room was subdivided in the manner of Bldgs 60 and 61.

With the Phase 2 rebuilding, the house became temporarily a four-roomed building, with an outer room, two small inner rooms and a rear yard. Other examples of buildings with two inner rooms are Bldgs 50 and 100. Another unusual characteristic of Bldg 224 is the central position of the external doorway to the rear, the only instance of its kind noted within the settlement. In Phase 2.2, there is only a single inner room and the general plan is that of a standard three-roomed building. As elsewhere, the accumulation of sand in the public areas, in this case in Temple Road, created an ever increasing discrepancy between the external street surfaces and the internal floors of the building, necessitating the construction of steps on both sides of the door.

Subsequently, partial robbing of the walls again occurred, and the results of this could be seen also in the disturbed nature of the deposits above the Phase 2 floors.

**Phase 1**

The original lines of the Phase 1 walls were clearly seen below the Phase 2 rebuilds of the main external walls of the building. The section excavated just outside Bldg 224 in Temple Road (see Chapter 2) revealed the Phase 1 wall line and doorway. The internal Phase 1 deposits were not excavated so the plan is problematic. The remains of a robber trench suggest that the inner room of the building was located in the northeast corner of the building, and that in Phase 1 the building was a two-roomed building. At the base of the robber trench was a black floor, clearly belonging to an even earlier phase of occupation in this area. Above this was 30 cm of floor and occupation debris associated with Phase 1. A plastered semicircular basin lay in the southwest corner of the building, while within what would have been the inner room was a storage vessel and part of a curving plaster feature. These features remained unexcavated.

**Phase 2**

At the end of Phase 1, the internal walls were taken down and the interior surface levelled up by depositing 50 cm of sand across the main rooms. All the external walls of the building were then rebuilt and the internal arrangement of rooms remodelled. The southeast and southwest walls were rebuilt on the same alignment as their predecessors, while the northeast and northwest rebuilds were slightly offset from their underlying predecessors.
The internal divisions of the building were re-arranged in Phase 2.1 to form a four-roomed building comprising an outer room (Area 316), two inner rooms (Areas 298 and 299) and a rectangular yard at the rear (Area 317). Subsequent demolition of the internal partition wall between the two inner rooms modified this plan (Phase 2.2).

Entrance to the building was still via a doorway in the south-east corner, which led in from Temple Road. In spite of raising the internal levels, there was still a major discrepancy between the street level and the Phase 2 floors of the building. To overcome this, two internal stone steps were built just inside the doorway bridging the gap between the threshold and the Phase 2.1 floors.

The earliest floor of Phase 2 within the outer room was fragmentary and confined to the eastern edges of the room. It was a very hard, grey plaster surface that sloped down to the north and was clean of finds. A bench-and-basin lay just inside the door, on the left when entering. The rim of the basin was made of a grey plaster, with a small gap for drainage in the northeast corner. Only a fragment of the bench remained: the rest of it had been chopped out in the wall robbing.

The partition wall of the inner room (Area 298) had been mostly robbed out, with only the stones of the door threshold and of one jamb remaining intact. Inside, the base of a large storage jar sat on the floor. A narrow dividing wall provided access into a small room beyond (Area 299). A break in the partition wall provided access between the rooms so that in this case the dividing wall is definitely part of an upstanding wall rather than a support wall for a platform.

In the outer room, a large opening in the northeast corner, lacking either threshold or doorsocket, led into the rear yard (Area 317). The wide opening (2.10 m) is unusual, but not unique, as Bldg 3 provides a second example. The central position on the rear wall of the yard leading out to the back of the building is also unusual, and there seems no obvious reason for this departure from the norm.

The main feature of this yard was a tannur in the north corner that had survived in remarkably good condition, perhaps because
of its sheltered location. It was of standard construction, with a pottery cylinder set in a stone surround and finished with a coat of grey plaster.

During Phase 2, the sand in the street outside the building continued its inexorable rise. The final solution to this problem was a terrace of two steps in the sand outside the door that made it possible to step down into the doorway. Stone revetment walls on both sides of the steps held back the loose sand, while the steps themselves were built with relatively small stones and mortar packing. A grey plaster finish was found adhering to parts of both the treads and the risers.

The doorsocket next to the external door was rebuilt on the higher floors of Phase 2.2. In its final form it had a plastered stone surround, and overlapping circular indentations on the inside show that the doorpost had been repositioned several times. The continuous re-use of the doorsocket, the series of internal floors and the accumulation of sand in the street give the impression that Phase 2.2 was of relatively long duration.

In Phase 2.2 the division between the two small inner rooms was demolished, leaving a three-roomed building. This was accompanied by substantial reflooring. A series of plaster patches covered the floor of the outer room, representing several episodes of reflooring. By contrast, in the inner room a single clay floor was put down over a thick layer of packing.

Within the outer room, the bench-and-basin was replastered and continued in use, and additional features appear within the room. Towards the centre lay a plastered circular hearth, with a raised lip and a scorched base. Close by, three shallow circular depressions in the floor may have supported storage jars or cooking pots. A large number of finds lay on and within the Phase 2.2 floor sequence, including 25 sealing fragments, a copper arrowhead and a chisel.

Phase 3

After Bldg 224 was abandoned, the walls were robbed for stone. The wall separating Area 307 from 316 was extensively plundered, as was that between Bldg 224 and Bldg 225, its neighbour to the east. By this time Bldg 225 had itself fallen into ruin, but the southwest corner was still in use as a cooking area. Debris associated with the tannurs ran over the line of the party wall separating Bldgs 224 and 225. Much of the debris from the demolition of Bldg 224 was dumped in the internal rooms. It is unusual to find any objects in the abandonment layers above the last floors of the Saar buildings (for obvious reasons), but in the case of Bldg 225 there were several from this horizon, including a copper awl with a bone handle. These could either have been churned up as a result of the above activity or, equally, be the result of continued activity in and around the cooking installations.
Building 225

Bldg 225 is a two-roomed building, with an outer room (Area 318) and an inner rectangular room (Area 319). It is unusual in that in an early phase it appears to have been connected to Bldg 226 via a doorway in the inner room, though the building itself remains unexcavated to this phase (Phase 1). Subsequently the connecting doorway was blocked and Bldg 225 rebuilt (Phase 2). The main southwest wall of the building was remodelled and a deep layer of sand spread across the outer room, and new installations constructed within the building. This corresponds to the major rebuild of Bldg 224 to the southwest. Bldg 225 later became partly dilapidated but was still utilized as a work area, and a suite of hearths and tannurs were built just inside the building (Phase 3).

Phase 1

Very little is known about Bldg 225 in this phase. It can be demonstrated that the external limits of the building were probably the same as in the later phases. Deeper excavation of Bldg 226 to the northeast showed that the shared wall between the buildings was original and that there was a connecting doorway. Similarly, excavation to the southwest showed that the wall shared with Bldg 220 was also original. However, while the boundaries of the building may have been the same, this cannot be stated with confidence for the internal arrangement of the two rooms.

Phase 2

At the end of Phase 1, the connecting door into Bldg 226 was blocked and the walls rebuilt. The earliest surface of this phase was excavated in the outer room (Area 318) where there was a single installation, a crudely-built plaster basin (Phase 2.1). It is possible that both surface and basin relate to the process of rebuilding rather than to the first floor of the rebuild. The basin was then back-filled and levelling material spread across the room filling in all the depressions and irregularities in the floor surface to form a level horizon. Two features were located on top of the re-laid floor (Phase 2.2): a large, ribbed, pottery vessel and, within the doorway into the inner room, a basin with a stone surround. The basin obstructed the doorway into the inner room (Area 319), which was devoid of any other features and had a roughly laid plaster floor.

The floors were replastered again (Phase 2.3), with some new installations appearing. There was an area of flat stones next to the rear door, perhaps used to keep items off the floor. A rectangular fire-pit lay in an unusual position inside the entrance from Temple Road. The basin obstructing the entrance into the inner room was demolished and inside the room itself there was a deep bowl set into a stone surround. The bowl, complete but cracked, had been patched inside with a small area of white plaster, perhaps in an attempt to repair it. Next to the pot was a low rectangular work platform. This was superseded by a rectangular basin, built with a stone surround and faced on the outside with a crude, uneven coat of plaster.

Phase 3

By Phase 3, both the rear wall of Bldg 225 and that shared with Bldg 224 were broken down, indicating the abandonment of these buildings. Part of the southeast wall was knocked down to widen access, and two tannurs and a series of supports for cooking pots were built in this corner of the old house. The pot supports consisted of two groups of stones set upright against the wall. The first group was made up of six stones: three small ones set in a row against the wall face, with a second row of three larger stones offset from the first. The second group, closer to the tannurs, had only two stones. There was evidence of burning around the stones, and concentrations of charcoal upon the floor surface within this area. It seems that the tannurs were retained in use for longer than the jar settings, since a concentrated deposit of charcoal and sand, presumably rake-out from the tannurs, had covered the stones.
 CHAPTER 3  INDIVIDUAL BUILDINGS IN DETAIL

Fig. 3.62  Phase 2.2 (SW)

Fig. 3.63  Plastered jar, tannurs and stone settings (SE)

Fig. 3.64  Phase 3
the early Dilmun settlement at Saar
Fig. 3.65  Bldg 226, Phase 1, showing on the left the blocked door and the cut-down section of the wall of the inner room (SW)
The early Dilmun settlement at Saar

Building 226

Bldg 226 is the easternmost building of Block C and marks the outer limit of settlement in this area. Immediately further east, the ground falls away to plain level where there were no signs of any further buildings. The building has two rooms, with a range of domestic installations in the outer room, and a connecting door in the inner room through into an unexcavated area, possibly part of an early phase of Bldg 225.

The building as excavated belongs to the earliest level of Block C. While the other buildings in the block continued to be renovated and inhabited, Bldg 226 had a short life span. After it was abandoned as a living building, it continued to be walked through for a time by its neighbours, who also dumped rubbish in it and robbed out some of the walls. The interconnecting doorway was then blocked off and no further activity took place within it.

Phase 1

The entrance to the building from Temple Road was through a door in the southeast corner which led into the outer room (Area 323). Opposite this door was a second door in the rear wall providing access out into what appeared to be an open area at the back of the building. A suite of four installations lay along the rear wall of the outer room. These were from west to east: a tannur, a cooking pot support above a hearth, one partly destroyed basin or work platform, and an area of flat stones. The tannur was very well preserved and of standard construction with a stone surround and pottery lining. The cooking pot support was made up of four stones, one with remnants of grey plaster still adhering to it. The upper part of the work platform was missing and it is possible that it may have functioned as a support for a basin or jar. To the east lay a low work platform, constructed from large flat stones that stood 10 cm proud of the surrounding surface. A ring hearth with a plastered lip lay in the middle of the outer room.

A raised area of stone was the only feature in the inner room. The most interesting aspect of this room is the door in the southwest wall leading through into Bldg 225. It is not known if it led into the inner or outer room of that building as the internal plan of this building in this phase is unknown.

Outside Bldg 226 to the east, an external surface ran away from the building, becoming uneven with sandy and ashy patches. There were no installations or signs of other buildings in this area.

Phase 2

While Bldg 225 was rebuilt and still inhabited, Bldg 226 was mostly demolished at the end of Phase 1. The main northeast wall of the building was extensively robbed out and the outer room entirely abandoned. Rubble connected with the demolition of Bldg 226 and the rebuild of Bldg 225 was dumped in what had been the inner room of the building and ramped up to the connecting doorway. Apparently the neighbours still wanted access through the connecting doorway, no longer of course into a living building but into what had become a semi-derelict area. They even went so far as to smash a wide opening in the wall opposite the door (the northeast wall of what had been the inner room of Bldg 226).

The inner room of Bldg 226 became a dumping ground for rubbish and debris. Directly overlying the Phase 1 floor, was a deposit of sand containing large stones, crushed plaster and crushed mortar fragments. The surface of the deposit was highly compacted and ramped up to the doorway connecting to Bldg 225. Overlying this to the east was a wind-blown sand deposit, formed as a result of the abandonment of the building and the exposure of the rooms to the elements. This was followed by two further rubble deposits, again ramped up and running through the connecting door, and a final sequence of rubble and midden. The midden deposits contained bone, shell, and pottery mixed in ash and charcoal sand.

In contrast, the outer room infilled entirely with wind-blown sand, a process no doubt accelerated by the robbing out of the northeast wall of the building, exposing the area fully to the elements. This sand deposit accumulated in places up to a depth of 1.50 m.
Block D is part of the Eastern Quarter and lies on the opposite side of Temple Road from Block C. Four buildings have been assigned to this block. Three of these share party walls (Bldgs 222, 64 and 65) and therefore can be considered as part of a single block, but the fourth (Bldg 65) is isolated and is described under this block merely for the sake of convenience. Similarly, the well (Bldg 500) is also described in this section. Bldg 222 is located at the junction of Main Street and Temple Road, with its entrance tucked away in an alley along its south side. Bldg 64 is also oriented away from Temple Road, with its doorway on the south side. Both buildings present blank façades to their neighbours in Block C across the way.

All the buildings of the block have only two rooms. Bldg 222 exhibits some variety with an additional porch or alcove in the eastern corner. Two of the linked buildings, and possibly all three, had access to the large communal area which opened out in front of the well (Bldg 500). This area is bounded on the south by the blank façade of the alley wall of Block E. It is characterised by a pronounced slope down to the well, and contained localised areas of rubble adjacent to the perimeter walls and sandy trampled surfaces with concentrations of shell and pot. The slope was considerable, the ground dropping some 2.5 m over the distance of 20 m that separates the rear of Bldg 222 from the well.

Underlying Bldg 65 were deposits that predated the construction of the building (Level D1). Information about the construction and first use of the Block D buildings (Level D2) is limited to that found in the sections (see Fig. 2.3). It is assumed that Bldg 65 dates to this time, although there is no direct stratigraphic connection between it and the other buildings in the block. Certainly, by the ensuing Level D3 it had already been demolished. The site was not built upon again so that we can observe here the same process of slight contraction in settlement that was noted for Block C. It is also clear that Block D, like Block C, marks the limit of settlement in this area. This is indicated by the lack of any masonry further east and by the agricultural nature of the deposits to the east of the well.

During Level D3, Bldgs 63 and 64 had a linking doorway, paralleling the situation in Bldgs 225 and 226 of Block C. Otherwise, it is not possible to say much about this level, except that the limits of the buildings appear to have been the same as in Level D3.

Level D3 represents a rebuilding of Bldgs 222, 64 and 63 and also corresponds to the main excavated level of these buildings. Towards the end of Level D3, there was a period of partial reuse, particularly noticeable in the outer room of Bldg 64 where the street wall was demolished and new cooking installations installed. This event may correspond with the construction of ovens in the ruins of Bldg 225 on the other side of Temple Road.
Building 222

Bldg 222 lies on the corner of the junction of Main Street with Temple Road. A narrow alley forms its southern boundary, while on the east side it in part adjoins Bldg 64 and in part forms the boundary of Area 306 which leads down to the well. The main entrance to the building was around the corner in Alleyway 3 so that along Main Street and Temple Road the building presents a blank façade. It deviates slightly from the normal two-roomed plan. The outer room (Area 305) is built out in the eastern corner where there is also an exit into the open area that leads down to the well. The plan in this respect resembles that of Bldg 51, which also has a similar extension, although the arrangement of the rear door is different. In the outer room, there is an unusual arrangement of a two adjacent semicircular hearths with a cooking pot support in between.

Although only the latest phase of the building was excavated (Phase 2), the main walls showed signs of having been rebuilt, suggesting an earlier phase underneath. Bldg 222 was later used as a rubbish dump, both as it was collapsing and afterwards (Phase 3.2).

Phase 1

The existence of a phase of Bldg 222 earlier than the one excavated was noted in the section across Alleyway 3 which showed an underlying robbed-out wall (Phase 1). This phase was not investigated within the building.

Phase 2

The Phase 2 rebuild was badly executed. The poor quality of the work is particularly noticeable on the buttress of the internal corner of the eastern wall. This leaned back into the room. An attempt to stabilise it was made by cementing it back into the wall with a layer of grey plaster, 20 cm thick in places. That there were additional problems with this part of the building is also indicated by the short length of buttress tacked on to the outside of the building in Area 306.

In the outer room, the plaster floor was missing along the southern edge in the area between the two external doors. Here, where it was subject to severe wear and tear, it had worn away and been replaced with sand infill.

The installations were ranged along the wall of the inner room. They included two adjoining semicircular hearths with a cooking pot support between them. Set in front of these were two depressions, perhaps further supports for jars. The three plastered cones that formed the cooking pot support were all scorched and the area between them filled with ash, showing that a fire had been lit beneath. This suite of installations appeared to have been rebuilt. Part of an earlier support was visible beneath the Phase 2.1 example, and the original plastering of the southern hearth ran below the floor.

Lying to the south of the cooking area was a low rectangular bench, partially covered with a compact grey plaster. It was set only 2–4 cm above floor level and may have been the remnant of a bench-and-basin installation.

Overlying the floor was a make-up deposit of clean sand and then another plaster floor (Phase 2.2). This too was trampled and worn away at the southern end. At this level, both the rectangular bench and the southern of the two semicircular hearths had fallen into disuse. The excavated floor of the inner room belongs to this phase. Two jars lay against the east wall, and lying next to them were two plaster lids and seven stone tools. Against the west wall was an area of flat stones.
Immediately outside the rear door of Bldg 222 were the fragmentary remains of a double-bin or basin set against the wall. This was similar to better preserved examples from elsewhere in the settlement. An associated external surface contained a scattering of fish-bone and shell, and formed part of the external deposits of the large open area (Area 306) that led down to the well.

Phase 3
The primary abandonment deposit overlying the floor of the building in Area 304 included large concentrations of potsherds together with some articulated bone and stone tools (Phase 3.1). This suggests that while the fabric of the building was beginning to decay the building was still open and being used for the disposal of rubbish. A deposit dumped against the west wall of the building indicated further evidence of rubbish disposal within the abandoned structure. This was made up of dark charcoally sand containing ash and sherds of large, ribbed storage vessels.

Subsequently the walls of the building collapsed entirely, as indicated by a deposit of rubble collapse, up to 90 cm in depth in places, set within a loose sand matrix.

A depression within the centre of this rubble horizon was filled with loosely compacted sand stained dark brown-black by the inclusion of large quantities of charcoal (Phase 3.2). It also contained significant quantities of pot, bone and shell, and a shell seal. The deposit undulated, rising up over the tops of the walls and following the uneven contours of the rubble below. It clearly represents an activity post-dating the building, where the surviving stubs of walls perhaps served as windbreaks for temporary fires and hearths.
Building 64

Bldg 64 is in the middle of Block D, adjoining Bldg 222 to the west and Bldg 63 to the east. It is sideways on to Temple Road, stretching along its south side, with a doorway leading out into the open space around the well. The early history of the building (Phase 1) is not known in detail. The sections against the external walls suggest the limits of the building always remained the same, but a blocked doorway in the northeast wall of the inner room indicates earlier variation.

In Phase 2, the building has an inner room and an outer one. Part of the eastern wall is missing in this phase: it appears to have fallen down the slope, with the remnant subsequently demolished. It is possible that this happened during the final occupation of the building in Phase 2.

Afterwards, much of the northwest wall of the building was robbed out, leaving the yard open to Temple Road. Additional cooking installations were then built in the yard (Phase 3), as also happened in Bldg 224 on the opposite side of Temple Road.

Phase 1

Sections against the blocked doorway of the inner room (Area 332) and in Temple Road indicated that the original limits of the building were the same as for Phase 2. Otherwise Phase 1 remains were not investigated. The blocked doorway in the inner room shows that there was originally internal communication between Bldgs 64 and 63, although what the internal arrangements of the rooms were in this phase is not known.

Phase 2

In Phase 2 the doorway in the northeast wall of the building was blocked up, sealing off access to the corresponding phase of Bldg 63. In front of the blocked doorway was a rectangular area of stone flagging. The floor of the inner room was clean. In the southwest corner there was a small spread of ash and scorched stones on the wall, indicating that there had been a small fire here.

The outer yard, Area 333, was a busy area. The main floor (Phase 2.1) was in general an uneven and fairly broken horizon, with a varied composition and compaction that reflected the different activity areas. Around the robber trench that cut the northwest wall of the building it was compact and sandy, while in the centre was an area of ash and soot where two shallow, circular depressions may have supported jars. The southwest corner was littered with bone, shell, sherds and an occasional stone tool, while installations were ranged along the southeast wall. These included the remnants of the three plastered cones of a cooking pot support. These were covered in ash debris and had been mostly destroyed. The base of a pot was set into the floor close by. The ash debris was very dense in this area, the result of constant firings around the hearth.

Further to the east was a sunken plastered basin. It was rendered in a gritty white gypsum plaster that lipped over on to the floor and also up the nearby wall. The finishing plaster was so worn that the base preparation of grey ashy plaster showed through.

On the opposing wall was part of a stone bench, perhaps including a basin. Like the other installations of this phase it had been largely destroyed and only a few stones were left.

Next to the door on the eastern side of the building, the floor contained a high density of fish-bone debris. This was traced over the eastern end of the southeast wall of the building where the wall was much reduced in height and almost flush with the floor.
This suggests that by the end of this phase the wall had already collapsed down the slope and not been rebuilt.

**Phase 3**

At the end of Phase 2 the entire length of the northwest wall of Area 333 was robbed, leaving only a jagged and broken corner at one end. Debris hurled back into the foundation trench included lumps of moulded plaster from installations destroyed in the process (Phase 3.1). The building was then abandoned and began filling in with sand, perhaps quite quickly now that it was open to the north. Within the sand, three circular scoops filled with ash indicate intermittent use of the yard, but not of the inner room. After further infilling of sand, in places to a depth of 70 cm, there was evidence for more extensive reoccupation characterised by a series of installations along the southern edge of the building (Phase 3.2).

A tannur lay in the southwest corner, with a stone superstructure and pottery lining, partly filled at the bottom with compact ash. Two intersecting circular fire-pits subsequently cut through the tannur. To the east were two cooking pot supports that also served as hearths. These were made up of a total of five stones which would originally have been plastered over so that each formed a cone shape. The plaster remained intact on two of these, while the rest survived only as heavily scorched stones. Against the outside corner of what had been the wall of the inner room was an eroded area of clay and stone which may have been part of another installation. Just in front of it was a circular hearth with a raised plastered lip. The debris and rake-out from the constant use of this hearth accumulated within and around it, and formed small islands of ashy deposits.

There was no floor as such, but only ashy trampled lenses made up of debris from the installations. These laminated ash deposits were up to 25 cm thick in places, lensing out into sand further away from the hearths.

At the eastern end of the building, the occupation banked up against the wall of the inner room. Four circular pits cut this accumulated debris. All of these had scorched sides and contained some compact and dense black ash.
Building 63

Bldg 63 is the easternmost building of the row that runs along the southern side of Temple Road. The southeast corner of the building had suffered some damage from bulldozer activity. The building lies sideways on to Temple Road, with an entrance on the northwest side opening into an outer room with installations (Area 330), and an inner room in the northeast corner (Area 331).

The section across Temple Road confirmed that there was an underlying phase of this building (Phase 1): an earlier version of the northwest wall, as well as a doorway, were found underlying the later Phase 2 building.

Phase 1

A keyhole excavation in the southern corner of Area 330, next to the blocked door into the inner room (Area 332) of Bldg 64, revealed Phase 1 walling and an associated floor running through the doorway. This earlier wall stood higher at the west end and was subsequently used to key in the Phase 2 wall. At the east end, sand had blown over the collapsed wall, and there was a deposit of mortar underlying the rebuild. The section across Temple Road also showed that the perimeter of the building on this side remained constant between phases, though information about the internal plan of this phase is lacking.

A curious linear depression outside the building in Area 306 should also be noted. This lay parallel with the main southeast wall of the building, but 1.6 metres to the south. It looks very much like the robbed out line of a wall, perhaps belonging to an earlier phase of Bldg 63, or conceivably Bldg 64, with which it also lines up.

Phase 2

In this phase, Bldg 63 had an outer room (Area 330) and an inner room (Area 331). The entrance was in the northwest corner where there was a threshold and doorsocket. The socket was semicircular, fashioned from a stone core surround and plastered with mortar to form a rim around a central cavity. Close to the door, there was a stone bench-and-basin. The semicircular basin attached to the east end of the bench had been rebuilt. A rather shapeless heap of clean brown clay lay in front of the basin, similar to the material used in the final plastering of the basin itself. Brown clay is not a material normally found in the buildings, although a similar matrix was noted in Area 333 of Bldg 64.

Located midway along the rear wall of the yard was a semicircular hearth and cooking pot support. As a consequence of the subsequent collapse of the rear wall these were in a poor state of preservation. Only a single plastered cone of the cooking pot support survived, although a slight raised area to the east was the likely position of a second. The third cone may have been against the wall, and thus destroyed when the wall fell down the slope.

The only floor identified in the yard was made up of ash lenses around the cooking installations, while elsewhere there was the occasional patch of white plaster. The inner room was devoid of installations.

Although the eastern corner of the building was lost, the surviving remnants of walls and floors suggested that there was a second external door at this end, providing access down to the well.
Building 65

Bldg 65 is located some 6 m east of Bldg 63 and is not attached to the rest of Block D. In its orientation it preserves the southern limit of Temple Road, with Bldg 226 located opposite. At this point, Temple Road curves slightly away to the north.

The plan and remains were fragmentary, and it is not really possible to say anything about the internal plan. The building may have been linked on the southwest side to Phase 1 of Bldg 63, although this was not established in excavation. Subsequently the building was demolished and not rebuilt, so that the same process of contraction of buildings occurred here as in Block C on the opposite side of Temple Road.

Phase 1

The walls of Bldg 65 were in places demolished to foundation level. The earliest surfaces identified in the area ran under or were disrupted by the walls, and thus predate the construction of the building. These have been assigned to Phase 1. There is little to say about them except to note the presence of part of a semicircular or circular hearth.

Phase 2

Parts of three walls of the building survived, joining up to form three sides of what may have been the inner room. Ash plaster adhering to both faces of the southwest wall fragment indicates that this wall formed an internal partition within the building. A possible door out on to Temple Road is indicated by a neat edge in the northwest wall fragment. Some isolated patches of flooring survived, as well as fragments of installations, including a semicircular hearth, a stone platform and part of a hearth. However, the compressed stratigraphy, combined with the subsequent thorough demolition of the building, makes it difficult to relate these stratigraphically.

It is clear that the building survived long enough for the doorway to be rebuilt (Phase 2.2).
Building 500

Bldg 500 is the designation for a well located in an open area east of the buildings of Block D. The well was oval at the top, a maximum 2.5 m in diameter, and lined with stones to a depth of 2.11 m. A series of stones jutting out from the sides served as a means of access for cleaning. A stone-lined channel led off to the southeast. The well was empty except for part of a bitumen bucket and some pieces of date-palm wood.

Phase 1

From the back of the buildings of Blocks D and E the land sloped considerably down to an open area devoid of any buildings except for the stone-lined well. The well itself had been dug through a surface that was traced for some considerable distance (up to 15 m north of the well and 8 m east). This surface appeared to be a layer of subsoil in a garden or agricultural area. It was fairly level and rich in abraded potsherds and shell. Below this surface lay a horizon of compact sterile sand that showed no traces of human activity.

The top of the well, slightly higher than ground level, had a stone surround with a ledge within it. The ledge is most visible on the west side. It may have been part of the same rebuild that was noted on the east side, or have served a different function, perhaps the support for a lid over the well, required to prevent sand from blowing in and filling it up.

A shallow stone channel led off from the north side of the well. This was stone-lined, with the edges formed by stones set on edge. It ran for 2 m before merging into a ditch that ran south into an unexcavated portion of the site. Whether the ditch was originally also stone-lined and subsequently robbed is not clear. Set into the ground nearby was a large flat stone that may have served some function connected with the well. Two steps were set into the well surround, just north of the channel take-off. The lower of these was made up of two stones that overhung the well shaft.

The well lining was neatly constructed, with a smooth face and a gradual incline towards the base. The lower courses were cornered, making a rectangular opening towards bedrock. Eleven protruding stones in the southern wall served as footholds. At a depth of 2.11 m there was a shelf of bedrock; the stone lining continued down on the south side for a further 1.55 m, resulting in a total depth on that side of 3.66 m. The bottom of the well was filled with a layer of wet dark blue-grey sand rich in freshwater shells. This was overlain by softer, still damp sand which contained rubble, pot sherds and a complete bitumen basket. The rubble may represent that part of the superstructure which collapsed into the well at the time of abandonment. Within the ensuing layer of wind-blown sand lay three pieces of date-palm trunks, the largest of which was 3.20 m long. Given its context this may simply have been tossed into the well as rubbish.

The bottom of the well was 3.41 m above sea level, while the base of the channel which led off to the side was 7.01 m. The water-level in the well must, therefore, have lain within these parameters.

This was the only water source identified in the settlement. However, it is possible, given the slope, that there were further wells along the eastern edge of the settlement behind the buildings of Blocks E and F.

The area next to the well must have needed constant maintenance to keep it free of obstruction and accessible: the removal of wind-blown sand and the sweeping away of material falling down the slope from the back of the buildings.

It looks as if the inhabitants of Block D tried to ease their passage up and down to the well by constructing rough stone revetments or pavements. These may have served a secondary purpose of preventing erosion of sand deposits (the predominant matrix) around the bases of the external walls of their buildings. There are two major areas of such stonework, a large strip along the walls of the alleyway to the southwest (Area 379) and a smaller rectangular area by the entrance to Bldg 64.
Block E is part of the Eastern Quarter of the settlement and lies on the east side of Main Street between Blocks D and F. It is separated by alleyways from Block D to the north and from Block F to the south.

There is evidence for up to four buildings being part of this block in the earliest level (Level E1), though their inter-relationship is not clear. Along Main Street, earlier phases of excavated Bldgs 60 and 61 were identified in the sections across the alleyways and across Main Street itself. These earlier phases were contemporary with elements of two buildings uncovered down the slope (Bldgs 66 and 67) immediately behind Bldgs 60 and 61 (Fig. 3.96). The plans of these are incomplete and were obscured by the later rebuilds to Bldgs 60 and 61.

The excavated phases of Bldgs 60 and 61 belong to the succeeding level (Level E2). However, there is no evidence for any corresponding rebuilds to Bldgs 66 and 67, so that this may have been left as an open area at this time. A cautionary note is that there has been some recent bulldozer activity in this area which destroyed part of the plastered areas to the rear of Bldg 60, and there may also have been some loss of archaeological deposits from erosion down the slope.

In Level E2, Bldgs 60 and 61 had identical plans and, as such, look very much like a pair of buildings. Each one has a relatively spacious outer room, with a bench-and-basin next to the door in the southwest corner, and two inner rooms. Directly opposite the entrance from Main Street, there is a second door leading out to the east.

To the rear of Bldg 60 were two heavily plastered areas, perhaps storage tanks or basins. Although the area to the rear of Bldg 61 was not investigated in detail, a fragment of wall suggests that this building had similar installations.
Building 60

Bldg 60 is the northernmost building of Block E. Evidence for the existence of its earliest phase (Phase 1) was found in the sections against the external walls of the building, but nothing is known of the internal plan at this time. In Phase 2, the building has two inner rooms, rather than the more usual one, and a typical range of installations. The inner rooms are generously sized so that the building is relatively large. To the rear were the fragmentary remains of two plastered areas, possibly storage tanks.

Phase 1

Excavations in Main Street and across the alleyways showed that there were earlier phases of the excavated buildings (see Figs. 2.7–8). The main southwest wall of Bldg 60 in this phase had been robbed out, but a stub of cross-wall was left and then built over during the Phase 2 rebuild. A section across Alleyway 3 to the northwest did not reveal any earlier wall, though this could reflect a relatively minor shift in the northern boundary of the building. Nothing is known of the internal plan of the building in this phase.

Phase 2

The front entrance into the building was in the southwest corner, providing access from Main Street. Immediately on the left of the door was a plastered doorsocket, and further along a bench-and-basin, subsequently renovated. A patch of floor survived in the entrance corridor with finely laminated lenses of mud/clay plaster. These appear to be water-laid and associated with the use of the nearby feature.

A group of thirteen stone tools lay at this end of the room, close to the robbed-out portion of the main southeast wall. Against the external eastern corner of the inner room was a collection of small irregular pebbles, perhaps gaming pieces.

Around the corner, in the main part of Area 372, was a shallow circular hearth with a moulded plaster rim. It sat on a mound of ash debris and rake-out which presumably originated from an earlier version buried underneath. Two pits were cut into this debris and were perhaps placements for storage jars. These were both filled with the overlying make-up deposit, indicating that they were in use until the end of the phase.

At the north end of the room were two stone platforms. Both were constructed of large stones, neatly laid to form an even and level surface, almost flush with the floor.

The northern inner room (Area 370) contained two more stone platforms. Here the floor was an uneven and very broken horizon of mortary sand with patches of plaster. A stone grinder next to the door and a small lump of copper were the only artefacts in the room. On the floor of the second inner room (Area 371) were two very worn seals.

A make-up deposit sealed the Phase 2.1 floors in all the internal rooms. In the southern one (Area 371) it was up to 40 cm thick and contained many plaster fragments, some with impressions of parallel reeds. Part of what was possibly a bitumen-coated length of wood, perhaps a roof beam, was also found in the debris. This material suggests that the room was roofed and that the roof had either collapsed or was pushed in prior to rebuilding.

A new surface was then re-laid in all three rooms (Phase 2.2). The main threshold into the street was raised and the buttress on the main northeast wall remodelled, with the rebuilt section of wall slightly offset from the earlier. In the outer room, the bench-
and-basin was rebuilt. Three layers of hard, coarse, white plaster could be seen here. Opposite this installation two aligned stones were set at right angles to the main southeast wall and may have been part of a platform or bench. The floor here was compact and well preserved. Seven stone tools and a globular pot were scattered across the room. Five stone basin fragments from the outer room-fitted additional fragments found in the inner room, Area 370. In this latter room the floor was clean with no occupation accumulating over it. A fragment of a hafted copper tool and a single stone tool lay on the floor. In contrast with the clean appearance of the Phase 2.2 floor in Area 370, the contemporary deposits in the other room (Area 371) revealed more activity. The presence of ash patches, shell and fish-bone suggest that it may have been used for dumping refuse into at this time.

The southeast corner of Bldg 60 was poorly preserved and the walling here had been mostly robbed out. A rear door might be expected here to provide access out to the open area at the back of the building (Area 381). Here, against the back wall of the building, were two large plastered tanks or bins. The best-preserved example had a base of four successive layers of hard gypsum plaster, each 1 cm thick. The final layer of plaster had been patched with a coarser grey material. The tank had a preserved depth of 67 cm.

In Phase 2.2, a tannur was constructed next to the tanks and against the rebuilt line of the main southeast wall of the building. A short fragment of wall to the southeast may have been a sheltering wall for the tannur or possibly an extension of the retaining walls of the tanks.
**Building 61**

Bldg 61 lies to the south of Bldg 60. It had an outer room (Area 610) and two inner rooms (Areas 611 and 612). A door in the southwest corner led in from Main Street. A second door in the opposite wall led out into an open area, where a fragment of walling attached to the rear of the building (Area 613) suggests there may have been a plastered basin or tank similar to those at the rear of Bldg 60. Antecedents of the building (Phase 1) are known from the sections, but only the latest floor of the rebuild was excavated in full (Phase 2.2). The surviving installations in the building were badly eroded, and two later robber trenches removed much of the main northeast wall of the building and a section of the northwest wall (Phase 3.1).

**Phase 2**

Two semicircular stone steps led down on to an early threshold (Phase 2.1), separated from the one above by a layer of mortar. The presence of the steps, here as elsewhere, illustrates the problem of rising street levels. In this case there was a difference of 45 cm between the height of the top step and the early threshold. Inside the outer room, close to the door, was a bench-and-basin which belonged with the Phase 2.1 floor.

Subsequently a layer of mortar make-up was laid, thick enough to raise the interior floor surface to a level compatible with that of the street outside. The stone threshold was then rebuilt and the floors renewed (Phase 2.2). The bench-and-basin was also rebuilt, but was subsequently destroyed so that a fragment of the base of the basin adhering to the wall was all that remained. Just inside the door into the southern inner room (Area 612) was a plastered rectangular platform. The plaster floor in this room had been repaired several times. No features were present on the floor of the northern inner room (Area 611).

**Phase 3**

The sequence of robber trenches and collapse suggest that stone from the walls was removed soon after the abandonment of the building. The robbing of the main southeast wall took place prior to the collapse of the building. Over the robber trench, and indeed over all of the outer room, lay a thin layer of wind-blown sand with rubble collapse above. The threshold of the northern inner room (Area 611) was also removed early on, perhaps at the same time as all the stone from the bench-and-basin in the outer room.

---

**Fig. 3.93 Phase 2.2**

**Fig. 3.94 Semicircular steps into Bldg 61 (NE)**

**Fig. 3.95 Bldg 61 (SW)**
Buildings 66 and 67

Bldgs 66 and 67 lay down the slope to the northeast of Bldgs 60, partly underlying the excavated phase of that building. Consequently the plans of these buildings are fragmentary, and it is not even certain that they represent two distinct buildings.

Phase 1

Two areas (Areas 384 and 388) have been assigned to Bldg 66, but for neither is there a complete plan. The northeast end of Area 384 was not reached in excavation, but there was here a short length of return wall with a neat face that provided shelter for a tannur and cooking pot support. The presence of these installations suggests that Area 384 functioned as the outer room of the building. If so, it is possible that the entrance to the building was at the southwest end where it met Alleyway 3, which runs around the edge of at least the later phase of Bldg 60.

Area 388 was unusual for the thick slabs of plaster that were on the walls. From the plan, Area 388 looks as if it may have been a precursor of the plastered features of Bldg 60. If so, given the preserved height of almost 2 m, perhaps these features are better described as plastered rooms rather than bins or basins.

Elements of two other areas were identified (Areas 385 and 387). It is not clear how they related to one another, but for convenience they have been grouped together as Bldg 67.

Neither building was subsequently rebuilt. Structures and external surfaces associated with the rebuilds to Bldgs 60 and 61 ran over the pulled down walls and collapse of Bldgs 66 and 67.
Block F is a row of buildings lying on the east side of Main Street and forming part of the Eastern Quarter of the settlement. A narrow alleyway separates it from Block E to the north and there is an open unexcavated space to the south.

As elsewhere, the initial underlying phase (Level F1) is incompletely known. At the north end of the block, there was a two-roomed building (Bldg 62) which was not subsequently rebuilt. Elements of early phases of two other two-roomed buildings in the block, Bldgs 55 and 57, were also identified, but not in Bldg 56 (see Fig. 2.11).

The block was rebuilt (Level F2) except for Bldg 62. The most interesting building is Bldg 56. This started off as a six-roomed building, with two doorways off Main Street. It looks as if it might have functioned as two separate but interconnected halves. Subsequently, the building was divided unequally into two: a single room building at the northern end (now Bldg 58), the only one of its kind in the settlement, and a larger unit of five separate areas to the south (retaining the Bldg 56 designation; see Fig. 3.109).

Both buildings are anomalous. Bldg 58 had no internal installations of any kind. Bldg 56 appears to have had a specialized use: two areas were heavily coated with gypsum plaster (Areas 70 and 73 on Fig. 3.109), of which the latter was probably a raised tank; there was an additional plastered area to the rear (Area 78); and in Area 93, there was a curious plastered bench with channels that is without parallel elsewhere in the settlement. The absence of standard installations such as the bench-and-basin, and the wider than usual doorway into Main Street, should also be noted. At the very end of its life (Phase 2.2), the building contracted again with some rooms still in use, but others being used for the dumping of rubbish.
Building 62

Bldg 62 is the northernmost building of Block F. It has an outer room (Area 377) with a small annexe at the rear (Area 382), and an inner room (Area 376). It had a single phase of use and was not rebuilt. Unlike the other buildings in the block, it has no second door to the rear. It also lacks a bench-and-basin or any form of cooking installation. In fact, the only feature of any kind is a buried storage jar in the inner room.

Phase 1

The earliest surface in the outer room was only partially excavated (Phase 1.1). The equivalent surface in the inner room was a poorly preserved floor of greyish plaster. A storage jar with a plaster lid was set into the middle of this floor, with its mouth at floor height. These are the primary floors of this phase of the building, and are level with the bottom of the extant walls.

Within the annexe (Area 382) a subsequent reflooring was noted (Phase 1.2). The surface was made up of a relatively hard whitish plaster overlain in the east by a thin lens of fine, light grey sand. No features were apparent, but a large number of small and trampled potsherds in the northern part of the room may have marked an activity zone of some sort. The floor did not extend into Area 382 but instead, along the southwest edge of the annexe, was a deposit of coarse yellow sand with some stone collapse. It is clear that there was not, at any time, a solid stone partition between these two rooms. The disruption of the upper floors, however, still requires an explanation and it may be that there was perhaps a less permanent partition separating annexe and room.

Subsequently, the threshold between the inner and outer rooms of the building was remodelled and new floors put down (Phase 1.3). The remodelling involved narrowing the doorway and building a stone threshold, two courses high, across the doorway.

A new threshold was also set into the external doorway into Main Street (unexcavated but visible in the doorway). The top of this was 50 cm above floor level, a discrepancy that ought to have required an intermediate internal step to get down on to the floor. The variation between external and internal height is, as elsewhere, the result of sand accumulating in the street.

Phase 2

The building was abandoned at the end of Phase 1. The southeast and northeast walls of the building were partly demolished. Sitting above the latest floor of the annexe was a large quantity of hard gypsum plaster fragments, mostly slumped from the north wall. Within the collapse of the rooms lay fragments of smashed pots, presumably thrown into the building that was now serving as a rubbish dump (Phase 2.1). It also seems to have been used during this phase as a temporary shelter for cooking: in the western half of the outer room there was a stone feature in burnt soil. The latest activity in the inner room was marked by a small fire-pit that cut through the underlying floors. Subsequently all the building walls collapsed (Phase 2.2). At the rear of the building this produced a dense area of rubble, tumbling off the rear walls of the building down the slope towards the plain.
Building 55

Bldg 55 is a two-roomed building with an outer (Area 80) and inner room (Area 81). It has two external doorways, one in the southwest corner leading out into Main Street and one directly opposite on the rear wall, leading out into area that sloped away to the northeast.

The building had two phases, both similar in plan except for minor repositioning of the internal and rear walls. Phase 1 was not investigated in any detail: only parts of the walls and floors of this phase were identified. In the subsequent phase (Phase 2), the building underwent a major rebuild which involved dismantling and rebuilding all the walls. The northeast wall of the inner room was moved further north and the doorway between the two rooms remodelled. The existing rear wall of the building was totally demolished and a new one constructed further out. The outer room at this time contained typical installations: a basin-and-bench, and a hearth with a cooking pot support.

Phase 1

Phase 1 floors were subject to limited investigation only. Three floors in the inner room were in a fragmentary state and had been partly destroyed by the robbing out of the northeast wall that accompanied the end of this phase in the inner room. On the second floor (Phase 1.2) lay a seal depicting a man riding an equid (Fig. 8.15). In occupation above the floor, and concentrated in the southeast corner of the room, were 14 pieces of flint and stone tools. No installations were found in the inner room. The outer room was investigated only in the area next to the rear door. Here, the Phase 1 doorway and wall were delineated.

Phase 2

All the walls of the building were rebuilt at the start of this phase. The Phase 1 northeastern partition wall between the inner and outer room was demolished and moved some 50 cm to the north. The rear wall of the building received similar treatment. A series of four pits in Area 80 is associated with the construction horizon. The sides of these pits were scorched and filled with ash and

Fig. 3.102 Phase 1 (above) and Phase 2.1 (below)

Fig. 3.103 Phase 1 (lower) and Phase 2 (upper) builds of northwest wall next to door of inner room (N)

Fig. 3.104 Pits in the construction horizon of Phase 2 (NE)
charcoal. The rebuilding also resulted in unusually wide entrances (1.20 m) at both the front and the rear of the building.

Close by the door into Main Street was a bench-and-basin, and lying next to the door into the inner room was a semicircular hearth, together with two plastered cones forming part of a cooking pot support. When further floors were laid down, these features were remodelled (Phases 2.2–2.3). The bench-and-basin was rebuilt and part of the Phase 2.1 basin retained to provide a second lower basin. On the corner of the inner room a fragmentary hearth or fire-pit replaced the earlier version.

The space at the rear of the building (Area 82) contained deposits of ash and charcoal suggesting that it was a refuse area at this time.

Fig. 3.105 Bench/jar support and basin, with earlier build below (NW)

Fig. 3.106 Phase 2.3

Fig. 3.107 Bldg 55 in Phase 2.1 (N)
Building 56

Bldg 56 had been partly excavated by the previous expedition, while along the northeast edge bulldozer activity had removed part of an external room. Except where prevented by plaster installations and floors which required preservation, excavation reached a uniform depth represented by a layer of levelling sand spread across the entire internal space of the building. It is not clear if this phase (Phase 1) represents the earliest phase of the building. Excavation in Main Street did not reveal an earlier street wall, though an earlier cross-wall marking the limit of adjacent Bldg 57 was found (see Fig. 2.11).

In Phase 1, Bldg 56 contained five interconnected rooms. Two rooms ran the entire depth of the building: Area 67 at the north end and Area 71 at the south. Each of these had an associated smaller room (Areas 69 and 70 respectively) and each had an entrance from Main Street. The fifth room (Area 68) linked the two halves of the building and provided access out to the rear. So although the building is described as a single entity, it may have functioned as two distinct units rather than one. Bldg 301 offers a parallel for this.

Subsequently, in Phase 2, the rear part of the building was remodelled. The cross-wall between Areas 67 and 68 was demolished and a new one constructed further to the north. There was no doorway in this so effectively the northern part of the building was sealed off (this part has been given a separate building number, Bldg 58, and is described below). To the south, a heavily-plastered raised area, possibly a water tank, was inserted (Area 73) and the small storeroom (Area 70) also received a coat of thick waterproof plaster. Another plastered room was present in this phase, located outside the rear door (Area 78).

The change in circulation through the building, and the construction of waterproofed rooms indicate a fundamental change in function. This is accentuated in Phase 2.2 when the main access was from the rear of the building. By this stage only Area 93 and possibly Area 69 remained in use; the rooms to the south now contained rubbish dumps.

Unfortunately, there are no clues as to how precisely Bldg 56 might have been utilized in Phase 2. The unique installation in Area 93, the lack of standard cooking and storage installations, and the extensive use of gypsum plaster suggests it served a more specialized function than its neighbours, perhaps related to a manufacturing or storage process that required a weatherproof (or rodent-proof) environment.

Phase 1

Bldg 56 had two doorways into Main Street and one that led out into an open area to the east. The doorway in the northwest corner led into a room that ran along the entire northwest side of the building (Area 67), opening out at the back into a larger rectangular space. Halfway along the room were a pair of internal buttresses. The southern buttress and adjoining doorjamb were coated with a hard brown plaster so roughly finished that the swirls created by the plasterer’s fingers were still visible. The colour of this plaster is distinct from the more common grey and white plasters, but it was also observed on the front wall of Bldg 56 and further down Main Street in Bldg 105. From Area 67, one door provided access into a small storeroom (Area 69), while a second led into Area 68 from where there was access to the rest of the building and out to the rear.

Only the top floor of this phase was excavated: a grey plaster deposit which petered out into a compacted, trampled horizon.
Associated with this was a doorsocket and internal step next to the door out into Main Street. At the other end, sitting in the centre of the room was a circular grey plaster hearth containing black ash and charcoal. Six flat stones were set against the northeast wall, perhaps a work platform.

The second room along the rear wall of the building (Area 68) connected the two halves of the building as well as containing an external door. The room was featureless except for a wide stone step and a doorsocket, both set against the doorway in the rear wall. It had a well-plastered floor which was slightly burnt near the southeast wall.

The door at the southern end of Area 68 led into a room that, like Area 67 at the northern end, ran the entire depth of the building (Area 71). The northeast part of this room in this phase was obscured by the subsequent construction of a storage tank. The one associated floor was a skim of plaster, overlain in places by a thin layer of charcoal.

**Phase 2**

The renovations to Bldg 56 at the end of Phase 1 resulted in the building being reduced in size. In the eastern corner of the building, a wall was inserted to create an enclosed rectangular space, probably a storage tank, without any doorway (Area 73). A double thickness of white plaster was applied to the floor which was raised 20–25 cm higher than that of the neighbouring area (Area 72). Each application of plaster was 5 cm thick and sat over a solid rubble core. Remnants of a finer plaster application running across the wall abutments were visible in places as were traces of bitumen. Access to this installation was from the southwest side which also served as the passageway between the front and rear parts of the building (Area 72). In this phase, this area was quite distinct from the rest of Area 71. Bedding material for the tank wall ran across the passageway and up to a mortared line of stones which formed the edge of a step down into Area 71. A plaster floor was then laid over the room and the doorsocket next to the entrance into Area 93 rebuilt. There may at this point have been a door between Area 72 and 71, indicated by a vertical groove in the plaster on the north side of the wall next to the step.

The small storeroom, Area 70, was also heavily plastered, with the same sort of waterproof plaster that was used in Areas 73 and 78. The floor, however, is completely missing, and indicated only by the plaster on the walls lipping out. Subsequent deposits relate only to the next phase when material was dumped across both Area 70 and 71.

To the rear of the building, there was a surface of limestone and plaster chips in a sand matrix. This ran up to Area 78, newly-constructed in this phase. The northeast edge of this area was destroyed. The interior walls of this room were lined with three coats of hard white plaster, each up to 1 cm thick. These were overlapped by two plaster coats on the floor where the total thickness of the plaster was 4 cm. The floor was level, though cracked and pitted in places. In the northwest corner the last coat of plaster was missing over a rectangular area of floor and wall, perhaps where something had sat prior to the last plastering and then subsequently been removed.

In the final phase of occupation in Bldg 56 (Phase 2.2) only one or possibly two internal rooms remained in use. A new plastered floor was laid in Area 93, but the door into Area 72 was blocked off and a curious plastered curve left on the north side of the doorway. There was a fragmentary plaster floor with two pits containing mammal bones. A bench was constructed against the northwest wall. Its top was divided by two grooves into three raised rectangular areas, each one higher than the other by 5 cm, with the highest on the northeast side. The grooves sloped down towards the front. There was also a groove between the back of the installation and the wall behind. It is not known if this feature had a Phase 2.1 predecessor.

The plastered tank (Area 73) was presumably by now in disrepair since access was cut off, while the other rooms in the southern part of the building (Areas 70–2) were used for dumping rubbish. Area 70 in this phase contained one of the highest percentages of charred material by weight recovered from the settlement.
Building 58

Bldg 58 was constructed out of the northern part of Bldg 56 when the latter building was rebuilt. A dividing wall without an interconnecting doorway sealed off Area 67 from the rooms to the south, creating a separate one-roomed unit. This dividing wall was built directly on top of the hearth of the preceding phase. Furthermore, no new floor was laid down within Bldg 58; the old one simply continued in use.

Access into the building was between a low-standing porch in Main Street, from where two stone steps led down on to the threshold of the door, with a further step set above the floor. By the end of the life of Bldg 58, the street level was 82 cm above the level of the floor.

Bldg 58 is the only single-roomed building in the settlement. This, and the lack of any installations inside, suggest that at the very least many of the household activities for which there is evidence in most other buildings were not taking place here.
Building 57

Bldg 57 lies at the southern end of Block F. In Phase 1 it was a typical two-roomed building, with front and rear access. When it was rebuilt in Phase 2, the front wall of the building was pushed out into Main Street and access to the inner room shifted to the short dividing wall. In the Phase 2 street wall of the inner room there was also a plastered opening, perhaps a threshold. If there was indeed a doorway here, it is a curious departure from the norm, although there is one other possible example (Bldg 111 in Block H).

Phase 1

Phase 1 is the original phase of Bldg 57, as shown in the section across Main Street where the bottom of the street wall was identified above a layer of black sand (see Fig. 2.9). The outer room of the building (Area 74) contained a hearth set against the internal northeast wall, with the remnants of a cooking pot support next to it. Around the corner, on the southeast internal wall, were four plastered stones, evidence of further hearths and cooking pot supports, surrounded by small patches of burning. The inner room in this phase had a grey ashy horizon rather than a well-laid floor; it did not contain any installations.

Phase 2

At the end of Phase 1, the building was remodelled and a layer of sand dumped across the two rooms to raise the internal levels. The inner room was shortened along the side parallel with Main Street and built further out into the street. The new street wall contained a plastered opening, and the plaster from this spread down and over the Phase 1 street wall which had been cut down but left exposed in the inner room. This opening was subsequently blocked by large, unmortared stones.

The outer room (Area 74) contained part of a jar set into the floor, the base of which was coated in bitumen and plaster, and a circular pad of plaster, perhaps the support for a post.
the early Dilmun settlement at Saar

Fig. 3.116. The Saar settlement and burial field (photograph taken in 1993) (SW)
Block G is part of the Southeastern Quarter of the settlement and comprises a block of buildings on the northeast side of Main Street. It contains a row of six buildings, not all of which are contemporary. The earliest level (Level G1) remains by and large unexcavated and is represented by underlying builds to existing walls. Bldgs 102, 104, 106 and 108 all provided evidence of an original build so that, at this level, Block G consisted of a row of at least four buildings and perhaps as many as six. Bldg 110 at the southern end remained unexcavated, and work in Bldg 100 at the north end was inconclusive on this point. Subsequently, Bldg 102 was abandoned, while its neighbours to north and south were rebuilt (Level G2). In effect, this split Block G into two parts, with Bldg 100 standing in isolation at the north end and a row of four buildings lying to the south.

Block G is remarkable for the uniformity of building plan: all buildings are of a simple two-roomed plan. In Level G2, the position of the inner room and external doors is also the same in all buildings. The data on installations in the block is incomplete: two buildings were excavated by the previous expedition (Bldgs 106 which had been stripped of installations and floors, and Bldg 108), while only the partial wall lines of Bldg 110 were identified.

Block G is stratigraphically isolated from the central area of the settlement. To the northwest, unexcavated buildings lie between it and Block F. It is assumed, however, that the latest major phase of occupation in the buildings of Block G (Level G2) corresponds to the latest main phase of occupation in the blocks to the north (Block F2 et al.), and that where evidence for an underlying building phase was obtained for Block G (Level G1) this also corresponds to the underlying building phase of those same blocks.
Building 100

Bldg 100 lies on the east side of Main Street at the northern end of Block G. The building was built (or possibly rebuilt) over the abandoned remains of Bldg 102 to the southeast and is free-standing in this phase. Buildings to the northwest were not investigated, but there was either an open space or an alleyway here. To the rear of Bldg 100 was a sloping open area.

The building had three rooms: an outer one containing the domestic installations and two inner rooms. During Phase 1 it acquired a porch outside the entrance from Main Street. Extrapolating from the examples of Bldgs 53 and 56, this is an indication that Bldg 100 was still inhabited towards the end of the life of the settlement. A door to the rear led out to an open space where there was a tannur near the northern corner of the building.

Phase 1

Entrance from Main Street into the building was in the southwest corner. By the end of this phase, the external street level was 70 cm higher than the internal floor level of the building so that a total of three steps including the threshold were required to get down into the building. A low L-shaped wall shielded the doorway on the northern side, and, in common with examples outside Bldgs 53 and 56, was constructed to stop the sand in the street from filling in the steps and seeping into the building under the door.

Inside the doorway into the outer room (Area 102) a bench-and-basin lay immediately on the right, against the southeast wall. It had a stone-built superstructure. The part nearest the doorway had a stone-edged rim and served as a jar support, while at the other end, at a lower height, was a plastered basin. This installation is very similar to an example from Bldg 51.

The outer room has a large buttress bonded into the corner of the walls of the inner rooms, twice the thickness of most other buttresses found in similar positions in other buildings. Opposite, on the rear wall, was a low rectangular bench/jar support and next to it, on the north side, a shallow plastered pit in the floor. On the right hand side of the doorway into the inner rooms was a plastered ledge, a feature noted in a similar position in other buildings (e.g., Bldg 204).

The outer room had two sequences of flooring (Phase 1.1 and 1.2). The Phase 1.1 floor, only partly excavated, was a hard plaster surface with several laminations. The subsequent floor (Phase 1.2) broke up in the southern half of the room where it was mixed in with ash and sand, reflecting increased wear and tear between the external doorways of the building.

From the outer room, a door led into the first of two inner rooms (Area 101) and from here there was access into the room behind (Area 100). No features contemporary with the Phase 1 occupation of the building were found in these inner rooms.

In the eastern corner of the building a doorway with a mortar re-used as doorksocket provided access to the open area behind the building (Area 103). Here, fragmentary surfaces sloped sharply down to the east. Close to the northern corner of the building was a tannur.

Phase 2

Partially blocking the doorway between the inner rooms was a poorly-built stone hearth. This lay above the last Phase 2 floor with an associated deposit of ash and bone. This debris spilled over the top of the partition wall between Areas 100 and 101 and suggests the use of the room as a rubbish dump (Phase 2.1) prior to the final collapse of the building. Overlying this again was wall tumble including fragments of hard white plaster with impressions of palm fronds, perhaps remnants of a repair to part of the ceiling.
Building 102

Bldg 102 lies south of Bldg 101. It was a two-roomed building with an entrance from Main Street in the western corner. The rear wall had been robbed out in places to below foundation level, but it is assumed that in common with all the other buildings in the block it also had a rear entrance. There were three separate flooring sequences in the outer room, accompanied by three episodes of raising the threshold of the front door (Phases 1.1–1.3). Subsequently, when Bldg 100 to the north was constructed (or rebuilt) and Bldg 104 to the south rebuilt, Bldg 102 was demolished, the street wall taken down, and the area used as a rubbish dump (Phase 2.1). It was then deliberately levelled off (Phase 2.2), an episode that happened well before the end of occupation in the neighbouring buildings.

Phase 1

The building had an outer room (Area 104) and an inner rectangular room (Area 105). The northwest and southeast walls were obscured by later rebuilds and there was some robbing out of the front and back walls of the building.

In the outer room, next to the doorway into Main Street, there was a well-plastered doorsocket with a stone surround. The threshold of the doorway showed three separate phases of rebuilding. A plastered bench with a trough lay in the passageway of the outer room. The installation had been well used, with eight applications of brown plaster 6 cm thick in total. Further along the same wall was a tannur.

The original floor here (Phase 1.1) was of plaster, overlain by ashy debris originating from the tannur. Following a resurfacing of this floor (Phase 1.2) three pits were dug into the room. Two of these were circular, with sterile sand fill, and may have originally held storage jars. The third and largest had scorched sides and was filled with ashy debris, and may have been a fire-pit. A final floor was laid above a sterile make-up deposit (Phase 1.3), and this was accompanied by the demolition of the original tannur and the building of a new one around the corner in the main part of the outer room. The bench-and-basin appeared to continue in use into Phase 1.3, though the fragmentary nature of the surface makes it difficult to be certain.

In the inner room (Area 105), there was a single unplastered floor corresponding to the three in the outer room. The room was without any installations.

Phase 2

At the end of Phase 1, the house walls were dismantled and built over during the rebuilding of the neighbouring houses. The space once occupied by Bldg 102, particularly the area that was formerly the inner room, was then used as a rubbish dump (Phase 2.1). There then appears to have been a deliberate effort to level off part of the site (Phase 2.2), perhaps to create a path from Main Street out to the back of Block G. This event happened while the adjacent buildings were still occupied.
Building 104

Bldg 104 is a two-roomed building with an outer room and an inner one. It has one external door in the southwest corner, providing access from Main Street, and a second one in the northeast wall, leading to an open space at the rear of the block. The southern half of the building had been excavated by the previous expedition, and later floors removed, so that the distribution of features and objects is incomplete. Our excavations were restricted to recovering the rest of the plan down to the exposed floors.

The building had some unusual construction features: the walls were built of large boulders packed round with smaller pebbles; a noticeable quantity of sea-stone was used, as in Bldg 226; and the southeast wall had two short sections that were not bonded. It also had some odd buttressing in the inner room which presumably reflects structural problems of some sort.

The building had two phases. The earliest (Phase 1) was exposed only in the sides of later pits and is otherwise unexcavated. Bldg 104 was then rebuilt (Phase 2). On its abandonment (Phase 3), a deep pit was dug in the northwest corner of the outer room and the walls at the rear of the building were partly robbed.

Phase 1

Phase 1 is known only from material exposed by the later pit in the northwest corner of the outer room. In the sides of this pit, a lower and earlier build of the rear (northeast) wall of the building, on the same alignment as the later one, was noted.

Phase 2

Access to Building 104 from Main Street was through a door in the southwest corner of the outer room (Area 114). Next to the doorway there was a round plaster object or installation in a fragmentary condition. A rectangular bench was also located here, with the sliced half of a jar set into the lower northern end to form a small basin. Bldgs 104 and 204 contained similar installations. On the rear wall of the outer room was a low work platform or bench, with an adjacent irregular scoop or pit filled with ash. Two shallow, circular depressions close to the rear wall may have served as jar supports.

During this phase, buttresses were added to both sides of the northeast partition wall of the inner room, as well as to a short stretch of the main southwest wall of the building. In the inner room (Area 113) there was a plastered doorsocket but no additional features.

Phase 3

Following the abandonment of the building, a large shallow scoop in the north part of the outer room removed much of the floor material. This feature then filled up with rubbish. Rather oddly, the southern extent of this rubbish dump was delineated by an uneven line of stones. Later on, a large circular pit, over 120 cm deep and 110 cm wide, was cut right down through this dump.
Fig. 3.124  Bldg 104 (N)

Fig. 3.125  Outline of burnt pit in Area 114 (SE)

Fig. 3.126  Bench and sliced jar serving as basin (NW)

Fig. 3.127  Main southwest wall, with large stones wedged in position

Fig. 3.128  Main southeast wall, built in short unbonded lengths
the early dilmun settlement at saar

Fig. 3.129 Southeastern Quarter, Blocks G and H (N)
Buildings 106, 108 and 110

Bldg 106 was excavated in its entirety by the previous expedition. It is a large two-roomed building with an outer and inner room. All the features and floors appear to have been removed but there was the remnant of a badly weathered hearth in the outer room. The main southwest wall of the building has a rebuild, marked by a kink in the wall, and the threshold in the doorway from Main Street has also been rebuilt, suggesting Bldg 104 has two or more phases.

Bldg 108 was also excavated by the previous expedition and no further excavation was carried out. It is also a two-roomed building with an outer and inner room. Entrance from Main Street was through a door in the southwest corner. There was a large and roughly constructed step between threshold and floor, indicating, yet again, a disparity between the street level and that of the internal floors.

A bench-and-basin lay in the outer room (Area 119) along the wall next to the rear door, and there was also a hearth next to the door into the inner room (Area 118). As was also the case with Bldg 106, there was a clear rebuild on the main southwest wall. No installations were left in the inner room.

Bldg 110 is unexcavated with only the tops of the walls exposed in places. It is a two-roomed building of similar size and plan to the rest of Block G.
Block H is part of the Southeastern Quarter of the settlement, lying on the southwest side of Main Street, opposite the houses of Block G. It contains a row of at least seven buildings (although it was not demonstrated that all were strictly contemporary). Beyond Block H, the line of Main Street continued to the southeast for at least another 45m before dropping off the ridge and under the modern plain level.

All the buildings in the block except for Bldg 101 at the northern end were excavated by the previous expedition. Our work was limited to the partial excavation of Bldg 101, to exposing the front walls of the buildings to fix the line of Main Street in this area, and to investigating of the building sequence of the block. Although none of the other buildings were fully excavated, enough work was carried out to suggest that all the buildings had simple two-roomed plans, mirroring Block H across the street.

In Main Street, the junction of Bldgs 109 and 111 was investigated and here there was evidence for an earlier building level sitting close to bedrock (Level H1). The visible excavated building phases were assigned to Level H2. A further period of re-use is indicated by very high thresholds in Bldgs 103 and 111 (Level H3), though deposits associated with these features were no longer present.

It is not possible due to the incompleteness of the evidence to comment on the range and disposition of installations within Block H; the plans are illustrated and reported on briefly in this section to complete the record.
**Building 101**

Bldg 101 is at the northern end of the block. The building was only partly excavated so that the plan remains incomplete. It appears that the original two-roomed unit was rebuilt once before falling into disuse and serving as an outside area to Bldg 103, which continued to be inhabited.

**Phase 1**

A doorway in the main northeast wall led over a stone threshold into an outer room (Area 108). A blocked doorway and threshold were visible at the same height in the northwest wall, suggesting that originally access to the building may have been from this side (though as the lower floor levels were not excavated this is not certain). The building has an unusual plan, similar only to Bldg 1, with the inner room constructed in the opposite corner to the house entrance, in effect doing away with the corridor section of the outer room. In the outer room there was a sequence of two floors belonging to this phase, separated by a thick layer of make-up. The floors of the inner room (Area 109) were not excavated to this phase.

**Buildings 103, 105, 107, 109, 111 and 113**

Bldg 103 is possibly a two-roomed unit. In a late phase, it has a very high threshold in the northwest wall with layers of ash spilling down over the walls of Bldg 101.

Bldg 105 is also a two-roomed unit. It is largely unexcavated but is unusual for the presence of a very thick brown plaster lining the wall of the inner room. The plaster was pushed into the stones up to 12 cm behind the wall face. The street doorway of the building shows a sequence of three thresholds.

Bldgs 107, 109 and 111 are all two-roomed units. Bldg 111 also has a high threshold inserted into the street wall, indicating late re-use. The northeast wall of the inner room had a layer of thick brown plaster, and on the southwest wall there was a 16 cm thick additional lining of the wall face in stone and finished with brown plaster. A continuation of the street wall beyond Bldg 111 indicates the presence of at least one more building in this block (Bldg 113).

**Buildings 150 and 151 on the southern edge**

At the southern end of the site, 82 m south of Block H, were some structures that had been excavated by the previous expedition. As extant in 1990, they appeared to consist of two semicircular structures, one course high, built directly on top of bedrock (Bldgs 150 and 151). The original report mentions that a ‘series of flat stones were found, forming an irregular pattern of incomplete circles and rough lines’ (Littleton 1984: 8). There were no associated archaeological deposits, just gravel wash and eroded pottery fragments of uncertain date, so there has to be some uncertainty about the dating of the structures themselves. They may not be contemporary with the settlement.
Block I is part of the Southern Quarter and comprises a row of buildings running along the west side of Main Street opposite Block F. The full extent of the block in any one level is not clear. Many of the buildings of the earliest construction level (Level I2) are obscured by later versions, and the southeastern end of the block remains unexcavated. The sequence is best observed in the section across Main Street (Fig. 2.9) which also illustrates pre-Block I deposits above bedrock (assigned to Level I1).

Level I2 represents construction and first use of the block. At the northern end, Janabiyah Street was quite narrow with at least one building (Bldg 49) lying north of Bldg 51. This is known only from fragments of walling found in the linking sections (see Fig. 3.231). To the south Bldgs 51–3 have Level I2 antecedents, though in the case of the latter the plan is largely unknown. Bldg 54 was not investigated to this level.

Level I3 represents a major rebuild. Bldg 52 was not rebuilt at this time, effectively splitting Block I into two parts: the southern one comprising Bldgs 53 and 54, plus at least one more unexcavated building beyond; and the northern one made up of Bldgs 51 and more unexcavated buildings to the north lying below Bldg 50. In the succeeding Level I4, Bldg 50 was constructed at the northern end of the block, at a time when some of the neighbouring buildings had been abandoned.

Block I is most notable for Bldg 53, which is the largest interconnected unit in the settlement. It has eleven separate areas, including a large walled courtyard (Area 58) and a second yard with storerooms along one side (Areas 84–7). The presence of a porch in the street indicates that it remained in use relatively late on (as did Bldg 58 opposite). Bldg 51, a rather ordinary looking unit architecturally, produced an unusual concentration of high-status items.
Building 50

Bldg 50 is the northernmost excavated building of Block I and was built at a time when the surrounding buildings were already falling into disuse. It has three separate areas: an outer room and two inner rooms, one leading into the other (an arrangement similar to Bldg 34). The innermost room (Area 91) is very narrow and the evidence for a doorway was inconclusive. Consequently, there remains some doubt about whether the partition wall between the two inner rooms was ever to full height.

Phase 1

Access to Bldg 50 was through an unusually wide doorway in the eastern corner. Inside the doorway, in the outer room (Area 57), was a bench with plastered trough. By the door into the first of the two inner rooms (Area 90) lay a stone ledge or shelf similar to examples in Bldgs 56 and 202 and, on the other side of the same doorway, a semicircular hearth. The outer room had a sequence of three floors surviving only as patches. There were no traces of flooring around the rear entrance, indicating heavy wear and tear in this area.

The inner room (Area 90) had a large plastered doorsocket, but was otherwise devoid of features. The uppermost floor was well plastered and preserved across the entire room. It is not clear how access was gained to the innermost room (Area 91). Clearly, if there was a doorway, it was blocked by the time that the latest floor was in use. Part of the dividing wall of the inner room showed a different construction technique which may mask the original doorway, though this is by no means conclusive. This innermost area did have a sequence of two floors with occupation material which suggest that, in spite of the problems with identifying the door, it nevertheless functioned originally as a separate room.

Phase 2

The collapse of the building was represented by several episodes of fallen masonry. Sitting above the first of these in Area 90 was a midden of black ashy sand, rich in bone, heaped up in the north corner of the room (Phase 2.1). Detailed micromorphological study showed that within this deposit there were at least two discrete horizons of discarded material.
Building 51

Bldg 51 is a two-roomed building with doorways out into Main Street to the east and into a large open area to the west (Area 59). A small additional space by the rear door differentiates the plan from that of a standard two-roomed building.

The outer area of Bldg 51 contained an unusual number of pits, including two with storage jars. It is possible that originally all the unplastered pits in this area contained pots. There was also a large number of finds from the building, including ten seals, two copper ingots, seven steatite lids, fourteen beads and over sixty stone tools. Even allowing for the fact that this material was spread over both the inner and outer rooms, on different floors and sometimes in make-up deposits, it nevertheless represents an unusual concentration of artefacts.

Bldg 51 was then abandoned (Phase 3), though the northwest wall was reutilized during the construction of Bldg 50. The southern wall of the building was robbed to foundation level.

Phase 1

The Phase 1 plan of Bldg 51 appears to have been the same as in Phase 2 except for the rear doorway. Here the Phase 2 rebuild chopped through a tannur, suggesting some minor realignment of walls (minor because the external section demonstrated that the extreme western corner of the building remained constant; Fig. 2.16).

The earliest floor level (Phase 1.1) was only exposed in the central part of the outer room. At this level, enough was preserved of the semicircular hearth in the outer room (Area 56) to show that it was of the same build as its successors.

The subsequent floor (Phase 1.2) contained a series of unplastered pits in the outer room. Five of these lay in a line along the northwest wall, with two further south. Two of these pits held jars that had been set at floor level for use as storage containers, and both jars still had stoppers covering the mouths. Perhaps all these pits originally served this same function. Next to the rear entrance, was a pit of a different type, coated with a hard white waterproof plaster.

Further plaster surfaces were then laid in the outer room (Phase 1.3 – 1.4). These floors were pitted. In the inner room (Area 55), there was a rectangular area of stones. Though this feature was irregular, it does appear to have been an installation, perhaps a low platform or work area. The inner room is noteworthy for the collection of finds that included a copper bun ingot, plaster and stone lids from Phase 1.3, and another fragment of a bun ingot, four seals (only one of which was damaged), two carnelian beads and eleven stone tools from Phase 1.4.

Phase 2

The walls of Bldg 51 were rebuilt at the end of Phase 1. This is seen most clearly in the section against the outside face of the southwest wall of the building, and in the central section of the northwest wall, where a layer of packing separated the upper and lower builds. The floors of both rooms were levelled up and resurfaced (Phase 2.1). The levelling material contained many objects which are assumed to be redeposited, perhaps originating in the nearby open area (Area 59) where there seems relatively little build-up. Inside the main entrance to the building there was a bench with a lower basin at the northeast end. The feature appears to have been rebuilt at least once and may have originated in Phase 1. A similar example was found in Bldg 100. The Phase 1 semicircular hearth next to the door into the inner room was rebuilt yet again in Phase 2.

In the open area to the rear (Area 59) localised, trampled surfaces predominated. Very little material accumulated during Phase 2, suggesting minimal activity (or possibly reworking of deposits). There were two pits close to the rear wall of Bldg 52, but otherwise no installations were present.

Phase 3

At the end of Phase 2, it would appear that the door into Main Street was deliberately blocked, though this was not noted in the rear entrance. The northwest wall was reused during the construction of Bldg 50 to the north. After the partial collapse of the building, which broke up the latest floor, part of the building served as a refuse dump, with black ashy sand dumped over the walls. The main south wall was robbed out (Phase 3.2).
Fig. 3.142 Bldg 51 (NW)

Fig. 3.143 Bench-and-basin (NW)

Fig. 3.144 Pits in main room of Bldg 51 (SW)

Fig. 3.145 Semicircular hearth in Bldg 51 (NE)
Building 52

Bldg 52 is a standard two-roomed unit with an outer and inner room. It had a relatively short phase of occupation with only a single floor between construction and abandonment. When the block underwent the major renovation of Level I3, Bldg 52 was demolished and left semi-derelict. Its neighbour to the south (Bldg 53) encroached over the old boundary wall, as clearly seen in the street section (Fig. 2.22). The area once occupied by Bldg 52 then became a walk-through, linking Main Street with the large open space at the rear of Block I.

Phase 1

In the construction horizon of Bldg 52, several fire-pits were identified that were connected with the construction process. Similar examples were noted in the construction levels of other buildings in the settlement.

During its short life, Bldg 51 had an outer room (Area 54) and an inner room (Area 53). Entrance was from the northeast corner of the building, off Main Street. Due to wall robbing and demolition, it is not clear if there was a rear entrance. There were two installations in the outer room: a bench-and-basin that was mostly destroyed, and a plastered semicircular hearth. The inner room was devoid of any features.

Phase 2

After the short occupation of Phase 2, the southeast end of Bldg 52 was removed and the walls of Bldg 53 superimposed. This process included the demolition to just above floor level of the main southwest wall of the building, the removal of the main southeast wall, and the slicing away of the walls of the inner room. Intermittent use of the abandoned building is suggested both by ashy horizons within the rubble of the inner room and by the presence of a plastered basin against the northwest wall of the building, lying between two rubble horizons. Subsequently, the partition wall between Bldgs 51 and 52 was robbed out down to foundation level.
Building 53

Bldg 53 is a building with eleven separate areas. These all interconnect and so are described here as a single building. The building has already been extensively discussed (Killick and Moon 1995). The following, however, is the definitive revised account of the architecture and phasing of this building.

An early building phase (Phase 1) underlies Bldg 53, elements of which were uncovered below the Phase 2 floors in Area 52. When Bldg 53 was rebuilt (Phase 2), its main northwest wall extended over the now-demolished Bldg 52.

In Phase 2, Bldg 53 has an intact doorway at the northern end protected in the latest phase by a porch (Fig. 3.155). Here the outer room (Area 52) runs rounds three sides of the inner room (Area 51). The only parallel to this arrangement is the rear part of Bldg 220. A doorway to the rear provides access into a large enclosed yard (Area 58) and a second doorway links through into an adjoining suite of three rooms (Areas 61, 62 and 64). These, in turn, had access into a second courtyard (Area 63) which had four storerooms running along the southeast edge (Areas 84–7). At the northeast end of Area 61, the street wall had been removed to foundation level. An area of flat stones here may indicate a threshold and second entrance from Main Street.

Bldg 53 has only a single floor in Phase 2, with building collapse lying immediately above. There is a chronology of construction, with the courtyards and storage rooms at the rear tacked on last (the walls of these areas all abut the eastern part of the building), but these still must have been constructed during the lifetime of the original (and only) floors in the rest of the building.

Phase 1

Limited investigations in Area 52 at the north end of the building, and in Area 64 at the south end, show that Bldg 53 was built over a range of earlier buildings. To the north, two earlier walls lay under the floor make-up of the Phase 2 building. These walls are interpreted as forming part of a building that adjoined Bldg 52. The northwestern wall was plastered on its northern face and, in the section of a pit which cut through it, two distinct plaster surfaces were noted, separated by a band of occupation. The southwest stretch of wall was plastered on both faces and contained an opening into what was probably the inner room of the building.

Within Area 64, underlying walls were noted showing through the Phase 2 flooring and running parallel with the northeast and southeast walls of the room, but the wider plan cannot be reconstructed for this area.

Phase 2

The doorway into the building from Main Street was sheltered by a small porch of two low stone walls, similar to examples from Bldg 58 across the way and Bldg 100 further south. These are considered to be an indication of relatively late occupation within the settlement: the porches are built on the latest surface identified in the street. In Bldg 53 the base of the porch walls stands 60 cm higher than the floor, which had to be reached via a single internal step. The doorway and most of Area 52 had already been excavated by the previous expedition: stones left in situ appear to indicate that the doorway was blocked in antiquity, which was
our original interpretation, but we cannot demonstrate beyond
doubt that this is the case.

This part of the building is made up of three distinct areas: an
outer room (Area 52) which runs round three sides of a smaller
inner room (Area 51) and a large rear courtyard (Area 58). There is
access through into Area 61 and the rest of the building.

The outer room has a standard range of installations. On the
wall opposite the door from Main Street was an eroded frag-
ment of a semicircular hearth. This is an unusual position for such
a feature, which is more normally found at the rear of a build-
ing. Indeed, next to the door into the inner room were traces of
what may have been a second example of such a hearth, though
no superstructure survived. Also along the northeastern wall was a
bench-and-basin, with the plastered basin at the east end, and next
to it a stone slab with a flat top which served as an additional shelf
or bench. Further into the room a large block of stone, perhaps an
anvil, stood on the floor, and next to the door into the inner room
was a low stone ledge. The inner room itself was devoid of installa-
tions and had a single plaster floor.

The open courtyard at the rear (Area 58) is the largest enclosed
yard in the settlement (44 sq m). The walls on the north and west
sides survived to a height of 1 m, and associated rubble collapse,
particularly off the west wall, suggests the original height was
around 2 m or higher, a sufficient height to prevent casual inspec-
tion by a passer-by. Nothing found in the courtyard gives much
clue as to its function: there was no surface as such, but dumps of
ash and rubbish in sand, with occasional concentrations of shells.
There was the remnant of the base of a plastered basin close to
the south wall, but otherwise it was devoid of storage or cook-
ing installations. Perhaps it served as an enclosure for animals, or
somewhere to store consumables or goods that did not need the
protection of a roof.

A possible second doorway out from Main Street lay at the
eastern end of the building in Area 61. Here the street wall was
robbed to foundation level, but a flat area of stones looks suspi-
ciously like an internal step similar to that in Area 52. From Area 61
there was access to a large inner room (Area 62), to a small room
to the south (Area 64), and out into another rear yard (Area 63)
and row of storerooms (Areas 84 – 7).

In Area 61 there was a rectangular bench, mostly destroyed,
but possibly a bench-and-basin feature, and against the south
wall a tannur. A plastered stone ledge had been built next to
the door into Area 64. Here fallen chunks of white plaster lay
in the debris overlying the floor of the room. The collapse was
most dense in the southwest corner where some of it formed
corner pieces, which may have come from a wall corner or door-
jamb. Another unusual feature of the room was the presence of
a stone bench along the entire length of the northeast wall. It
was well made and had originally been plastered. A storage jar
had been set into the floor of the room in the eastern corner.
Taken together these feature suggest some unusual function for
this room.

Returning to Area 61, an adjacent door leads into a second
yard (Area 62) and to four small storerooms arranged along its
southern wall (Areas 84 – 7). The deposits and installations in
Area 63 suggest a busy work area, with broken and discarded bits
of worked and unworked stone left lying around, perhaps stored
for re-use. Part of a stone basin subsequently rammed into the
south wall of the yard to help keep it up is a good illustration of
such practice.

While there may originally have been a single plastered sur-
face across this area, wear-and-tear had reduced it to several
different horizons. Where the floor sloped up towards the north-
west end of the yard it had clearly visible laminations of thin, fri-
able grey plaster with lenses of ash, and it was also well preserved
around the cooking installations on the north wall. Elsewhere,
it deteriorated into soft ashy grey sand with pottery and shell
churned in. It was particularly worn in the centre of the room,
due to heavy trampling.

Along the north wall of the room was a tannur, the rakings of
which spilled out southwards on to the floor. Two plastered stones
from a hearth support lay just to the east. A thick wedge of plas-
ter on the wall behind indicated the possible position of the third
cone of the support. A second similar hearth lay close-by: the rem-
ants of two supports were clearly visible but little else remained.
On the south side, was an unusual installation made up of a low
circular arrangement of loose stones abutting the face of the wall.
The stones were roughly laid to a maximum of four courses along
the south edge against the wall, and may represent a crude support
for a large storage vessel.

Four small storage rooms lay along the southern edge of
Area 63. In Area 84 a doorway led to a second room (Area 85). In
both these rooms there were no clearly defined floor horizons, but
ephemeral trampled surfaces mixed in with sand.

Two smaller rooms completed the suite (Areas 86 and 87). In
Area 86, the floor survived as three patches of grey plaster. This was
overlain by a layer of uneven stones, with some occupation debris
mixed in. Similar material was found in Area 87. It was originally
speculated that these might form rough stone pavements in these
rooms, but an alternative explanation is that they signify the first
stage of collapse, with the accompanying cultural material related
to episodes of dumping.
Fig. 3.153  Collapsed rear wall of court-
yard, Area 58 (NW)

Fig. 3.154  Stone support and basin
fragments in rear yard, Area 63 (SE)

Fig. 3.155  Phase 2

Fig. 3.156  Fallen plaster in Area 64 (SE)

Fig. 3.157  Storage jar
with sherd lid set into
floor in Area 64 (E)
Building 54

Bldg 54 lies to the south of Bldg 53. It is a three-roomed unit with an atypical arrangement of rooms: an outer room running the length of the building (Area 92) provides access into a subsidiary room (Area 65), from where a door leads into the third chamber (Area 64). The wall running along Main Street was robbed out except for a doorjamb in the southeast corner. There is also a doorway at the rear of the building out into an external space (Area 88). The position of the bench-and-basin feature next to the rear door is odd and, on analogy with other buildings, suggests that this may have been the main entrance to the building. The prolongation of the main southeast wall of the building beyond the rear entrance and the presence of buttresses on the south side indicate the presence of an adjoining, unexcavated building.

The building has one excavated phase with a single floor in the yard, but four replasterings were noted in Area 65 (Phase 1). After initial collapse of the building (Phase 2.1), there was an episode of dumping refuse (Phase 2.2) before further collapse took place.

Phase 1

Entrances to the building were located at either end of the outer room (Area 92). The northeast entrance was robbed out but indicated by a doorjamb and part of what may have been an internal step.

The installations were grouped at the southwest end of the building: a bench-and-basin awkwardly positioned next to the doorway; and a semicircular hearth and cooking pot support along the opposite wall of the outer room. Just outside in the open space to the south of the building (Area 88) there was a tannur.

The single floor in the outer room was made up of laminated plaster surfaces containing thin lenses of ash. A large worked stone with four small circular depressions in its surface lay on the floor next to a fragment of plaster basin.

In the first inner room (Area 65) there were four separate floor horizons, compressed within 20 cm of deposit. The original floor (Phase 2.1) was laid over a deposit of levelling material which ran under the internal walls of the building but up to earlier versions of the main boundary walls with Bldg 53. Near the doorway into the innermost chamber was a storage jar set into a pit so that its rim was at floor level and, on the opposite side of the doorway, a small ledge made up of two large stones.

The second floor in the sequence (Phase 1.2) was not so well made, consisting of grey compact sand with lenses of yellow mortar. The storage jar was sealed by this reflooring and thus no longer in use.

In the next reflooring (Phase 1.3), the position of the door into the inner chamber switched sides, with a doorsocket sitting where formerly the stone ledge had been.

Apart from a doorsocket set into the original floor, the innermost room (Area 66) was devoid of features. The primary surface was a compact grey plaster floor.

Phase 2

Between two layers of collapse in the innermost room was a refuse dump with a concentration of pottery, shell and bone. This dump sealed the robber trenches that had removed the main northeast wall of the building after the initial collapse of the walls. This was the only evidence for post-occupation activity in this area.
Block JE is part of the Central Quarter and is made up of three buildings lying along the west side of Main Street and south of the temple (Bldgs 200, 210 and 211). The buildings share a continuous section of street wall, uninterrupted except for the doorways to Bldgs 210 and 211. Bldg 200 is on a different orientation from the other two, with a doorway tucked away off South Alley.

The earliest building level of the block (Level JE1) is known from the section across Main Street (see Fig. 3.161), and from a small sounding in Bldg 210 where a precursor to the excavated building of Level JE2 was identified.

Level JE2 represents the main excavated phase of all three buildings and it is a relatively lengthy one, as illustrated by the sequence of thresholds in Bldg 211 and the accumulation of sand in Main Street that was observed in section. At this time, Janabiyah Street was bounded to the south by (unexcavated) Bldg 49, and it was only subsequently that Bldg 50 encroached on this space, by which time Block JE had already fallen into general disuse. A correlation to this is that at the northern end of the block, evidence from the section across South Alley shows that by the time of the final renovations to the temple in Phase 6, Bldg 200 had also been abandoned.

Bldg 200 has an unusual plan, with two rooms, one behind the other, both running the full width of the building. The installations within Bldg 200, however, seem to be fairly typical and include a bench-and-basin and a hearth. Bldgs 210 and 211 are both lengthways-on to Main Street and have doorways leading out into this thoroughfare. They each have three rooms apiece, an outer room, an inner room, and a rear yard, though Bldg 210 originally had the use of two extra areas to the rear (Areas 126 and 127). These were subsequently demolished and became part of the open area that spread west to Bldg 7 of Block JN. Bldg 211 also had the use of an open external area which was bounded by Bldg 12 to the west and tucked off the north side of Janabiyah Street (Area 214).
the early dilmun settlement at saar
Fig. 3.162 The Central Quarter, with Block JE next to the temple (SW)
Building 200

Bldg 200 lay south of the temple at the junction of South Alley and Main Street. It has two rectangular rooms, one behind the other, with a single entrance tucked away in the southwest corner off a blind alley. The outer room (Area 205) is the larger of the two; a doorway in the eastern corner leads into the second room (Area 204). The plan of this building has no exact parallel. Blds 8 and 333 have a similar arrangement but are on an indirect axis. There is a typical range of cooking and storage installations in the building.

The main phase (Phase 2) included a sequence of five superimposed floors. An earlier phase (Phase 1) was identified in the northwestern corner, where the main wall had an earlier build.

Phase 1

The plan of the building in this phase is not known. Limited excavation in one corner of the outer room (Area 205) showed that the main northwest wall of the building sat on a layer of sand infill while the southwest wall continued much deeper, indicating an earlier, and unexcavated, phase.

Phase 2

At the end of Phase 1, a 60 cm deep deposit of sand was dumped over the area and new walls constructed, except for the southwest wall where the Phase 1 wall was retained and built up higher.

Fig. 3.164 The main room of Bldg 200 (NE)

Fig. 3.165 Niche and bench with basin in Area 205 (SE)
Entrance to the building in this phase was in the southern corner which led straight into the larger of the two rooms (Area 205). Immediately on the right was a plastered bench-and-basin, with a rectangular niche next to it built into the wall. The base of the niche was flush with the floor of the building whereas other examples of niches, such as those in Bldgs 203 and 208, are built much higher. A circular hearth with plastered lip was set into the floor near the centre of the room. This was subsequently repaired and relined. A cooking pot support and hearth, made up of two free-standing cones and one set against the wall, sat next to the doorway into the inner room. In the inner room, the base of a smashed storage jar had been set into the floor close to the doorway, and on the floor itself were two clay tokens, one seal impression and half of a bun ingot, a combination suggesting Area 204 was used as a storeroom.

Both rooms were resurfaced at the same time (Phase 2.2). In the outer room, the Phase 2.1 bench-and-basin was not rebuilt, but in the centre of the room a large rectangular hearth or fire-pit replaced the earlier version, and at the eastern end a new cooking pot support and hearth replaced the older version. In the west half of the room were fragments of one or more bitumen baskets. Here the floor has eroded back to the make-up level. In Phase 2.3, the floors were again resurfaced, though they survived only as patchy and intermittent surfaces. The cooking pot support and hearth were again rebuilt and a stone shelf tucked into the north corner. This was made up of a single large stone placed on a packing of smaller stones, all of which were mortared to the wall faces.

With the final floor in the sequence (Phase 2.4), a bench-and-basin reappears along the southeast wall, further away from the doorway than its predecessors. A large worked stone block lay next to it, perhaps an anvil. The cooking pot support was again remodelled and a new shelf of rough stones was built into the northern corner, slightly larger than its predecessor.

**Phase 3**

After the building was abandoned, sand blew into the rooms and this was followed by the collapse of the main walls of the building. Subsequently, the raft of mortar associated with the Phase 6 rebuild of the temple on the north side of the alley ran over the stub of the collapsed walls of Bldg 200. This shows that Bldg 200 had already been abandoned for some time prior to the final rebuild of the temple.

---

**Fig. 3.167 Phase 2.4**

**Fig. 3.168 Remnant of circular hearth (Phase 2.1), cut by later fire-pit (SE)**

**Fig. 3.169 Section across Phase 2.2 fire-pit in Area 205 (NE)**

**Fig. 3.170 Section across South Alley, between Bldg 200 and the temple**
Building 210

Bldg 210 lay between Bldgs 200 and 211 on the southwest side of Main Street. In its excavated phase (Phase 2), the building had an inner room and an outer room with a small extension or annexe in the northwest corner, showing some similarity in this respect to Bldg 62. A doorway in the southwest corner led out into a large open area. In the earlier phase (Phase 1) this open area contained two enclosed rooms (Areas 126 and 127) which also belonged to Bldg 210. These are reminiscent of the ancillary rooms (Areas 128 and 129) shared by Bldgs 11 and 12. In the inner room, an intact copper hoe was found.

Phase 1

During Phase 1, the limits and plan of the main part of the building appear to have been as seen in Phase 2, with the main boundary walls of the building in the same position as their later counterparts. There was a single doorway providing access off Main Street into the eastern half of the building. The inner room (Area 206) had a well-plastered floor, identified in a limited area only. This lay below sand and packing for the Phase 2 floor. The outer room (Area 207) was not investigated at this level. To the rear was an enclosed yard (Area 127) with a small room in the northeast corner (Area 126). The yard had a worn plaster floor, partly scorched in the centre. At the southern end a plastered double-basin was set against the southeast wall. A contemporary floor in the small chamber (Area 126) was badly eroded and only survived as a diagonal strip across the room.

Phase 2

In this phase, the doorway in the southwest corner of Area 207 led out into a wide open space shared by neighbouring buildings and containing the cut-down walls of Areas 126 and 127. Near the rear door of the building in this phase was the base of a large storage jar which had been filled with plaster.

Next to the door from Main Street was a plastered doorsocket with a stone surround. A bench-and-basin lay against the southeast wall, while opposite was a tannur and large rectangular pit with two shallow depressions in the bottom. In the main part of Area 207, a cooking pot support and hearth lay against the southwest wall, and tucked away in the far corner was a pit with a stone surround, perhaps a jar support. The inner room was devoid of installations, but rich in metal artefacts including a hoe, a pin, a ring, three shell beads and a seal.

In Phase 2.2 the internal rooms of the building were resurfaced. The only architectural addition was a substantial buttress built in Area 207 against the northwest wall of the building which by this stage had a distinct inward lean.

Phase 3

An episode of sand blowing into the building was followed by the collapse of all the building walls leaving the building full of rubble. Transient occupation, represented by temporary fires, occurred in what was left of the northeast corner of the building, and against a portion of the surviving southeast wall.
Fig. 3.173  Tannur, doorway, and bench with basin in Area 207 (NE)

Fig. 3.174  Rear yard and room, Areas 126 and 127 (SE)

Fig. 3.172  Bldg 210 (N)

Fig. 3.175  Plastered jar base in Area 127 (SE)
Building 211

Bldg 211 is situated at the eastern corner of Block J. On the north side, the building shared a wall with Bldg 210, on the east side was Main Street, on the south side Janabiyah Street, and on the west side a square to which Bldg 211 alone had reasonable access. The building had an outer and inner room, with an additional yard on the south side, as well as an external square which was walled on three sides but open to Janabiyah Street to the south.

A single phase of occupation was excavated (Phase 1), but this had a lengthy flooring sequence accompanied by a sequence of three thresholds in the street doorway. At the northern end of the outer room, there were five episodes of reflooring interleaved with sand and mortar packing. These ramped down into the room to the south so that the last three surfaces to the north (Phase 1.4) merged into a single surface further south.

The threshold in the door out into Main Street was constantly being raised and steps added to combat the problem of rising external levels of sand. This was not so acute at the southern end of the building by the entrance into Janabiyah Street. As the sand rose in Main Street, making access into the northern end of the building difficult, the entrance into Janabiyah Street may have become the main one. In the early part of Phase 1, the bench-and-basin installation was located in the main part of the outer room, as close to the door into Main Street as possible without obstructing the passage. However, by Phase 1.3 this installation had been demolished and a new one constructed in the rear yard by the interconnecting doorway. The repositioning of this installation is taken as an indication of a change in circulation. It is the only example of such an installation being sited in the rear yard.

The contents of the inner room are noteworthy for the presence of a jar embedded in one of the floors, together with twelve fragments of seal impressions, suggesting that one of the functions of this room was for storage.

Phase 1

The building was entered at the north end through a door from Main Street. This opened into the narrow passageway which was part of the outer room (Area 212). In the latter part of Phase 1 this entrance was obstructed by a large tannur associated with Phase 1.4 floors onward. It is not known if this was also a feature of the earliest floors. Around the corner in the main part of Area 212, there was a bench-and-basin. Like other examples, the surface of the bench was made up of an edging of stones with a hollow centre, suggesting that it might originally have supported a jar. A plastered basin, set lower, made up the eastern half of the installation.

Against the southeast wall of the room was a cooking pot support with semicircular hearth. Seven seal impressions were found on the plaster floor. Charcoal and ash, debris from the hearth, had been swept into the south corner of the room.

In the inner room, a small pot had been set into the floor in mid-room. The rear yard (Area 213) and external square (Area 214) were not excavated to this phase.

Subsequently the outer room was resurfaced (Phase 1.2), raising the internal floor level by 20cm. This was accompanied by a corresponding rebuild of the threshold in the doorway from Main Street and by a remodelling of the installations in the room. It is possible that the southeast wall of Area 213 was rebuilt in this phase. The resurfacing of the internal floors resulted in the disappearance of part of the bench-and-basin installation: the basin at the eastern end was covered over by the new floor while the
higher western end continued in use. On the southern wall the hearths were replaced by a semicircular hearth sunk into the floor and without any superstructure.

The Phase 1.2 reflooring of Area 212 corresponded to the lowest excavated floor in the yard to the south (Area 213). In fact, the floor sequence in the yard was compressed: the Phase 1.2 floor was made up of a series of laminated and partial plasterings interleaved with thin occupation lenses, suggesting constant wear and repair. A new bench-and-basin was constructed by the internal door of the yard, replacing in function the now obsolete one in the inner room. On the opposite side of the door the plastered base of a large storage jar had been set into the floor.

The sitting of the bench-and-basin, usually set close to the main door of a building, suggests that the main entrance into the building was now from the blind alley to the southwest (Area 214).

Phase 1.3 represents another episode of reflooring in Area 212, again more pronounced closest to the northeast door out into Main Street, and accompanied by a rebuild of the threshold. It is unclear whether the tannur next to the door originated in this phase. No other features were identified in the outer room in this phase. The absence of any hearths suggests that the cooking area may by now have shifted, perhaps to the square outside (Area 214).

The installations in the rear yard (Area 213) remained the same through Phases 1.2–1.4.

Starting in Phase 1.3 or 1.4, the external square became quite a busy area. Set into a plaster surface on the west side against the wall of Bldg 12 was a row of four shallow depressions, with a second, more irregular row further from the wall. On the opposite wall was a bench-and-basin. The north half of this surface was missed in excavation which is hard to reconcile with its ease of recognition further south. We can only suggest that it was broken up by the large amount of rubble found in this area.

The build-up of sand in Main Street resulted in the construction of yet another raised threshold within the main doorway, after which a final step was added. In consequence, partial floors were laid down just inside the doorway of Bldg 211 forming a ramp from the new threshold down to the southern half of the room which remained at the same level. Three minor but distinct episodes of reflooring were noted (Phases 1.4). The first was laid over a wedge of sand and mortar. Partially blocking the doorway at this time was a tannur with an unusually large stone superstructure that filled the width of the passageway.

In the inner room (Area 211), a smashed pot lay within the latest occupation horizon. Twelve fragments of seal impressions were found nearby, including ones that matched an example from a contemporary level of Bldg 200 (Saar Report 2: 82–4; compare 1159:021 with 1161:15). In the rear yard the same floor continued in use, with evidence for continual patching.

Awkwardly situated in the middle of the passage during this phase, and dug into the floor, was a pit filled with green clay similar to the material used for seal impressions.
Block JN is part of the Central Quarter and contains two buildings that line the southern side of South Alley (Bldgs 7 and 13). Both buildings are oriented northwards, with doorways out into South Alley, though in the case of Bldg 13 access was via an intermediate space shared with Bldg 200. To the west is Saar Square and the buildings of Block KN, and to the south Bldgs 10–12 of Block JS.

The early history of the block is not known, though the section across Saar Square which linked Bldg 7 to Bldg 206 revealed evidence for an earlier underlying building. As excavated, Block JN has two levels. In the first (Level JN1), Bldg 7 has an inner room, an outer room and a rear yard, and Bldg 13 an inner room and an outer area, as well as access to Area 129 to the south (although how this was shared is not clear). In the succeeding level (Level JN2), much of the block became part of the open space of half-demolished walls and debris that spread over the heart of the Central Quarter as a whole. During this level, Bldg 13 was mostly demolished and a new entrance knocked through the street wall facing South Alley, presumably used for getting in and out of Bldg 7. This building too underwent significant restructuring: the inner room was reutilized as a cooking area, perhaps by one of its neighbours, and the southeast perimeter wall demolished (as also were Areas 126 and 127 to the south to which Bldg 7 had previously had access).
**Building 7**

Bldg 7 lies at the northwest corner of Block JN, where South Alley opens out into Saar Square. Excavation within the building was limited to the latest levels, but information about the antecedents of the building was garnered from excavations in South Alley to the northwest and against the external face of the main southwest wall of the building.

Bldg 7 was originally made up of three rooms with a single entrance from South Alley (Phase 1). This led into an outer room (Area 44), with an inner rectangular room tucked into the western corner (Area 43). A door in the east corner provided access into a second area running around the northeast and southeast sides of the building (Area 45). Subsequently, there were significant changes in the orientation and perhaps usage of Bldg 7, though the interpretation is problematic. The main walls of the building were rebuilt, the thresholds raised, and a new floor laid in the inner and outer rooms (Phase 2). The doorway into South Alley was blocked up, perhaps because the inhabitants were finally defeated by the rising sand, and external access created by inserting a doorway in the street wall of Bldg 13 to the northeast. By this time, Bldg 13 and other buildings in the centre of Block J had been demolished and, as a result, the rear yard of Bldg 7 (Area 45) was no longer enclosed but open on the east side, forming part of a single open space (Area 131). This space was shared with Bldg 210 to the east and with Bldg 10 to the south.

In Phase 2, the inner room of Bldg 7 contained a cooking pot support and tannur, and was clearly used mainly for cooking (as was the inner room of Bldg 222).

**Phase 1**

Although the Phase 1 levels were not extensively investigated, the limited results suggest that Bldg 7 was a three-roomed building in this phase, with a single entrance from South Alley. Excavations in the alley showed that the position of the northwest wall of the building was the same in Phase 1 as in Phase 2. The exterior of the main southwest wall of the building was also investigated. Here the underlying Phase 1 wall of the building had been robbed out prior to the Phase 2 rebuild. Phase 1 deposits were not excavated in either the inner rectangular room (Area 43) or the outer room (Area 44). In the rear yard (Area 45), part of the latest Phase 1 surface was exposed revealing a post hole in mid-room close to the rear wall.

**Phase 2**

The main southwest wall of the building was removed at the end of Phase 1 and then rebuilt higher up on the same alignment. This may also have been the case for the partition walls between Areas 43 and 44. The northwest wall, fronting South Alley, was left intact and built up, with a new threshold inserted into the doorway some...
80 cm higher than the Phase 1 equivalent. This was subsequently blocked (Phase 2.2) resulting in a major re-orientation of the building. By this time, neighbouring Bldg 13 had fallen into disuse and there was a single large and open area (Area 131) at the heart of Block J. A new doorway was knocked through the street wall of the abandoned Bldg 13.

The inner room of the building (Area 43) was now used for cooking rather than storage. A circular hearth with a moulded plaster rim lay to the left of the doorway. Just beyond was a cooking pot support with a hearth and a tannur in the corner. The plaster floor of the room looked well worn and had been eroded along the north wall and next to the door. The plaster surface of the outer room (Area 44) was intact except again for the areas around the doors. Recessed into the floor of Area 44 was a double-chambered hearth. Both chambers were intact and had moulded plaster edges raised above floor height. The western chamber was smaller and deeper than the eastern one. Opposite the hearth, against the southeast wall, was a fragment of a plastered basin, perhaps originally with a bench attached.

Covering Area 131 (which now comprised what had formerly been the outer area of Bldg 7, the entire surface area of Bldg 13 and former rooms at the back of Bldgs 211) was a jumble of partly demolished walls and rubble heaps, sometimes levelled flat to form rough paving, scattered occupation debris including dumps of shell and crabs, installations, patches of a single plaster surface, and large pockets of sand.

In the southwest part of Area 131, the floor surface was truncated by two pits or gullies which cut the surface on a northwest to southeast alignment. These features may have been the ghosts of wooden or barasti partitions, though no hard archaeological evidence survives. A plastered pit lay to the northwest. A large circular hearth lay against the wall with South Alley.

![Fig. 3.185 Circular hearth, cooking pot support and tannur in Area 43 (W)](image1)

![Fig. 3.186 Double-chambered hearth in Area 44 (NW)](image2)

![Fig. 3.184 Phase 2.2](image3)

![Fig. 3.187 Blocked door between Area 44 and South Alley (NW)](image4)
Building 13

Bldg 13 lies on the south side of South Alley. It shares a wall with Bldg 7 to the west and an alleyway with Bldg 200 to the east. The building has an inner room (Area 46) and an outer room (Area 130). A blocked doorway suggests that there may have originally been an entrance directly off South Alley, but in the excavated phase (Phase 1) the only external entrance was from the shared alleyway with Bldg 200. There is also an opening in the rear of the building, This leads not to the outside but into another area (Area 126) which can also be entered from Bldgs 10 and 11. This area is discussed in the description of Bldg 11.

Bldg 13 appears to have been abandoned rather earlier than its neighbours (Phase 2). Episodes of dumping, wall robbing and collapse occurred prior to a systematic levelling of walls which resulted in the creation of a single large open space (Area 136) across much of this part of Block J.

The predominance of storage installations, many assumed to be connected with the storage of liquid, and the absence of cooking hearths are unusual features of the building.

Phase 1

Entry to the building was from the alleyway in the northeast corner shared with Bldg 200. The entrance exists solely as a gap in the wall leading directly into the outer area of the building (Area 130). With a width 1.5 m it is considerably wider than the standard doorways.

Immediately on the right of the entrance was a semicircular low wall made up of unmortared stones, perhaps a storage bin. Shell material had been dumped behind it but it is unclear if this related to its primary function. Nearby was a plastered sunken pit or basin while further to the south, near the entrance into Area 129, was a rectangular basin. This had a single lining of hard white plaster. Two depressions next to the basin were possibly jar settings associated with its use.
Another installation connected with storage lay at the northern end of the room: a double-basin on a stone superstructure. This had five re-linings of hard white plaster.

The floor of this outer room was very worn in places. This might be due to usage or, as it is the final floor of the building, to prolonged exposure to the elements. The floor within the outer area was later resurfaced (Phase 1.2) but only a fragment survived against the northeast wall.

Two areas of light scorching to the floor surface of the outer room were noted; these were the only evidence of cooking/fire within the building. The installations within the building were otherwise associated with storage, perhaps of liquids.

The location of the door into the inner room (Area 46) is not known because of extensive wall robbing, though the likeliest position is in the short wall. There were three small circular depressions in the room and a fourth, larger one, all presumed to be jar settings.

### Phase 2

The internal walls were robbed during a phase of scrappy occupation which perhaps saw a period of transient use of the building shell, or possibly the dumping of debris into the empty building by neighbours (Phase 2.1). Large spreads of ash, grey plaster and isolated patches of gritty mortar extended across the building, ramped up against the main northeast wall. Finds lifted from the deposit suggested that it represented occupation activity rather than the gradual erosion of walls and features. A shell midden lay within the centre of the ramped area.

A robber trench removed the walls of the inner room and this was followed by a further build-up of occupation material (Phase 2.2).

The main external walls of the building then started to collapse, infilling Bldg 13 and Areas 128 and 129 with dense stone rubble (Phase 2.3). It was only after this event that Bldg 13 was partly levelled off to create one large open space at the heart of the block (Phase 2.4). An entrance out into South Alley was knocked through what had once been the street wall of the inner room, and a new surface laid down over much of what had formerly been Bldg 13. This is described in more detail under Bldg 7.
Block JS is part of the Central Quarter and is made up of three buildings along the north side of Janabiya Square (Bldgs 10–12). A fourth building (Bldg 9) was built over Bldg 10 at a time when all other buildings in the block had fallen into disuse. The plan of Bldg 10 is incomplete because of this subsequent activity. The buildings in the block were not excavated below the latest floors. Consequently, there are only two block levels: Block Level JS1 refers to Bldgs 10–12, and Block Level JS2 to the superimposed Bldg 9.

Bldg 11 as described here has two rooms with minimal installations, one behind the other, with a doorway from Janabiya Square and access to two areas to the north (Areas 128 and 129). This access is shared by Bldg 12 and even Bldg 13 to the north. Given that Bldgs 11 and 12 interconnect in this fashion, it would be equally legitimate to describe them as a single unit. However, we have opted in this case to describe them separately, as excavated. Under this scheme, Bldg 12 refers to two rooms only (Areas 164 and 165).

In the latest phase the areas to the north were demolished and became part of the large open area behind many of the Block J buildings.
Building 9

Bldg 9 is located at the southwest corner of Block JS. It formed a late addition to the block, being partly superimposed over Bldg 10 and on a slightly different alignment. It also reused part of the walls of Bldg 4, as can be seen in the street section (Fig. 2.19). The building had three rooms comprising an inner room, an outer room and an open yard to the west (Area 31). It has only a single building phase.

Phase 1

Bldg 9 was constructed over the northeast part of Area 31. Within the building, excavation stopped at the uppermost surfaces, but these lay only a few centimetres above the bottoms of the walls so they may also be the primary floors of the building. There were only a few installations: three pits in the inner room (Area 161) which may have held storage jars, and three simple semicircular hearths in the outer room (Area 160).

The area to the west (Area 31) was a re-use of an existing space and hence its odd shape. It seems to have been enclosed, as the main southwest wall of the building extended as far as the perimeter of the old Bldg 4. There were no installations in this area at this time.

The inhabitants of Bldg 9 may also have reutilized part of Area 49, as a short stretch of wall and a hearth with cooking supports found in this area both postdate the demolition of Bldg 10.

Fig. 3.196 Phase 1

Fig. 3.197 Bldg 9 (NW)
Building 10

Bldg 10 lies in the southwest corner of Block J. The southern half of the building was demolished during the subsequent construction of Bldg 9 so that the plan is known only in part. The building, as reconstructed, has an inner room (Area 47) and an outer room (Area 48) with a small recess immediately inside the doorway from Janabiyah Square. Two large groups of stone tools were found in this outer room.

Phase 1

The entrance to the building was from Janabiyah Square to the south. This provided access into the outer room (Area 48) where immediately on the right set into a small recess was a bench-and-basin. Set upright into the bench was the lower part of a pottery vessel. Only part of the latest floor of this phase was excavated in the outer room. This was a hard, plaster surface, heavily scorched in the centre of the excavated area. Forty-three stone tools were found on the floor, largely concentrated in two groups against the main southwest wall. There was a contemporary plaster floor in the inner room (Area 47). This was badly laid, with several large stones protruding through it. Along the southeast wall was a heavily damaged installation, possibly a basin.

Phase 2

Bldg 10 was demolished when Bldg 9 was built over it. The Phase 1 floors in the inner room and along the southwest half of the outer room were overlain by rubble and sand. However, the eastern part of the old outer area appears to have been reused. Here, the front wall was cut down so that there was open access from the street, and the old northeast wall of Bldg 10 extended towards the street, shutting off what had been the alcove area. This created a single outer area (Area 49) that continued in use, with a new plaster floor delimiting its extent (Phase 2.1). A cooking pot support with hearth lay close to the northwest wall (see the Phase 1 plan of Bldg 9 opposite).

Subsequent activity in this area is indicated by a dump of material mixed with wall debris which was banked up and over the southeast corner of the building (Phase 2.2).
Building 11

Bldg 11 lies between Bldgs 10 and 12. There was an entrance at the front from Janabiyah Square which led into two rooms, one behind the other. The plan is unusual and without an exact parallel (see Bldg 200 for one room lying behind the other, though without through access). A door at the rear provides access to a large yard with a small room at the western end (Areas 128–9). Access to this area was also possible from neighbouring Bldg 13 to the north and Bldg 12 to the east, so it is not really clear to which of these buildings the two rooms belonged or how they were shared. There is, however, a difference in the way the doors into this communal area were treated: a stone threshold for the Bldg 12 door; doorjambs but no threshold in the Bldg 11 door; and a rather ragged makeshift entry from Bldg 7 where, nevertheless, the connecting floor was clearly established in excavation. Whether this varying treatment has any further significance is open to question.

The small room at the back (Area 128) was a storage area, containing five depressions that served as jar supports. However, at the front of the building, the typical installations of a Saar building used for water storage and cooking were not present. Bldg 11 may not, therefore, have served the same purpose as, for example, its neighbour Bldg 12, or indeed even have been a separate unit.

Phase 1

Entrance into the building was from Janabiyah Square into the smaller of the two rooms (Area 163). From here it was possible to walk straight through into the second room (Area 162) and then into two rooms at the rear (Areas 128 and 129). A large plaster basin belonging to an underlying surface was visible, poking up through the excavated floor (Phase 1.1) and possibly associated with the construction phase.

In Phase 1.2, part of a work surface or perhaps a bench lay just inside the street entrance. It was made up of a flat rectangular area of stones. A shallow plastered depression lay close to the opposite wall, perhaps a jar support.

An opening in the northwest wall led into a second room to the north (Area 162). The floor of this room was replastered at least once. A door in the north corner led into a large yard (Area 129) which had a second room along the southwestern edge (Area 128). There was also access to these rooms from the back of Bldg 13 to the north and from neighbouring Bldg 12 to the east.

In the large yard there was a plastered basin in mid-room, and a circular pit filled with ash and charcoal. The room was devoid of household tools. In the small room, five depressions in the plaster floor are here interpreted as jar settings. The largest one had a collection of sherds from more than one vessel sitting in it, while the semicircular one against the north wall of the room contained sherds from a single cooking pot. One other depression, situated towards the centre of the room, had vertical sides and may have been a post hole.

Subsequently (Phase 1.2), the back rooms of the building (Areas 128 and 129) were demolished and became part of the open space (Area 136) which occupied the heart of Block J.

Phase 2

A dense mass of tumbled limestone from the collapsed walls overlay the internal walls of the building and infilled both rooms. Mixed in with this rubble in the outer room was a cylinder seal and four stone tools including a large anvil. In the neighbouring room (Area 128) there was a spread of eroded plaster, perhaps from the ceiling, and lying in the sand above this was a small area of ashy material containing shell and pot, presumably discard from neighbouring buildings still in use or from the newly-constructed Bldg 9 to the southwest.
Building 12

Bldg 12 is at the junction of Janabiyah Street and a blind alley that served Bldg 211. It has an outer room, with an inner room in the southeast corner. The outer room had two doors opposite each other, one leading in from the street, and the other providing access into the yard at the rear shared with neighbouring buildings (Area 129). No cooking installations were found though a scorched area of floor suggests a hearth might originally have been present. It was excavated only to the latest floors (Phase 1). Subsequent activity indicates that the building continued to be used, though perhaps for a different purpose (Phase 2).

Phase 1

The principal walls of Bldg 12 continued down below the levels at which excavation stopped, suggesting an earlier phase. This was confirmed by the presence of a plastered basin seen underlying the excavated floor.

The outer room (Area 164) contained a bench-and-basin on the northwest wall. The plaster floor was degraded, with large areas of plaster missing. An area of scorching indicated an isolated, but intense, fire in the northeast corner. A door to the rear led out into a rear yard shared with Bldgs 11 and 13.

A large pit with scorched edges and filled with ashy material took up much of the area of the inner room (Area 165). The pit was contemporary with a rectangular platform of flat stones.

Phase 2

A substantial deposit of black sand and occupational debris subsequently built up within the building. This spilled through into the large open area that extended across the middle of the Central Quarter at this time. It shows that activity was still going on in this phase, even though by this time the Phase 1 installations were well buried and had not been replaced. Subsequently, the outer area (Area 164) filled up with a ramped mass of tumbled stone and mortar. The inner chamber, however, was devoid of rubble and infilled with wind-blown sand.
Block KN is part of the Central Quarter and is made up of three buildings on the south side of Saar Square (from west to east Bldgs 14, 5 and 8). Blocks KN and KS abut the southwest side of Block JN and JS respectively, following the same alignment but offset to the southeast. This allows South Alley to open up into Saar Square on the north side and, conversely, on the south side results in Janabiyah Square being narrowed down into Janabiyah Street. The buildings of Block KN are oriented northwards with doors out into Saar Square, while those of Block KS face southwards on to Janabiyah Street. This provides the rationale for the division into Blocks KN and KS.

Archaeological deposits underlying the construction of the block are assigned to Level KN1. The buildings were excavated to the latest phases, but walls of an earlier phase were found in the sections and test pits and these are assigned to Level KN2. The excavated phases are assigned to Level KN3.

Bldg 14 has a unique plan consisting of six separate areas originally, including a substantial raised basin or tank. Remodelling of the building resulted in changed access to all three rooms along the south side, with one perhaps being used by Bldg 2 to the south. Outside the building to the west was a busy open space containing a four-chambered basin. Bldg 5 also has an unusual plan, with a partitioned outer room and two inner rooms, as well as a very busy kitchen area to the rear originally shared with Bldg 4. Bldg 8 too is atypical: it wraps around two sides of Bldg 5, with an inner room lying directly behind and at right angles to the outer room.
**Building 14**

Bldg 14 is the label used to describe a group of six areas located along the western side of the block. It is a disparate group of rooms, not at all typical in arrangement. Most of the areas appear to have interconnected originally, and this is the reason why they have been given a single building number. One feature found in the area appears to predate construction and has been assigned to Phase 1.

Most rooms were excavated only to their latest floors and are assigned to Phase 2. Further modifications, principally blocked doorways, indicate a final phase of occupation (Phase 3).

There are some unusual aspects to Bldg 14. The main room (Area 18) had a large above-ground storage tank in the eastern corner, the room to the south (Area 14) was later blocked off and left with no floor-level access, and access into another room in the southwest corner (Area 13) was also blocked. Along the west side of the building was a single room (Area 17) with a very wide opening in the southwest wall. This western edge also contained a concentration of cooking and storage installations.

**Phase 1**

A single plastered pit lay under the support wall of Area 19 and is therefore considered to predate the building as excavated.

**Phase 2**

A doorway in Janabiyah Alley at the north end of the building led into a large room (Area 18). A bench-and-basin lay just inside the door on the northwest wall. The basin had seen long service and had been replastered ten times so that its original size had been reduced by half.

Along the eastern edge was a large plastered tank (Area 19). The bottom and sides were coated with a hard white plaster and the entire installation sat on a base of stone and rubble, which raised it some 90 cm above the level of the surrounding floor. The reason for raising this tank above ground is not known, but it is reminiscent of Area 71 in Bldg 56. It may be suggested that the builders were aware that a solid base was needed to support the weight of the liquid. Repairs to the western support wall of the tank suggest, however, that the contents constantly leaked out, eroding the wall face. Two stone buttresses were also added against this wall either as additional supports or, conceivably, as small platforms to provide easier access to the tank. Within Area 18, only the uppermost plaster floor was uncovered.
At the southern end of Area 18, doorways, subsequently blocked, show that there was access into two further rooms in this part of the building (Areas 13 and 14). The relevant floor levels for this phase were not excavated.

Returning to the main room, a door in the northwest corner led out into a large rectangular area (Area 17). Along the northeast wall was a basin with two compartments set in a stone surround. Both basins were lined with plaster and connected by a narrow trough which sloped down into the smaller basin at the southern end. A tannur had been built into the angle of the walls in the east corner and, further along the southern wall, there was a circular plastered pit with five stone tools placed around the edge. These were surely used to keep in place a cover or lid. A stone trough and two more stone tools sat on the floor nearby. A single surface continued from Area 17 through into the open area to the west (Area 15).

The room in the southwest corner (Area 12) had no obvious opening. The flimsy northwest wall was preserved to a height of 60 cm above the internal floor. No threshold or door was visible but against the internal face were two crude steps dropping down on to the floor. Perhaps it was necessary to step up into the building through a very high (and now collapsed) threshold, though no traces of any external steps to facilitate this remained.

Installations were scattered across the open space to the west of Bldg 14. In front of the opening between Areas 15 and 17 was a pit with scorched edges, and further away were two plaster-lined pits or basins, and a group of four basins set within a single structure.

Phase 3

In Phase 3, the main room of the building (Area 18) was blocked off from the rooms along the southern edge (Areas 13 and 14). To the southeast, the doorway into Area 14 was blocked and the room left without any apparent access in this phase, yet a sequence of three well-prepared surfaces of plaster lipping up against the walls and the blocked door suggest it was still in use. There is also a discrepancy in floor level here, with the latest floor sitting 70 cm higher than the one and only surface in Area 18 (which is assumed to continue in use). The lack of floor-level access and the presence of hard plaster suggest the room was used for storage, but how the access worked is a puzzle. Perhaps there was a ladder from which it was possible to clamber over the blocked door. The door blocking survived to a height of 1.20 m above floor level but it cannot be demonstrated, of course, that it continued higher. Access from the roof is also possible, although it would have been a difficult route for moving stores into and out of the room unless access was only occasionally required.

The door into Area 13 was also blocked. A crude opening in the southern wall of this room suggests that it could now only be entered from Area 11 to the south, which was presumably shared with Bldg 2. There were no installations in this room.

Phase 4

Overlying the latest phase of occupation were spreads of sand and building rubble, indicating abandonment and collapse of the surrounding structures (Phase 4.1). In the external areas, lenses of ashy sand and charcoal, containing pottery, shell and bone, and a single pit filled with ash and charcoal, attested to further activity representing either late occupation among the ruins or the dumping of unwanted debris into the derelict structure (Phase 4.2).
Building 5

Bldg 5 lay along the northwest edge of Block K with an entrance off Saar Square. Only the latest phase was excavated (Phase 2) but the extant walls of this phase provide evidence for an earlier phase which had a different plan (Phase 1).

In Phase 2, the building had an atypical plan, not paralleled elsewhere at Saar. An external door in the western corner led into the main room of the building (Area 21) which was partially divided off by a partition wall. In the southern corner of this room a door led outside to a kitchen area (Area 20) and in the eastern corner another door led into a rectangular inner room (Area 25). From here, it was possible to step up into a second inner chamber (Area 42). To the rear of the building was a busy domestic area, which by the end of this phase had been subdivided into three separate spaces by low stone walls (Areas 20, 26 and 27).

Phase 1

The section across Saar Square showed that Bldg 5 originally had a door at the northern end of the building. The partition wall between Area 42 and 21 was not present in this phase, so this part of the building may have comprised an outer room with a single inner room in the east corner (subsequently Area 25). The external area to the rear of the building was in this phase shared with Bldg 4, as indicated by the blocked door in the northwest wall of that building.

Phase 2

Entrance to the building in this phase was from Saar Square through a door in the western corner. This led into a passageway that was screened from the rest of the room by a partition wall (Area 21). Immediately on the left of the door was a stone platform without any attached basin. A stone tool and a fragment of a stone basin lay next to the bench on the plaster floor. The passage then opened up into the rest of the room. Here, by the end of the partition wall, was a large post hole set into the floor, perhaps providing additional roof support or perhaps part of a temporary screen. The room was otherwise devoid of any installations; it also had a clean plaster floor that survived intact across the entire room. Part of a large stone basin and a jar lid sat upon the floor. The lack of installations and the well-kept appearance of the floor suggest that here, for once, was an outer room where food preparation was not carried out. Perhaps this activity was now confined to Area 20 at the back.

The floor of the inner room to the east (Area 25) provides a contrast, with scatters of pottery and stone tools around the edges of the room. From here, a step led up through a narrow doorway into the innermost room (Area 42) where there was a floor of hard, blue-grey plaster. This lay 30 cm above that of the neighbouring room.

In the south corner of the building a door led out into a very busy kitchen area, divided up by low stone walls into three distinct activity areas (Areas 20, 26 and 27). Entering Area 20 from Bldg 5, a small pit or jar setting lay to the left and, to the right, a grindstone was set into the floor. A tannur had been built in the corner, and next to it was a large ash pit and a plaster-lined pit or basin.

There were two further plaster-lined basins in Area 27, one constructed with a stone surround, the other set down into the floor. Both had been re-lined several times, indicating an extensive period of use. In front of these was a small pit or jar support containing sherds from a single pot. On the eastern side of the area a second pot with intact base sat within a similar pit. Area 27 was subsequently resurfaced (Phase 3.2).

Area 26 was less busy, and contained a single pit. Enclosed within its crude, curved wall the rationale for this space might have been to keep the contents divorced from those of the neighbouring areas. Deposits of ash and charcoal subsequently overlay floor-level installations in all three of these areas. Some of this material was generated by the tannur in the corner, and some dumped in from elsewhere.
Building 8

Bldg 8 lay at the north corner of Block K and against the western end of Block J. It was built on a curious plot that ran around two sides of adjacent Bldg 5. There was a long narrow room (Area 29), entered from Saar Square, which then turned at right angles and led into an enclosed room at the rear (Area 28), while in the east corner a door led out into an odd-shaped yard (Area 30).

Limited excavation in the north corner of the building revealed an early wall and doorway (Phase 1) which were later rebuilt (Phase 2). Examination of the wall bonding and abutments shows that the main excavated phase of Bldg 8 (Phase 2) is contemporary with that of Bldg 5 (Phase 2); the southwest wall of the inner room (Area 28) bonds with a rebuilt portion of the main southeast wall of Bldg 5. It also cuts walls at the rear of Bldg 4 and is thus associated with the remodelling that accompanied the start of Phase 3 of that building.

Phase 1

This phase was largely unexcavated. To the south of the building there was one surface within Area 30 that predated the Phase 2 walls. This was a hard grey plaster floor with a cluster of four plastered pits set into it. Of these, three were contemporary and the fourth later. Remnants of a plaster-lined basin were visible in the sides of these pits, indicating even earlier occupation. To the southwest were two large circular pits, one of which was lined with a thick blue-grey plaster. A rectangular basin in the south corner was partly overlain by the Phase 2 walls. The northern limit of Area 30 in this phase is not known as it is truncated by the construction of the Phase 2 walls.

Phase 2

The main room (Area 29) was entered through the door from Saar Square to the north. A bench-and-basin installation lay on the western side of this area. In this example, the basin was flanked by stone benches. Along the northeast wall were four plastered stones, part of a cooking support. To the south, and set into the floor, was an upturned pot base lined with plaster. This had been worn smooth through the action of something being turned within it. Twenty-six stone tools lay on the floor, located mainly around the edges of the room.

The inner room (Area 28) did not contain any installations. The floor of grey plaster was worn down into channels in several places suggesting relatively heavy use for an inner room. Area 30 was also now devoid of installations, with an ashy sand occupation associated with this phase.
Block KS is part of the Central Quarter and comprises a row of four buildings (Bldgs 1–4) on the north side of Janabiyah Street. Westwards is an open area, running up to the bare rock of the limestone ridge on which the settlement sits. To the north, the buildings abut and bond with the walls of the buildings of Block JN.

Four block levels were distinguished. Level KS1 includes all deposits found below the construction level. Level KS2 is the initial build of Block KS as seen in the section across Janabiyah Square and the earlier phases of Bldgs 2 and 4. Level KS3 represents the main excavated and contemporary phases of the four buildings. The northeast wall of Bldg 4 was subsequently re-used when Bldg 9 was constructed over the southwest corner of Block JS.

Bldg 9, plus the abandonment levels in the other buildings, are assigned to Level KS4.

The four buildings, though in many ways quite similar, display subtle variations: Bldg 1 is a two-roomed unit with no rear access, containing a bench-and-basin and tannur; Bldg 2 is also a two-roomed unit but has rear access and is devoid of installations; Bldg 3 has an enclosed rear yard containing a range of storage installations; and Bldg 4 has just a small third room, also enclosed, at the back of the building. Bldgs 1 and 2 did not appear to have antecedents so that originally the block may not have extended quite so far west along Janabiyah Street.
the early Dilmun settlement at Saar

Fig. 3.220 The Central and Northern Quarters (NE)
CHAPTER 3 \ INDIVIDUAL BUILDINGS IN DETAIL

Building 1

Bldg 1 is located at the southwest corner of Block KS. It is a two-roomed unit with an outer and an inner room. The latter is positioned against the rear wall of the building, a deviation from the normal practice of placing the inner room next to the doorway on the front wall.

Phase 1

Lying below the walls of Bldg 1 were widespread deposits of silt and sand, containing burnt patches and pottery, shell and bone material. This indicates that there was some activity in this area prior to the construction of Bldg 1.

Phase 2

The outer room (Area 1) was entered through a door in the southeast corner. Next to the door was a bench-and-basin installation. In the northwest corner was a tannur and, by the door into the inner room, a low platform or bench. The building was refloored twice (Phases 2.2 and 2.3). In the outer room a pit appeared in front of the bench-and-basin and, in the inner room, there was also a plastered pit in the southern corner.

Phase 3

Bldg 1 was subsequently abandoned and the walls and installations began to collapse (Phase 3.1). The main northeast wall and the southeast boundary wall of the inner room were robbed, and the trenches back-filled with mortar debris and sand. A deposit of loose burnt sand lay over part of the building, representing occasional use of the ruined structure (Phase 3.2).

Building 2

Bldg 2 was also a two-roomed unit. The outer room (Area 4) was entered through a doorway from Janabiyah Street while a second external door, located in the opposing wall, led out to Area 11. It is possible that Bldg 2 shared or had exclusive access to Area 13: the original door into this room was blocked at this time and a crude opening made in the southeast wall. Although the plan of Bldg 2 suggests it was a typical two-roomed unit, it did not contain a single installation so that its function is not clear.

Phase 1

Deposits of silt and sand with fragments of pottery, shell and bone lay below the walls of Bldg 2, indicating that activity was occurring within this area of the settlement prior to the construction of Bldg 2.

Phase 2

In the outer room (Area 3), only one floor was identified; in the inner room the original floor was partially re-surfaced. Stone thresholds were present in both of the external door and the one between the inner and outer room. There were no installations in the building. In the inner room (Area 4), there was a concentration of copper artefacts: a complete copper spearhead, the haft of a second, a fish-hook, and two further small fragments.
Building 3

Bldg 3 lay along the southeast edge of Block J fronting Janabiyah Street, sandwiched between Bldgs 2 and 4. There is only a partial plan for the earliest phase: an early cross-wall was identified separating the outer room from the rear yard. In Phase 2, the building was a three-roomed unit with an outer room, an inner room and an enclosed rear yard. There are a range of plastered features in the rear yard, but a noticeable absence of a standard bench-and-basin and of any cooking installations.

Phase 1

The building had a door in the southeast corner, entering into an outer room (Area 6), with an inner room tucked away in the south corner (Area 5). The northern boundary of the outer room was not the same as in the succeeding Phase 2. Its position is indicated by a rectangular area of robbed out cross-wall adjoining the main northeast wall of the building, and by an area of mortar further to the southwest that was seen only in section. It lies further north than its Phase 2 successor. There is a question mark over whether the rear yard was enclosed on the southwest side in this phase, since the main southwest wall of the building is not visible underneath its Phase 2 equivalent (whereas it is visible further south along the same wall). However, it may have been robbed out before rebuilding, as happened elsewhere in the settlement.

Phase 2

Bldg 3 was rebuilt. A higher threshold was put into the external doorway and the main southwest wall partially re-built. A new dividing wall between the outer room (Area 6) and the rear yard (Area 10) was constructed. The partition walls of the inner room were also rebuilt. The rebuild on the northeast wall was quite rough, with the additional stonework crudely abutted against the standing portions of masonry. Two fire-pits were cut into the make-up horizons of the outer room, perhaps connected with the construction process.

The outer room (Area 6) did not contain any cooking installations nor was there any bench-and-basin by the entrance to the building. Three pits were dug into the floor. Two had scorched sides, and all had ashy fills, and so they may have been used for cooking. In the inner room, the base of a circular storage jar lay in the south corner.

Four pits lay close to the northwest wall of the rear yard (Area 10). These were all plaster-lined, and one had as its base the lower half of a storage vessel filled with plaster.

The floor of the rear yard was subsequently re-laid (Phase 2.2) and a pit, which contained a heap of gazelle bones, dug through two of the now disused plastered pits. The function of these pits in this phase may have been superseded by the two large rectangular basins or bins built at this time in the southern corner of the area.
Building 4

Bldg 4 adjoined and lay to the northeast of Bldg 3. Like the other buildings along this side of Block KS, it fronted Janabiyah Street. The building has an early phase (Phase 1) noted in the section across Janabiyah Street. In Phase 2, it has an outer and inner room. The latter is unusual, both for the position of the door and the presence of a cooking pot support and hearth. To the rear there was access to an open area shared with Bldg 5 to the north (Area 27), as well as to a small third room (Area 32). Bldg 4 was then remodelled (Phase 3). This included reorienting the door to the inner room, as well as the demolition of part of the rear room during the construction of Bldg 8. No cooking installations were found associated with this phase.

Phase 1

Phase 1 of the building is known from the section across Janabiyah Street, which showed an earlier street wall and threshold underlying the excavated Phase 2 building (Fig. 2.20). A short segment of the northeast wall of Area 33 also dates to this phase. The plan of the building is otherwise unknown.

Phase 2

The outer room (Area 9) was entered through a door in the southeast wall. The entrance to the inner room (Area 33) was immediately on the left. The positioning of the internal door of the inner room so close to the external door of the building is unique to Bldg 4 and there must have been a very good reason for this departure from the norm (particularly as it is subsequently corrected).

In the inner room immediately on the right was a doorsocket, made from a single block of stone with a central depression, and set into a smooth plaster floor that stretched across all of the room. On the southeast wall was a cooking pot support with hearth and, in the corner, a storage jar had been packed into the floor with a surround of small pebbles. Towards the centre of the room were two further installations: a grey plaster-lined pit with scorched sides and a circular depression with a plastered rim, perhaps another jar setting.

The outer yard (Area 9) contained a single feature: a large grindstone set into, but standing proud of, the surrounding plaster floor. A door in the northwest corner of the outer room led into an outside area of unknown plan at this phase. A second door in the northwest wall led into a fourth area (Area 32) truncated by the subsequent construction of Bldg 8. Consequently the plan is incomplete, though the presence of a well-plastered floor suggests it was enclosed rather than open.

Phase 3

Bldg 4 underwent various modifications at the same time as Bldg 8 was constructed (or rebuilt). The door to the inner room was blocked off and a new opening knocked through the northwest wall. At the same time, the installations located in the inner room were abandoned and covered, and new features constructed in the outer room. The doorway leading to Area 27 was blocked and the rear of Area 32 was demolished by the insertion of Bldg 8.

These changes represented a fundamental re-design of the internal arrangements of the building. The inner room became devoid of installations and of much of the activity that would have been associated with them. Throughout the rest of the lifetime of the building, it had just a single floor surface with minimal associated occupation. The outer room (Area 9) was now the busy area. Four pits were dug into the earliest floor (Phase 3.1), arranged in an arc to the left of the doorway leading in from the street. Against the wall of the inner room there was a robbed out installation, perhaps a bench-and-basin. The concentration of the four pits by the main entrance is unusual and suggests the need to store a commodity close to the access point to the building, perhaps water or something particular to the occupation of the owner. The absence of any cooking installations in the building may be an indication that Bldg 4 did not have a domestic function.
Block M is a disparate group of four buildings on the south side of Janabiyah Square (Bldgs 34, 35, 37 and 38) making up part of the Southern Quarter. Bldg 36, a later oval-shaped structure located in the same area and identified as a kiln, is also described here.

Block M has three levels: Level M1 is represented by an earlier phase of Bldg 35 that was identified in the section linking Block M to Block I to the east (see Fig. 2.16); the main excavated phases in Bldgs 34–7 are assigned to the next level (Level M2); and, finally, the construction and use of the kiln (Bldg 36) post-dates the main occupation of the neighbouring buildings and so is ascribed to Level M3.

Bldg 34 was excavated to the highest surviving floors and was a three-roomed building with an outer room and two inter-connecting inner rooms, the innermost of which was blocked off in the latest phase. Bldg 35 was an unusual complex with at least five separate areas. It was not completely excavated and the limits of the building to the south were not reached. Bldg 37 is unusual for the three entrances into its outer room. The plan of Bldg 38, not excavated to floor level, suggests a two-roomed unit with outer and inner room. Where excavated, the buildings of Block M contained a standard range of cooking and storage installations, including tannurs, bench-and basins and cooking supports.
Chapter 3  Individual Buildings in Detail

Building 34

Bldg 34 lies on the south side of Janabiyah Street where it opens out into Janabiyah Square. It has been assigned to this block rather than Block L because of its different orientation (the doorway is on the eastern side) and because the plan shows it is closely integrated with Bldg 35 to the east.

A door off the square led into an outer room (Area 600). The outer room was elongated to the southeast, extending beyond the line of the inner walls. It contained a range of domestic installations and was a very busy area. A door in the southeast corner provided access into what was probably an open space beyond (Area 605). Here, there was a tannur in the corner. The building had originally a single inner room (Area 607), subsequently divided into two (Areas 601 and 602).

Phase 1

The building was entered via a door in the northeast corner. Immediately on the left was a bench-and-basin which had been rebuilt and, at the level of the upper floor (Phase 1.2), there was an additional bench on the western side. By the corner of the walls of the inner room there was an activity area with large flat-topped stones, a square-cut doorsocket re-used as a grindstone, a pot rim and a pot base, and seven stone tools. A hearth with a cooking pot support lay on the opposite wall. There were two plastered cones, with the wall behind providing additional support. At the southern end of the outer room, part of the base of a pot filled with plaster had been set into the floor. Here a door led out to an open area (Area 605) with a tannur lying immediately beyond the doorway on the left. The limits of Area 605 were not determined.

Initially, Bldg 34 had a single inner room with a floor that ran under the later cross-wall. Subsequently (Phase 1.2), the room was divided into two (Areas 601 and 602). The associated floors in both rooms were patchy and the floor in the innermost room was cut by a pit that lay in front of the door.
Building 35

Bldg 35 is situated on the south side of Janabiyah Square. It was a large unit with at least five enclosed areas. A central rectangular room (Area 655) provided access to two rooms on the east side laid out on standard plan of inner and outer room (Areas 651 and 653). On the west side there were separate doorways into two further rooms that were also originally interconnected (Areas 604 and 656). It should be noted that this latter area remains unexcavated and also that the southern limit of the building was not found.

Bldg 35 had an early phase that was only investigated in the section linking Block M to Block I to the east (Phase 1). This was followed by a major rebuild (Phase 2).

Phase 1

The main northeast wall of Bldg 35 originally extended further out to the northeast where it met a return. These walls were subsequently demolished in the Phase 2 rebuild (see Figs. 2.18 and 3.232).

Phase 2

Doorways at either end of the central room (Area 655) provided access into the building. It is also possible that the southern doorway in Area 656 was an external one. There was a group of installations in the northern half of the central room: a bench-and-basin immediately inside the door from Janabiyah Square; a tannur in the north corner; a hearth against the eastern wall; and two shallow scoops in mid-room that may have been jar supports. At the southern end was a semicircular hearth and cooking pot support.

A door in the eastern wall led into Area 653. This had a stone platform along its eastern edge. Scattered on it were ten stone tools, a plaster lid, a stone basin upturned with its base re-used as a grindstone and a copper blade with its tip broken off. The construction of the stone platform occurred when the door into the inner room was blocked off (Phase 2.2).

The southern limit of the room at the southern end of Bldg 35 (Area 657) was not reached. It is not clear, therefore, if it is an open or enclosed area, though the presence of possible return walls suggest the latter. An ashy plaster floor covered the northern half of this room, and sitting on this was a cooking pot support.

Along the western side of the central room was a door into a small room (Area 604), which in turn connected to a larger room to the south (Area 656) through a step and doorway in the southern corner. This last room also had a door back into the central room, as well as one in the southern corner. Area 656 was not excavated to floor level.

In Area 604 the doorway in the south wall was blocked off. Curiously, the niche in the rebuilt doorway between Areas 604 and 655 contained part of an articulated fish skeleton (the skull was missing). This looked as if it had been deliberately pushed into the niche, though this cannot be conclusively demonstrated, and whether headless fish had any prophylactic or fortunate properties in Dilmun is not known.

The central room (Area 655) was subsequently resurfaced (Phase 2.3) and its southwest wall strengthened by the addition of a buttress which was built over the bench-and-basin.

Fig. 3.231 Janabiyah Square as reconstructed for Level M1
Fig. 3.232 Robbed out wall of lower phase of Bldg 35 (SW)

Fig. 3.233 Bench-and-basin built over by buttress, in Area 655 (SW)

Fig. 3.234 Blocked door between Areas 604 and 656 (SE)

Fig. 3.235 Phase 2.2

Fig. 3.236 Bldg 35 (W)
Building 36

Bldg 36 lies just in front of Bldg 35, almost touching its northern wall. It is a free-standing oval-shaped structure with a specialized industrial use as a gypsum-burning kiln. The top courses of the perimeter wall leaned inwards suggesting a partly conical or domed superstructure. There was a narrow entrance on the north-west side, and associated with this was an external hard-packed surface of sand and gravel.

Internally, the building was characterised by superimposed deposits of burnt material interleaved with plaster floors. The first of these was a red/orange silt and sand layer that lay at the very base of the wall, and above this was a gypsum plaster floor. Contemporary with this upper floor was a fire-pit in the north corner. This was in use throughout the working life of the building, being continually replastered. On top of the plaster floor was a thin layer of charcoal and orange silt and sand, with a second plaster floor restricted to the central area. Three further episodes of burning and replastering occur in this central area, and it appears that fires were set on top of the plaster levels and the debris subsequently compacted into burnt earth horizons.

Analysis of plaster samples (Graham Morgan)

Three plaster layers from a single sample of the kiln lining were analysed to determine the chemical composition. At the same time, four samples of plaster from walls and installations in the settlement were analysed for comparison, as well as a typical chunk of rock used for building material and a soil (sand) sample.

The presence of quantities of sulphate within the lime and mud kiln lining suggests that the structure was a gypsum-burning kiln. The temperature necessary to convert gypsum to plaster of Paris is only about 150 °C. A much higher temperature, 850 – 900 °C, is needed to burn limestone. At such a temperature, the clay lining from the kiln would have been much redder and, in addition, the lime coating would have been destroyed.

The plasters are gypsum plasters, with the traces of lime being a common contaminant. Sample 2067:01, having 11% lime, may be a mixture of gypsum and lime but, as it also has a slightly higher sandy aggregate content, the carbonate may have come from the sand, as the sand sample provided contained some 20% carbonate.

Sample 6670:03 (wall plaster) contained traces of some organic material. A protein-like smell was detected on heating and this could well have been an animal additive, oil for example. The addition of organic additives would probably have given the plaster an improved setting time or resistance to over-quick drying before it had set, particularly important in hot climates. The rock sample was very pure, 99% carbonate, but the silt traces gave it considerable resistance to acid dissolution. It would probably have made a very good lime.

The gypsum plasters were probably made using just calcined gypsum, contaminated with naturally occurring limestone and, perhaps, with the deliberate addition of some of the local sand. It is likely that the gypsum was poorly burnt, some being under calcined and some being over calcined, giving a mixture that could be used directly as a plaster-making material without the addition of further aggregate.
Buildings 37 and 38

Bldg 37 lies southeast of Bldg 35. It has an outer room (Area 658) with an inner room on the south side (Area 659). Unusually, the outer room had three external doorways in it, two of which led out into the same open area to the north. The outer room lacks a proper passageway, similar in this respect to Bldg 209 of Block B. In the northern corner of the outer room there was a stone bench, so poorly preserved that it is not clear if it originally contained a basin. A plastered ledge lay in the angle of the walls in the southeast corner, preserved to its original height of 10 cm, and on the other side of the door into the inner room were the three plastered cones of a cooking pot support. The inner room was not excavated to floor level.

Bldg 38 lies east of Bldg 37. Its eastern wall forms one side of an alleyway which separates it from the large rear yard of Bldg 53 of Block I to the east. The areas to the south of the building remain unexcavated.

While the limits of this building were found, the internal areas were not excavated to floor level, so not much can be said about the building. It had an outer area (Area 660) and an inner room in the northwest corner (Area 667), and access into the building was through a single door in the southeast corner, orienting the building away from Diraz Square. Running along the southwest edge of the inner room was a low stone platform.
Block N is part of the Western Quarter. It sits rather awkwardly at the western end of Saar Square and comprises two buildings that together form a free-standing block (Bldgs 6 and 305). The block is separated by a small alleyway from Block K to the south. To the west lies an open area at the edge of the settlement while to the north is another open area, Awali Square. Bldg 6 has an outer room running the length of the building with an inner room in the eastern corner. In Level N1, there was an unusual range of installations in both rooms, particularly in the inner room, where there was a plastered tank or basin with a channel that ran under the wall out into Saar Square. Bldg 305 also had an outer room running the length of the building, with a centrally located inner room that was heavily plastered. The plan of Block N suggests that the builders were struggling either to fit two units into the available space or to divide equitably what was originally one building (or perhaps both).

In Level N2, the floor level in Bldg 305 was raised and the dividing wall between the two rooms rebuilt. In Bldg 6 there was no obvious rebuild but a continual process of build-up of occupation and sand. Finally, part of the outer room of Bldg 305 was divided in two by the addition of an internal wall at the western end (Level N3). This occurred after the main period of occupation of the building.
Building 6

Bldg 6 is a two-roomed unit, with an outer room that runs the entire length of the building (Area 24) and a rectangular room in the eastern corner (Area 23). The building had two entrances, one at the east end from Saar Square, and one at the western end that led out into the open area along the edge of the settlement. It is possible that an unbonded section of wall on the east side of adjoining Area 417 is a blocked doorway, in which case Bldgs 6 and 305 interconnected at an earlier phase. However, as the early history of the building was not investigated, this remains speculative.

Phase 1

All of the inner room was excavated to this phase, but only the mid-section of the outer room. Consequently, our knowledge of the installations in the latter is not complete. In the outer room (Area 24), there was a group of installations across the middle of the room: a long rectangular pit with scorched edges; two circular pits in front of it; and a third on the south wall. One of these contained part of the base of a large storage jar, and all three may have served as settings for such jars. Nearby, a small jar was buried up to its rim in the floor. A rectangular stone bench with an adjacent shallow depression, perhaps representing another jar setting, lay to the east.

The inner room (Area 23) had a large doorsocket with two circular depressions where successive doorposts had sat. Next to the door was a rectangular tank or bin with two plastered lumps that partly divided it into two (perhaps helping to support a lid). Running from the corner of this installation eastwards towards the outer wall of the room was a depression or channel in the floor. The outer wall here had a narrow channel in it, perhaps a continuation of the same feature. Various interpretations suggest themselves. Could it have been a hammam? Or were the pits in Area 24 and the tank and drain in Area 23 part of some processing activity? If so, then no obvious by-products were left behind as clues.

Phase 2

A new threshold was built into the western doorway of Bldg 6. The associated floor sloped steeply down from the entrance. The Phase 1 installations in the centre of the room were not retained, but were replaced by a single bench-and-basin just inside the door. The inner room was empty of installations in this phase.

Fig. 3.243 Rectangular bin or basin in Area 23 (SW)
Building 305

Bldg 305 originally had a single outer room (Area 419) and an inner room (Area 417), though these are not in the usual arrangement, as the inner room is in the middle of the building and not in a corner.

Phase 1 is largely unknown. In Phase 2, the building had two entrances, one at the western end, from the open area along this edge of the settlement, and one at the eastern end from Saar Square. Both entrances led into the large outer room (Area 419) from where there was an opening and a step up into a small inner room (Area 417) which was heavily plastered.

In the last remodelling of the building (Phase 3), the southwest end of the outer room was partitioned in two (Areas 418 and 41), and there was a concentration of areas of flat stones at the western end of the building.

Phase 1

In a narrow section excavated across the outer and inner rooms, plaster floors lay below the excavated Phase 2 floor in both rooms. Since these were followed by substantial levelling deposits, these floors have been assigned to a separate phase, but no further details are known.

Phase 2

At the end of Phase 1, sand up to 35 cm deep was dumped into the building as levelling, and the rooms resurfaced. In the outer room (Area 419), three installations lay along the southeast wall: a semicircular hearth with a raised plastered lip; a cooking pot support set within its own hearth area; and close to the eastern entrance, a circular plastered pit.

Baked plaster and ash lenses spread out from the cooking installations, but elsewhere in the room there was only a sand horizon, suggesting either that there had never been a laid floor here or that it had been worn away except where baked by the hearths. No installations were present in that part of the inner room excavated to this phase.

There was no proper doorway between the outer and inner room, but an opening in the wall provided a step up into the inner room. Here the floor was some 30 cm higher than the equivalent one in the outer room. The room was replastered at least once, with a bedding coat of ashy plaster, particularly thick around the edges of the room. The odd entrance and the heavy plaster suggest the room may have been used for storage.

Phase 3

In the outer room, a short stretch of wall was built just inside the doorway at the western end, dividing the area into two (Areas 418 and 41). The wall was built over wind-blown sand suggesting that it postdates the main period of occupation of the building. Grouped close to the door into the inner room and also sitting on sand were four areas of flat stones, serving perhaps as rather crude benches.

In the inner room there was an occupation horizon associated with the wall partitioning, but no floor or surface as such. This was followed by some sporadic occupation (Phase 3.2): in Area 418, an ephemeral hearth formed by a ring of stones together with a small amount of occupational debris; a spread of ash within the wind-blown sand in the same room; and in Area 41 two patches of compact stained sand.
Fig. 3.247  Block N (SW)

Fig. 3.248  Hearth and debris in Area 419 (SE)

Fig. 3.249  Phase 3 partition wall between Areas 418 and 41 (NE)

Fig. 3.250  Plastered pit/basin in Area 419 (SE)
Block P, part of the Western Quarter, is located immediately behind and to the southwest of the temple. It is made up of four buildings (Bldgs 206, 207, 303 and 304) which are all in a row along the north side of South Alley and Saar Square. (The temple, attached to the northeastern end of Bldg 206, is for convenience also described briefly in this section.)

All the buildings open to the south on to Saar Square and its alleyway, South Alley, which runs along the south side of the temple out into Main Street. From the northwest corner of Saar Square there is access through a very narrow opening into an open space (Awali Square) close to the western edge of the site. A short section of wall between Bldg 303 and Block Q to the north marks the division between Diraz and Awali Squares, with the rear door of Bldg 207 opening into the former and those of Bldgs 303 and 304 into the latter. This marks a clear division in circulation between the buildings of Block P.

The block has been divided into four levels. The first (Level P1) was identified in the section across Saar Square to the south (see Fig. 2.21). Here, underlying the excavated phases of Bldgs 206 and 207 were robbed-out walls of buildings on the same alignment, presumably representing earlier versions of those buildings.

In Level P2 all the buildings were rebuilt, again the evidence comes from the sections in Diraz Square, and the main phases of occupation of Bldgs 207, 303 and 304 are assigned to this level. Limited excavation within Bldg 206 revealed a flooring sequence assigned to this level, although the plan is not known.

Subsequently, Bldgs 207, 303 and 304 were abandoned but Bldg 206 underwent one final rebuild (Level P3). This lasted for only a short length of time before renovation work to the rear wall of the temple resulted in it falling into disuse (Level P4).

All the buildings in the block have two rooms, with Bldgs 304 and 304 possessing small extensions to the outer room. Cooking installations are present in all buildings except Bldg 206. In fact, this building is devoid of any features so that it must have functioned in a different way from the other three. In addition to the usual range of installations, there are two well-preserved plaster bins or troughs in the outer room of Bldg 303.

Fig. 2.21 Block Level P2
Building 206

Bldg 206 lies immediately west of the temple. Its earliest phases are known only from the section in South Alley and limited excavation in the northeast corner of the building (Phases 1 and 2). The excavated phase of the building (Phase 3) is a comparatively late rebuild. In Phase 3, Bldg 206 has an outer and inner room, both devoid of any installations, and only a single floor was associated with this phase, indicating a short life span. One reason for this brevity might have been the instability of the rear wall of the temple which formed the boundary of the building on the northeastern side. This required continual renovation and subsequent buttresses against the temple wall ran right through Bldg 206, by then unoccupied.

Phases 1 and 2

In the section in South Alley, there were two building phases which underlay the excavated phase of Bldg 206. The earliest was represented by a robber trench running parallel to the later street wall of Bldgs 206 and 207 (Phase 1). Above this was a rebuild, again on the same alignment (Phase 2). A sequence of flooring found during limited excavation in the northern corner of the building, against the temple wall, is also dated to Phase 2. These floors ran under the line of the doorway and main northwest wall of Phase 3, showing that the Phase 2 plan must have been different.

Phase 3

Bldg 206, in its excavated phase, had an outer room (Area 270) and an inner one (Area 271). It utilized the existing rear wall of the temple and the rebuilt northeast wall of Bldg 207. The southern entrance into the building, from Saar Square, did not have any threshold while the northern entrance from Diraz Square had a plastered lip on its inside face which did not extend as far as the outer. Both the inner and outer rooms were entirely devoid of any installations, and equally interestingly there was no occupation build-up above the single floor associated with this phase. The floor itself was very uneven, made up of trampled mortar with the occasional stone poking through. The absence of installations and any debris on the single floor suggests that the Bldg 206 did not, at least in this phase, function in the same way as its better equipped neighbours in the block.

Phase 4

After the rebuild of Phase 3, subsequent activity in Bldg 206 was driven by the need to renovate the temple. The rear wall of the temple became unstable and to prop it up an additional buttress was added to its external face. This ran along the northeast side of Area 270. It was built directly on top of the Phase 3 floor and went straight through the southern entrance of Bldg 206. Well after the abandonment of the building, when enough time had passed for the walls to have collapsed, one final attempt was made in this area to shore up the southwest corner of the temple (Phase 4.2).
Building 207

Bldg 207 has an outer and inner room, with an entrance from South Alley and a second one from Diraz Square. The outer room possessed a full range of domestic installations which included a bench-and-basin, a tannur, a semicircular hearth with a cooking pot support made up of three plastered cones, and a low stone platform or work area.

The building was one of two chosen for detailed excavation as part of the soil micromorphology programme and so was subject to a different excavation routine to others in the settlement (see Chapter 10). As a result, the occupational and post-depositional processes at work in the building were observed in greater detail than usual. Bldg 207 was excavated down to the start of the latest floor sequence in the building (Phase 2). This coincided with the bottoming of the features. The presence of an earlier phase (Phase 1) was confirmed in the section in South Alley which showed an earlier phase below.

Phase 1

In the section in South Alley, a section of robbed-out walling was found below and on the same alignment as the Phase 2 building. This phase otherwise remains unexcavated.

Phase 2

In Phase 2, Bldg 207 had an outer (Area 272) and inner (Area 273) room. At the southeast end of the building, a doorway provided access from South Alley into the outer room. There was a plaster doorsocket with a stone surround immediately on the left. Along the western edge of the corridor area of the outer room were a bench-and-basin and a tannur. Two coats of plaster had been crudely applied to the basin, leaving trails of finger marks. The tannur had a stone superstructure, and a cooking chamber built with a cylindrical clay lining. Compact bands of ash debris, representing the residue of continual firings, filled up this chamber. These deposits were periodically cleared out and left to accumulate around the base of the tannur, thereby raising the surrounding floor level.

On the rear wall of the building there was a semicircular hearth with an associated cooking pot support. The hearth had a burnt base and a moulded lip of plaster which, at the west end, formed part of one of the supports of the jar stand. The adjacent wall was heavily rendered in an ash and gypsum plaster and blackened through scorching. Episodes of raking out of the hearth were observed in the composition of the surrounding floor.

A shallow platform of flatly laid stones ran along the entire southwest wall of the outer room. Due to its irregularity it may not have been constructed in one event. Positioned nearby was a low rectangular bench completely coated in gypsum plaster and in the floor in this area there was a shallow plastered scoop or pit.

The single floor series excavated in the outer room (Area 272) was made up of lenses of trampled debris of ash, plaster, sand and mortar, none of which formed a uniform horizon across the area. The earliest layers in this sequence were flush with the bases of the internal installations and there was no indication that a primary plastered surface had been laid. The upper horizon in the sequence comprised 10 cm of occupation debris trampled into hardened patches of floor. Ashy laminations were present around the fire installations. A subsequent deposit of soft, mottled grey, sand, ash and occupation debris was banked up over the hearth and cooking support. The interpretation of this deposit is uncertain but it may represent wind-churned hearth debris. The surfaces in the corridor area between the two external doors of the building were very uneven, indicating high use.

In the inner room (Area 273), the floor comprised lenses of trampled occupation with patchy horizons of crusty sand, off-white plaster and grey ash deposits. Fifty-three stone tools were scattered through the room, concentrated by the northwest wall near the doorway, and near the stone platform in the south corner. This platform was made up of a single course of stones, with a gap in its southwestern end. The floors in this room bottomed out over a layer of clean sand which separated this phase from the lower, unexcavated phase that was also noted in the street sections.
Phase 3

As the floors and occupation strata of the building were observed in particularly fine detail for the micromorphological study, so too were the processes of collapse.

In the outer room, and above the occupation deposits, there were patches of mixed sand lenses within a denser matrix of mortar. These deposits also contained fragments of grey ash plaster derived from the collapsing installations in the room and, as a whole, represent one of the initial events in the sequence of collapse. Ensuing deposits of sand were blown through the doorway, settling deepest in the corridor, a circumstance which would occur only if the area had been roofed and the roof was still standing. That this was so is strongly suggested by the next layer, which covered the whole area and comprised a thick layer of homogenous mortar and rubble. At its maximum this was 30 cm deep, with a minimum of 7 cm towards the centre. This deposit appeared to have been laid down as a single event. The spatial distribution of this layer suggests roof collapse rather than mortar erosion from the walls.

In the inner room, small areas of windswept material immediately above occupation were not observed. Instead there was a layer of heavily compacted clay with fine lenses of sand and heavy with salt content. It was concentrated to the east of the area, where the underlying floor was clear of artefacts or occupation debris and may represent decayed matting. Immediately above this was the same thick layer of mortar that was noted in the outer area, and interpreted as roof collapse. Once the roof had gone, a section of the northwestern wall of the inner room fell in. This event was represented in the archaeological record by a layer of gypsum plaster and stone collapse which fell out of the wall, leaving an observable hole in the upstanding section. Sand then blew in, filling up the room.
Building 303

Bldg 303 had an inner room, and an outer room with a small extension that ran around part of the rear wall of the neighbouring building. There were two entrances, one from Saar Square on the south side and one from Awali Square on the western side. Only the latest phase of occupation was excavated (Phase 1), after which the building was abandoned (Phase 2).

In addition to a semicircular hearth and cooking support, the outer room contained a shallow rectangular bin or trough, an installation that was not found elsewhere in the settlement. A similar installation, but semicircular in shape, lay close by.

Phase 1

The entrance from Saar Square led through a narrow passageway into the main part of the outer room (Area 412). Next to the door was a single niche or recess, with a second example at right angles on the wall of the inner room.

The passage, perhaps because of its narrowness, was devoid of installations. Close to where the room turns through a right angle, there was a semicircular hearth against the wall. A cooking pot support lay around the corner, as well as the bottom half of a jar set in a well-plastered surround, perhaps a storage bin. By the door leading out into Awali Square was a long plaster bin or basin. This was not a type found elsewhere in the settlement. Next to the door in the wall were two recesses similar to the examples next to the other doorway.

In the inner room (Area 411), an area of closely packed stones in the southeast corner may have been a low platform. The outer room had three floors. Near to the rear door, the scouring of the wind revealed a lower plaster surface (Phase 1.1), together with the outline of a plastered basin or pit, both of which remained unexcavated. This area was then replastered on two occasions (Phases 1.2 and 1.3). The final surface was ashy and undulating, overlying the threshold stones of the door into the inner room. The same installations remained in use throughout. An additional feature was a group of stones next to the door into the inner room, perhaps the remnant of a small bin.

Phase 2

On abandonment the building was entirely filled with wind-blown sand. One area of eroded mortar was found, washed off the southeast wall of Area 416. The neck of a jar stopped up with plaster and a second plastered object had been tossed into the building on top of the eroded mortar.
Building 304

Bldg 304 is at the southwest end of Block P. It has an outer and an inner room. As with Bldg 303, the outer room extends beyond the building line of the inner room so that the main southwest wall of the building is stepped out. The building could be entered through Saar Square in the southeast corner or in the western corner, from Awali Square. The location of the installations suggest the former is the main entrance.

Excavation did not proceed below the uppermost floor levels within either of the rooms of Bldg 304. After the building was abandoned, but while the exterior walls at least were still standing, a short stretch of wall was added to the exterior of the building at the western end.

Phase 1

The outer room of Bldg 304 (Area 414) contained a tannur in the northwest corner, and a semicircular hearth and cooking pot support on the opposite wall. In the passageway leading in from the door off Saar Square was a bench-and-basin, with a crude niche in the wall above, perhaps where objects used with the installation were kept. In the wall next to the door from Saar Square were two recesses, one of which went right through the wall, with a third at right angles on the wall of the inner room. These are similar to examples noted elsewhere and are presumed to have been part of the door fittings.

Along the northeast wall, some closely-laid stones formed a rough working platform and, in the north corner of the outer room, there was a low stone ledge. The inner room (Area 413) also contained a small area of stone pavement.

During Phase 1 an external buttress was added to the external corner of the doorway into Awali Square.

Phase 2

At some point during the abandonment and collapse of the building, a short stretch of wall was added to the western corner of the building. It sat on sand 60 cm above the level of the threshold of the rear door of Bldg 304.
Phase 1
Prior to the construction of the temple, the existing buildings on the site were demolished. On the surface from which the builders began construction, traces of their activities could still be detected. The temple itself was not very regular: while the short walls are reasonably true, the long walls have appreciable curves and kinks in them. The looping section of the northwest corner remains a puzzle, and though initially thought to be a rebuild it does in fact belong to the original construction phase.

A single shallow buttress was built into each of the short walls to carry the load of the main roof beams. There appeared to be only a single buttress in the long walls at this time. The roof was also supported on three columns running down the centre of the temple, a circular one at the eastern end near the doorway and, further in, two rectangular columns.

Within the temple, there was a single altar along the southeast wall and a suite of installations in the northeast corner. The altar belonging to the earliest phase of the temple had been partly destroyed during the subsequent rebuilding. The front, however, was still preserved, and was a low rectangular table. Like its later better-preserved counterpart, it seems to have had a back, perhaps with a curved device attached, though only a small fragment of lipped plaster was left to suggest this.

Built into the northeast corner of the temple, directly to the right of the temple entrance, was a high bench or podium, of a long rectangular shape. It was approached by two low steps. Next to this high bench, constructed along the north wall, was a bench at a lower height, and a smaller one adjacent to it.

The high bench was utilized throughout the life of the temple, being replastered in Phase 2, and rebuilt and plastered again in Phase 3. Integral to the construction of this bench were the two low steps. Both steps were replastered several times and the upper one was particularly well worn. The adjacent long bench was built against the northwest wall. It had a stone core, and remnants of a white gypsum plaster could be observed adhering to the Phase 1 stonework.

Outside the temple, excavation stopped at the base of the two stone columns or offering tables belonging to Phase 2. It is not known if similar structures existed in Phase 1.

<table>
<thead>
<tr>
<th>Site level</th>
<th>Temple phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Pre-temple remains</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Construction and first use</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Minor modifications</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>A major rebuild</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Modifications</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Adding a room</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>External renovations and abandonment</td>
</tr>
</tbody>
</table>
Phase 2

Various minor additions and modifications were made to the temple, after its construction in Phase 1 and prior to the major rebuild which characterizes Phase 3. Internally, these modifications comprise the addition of a narrow buttress to the mid-section of the northwest wall, and the construction of a possible shelf along the back wall. At the back of the temple nine circular depressions, interpreted as jar supports, had been made in the floor. In the same area, next to the wall of the storeroom, were two low stone walls, perhaps supports for a shelf or for some other superstructure.

At the end of Phase 2, the benches and altar were replastered with a fine mortar composition which lipped on to the associated floor. This gives an indication of the extant heights of these features during their use in Phase 2: the altar stood 35 cm above the final floor, the high bench to a height of 139 cm, the long bench 34 cm and the small bench 20 cm.

In the open space in front of the temple were two stone-built bases, one circular and the other with a square end. Both bases survived to less than 1 m in height. Their function is unknown, but they seem to have no structural relationship to the temple and may have been low tables set outside for some public function. The street deposits around the bases were clean wind-blown sands, providing no further clue to their function.

Phase 3

A major remodelling of the temple took place after Phase 2: the central section of the northwest wall and practically the entire length of the southeast wall were dismantled. The internal floor level was raised by as much as 1 m in places. Two altars replaced the single one of Phase 3 and a new bench was constructed in the northeast corner.

The process of demolition was well documented archaeologically, and it would appear that the dismantling of the walls was done quite carefully. Whereas the rubble and mortar debris from the two walls making up the possible shelf support at the back of the temple were left in a heap, the rest of the temple area was relatively clean of any demolition debris, and the installations of Phase 2 were buried in pristine condition. During the rebuilding, sand was spread over the main room to a depth of 60–100 cm.

The northwest and southeast sections of walling were rebuilt to the same width, but internal buttresses were incorporated into each wall. These are only marginally thicker than the main wall and some 70 cm wide on average. Because they are roughly aligned with the columns they were probably constructed to provide additional support for the main load-bearing roof beams.

Above the Phase 2 altar, a new slightly smaller version was constructed. The front of the altar was a low rectangular table built with a stone surround and with an inner fill of soft sand scorched from fires. The altar back was crescent-shaped and constructed of one thickness of small stones covered with fine plaster and fashioned into a crescent-shaped moulding.

A major innovation in Phase 3 was the construction of a second altar against the central column, roughly on the same alignment as its counterpart and facing the same direction. The two low benches in the northeast corner wall were replaced by a single bench in Phase 3. The high bench in the northeast corner, however, was not raised during renovation but merely replastered, so that in Phase 2 its height was effectively reduced by half. Another addition to the suite of installations in this area was the construction of a square plinth adjoining the south end of the high bench and 15 cm higher. The plaster on the sides of this plinth was one continuous rendering, so its original height is preserved (74 cm).

Outside the temple, the two stone bases survived the transition from Phase 2 to Phase 3.

Phase 4

Phase 4 is defined by minor modifications within the temple: the table of the central altar was lengthened and the bench along the northwest wall was rebuilt. It was during this phase that Bldg 206 was built up against the rear wall of the temple.

Phase 5

In Phase 5 a second internal room was added to the temple, constructed inside the angle of the southwest corner. Part of the reason for adding internal walls may have been to provide additional support for the roof. Simultaneously, the central column, which had by now acquired a significant lean to the south, was also strengthened by the addition of a stone skirt around the base. Masonry skirts were also added along the entire external length of both the southeast and southwest walls.

Rising internal floor levels again forced some adjustments to the height of the altar tables. An additional course of stones was added to the table of the southern altar raising it by 28 cm, and the back of the altar, with its curved shape, was also rebuilt and replastered.

Externally, the southeast and southwest walls were strengthened by the addition of buttresses along their entire length. For whatever reason, probably to do with the vagaries of the wind, sand had accumulated in greatest depth at the front of the temple so that the buttress against the southeast wall stood far higher at the front of the temple than at the back.

Phase 6

In Phase 6, two further modifications were made to the external walls and the two bases in front of the temple were replaced by five. Although there is no direct stratigraphic link between these external changes and the internal floor sequence of the temple, it was assumed that they were contemporary with the final plastering of the temple floor prior to abandonment.

Externally, an additional skin of stone was added to the southwest corner of the temple. By this time, South Alley had just about filled up with sand, covering much of the support skin that had been constructed in Phase 5. Sitting on this sand was a raft of pink mortar ramped up to the southeast wall of the temple. This same mortar also ran over the walls of Bldg 200 on the other side of South Alley demonstrating that by the last phase of the temple the neighbouring buildings to the south had fallen into disuse. It was on top of this mortar that the Phase 6 buttress had been constructed.

In front of the temple, the two stone bases of Phase 5 were replaced by five circular ones arranged in two rows. These were built very high up in the deposits of wind-blown sand that had accumulated in the street.
Block Q is part of the Western Quarter and lies on the south side of Diraz Alley, west of Diraz Square. The block is tenuously connected to Block P to the south by a short length of external wall which separates Diraz Square from Awali Square, but it is otherwise free-standing and, at the western end, surrounded by open space. Two separate and relatively large buildings make up this block (Bldgs 300 and 301) but, as excavated, they are not contemporary.

At the eastern end of the block, Bldg 300 fronts on to Diraz Square. It is a three-roomed unit that was occupied early on in the life of the block (Level Q1). It was not subsequently rebuilt, but was instead left to fall into disuse. In spite of this, it was not pillaged for stone and the walls still survived to roof height in places.

Behind Bldg 300 at the western end of Block Q, there was a five-roomed unit (Bldg 301) with an additional external area along the south side that, unusually, had a plastered surface. The excavated phase of this building belongs to a time when Bldg 300 had already been abandoned (Level Q2). Bldg 301 has three external doors and two sets of domestic installations, each comprising a tannur, bench-and-basin, cooking pot support and semicircular hearth. Such duplication suggests that two separate, but perhaps related, households may have occupied the building. Subsequently, Bldg 301 seems to have been partially re-used: some of the internal thresholds were raised and there were some signs of continued activity in some of the rooms.
Building 300

Bldg 300 lies along the western edge of Diraz Square. It has three areas: an inner room (Area 400), an outer room (Area 401) and a rear yard (Area 402), and a single entrance from Diraz Square. The outer room had a set of well-preserved installations which included a bench-and-basin, tannur and semicircular hearth. The rear yard was not excavated to floor level because of the instability of the southwest wall.

Bldg 300 had only a single building phase (Phase 1). The sections across Diraz Square (see Figs. 2.22–23) established that when the neighbouring blocks were rebuilt (Block A to the east and Block P to the south), Bldg 300 was abandoned and fell into disuse. Subsequently, a late wall was added over the southeast wall of the rear yard (Phase 2.1). As this post-dates the occupation of Bldg 300, it presumably relates to the still inhabited Bldg 301 next door.

A section of the wall of the inner room was preserved to roof beam height (as was also the case in Bldg 224).

Phase 1

The door into the building was from Diraz Square at the eastern end. This led into a large outer room (Area 401). In the wall next to the door were two rectangular holes, matching a pair on the door of the opposite wall out into the rear yard, and assumed here as elsewhere to be part of the door furniture. A bench-and-basin installation lay just inside, and a tannur was in the western corner against a rebuild of the main northwest wall. This rebuild must have been undertaken quite soon after the construction of the building, as it predates the lowest excavated floor (Phase 1.1), one which is quite early in the flooring sequence of the building as observed in the threshold sequence of the external door.

Fig. 3.271 Phase 1.1

Fig. 3.272 Bldg 300 (S)
In the northern half of the room, close to the door threshold into the rear yard, was an unplastered pit and, in mid-room in the same area, a flat-bottomed plastered pit that may have been a post hole. Two successive pits against the southwest wall were heavily scorched and contained ash and animal bones.

The southwest wall of the inner room stood to a height of over two metres. Within the wall, at the same height, were two circular holes, 22–28 cm in diameter and 78 cm apart centre-to-centre. These were holes for roof beams, for the inner and outer room. The height of the roofing, as measured from the lowest excavated floor in the inner room to the bottom of the holes, was 1.80 m.

The inner room (Area 400) was devoid of installations. The rear yard (Area 402) was not excavated to this phase. The outer room was levelled up with a sand layer 25 cm deep before the final floor of the building was laid (Phase 1.2). This last floor was severely eroded, and only survived as five isolated patches of plaster. The thresholds in the external door and in the door of the rear yard were both raised at this time. The one into the rear yard sat directly on sand and was constructed of large stone blocks. A large flat stone had been placed halfway down the cooking chamber of the tannur to raise the bottom of the chamber so that it could continue to be used, even though much reduced in height.

The bench-and-basin installation inside the street door was also remodelled, with a new basin set above and inside the earlier one. A new installation, a curved section of plastered stone with a lip, was added to the corner of the same wall. The base of this installation was not plastered and it was also quite small, extending only 20 cm from the wall face.

Against the southwest wall of the outer room, and just in front of a wall buttress, was a plaster-lined groove set into the floor. It is not clear what its purpose was. Further along the same wall, a cooking pot support and hearth replaced the fire-pits. The inner room was also levelled up, but remained free of installations.

Phase 2

At the end of Phase 1, Bldg 300 was abandoned and not rebuilt. There was limited evidence for further use of the rear yard, where a trampled sandy horizon lay 30 cm above the latest threshold (Phase 2.1). Tucked into a crack in the wall at this level was a stone basin. The southeast wall of the rear yard was also poorly rebuilt at this time. This may have had more to do with the renovations to neighbouring buildings, as Bldg 300 was by now abandoned.
Building 301

Bldg 301 lies close to the western edge of the settlement. It shares a wall with Bldg 300 on the eastern side, but is free-standing on the three other sides. The area to the north and west is unexcavated, but appears to be open and superficially devoid of buildings. To the south is Awali Square, an open area between Blocks Q and P.

The building has an untypical room and installation layout, with three external doors and five interconnecting internal rooms. Within the five rooms are two separate sets of installations, and so it would appear to contain two separate households which shared a common ‘hallway’. Excavation stopped at the highest surface in each room (Phase 1.1). The thresholds in the northern half of the building were remodelled and some later installations constructed in one room (Area 406) on sand, but without an associated floor horizon (Phase 1.2).

Phase 1

At the western end of the building, a doorway provided access into an unusually large rectangular room (Area 406). A plastered doorsocket lay to the right, while clustered in the northwest corner were a plastered bench-and-basin, a tannur, and a cooking pot support with hearth area. The tannur, though it lay directly under the modern land surface, was exceptionally well preserved, with a rendering of black ashy plaster. Its construction was typical for this sort of installation, with a conical pottery sleeve set in a stone and mortar surround. It stood to a height of 35 cm above the floor. A well-baked ashy area east of the cooking pot support indicated where a hearth may originally have lain, though no raised lip was found in this instance. A well-preserved coat of hard grey plaster covered all the wall faces in the room.

On the south side, there was a door into a second, smaller room (Area 409) that was devoid of installations. A doorway at the east end of Area 406 led into a third room (Area 405) which was also without installations. From here there was an external door out into Diraz Alley, and a second into the fourth room of the building (Area 408). Inside the doorway into this room was a large plastered doorsocket. The corner of the wall behind had been moulded into a curve with a thick application of plaster, presumably to match the round door post. A bench-and-basin lay further inside the room along the western wall. Next to the doorway which led into the sixth room (Area 407), there was a semicircular hearth and cooking pot support, and in the southwest corner a tannur and the third external door.

Within the inner room (Area 407) a stone platform was set into an alcove in the northwest wall. There were traces of two other possible installations, surviving only as groups of stones with traces of plaster.

From the southwest corner of the building, the door led out into an area which was not enclosed but nevertheless had a plaster surface (Area 410). This extended on the southern and western sides beyond the building line. Set in this surface by the doorway was a shallow plastered pit or basin. There is no indication that this area was either enclosed or roofed, though the state of preservation of the plaster might support such an assumption.

Subsequently, the building was partially re-used (Phase 1.2). The thresholds of the three doors in Area 406 were all raised. Episodes of dumping occurred in Areas 406 and 409, and a large bitumen basket was thrown into Area 407. No associated flooring, however, could be attributed to this phase. In Area 406, three installations dated to this phase: a fragmentary bench-and-basin; an L-shaped area of rough stone walling, and a fragment of the plastered lip of an installation.
Fig. 3.278  Tannur in Area 406 (N)

Fig. 3.279  Cooking pot support in Area 406 (N)

Fig. 3.280  Pavement in Area 407 (N)

Fig. 3.281  Raised threshold between Areas 409 and 406 (N)

Fig. 3.282  Bldg 301, with external plastered area (N)
Building plans

It will be apparent from the detailed descriptions of the building blocks and of individual buildings that there are many standard features in the layout and design of the Saar settlement. This phenomenon is one of the most interesting features of Saar, provoking many questions about the community that designed, built and used these structures 4,000 years ago.

One of the most striking regularities is of course that the buildings were constructed in rows, sharing communal walls; there is not a single stand-alone building in the settlement (excluding obviously different structures such as the kiln and well). In some blocks, there are rows of almost identical buildings (for example, Blocks G and H in the Southeastern Quarter), while in others there are variations on a common theme (e.g. Blocks D and E).

A particularly characteristic element of the ground plans is a rectangular room built in the corner of a larger room. The simplest buildings at Saar consist solely of two rooms arranged thus, one inside the other. Larger buildings have additions to this basic unit, or divisions within it, while some consist of more than one such unit. Comparatively few buildings dispense with it altogether.

The buildings of Saar have been grouped into six distinct variants. As with all survivals, there are inevitable inconsistencies in the classification, where some examples do not fit any one category perfectly, or could be assigned to more than one, and some categories are more homogeneous than others.

The following classification includes all buildings that have a reasonably complete plan. Occasionally, where the layout of a building has been significantly altered from phase to phase, then more than one phase of a building has been included.

Group A: two rooms, one room in the corner of another

The simplest Saar building consists of a rectangular room partitioned off in one corner to create a second room (Group A). The inner room is usually located on the front wall of the building next to the main entrance from the outside. The outer room divides naturally into two distinct areas: inside the main door its width is constrained by the wall of the inner room, so that it is effectively a passageway, while at the rear it opens out across the full width of the building. There is usually a second entrance on the rear wall immediately opposite the one on the front wall. The door into the inner room always faces away from the front entrance.

Group A is the commonest ground plan found at Saar. There are 33 examples of the Group A plan in total (including partially excavated buildings), accounting for 44% of all buildings. These include some minor variations. In most cases, the inner room is located on the left-hand side when entering a building so that in a row of buildings of this type the inner rooms of adjacent buildings never share a wall. However, there are seven examples where the inner room is on the right-hand side. Three of these, Bldgs 33, 210 and 303, break the rule about non-contiguous inner rooms. The other examples are Bldg 12 which is on the end of a row, Bldg 102 and 107 whose neighbours are unexcavated, and Bldg 351 where there is a change in the orientation of the adjacent building.

Other minor variations on the basic ground plan are as follows: Bldg 225 has the main doorway on an indirect axis; Bldg 1 has an inner room located on the rear wall of the building and no door to the rear; Bldg 38 may be a second example of this type; and Bldg 37 (included here though not a particularly good fit for this group) is unique in having three external doors, and a shortened passageway which compromises the rectangular shape of the building.

The average size of the Group A buildings is 31 sq.m. More than half are in the 20–30 sq.m range; the smallest examples are Bldgs 38 and 52 (19 and 20 sq.m, respectively) and the largest is Bldg 352 (46 sq.m).

![Fig.4.1 Total floor area of Group A buildings](image1)

![Fig.4.2 Examples of Group A buildings](image2)
Group C: two rooms, one leading to another

There are two two-roomed buildings where the two rooms are not arranged in the same way as with Groups A and B. The common feature is that one room leads through to the next, and does not wrap around it. Thus Bldg 200 has two rectangular rooms, one arranged directly behind the other, and in Bldg 353 the outer room is long and thin, with the inner chamber set at a right angle.

Another example of this type of arrangement can be seen in Bldg 8 of Group D (in Block KN) where the outer room itself has a right-angled bend, the shape dictated by existing structures on either side, and leads directly through to the second.

Group B: two room variants of A

Seven buildings (9% of the sample) retain the basic two-room plan of Group A, but with some variation. In five of these buildings, the rear or side wall of the outer room has been staggered to give a small extra space. Part of the rear wall of Bldg 222, including the doorway, thus projects 1.5 m behind the natural building line, providing an extra 4.8 sq.m of internal space. A similar arrangement produced an extra 4.8 sq.m for Bldg 62 which is similar to Bldg 1 in having no rear doorway. The extra space could be considered as another room, but as no evidence of a doorway was found it has not been designated as such. However, such a division could easily have been created by the use of some insubstantial material such as palm-frond that has not left a trace in the record. Bldg 31 has a similar extra space, but in this case the space includes provision for an external doorway.

In Bldgs 303 and 304, the rear wall extends laterally beyond the building line rather than backwards, producing slightly different results in each case.

Two adjoining buildings, Bldgs 6 and 305, have stepped internal walls. In Bldg 6, this results in an inner room in one corner and a kinked outer room, a similar plan to Bldg 202. In Bldg 305, the inner room is not built into a corner. Another curious variation of Bldg 305 is the position of the southwestern external doorway which is further in than the main wall.

At least some of these buildings look as if they have been squeezed into the space available, particularly Bldgs 6 and 305. This may also be the cause of the narrow extenated form of Bldg 303.

Group D: three rooms, as A but with an extra room/yard

Some buildings have the same basic two-roomed ground plan as Group A but an extra room or yard as well, making three separate areas. These three-roomed buildings are not as common as their two-roomed counterparts. In some cases, there is no external access from the rear yard (Bldgs 205 and 300), while others have a door that leads out into a square or open space (Bldgs 208, 211 and 224). Bldg 7 has an additional yard running around two sides. Bldg 208 has a small room added to the back of the house which does not extend the full width of the building.
Fig. 4.6 Distribution of building types
The average size of Group D buildings is 52 sq.m. The smallest example (Bldg 208) is 39 sq.m respectively, and the largest buildings by far in this group are Bldgs 300 (73 sq.m) and Bldg 7 (72 sq.m).

**Fig. 4.7 Total floor area of Group D buildings**

**Group E: three rooms, as A, B or C but with two inner rooms**

There are seven examples of buildings of the same basic type as Groups A–C, but with two inner rooms rather than just one. They fall into two main subcategories, The first comprises the pair of buildings that make up Block E, Bldgs 60 and 61. Here the two inner rooms are found side-by-side, each as large as the single ones found in other buildings, and each with its own entrance from the outer room. In the second group (Bldgs 34 and 54, for example), the two inner rooms have a connecting doorway and only one of the pair has a door directly into the outer room. It should be noted that in the cases of Bldg 50 and Bldg 100, it is possible that the dividing walls were not full height and the internal spaces were not therefore truly separate. In Bldg 34 the rear door extends beyond the building line, making it similar to Group B buildings such as Bldg 304. The two inner rooms of Bldg 8 span the entire width of the building and, in this respect, it is similar to two-room Bldg 200.

Bldg 244 was a temporary member of this group, in that the two inner rooms of Phase 2.1 were combined into one in Phase 2.2.

The average size of Group E buildings is 45 sq.m.

**Fig. 4.8 Examples of Group E buildings**

**Group F: four rooms or more**

There are nine units at Saar that have more than three interconnecting rooms. Some of these function as single units and look self-contained. For others, the architectural boundary is more blurred: Duplicative sets of installations and shared access to communal areas make it difficult to work out the limits of a single unit or ‘household’. The group is not an homogeneous one, and each member of it needs to be examined in turn.

Bldg 53 has 11 interconnecting areas. It is unique in having two very large yards, one of which has a row of four small rooms down one side. It has a single entrance from Main Street and therefore clearly functioned as an integrated single unit. The large size of Bldg 53 (149 sq.m including the yards) marks it down as an exceptional building at Saar, and it has been suggested that its owner was of relatively high status (Killick and Moon 1995).

Bldg 35 is a large unit with at least five enclosed areas (possibly more as its limits to the south were not reached). It has a standard two-roomed unit of Group D type along one side, with a further three rooms on the other. It also appears to have functioned as a single unit.

Bldg 14 has an unusual plan and is missing the standard component of one room built in the corner of another. It has a total of five separate areas, plus a raised plastered tank. Although there was an unusual concentration of plastered basins in the open area immediately outside this building, the internal installations were of standard type (such as a bench-and-basin, tannur, fire-pit and plastered pit).

Bldg 56 has a complicated history. In Phase 1 it had six interconnecting areas and three entrances (two off Main Street). Not all areas were excavated to this phase so the data from the installations is incomplete. Subsequently, in Phase 2, the building was divided into two separate parts, some rooms were heavily plastered, and an additional room added outside the rear door.

Bldgs 202, 203 and 204 were treated as separate buildings in Chapter 3, though it was noted that they all shared a rear yard and therefore interconnected. For this reason, they are combined here as one member of Group F. In fact, the disposition of the installations suggests that Bldg 204 at least was a separate ‘household’. Bldg 202 also became a separate unit when the rear yard was subsequently partitioned off. The possibility remains, of course, that this group of buildings originally functioned as a single unit.

Bldg 301 has five interconnecting rooms. Duplicative installations within this unit suggest that it contained two separate ‘households’.

Bldg 220 has two distinct parts: the main one consists of two separate buildings (Bldgs 228 and 229) knocked into one, and to the rear there is a large yard and a subsidiary room. It was not possible to define the limits of the building in this area and it is, consequently, a difficult building to interpret.

Bldgs 11, 12 and 13 also interconnect and so demand inclusion in this group. All three buildings have shared access to two areas in the middle (described as part of Bldg 11 in the preceding chapter), but whether they should all be considered together as a single ‘household’ is simply not clear. Bldg 12 on its own could be interpreted as a standard Group D building with access to the shared areas to the rear. Bldg 13 to the north looks the most separate part of the complex, connecting through only a makeshift opening to the shared areas.

Thus, some members of Group F would appear to have functioned as single coherent units with only one set of cooking installations. The situation is less clear in other cases, but where complexes have more than one suite of the same installations, this surely suggests duplication of activities and, hence, separateness.
**Fig. 4.9 Group F buildings**

**Unique buildings**

Some buildings defy classification into groups, and are just different from the others. The temple, of course, is one such example and needs no further comment. Bldg 58, also in this group, consisted of a single room, the only such example found in the settlement. Two circular structures have been identified as having specific functions, Bldg 500 (a well) and Bldg 36 (a gypsum kiln), and two semicircular structures on the southeastern edge of the settlement (Bldgs 150 and 151) must also have had some special use.
<table>
<thead>
<tr>
<th>Bldg No.</th>
<th>Phase</th>
<th>Area</th>
<th>Sq. m.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.1</td>
<td>1</td>
<td>34</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>3</td>
<td>8</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>2.1</td>
<td>5</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>3.1</td>
<td>9</td>
<td>29</td>
<td>52</td>
</tr>
<tr>
<td>5</td>
<td>2.1</td>
<td>20</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>6</td>
<td>1.1</td>
<td>23</td>
<td>6</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>2.1</td>
<td>43</td>
<td>7</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>2.1</td>
<td>28</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>9</td>
<td>1.1</td>
<td>160</td>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td>10</td>
<td>1.1</td>
<td>47</td>
<td>7</td>
<td>54</td>
</tr>
<tr>
<td>11</td>
<td>1.1</td>
<td>162</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>12</td>
<td>1.1</td>
<td>164</td>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td>13</td>
<td>1.1</td>
<td>46</td>
<td>7</td>
<td>53</td>
</tr>
<tr>
<td>14</td>
<td>3.1</td>
<td>12</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>15</td>
<td>3.1</td>
<td>12</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>16</td>
<td>2.1</td>
<td>680</td>
<td>26</td>
<td>340</td>
</tr>
<tr>
<td>17</td>
<td>2.1</td>
<td>600</td>
<td>31</td>
<td>340</td>
</tr>
<tr>
<td>18</td>
<td>2.1</td>
<td>600</td>
<td>10</td>
<td>360</td>
</tr>
<tr>
<td>19</td>
<td>2.1</td>
<td>600</td>
<td>1</td>
<td>601</td>
</tr>
<tr>
<td>20</td>
<td>2.1</td>
<td>600</td>
<td>4</td>
<td>604</td>
</tr>
<tr>
<td>21</td>
<td>2.1</td>
<td>600</td>
<td>10</td>
<td>609</td>
</tr>
<tr>
<td>22</td>
<td>2.1</td>
<td>600</td>
<td>15</td>
<td>660</td>
</tr>
<tr>
<td>23</td>
<td>2.1</td>
<td>657</td>
<td>26</td>
<td>83</td>
</tr>
<tr>
<td>24</td>
<td>1.1</td>
<td>658</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>25</td>
<td>1.1</td>
<td>660</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>26</td>
<td>2.1</td>
<td>57</td>
<td>27</td>
<td>84</td>
</tr>
<tr>
<td>27</td>
<td>2.1</td>
<td>55</td>
<td>8</td>
<td>63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bldg No.</th>
<th>Phase</th>
<th>Area</th>
<th>Sq. m.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>2.1</td>
<td>53</td>
<td>3</td>
<td>56</td>
</tr>
<tr>
<td>53</td>
<td>2.1</td>
<td>51</td>
<td>4</td>
<td>55</td>
</tr>
<tr>
<td>54</td>
<td>3.1</td>
<td>80</td>
<td>19</td>
<td>99</td>
</tr>
<tr>
<td>55</td>
<td>3.1</td>
<td>81</td>
<td>7</td>
<td>88</td>
</tr>
<tr>
<td>56</td>
<td>3.1</td>
<td>67</td>
<td>20</td>
<td>87</td>
</tr>
<tr>
<td>57</td>
<td>2.1</td>
<td>74</td>
<td>27</td>
<td>101</td>
</tr>
<tr>
<td>58</td>
<td>3.1</td>
<td>94</td>
<td>15</td>
<td>109</td>
</tr>
<tr>
<td>59</td>
<td>3.1</td>
<td>70</td>
<td>3</td>
<td>73</td>
</tr>
<tr>
<td>60</td>
<td>3.1</td>
<td>370</td>
<td>8</td>
<td>378</td>
</tr>
<tr>
<td>61</td>
<td>2.1</td>
<td>610</td>
<td>35</td>
<td>645</td>
</tr>
<tr>
<td>62</td>
<td>2.1</td>
<td>376</td>
<td>8</td>
<td>384</td>
</tr>
<tr>
<td>63</td>
<td>2.1</td>
<td>330</td>
<td>15</td>
<td>345</td>
</tr>
<tr>
<td>64</td>
<td>2.1</td>
<td>352</td>
<td>7</td>
<td>359</td>
</tr>
<tr>
<td>65</td>
<td>2.1</td>
<td>333</td>
<td>23</td>
<td>356</td>
</tr>
<tr>
<td>66</td>
<td>2.1</td>
<td>100</td>
<td>3</td>
<td>103</td>
</tr>
<tr>
<td>67</td>
<td>2.1</td>
<td>104</td>
<td>23</td>
<td>127</td>
</tr>
<tr>
<td>68</td>
<td>2.1</td>
<td>113</td>
<td>9</td>
<td>122</td>
</tr>
<tr>
<td>69</td>
<td>2.1</td>
<td>116</td>
<td>9</td>
<td>125</td>
</tr>
<tr>
<td>70</td>
<td>2.1</td>
<td>118</td>
<td>8</td>
<td>126</td>
</tr>
<tr>
<td>71</td>
<td>2.1</td>
<td>120</td>
<td>8</td>
<td>128</td>
</tr>
<tr>
<td>72</td>
<td>2.1</td>
<td>204</td>
<td>8</td>
<td>212</td>
</tr>
<tr>
<td>73</td>
<td>2.1</td>
<td>200</td>
<td>7</td>
<td>207</td>
</tr>
<tr>
<td>74</td>
<td>2.1</td>
<td>226</td>
<td>8</td>
<td>234</td>
</tr>
<tr>
<td>75</td>
<td>2.1</td>
<td>227</td>
<td>12</td>
<td>240</td>
</tr>
<tr>
<td>76</td>
<td>2.1</td>
<td>228</td>
<td>19</td>
<td>247</td>
</tr>
<tr>
<td>77</td>
<td>2.1</td>
<td>229</td>
<td>7</td>
<td>236</td>
</tr>
<tr>
<td>78</td>
<td>2.1</td>
<td>232</td>
<td>7</td>
<td>239</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bldg No.</th>
<th>Phase</th>
<th>Area</th>
<th>Sq. m.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>204</td>
<td>1.1</td>
<td>232</td>
<td>7</td>
<td>239</td>
</tr>
<tr>
<td>205</td>
<td>2.1</td>
<td>235</td>
<td>8</td>
<td>243</td>
</tr>
<tr>
<td>206</td>
<td>3.1</td>
<td>270</td>
<td>20</td>
<td>290</td>
</tr>
<tr>
<td>207</td>
<td>2.1</td>
<td>272</td>
<td>30</td>
<td>302</td>
</tr>
<tr>
<td>208</td>
<td>1.1</td>
<td>238</td>
<td>13</td>
<td>251</td>
</tr>
<tr>
<td>209</td>
<td>2.1</td>
<td>240</td>
<td>5</td>
<td>245</td>
</tr>
<tr>
<td>210</td>
<td>2.1</td>
<td>126</td>
<td>3</td>
<td>129</td>
</tr>
<tr>
<td>211</td>
<td>1.1</td>
<td>211</td>
<td>13</td>
<td>224</td>
</tr>
<tr>
<td>212</td>
<td>2.1</td>
<td>309</td>
<td>5</td>
<td>314</td>
</tr>
<tr>
<td>213</td>
<td>2.1</td>
<td>298</td>
<td>5</td>
<td>303</td>
</tr>
<tr>
<td>214</td>
<td>2.1</td>
<td>162</td>
<td>3</td>
<td>165</td>
</tr>
<tr>
<td>215</td>
<td>1.1</td>
<td>164</td>
<td>22</td>
<td>186</td>
</tr>
<tr>
<td>216</td>
<td>1.1</td>
<td>46</td>
<td>7</td>
<td>53</td>
</tr>
<tr>
<td>217</td>
<td>1.1</td>
<td>130</td>
<td>56</td>
<td>186</td>
</tr>
<tr>
<td>218</td>
<td>1.1</td>
<td>125</td>
<td>5</td>
<td>130</td>
</tr>
<tr>
<td>219</td>
<td>1.1</td>
<td>322</td>
<td>7</td>
<td>329</td>
</tr>
<tr>
<td>220</td>
<td>2.1</td>
<td>325</td>
<td>5</td>
<td>330</td>
</tr>
<tr>
<td>221</td>
<td>1.1</td>
<td>326</td>
<td>16</td>
<td>342</td>
</tr>
<tr>
<td>222</td>
<td>1.1</td>
<td>327</td>
<td>7</td>
<td>334</td>
</tr>
<tr>
<td>223</td>
<td>1.1</td>
<td>400</td>
<td>14</td>
<td>414</td>
</tr>
<tr>
<td>224</td>
<td>2.1</td>
<td>401</td>
<td>15</td>
<td>416</td>
</tr>
<tr>
<td>225</td>
<td>2.1</td>
<td>402</td>
<td>24</td>
<td>426</td>
</tr>
<tr>
<td>226</td>
<td>1.1</td>
<td>403</td>
<td>15</td>
<td>418</td>
</tr>
<tr>
<td>227</td>
<td>1.1</td>
<td>404</td>
<td>23</td>
<td>427</td>
</tr>
<tr>
<td>228</td>
<td>1.1</td>
<td>405</td>
<td>6</td>
<td>411</td>
</tr>
<tr>
<td>229</td>
<td>1.1</td>
<td>406</td>
<td>23</td>
<td>429</td>
</tr>
<tr>
<td>230</td>
<td>2.1</td>
<td>407</td>
<td>9</td>
<td>416</td>
</tr>
<tr>
<td>231</td>
<td>2.1</td>
<td>408</td>
<td>18</td>
<td>426</td>
</tr>
<tr>
<td>232</td>
<td>2.1</td>
<td>409</td>
<td>12</td>
<td>421</td>
</tr>
<tr>
<td>233</td>
<td>1.1</td>
<td>411</td>
<td>4</td>
<td>415</td>
</tr>
<tr>
<td>234</td>
<td>1.1</td>
<td>412</td>
<td>21</td>
<td>433</td>
</tr>
<tr>
<td>235</td>
<td>1.1</td>
<td>413</td>
<td>8</td>
<td>421</td>
</tr>
<tr>
<td>236</td>
<td>1.1</td>
<td>414</td>
<td>23</td>
<td>437</td>
</tr>
<tr>
<td>237</td>
<td>1.1</td>
<td>417</td>
<td>4</td>
<td>421</td>
</tr>
<tr>
<td>238</td>
<td>1.1</td>
<td>419</td>
<td>25</td>
<td>444</td>
</tr>
<tr>
<td>239</td>
<td>1.1</td>
<td>700</td>
<td>13</td>
<td>713</td>
</tr>
<tr>
<td>240</td>
<td>2.1</td>
<td>701</td>
<td>32</td>
<td>733</td>
</tr>
<tr>
<td>241</td>
<td>2.1</td>
<td>704</td>
<td>7</td>
<td>711</td>
</tr>
</tbody>
</table>

Table 4.1 Building dimensions
Construction methods

The buildings at Saar are built of rough limestone, the same material that makes up the ridge on which the settlement stands. The walls are uncarded, and stones are bonded with a sandy, gritty mortar, sometimes containing an aggregate of small pebbles. Foundation trenches were rarely observed. Walls were sometimes built in unbonded sections so that abutting walls do not *per se* provide evidence for the construction sequence. Occasionally a string course can be observed.

By and large, the plaster render that was applied to the external face of the walls has eroded off, although fragments were occasionally found still in position. Quantities of plaster fragments, sometimes very considerable quantities, were often found in the collapse level of the buildings. A proportion of these were saved and catalogued, and a few analysed. Many show impressions of the wall faces and occasionally corners. Only in the temple was any trace discovered of painted plaster (Fig. 5.25f), but there are fragments consistent with moulded plaster decoration (e.g. 1141:05 and 416:11).

In a few cases, it can be ascertained that the pieces are from the roof, rather than the walls. This diagnosis is generally from the impressions of palm-leaf or reed roofing material found on one side, occasionally with evidence for the way they were tied or fastened, and sometimes with impressions of the palm beams that supported them (e.g. Fig. 4.11 and J16:06:02).

Doorways displayed some variation in width, but most were between 70 and 80 cm. Some of the door jambs, or sometimes the walling next to the door, contained narrow recesses which must have been part of the door fittings. Perhaps some received the locking bar or its support (Fig. 3.275). In one example, the recess was formed by setting the broken neck of a jar into the wall (Fig. 4.12).

There was no evidence for any window openings in the buildings. Four buildings had small ledges built into one of the walls (Bldgs 64, 200, 202 and 208; Figs. 3.22 and 165). These were all of approximately the same width (40–44 cm). A fifth example in Bldg 207, 50 cm in width, was subsequently blocked up (Fig. 4.13).

Narrow buttresses were built into the walls, typically on those walls opposite the corner of the inner room, to support the main roof beams. In the two cases where it was possible to take a floor to roof beam measurement, these indicate a minimum roof height of between 1.8 m (Bldg 300) and 2.2 m (Bldg 224). The diameter of the holes for the roof beams is consistent with the use of date palm trunks to support the roof.

The combined evidence of excavation and micromorphological investigations (see Chapter 10) suggests that in a standard two-roomed building both the inner and outer rooms were roofed, though perhaps the latter had a lighter covering such as palm fronds, whereas the rear yards of the three-roomed buildings may have been partly open to the elements.

There is no evidence for a second storey to the buildings. Stretches of collapsed wall are consistent with a single storey structure, and there is no trace of any means of access to an upper floor. All walls have a standard thickness of approximately 60 cm, and there is no difference in thickness between walls that clearly did not support a second storey (i.e. the perimeter wall of the courtyards of Bldg 53) and those that theoretically could have. Furthermore, there is a very clear abandonment sequence in many of the buildings. This was particularly well observed in the micro-stratigraphic analysis of post-abandonment deposits in Bldg 207, where again no evidence for an upper storey was found.

In one or two cases such as Bldg 224 there is possible evidence for use of the roof as extra space, in the form of objects sitting above roof collapse. But an alternative explanation, that the material was dumped into the building after its collapse, is equally valid. No permanent means of access to the roof was found. It could be argued that this latter point is a weak argument, as wooden ladders to the roof would not necessarily leave any trace in the archaeological record. However, stone was the main building material at Saar and wood, apart from date-palm, was very poorly represented in the archaeobotanical record (Nesbitt 1993, Gale 1994).

---

Fig. 4.11 Fragment of plaster with reed impressions (L17:63:01)

Fig. 4.12 Jar neck in wall next to door in Bldg 203 (SW)

Fig. 4.13 Blocked-up ledge in the northeastern wall of Bldg 207 (NE)
Installations

Installations are pieces of equipment that are integral to the structure of a building, and not readily removable. Common examples at Saar are ovens and basins. As with the building plans, the installations group readily into standard types, described below. The numbers attached to each are the feature codes used both in excavation and in the excavation databases to identify each type of installation.

Common installations in the Saar buildings

Tannurs (Type 200)
The Arabic term ‘tannur’ is retained here to apply to a very specific type of oven that has a widespread distribution in time and space. It is designed to heat a clay cylinder to a high temperature using minimum fuel, and is employed primarily, though not exclusively, for the cooking of unleavened bread.

There are thirty-five examples from Saar, all very similar in construction but with some variation in size. Each tannur has a circular stone superstructure built around the cooking chamber, which in turn is made from a single pottery sleeve inserted into the stonework. It is heavily plastered, with a finishing coat of smooth white plaster over an ashy bedding layer.

The overall size ranges in diameter from 40 to 110 cm, with twenty-one examples between 70 and 90 cm. The height of complete and intact examples is between 40 and 50 cm, with one exceptionally standing as high as 75 cm.

The central pottery sleeve is tapered, being wider at the top than at the bottom. The reduction in diameter is quite pronounced, from around 46 cm at the top down to around 30 cm at the base, over a typical height of 40 cm. The sleeve is raised a few centimetres above ground level to leave a small firing chamber below and within the stone surround. This usually contains a fine grey ash.

The tannurs are generally not free-standing, but built against an existing wall or in a corner and, as might be expected, all show signs of being scorched and baked by fire. Ash rake-out is sometimes heaped upon the adjacent surface.

Semicircular hearths (Type 201)
There are thirty-one examples of semicircular hearths. These are characterised by a raised plastered edge which separates the interior of the hearth from the surrounding floor. The lip is made up of small stones, set in a brown mortar and then heavily plastered over. The interior floor of the hearth is usually baked hard from burning.

Most examples have a diameter (or length) of around 70 cm, with a lip raised some 10–20 cm above the height of the floor, though obviously this can decrease as floors are raised through re-plastering, so that in final stages of use it may be almost at floor level. The radius (width) to diameter (length) ratio is on average 0.75:1 so strictly speaking many are elliptical rather than semicircular. The three largest examples (width over 1 m) are, however, truly semicircular.

The floors of the hearths are baked hard through use, often show signs of several replasterings and are occasionally built at a higher level. The walls and floors in the vicinity are also often scorched, with ash from the hearth spilled out over the associated surfaces.

Semicircular hearths are usually present in the outer room of a building, either against the rear wall of the room or against the wall which provides access into the inner room. They are usually found singly, with no more than one per household. Sometimes they are part of a cooking suite which may also include a cooking pot support or tannur. In one case, two semicircular hearths are separated by a cooking pot support (see Type 210).

They seem to be the basic cooking mechanism in every household, and could have been used for boiling liquids, and stewing and grilling foodstuffs.

Ring hearths (Type 202)
There are twelve examples of simple ring hearths. These have a plastered base which raises the hearth slightly above the level of the surrounding floor, and a ring or lip, also plastered. They are integral with the floor, and the plaster for both floor and hearth is usually applied at the same time. The average diameter of the hearths is 57 cm. The largest had a diameter of 80 cm and one much smaller example was found (diameter 25 cm). The height of the plastered lip, and hence the depth of the hearth, was no more than 15 cm. As the floors were replastered so the height of the hearths was in some cases reduced, occasionally almost to floor level. In other examples, the hearths themselves were renovated and replastered, sometimes repeatedly.

Both the hearth and the surrounding floor were usually baked and ash rake-out from the hearth was often present. In one case, the amount of ash was so considerable that it had almost buried the hearth itself.

Fire-pits (Types 204)
A fire-pit is defined as a scoop or pit dug into the ground, showing signs of having been burnt or scorched. There are fifty-four examples these at Saar. Most examples in this category are circular, but a few are oval or irregular in shape (for vertical-sided examples see below).

These features usually contain a residual ashy fill, and their sides and base are burnt. Where they have been built next to a wall, the wall too may show signs of fire damage.

The average diameter of the pits is 60 cm. The smallest examples are half this size, and only three examples have a diameter...
of greater than 80 cm. The average depth is 20 cm and only four examples—not the ones with the greatest diameters—are over 40 cm in depth.

The average width-to-depth ratio is 5:1, but the variations are extreme, ranging from one example with a diameter of 58 cm and a depth of 55 cm (giving a ratio of just over 1:1) to one with a slightly larger diameter which has a depth of only 5 cm (a ratio of 12:1). This suggests that these two examples, though both clearly for the use of fire, cannot have served identical functions. Some of the shallower pits, particularly those that are merely scoops of sand filled with ash, may represent the remains of a single fire. This is particularly likely for those pits found in the post-habitation levels of the buildings, or in open areas.

However, some shallow examples must have had a more permanent function, as illustrated by an especially well-preserved one in Bldg 209. This was a shallow circular pit with an upturned broken jar rim set into the middle, and wedged into position by several stones (Fig. 33). The rim served as a support for a cooking vessel, while the pit held the fuel. Both the base and sides of the pit were heavily burnt. Other pits of similar dimensions, but without any permanent jar support, may have been the same.

The particular function of the deeper pits is more problematic. They are all associated with burning, having scorched bases and sides, and ashy fills. An association with cooking is not proven, though given the contextual evidence it seems likely. Perhaps they were for cooking food that was either too large for other types of ovens and hearths, such as parts of animal carcasses, or that cooked better by slow roasting at a low temperature.

**Vertical-sided fire-pits (Type 205)**

There were a small number of scorched pits that had vertical sides: one example was square, four were rectangular and two were oval. Members of this group may not have served the same specific function, but all are characterised by the presence of burning on the base or along the edges.

The most informative example was a shallow rectangular fire-pit in Bldg 208, 120 cm long and 50 cm wide. Either side of the pit, approximately halfway along its length, were rectangular post holes with vertical sides. It is possible that these supported a frame from which the item to be heated could be suspended. If the purpose of these pits was for cooking food, then a small carcass suspended for roasting, or a cooking pot are easily imagined.

Other vertical-sided pits had different associations. One, in Bldg 6, had been dug next to two circular pits, while another example, in Bldg 208, lay in front of a small stone bench.

With one exception, all the vertical-sided pits were relatively shallow, being no more than 20 cm deep.

Vertical-sided fire-pits have a much more restricted distribution than any of the other cooking installations.

**Cooking pot supports (Types 210/211)**

These installations consist of two or more upright plastered stones, usually set along a wall next to a semicircular hearth, and spaced so as to support a round-bottomed cooking pot. There were forty-six examples (excluding rebuilds). Most have three stones forming a ‘tripod’ support. The stones are well plastered, thicker at the base than at the top, so that each resembles a cone. They stand, on average, 20 cm high, with the largest example 30 cm. Some have only two free-standing plastered stones, in which case the third cone is either semi-engaged in the wall at the rear of the support, or entirely absent. If absent, then the wall alone provided sufficient support, as indicated sometimes by an extra thick ‘bulge’ of plaster. One example has four unplastered stones set in a square.

Most jar supports of this sort are found adjacent to semicircular hearths, and have sometimes been built as an integral feature of the hearth, with one of the supports set within its raised lip or surround. In one or two examples, the jar support has its own raised lip. In these cases it is clear that the support served also as a hearth. There is always plenty of ash in and around these installations, much of it rake-out from the nearby semicircular hearths, but sometimes a thin layer of charcoal was found lying between the cones. A variety of kitchen uses can be imagined for the supports: somewhere to put the jar before and after cooking; a place to keep cooked food warm; a facility for simmering by putting a few embers between the cones; or an additional hearth when the occasion demanded.

An intriguing modern set of supports, as well as a hearth and tannur, were noted from an abandoned village house in Saudi Arabia (Fig. 4.18; pers. comm. N. Al-Shaikh).
**Plastered storage pits (Type 300)**
This category encompasses all instances of pits dug into a surface and then lined with a hard, white, waterproof coating of plaster. It is a relatively common installation (sixty-seven examples). Pits could be replastered many times—seven was the maximum observed—so that their capacity was constantly reduced, with the thick plaster forming a lip up to 10 cm above floor level. In one case the lip had a core of small stones. Most pits were round or oval, and occasionally square. The main variation is in depth. Some examples are relatively shallow (7–10 cm), while others are much deeper (62 cm in one case). Two pits were exceptionally large; the largest of these (Fig. 4.19c) was 1 m wide and 50 cm deep and, calculated as a half sphere, would have held 261 litres.

![Fig. 4.19 Plastered storage pits (Type 300)](image)

The range in size (and capacity) might suggest some variation of function, particularly at the two ends of the range, or it might reflect differing storage requirements for the same item(s) from household to household. Not all plastered pits need have stored the same item, nor have been restricted to a single purpose. Many permutations are conceivable and both solid and/or liquids could have been stored in them. Common to all these pits was the facility for providing the contents with a clean, waterproof environment. Whether waterproofing or isolation from the surrounding soil was the main benefit of the plaster protection is hard to say. In one case, there was circumstantial evidence for a covering over the pit, one light enough to have been held down by a stones, and so perhaps a textile.

**Storage bins/basins (Type 301)**
There are twelve installations that have a stone superstructure containing a single plastered bin/basin. This group includes circular or oval examples with a substantial stone superstructure (Fig. 4.20a), as well square or rectangular examples with less substantial stonework (Fig. 4.20b and c). The distinction between basins (to hold liquids) and bins (to hold solids) is a difficult one to make, especially where the superstructure of an installation has been largely destroyed, but the intact examples with thinner walls seem more suited to the storage of non-liquid items, while the single intact example with a thick stone superstructure supporting the bin/basin seems more suited to holding liquids.

![Fig. 4.20 Storage bins/basins (Type 300)](image)

**Double basins/bins (Type 303)**
There are ten examples of rectangular basins/bins containing two separate storage compartments. These are generally larger than the Type 202 installations. The largest double basin/bin, from outside Bldg 220, was 2.4 m long with compartments measuring 60 × 80 and 90 × 100 cm. Most others were 1–1.5 m in length. No examples survived to their original height.

There could be many reasons why such installations had a double compartment. This feature might be related to construction technique, being an economical way to gain larger capacity in a situation where a single large basin/bin would not be suited to whatever was being stored; it might reflect a desire to store more than one commodity or to split the storage of the same commodity; or it might represent two different stages of processing or storage.

![Fig. 4.21 Double basins/bins (Type 303)](image)
Buried storage jars (Type 310)

There were seven examples of a portable jar sunk up to its neck so that the rim was almost flush with the floor. These were found in Bldgs 31 (2 jars), 53, 54, 62 and 21 (2 jars). The mouth of the vessel was protected by a plaster stopper, in some cases still in situ, or, in one example, by a ribbed body sherd. Two different vessel types were used in this way: round-bottomed cooking pots and oval-shaped jars.

Reasons for burying jars in this manner might include one or more of the following factors:

1. Storage security: it was hard to broach or spill the contents.
2. Concealment: siting the pot below floor in a dark corner would render it effectively invisible.
3. Food preservation or processing; a food for which below-ground conditions were in some way more favourable.
4. Lack of space: the jars provide more storage over a smaller area of the floor.

Ease of access to the contents was presumably not required, as such jars are difficult to empty and almost impossible to wash out. While some of the unplastered pits discovered might also originally have contained jars, these installations are still comparatively rare, suggesting a rather particular function, not an everyday one.

This would fit well with their use as a household 'safe', to conceal items of value or importance. Such concealment would, of course, be compromised if such devices were common. Extra weight for this explanation is perhaps provided by the locations in buildings with evidence of comparative wealth or distinction (except for Bldg 62). Bldg 31 contained a large number of sealings, and Bldg 51 an unusual quantity of seals, while Block I generally had more evidence for imported pottery than other parts of the settlement.

Storage vats (Type 311)

Permanent storage space inside buildings was provided not only by basins, but occasionally by large pottery vessels, usually partly set into the ground. Generally, only the base of these vessels was preserved. They were not common: only eleven examples in total.

Two were ribbed vats with layers of gypsum plaster and bitumen over the base. One of them contained two coatings of gypsum plaster, each 15cm deep. The original form of the other vats could not be determined, though at least one had a round base containing several coats of gypsum plaster.

Bench-and-basin (Type 400)

There are 44 instances (excluding rebuilds) of a stone-built rectangular bench, with a small shallow trough at one end. This type of installation is remarkably uniform, with little variation in size, construction or position inside buildings. Typical dimensions are 110 cm long and 60 cm wide, with the bench taking up about two-thirds of this space and the basin the rest. The bench is built of solid stone with the sides faced with plaster. The top has usually not survived, but in one intact example it had a stone edge around a central depression. A second example had a more regular, rectangular hole in the centre. The height of the intact bench was 53 cm above the floor level.

The basin was usually set a few centimetres lower than the bench and finished with a coat of hard white plaster, with the bottom sloping down towards the front of the installation. In some cases, a drainage lip was still preserved. Instead of a plastered trough, two examples have half of a jar set into the stone surround, presumably serving a similar function.

Bench-and-basins are usually found immediately inside the main door of a building, and would be the first thing encountered on entering. For buildings of Type A, B or D, this position is in the passageway leading through into the main room, usually on the partition wall of the inner room, be this on the right or left side. Occasionally the installations are found further inside, either next to the door into the inner room, or on the wall opposite the main entrance. The basin is usually sited on the side of the support furthest away from the door. Inevitably, there is a handful of exceptions, though at least some of these can be ascribed to different circulatory patterns through the relevant buildings.

The top of the intact example, with its depression and stone facing, suggests that it acted as a support for a container, while the waterproofed basin, with its drainage lip, show that an expendable liquid, most likely water, was splashed down into the basin before
<table>
<thead>
<tr>
<th>Bldg</th>
<th>Cooking/Heating</th>
<th>Storage</th>
<th>Workspace</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tannur 200</td>
<td>210/211</td>
<td>201/202</td>
</tr>
<tr>
<td>Group A</td>
<td>1</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>52</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>64</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>102</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>104</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>206</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>207</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>221</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>223</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>225</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>226</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>326</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>352</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td>Group B</td>
<td>6</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>62</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>222</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>303</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>304</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>305</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>29%</td>
<td>71%</td>
</tr>
<tr>
<td>Group C</td>
<td>200</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>353</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>0%</td>
<td>50%</td>
</tr>
<tr>
<td>Group D</td>
<td>3</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>205</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>208</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>210</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>211</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>224</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>64%</td>
<td>64%</td>
</tr>
<tr>
<td>Group E</td>
<td>5</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>34</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>71%</td>
<td>43%</td>
</tr>
<tr>
<td>Group F</td>
<td>11</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>202</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>203</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>204</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>209</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>301</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>54%</td>
<td>38%</td>
</tr>
<tr>
<td>Number of buildings (out of 55) and %</td>
<td>28</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>51%</td>
<td>52%</td>
<td>49%</td>
</tr>
</tbody>
</table>

Table 4.2 Presence/absence of selected installation types by Building Group
draining out and soaking into the floor—indicating a relatively small amount was used at any one time.

The conclusion, therefore, is that these installations were used for water storage and for washing. Their location next to the entrance might be partly a matter of convenience, being the easiest place to transfer water brought up from the well, or it might also indicate a more deeply-rooted social function—the washing of hands or feet on entering the building, for example.

Whatever the exact interpretation, the absence/presence in a building of this type of installation may serve, along with other indicators, to show a commonality of function between buildings.

**Distribution of installations**

Table 4.2 shows the presence/absence of some of the distinctive installation types found at Saar, arranged by Building Groups A–F as defined above. The installations are further grouped into three categories reflecting their suggested usage: cooking/heating, storage, and workspaces. Only those buildings for which a complete plan was recovered are included in the table.

The most noticeable phenomenon is the absence of common installation types in three buildings (two Group A buildings, Bldg 2 and 206, and Bldg 58, a result of a late remodelling of Bldg 6). In fact, all three of these have no installations of any type at all. It is possible that the Block A examples were originally built with the same purpose in mind as others of the same plan, but then for one reason or another later used for something different; vernacular architecture has many examples of this. Thus they could have been transformed into shops, or work or storage areas not requiring built-in equipment. Another possibility is that they were residences, but that the social structure included groups who did not perform any cooking or domestic activities inside their houses.

At the other end of the scale, there are eleven buildings that have six or more types of installation. These encompass examples from all our building groups, except for Group C which has, in any case, only two members, though most are the larger complexes of Group F.

Some form of cooking installation is present in all but seven of the fifty–five buildings listed. Tannurs, cooking pot supports and hearths are equally common. Most buildings have more than one cooking installation, and twenty buildings (36%) having three or more, but there does not seem to be any noticeable correlation between building size and installation types. Thus, Bldg 53 (149 sq.m) has the same range of cooking installations as Bldg 207 (43 sq.m), though exceptionally the former has two tannurs.

Among the storage installations, the commonest type, indeed the commonest installation overall, is the bench-and-basin (Type 105) which occurs in thirty-eight buildings. Again, there is little variation between building groups. It is definitely present in 63% of buildings of Group A, and some of the others contained fragments that may have belonged to such a device. In fact, of the Group A buildings with any installations at all, only Bldg 57 definitely did not have one of these. They are also common in all the other building groups (63% of Group F buildings, for example). Whatever the precise use of this ‘wet-storage’ installation, it clearly constituted a more-or-less essential piece of equipment, whatever the plan of the building.

Buildings which do not have any of the commonest storage installations are Bldgs 9, 56, 62 and 305 (plus the three buildings without any installations at all), of which the omission in Bldg 56 is the most noteworthy, given its size. This may not be as significant as the lack of cooking installations in other buildings, given that portable pottery vessels were in common use for storage.

Of the seven buried storage jars (Type 310, possibly to be interpreted as ‘safes’), none occur in Group A or C buildings, and there are only two in Group B buildings (Bldgs 51 and 62). On the slim statistics available, these seem to go with larger buildings.

Stone platforms or benches (Type 109) occur in 50% of Saar buildings, though it should be noted that some may be partly-deminshed bench-and-basins. All the larger multi-room complexes have them, and their distribution is otherwise fairly even. Unplastered pits (Type 300) are also common.

It is difficult to understand the significance of the minor variations in the range and distribution of installations in the buildings. Their most remarkable feature is, in fact, the very uniformity of type and distribution from building to building.

**Building function**

Most buildings at Saar have the same plan, or minor variations thereof. Nearly all the buildings also have the same range of cooking and storage installations, with some exceptions noted. The range of finds from the buildings, which are for the most part utilitarian items used in routine domestic chores (see Chapter 5), are also fairly uniform and it is difficult to find much meaningful variation from building to building. All this combines to suggest the obvious: most buildings performed the same function and were houses for living in.

Some of the buildings which have no cooking facilities still seem, on the basis of the presence of other installations and the range of finds, to have been residences. Bldg 61 is an obvious example of this type. In this case, either the inhabitants of the house cooked elsewhere or were cooked for. Another example is Bldg 13, unusual for the number of its storage installations.

That the primary function of nearly all these buildings was domestic does not preclude some of them, most obviously the larger examples, from having important additional secondary uses. Bldg 36, for example, has a standard range of domestic installations and lots of extra work and storage spaces, suggesting commercial as well as residential use. Other indicators of additional functions may be more subtle, such as the gypsum-plastered tombs and rooms of Bldgs 5, 56 and 60.

Very few buildings can definitely described as entirely non-residential. The one most obviously so is, of course, Bldg 201 (the temple). This stands out for the uniqueness of its plan and range of installations. Non-rectilinear Bldg 36 had an industrial use as a gypsum kiln. It was built and used relatively late on in the life of the settlement. Bldg 56 is another strong candidate, due to a combination of its gypsum plastered areas, a lack of standard installations, and the presence of a unique one (a plastered bench with tunnels in the top). Bldg 58, with its single room and lack of installations, may also have served a different function, such as a storeroom or even perhaps as a shop. Another unit entirely lacking in installations is Bldg 2 but, in contrast to Bldg 58, this has an absolutely standard plan. It is also the building where two copper spearheads were found, as well as two other copper objects and a small amount of copper waste/spill, so perhaps it too served as storeroom.
Chapter 5  Tools, weapons, utensils and ornaments

Jane Moon

Introduction

As far as we can tell, Saar was abandoned in a peaceful fashion. Although we do not know why the people left, we can be certain that their departure was not wholesale or sudden. One does not expect, therefore, to find the buildings arranged exactly as when they were lived in, nor to encounter large numbers of hastily abandoned possessions. We have to reconstruct the life of the inhabitants of Saar by interpreting what they had lost, forgotten, broken or discarded, and if this is more challenging than the gift (to an archaeologist) of a grand destruction level, it is also satisfying to know that they had finished with the artefacts we examine, and not been parted from them violently.

Copper tools, weapons and other items

For a modest-sized settlement, Saar was amply provided with metal artefacts. These are all made of copper or copper alloys: no evidence was found for artefacts of gold, silver or other metals. Occasional rust stains are probably attributable to the presence of iron oxide, but not, of course, evidence for iron working, which did not come to the island until later. For ease of reference the metal objects are all described in this chapter as ‘copper’, though the samples analysed in Chapter 9 demonstrate that a range of alloys are present in the metal assemblage.

Over 200 items were recovered in varying states of preservation, and 58 further occurrences noted of unidentifiable fragments or groups of them. The copper artefacts were examined and stabilized by the Expedition’s conservators, and a representative selection cleaned. Full cleaning of all the items has not been attempted, and awaits the establishment of a long-term conservation strategy by the Bahrain National Museum.

While copper artefacts provide one or two of the more spectacular items of the Saar assemblage, they are also the most difficult to present. The peculiar way in which copper gradually deforms with corrosion means that the archaeologist can be faced with different degrees of uncertainty over the identity of an object. The range extends from the clearly obvious, such as a fish-hook, through decaying fragments which might be parts of fish-hooks, but might equally well have been parts of rings or pins or nails, thence to fragments which could have been something, but no identification is possible, to small lumps which were probably just casting slag or waste. In catalogue incomplete copper objects we have tried to convey the range of possibilities as fully as we can, only taking refuge in the bald description ‘fragment’ as a last resort. ‘Wire object’ is used for pieces made of thin, solid copper, round in section, which may have come from hooks, rings etc., and ‘rod object’ for thicker lengths, round or square in section, which seem to have come from items such as awls. ‘Object’ is used for pieces that are with reasonable certainty from artefacts, and ‘fragment’ for scraps of corroded copper about which nothing more can be said. Many ‘fragments’ are described as ‘casting slag’.

This information began to be added to catalogue entries following a visit in 1992 by Paul Yule of the Bergbaumuseum at Bochum, who identified some groups of fragments as such. Many of our other ‘fragments’, especially those from earlier seasons, may well be casting slag, despite not being explicitly described as such in the catalogue.

No moulds or crucibles were found, but the ubiquity of waste fragments, and the positive identification of at least some as the by-products of casting, must be taken as evidence that some manufacturing was taking place. The presence of ingots (e.g. Fig. 5.1a–b), could be taken as supporting evidence, though it is possible to think of other explanations for their presence, for instance as trade items.

A preliminary look at the distribution of copper objects shows that the buildings with the most copper finds, including fragments are, in order: Bldg 51, then the temple, then Bldgs 52 and 207. If fragments are excluded, the place with the greatest number of artefacts is the temple, then Bldgs 224 and 51, then Bldg 220. The floor of Area 316 of Bldg 224 produced the largest number of copper items in a single context: a pin, two wire objects, and fragments of an arrowhead, a chisel, a hook and a possible hatchet.

Weapons

In contrast, perhaps, to the impression gained from Dilmun tombs, the metalwork assemblage from the settlement at Saar provided little evidence for warmongering or hunting. The most obvious, however, was the presence of two spear- or lance-heads, quite different from each other. The larger had a short head and thick tang (Fig. 5.1d). Although there was no mid-rib, the blade was made thicker down the centre, which was presumably sufficient strengthening for a short blade like this. The other had a long thin blade, with a mid-rib, and folded-over socket for hafting (Fig. 5.1c). Although there are several Dilmun spearheads of comparable type published, none are exactly like these: socketed ones from the Northern Burial Complex and other nearby graves are shorter, with flaring sockets (Mughal 1983: 539, pl. LI, a; Ibrahim 1982: 156, fig. 47, 1–3), while the tanged ones are longer (Mughal 1983: 539, pl. LII, 5). A socketed example from Qala‘at al-Bahrain Level 1b is altogether longer and more gracile (Q, al-B. 1: 379, fig. 185). Small socketed spearheads, of the kind commonly found in the graves were lacking (Mughal 1983: 539, pl. LII, a, 1–3, and 479, fig. 26, 1–4; Ibrahim 1982: 217, pl. 55, 1–4).

Superficially similar, but slightly larger, was a blade with a thin, flat tang (as far as preserved), and no blade reinforcement at all (Fig. 5.1e). Perhaps best interpreted as a dagger, though the shape and size do not preclude a spear, it is hard to see how it could have withstood any measure of violence without buckling. It could also have been a knife, or a piece of ceremonial regalia. One exactly the same, but two centimetres shorter, was found among the Hamad Town burials (Srivastava 1991: 283, pl. XLI, 3).

The copper armoury of Ancient Saar seems otherwise only represented with certainty by a broken-off socket identical to Fig. 5.1c, found in the same place (the inner room of Bldg 3), and by a possible arrowhead (Fig. 5.1f). On closer inspection, however, many corroded and broken pieces may well have belonged to weapons.
FIG. 5.1

5.1a 1159:03 Copper ingot. Half of a bun ingot, originally hemispherical, now sub rectangular with one face convex, the other flat. The latter has small areas of brown staining (iron/rust?). Good condition. Dimensions 10.2 × 6.8 × 2.8 cm. Bldg 200, Area 204, floor.

5.1b K16:51:01 Copper bun ingot. Roughly hemispherical, and solid. Diam. 10.3 – 10.7. H. 5.5 cm. Bldg 51, Area 55, occupation.

5.1c F17:51:03 Copper socketed spearhead. Complete and in good condition. Blade long and narrow, with central rib, widening very slightly towards the base. Socket made of copper sheet bent round to overlap. Total l. 18.3; blade l. 10.0; socket l. 8.3. Max. w. 2.9. Bldg 2, Area 4, floor.

5.1d 3215:01 Copper spearhead. Tanged spearhead with tip broken off, and perhaps one lower corner. Blade is in the form of a short isosceles triangle, the long sides gently curved. There is no mid-rib, but the blade is thicker down the centre. The tang is thick and solid, widest beside the blade, tapering and squared off at the other end, rectangular in section. The flat surfaces of the object are covered in small lumpy corrosion, otherwise it feels solid. Extant max. l. 12.8; w. 4.2; th. 0.9 cm. Blade l. 6.1; w. 4.2 – 1.8; th. 0.9 – 0.4 cm. Tang l. 6.65; w. 2.05 – 0.7; th. 0.9 – 0.35 cm. Bldg 305, Area 418, sand.

5.1e 5592:01 Copper dagger blade. Long copper blade with flat tang, mostly broken off. Long thin blade, gradually widens towards tang, then tapers abruptly. Flat faces with slightly rounded tip. L. 14.7; w. 4.0; th. 0.25 – 0.6 cm. Tang l. 2.1; w. at end 1.35 cm; th. 0.4 cm. Bldg 226, Area 323, sand.

5.1f 5510:78 Copper arrowhead? Thin, flat, triangular piece of copper. Two adjacent edges appear to have been sharp, and converge to a point. The third is masked by corrosion. One face is thick and lumpy, possibly only from corrosion. Presumably the end of a blade, possibly a complete arrowhead. In reasonable condition. L. 2.5; w. 1.5; th. 0.3 – 0.6 cm. Bldg 224, Area 316, floor.

5.1g 7004:05 Copper blade frag? Piece of copper sheet, approximately square. One side broken, the others probably intact. Perhaps part of a blade. Dimensions 2.9 × 2.55, th. 0.7 cm. Bldg 34, Area 601, collapse.

5.1h Q20:41:05 Copper blade. Piece of substantial copper sheet, approximately rectangular in plan, with one corner recently broken off. Thin tang protrudes from the centre of one short side. Presumably the remains of blade. Dimensions 5.4 × 2.9 × 0.4 cm. Also there is a second fragment that does not join: 1.6 × 1.8 × 0.3 cm. Bldg 102, Area 105, midden.

5.1i 4039:01 Copper blade fragment. Thin, flat strip of metal, long sides converge to a blunt point, other end broken off. Presumably the tip of a blade. L. 3.6; w. at wide end 1.9, at narrow end 0.4 cm. Bldg 208, Area 242, sand.

5.1j 1529:02 Copper haft? Tubular length of copper with longitudinal split. One end slightly splayed. Perhaps the hafting socket from a small tool? L. 3.4, diam. 0.6 cm. Bldg 201, Area 200, sand.

Abbreviations in catalogue
L. length
Th. thickness
W. width
Diam. diameter
Fig. 5.1 Scale 1:2
These include fifteen blades, or pieces of them (e.g. Fig. 5.1g–i), one of which had a possible rivet hole (E3:12:03). There are also two possible broken sockets (2506:050, 1529:020). Axes can serve either as weapons or tools. One beautifully wrought blade, of the type known as a 'blade-axe', was found in good condition (Fig. 5.2a). This distinctive blade has a wide circulation and is found at sites contemporary with Saar and slightly earlier: at Umm an-Nar (Frifelt 1995: 195, fig. 276), and Tell Abraq (Potts 1993: 329, fig. 23.6) in the Emirates; at Harappa in the Indus (Vats 1940: pl. cxxiii, 20–1); and also at Susa (Tallon 1987, nos. 468–9).

Less satisfactory for identification were two tanged items more-or-less in the shape of hatchet-heads, which irresistibly recall the metal flags used to mark holes on golf putting greens (e.g. Fig. 5.1b). Similar blades were found in the nearby Northern Burial Complex (Mughal 1983: 53, pl. 1.11, 3 and 479, fig. 26, 6). Like the flat spear or knife above, none of these give the impression of being very robust.

**Tools**

In contrast to the weaponry, or at least that which remains to us, the copper tools of Saar bear every indication of being designed for hard work. Perhaps the most evocative implement found, from Bldg 220, is a solid and well-preserved awl, still firmly anchored in a bone haft worn smooth and easy to hold (Fig. 5.2c).

The broken handle of another example was also found (Fig. 5.6c), and there was one the same in a nearby grave (Ibrahim 1982: 155, fig. 46, 6), but this one differs in that the rather spiky distal end of a sheep/goat radius forms the handle, rather than the smoother, and presumably more comfortable distal end of a metatarsal. Further evidence for these useful tools was provided by an awl blade without its haft (Fig. 5.2d), and probably by some of the pieces catalogued as ‘rod fragment’.

Equally robust and business-like is a heavy chisel found on a floor in Bldg 51 (Fig. 5.2g). Partial cleaning has revealed the solid metal beneath the corrosion. A second example, from the same building, has a narrower end (Fig. 5.2h). Again, there is further evidence for these tools from fragments (Fig. 5.2f, i–j), including a possible haft fragment (Fig. 5.4t), if it is not a bead. There was at least one chisel-awl, with one end pointed and the other flattened (Fig. 5.2e).

There were three examples of blades apparently for domestic use. One was a small lunate blade (F17:26:003) and the others possible saws (Fig. 5.3 a and c), though the serration may be an illusion of the corrosion patterns.

The discovery of a large hoe blade in Bldg 211 was something of a surprise: it still weighs over two kilos, and seems a strange thing to abandon, considering how much it must have been worth (Fig. 5.3b). A request by one of the local workmen to use it, in place of the (inferior) one he had been issued with, neatly underlined the unchanging nature of agricultural implements in the region.

---

**FIG. 5.2**

5.2a 2682:03 Copper axe, or possibly a chisel. Long, flat blade, approximately rectangular, narrowing slightly towards one end, which is thick and neatly squared off. The opposing end splays abruptly outwards to a sharp thin, square edge. L. 14.1, w. 2.4 (min), 5.1 (max), th. 0.3 (min), 0.9 (max) cm. Bldg 54, Area 92, floor.

5.2b 5510:88 Copper hatchet? Flat, heavy, sub-rectangular sheet of copper, with short rod extending from one corner, producing the shape of an axe with a very short handle with rounded tip: possibly a square blade with tang. The blade-edge opposite the ‘tang’ has good condition with one recent nick in upper edge. Otherwise apparently intact. Similar to 292:02. H. with tang 8.75, without tang 5.2–6.2, w. 7.5, th. 0.4. Thickness of tang with lump 1.0 cm. Bldg 224, Area 316, floor.

5.2c 5506:03 Copper awl in bone handle. Awl blade is square in section, becoming circular and narrowing to a point at the end. Exposed L. 8.1, diam. 0.5–0.8 cm. Handle is made from the distal end of the tibia of a young sheep/goat, with slightly damaged epiphysis at the handle end. The shaft has been cut off at right angles, and the blade hafted into a circular hole. In this area the bone has been shaped to be roughly square in section with rounded corners. Handle L. 7.8–7.9 cm. At hafting point: w. 1.2, th. 1.3 cm. Overall tool length 16 cm. Part of handle split away below hafting point. Bldg 224, Area 307, collapse.

5.2d F18:45:08 Copper awl? Long rod, possibly an awl, badly corroded. Probably square in section. Tapered slightly at either end. Dimensions 7.9×0.8 cm. Bldg 1, Area 2, occupation.

5.2e 4189:01 Copper chisel/awl. Cylindrical copper object, tapered at both ends. Circular in section and pointed at one end, and square in section at the other. Large swelling of corrosion near midpoint. Presumably an awl or chisel, or perhaps both. L. 6.5, diam. in centre 0.5, th. of squared section 0.5 cm. Bldg 209, Area 247, floor.

5.2f 2669:01 Copper rod object. Cylindrical copper object, one end bent over, the other broken off. L. 5.2, w. 0.8, th. 0.6 cm. Bldg 51, Area 55, occupation.

5.2g K16:51:11 Copper chisel. Intact. Square in section, with one end left square and the other flattened into a slightly splayed square-ended blade. Dimensions 10.2×1.5×1.2 cm. Bldg 54, Area 65, floor.

5.2h L17:08:03 Copper chisel. Blade apparently complete, but badly corroded. Rectangular in section, flattening and broadening slightly towards one end, tapering towards the other, and also flattening, but very slightly, and possibly broken off. L. 10.2, broad end 1.4, narrow end 0.7. Max. th. 1.2 cm. Bldg 53, Area 51, floor.

5.2i 5510:64 Copper fragment, possibly from a chisel. Broken elongated piece of copper with square section tapering and flattening towards one end. Extant L. 3.4, w. and th. 0.7–1.0 cm (original – with patina lumps). Bldg 224, Area 316, floor.

5.2j 5500:19 Copper chisel fragment. Elongated solid piece of copper with flat faces and square section. One end is flatter with a convex edge. Dimensions: 4.5×0.8–1.1×0.8 cm. Bldg 224, Area 316, sand.
Small implements and jewellery

Fish-hooks were the most numerous type of copper object: over 30 definite examples, and probably many more represented by fragments that could only be classified as ‘wire objects’ (e.g. Fig. 5.3g–m). All were large, up to 6.5 cm and rarely less than 4.5 cm, some were barbed (Figs. 5.40:01), many in an excellent state of preservation, and one or two still had the line whipped round the shaft (Fig. 5.3l). Many of the ‘wire objects’ could equally have belonged to pins or needles. Two certain needles were found (e.g. Fig. 5.3d), and two pairs of tweezers (Fig. 5.3e–f).

Lengths of thicker copper wire were fairly numerous (17 including fragments), and generally classified as fragmentary ‘pins’. They could indeed be clasp pins or similar, but of course their intended use is unknown (Fig. 5.4a–c). Half a dozen similar pieces, but generally rectangular in section, have been classified as ‘nails’, though clearly it is not really possible to differentiate, especially for smaller fragments. One unusually well-preserved nail, in fact round in section, looked so exactly like a six-inch nail from the excavation equipment that we initially doubted its authenticity. The context, however, is secure, and it may have been connected with the furnishings of the temple, or with paraphernalia from the area just outside, as it was found in the street by the door (Fig. 5.4d).

Copper jewellery was otherwise represented chiefly by rings: 24 altogether, including broken pieces. Which part of the body they were meant to embellish can only be guessed at, but by analogy with living cultures, the rings of several coils were for the fingers (Fig. 5.4e–f) while the split, single rings were ear-rings (Fig. 5.4g–j). Sometimes no split was discernible, suggesting a finger ring, but it may have been hidden by corrosion (Fig. 5.4k), and one or two might well have been either finger or ear-rings, including incomplete pieces (Fig. 5.4l and p). Related parallels are numerous, (e.g. Mughal 1983: pl. LIII, b, 8–15), and indeed these simple ornaments have a very wide geographical and chronological span. A couple of rings were so tiny they must have been components for something else, possibly chains or clasps (Fig. 5.4m–o).

Only one bangle was recovered (Fig. 5.4q), and not even definite fragments of any others. Bangles are common enough in Dilmun graves (e.g. Mughal 1983: pl. 539, pl. LIII, b, 4–6; Ibrahim 1982: pl. 216, pl. 54, 1 and 4): presumably they were more difficult to lose than rings. Evidence for beads was equivocal: there was a possible tubular one (1042:28), and two even less definite round ones (Figs.2:31 and 3001:53), the latter impossible to distinguish properly from blobs of casting slag. The ‘haft fragment’ mentioned above (Fig. 5.4r) could also be a thick bead.

A number of unusual items and enigmatic fragments of copper came from the temple: the remains of the only copper vessel found at Saar (502:01), a possible graving tool (Fig. 5.4v), a complex clasp (Fig. 5.4t), and an object shaped like a shoehorn (Saar Report 1: 60 [29], [34], [33] and [31] respectively). Single instances of unidentified artefacts from other parts of the settlement were: part of a disc (598:04), a knob-like fragment (Fig. 5.4r), a piece shaped like part of a flat ring (Fig. 5.4v), and a loop of thick wire (Fig. 5.4w).

---

**FIG. 5.3**

5.3a 7509:01 Copper saw blade? Long, thin, and flat, with straight sides which converge gently towards a thinner end, now broken off. Wider end also broken off. One long edge would appear to be toothed, but this might just be the effect of corrosion. The other edge is slightly undulating. The surface is covered in small lumpy corrosion, otherwise the core metal appears solid. Extant L. 15.1; w. 4.4–2.0; th. 0.65–0.25 cm. Bldg 35, Area 653, feature.

5.3b 114:20.02 Copper hoe. Complete hoe head in fairly good condition, worn slightly on one side. Thick sheet of metal, approximately oval in plan, one long edge slightly flattened and slightly bent up to form the blade-edge. Near the opposite edge is a round hole, with a high collar to the inside. This is reinforced by a solid rib opposite the blade-edge, sloping down towards the centre of the blade. W. 18.0, L. 15.0, thickness of blade 0.6, max. depth of collar 3.0, diam. of hole 3.3–4.0 cm. Bldg 210, Area 206, occupation.

5.3c 6025:20 Copper saw blade? Elongated piece of copper bent into a slight curve. Oval in section and tapering at one extant end. Edges are slightly rippled, possibly deliberately serrated or could just be the effect of corrosion. L. 3.5, w. 0.6–0.3, th. 0.3–0.2 cm. Bldg 64, Area 306, occupation.

5.3d 4332:21 Copper needle with pointed end broken off, otherwise in good condition. Shaft is circular in section. End with eye cut through is wider, and slightly squared off and pinched. Eye is elongated with pointed ends. Extant L. 5.3, diam. 0.2 cm, Wider at eye w. 0.3 cm. Eye end tip w. 0.2 cm. Eye inside L. 0.7, w. 0.1 cm. Bldg 7, Area 131, surface.

5.3e 2525:03 Pair of copper tweezers, looped at one end, with pointed pincers of equal length at other end. Overall L. 6.1 cm. L. of pincers 4.1, th. 0.4 cm. Bldg 52, Area 54, floor.

5.3f 5167:16 Pair of copper tweezers. Head is looped, blades are pointed at the ends. L. 5.3, w. 0.9, th. 0.5 cm. Bldg 220, Area 310, floor.

5.3g 1733:02 Large complete copper fish-hook broken into two fragments. L. 6.0, w. of hook end 3.6, thickness of shank 0.5 cm. Corrosion has begun to explode the shank to about 1.0 cm wide. Bldg 203, Area 229, occupation.

5.3h 0000:03 Complete fish-hook in excellent condition. Straight shaft, tapering towards the top. Lower end shaped in a squarish hook, with upright, pointed tip. Shaft is oval in section. L. 5.15, w. 2.2, th. 0.4–0.35 cm. From surface of site.

5.3i 1733:06 Copper fish-hook, broken into two pieces. Top of shank missing. Total L. 4.7, w. 2.7, th. 0.7 cm. Bldg 203, Area 229, occupation.

5.3j 4130:05 Copper fish-hook. Shaft thickened towards the top, then tapering and abruptly bent inwards. L. 4.1, w. 1.9, th. 0.2 (min), 0.5 cm (max). Bldg 208, Area 242, floor.

5.3k 2057:04 Copper fish-hook. A straight length of metal, with a broad hook at one end. Ribbed appearance of corrosion on shaft may reflect impression of original binding. L. 3.7 cm. Diam. at straight end 0.2 cm. Diam. at pointed end 0.01 cm. Bldg 56, Area 93, floor.

5.3l K16:1605 Copper fish-hook. Elegant example, in excellent state of preservation. Corroded line still bound round top. L. 4.9, max. w. 2.5, max. diam. of shank 0.6. Bldg 51, Area 56, collapse.

5.3m 1864:24 Copper fish-hook. Long straight shaft, hook end bent out slightly. L. 5.0, th. 0.3 cm. Bldg 207, Area 273, occupation.
Fig. 5.3 Scale a-c, g-m 1:2; c-f 1:1
FIG. 5.4

5.4a F18:46:07 Copper pin. Long thin piece of copper, circular in section, pointed at one end. Large lump of corrosion near point suggests some protuberance. Presumably pin or similar. L. c. 9.1, original diam. 0.25 cm. Bldg 1, Area 2, floor.

5.4b 1853:37 Copper pin. Length of substantial copper wire, tapering and bent up at one end. Presumably a cloak pin, or similar. L. 14.2, th. 0.3 (min), 0.7 (max) cm. Bldg 207, Area 272, occupation.

5.4c 2112:04 Copper pin. Length of copper wire, slightly bent, one end tapering and broken off. Presumably a cloak pin or similar. Dimensions 6.9 cm long, 0.2 – 0.3 cm thick. Bldg 56, Area 69, floor.

5.4d 1874:02 Copper nail. Very large copper nail or long pin, in excellent condition. Small disc-shaped head, long cylindrical shaft. L. 19.4, th. 0.8 cm. Diam. across head 1.2 cm. Bldg 201, Area 201, sand.

5.4e 5500:05 Copper ring. Strip of copper curled twice to form a coiled ring. Good condition with thick patina. Strip w. 3, th. 3 cm, ring diam. 1.9 – 2.0 cm. Bldg 224, Area 316, sand.

5.4f I14:16:08 Copper ring. Copper strip or length of wire coiled into a ring. Three coils. Overall diam. 1.8 cm, depth of ring 1.5 cm, w. of strip 0.4 cm. Bldg 210, Area 206, collapse.

5.4g 1864:10 Copper ring. Length of copper wire bent into a slightly oval ring with widely overlapping ends. Outer diam. 1.7 (min), 2.0 (max); inner diam. 0.8 (min), 1.2 (max); width of band 0.3 (min), 0.5 (max); th. 0.2 (min), 0.6 (max). Bldg 207, Area 273, occupation.

5.4h 5503:04 Copper ring. Length of copper wire, bent round until ends meet to form tiny ring. Diam. 0.4 – 0.6 cm; th. 0.2 – 0.4 cm. Bldg 225, Area 318, surface.

5.4i 246:08 Copper ring. Length of copper wire bent into a circle and overlapped to form a ring. One end swollen with corrosion, also the point where end touches body of ring, perhaps concealing a decorative feature. Diam. 1.65, th. 0.3 cm. Bldg 4, Area 9, occupation.

5.4j 4019:24 Copper ring. Narrow strip of copper, or perhaps length of wire, bent into a ring. Ends overlap slightly. Outer end flat. Outer diam. 2.0, inner diam. 1.6 cm, w. of band 0.4, th. 0.2 cm. Bldg 205, Area 236, floor.

5.4k 1871:06 Copper ring, now attached to roughly rectangular fragment, with slightly curved edges. Diam. of ring 1.9, w. of band 0.5, th. 0.4 cm. Dimensions of rectangular fragment 2.1 × 1.7 × 0.5 cm. Bldg 207, Area 273, collapse.

5.4l J17:04:09 Copper ring. Thick, narrow strip of copper bent over to form about three-quarters of a hoop. Presumably a finger ring or similar. Diam. 2.1, th. 0.3 cm. Bldg 51, Area 59, occupation.

5.4m 4097:06 Copper ring. Tiny copper ring, or perhaps a link. Thin wire bent round until ends form a join which protrudes slightly from the circumference. Intact. Diam. 1.1 – 1.0, th. 0.3 cm. Bldg 205, Area 237, occupation.

5.4n H13:14:04 Copper ring. Small copper ring or link formed from a piece of flattened wire, pointed at one end, bend round so the ends are near each other. Diam. 0.9 cm. [This description revises that published in Saar 1: 113]. Bldg 201, Area 200, occupation.

5.4o 2130:12 Copper ring. Length of copper wire bent round into a tiny ring. Circumference flattened where ends overlap. Dimensions 0.7x 0.9×0.2. Bldg 57, Area 74, make-up.

5.4p 4086:15 Copper ring frag. Narrow strip of copper, bent round into a curve, probably part of a finger ring or similar. L. 2.1, w. 0.3, th. 0.1 cm. Bldg 205, Area 237, occupation.

5.4q P20:01:02 Copper bangle. Thin bangle, oval in section. Diam. 6.5, th. 0.3, w. 0.5 cm. Sand.

5.4r H13:09:01 Copper clasp frag. Piece of copper bent round into a ring, with the ends overlapping slightly. Fresh breaks to both ends. Dimensions 3.7 × 1.7 × 0.4 cm. Bldg 201, Area 200, floor.

5.4s 1853:121 Copper object. Short, subcylindrical piece of copper, bulging slightly in the middle, and tapering at one end, which is round in section. The other end appears more damaged, is slightly bumpy and oval in section. L. 2.7, diam. 1.4 – 0.9 cm. Bldg 207, Area 272, occupation.

5.4t G17:36:02 Copper wire loop. Length of thick copper wire, curled round to form a loop with long, pointed, overlapping ends. L. of wire c.11.5; th. 0.6. Diam. of loop 1.5 – 2.8 cm. Bldg 3, Area 6, floor.

5.4u 1505:03 Copper graver? Strip of copper, square in section, notched at one end. Perhaps a graving tool. L. 2.5 cm. Bldg 201, Area 200, floor.

5.4v J16:06:03 Copper semicircle. Thick strip of copper, bent round into a flat semicircle, as though part of a large washer. Apparently complete, but corrosion conceals ends, so possibly part of a circular object. If so, about a third remains. W. of strip 1.3, th. 0.7 cm if circular, outer diam. would be c. 7.5 cm, inner c. 5.5 cm. Bldg 51, Area 59, sand.

5.4w G17:36:02 Copper wire loop. Length of thick copper wire, curled round to form a loop with long, pointed, overlapping ends. L. of wire c.11.5; th. 0.6. Diam. of loop 1.5 – 2.8 cm. Bldg 3, Area 6, floor.
Fig. 5.4 Scale: a-d 1:2, e-w 1:1
Small items of ivory, bone and shell

Ivory objects

Four items of ivory were identified at Saar, of which the most spectacular was a rectangular stamp seal found in Bldg 50 (Fig. 5.6g), and previously published by Crawford (Saar Report 2: 53). The other pieces were all sections of tusks, perhaps intended for fashioning into something else. One, from Bldg 61, had clearly been sawn and perhaps split for use, and the edges worked thin (Fig. 5.3b). Another larger length of tusk, from the temple, had been polished (Fig. 5.5a), and the third, found in Bldg 207, appeared to have been squared off, but was in very poor condition (1864:49). The tusk from the temple has been identified as elephant ivory (by James Rackham). The source of the other pieces is not yet known.

Bone artefacts

Bone was probably used to make many household objects and ornaments, being presumably cheap and easily available. It is not very robust, and breaks or splits easily. Small artefacts of bone are difficult to differentiate from unworked material in excavation and sieving, and several of those from Saar were only identified later, when the zooarchaeologists cleaned and examined the bone material. Perhaps the most surprising of these ‘subsequent’ finds was a comb, represented by slivers of bone, each carefully shaped to a point at one end (Fig. 5.6h). A second such find was a flat, pierced wand, too fragmentary for its purpose to be discerned (Fig. 5.6b).

Another simple but handsome artefact is a squared-off shaft of bone, ornamented with incised dot-and-circle motifs. The actual extremities are broken away, but the decorated part is bounded at either end by a series of incised encircling grooves. The craftsmanship is simple but careful, and the result pleasing (Fig. 5.5d).

The purpose of this implement is obscure, but it bears a general similarity to Harappan carved ivory ‘counters’, especially an example from Nausharo with the same four dot-and-circle decorated faces (Kenoyer 1998: 214, cat. no. 113, also cat. nos. 114–16, from Mohenjo Daro).

Two bone rings (e.g. Fig. 5.9d), very similar to rings carved from shell (below Fig. 5.7e), were probably ornaments, or perhaps components. Two fragments of hollow, worked bone may have belonged to simple musical instruments of the kind in universal use among pre-industrial peoples (Rimmer 1981: pl. 1). In one case a piece of bird ulna has been pierced with holes, but apparently not finished (Fig. 5.5c), and the other is a mere fragment that might have formed one end of such a device (Fig. 5.6a). Alternatively, this latter fragment may be a broken long spacer bead, similar to those made of clay shown below (e.g. Fig. 5.10j).

At least three bone objects appear to be tools, or parts of them. A simple handle made from the distal end of the metatarsal of a sheep/goat (Fig. 5.6c) is similar to that of a copper awl previously found in Bldg 224 (Fig. 5.2c), except there the lower end of the tibia of a young sheep/goat had been used. An awl perhaps intended for use on less resistant material is made entirely from bone (Fig. 5.6e), and another piece looks very like a chisel, but if such, must also have been for working something not too resilient (Fig. 5.6f).

While the function of worked bone artefacts was often ambiguous, the worst problem of all was caused by part of a carangid skull which bore a natural resemblance to a fish, and was labelled on discovery as a figurine (Fig. 5.6d). Despite fierce debate among the staff, no agreement could be reached over whether it was entirely natural or had been deliberately modified. We leave the final decision, therefore, to the reader.

**FIG. 5.5**

5.5a 1821:01 Ivory object. Artefact of elephant ivory, from early temple floor. Cut length of flattened shaft, very cracked and broken pieces joined together. Both ends show where cut. L 9.4, w. 2.5 – 2.2, th. 0.6 cm. Bldg 201, Area 200, floor.

5.5b 7057:11 Ivory, worked. Rectangular piece of ivory (?), with paler outer part and denser inner part. Presumably cut from tusk with convex outer face. This face is slightly flaking with several shallow cut-marks near the edges, some pitting and a few brown stains. The opposite face is flat with shallow irregular hollows. The two sides have been sawn straight and vertical. The two ends are thin, the convex face curving down to the edges. One end is damaged, and the entire piece is broken across the middle into two joining fragments. Total dimensions 6.0 × 3.8 × 1.0 cm. Bldg 61, Area 610, fill.

5.5c 1580:17 Bone ring. Slice from long bone of large animal, shaped and polished into a ring. Outer edges all very smooth. Diam. 2.8, th. 0.3, diam. of the hole 1.8 cm. Bldg 203, Area 229, occupation.

5.5d 5506:01 Bone object made from a long thin piece of solid bone, shaped to be square in section. Each of the four faces is carefully smoothed, and decorated with a single line of incised dot-and-circle motifs along its length. Two faces have 6 circles, one has 7, the other has 8. The motifs are regular but their placement is not. At either end the object tapers, and is carved into parallel deep grooves perpendicular to the length. One end has 5 grooves, the other has 3. Extant. The ends are broken off. L 6.3, w./th. 0.6 – 0.8 cm. End with 5 grooves w. 0.3 cm. Bldg 224, Area 307, collapse.

5.5e 5510:14 Bone whistle? Long, thin, hollow bone, with holes. Ulna shaft of large bird, one end cut off, the other broken off. Near the break are three cuts across the surface of the shaft. There is a small hole near the cut end, and two more near the other, as well as a chip which may be an attempt to bore a fourth. They are not finished, but do not look accidental either. Possibly an unfinished whistle? L 8.8, w. 0.5 – 0.6 cm. Holes diam. 0.2, 0.2 and 0.3 cm. Bldg 224, Area 316, floor.
Fig. 5.5 Scale 1:1
FIG. 5.6

5.6a 114:20:25 Bone whistle frag. Length of shaft of long bone of a fox-sized animal, highly polished in places along its length. One end smoothed off, the other, which is slightly wider, is broken. Possibly part of a whistle? L. 2.9, w. 0.6, th. 0.1 cm. Bldg 210, Area 206, occupation.

5.6b 164:48 Bone object. Two fragments, presumably from the same long, thin, flat bone artefact. One piece is thin and flat, approximately sub-rectangular, with the edges and one end rounded off. The other end is broken. 9 mm from the finished end is a drilled hole. The other piece is also thin and flat, and now sub-rectangular, with at least one end broken off. The other end may be either worn or broken. The pieces do not join, but appear related. Dimensions of piece with hole: ext. l. 1.0, max. pres. w. 1.2, th. 0.7, hole 0.25 cm. Other piece: ext. l. 2.4, max. w. 1.4, th. 0.9 cm. Bldg 207, Area 273, occupation.

5.6c 8021:16 Bone handle. Distal end of sheep metatarsal, with the proximal end cut off, presumably the handle for a tool such as 5506:03. The cut edge fairly smooth, perhaps ground, with a rectangle cut out of the bone next to it. On the side opposite the hole are two fine etched lines, starting 0.2 cm from the cut edge, and continuing down the shaft for at least 1.2 cm. On one other side are finer lines parallel to, and 0.7 cm from, the edge. Bone has recently broken close to the joint. Inside the bone is a mass of carbonised date pips, pushed in to a depth of 3 cm. Total l. 9.05; w. 2.3–1.5–1.8 (joint–shaft middle–cut end); th. 1.55–1.0–1.0 (joint–shaft middle–cut end). Cut hole l. 1.2; w. 1.0–0.9 (bone outer surface end–inner edge); 0.8–0.3 cm (bone inner surface end–inner edge). Date pip packing starts 2.3 cm from cut end. Bldg 352, Area 700, floor.

5.6d 8026:02 Fish-bone, worked? Sagital bone of Carangoides chrysophis, possibly partly worked to enhance its natural similarity to a model fish. Most of the bone is extant, but one end is broken off. The bone has naturally angled, curved shallow lines, resembling scales, and linear seams top and bottom. Towards the pointed end (head), the bottom seam joins a natural line which curves up each side, resembling gills. On one side near the tip is a circular hole, like an eye, and the tip is also slightly damaged making it look like a mouth. Length 5.85 × 2.5 × 1.55 cm. Eyehole diam. 0.15 cm. Bldg 305, Area 417, floor.

5.6e 2526:03 Bone awl. Part of an artefact fashioned from the shaft of the metacarpal of a sheep/goat, hollow down the centre. From about half way along the extant length, one side of the bone has been pared away, and the resulting tongue of thin bone shaved to a point, of which the tip is broken away. The thick end of the object is also broken off. The thin end shows polish. Presumably part of a bone awl. L. 4.9, max. diam. 1.3, l. of point 2.2 cm. Bldg 52, Area 53, occupation.

5.6f K16:29:21 Bone tool? Object made from a splinter from a long bone of a cattle-sized animal, shaped to be rectangular in section. One end broken off, the other, which tapers slightly, has been pared to a chisel-like end. L. 6.5, max. w. 0.9, th. 0.6 cm. Bldg 51, Area 55, floor.

5.6g 1098:03 Ivory seal. Seal. Gable backed, rectangular in plan. Perforated longitudinally. Reverse has 3 incised lines across short axis of gable, dot-and-circle motif in each corner. Design: hatched rectangle in centre (4 x 3 squares); flanked on each side by double ended ‘standard’ with crescent at each end; each crescent encloses a rosette, two of which have crosses in the centre and one a drilled hole. L. 1.91, w. 1.45, th. 0.9 cm. Bldg 50, Area 57, floor.

5.6h F17:65:06 Bone comb. Sixteen long, tapered, flat pieces of deliberately-shaped bone, presumably the teeth of a comb (15 illustrated). Longest piece 2.5 × 0.4 × 0.2 cm; shortest piece 1.5 × 0.4 × 0.15 cm. Bldg 14, Area 11, occupation.
Fig. 5.6 Scale 1:1
Shell artefacts

Shellfish were not only used for eating at Saar. Apart from the quantities of natural shells found in the settlement, we identified 146 shell items that had apparently been modified. Shell, like bone, is an easily worked medium from which to manufacture simple ornaments and tools, and for islanders it was even more readily available than bone.

Most of the worked shells were noted as such by the finds cataloguers, and the species usually identified by them, often by the common name. Levels of identification improved dramatically during and following visits by our malacologist, Emily Glover, who was also able to recognize further worked items. Where possible, artefacts found between visits were kept for her further inspection, but it was not possible for every item to be thus checked, hence some identifications that are provisional or very rough, e.g. ‘bivalve’, ‘gastropod’. We are also grateful to volunteer Steven Green for suggesting some identifications.

The most frequently encountered item was a bivalve shell with a rough hole punched in it (Glover 1995: 164); over 50 were noted, and the true count may be higher, with further specimens probably still unidentified among large groups of natural shells. The most popular species for this treatment was the pearl oyster (Fig. 5.7a–c), but there were clams (Fig. 5.7d) cockles (Fig. 5.7e), scallops (e.g. 4037:06) and spiny oysters (Fig. 5.7f–g) too. It is not certain that every single one of these was deliberately pierced: the holes are perfunctory, and not worked. On the other hand it is hard to see how the clams in particular could incur this form of damage by accident, as uncontrolled force great enough to take a chip right out would normally shatter the shell. Whether the shells were intended as decorative accoutrements, to be worn strung, or

---

**FIG. 5.7**

5.7a 4017:10 Pierced bivalve. Pearl oyster shell with large sub-oval hole cut into it. L. Of shell 5.1, w. 5.1, hole 2.2 x 1.4 x 0.2 cm. Bldg 205, Area 236, occupation.

5.7b 1086:07 Pierced bivalve. Pearl oyster shell with hole through it. Diam. of hole 1.3 cm. Sand in street.

5.7c 1125:06 Pierced bivalve. Pearl oyster shell with small oval hole roughly cut into one side. Intact. Shell L.38, w. 4.3, hole 0.7 x 0.5 x 0.2 cm. Bldg 211, Area 212, floor.

5.7d 4028:20 Pierced bivalve. Clam shell with subcircular hole cut into its body from the exterior. Shell 3.4 x 4.0, hole 1.0 x 1.0 x 0.2 cm. Bldg 205, Area 235, floor.

5.7e 1771:11 Pierced bivalve. Cockle shell with oval hole roughly cut into the side. Intact. Dimensions: 4.4 x 3.6, hole 0.9 x 0.6 x 0.2 cm. Bldg 204, Area 233, floor.

5.7f 9023:15 Pierced bivalve. Shell of spiny oyster (Spondylus exilis) with large sub-oval hole in the centre of the side. Intact. Shell L.6.0, w. 5.9, hole 1.0 x 0.5 cm. Sand.

5.7g 1158:12 Pierced bivalve. Shell of Spiny oyster (Spondylus exilis) with oval hole roughly cut into one side. Intact. Dimensions 6.3 x 6.2, hole 1.7 x 1.0 x 0.2 cm. Bldg 211, Area 212, make-up.

5.7h 5264:02 Pierced conch. Small conch shell (Strombus persicus) with large sub-oval hole in the side. Shell L.5.4, w. 2.7, th. 2.2, hole dimensions 1.5 x 0.9 cm. Bldg 220, Area 314, occupation.

5.7i 5068:03 Pierced cowrie shell with small hole in the side. Possibly used as a bead. Dimensions 3.9 x 2.5 x 1.8 cm. Sub-oval hole 0.4 x 0.3 cm. Bldg 222, Area 305, floor.

5.7j 6021:06 Pierced cowrie shell with sub-oval hole pierced through upper side. Brown spotted surface. Intact. L. 3.2, w. 2.3, th. 1.6 cm. Hole 0.4 x 0.3 cm. Area 332, sand.

5.7k and l 1156:08 Shell bead. Length of naturally tubular Dentalium octangulatum, tip missing, but otherwise in good condition. Presumably used as a bead. Diam. 0.4, l. 2.8 cm. Bldg 200, Area 205, floor.

5.7m 1001:43 Shell tool. Long, thin piece of shell with the natural curvature of a bivalve (possibly Pinnus sp.) cut to be roughly sub-rectangular in plan, one end wider than the other. One corner of the wide end has been notched away. Perhaps a scraper. L. 4.7, w. 1.9, th. 0.4 cm. Sand.

5.7n 5500:20 Shell bead. Complete cone shell with small hole at apex, presumably for use as bead. L. 3.3, diam. 1.3 – 1.7 cm. Bldg 224, Area 316, sand.

5.7o & p (middle) 5510:77 Shell bead. Apex cut and smoothed off to form a large hole. In excellent condition. Intact. L. 2.4, w. 1.4, th. 1.1 cm. Hole diam. 0.3 – 0.35 cm. Bldg 224, Area 316, floor.

5.7p (left) 5510:102 Shell bead. Glossy yellow gastropod, possibly Ancilla sp. Apex cut off forming large hole, now partly damaged, presumably for use as bead. Otherwise intact. L. 2.3, w. 1.4, th. 1.2 cm. Bldg 224, Area 316, floor.

5.7q (centre) 5540:02 Shell bead. Glossy yellow gastropod, possibly Ancilla sp. Apex end cut off to form large hole, presumably for use as a bead. Intact. L. 2.1, w. 1.3, th. 1.0 cm. Bldg 224, Area 307, make-up.

5.7q (left) 1853:60 Shell bead. Gastropod shell (Conus ebreaus), with small circular hole at one end, presumably for use as bead. L. 2.4, diam. of widest end 1.8, diam. of hole 0.1 – 0.2 cm. Bldg 207, Area 272, occupation.

5.7q (right) 1864:41 Shell bead. Gastropod shell (Conus ebreaus) with circular hole at one end, for use as bead. L. 2.8, diam. of widest end 2.0, diam. of hole 0.4 cm. Bldg 207, Area 273, occupation.

5.7r 1610:02 Shell ring. Cockle shell (Glycymeris pectunculus) with edges smoothed and a large hole cut into the body of the shell. Diam. 3.8 cm. Bldg 201, Area 200, floor.

5.7s 2665:04 Shell ring. Diam. 2.7 (outer), 2.1 (inner), th. 0.3 cm. Bldg 53, Area 84, occupation.
Fig. 5.7 Scale 1:2
FIG. 5.8

5.8a 5506:16 Worked gastropod. Large gastropod shell (possibly Indian Chank, Turbinella sp.) with large sections of the side removed, apparently deliberately, revealing central column. The latter is creamy white and very shiny. Apex not cut. L. 12.5, w. 6.6, th. 7.0 cm. Bldg 224, Area 307, collapse.

5.8b 2130:13 Pierced gastropod shell (Ficus subintermedia), pierced at one end, and with a strip missing from the surface. L. 5.5, w. 3.8 cm, hole diam. 0.8 cm. Bldg 57, Area 74, make-up.

5.8c 217:04 Worked oyster shell. Large oyster shell, broken more-or-less in half longitudinally. The surviving edge is chipped in several places, perhaps deliberately. Traces of at least eight small drilled holes survive. L. 11.0, preserved w. 7.6, diam. of holes c. 0.5 cm. Bldg 4, Area 9, fill of cut.

5.8d 238:11 Shell tool. Flat piece of pearl oyster shell (Pinctada sp.), roughly oval, and pointed at one end. Apparently deliberately shaped. Dimensions 3.4 × 1.4 × 0.25 cm. Bldg 5, Area 27, occupation.

5.8e 1733:08 Worked shell. Bivalve shell (possibly Pinna sp.), possibly worked at one end, now broken into three large fragments, and several flakes. Shell surface is completely eroded to mother of pearl. Largest fragment has convex wide end (worked?), one long edge being the hinge of the shell. Dimensions largest fragment 6.9 × 1.5 – 0.6 × 0.1 cm. Bldg 203, Area 229, occupation.

5.8f 244:03 Shell tool. Operculum of Turbo sp. The interior surface has been incised, with irregular pattern of lines and the edge has small pieces chipped off, perhaps from an attempt at perforation. Operculum surface is degraded. Diam. 1.5 cm. Bldg 8, Area 28, occupation.

5.8g 1612:12 Shell tool. Possible scraper made from a clam shell. The edge of the shell has been retouched from the exterior surface to form a denticulated edge. The worked edge is approximately half of the full length of the edge. Intact. Shell l. 3.8, w. 4.4 cm. Length of retouch 2.8 cm. Bldg 201, Area 200, floor.

5.8h 7001:30 Shell tool. Tool, possibly polisher, made from a long, narrow, oval piece of cowrie shell (possibly Cyprea tigris), with a worn brown spotted surface. One long edge, slightly incurved, is the ribbed shell opening, the other long and convex, being the worn-down body. All edges are well rounded from wear, and the two sides have occasional small scars, possibly from use. The two ends show wear with fine striations across the width. One is thicker than the other and is also slightly pitted. Intact. Dimensions 6.3 × 1.55 × 0.65 cm. Ends: thicker 0.75 × 0.55, narrower 0.7 × 0.4 cm. Bldg 34, Area 600, collapse.

5.8i P19:04:19 Worked shell. Oyster shell with edge ground away and several small holes and attempted holes. Dimensions 10.1 × 5.0 cm. Bldg 100, Area 101, occupation.

5.8j 0211:05 Shell scoop. Large conch shell (Lambis truncata), surface of shell partially smoothed, and aperture and body whorl removed to form an open scoop-shape. L. 9.4, w. 7.2 cm. Bldg 4, Area 9, sand.

5.8k 4316:07 Cosmetic shell. Large deep bivalve shell (possibly Anodonta sp.) with light green clay inside. Shell h. 4.8, w. 5.0, th. 2.5 cm. Bldg 7, Area 44, floor.

5.8l Q20:22:07 Large shell seal, made from the apex of a large cone shell. Edge waisted. Reverse domed, using natural shape of shell, and perforated transversely. Traces of burning. Obverse has the natural ‘incised’ spiral of the sectioned shell. Diam. 3.5, ht. 1.4 cm. Bldg 104, Area 113, floor.

5.8m 4026:09 Shell seal. Sliced-off apex of large cone shell, presumably intended as a shell seal, using the natural spiral pattern of the sectioned shell. Diam. 2.4 – 2.6, h. 1.2 cm. Bldg 205, Area 235, floor.

5.8n 4348:25 Blister pearl. Oyster shell (Pinctada sp.) with possible pearl inside. Shell h. 4.5, w. 4.5 cm. Pearl l. 0.2, w. 0.15 cm. Bldg 8, Area 29, floor.

5.8o G17:06:05 Pearl. Small, yellow pearl, pyramid-shaped. Diam. 0.2 cm. Bldg 4, Area 9, occupation.


5.8q K16:49:12 Pearl. Small yellow pearl, one side with slight protrusion, probably fits K16:49:11. Diam. 0.2 cm. Bldg 51, Area 56, make-up.
Fig. 5.8 Scale: a-n 1:2, o-p 1:1
sewn to clothing, or whether they had another function, such as components for rattles or weights for surface nets (Saar Report 1: 61) cannot be determined. Gastropod shells were occasionally also found pierced through the body: there were five small conches (e.g. Fig. 5.7h), three cowries (e.g. Fig. 5.7i–j) and five whelks.

Two other simple modifications of shells were noted. One was cut-off lengths of the naturally tubular Dentalium, producing long beads of the ‘spacer’ type (e.g. Fig. 5.7k–l). Another was the piercing of gastropod shells through the apex, or removing the end of the apex to open the end of the column. As the opposite end of the shell is open, it is then effectively perforated for stringing or sewing on to something. Cone shells were often chosen for this treatment, if such being identified (e.g. Fig. 5.7n), though there is a group of three smaller shells from Bldg 224 (Fig. 5.7p), and one example of the brown and white striped whelk Engina mendicinaaria (4028:33). About half of the cone shells were positively identified as Conus obraeus, which have a pretty chequered pattern of red-brown and white (e.g. Fig. 5.7q), but do not occur north of the Musandam Peninsula, showing that trade with Oman included small everyday luxuries as well as industrial supplies.

There were few examples of true shell beads, i.e. ones made by fashioning a particular shape from a solid piece of material, and these were all of differing types (see below Fig. 5.11p–q). Shell rings, as opposed to shells with simple piercing, were rare: three cockles (Glycymerispectunculus) with large holes carefully cut out of the middle (e.g. Fig. 5.7r), and two carefully made washer-shaped pieces of the same form as the bone rings mentioned above (e.g. Fig. 5.7s). One or two shells were found with pieces deliberately removed, but had no obvious end-use (Fig. 5.8a–b). They may have been unfinished, or intended for use as raw material, though it is difficult to see what purpose lay behind groups of randomly drilled holes, such as those occasionally found in large oyster shells (Fig. 5.8c), unless they were trial pieces.

Shell was not only used to make ornaments: several pieces had the appearance of simple tools for scraping or polishing (e.g. Fig. 5.8d). Further examples included: two modified Pinna shells (Fig. 5.7m, Fig. 5.8e), a large operculum (Fig. 5.8f), a notched clam (Fig. 5.8g), and part of a large cowrie (Fig. 5.8h). Occasionally it was unclear whether a modified shell was intended as a tool or an ornament, as with a pierced oyster with a filed edge (Fig. 5.8i). A conch had been worked into a scoop by removing the central column and widening the aperture (Fig. 5.8j). A similar shell from a City IIA level at Qal’at al-Bahrain had been treated the same way (Q, al-B. r. 414). One bivalve shell was found filled with a pale green clay-like compound (Fig. 5.8k). Although rare in the Gulf, shells used this way are well attested from graves in ancient Iraq, from the third millennium BC onwards. There they were always presumed to contain a cosmetic substance. Some of them were in fact analysed, and the green colouring shown to come from a copper compound diluted with bone ash (Bimson 1980).

**Shell seals**

Simple seals made by sectioning large gastropods are a typical Dilmun artefact type (Al-Khalifa 1986). Six possible examples were noted at Saar, of which one, a cone shell, was in good condition, and included a perforation of the reverse (Fig. 5.8l), showing it to be very obviously related to steatite Dilmun stamp-seals. Others examples from Saar, however, demonstrate the intended end-use less clearly, and appear to be ‘unfinished’ (e.g. Fig. 5.8m), so it is not entirely certain whether they are really meant to be seal blanks, or possibly some other artefact (cf. Q, al-B. r. 414, fig. 2065). Contemporary burials at Hamad Town produced a range of arte-
Beads and personal ornaments

The tiny human images on Dilmun seals have such a perfunctory rendering of clothing that very little can be discerned of the way in which the inhabitants of ancient Dilmun dressed and decorated themselves. Metal jewellery (see above) is neither abundant nor varied in the settlement at Saar, but a variety of attractive beads, mostly of stone, demonstrates the enjoyment of personal ornaments that has been part of the human condition for many thousands of years. Styles of dress and accoutrements are not, of course, formulated only for enjoyment or practicality, but play an important role in externalizing and reinforcing social relationships. Just how this might have worked at Saar cannot yet be determined from the evidence of the settlement, but progress may become possible when material from the related cemeteries has been studied.

Bitumen ‘beads’ have been omitted from consideration here on the supposition that they were probably used for net-floats or some other utilitarian purpose rather than ornament. They are described in the section on bitumen objects below.

Woolley’s typology of bead shapes for the Royal Cemetery at Ur is followed where relevant (Woolley 1934: ch. xviii).

Where type of stone was self-evident, e.g. carnelian, it was recorded as such. The beads have not been systematically examined by a petrologist, however, and for some types only a visual description of the stone is possible. The Expedition is grateful for the services of Mike Mendek, lately of the Bahrain Petroleum Company, who made some informal identifications.

Beads catalogued as faience have similarly not been confirmed as such by a specialist.

Beads judged to be intrusive from a much later time have been omitted from consideration (4309:01; 4338:01–06; 6005:09, 1001:26–39; 4335:01 and 04).

Steatite ornament

In addition to the copper jewellery and the beads described below, there was one further item that must have been a personal ornament of some kind. This was a steatite lozenge, plain, but striking in its simplicity. It is pierced with two holes in opposite corners, and would have made a good centrepiece for a necklace, or could have been attached to clothing (Fig. 5.9a).

Beads of carnelian and of other stones

A total of 29 carnelian beads were found at Saar, the types and frequency comprised as follows:

- Cylindrical (9), e.g. Fig. 5.9b–d and h;
- Disc-shaped (5), the thicker ones continuous with short cylindrical ones, e.g. Fig. 5.9c and i;
- Biconical (4), e.g. Fig. 5.9j–l;
- Cylindrical with tapering end (3), e.g. Fig. 5.9f, g and m;
- Lozenge-shaped (3), e.g. Fig. 5.9n;
- Spherical (2), e.g. Fig. 5.9p–q;
- Transverse disc (1), e.g. Fig. 5.9o;
- Lentoid, (1), e.g. Fig. 5.9t;
- Broken (1): 6003:06.

Fourteen beads were of stone other than carnelian:

- Cylindrical, agate (3), e.g. Fig. 5.9e–t;
- Cylindrical, grey stone (3), Fig. 9u;
- Ovoid, white stone (2), e.g. Fig. 5.9v;
- Biconical, green stone (3), Fig. 5.9w;
- Biconical, white stone (1), Fig. 5.9x;
- Triangular, black stone (1), Fig. 5.9y;
- Rhomboid, quartz (1), K770:08;
- Unknown shape, blue stone, 258:04;
- Unknown stone, sphere, Fig. 5.9z;
- Unknown stone, disc, Fig. 5.9a.

It will be apparent from the illustrated selection that most stone bead forms at Saar are essentially simple: thick disc-shaped, plain spherical, biconical, or cylindrical with slightly tapered ends (sometimes called ‘date-shaped’ (e.g. Woolley type 6)). The few exceptions include a large carnelian disc pierced from one edge of the circumference to the other, rather than from face to face (Fig. 5.9o) and the occasional lozenge-shaped or spheroid one, again usually of carnelian.

Several different types and colours of stone are represented in the bead assemblage: grey and black steatite, white marble, green jasper, banded agate, but perhaps the most strikingly colourful material is carnelian, with its range of rich translucent reds, browns and oranges. It was also the most common: 28 carnelian beads were found, as opposed to 15 of other types of stone. All these must have come from further east, presumably arriving at Bahrain by way of the coastal Indus cities, as did other types of stone for bead-making (Kenoyer 1998: 92–3). Whether some beads arrived ready-made it is not possible to determine, but bead types characteristic of the Indus have not in fact been identified at Saar: there is no baked carnelian, and none of the very long, thin cylindrical carnelian beads, each one of which took weeks to drill, and presumably sold for a small fortune (Kenoyer 1998: 161). On the other hand, bead-manufacture certainly took place at contemporary Qala’at al-Bahrain where broken seals and steatite vessels were found, probably being re-used for bead-making (Q, al-B. r. 394), as well as unfinished carnelian ornaments (ibid. 393, fig. 1966). Bead shapes, especially simple ones, remain constant over long periods of time and long distances, so comparisons are not necessarily indicative of contact. However, it comes as no surprise to note that the same slightly tapered cylindrical shape, and the same short biconical shape are well represented at Qala’at al-Bahrain (Q, al-B. r. 391–3), and that banded agate beads occur there alongside those of carnelian (ibid. 393, fig. 1960).

Beads of clay

Given its cheapness and ready availability, it is no surprise that clay was the most popular material for beads at Saar (47 examples). The shapes chosen, however, merely copied those common for stone ones: mostly cylindrical, with or without slightly tapering ends, sometimes round or ovoid, occasionally biconical, suggesting that clay was used as a cheap substitute, rather than a medium to be exploited for its own properties. If so, the dull pink surface of the clay beads is but a poor match for the polished agate and carnelian it sought to imitate. The only possibly different clay bead was an object shaped like a tiny clay wheel, incised with tiny circles on the hubs (Fig. 5.10i). The rest were as follows:

- Cylindrical, ends straight or tapered (26), e.g. Fig. 5.10b–c, i–m, and s, Fig. 5.11a–f;
- Ovoid or round (17), e.g. Fig. 5.10a, d–h, q and s, Fig. 5.11g–k;
- Biconical (3), Fig. 5.10n, o and r;
- Short cylinder with rib (1), Fig. 5.10p.
5.9a S120:05 Steatite lozenge. Flat, diamond-shaped steatite object with drilled holes at two opposing corners. Upper and lower surfaces are smooth. L. 3.8, w. 3.0, th. 0.5 cm. Diam. of drilled holes 0.2 cm. Bldg 220, Area 309, fill of robber trench.

5.9b R20:35:16 Cylindrical carnelian bead, one end cut off flat, the other apparently damaged. Woolley Type 4. Dimensions 1.2 × 0.6 × 0.6 cm. Bldg 104, Area 114, floor.

5.9c E17:02:02 Short, cylindrical carnelian bead. Dimensions 0.3 × 0.3 × 0.1 cm. Bldg 14, Area 15, occupation.


5.9e P20:07:04 Banded brown carnelian bead with flecks of white. Cylindrical. Dimensions 0.81 × 0.45 cm. Bldg 101, Area 106 surface.

5.9f P20:07:05 Banded brown carnelian bead with white patina. Cylindrical with slightly tapered ends, one slightly damaged. Dimensions 0.82 × 0.5 cm. Bldg 101, Area 106 surface.

5.9g P20:07:06 Banded brown carnelian bead with white patina. Cylindrical with slightly tapered ends. Dimensions 0.8 × 0.45 cm. Bldg 101, Area 106 surface.

5.9h 1871:04 Translucent orange-red carnelian bead in the shape of a thick disc, ends rounded and slightly tapered. L. 0.4, diam. 0.6 cm. Bldg 207, Area 273, collapse.

5.9i 1870:19 Cylindrical bead of translucent orange-red carnelian. Ends slightly tapered. Slightly chipped at both ends. Woolley Type 6. L. 1.1, diam. 0.6 cm. Bldg 207, Area 273, floor.

5.9j 1864:06 Cylindrical carnelian bead, translucent red to orange, ends slightly tapered. Woolley Type 6. L. 0.9, diam. 0.5 cm. Bldg 207, Area 273, occupation.

5.9k 1864:31 Cylindrical bead of carnelian or agate. Colour clear, with lines of translucent red/orange around circumference. Woolley Type 4. L. 1.1, diam. 0.4 cm. Bldg 207, Area 273, occupation.

5.9l 1133:03 Short, cylindrical carnelian bead. Intact. Diam. 0.55 cm. L. 0.5 cm. Bldg 211, Area 212, make-up.

5.9m K16:29:09 Biconical carnelian bead. Perforation slightly off centre. Woolley Type 8. Dimensions 0.6 × 0.6 cm. Bldg 51, Area 55, floor.

5.9n K16:29:14 Biconical carnelian bead with nearly half missing. Broken along perforation. Dimensions 1.0 × 0.7 cm. Bldg 51, Area 55, floor.

5.9o Q20:54:05 Biconical carnelian bead. Woolley Type 8. Dimensions 0.8 × 0.6 cm. Bldg 102, Area 104, occupation.

5.9p S510:16 Cylindrical carnelian bead with tapered ends. Banded orange-red. Intact. Woolley Type 6. L. 1.76, w. 0.4 – 0.8 cm. Bldg 224, Area 316, floor.

5.9q 4197:12 Lozenge-shaped carnelian of red-orange colour, pierced longitudinally. Woolley Type 20. Dimensions 1.5 × 0.8 × 0.3 cm. Bldg 209, Area 247, floor.

5.9r 4197:04 Disc-shaped carnelian bead of red-orange colour, pierced transversely. Diam. 2.1, th. 0.7 cm. Bldg 209, Area 247, floor.

5.9s E17:02:02 Sub-spherical carnelian bead. Dimensions 0.6 × 0.6, diam of central perforation approx 0.2 cm. Bldg 14, Area 15, occupation.

5.9t 4332:01 Spheroid carnelian bead. Mottled orange red colour with polished surface and single hole. Intact and in good condition. Diam. 1.6, h. 1.5 cm. Hole diam. 0.15 cm. Weight 5.4 gm. Bldg 7, Area 131 surface.

5.9u P20:07:07 Dull brown, lentoid carnelian bead, with chips and white patches. Woolley Type 3. Dimensions 0.75 × 0.9 cm. Bldg 101, Area 106 surface.

5.9v 1773:01 Stone bead. Long cylindrical bead of orange banded agate, with slightly tapered ends. Intact except for worn ends beside the holes. Polished surface. Woolley Type 6. Max. diam. 0.9, min. 0.7, l. 3.3 cm. Bldg 201, Area 200, floor.

5.9w 1753:02 Stone bead. Long cylindrical bead of pink agate, with slightly tapered ends. Intact. Woolley Type 6. Diam. 0.3, l. 0.9 cm. Bldg 204, Area 232, occupation.

5.9x 6531:01 Stone bead. Cylindrical bead, tapered at the ends, of grey mottled stone with very polished surface. Possibly steatite. Intact. Woolley Type 6. L. 2.2, diam. 0.5 – 0.9 cm. Bldg 60, Area 372, occupation.

5.9y 4025:24 Stone bead. Ovoid bead of white stone. Woolley Type 12. Not measured, but diam. c. 0.8 cm from photograph. Bldg 205, Area 236, floor.

5.9z 1864:23 Stone bead. Short biconical bead of shiny grass-green stone, possibly jasper. Woolley Type 8. L. 1.3, diam. 1.0 cm. Bldg 207, Area 273, occupation.

5.9aa R20:28:05 Biconical white stone bead, perforation slightly off centre. Woolley Type 9, rounded. Dimensions 1.1 × 0.8 × 0.7 cm. Bldg 104, Area 115, midden.

5.9ab L17:46:02 Small, black, polished stone bead. Triangular in plan, with rounded corners. Perforation off-centre. Dimensions 1.0 × 1.0 × 0.6 cm. Bldg 53, Area 52, pit fill.

5.9ac E17:02:03 Stone bead. Spherical bead, half broken along the length of the central perforation. Woolley Type 13. Dimensions 0.6 × 0.6 × 0.2 cm. Bldg 14, Area 15, occupation.

5.9ad R20:26:02 Tiny stone bead in the shape of a thick disc. Dimensions 0.2 × 0.3 cm. Stone bead. Bldg 104, Area 115, midden.
Fig. 5.9 Scale 1:1
5.10a – d, S143:20 Clay beads. Eight short, cylindrical red clay beads. L. of smallest bead 0.3, diam. 0.2 cm; length of largest bead 0.6, diam. 0.4 cm. Bldg 220, Area 311, floor.

5.10e – h S143:04 Clay beads. Eight red clay beads, roughly round or ovoid. L. of smallest bead 0.3, diam. 0.3 cm; length of largest bead 0.5, diam. 0.5 cm. Bldg 220, Area 311, floor.

5.10i K17:45:08 Long, tubular, clay bead of light brown clay. Carefully manufactured, with squared-off ends. Dimensions 2.1 x 0.4 cm. Bldg 5, Area 56, make-up.

5.10j 1746:04 Red clay bead, roughly cylindrical with tapered ends. L. 0.7, diam. 0.2 cm. Bldg 203, Area 231, occupation.

5.10k S167:13 Roughly cylindrical red clay bead with slightly tapered ends. L. 0.7, diam. 0.3 cm. Bldg 220, Area 310, floor.

5.10l E16:12:06 Small roughly cylindrical orange clay bead with slightly tapered ends. Dimensions 1.0 x 0.3 x 0.3 cm. Bldg 14, Area 15, occupation.

5.10m 1760:04 Light brown clay bead, roughly cylindrical with tapered ends. L. 0.9, diam. 0.4 cm. Bldg 203, Area 231, fill of plastered basin.

5.10n S155:23 Roughly biconical red clay bead. L. 1.2, diam. 0.7 cm. Bldg 220, Area 310, floor.

5.10o L17:08:08 Biconical clay bead, surface paler. Small central perforation, approx. 0.2 cm in diam. Bead 1.2 x 1.0 cm. Bldg 53, Area 51, floor.

5.10p P20:04:06 Short, cylindrical, reddish clay bead, apparently with longitudinal rib on either side. Broken in half. Extant 1.0 cm. Bldg 101, Area 109, occupation.

5.10q K16:49:04 Sub-spherical bead of baked clay. Slightly irregular central perforation, approx. 0.3 cm in diam. Bead dimensions 0.8 x 1.1 cm. Bldg 51, Area 56, make-up.

5.10r E16:12:05 Large, crude, cream coloured clay bead, sharply biconical with pinched ends. Perforation begun from both ends, but does not go all the way through. Dimensions 1.3 x 1.6 x 1.3 cm. Bldg 14, Area 15, occupation.

5.10s Beads from S143:04 and 20 strung together (see 5.10a and b above).
Fig. 5.10 Scale a–q 2:1, r–s 1:1
Beads of faience, frit or paste

Four beads made of faience, or possibly frit, were found: two ovoid (e.g., Fig. 5.11l), one biconical (K16.49:03), and one an interesting double-lozenge shape (Fig. 5.11m). One tiny tubular bead of a perfect lapis blue was of uncertain composition, perhaps a paste made of ground lapis (Fig. 5.11n).

Beads made from shell

Beads made to a deliberate shape from a solid piece of shell (as opposed to shells merely modified for stringing, above, Fig. 5.7), numbered only five. Two were probably cone shells that had been sliced and ground down to a rough disc-shape (Fig. 5.11p–q), while the others had been so shaped that they no longer bore any form related to the original shell (Fig. 5.11l and i). There was also one washer-shaped bead that is an intermediate type between a bead and a ring (Fig. 5.11f).

Beads of copper or glass

Most of the glass beads encountered at Saar were associated with intrusive cuts from surface, but there were three examples that did not appear to be so: one multifaceted purple-coloured bead (900:09) and two tiny black cylindrical ones, which were discovered in the sieving of the temple floors (1907:03). However, as they are not of known Dilmun type, and objects this small can find their way down worm or root holes, we prefer to treat their occurrence with caution for the moment. A tubular length of copper may have been a cylindrical bead (1042:28).

**FIG. 5.11**

5.11a–b S551:04 Two tubular beads of dull orange clay, hand-rolled. Ends of both are slightly chipped but otherwise intact. Bead 1: in better condition: L 1.2, diam. 0.3 cm. Bead 2: damaged end: L 1.1, diam. 0.3 cm. Bldg 224, Area 316, floor.

5.11c S510:20 Tubular bead of dull orange clay. Smooth surface, slightly narrowed ends. Ends chipped. L 1.1, diam. 0.35 cm. Bldg 224, Area 316, floor.

5.11d S510:22 Tubular, dull orange, clay bead. Smooth surface. Intact. L 1.1, diam. 0.33 cm. Bldg 224, Area 316, floor.

5.11e S510:59 Tubular clay bead. Dull orange-red clay with smooth surface. Slight tapering at ends. Intact. L 1.1, diam. 0.3 cm. Bldg 224, Area 316, floor.

5.11f S510:60 Tubular clay bead. Dull orange-red clay with smooth surface. Intact. L 1.0, diam. 0.3 cm. Bldg 224, Area 316, floor.

5.11g–i S540:01 Clay beads. Three small ovoid beads of dull orange clay with rare small white inclusions. Intact. L 0.3–0.4, diam. 0.3 cm. Bldg 224, Area 307, make-up.

5.11j S510:61 Clay bead. Slightly irregular ovoid bead of dull orange-red clay. Appears hand-rolled. Intact. L 0.4, max diam. 0.3 cm. Bldg 224, Area 316, floor.

5.11k S510:62 Clay bead. Slightly irregular ovoid bead of dull orange-red clay. Appears from fingerprints to be hand-rolled. Intact. L 0.5, max diam. 0.3 cm. Bldg 224, Area 316, floor.

5.111 4132:02 Faience bead. Pale green ovoid bead, probably faience, or perhaps frit. L 1.0, diam. 1.2 cm. Bldg 208, Area 246, floor.

5.11m 2674:04 Faience bead. Light blue bead in the shape of an elongated lozenge. Probably faience, or perhaps frit. L 1.5, diam. 0.7 cm. Bldg 54, Area 66, floor.

5.11n 2669:05 Paste bead. Thin lapis-blue cylindrical bead with tapering ends. Perhaps lapis paste, or frit. Woolley Type 6. L 1.0, diam. 0.2 cm. Bldg 54, Area 65, floor.

5.11o L17:08:06 Shell bead. Solid piece of shell, worked into the shape of a truncated cone with rounded edges, pierced longitudinally, presumably for use as bead. Diam. 1.3, th. 0.5 cm. Bldg 53, Area 51, floor.

5.11p 5595:08 Shell bead? Apex of a cone shell, worn or ground to a rough, thick, ring-shape, for use as a bead, or possibly accidental. Diam. 1.2–1.4, th. 0.6, hole diam. 0.4–0.5 cm. Weight 1.2 gm. Bldg 225, Area 318, floor.

5.11q 7544:16 Shell bead. Half barrel-shaped bead, made from a sawn-off top half of a strombus shell. Slightly glossy white-light brown shell. Carefully ground smooth at apex and around spiral edges. Apex hole at a slight angle to the other end. Intact. Diam. 1.3–1.2, l. 0.95 cm. Bldg 35, Area 655, floor.

5.11r 1042:10 Shell bead. Thick, cylindrical, cream coloured bead, pierced longitudinally. Apparently fashioned from a solid piece of a large shell. Very finely worked with chisel-like tool. Outer surface is very smooth and has a sheen. Woolley Type 4. Overall diam. 0.7, l. 1.2, diam. of the perforation 0.2 cm. Bldg 211, Area 211, floor.

5.11s 2548:05 Shell bead. Disc-shaped slice through Strombus decorus shell, with wide hole through, presumably for use as bead. Diam. 1.7 cm. Bldg 51, Area 55, floor.
Small objects made from clay or pottery

Easy to shape, locally available, and needing no expert process before use, clay was abidingly useful in the ancient Middle East. When baked hard it is even fairly durable, and was used to make many small household items. In Bahrain, where sand is more common than clayey soil, clay was perhaps not as universally employed as in other parts of the region, but there is still a remarkable variety of small clay and pottery artefacts from Saar, as well as the beads described above. Some items are paralleled in settlements elsewhere (though rarely in graves), but their use is not certain. A few items are quite unique, and a challenge to explain.

Animal figurines

Small figurines made of baked clay are found in excavations throughout the Middle East, in many periods. In ancient Iraq they are particularly common in the Ubaid period, but occur in occupation contexts through to much later times, and during the first part of the second millennium mould manufacture became common. As so little settlement of the Early Dilmun period has been investigated, it is hard to say yet if they are usual for Bahrain at this period, though they are certainly plentiful later (Q, al-B. 2: 187–92). Five were found at Saar, all of animals.

All the figurines were handmade, of the very crude and simple style that is typical for their genre, and, equally typically, all had lost their heads and legs. Even from the worn torsos which survive, however, at least two types can be distinguished. The best-preserved animal has a hollow back and an elongated body, one end pulled well forward, the other being pushed back. The pinched portions of the legs, which were probably represented just by the pinched corners of the torso. The piece might reasonably be interpreted as a sheep. A slightly smaller example has the same general shape (Fig. 5.12a). Another torso seems to represent a more solidly built creature, conceivably a bovid (Fig. 5.12c). As extant, it is very similar to a bull figurine from Qala‘at al-Bahrain, which has its perfunctory head modelled from the front of the torso, without any attempt to render a neck. Slightly more ambitious is another figurine with a straight back, but this time with a slimmer body, and with the start of an elongated pinched neck (Fig. 5.12b). This time there are stumps of real legs, and an attempt to depict a tail. A further figurine is too mutilated now to comment on at all (Kr2:20:28).

There are two further relevant examples from Qala‘at al-Bahrain, from levels of approximately the same date as Saar. One was of the long-necked type, with an abruptly turned-down tail, perhaps the usual sheep, but the other, of the square-bodied type, which was in good condition, seems to be nothing less than an elephant (Q, al-B.: 1: 360–1, figs. 1767 and 1766).

Just what small clay figurines of this type were for has not yet been determined. An obvious and much repeated suggestion is that they were toys, perhaps made by young children themselves, which would explain the poor workmanship. In Sumerian cities dating to the second half of the third millennium BC, large numbers of clay models of animal, humans, horsemen, and chariots, are found in the refuse tips associated with certain large public buildings. In a study of those from Abu Salabikh by Ellen MacAdam, differences were noted between figurines that came from the rubbish tip of a Sumerian administrative complex (likely to have included a temple) and those found in the surrounding settlement (MacAdam 1993). She concluded that it seems probable that the figurines played some part in the ritual of...
Fig. 5.12 Scale 1:2
the temple’, and that ‘the crudeness of manufacture and the short period of use... indicate that the actual act of making the figurine, rather than the quality of the likeness, was the significant part of the ritual’ (McAdam 1993: 91). She goes on to point out that the ‘belief that clay could wither symbolically or in reality take on life is a powerful and persistent one’ for the Middle East, and that in the Babylonian story of creation the first men and women were made from figures of clay and blood (ibid.). The Biblical creation story is not very different (Gen. 1: 7). Clearly there are not yet enough Early Dilmun figurines to point to a ritual use for them, and the five from Saar remain enigmatic. It is interesting to note, however, that two of the find-spots (Bldg 53, Bldg 220) are associated with other items of wealth, and two others (Bldgs 1 and 52) had relatively rich quantities of metal in them, so perhaps the figurines have some status significance connected with wealth, and are more than mere toys after all.

Counters or gaming pieces
Two small cones of baked clay we have described as possible ‘counters’ or gaming pieces. This identification is a guess, as their use is completely unknown (e.g. Fig. 5.12d). One similar example was found at Qala’at al-Bahrain (Q al-B. 1: 367, fig. 1791).

FIG. 5.13

5.13a 4026:12 Pottery sherd with hole drilled through centre. Sub-rectangular shoulder sherd from large ribbed jar. Pink clay, paler surface out, with fine grit temper. Dimensions 9.0 × 7.4 × 0.6 cm. Hole diam. upper drilling: 0.7; lower: 0.2 cm. Bldg 205, Area 235, floor.

5.13b G17:17:02 Small pierced disc of fired red clay with shell temper (Barbar ware). Diam. 2.4, h. 0.4, central perforation 0.2 cm. Bldg 3, Area 5, occupation.

5.13c K16:17:05 Oval clay disc, cut from cooking-pot. Red clay, purple surface out, circular lime inclusions. Small hole in centre. Dimensions 4.6 × 3.9 × 0.2 cm. Diam. of hole 0.3 cm. Bldg 51, Area 55, collapse.

5.13d 1564:01 Fragment of thin, flat, perforated pottery object. Hard pink clay, cream surface, grit temper. Extant end is rounded, suggesting an oval form originally, but associated fragment with long, straight edge suggests a long, thin shape with rounded ends. Roughly flattened on both surfaces, with small perforations all over. Extant L. 12.7, w. c. 14 cm. 1.8 cm thick. Bldg 202, Area 225, floor.

5.13e 7501:04 About half of a pottery disc, with a central perforation, flanged on one side. Red clay, quartz inclusions. Edges roughly shaped. Perhaps made from a vessel sherd, as one surface is like the outside of a pot, and the other like the inside, but seems too flat. Diam. c. 10.0. diam. of hole 2.5, th. 0.4 cm. Bldg 36, Area 650, occupation.

5.13f 3218:17 About half of a pottery object apparently shaped like a doughnut. Flattened base, the inner rim hollowed out to leave an internal cavity all the way round. Dark red clay, with numerous tiny black and occasional sub-rounded quartz inclusions. Occasional tiny voids. The convex exterior is very rough and worn, the concave interior smooth. Badly worn, so true shape may be misrepresented. Diam. (reconstr.) 9.0, extant h. 3.65, wall th. 1.0 – 1.4 – 0.6 (convex face–side–flat face), max. extant L. 7.45 cm. Bldg 36, Area 650, occupation.

5.13g 2665:10 Leg-like pottery object, perhaps a handle. Hard-fired pink clay, temper of grit and black grit, cream surface. Cylindrical piece of clay, one end broken off, the other bent at a shallow angle then splayed into sub-triangular foot, which has clearly been attached to something very smooth. Extant L. 7.5, w. 2.1, th. (object at angle) 2.1 – 2.2, wide end 3.1 × 2.1 cm.

5.13h 1009:08 Part of a ring, or possibly handle, of hard fired clay. Dense pink fabric. Perhaps a net-sinker or similar. Just under half survives, assuming it is a ring. One break shows a tubular section; the other side is much thinner, but probably broken. Outer diam. 6.0, inner diam. 2.0, depth 2 cm. Bldg 211, Area 212, collapse.

5.13i 4332:30 Fragment of large, thin, flat pottery object. Brown clay, dark core, hard grit temper. One surface flat but not well smoothed, as though made against rough flat surface such as earth. Opposite surface has cream slip, with patterns in red, probably reserved from the slip. Pattern consists of concentric circles of alternating cream and red stripes, with at least one diagonal line. Design suggests object was circular. Sploede of bitumen on rough side. Dimensions 10.0 × 9.5 × 1.8 cm. Bldg 211, Area 212, collapse.

5.13j 5105:10 Object of baked clay. Long piece of pottery, approximately cylindrical, but slightly squashed. Ends bent at right angles towards each other and splayed and hollowed out. Perhaps a handle. One side broken off. Orange clay, grit temper. Dimensions 7.6 × 3.7 × 3.2 cm. Bldg 220, Area 309, collapse.

5.13k F18:33:32 Tiny flanged disc of red clay, core black in places, with large central perforation. About half of edge missing. On one side the disc face has an encircling band of tiny incised circles, made with a small hollow instrument such as a quill. Perhaps a bead, or a toy wheel. Diam. 1.8, diam. of perforation 0.76 cm. Bldg 1, Area 2, occupation.

5.13l L17:09:06 Notched posherd. Trapezoidal-shaped potsherd from large vessel, V-shaped notch cut into widest edge. Pink clay, cream surface, grit temper. Dimensions 3.6 × 4.2 × 1.0 cm. Bldg 52, Area 53, collapse.

5.13m 2531:03 Clay button. Hard, dark-grey clay disc, one surface flat, the other slightly domed. In the centre are two tiny holes, 0.2 mm apart. Max. diam. 1.5, h. 0.72 cm. Bldg 52, Area 54, fill of pit.

5.13n 4018:04 Clay ball. Ball of burnt dark brown clay, roughly spherical, much of surface broken away. Perhaps a stopper. Diam. 3.2 h. 2.35 cm. Bldg 205, Area 236, fill of hearth.
Fig. 5.13 Scale: a-j 1:2, k-n 1:1
Shaped and pierced sherds
Fifteen potsherds were noted to be apparently deliberately shaped, usually into oval or sub-rectangular shapes (e.g. Fig. 5.12g). They usually gave the appearance of being cut out of the side of a vessel, though it seems more likely that they were made from a broken piece carefully smoothed round the edges (Fig. 5.12f and h). Some had been rubbed on the faces to make them flatter (e.g. 7559:03). What they were used for cannot be determined with certainty, but they would have made useful small scraping tools, and some had slightly notched edges, which would have made them more effective (e.g. 4506:13). One or two were worked to be slightly sharp at one point, and would have been good for scraping into corners (e.g. 6538:10). Such objects were found at Qala’at al-Bahrain too, considered to be possible gaming pieces (Q, al-B. i: 367–8, fig. 1795–6). Sometimes it was difficult to tell whether a small, more-or-less oval sherd was really deliberately shaped, or had just become that way through wear, so not all those catalogued at Saar may be tools. Conversely, it is also highly likely that other shaped sherds remain undetected among the tens of thousands of body sherds collected. One slightly larger sherd was worn and pitted on one surface, and perhaps also stained, so appeared to have been used as a palette, and as a grindstone for something fine (Fig. 5.12l).

In addition to the solid shaped sherds, there were 11 similar ones pierced through the middle (e.g. Fig. 5.13a), including one painted one (2000:01). Additionally, one substantial bowl rim was also pierced (K17:76:04); perhaps the latter was unfinished, or was for some purpose that did not require it to be neatly finished. Five further pierced sherds, on the other hand, were carefully worked into a near-perfect disc-shape (e.g. Fig. 5.13b–c). Pierced pottery discs and pierced shaped sherds are common for many periods from most parts of the Middle East as well as the Gulf (Q, al-B. i: 367–8, figs. 1807, 1808), and often denoted as ‘spindle whorls’ or ‘net-sinkers’. They would serve well for either.

Architectural elements and features
Architectural accessories, such as drainpipes, were frequently made of pottery in the ancient Middle East. Saar, however, only offers one possible case of deliberate manufacture of this kind, of which there are two examples: long, thin, flat, sieve-like objects (e.g. Fig. 5.13d), conceivably parts of drainage systems. Pottery vessels re-used as architectural features are described in the following section.

Enigmatic clay or pottery items
It was very hard to suggest a purpose or identification for several of the clay artefacts. Among the most puzzling were:

A disc with flanged perforation, possibly a toy wheel (Fig. 5.13e), and a similar one, but much smaller, which was unbaked (Fig. 5.13k);

A circular object shaped like a doughnut with flattened base, but with the inside hollowed out from the centre (Fig. 5.13f);

Fragments of a flat and probably circular object, painted on one surface with concentric red and white circles (Fig. 5.13j);

A sherd with a v-shaped notch cut in one side, perhaps to use for straightening or skinning a stick or similar (Fig. 5.13j);

A small disc, domed on one side, with two perforations in the centre, just like a button (Fig. 5.13m);

A ball of sealing clay, like the bitumen ball described below (Fig. 5.15b), but a little smaller (Fig. 5.13n);

A long, flat object with multiple holes, presumably for draining something (666:05).

Three long, thin items may conceivably have been handles, though none is entirely convincing. Two (Fig. 5.13h and i) may in fact have been broken pottery rings, while another (Fig. 5.13g) is very reminiscent of the Dilmun glyptic depiction of detached hoofed legs dangling in pairs from poles or caducei (Saar Report 1: 57 [8]), Saar Report 2: 6, 4025:06), leading to the suspicion that it might have been part of a cult model of some kind.

There were two instances of broken pots re-used as artefacts. One is a jar neck stuffed with plaster, then pierced with a palm-stalk (666:16). Not dissimilar in concept is the neck and shoulder part of a jar, blocked with ash, and with a hole made with an implement square in section (K17:35:06). These last two could have been part of some kind of drainage or filtering system, though the pierced neck at least would serve very well to secure a palm-frond in an upright position, if so required. Upright palm fronds have been used as a form of decoration, particularly for doorways, since very ancient times in the Middle East (Moon 1981: 70). Outside the entrance to the Saar temple is an emplacement that just might have served such a purpose (Saar Report 1: 140).

Also presumably used to support or hold something was a tubular stand. This is broken at one end, and therefore sits most obviously on its other end (Saar Report 1: 78, [74]). The complete end, however, could be interpreted as having an integral saucer, if the whole thing was meant to stand the other way up (1941:01). This was found in the temple, and is reminiscent of the much earlier Early Dynastic pottery stands of Iraq. The sacred find-spot, and just possibly the conservative form, suggest its use as a piece of ritual furniture, especially as nothing similar was noted in the rest of the settlement.

Objects made from re-used pottery vessels
Even when beyond repair, pots sometimes went on being useful. In particular, a jar with the top broken off could be ground down for re-use as an open vessel (3002:67, 7507:04). The lower half of a ribbed jar, evenly cut or broken off, was found in the back room of the temple, Area 220, having been used to hold bitumen during building work, then abandoned under the newly-laid floor (1750:07, Saar Report 1: 78, [71]). Adaptation of broken pots extended not only to household utensils but to fittings too. In Bldg 225 a large storage vat was lined with plaster and used as a basin (5524:01). In Bldg 35 the lower part of a ribbed jar was set into the ground (7546:07), the angular base evened out by plastering another to the inside. It was one of a group of three bases (with 7546:03 and 08), found along with a stone pounder (7546:02). The doorsocket for Area 222, in Bldg 305, was a re-used jar base (5064:01), as was the tannur in Bldg 303 (3305:02). Strangely, it was sometimes the upper parts of jars that were turned upside down and re-used, in one case as a hearth (4198:01), in another simply set into the ground and modified with plaster (4324:05). Hearths made from partial, inverted jars have a precedent in ancient Iraq, going back at least to the middle of the third millennium (Crawford 1983: 33; Gibson 1981: 57 and pl. 31/2).
**Bitumen artefacts and uses**

Bitumen was used by man in many forms from the earliest times (Forbes 1993, Connan et al. 1998). Noah, for instance, could not have caulked his ark without it (Gen. 6: 4), and Moses would have sunk at the very start of his career (Exod. 2: 2). Fascination with the strange properties of certain bitumen compounds is not recent either: Alexander is reputed to have poured naptha over a boy in a bath, and lit it to see if it would burn in water (Strabo XVI.1.15, quoted in Forbes 1993: 35). The waterproofing and adhesive qualities of bitumen compounds have rendered them highly desirable, if not indispensable, to the historically obscure as well as the great and famous: the women's room of the Akkadian palace at Eshnunna, for instance, contained sheets of bitumen mastic along with mother-of-pearl and other components of mosaic work (Frankfort 1934). ‘Bitumen’ in the text that follows means bituminous-based compounds (Connan 1998: 141), rather than pure bitumen.

Recent analyses have shown convincingly that the people of Saar, in common with those who made the bitumen objects from tombs at Karranah and Buri, imported their raw material from Iran. The citizens of contemporary Qala’at al-Bahrain, by contrast, got theirs from Iraq, probably from Hit (Connan 1998: 178). The reason for the choice of different sources for bitumen at two sites so close together can only be guessed at, but it reflects other differences observed in the respective lifestyles of Qala’at al-Bahrain and Saar (see Chapter 8).

The uses to which bitumen was put at Saar included: the manufacture of ‘balls’ and ‘beads’, lids and stoppers for pottery vessels, and bungs to repair holes in them; the lining and coating of woven containers, and sometimes pottery ones; coating wood; and perhaps coating roofs. It was most frequent in the form of small fragments, most of which could be seen from the impression they bore to be from the waterproofing of woven containers.

**Bitumen ‘beads’**

The commonest bitumen artefacts found at Saar, after fragments of vessels, were large ‘beads’ (66 examples, e.g. Fig. 5.14a–g). These were simple lumps of coarse bitumen, rolled into a more-or-less spherical shape, with a wide hole through the middle. Some have rough impressions of matting on them, probably accidental (Fig. 5.14h); perhaps they were left on mats to solidify after being shaped. Superficially similar to the bitumen cores for gold-leaf beads from rich Mesopotamian graves, for instance at Ur (Plenderleith 1934: 295) and Abu Salabikh (Postgate and Moon 1982: pl. v, c), the fact that they are not reported from graves on Bahrain speaks against such a use here, although there is one stone bead with gold foil from the Saar Burial Complex (Mughal 1983: 95, sr 191). No bitumen beads are reported to date from Qala’at al-Bahrain either, the nearest similar object being a clay bead of similar size and proportions (Q. al-B. 1: 36, fig. 94). Previous suggestions include components for an abacus, use in line or net fishing (Saar Report i: 63), or spindle whorls (Connan 1998: 143, fig. 2).

**Balls and lumps**

Only one bitumen ball was identified (248:18, Fig. 5.15b), from Bldg 4, in contrast to the relatively frequency of the type at Qala’at al-Bahrain (Q. al-B. 1: 408). Its purpose remains a puzzle. One suggestion offered was that it represented a piece of raw material waiting to be worked. A few of the many bitumen fragments found were definite lumps, rather than pieces of coating or artefacts, again possibly ‘near’ raw material. More lumps may of course be represented among smaller fragments of bitumen.

**Closures: lids, stoppers and bungs**

Plaster lids in the shape of flattened hemispheres were common at Saar, and some have been found in situ in the mouths of jars (above, Fig. 3.98). No bitumen closures have been found in such association, but it is obvious from their shape that some of the bitumen finds served this purpose. In previous publications on Saar various designations for bitumen closures (‘lid’, ‘stopper’, ‘bung’) were used fairly indiscriminately (Saar Report i: 63, 116). With the larger sample now available from the rest of the site, a better classification can be attempted. As will be seen below, however, the distinguishable types form such a close continuum that such division has its limitations, though we have maintained it to some extent in the catalogue, to try and group distinct shapes.

One such type, (described as ‘stopper’) was obviously designed to be pushed right into a narrow neck. These were rare: there was one good example from the temple, shaped as a slightly tapering cylinder, like a modern flagon cork (Fig. 5.15c), and another of the same type from Bldg 53 (Kt8:2019). A smaller type from Bldg 56 (Fig. 5.15d) may have been a counter or gaming piece instead.

A slightly more elaborate, and evidently more permanent, form of closure (described as ‘lid’) was a cylinder with a wide flange at one end. The cylinder fitted right into the jar-neck, and the flange over the top, the whole thing being presumably fitted while the bitumen was in a malleable state. An example from the temple (Fig. 5.15a) has impressions of woven palm-leaf on the face that went into the vessel, suggesting that a piece of palm-basket was stuffed into the hole first to make the lid fit more tightly. This example is well preserved, and it is obvious how it worked, but for other, similarly shaped pieces it is hard to be sure whether the cylindrical end went into the vessel, or whether the lid was used the other way up, and the cylinder formed a handle (Fig. 5.14f). To add to the uncertainty, the essential ‘mushroom’ shape also forms a continuum with pieces of bitumen used as bungs for broken vessels.

Sherds of pottery repaired with bitumen bungs occur with regularity at Saar, though they have not all been individually recorded. The repair was effected by extruding from a blob of bitumen a long thin ‘stalk’, pushing that through the hole to be mended, spreading out the rest of the blob against the side of the pot, and pushing another blob against the hole from the other side (Fig. 5.14l). Bitumen bungs like this, which have come away from the pot, are recognizable from the ‘stalk’ part (Fig. 5.14k). There were remains of at least 10 bungs of this kind, some with the same form as mushroom-shaped stoppers, but so tiny that they must have been repair-bungs. An additional 13 examples could have been either repair bungs or small lids (e.g. Fig. 5.14i).

**Bitumen used to line pots**

Pottery vessels are sometimes found lined with bitumen, and sherds of these are frequently encountered. Sherds were not usually individually noted, apart from one as an example (2502:24). It is often impossible to be sure if the bitumen lining is deliberate waterproofing for the pot, or just the result of the pot having been used to hold bitumen, like the topless jar found at the back of the temple, presumably used for some aspect of the renovations, and left there to be covered by the new floor when its job was done (Saar Report i, [71]). Although such treatment of pottery was only noted for Mesopotamian-style pottery at Qala’at al-Bahrain, it was reasonably common at Saar for all styles.
5.14a–b 246:03 Cylindrical bitumen bead. Pierced through the middle. Smoothed on outer surface, but with no fabric or weave impressions in evidence. Diam. 2.0, l. 2.3 cm. Diam. of the perforation 0.5 cm. Bldg 4, Area 9, occupation.

5.14c 3302:08 Spherical bitumen bead with large central hole. Inclusions and impressions of vegetable matter. Good condition, intact. Diam. 2.3, l. 2.1 cm. Weight 6.1 gm. Bldg 303, Area 411, occupation.

5.14d 5503:03 Spherical bitumen bead with large central hole. Surface pitted. Intact. Diam. 2.2 – 2.3, h.1.8 cm. Weight 4.7 gm. Bldg 225, Area 318, surface.

5.14e 1558:01 Crude, roughly spherical bitumen bead. Pierced through the middle. Some evidence of fibre impressions on the outer surface. Overall diam. 2.5, diam. of the perforation 0.6 cm. Bldg 202, Area 225, sand.

5.14f J16:05:07 Slightly damaged bead of bitumen. Max. diam. 2.3, l. 2.2, diam. of perforation 0.7 cm. Bldg 51, Area 59, occupation.

5.14g 4028:05 Spherical bitumen bead. Large central hole. Intact except for two areas of deep pitting. Diam. 2.2, l. 1.9 cm. Bldg 205, Area 235, floor.

5.14h 1574:01 Spherical bitumen bead, pierced through the middle. The outer surface is smooth except for one patch, which has been flattened and has basket weave impressions on it. Diam. 2.2, diam. of perforation 0.6 cm. Bldg 203, Area 31, sand.

5.14i 1772:01 Bitumen lid or bung. Mushroom-shaped. Lower surface now pitted, but once smooth and convex. Upper side has a short stem. Lower face part of object and one side of upper stem is broken. Dimensions 4.7 × 3.3 × 2.5 cm.

5.14j 7545:01 Bitumen lid. About half extant, in two joining fragments. Sub-oval in plan, with thick cylindrical knob in centre. Knob has flat top. The upper face of the lid is concave around the knob, then curves downward near the thin, ragged edge. The lower face, however, is convex in the centre, concave near the edge. The surfaces were originally smooth, now largely worn and slightly pitted, showing impressions and inclusions of vegetable matter. Extant 1.565, w. 4.0, th. 1.05 (2.75 with knob), diam. of knob 2.5 – 2.1 cm. Found above bitumen basket frags 7533:07, associated with flint and stone group 7533:06 – 52. Bldg 35, Area 604, floor.

5.14k 3298:08 Small, oval, bitumen bung. One face is slightly convex, curving up to thin, irregular edges. The other face is flat with a small irregular knob towards one side. There are numerous impressions and inclusions of vegetable material. Found beside bitumen basket rim fragment 3298:7. Dimensions 2.5 × 2.3 × 0.6 – 0.3 (with/without knob), knob dimensions 0.6 × 0.55 cm. Bldg 352, Area 701, occupation.

5.14l 8018:02 Bitumen lid, or large bung. Two oval lumps of bitumen pushed onto either side of a hole in a pottery vessel. Fragment of ribbed pot survives between. Larger piece has a roughly convex lower face, the smaller is flattish with a probable shallow knob. Entire surface is pitted, and bitumen contains numerous vegetable inclusions and impressions. The edges are all chipped. Dimensions 7.65 × 6.55 × 2.45 cm. Bldg 353, Area 708 surface.
Fig. 5.14 Scale: a-h 1:1, i-l 1:2
Woven vessels coated with bitumen

A very large proportion of the bitumen found at Saar was fragments from the linings or coatings of woven vessels (235 from a total of 548 catalogue entries for bitumen objects and fragments). The identification of these is determined from the impressions of weaving left on the bitumen. The word ‘vessel’ is here employed in preference to ‘basket’, as some at least are from what are essentially small woven cups, and the English word ‘basket’ suggests something larger and more open. ‘Coating’ is similarly used in preference to ‘lining’ for this use of bitumen, as ‘lining’ means a cover for the inside of something, and it is clear that many vessels were covered both inside and out. In these cases the actual basketwork was completely hidden, and used only as a frame, in the manner of Far Eastern tea-bowls made from woven horsehair and lacquered.

Vessels of coated palm-leaf are frequently found in graves of the period in Bahrain (Ibrahim 1982: 34), though under-represented in the literature because of their extreme fragility. They must have been very common in the everyday life of ancient Dilmun, as they were in recent times in the Gulf.

No specific botanical study of the impressions in the bitumen has been made, but it is assumed that the material used in the construction of the vessel frames was palm-leaf, which was freely available at Saar. However, it is also possible that reeds or other kinds of leaf were used. Manufacturing techniques for Dilmun woven vessels have been well explained by Højlund (1995), particularly the way in which the bases were sometimes constructed to be square. At least some of the weavers at Saar used the same one-over-two-under, successively displaced by one, technique described for Qala’at al-Bahrain (e.g. Fig. 5.15e).

The problems attendant on lifting and preserving bitumen, which is of course impervious to water and dissolves in other solvents, have been noted before (Saar Report 1: 61). For types, structure, and approximate dimension, therefore, records made in situ, before the risky operation of lifting, are often the only evidence we were able to glean for all but the tiniest vessels. While the curvature of larger fragments sometimes shows whether they came from the inside or outside of a vessel, this is not the case for smaller pieces.

A visit to an abandoned modern village in the Middle East makes it clear what happens to discarded baskets and mats: they break up, get nibbled by ruminants and rodents, and the fragments blow into every corner. Many of the pieces found at Saar had suffered the same fate, but occasionally vessels were found in situ. In the outer room (Area 205) of Bldg. 200 three medium-sized vessels were found on the floor (e.g. Fig. 5.19 and 20), where the square base of one could still be made out. Fragments of what was presumably a larger container, probably an actual basket, were found in Bldg. 301 (in Area 408). The splaying ribs are clearly visible (Fig. 5.17). The base of a similar type was found in Area 309 of Bldg. 220 (Fig. 5.18, the radiating ribs of the apparently circular base again just visible). A vessel with a definitely round base came from the temple (Saar Report 1: [43]). Only in the well (Bldg. 500) was a larger vessel sufficiently preserved for its dimensions to be determined—it was about 30 cm in diameter (Fig. 5.20). This find provoked speculation as to whether it represented the well’s ‘bucket’, fallen in when the superstructure collapsed, but it is also possible that the vessel was simply lost down the well. The base appeared, from the inside at least, to be round rather than square.

Bldg. 211 produced a small square-based vessel in reasonable condition (Fig. 5.16), but otherwise the best examples of the smaller kind of bitumen container, which might be described as cups, came from the back room (Area 220) of the temple. There were two of them in Phase 2 (Fig. 5.15f–g), and in Phase 3 one more (Saar Report 1, [44]). Re-examination of one (g) has shown that it has the base stitched diagonally from corner to corner, correcting the preliminary observation that it was not possible to tell how they were made (Saar Report 1: 61). Further fragments of 10 square-based vessels, identified as such by the presence among fragments of a least one corner, were noted, including two that definitely had crossed diagonal stitching.

**Fig. 5.15**

5.15a 1597:03 Mushroom-shaped bitumen lid. Roughly disc-shaped with a central knob on one side. Overall diam. 11.4 cm. Diam. of the knob 4.8 cm. L. of knob 3.7 cm. Bldg. 201, Area 220, floor.

5.15b 248:18 Bitumen ball. Spherical lump. All surfaces pitted and lined. Diam. 5 cm. Bldg. 4, Area 33, floor.

5.15c 1662:01 Bitumen stopper. Cone-shaped, with flattened tip. Diam. at widest end 4.6, diam. at narrow end 2, max depth 3.9 cm. Bldg. 201, Area 200, from wall.

5.15d 2157:06 Bitumen stopper. Bullet-shaped piece of bitumen, circular at one end, then tapering off to a point at the other. Diam. at widest end 2.1, diam. at pointed end 1.0, l. 3.0 cm. Bldg. 56, Area 68, make-up.

5.15e F18:45:01 Fragment of the lining to a bitumen-coated woven vessel. Dimensions c. 6.0 – 8.0 cm. Bldg. 1, Area 2, occupation.

5.15f 1752:02 Bitumen vessel. Crushed, but half-complete, bitumen-lined woven vessel. Impressions of cross-woven palm-leaf strips on the interior. The exterior is smooth with a slight horizontal indentation below the rim corresponding to the position of the original woven rim edge. Approx. dimensions 9.5 × 6.5 × 3.0 cm. Bldg. 201, Area 220, floor.

5.15g 1752:03 Bitumen-lined woven vessel. The rim is circular but the base is square, stitched up diagonally from corner to corner, making crossed seams. Lined inside and out, as shown by impressions of cross-woven palm-leaf. Slight horizontal indentation below the rim of the bitumen, showing where the rim of the woven material finished. Intact, except for rim damage. Badly cracked in all directions. Diam. 5.5 – 7.4 (distorted), approximate h. 6.0 cm. Bldg. 201, Area 220, floor.
Fig. 5.15  Scale: a 1:2, b-g 1:1
Bitumen-coated mats
It is quite likely that some of the weave-impressed bitumen fragments from Saar that had relatively wide palm-strips and coarse weave actually come from mats rather than large baskets, as at Qala‘at al-Bahrain (Q, al-B. r: 409). A patch of coarser weave from Area 372 of Bldg 60, for instance, looked much like matting (65211).

Sealings and impressions
Although there were no finds of bitumen sealings with seal impressions, two pieces from the temple may have been used to seal: one bears impressions of coiled grass or palm leaf, perhaps the binding to a bundle (1905-08, Saar Report r: 63), and one may have been a pot sealing (1763:04). Bitumen fragments often bear, accidentally or deliberately, impressions of organic matter, and offer a small glimpse at some of the vanished everyday materials that were part of life at Saar, such as wood (1527:01, F18:33:20), textile (1513:02), and reeds or stalks (1536:06).

Bitumen used in buildings
Four bitumen items from Saar are broken pieces of what was obviously the thick lining or coating to something substantial: two are from Bldg 31 (K16:51:06, K16:05:04), one from nearby Bldg 37 (7588:4), and one from Bldg 14 (F1770:08). These pieces average around 2.5 cm thick, one face smoothed, the other with impressions of what appear to be plant stalks laid parallel to each other, and palm leaves. They are essentially similar to the 'reed-impressed triangular pieces' from Qala‘at al-Bahrain (Q, al-B. r: 409), though none of the pieces from Saar is noticeably triangular in section.

We surmised that they may have come from the coating to a roof, or perhaps a vertical room-divider made of barasti-work. If the former, then the rarity of these fragments suggests that few roofs were so treated, and perhaps only partly, where there were particular and localised problems of water ingress. Coating an entire roof with bitumen would presumably be an expensive undertaking.

In Area 371 of Bldg 60 was found a fragmentary, bitumen-coated plank of palm wood (7568:04), again possibly part of a partition or roof.

FIGS. 5.16 – 5.20
5.16 1158:04 Bitumen-coated vessel, perhaps a cup. Large fragment, including base, with impressions of cross-woven date palm strips. Approx. dimensions 4.6 x 6.6 x 5.5 cm. Bldg 211, Area 212, make-up.

5.17 3043:01 Bitumen vessel. Large fragment from the bitumen lining to a large basket, bag or mat. Found lying flat on the sand beside a tannur, possibly used as a mat or emplacement. One side (upper in ground) has radiating spokes of palm frond stalks woven at right angles with palm frond leaf strips. The other side has the more usual cross-woven palm leaf strips. There is a portion of slightly thicker edging at one end, which is approx. 3 cm wide. This is made of a double line of thicker leaf or frond strip. Both sides have a partially preserved smoother coating of bitumen and mud (?). Dimensions 36.5 x 18.0 x 1.0 (max. edging), frond strip w. (other side) max 1.0 cm. Bldg 301, Area 408, sand.

5.18 5105:02 Numerous bitumen fragments from the lining for a basket, all with impressions. Dimensions of one of the larger fragments 6.7 x 2.1 x 0.5 cm. Bldg 220, Area 309, collapse.

5.19 1148:05 Numerous fragments of bitumen from the lining of one or more woven vessels. Impressions of cross-weave. Largest 3.8 x 2.7 x 0.7 cm. Bldg 200, Area 205, make-up.

5.20 6016:05 Bitumen-coated vessel of woven palm-fronds, perhaps the ‘bucket’ for the well. Actual pieces of palm-frond preserved too. W. of palm frond pieces used approx. 1.1 (unusually wide), largest fragment 6.0 x 5.1 x 2.3, diam. (measured in situ) c. 30 – 36 cm. Bldg 500, Area 500, sand.
Items made from plaster

Gypsum plaster was manufactured at Saar, at least later on in the life of the settlement, as evidenced by the discovery of a kiln used in the production of gypsum (Bldg 36).

Render

The buildings of Saar were constructed of rough-hewn stone mortared together and rendered with plaster. It was not unexpected, therefore, when quantities of plaster fragments—sometimes very considerable quantities—were found in the collapse levels of the buildings. A proportion of these were saved and catalogued. Where it was obvious that plaster fragments came from the coating of a building, they have been described as ‘render frags.’ Many show impressions of the wall faces, and occasionally of corners. Only in the temple was any trace discovered of painted plaster (Saar Report ii: 28), but there are fragments consistent with moulded plaster decoration (e.g. 114:03 and 416:11). In the few cases for which it can be ascertained that pieces are from the roof, rather than from the walls, they have been catalogued as ‘roof frags.’ This identification is generally from the impressions of palm-leaf or reed roofing material found on one side, occasionally with evidence for the way they were tied or fastened, and sometimes with impressions of the palm beams which supported them (e.g. 161:06:02). Many of the pieces described merely as ‘frags.’ may also be from render. Floors could be plastered too, and occasionally preserve impressions of what was placed on them, such as jar-bases. The child’s footprint found in the temple has been preserved as a find (Saar Report ii: [143]).

Waterproofing

Like bitumen, plaster was a useful plastic, waterproof medium for lining or coating otherwise porous vessels. Only three plaster fragments bore the impressions of woven palm leaf, suggesting that plaster was not a popular as bitumen for lining baskets or other woven vessels (605:02, 300:26, 300:10). Other fragments were smooth on the outer surfaces, and so presumably once lined pots on the inside (662:05, 612:04, F18:25:02), while four appeared to have been smeared round the outsides of pots (P19:02:11, 430:16 and 17, 605:04).

The large storage jar with a deliberate hole through the base is a standard item of Dilmun household equipment (see Chapter 7 below, Type S2). The bottoms of these were sometimes lined with plaster, itself pierced to allow the hole to work (256:12). Vessel bases without holes were also lined (Q5:20:01, M17:20:06).

Plaster objects

The readiness with which plaster can be poured or shaped makes it an easy material for the manufacture of household objects. This quality clearly triumphed, in some cases, over the softness and general lack of durability which are its drawbacks.

Covering devices

Lids and stoppers were the commonest category of objects fashioned from plaster: 134 altogether, including fragments. The smallest plaster lid measured had a diameter of 4.5 cm, the largest 51 cm, but the vast majority were between 10 and 18 cm, reinforcing the interpretation that they were for covering pottery jars. Two were actually found in situ on jars (602:03:07 and 413:2:04). Rather surpris-ingly they do not seem to have been a feature of life at Qal’a at al-Bahrain, where only one has been noted (Q. al-B: 1: 407).

The most frequent variety at Saar is a disc, domed to a greater or lesser degree on one side. There were 83 examples (e.g. Fig. 5.21b, d, e and g). One bore impressions of a knitted or netted material, presumably laid between it and the mouth of the vessel while the plaster was still wet (Fig. 5.22f). One large specimen (408:6:8, Fig. 5.21a) was associated with the fragmentary upper part of a large Indus-related vat (4086:09). Next commonest is a disc form flat on both sides, with 26 examples, varying from thin to thick, and from small jar to vat size (e.g. Fig. 5.22a–c). The two shape categories merge, with a few disc lids having just a slight bulge, and one or two bulging on both faces (e.g. 7537:01, K7:103:01). Only seven lids actually had knobs to make handling easier (e.g. Fig. 5.22d). Disc lids and domed lids also occurred in stone (p. 230).

One plaster lid has the clear impression of reed or palm-leaf matting (7544:02), suggesting either that it was still wet when used to finish the closing of a vessel first covered with matting, or that plaster lids were laid out to dry on mats during manufacture. As already mentioned, impressions of other materials occur too (e.g. Fig. 5.22e).

Four re-usable plaster closures were stoppers, designed to fit into, rather than sit on, the mouth of a vessel (Fig. 5.22f and g). In other cases, plaster had been directly pushed into the necks of jars while wet, rather than making the form of a lid and drying it first (e.g. Fig. 7.2d). One candidate was a sieve-necked jar (Fig. 7.4a), presumably intended for long-term storage.

Objects of unknown function

Some plaster objects were very difficult to identify. There were many pieces that had obviously been deliberately shaped, and did not seem to form a piece of wall-plaster or part of an installation, but for which it is hard to guess the function. Twenty-six pierced discs made of plaster were discovered, for instance. They may have been a form of lid designed to partially close a vessel, and let a certain amount of air in, or vapour out. As they lend themselves to tying onto something, they might equally well be some form of weight or counterbalance (e.g. Fig. 5.21c, 5.22h–i). One seemed to be a pierced stopper (Fig. 5.23a). There was also a solid disc with a grooved edge, for all the world like a pulley-wheel (4132:06), and small cone that could have been a counter (Fig. 5.22k). There is also a possible vessel (Fig. 5.22l), and an enigmatic form which seems, improbably, to have been a grinding instrument (332:01). For some, it is difficult even to attempt a guess (e.g. Fig. 5.22l).

Occasionally plaster was used to adapt a pottery vessel, not to waterproof or seal it, but to create an object in its own right. Two possible stands were created in this way, using plaster and jar-necks (see above). There is also a jar shoulder stuffed with ash plaster (Fig. 5.23e), found in a collapse stratum of Bldg 303 together with an object reminiscent of a spindle whorl, but which is actually the very tip of a pierced vat base, carefully filled with plaster and re-pierced (Fig. 5.23b).
5.21a 4086:08 Plaster lid, one surface flat and fairly smooth, the other slightly domed. Found with Indus jar vessel rim 4086:09. Diam. 28.5 – 3.0, th. 5.3 cm. Bldg 205, Area 237, occupation.

5.21b 4019:05 Domed lid made of gypsum plaster. One face convex, the other smooth and flat with several deep linear striations. Three-quarters complete. Diam. 8.6, th. 2.8 cm. Bldg 205, Area 236, floor.

5.21c E18:30:01 Pierced plaster disc. Disc of grey plaster, with off-centre perforation. One broad surface almost flat, the other domed. Max. diam. 8.6, max. h. 3.8, perforation approx. 1.6. Bldg 1, Area 1, occupation.

5.21d 1739:04 Domed plaster lid. One face convex with flattened centre, the other face flat to slightly concave. Intact except for small chip from one edge. Diam. 8.2 – 8.5, h. 2.9 cm. Bldg 204, Area 232, sand.

5.21e F18:45:20 White plaster lid, roughly hemispherical in shape. One face fairly flat, the other convex. Max. diam. 8.8, max. h. 3.5 cm. Weight 273.5 gm. Bldg 1, Area 2, occupation.

5.21f 3215:06 Large domed lid of whitish plaster. One face flat, with swirling finger marks from smoothing out the plaster. The other face convex, and slightly wrinkled, with concentric impressions of a tightly woven basket, the centre of which has an irregular star impression (stitching of the central seam?). The edges are slightly undulating and curved up (due to settling in the basket when it was made). Intact. Diam. 18.0 – 17.5, th. 4.75 cm. Bldg 305, Area 418, sand.

5.21g P19:04:11 Hemispherical lid, of white plaster. Lower half domed, upper part splays near top to slightly convex face. Diam. 11.9 – 12.5, h. 5.4 – 8.5 cm. Bldg 100, Area 101, occupation.
Fig. 5.21 Scale 1:4
FIG. 5.22

5.22a Q19:01:04 Thick, white plaster lid, in the shape of an oval disc. Convex faces. Max. diam. 9.1, max. h. 5.0 cm. Bldg 100, Area 103, collapse.

5.22b S147:09 Thick, light grey plaster disc, perhaps a lid. One surface flat and smooth, with an off-centre circular indentation. The opposing surface is also flat and smooth, but shows signs of wear in the centre, and is slightly chipped along part of the edge. Very worn along the whole edge of the disc. Diam. 6.9, th. 3.9, diam. of indentation 1.3, depth approx 0.9 cm. Bldg 220, Area 310, floor.

5.22c P19:04:13 Plaster disc lid. Five joining fragments of a very large disc-shaped lid, of light grey plaster. About three-quarters extant. Both faces are smooth and slightly convex, with rounded edges. The largest fragment has irregular hollows on one face. Diam. 51.0, th. 3.75 cm; hollow is 10.0 × 7.0 × 1.5 – 3 cm. Bldg 100, Area 101, occupation.

5.22d 6021:05 Sub-oval fragment of a lid made of white plaster. Base slightly convex with broad linear impressions, possibly of palm-frond. Upper side also slightly convex, with linear zones of vegetal impressions, in between pronounced ridges, with remains of large sub-rectangular/angled knob with a smooth convex surface. Narrow edges, all now broken and worn. Dimensions 12.8 × 10.4 × 0.4 – 4.1 (edge to centre, with knob), knob l. 8.0, w. 2.8 – 4.0 cm. Area 332, sand.

5.22e 1573:03 Light-coloured, disk-shaped plaster lid. Edge damaged. Diam. 12.2, max depth 4.0 cm. Bldg 203, Area 229, feature.

5.22f F18:33:09 Pear-shaped lump of white plaster, perhaps a stopper. Max. h. 11.2, base diam. approx. 10.5. Bldg 1, Area 2, occupation.

5.22g S226:08 Lump of grey plaster, carefully shaped to a rounded cone: presumably a stopper. Has flattish upper face tapering to a rounded base. Intact. H. 8.4, diam. 7.9 – 8.0 cm. Weight 507.8 gm. Bldg 220, Area 314, occupation.

5.22h 2053:01 Pierced object of light grey plaster. Discoid, with two smooth, compact, convex surfaces, possibly made in a sand mould. Hole through one edge. Sharp angled circumference or rim. Smoothest surface is side opposite hole. Hole in side does not extend through the object and has probably been made by a palm frond twig. Residue of possible metallic ore in the hole. Diam. 6.9 cm. H. 3.1 cm. Hole 1.4 × 1.1 cm. Depth 2.1 cm. Bldg 56, Area 67, floor.

5.22l F18:45:09 Flat, circular disc of white plaster with central small perforation. Convex faces. Diam. 12.5, max. h. 3.3. cm. Bldg 1, Area 2, occupation.

5.22j K16:17:03 Small, shallow, plaster vessel, or perhaps a lid. Good condition. Heavy base, thick, straight sides. Diam. base 7.8 – 7.9, diam. mouth 6.75, h. 4.7 – 5.0. Inside depth 1.5 cm. Bldg 51, Area 55, collapse.

5.22k S546:05 Small conical or pyramid-shaped object, possible counter or gaming piece. Four faces have rounded corners. Rounded apex and flat rectangular base. All surfaces smooth, but not perfectly. Intact. H. 3.8, w. 2.44 – 0.7 (base – near apex), th. (base – near apex) 2.0 – 0.7 cm. Bldg 224, Area 316, make-up.

Architectural elements

Plaster was a major component in the construction of basins and fire installations, and was used for coating furnishings such as stone-built benches. Another occasional use was for the conversion of a pottery vessel to use as a basin, as in Bldg 210 (1072:01), and there is one example of a plaster doorsocket (Fig. 5.23d), and two examples of small plaster blocks, of unknown function (6580:13, L18:27:04).

FIG. 5.23

5.23a 3311:11 Plaster pierced stopper. Mushroom-shaped object of light grey plaster, pierced longitudinally, perhaps a stopper. Roughly-made and slightly worn, perhaps formed inside a jar-neck. The larger circular end flares outward from the slightly concave stem. It has a convex face and thick rounded edges which have been badly chipped. The other circular end is flattish, sloping down unevenly at one side, where it is worn or poorly finished. The centre of the object has been pierced by, or formed around, a palm-frond stem. This hole is at a slight angle to the length of the object. H. 8.65, end diams. 13.5 and 8.85, hole dimensions 2.2 × 1.7 cm. Weight approx. 940 gm. Bldg 304, Area 414, collapse.

5.23b 3310:01 Broken pottery jar base, plugged with grey ashy plaster, and pierced by large central hole formed by palm-frond stem (shape of stem clearly discernible). Pot is very worn and flaking, with most of the surface missing. Lower parts of horizontal row of rounded indentations (finger impressions) where body starts to swell above base. Orange-red fabric with numerous sub-rounded quartz grains, and occasional white inclusions. In the larger opening the plaster is convex, with numerous small hollows and fracture lines. It has vegetable inclusions and impressions. Dimensions (max.) 14.2 × 12.0 × 9.6, neck diam. 6.35 – 6.15, hole diam. 2.5 – 2.4 cm. Bldg 303, Area 414, collapse.

5.23c 5018:02 Plaster perforated object. Trapezoidal fragment. Grey plaster with brown residue, or skin from weathering, on surface. Flat faces and edges, with a rounded corner. Regular vertically punched holes through sides, possibly created by palm-frond twigs. Broken along two lines of these holes. Possibly part of a house ventilation grill, or a coarse sieve. Dimensions 9.6 × 8.7 × 3.4 cm. Bldg 221, Area 301, floor.

5.23d 1567:14 Conical doorsocket of light grey plaster. Interior concave with flattish base. Interior is roughly pecked with concentric mark only on one upper side. Light brown sandy sediment adhering to inner sides obscuring surface. Rim damaged but generally roughly rounded. Exterior surface smoother, probably due to plaster being poured directly into sandy surface of floor. Base is a rounded point. H. exterior 12.4, depth interior 6.0, diam. exterior 16.3 – 18.0, diam. interior 13.3 – 15.0 cm. Bldg 203, Area 229, floor.

5.23e 3304:02 Neck and shoulder of pottery jar, plugged with grey ashy plaster. Ribbed jar, of red ware with small round inclusions, fairly worn and pitted. Rim, neck and shoulder extant. (Højlund Rim Type B3, ware 2). Brown fabric with cream surface. The wide face of plaster in the broken shoulder of the pot is convex. The plaster has numerous tiny white pieces of plaster, tiny pebbles and vegetal inclusions, including a carbonised date pip. Dimensions (max.) 20.0 × 17.5 × 10.1, neck diam. 11.6 – 11.5 cm. Bldg 303, Area 412, collapse.

5.23f 1610:04 Six pieces of painted plaster (two illustrated). One side of each fragment is flattened and painted with a red coloured substance, possibly ochre. Largest piece: 6.5 × 4 × 1.4 cm. Bldg 201, Area 200, floor.
Stone vessels

Steatite vessels

Carved steatite vessels provide perhaps the most substantial link between the Dilmun culture and its neighbours in the Emirates and Oman. In stark contrast to the ceramic assemblage of Saar, which owes so little to the contemporary Wadi Suq culture of those areas, the steatite vessels have precise parallels in the Lower Gulf. In fact, they are so exact that the items were probably manufactured there and imported into Bahrain ready-made. Working of the soft stone native to Oman, including chlorite and steatite, has a long history on the Arabian peninsula. As those from Saar have not yet been examined by a petrologist, the attribution ‘steatite’ is used provisionally here. Many of the designs used are long-lived. This has led to a certain amount of difficulty in assigning dates to them, exacerbated by the proportion of pieces found in isolated funerary contexts, rather than in stratified ones. The problem has recently been re-examined by Hélène David (1996), who has attempted to clarify the basic division of decorative vessel styles originally proposed by Piotr de Miroshchedji (1973), and elaborated by Karen Frifelt (1975: 379–80) and others, and which is widely quoted in the literature. For the previous ‘série ancienne’, a very widespread style characterised by complex and elaborate decoration, mostly of third millennium date, David proposed ‘Figurative Style’, noting that it ‘a purely chronological distinction is not accurate’ (1996: 32). However, for the ‘série récente’ group, typified by shallow open bowls, compartmented rectangular boxes, circular lids and tall cylindrical vessels, nearly always decorated with bands of dot-in-circle motifs, she proposes the term ‘Umm an-Nar Style’, from the strong association with sites on the mainland of that culture, dated between 2,500 and 2,000 BC. Similarly, for the assemblage previously called ‘série tardive’, which has a greater proportion of lids, more lugged and spurred vessels, and slightly freer designs, typically hatched lines, in addition to the simple drilled dot-in-circle, the term ‘Wadi Suq Style’ is suggested, from the culture which essentially succeeded the Umm an-Nar in the same parts of Arabia, and lasted, with modifications, up to 1000 (Carter 1997: 88–9). As is so often the case with calling cultural assemblages after chronological periods, which are in turn called after the sites, the terms work well enough for the immediate geographical area, but less well as soon as they start to travel. In Bahrain, as will be shown, the ‘Umm an-Nar’ style is in fact found in contexts of Wadi Suq date.

Steatite vessels are more common on the Arabian mainland than in Dilmun, though David’s count for Dilmun of only 88 in Umm an-Nar style and 33 in Wadi Suq style is of course of reported vessels (1996: 20), and unpublished Dilmun excavations far exceed those for which the information is fully accessible. Nevertheless, the small but stratified Saar corpus adds not only to the numbers but to the debate on association of style and chronology. Altogether 30 vessels, or fragments of them, and 11 lids were found. Virtually all had incised patterns.

The form most often repeated was a shallow, round-bodied bowl, decorated with a band of circles just below the rim, bordered top and bottom with a single line (e.g. Fig. 5.24 a–d and g). The circles usually have a double circumference, and always a perfectly-placed central dot, indicating their creation with a compass tool. One bowl has circles with a single circumference, but double lines to the border instead (Fig. 5.24e). Another one has the minor variation of multiple lines below the circles (Q6q0013). These are all fairly small vessels, the rim diameters, where they could be determined, ranging between 8 and 11 cm, with one slightly larger one (Fig. 5.24b, 14 cm). Some have very close parallels in the Northern Burial Complex: Fig. 5.24e, with the double border lines, has an near-identical match from Burial 1528 (Mughal 1983: pl. t, 4), and 3050:05 is very like one from Burial 19 (ibid. pl. n, 1). One base fragment with no decoration exemplifies a more angular form (Fig. 5.25h). A single instance occurred of a dark clay vessel decorated with dot-and-circle decoration—a creditable attempt at imitating the presumably much more expensive steatite bowls which are altogether rarer at Saar than pottery ones (Fig. 5.24h).

These eight small bowls decorated with a band of dot-in-circle motifs under the rim are, as we have noted, generally held to be diagnostic of the ‘Umm an-Nar’ or ‘série récente’ style of steatite vessel, and are therefore held to date to the late third millennium BC (Potts 1990a: 106–10). A compartmented rectangular box decorated with dot-in-circle motifs, the only one of its kind found at Saar, is also characteristic of the same assemblage (David 1996: 36, fig. 5.7), this one having lost one of its compartments and been filed off to become a single, squarish container (Fig. 5.24i). One further ‘Umm an-Nar’ style piece was found, not actually steatite, but clearly in the same tradition of soft-stone carving: a cylindrical vessel with exterior covered by hatched horizontal ribs (Fig. 5.25a). This too was divided inside into two compartments.

The rest of the carved steatite vessels from Saar almost all fit into the assemblage described as ‘Wadi Suq’ or ‘série tardive’. Two spurred vessels found in the same location are decorated with the band of dot-in-circle motifs, but while one is otherwise plain (Fig. 5.25c), the other has the characteristically ‘later’ addition of a horizontal zigzag design below the band, effected by groups of parallel incised lines alternately sloped first on one diagonal then the other (Fig. 5.25d). Fragments of lugged vessels are also compatible with the Wadi Suq assemblage too: one has a lug at the widest point of the vessel, and the usual dot-in-circle pattern (Fig. 5.25f); and a rim piece with a lug fragment at the top (000:02) has the zigzag decoration. A section from the body of a long, deep vessel has multiple rows of dot-in-circle as well as zigzag (Fig. 5.24f), and there is a base fragment with zigzag on the lower body (Fig. 5.25c).

Steatite lids

A preponderance of lids, and their more elaborate decoration, is associated with the Wadi Suq as opposed to the Umm an-Nar corpus. The excavations at Saar have yielded nine more-or-less complete lids and two fragments, making up about 25% of the carved steatite found. Lids with the typically Wadi Suq hatched edges in addition to dot-in-circle decoration are represented (Fig. 5.26b–c), and those with enough of the handle remaining show decoration on the knob at the end (Fig. 5.26d–f). Decoration of the knob is more typical of the Wadi Suq style, especially if it involves hatched designs. The Saar lids, however, all have plain dot-in-circle on the knob, and this does also occur among Umm an-Nar vessels (David 1996: fig. 5.9). The remaining pieces have the typically Umm an-Nar simple decoration on the body of the lid, but with no handle-end preserved (e.g. Fig. 5.26a, Fig. 5.27a, c and h), and there is one isolated handle which does have the end decorated (Fig. 5.27d).

As for overall shape, one lid is a flat disc (Fig. 5.27a), and one almost flat (Fig. 5.27c), but the rest have the profile of a truncated cone (e.g. Fig. 5.27b). Curiously, the diameters are on the whole smaller than those of the surviving vessels: generally between 4.5 and 7.5 cm, with one each at 9.0.5 and 12 cm. Only these last three would have fitted any of the measurable bowls found; the rest are more the right size for the typical Wadi Suq lugged vessels with slightly closed mouth (David 1996: fig. 6, 6–11), of which Saar produced two probable examples (Fig. 5.27f and L16:00:01) which unfortunately cannot be measured.
FIG. 5.24

5.24a 6025:17 Steatite bowl. Piece from rim and body of bowl made of very dark grey stone. Profile to near base. surface worn, but originally smooth. Simple rounded rim, curved sides drop quite steeply. Incised decoration on outside is confined to area below rim, and consists of: deeply incised encircling line just below rim, below that a band of widely-spaced circles each with double circumference and central dot. Below that a more shallow encircling line. Rim diam. 11.6, extant h. 4.9, w. 6.1, th. 0.8 cm. Bldg 64, Area 306, occupation.

5.24b 5000:17 Steatite bowl rim. Rim fragment from deep decorated bowl made of pale grey coarse-grained steatite. Rounded rim, flat on top, sides near-vertical, swelling slightly. Smooth surfaces. Exterior incised decoration: deep, uneven encircling band immediately below rim; below that a band of circular motifs, each consisting of two concentric circles with a central dot. One extant; traces of two others; rest lost. Extant circular motif disfigured by large diagonal gouge, perhaps from a chisel. Extant h. 2.35, diam. (reconstr.) c. 14.0, th. 0.7 cm. From unstratified sand.

5.24c 5050:05 Decorated steatite bowl. Four adjoining sherds give full profile, about a third extant. Dark grey-green stone. Rim rounded, sides swell very slightly then taper gently to flat base. Exterior originally smooth, now pitted and worn, with incised decoration consisting of: encircling line immediately below rim; below that an encircling band of circular motifs, each consisting of two concentric circles with central dot; below that, another line. The decoration is confined to a narrow band below the rim, and is carefully executed, the lines being regular and evenly-cut. H. 7.2, rim diam. 10.6 cm. Bldg 222, Area 305, collapse.

5.24d 5506:04 Steatite bowl rim. Fragment from the rim and upper body of a large decorated steatite bowl. Rim flat on top, sides fairly slender, tapering slightly to curve in towards base. All surfaces smooth with fine tool scratches, these being slightly deeper on the interior. Good condition generally. Incised decoration on outside is confined to the area below the rim. It consists of a band of circles each with double circumference and central dot. The band is bordered top and bottom with a single encircling line. H. 6.1, w. 6.0, th. 0.6, diam. of bowl (reconstr.) c. 24 – 26 cm. Bldg 224, Area 307, collapse.

5.24e 1100:01 Small, shallow bowl of decorated pale grey steatite. About a third extant. Thick, rounded rim, sides curve inwards to rounded base. Both surfaces smooth. Two encircling parallel lines incised on exterior just below rim, below them an encircling band of circles each with central dot, and below that another pair of parallel encircling lines. The decoration is shallow and uneven, the parallel lines being cut as a series of more-or-less straight ones. H. 2.8; diam. (reconstr.) 8.0. From unstratified sand.

5.24f Q21:01:01 Body fragment from decorated steatite bowl. Interior and exterior surfaces show signs of burning. Three of the edges appear to have fresh breaks, the fourth exhibits signs of weathering. Decoration shows remains of band of circles each with central dot, below which six horizontal lines slanting down to the left, and to the right one preserved line at the opposed diagonal. Fits, and joined to L16:01:004. Dimensions 5.2 × 3.2 × 0.6 cm. From unstratified sand.

5.24g 8021:01 Rim and part of body of decorated steatite bowl. Almost a quarter of rim and part of body extant. Coarse grained, greenish-grey steatite, worn surfaces, broken into four joining fragments. Simple rounded rim, now worn and slightly undulating, sides gently rounded, dropping nearly vertically then curving inwards: base presumably wide and gently rounded. Below rim on exterior is an incised horizontal row of circles each with double circumference and central dot, below that a horizontal line. This decoration is worn and in parts vague. Both faces have been ground and polished smooth. Present h. 4.9 cm. Rim diam. (reconstr.) c. 9.5 cm. Bldg 352, Area 700, floor.

5.24h 2141:09 Incised pottery bowl. Rim fragment of cup or small bowl, decorated in imitation of steatite vessel. Simple, narrow, rounded rim. Fine orange-brown clay with grey core, and darker brown slip, almost totally worn away out. Decoration just below the rim consists of two encircling lines, between which is a horizontal band of circles, each with a central dot. Dimensions 3.95 × 3.95 × 0.6 cm. Rim diam. (reconstr.) 8.0. Extant h. 3.8 cm. Bldg 56, Area 68, occupation.

5.24i 5224:01 Steatite vessel. Rectangular vessel carved from dark grey steatite. Plain, thin, slightly worn rim, sides almost straight, sloped outwards to near base, then slightly in, turning abruptly to almost flat, very slightly convex base. The vessel is wider at the base than at the rim, and trapezoid in plan. Smooth and polished. All corners are slightly rounded. Interior has smooth flat surfaces curving to flat-slightly concave base. Three faces of the exterior have incised decoration, while the fourth (the largest) is plain, with a swollen ridge down each side and across the bottom. This is presumably the filed-down stump of a con-joining vessel, the original being double. The incised decoration on the sides adjacent to the break consists in each case of a vertical row of four circles down either side, each circle with double circumference and central dot. The side opposite the break, which is slightly larger, is the same, but with the addition of another circle between the lowest two, to form a row across the bottom, and another immediately above, to form another horizontal row. All three sides are outlined with a single incised line down the sides and across the bottom. H. 5.1, w. 3.5 – 5.2, th. 3.8 – 4.2 cm. Bldg 220, Area 314, floor.
Fig. 5.24 Scale 1:2
5.25a 7507:06 Stone vessel. Half the base and part of the body of a decorated cylindrical compartmented vessel, of unusual dark grey stone, fine grained with high concentration of mica. A low grade metamorphic stone, not steatite (Peter Bush and Graham Evans, pers. comm. 1999). Fragment is pitted and scarred at one end, and may have been reused for pounding. Base is circular, almost flat, very slightly convex, and polished, with walls rising almost vertically, sloping inward very slightly towards the top. No trace of rim. Interior is divided into two identical halves by a thin, vertical wall up the middle, ¼ of one compartment being extant, and ¼ of the other. The interior has been chiselled out and later ground smooth (not polished), leaving remnant chisel marks in the corners and on the dividing wall. The exterior is decorated all over with closely incised horizontal lines forming a ribbed pattern. The ribs are evenly nicked with fine vertical lines. Base diam. 10.5, extant h. 4.73, exterior wall w. 0.5, dividing wall w. 0.45 – 0.75 (top – base), max. dimensions 10.25 × 5.45 × 4.73 cm. Bldg 35, Area 653, occupation.

5.25b 2595:08 Steatite base fragment. Sherd from the base and lower body of a deep, thick-walled vessel. Sides steep, base flat. Preserved h. 3.6, th. 0.8, base diam. (reconstr.) c. 7.8 cm. Bldg 53, Area 84, collapse.

5.25c 2642:07 Steatite base fragment. Sherd from junction of body and base of decorated grey steatite vessel. Lowest part of side turns fairly abruptly to thick, gently rounded base. Outside polished. Fragment of incised decoration preserved just above base. Four parallel horizontal lines bound the very bottom of the design, and just above, and merging into them, is a group of five diagonal lines sloping down to the left, possibly part of a zigzag design. Dimensions 4.7 × 3.8, thickness of base 0.8 cm. Bldg 53, Area 84, floor.

5.25d L16:01:04 Steatite spouted bowl. Fragmentary shallow spouted bowl of decorated grey steatite. Three-quarters of rim missing, and sections of body. Rim rounded, body swells slightly then tapers gradually to wide, gently rounded base. Short, blunt spout is open at the top, cut directly at the lip and not piercing the body. Exterior is polished, with incised decoration consisting of a band of circles with central dot immediately below rim, bordered top and bottom by a double encircling line. Below that, extending down the body, is a band of groups of five or six short diagonal lines, each group at the opposed diagonal to its neighbours, producing a zigzag effect. The decoration is careful and even. H. 6.0, rim diam. c. 14.0 cm. Bldg 53, Area 61, sand.

5.25e L16:01:05 Steatite spouted bowl. Shallow spouted bowl of dark grey steatite, possibly burnt, rather worn. About half of rim, body and base preserved, giving full profile, including spout. Fairly thick, rounded rim, body tapers gradually into wide, flat base. Short, blunt spout just below rim. Incised decoration in confined to area immediately below rim: single encircling line, below which is a band of incised circles with central dot, with another encircling line below these. The circles may have a second, outer circumference (surface is too worn to be sure), much wider than normal. Decoration is rather uneven and perfunctory, with the circles placed widely apart. H. 4.5, diam. c. 11.8, internal spout hole 0.8, external 1.0 cm. Bldg 53, Area 61, sand.

5.25f 7507:07 Steatite vessel fragment. Sherd from small decorated lugged vessel of grey steatite, including tiny portion of rim. Exterior ground smooth, interior showing consecutive sloping chisel marks. Plain rim, narrowed to a thin fine edge at the top. Sides straight, thickening and flaring slightly to lug, then rounded and tapering, presumably to thick round base. The incised decoration is confined to a band of circles just below the rim, each with a double circumference and central dot. The band is bordered top and bottom by a single incised line. The lug is tubular, pierced vertically, and has two vertical incised lines on it. Gypsum crystals have formed on parts of the exterior and within the lug hole. Dimensions 6.3 × 4.95 × 0.25 – 0.85, rim diam. (reconstr.) perhaps c. 8 cm. Bldg 35, Area 653, occupation.
**Dating of the Saar steatite vessels**

It must be concluded that either the série récente style of steatite carving is not in fact confined to the Umm an-Nar period after all, and actually goes on later; or it really is third millennium, in which case we have to explain its presence at Saar. Should we reconsider the date of the excavated settlement at Saar? Could it be as early as the late third millennium? There are too many parallels with early second millennium material for that, including occasional finds of Wadi Suq pottery. Do the ‘earlier’ steatite pieces derive from the unexcavated late third millennium levels at Saar? The number of vessels represented only by small fragments would be compatible with this explanation, as fragments often find their way into higher levels through rodent and insect action or other disturbance. If so, it is curious that nothing much else characteristic of the earlier period has surfaced, apart from the very occasional chain-ridge ware sherd. Unusually, the site is essentially undisturbed. Were the inhabitants of Saar collectors of antique steatite? This is not impossible: the compartmented box (Fig, 5.24j) at least had been broken and modified for re-use, as had a very similar one found in a nearby grave (Ibrahim 1982: fig. 45, 4). Many of the lids were very worn at the edges, and although the thin rim of a soft stone lid is obviously liable to abrade, it is the degree of hard use which is puzzling, assuming the stone vessels to have been considered valuable and treated carefully. The lids clearly had either a hard life or a long one. Is it even possible that they were deliberately re-sized, by a non-expert, and sometimes redecorated? One in particular (Fig. 5.26a) has an inner band of circles which has much less wear than the eroded outer one, and looks as though it might have been cut later, with a different instrument.

The overlong survival of Umm an-Nar steatite vessels, along with that of Persian Gulf seals, is a problem that has exercised Potts in connection with the Southern Burial Complex at Saar (1990a: 176-7), which was excavated before the settlement (Mughal 1983). Several of the graves in this complex contained the ‘wrong’ kind of stone vessel—some, as noted, identical to ones found in the settlement, and these were not just from the relatively earlier burials at the centre of the complex. It was concluded that the third millennium artefacts were in fact heirlooms (Potts 1990a: 77). While the date of their final manufacture may still be open to debate, the evidence from Saar shows that the use of Umm an-Nar style steatite vessels continues into the early second millennium. This situation echoes that at Qala’at al-Bahrain, where contexts of early second millennium date produced vessels in Wadi Suq and Umm an-Nar styles (Q. al-B. r: 386-91).

**Unusual steatite pieces**

Finally, a few pieces of carved steatite seem to be simply unusual or out of place. A small fragment was found of a very large vessel with no extant decoration (314,17), part of another, larger—than—usual one, had just two simple grooves under the rim (L14; 20; 21), and a further rim fragment came from an especially well-crafted deep vessel, with a design of sunbursts and a ‘dogtooth’ band (Fig. 5.27g). Part of a very wide, flat plate, or perhaps a kind of lid, with short, incurved rim, was the only steatite vessel found in the temple (Fig. 5.27f, Saar Report 1: 63-4, [53]). That is to say, one fragment of it was found in the temple, and the second some four years later, in the open area (306) that links Bldg 64 and its neighbours with the well.

**FIG. 5.26**

5.26a 3245:02 Circular steatite lid with long, central, cylindrical knob. Made from dark grey steatite. Part of rim broken away. Upper surface is highly polished and slopes up towards central stalk—like handle, which seems to have been broken off then re-smoothed. This face is decorated near the rim with a single circular row of incised concentric circles (2 circles) with central dots. 12 of these circles are extant, and 4 (estimated) are missing. The top of the slightly tapering knob is at present slightly convex, its surface worn off. The lower face of the lid has been ground flat, smooth but not polished. It is defined by a slightly smaller circle which has cut back vertically the lower half of the rounded rim, presumably to make a snug fit. Parts of the upper and lower face, the end of the knob, and the rim are pitted and scarred, possibly from reuse as a pounder. Max. diam. 6.6—6.8, total h. with knob 4.25, h. without knob th. 1.45—0.85, lower face diam. 5.75—5.6, knob diam. at bottom 2.85—2.5, at top 1.9 cm. Bldg 6, Area 24, floor.

5.26b P20:35:03 Half of a decorated steatite lid, unusually small, and unusually black. Conical in shape, with internal flange. Central handle broken off, surface badly pitted, and some of the decoration lost. The outside edge is hatched all the way round with short incised angled lines, inside which runs a band of circles, each with central dot. The base of the handle is encircled with a double incised line. Diam. 5.0, extant h. 2.1 cm. Bldg 103, Area 110, collapse.

5.26c K16:51:05 Decorated lid of grey steatite. Disc-shaped, rising slightly towards the centre, with a short, stalk-like handle that widens out and is flattened at the top. Handle and edges chipped. Edge is hatched by series of short, slanted incised lines, inside which is a band of circles, with double circumference and central dot. The base of the handle is incircled with a single incised line, and there is another near the top. On the top of the handle are two more circles, the same size as the others. H. 3.9, diam. 7.4—7.1 cm. Bldg 51, Area 55, occupation.

5.26d K16:29:06 Decorated steatite lid. Complete except for slight damage to edge. Profile is that of a low cone. Thick stalk—like handle at centre, flattened and widened at the top. Inside flanged. Upper face covered by double band of incised circles, each with double circumference and central dot. Top of handle is covered with random pattern of single circles with central dot in a smaller size than those on the body. Lid diam. 8.7, knob max. diam. 3.8, h. 5.2 cm. Bldg 51, Area 55, floor.

5.26e L16:15:01 Small decorated lid of grey steatite, with stalk-like handle. Slight damage to the top of the knob on the end of the handle, and some chipping around edge. Conical in profile. Band of incised circle, each with double circumference and central dot, around edge. Possibly circle motifs on knob too, but worn. Single incised line around the base of the knob. H. 5.1, diam. 6.8 cm. Bldg 51, Area 55, occupation.

5.26f K16:51:25 Decorated lid of light grey steatite. Shape of low cone in profile, with central stalk—like handle, which is thickened and domed at the top. Lower edge is flanged, inside slightly concave. Slight damage to top of knob and outer edge. Incised decoration is very neat, consisting of ring of circles round the outer edge, each with double circumference and central dot. FAint incised line around the base of the handle, the top of which has been covered in a series of single circles with central dot. H. 5.0, diam. 7.3 cm. Bldg 51, Area 55, occupation.
Chapter 5: Tools, Weapons, Utensils and Ornaments

Fig. 5.26 Scale 1:2
One rim fragment, also from a particularly fine vessel, has elements of a complex design quite different in inspiration from the simple ones just described (Fig. 5.27e). Not much remains, but the intricate pattern completely covers the surviving surface, and is surely the 'mat weave' type of decoration of the ‘Figurative’ or ‘écre ancienne’ style of steatite carving (David 1996: 32). Outside Bahrain this style is considered typical of the mid to late third millennium B.C., but is attested as late as Ur III (Potts 1994: 255ff.). However, a complete vessel of this kind was found in the Northern Burial Complex (Crawford and Al-Sindi 1996), in a grave that is likely to be contemporaneous with the settlement, so even this ‘earliest’ style of steatite carving is still found in contexts as late as the early second millennium in the Saar area.

Like Dilmun seals, steatite vessels carved in the styles of the Gulf sometimes turn up in Iraq. Two were found at Ur, one in Private Grave 473 (U.9020.53), along with a cylinder seal with classic EDIIIIB crossed lions (U.9028), the other in a ‘Sargonid’ grave, PG 899 (U.10547.54) with no other registered finds (Wooley 1934: 430 and 359). Both these vessels are said to have incised circles round the rim, but neither is illustrated. Another very plain bowl with a band of dotted circles at the rim was found at Girsu, but this time enlivened by the prominent inscription of a businessman of long ago: ‘Ur-Bau, son of Sheh-Sheh, great merchant of the time of Amar-Sin’ (Amiet 1979: pl. xxia).

**Fine vessels made from stone other than steatite**

Evidence for small, fine vessels made from stone other than steatite is very limited: just three complete examples and half a dozen fragments. The surviving complete ones are exceptionally attractive, including a shallow bowl of banded pink stone (Fig. 5.27i), and a deeper vessel of soft cream alabaster-like material (Fig. 5.27j). The third (Fig.770:04), very unusually for Bahrain, unfortunately disappeared from the site before it could be recorded. From the fragments of such vessels that were found, little can be made, but the repeated use of a pinkish quartzite was noted (1006:10, 4730:01), also what seems to be part of a stone plate (4756:07).

**FIG. 5.27**

5.27a K16:51:17 Decorated lid of grey steatite, handle missing and edges slightly damaged, surface worn and badly scratched. Flat, disc-shape, with internal flange. Around the circumference is a double row of incised circles, each with double circumference and central dot. Extant h. 2.5, diam. 10.4 cm. Bldg 51, Area 55, occupation.

5.27b K17:45:05 Exceptionally small decorated lid of grey steatite. Central handle is missing, and edge is chipped for about a third of the circumference. Shape of a low cone, with inside flanged. Edge is hatched with short diagonal lines. Body completely covered with a double row of circles, each with central dot. Single incised line around base of handle. Extant h. 1.6, diam. 4.0 cm. Bldg 51, Area 56, make-up.

5.27c 2535:11 Small lid of decorated light grey steatite. Disc-shape, with a vertical cylindrical handle at the centre. Edge worn, also top of handle. Lower surface has shallow indentation round edge. Upper surface is decorated with a band of incised circles, all with central dot, and all but one with double circumference. There was a second, outer ring, which is now badly worn at the edges, the circles on this one with single circumference. The base of the knob is encircled with a single incised line. Polish is visible on the knob itself. Overall diam. 6.5, internal diam. 4.9, diam. of knob 1.8, length of knob 2.3 cm. Bldg 51, Area 56, floor.

5.27d S155:05 Handle broken off a steatite lid. Cylindrical with swollen end, in the centre of which is incised a circle with central dot. H. 2.8, diam. of upper part 2.8, diam. of lower part 2.1 cm. Bldg 220, Area 310, floor.

5.27e 2103:03 Rim fragment from deep vessel made of soft, mid-grey stone, with complex carved decoration on exterior. Rim flat on top, sides vertical. Just under the rim is an encircling groove, and below that a horizontal ridge. In one place the ridge is interrupted, and just under this point are two holes, side-by-side, not bored right through the vessel wall. The area directly below the holes is carved into four raised, rounded ridges, running vertically down the body of the vessel. The area to the left of the vertical panel thus formed is preserved as a cross-hatched triangle with its apex to the right, against the nearest ridge, but it may be part of a lozenge, or a of a long vertical zigzag design. The area outside the triangle is hatched diagonally. To the right of the vertical ridges is a group of parallel diagonal lines, perhaps part of a panel mirroring that on the left. Dimensions 2.9 x 2.8 x 0.5 cm. Bldg 55, Area 82, sand.

5.27f 6205:16 Fragmentary plate, or perhaps a lid. Grey/pink crystalline stone, with occasional light-green impurities. Thick rim, rounded on top, turns abruptly at right angles to form thin, flat base. Rim/side is concave on inner edge. Smoothly finished surfaces with high polish on rim and outer surface. H. 0.9, rim diam. c. 16.0, th. of body 0.25, th. of rim 0.6 cm. General dimensions 4.4 x 1.8 x 0.6 cm. Fits 1529:03, from the temple. Bldg 64, Area 306, occupation.

5.27g F18:33:17 Rim fragment from decorated open vessel made of dark grey steatite. Rim plain, sides steep. Surfaces very shiny, well polished or possibly glazed. Just under the rim on the outside are two carved motifs side by side, each representing a ‘sunburst’: a central circle surrounded by short, radiating lines that are pointed at the outer edge. Below these is an encircling band of touching triangles, apex down, and just below that a similar band; the triangles apex up. The decoration is very carefully executed and the surface finish exceptionally fine. Dimensions 2.0 x 2.3 cm. Bldg 1, Area 2, occupation.

5.27h 3245:01 Rim fragment from decorated lid of pale grey steatite. Upper face convex, the lower is concave. Underneath flanged. Single band of incised circles, with double circumference and central dot. Surface has been ground and partly polished. Dimensions 6.5 x 3.5 x 0.85, rim diam. (reconst.) 12, rim th. 0.7, extant h. 1.6 cm. Bldg 6, Area 24, floor.

5.27i 000:04 Stone bowl. Small bowl, of banded dark pink to cream-coloured stone with smoothed surfaces. Complete. Slightly bevelled rim. Interior gently concave, exterior straight with small flat base. Intact except for three chips in rim. H. 3.0 – 3.9, rim diam. 7.9, base diam. 3.0 cm. From surface of site.

5.27j 2535:12 Stone bowl. Small, cream-coloured alabaster bowl or cup. Complete. Flattened rim, wide mouth, slightly convex sides and a shallow indented base. Heavily encrusted with salt, and inner surface cracked in two places. H. 4.2, rim diam. 7.9, diam. of base 5.0 cm. Bldg 51, Area 56, floor.
Fig. 5.27 Scale 1:2
Stone objects

The people of Saar exploited fully the rich source of local stone that lay just beneath their feet, not only for building but to fashion tools, and sometimes ornaments and vessels too. Tools such as grinders, pounders, rubbers and choppers were the most common man-made items encountered in the excavations at Saar, accounting for over a third of artefacts recorded.

Stone tools

The stone tools were to be the subject of a special study (by Robyn Stocks), but unfortunately this could not be completed in time for publication here. The overview that follows is therefore a provisional summary and illustration of the main types identified.

Material

Stone tools were made from five basic types of stone. Irregular chunks of local limestone were used for every kind of tool, each piece presumably chosen because its natural irregularities assisted the required action. More handsome were those artefacts made from the spherical nodules that occur naturally in the area, as these produced tools of correspondingly regular form. They were particularly popular for rubbing tools, a use that resulted in one or more flat surfaces. Sometimes the wear was very even, producing a sphere with flattened ends, or a cube. Fossils, also naturally occurring and of regular proportions, were useful raw material too. Echinoids (sea urchins) would seemingly have made good rubbing tools, with a conical top providing a reasonable grip, and the underneath conveniently flat. Nevertheless they were used mainly for pounding, as were bivalves (large clam-like shells). Presumably the relatively sharp edges were good for pounding a narrow target.

Farah, or beach-rock, a light-coloured, gritty, and coarse-grained conglomerate containing many shells, was extensively employed for grinders, being very abrasive, but not especially durable.

FIG. 5.28

5.28a K16:29:11 Grinder of white limestone. Roughly square in plan, one broad face ground smooth, the other slightly humped. Dimensions 22.4 × 21.0 × 5.2 cm. Bldg 51, Area 55, floor.

5.28b L17:08:05 Grinder of limestone. Sub-rectangular in plan, one broad face smooth, the other worked. Dimensions 18 × 16 × 5 cm. Bldg 53, Area 51, floor.

5.28c 4037:03 Stone grinder. Sub-rectangular light brown stone with numerous small quartz inclusions. One surface worn smooth and flat. The opposite is irregular and convex. Thin for its size. Intact. L. 20.7 w. 17.9, th. 3.5 cm. Bldg 209, Area 247, occupation.

5.28d 3600:01 Stone grinder, or possibly grindstone. Heavy, dark grey igneous stone with medium pale inclusions, possibly dolerite (unusual for this type of tool). Intact. The stone was roughly shaped to be oval, and the entire surface pitted. One sub-rectangular face has been worn flat and fairly smooth over the pitting. The wear curves down at each end. There are fine unidirectional striations across the width of the surface. The sides are scarred, especially one. Dimensions 23.7 × 16.6 × 6.0–5.5 cm. Weight 4.91 kg. Building 310, sand.

5.28e 4017:08 Stone grindstone. Fragment, double sided, possibly reused as pounder. Chunky rectangular fragment of light brown sandstone. Both upper and lower surfaces worn smooth. These show rough pecking and unidirectional striations across the width of the fragment. The extant edge is vertical with concentrated pecking in the centre (where reused as pounder?). Dimensions 8.3 × 7.6 × 6.0–7.6 cm. Bldg 205, Area 236, occupation.

5.28f 7027:02 Stone grindstone. Intact. Dressed block of whitish oolitic limestone reused first as a mortar or doorsocket, then as a grindstone and possible mortar. Square block with shaping scars and sloping chisel marks on the four flat rectangular sides. The upper square face (when found) is slightly concave with occasional linear chisel marks and unidirectional striations parallel to one edge. There are several small pitted areas scattered across the face, perhaps not natural. The lower square face is flat with an oval pitted concave zone towards one corner. The rest of the face is partly pitted with remnant shallow shaping scars. The two faces, especially the lower one, are partly covered with gypsum crystals, obscuring details. Max. dimensions 33.8 × 33.0 × 12.1–9.5; upper face 33.8–32.5 × 32.5–31.8; lower face 34–33 × 30.8–30.0; oval zone (lower face) approx. 18.0 × 15.0; depth of concave face 1.6; depth of pitted oval 1.7 cm. Bldg 34, Area 600, floor.

5.28g Q20:52:11 Stone grindstone. Apparently intact. Irregular slab of limestone, one end much narrower than the other. One face worn into a slight depression from back and forth movement. Dimensions 43.0 × 27.0 × 9.0 cm. Bldg 102, Area 105, occupation.
Grinders
Stone grinders, of fragments of them, are particularly frequent at Saar. Altogether over 220 were identified, of which about thirty were definitely intact. They take the form of fairly thin slabs of stone, shaped to be rectangular or sub-oval in plan. They are of a convenient size to be pushed back-and-forth with one or both hands, usually around 20–25 cm long and 15–20 cm wide. A few are about half that size, perhaps for finer work or for smaller hands to practise with. One of the faces—the one that does the grinding—is very flat, and shows signs of use. The other is usually slightly domed, either deliberately shaped, or left as naturally convex, affording a comfortable hold for the hand (e.g., Fig. 5.28a–b). Up to seven of the grinders seem to have been used on both sides, and 11 show signs of having been reused as a different type of tool, such as a pounder.

The stone used is almost always faurush (Fig. 5.28c). Exceptionally, a grinder is made from imported igneous rock (Fig. 5.28d).

This type of grinder is familiar from many cultural contexts over a wide geographical area, and is associated with the grinding of grain to make flour. This hardly seems a likely function at Saar, given the apparent dearth of grain, although the recovery conditions for plant remains at the site (Nesbitt 1993) preclude any firm conclusions on this point. What other foodstuff or commodity for which we have evidence would benefit from such treatment is not immediately obvious, but it might be noted in passing that tooth decay was a common problem of the local population (Højgaard 1986), so there might well have been a requirement for finely ground foodstuff. Bahraini cuisine includes several paste-like dishes, such as madhrouba (ground chicken and rice). These were traditionally considered delicacies due to the hard work involved, but are now commonplace thanks to the advent of the electric blender. Like many traditional delicacies in this changing world, they are now mostly confined to special occasions, such as Ramadhan suppers.

Grindstones
Grindstones, in contrast to grinders, were found in many shapes and sizes, and it is harder to tell if they are intact, because rough, irregular pieces of stone, unfinished round the edges, were often used (Fig. 5.29a). Some were therefore completely irregular in form, while others were carefully shaped to be round or square on the outside (e.g., Fig. 5.28f). None was larger than 55 cm in diameter, and one that seemed deliberately shaped into a square was a mere 17.0 × 15.5 cm (430701). Sandstone or limestone were the usual materials, occasionally faurush, and broken or discarded pieces of other artefacts such as door sockets or basins were sometimes re-used. At least three had been re-used on the opposite face (e.g., Fig. 5.28e).

Some grindstones were obvious candidates for use with the rectangular grinders described above (e.g., Fig. 5.29a, Fig. 5.28g), and characteristically wore themselves into a saddle-shape. Others must have been used with smaller tools such as pounders or pestles (e.g., Fig. 5.29d).

Mortars
A handful of stone artefacts have been classified as mortars, having hollows that seem to have been deliberately created as part of the tool, rather than just appearing as the result of constant use. They vary greatly in size as well as form. An example from Bldg 35, for instance, is neatly shaped to be exactly 23.5 cm square (750.403). Others were more casually shaped (Fig. 5.29b). Some of these items are impossible to distinguish from door sockets no longer in situ, and it is entirely probable that either was re-used as either. Four examples were found of large boulders with worn hollows in the top, two of them tall enough to suggest they were meant to assist the grinding or pounding of something from a standing position. One was in Bldg 53 (above, Fig. 3.149, top of photo), but the others stood in open spaces. One was in Saar Square, just south of Bldg 304, another in Diraz Square, against the southwestern wall of Bldg 203 (Fig. 5.29e), and positioned to be easily accessible to all four houses in Block A (Fig. 3.3 above). Yet another stood in Main Street, just outside Bldg 60.

Contexts and groups of grinders and grindstones
Broken pieces of both grinders and grindstones were, inevitably, found re-used as building material for stone features. Even when found on floors, grinders are very portable, and it is hard to be sure if their find-spots represent the place where they were used.

FIG. 5.29
5.29a 4108:01 Stone grindstone, double sided. Large, sub-rectangular light brown sandstone. One surface (upper) has been worn smooth and concave forming rough, rounded long edges. It has been worn away/broken at one end. This surface has wiggly unidirectional striations between the sand grains, running down the length of the face. The opposite (lower) surface has also been worn concave, in an oval or rectangular trough. It has a fairly high rounded/partly flat rim around three sides and is open at one end. The striations are the same as above. Approximately half way down its length the surface becomes very irregular and deeper, with deep grooves, possibly due to intense wear through use. The worn area has created a small hole in the side of the object. All the sides are roughly flat, apart from the worn end, which is very irregular. Dimensions 60.0 × 34.5 × 18.0–15.5; upper surface dimensions 38.0–52.0 × 16.0, depth 20.0; lower surface dimensions 58.2 × 33.0, depth 6.4; hole dimensions 1.8 × 1.5 cm. Bldg 205, Area 237, feature.

5.29b 1567:12 Stone mortar, reused as possible pounder. Intact. Grey-green close-grained stone with scattered galena crystals. Sub-triangular with rounded sides and edges. Two stages of use visible. The more recent wear was an uneven scatter of lighter-coloured pecking across the whole surface, with one rounded corner having been heavily pecked. The older wear is seen mostly on the concave upper face, which is covered with old pecking. Near the centre is an old oval hollow which has concentric turning marks, like a mini socket. The lower face is broken and slightly convex and the three sides are convex to concave. All are worn and show little evidence of use. The surface of the stone is worn and slightly flaking. Dimensions 14.8 × 14.7 × 4.2–7.9 cm. Bldg 203, Area 229, floor.

5.29c 1567:10 Stone grinder. Possibly once oval shaped, now broken. Sub-rectangular fragment of medium-coarse light brown sandstone with occasional shell grit. One surface has been worn very smooth and flat with shallow linear troughs visible towards one side, and remnant pecking in centre. The opposite face is slightly angled to the first and shows similar wear. The edges are rounded with some bevelling. Dimensions 16.0 × 15.7 × 1.0–3.1 cm. Bldg 203, Area 229, floor.

5.29d 2567:01 Stone grindstone. Shape is that of large disc, worn into a depression in the middle, with the very centre worn right through. Smooth, light coloured stone. Set into the ground. Diam. 32, depth 5.3 cm. Bldg 50, Area 57, collapse.

5.29e 9220:01 Large stone mortar. Roughly-shaped lump of limestone, with upper surface worn into a shallow irregular hollow. Not measured. Area 40, sand.
Fig. 5.29 Scale a 1:8, b-d 1:4
The larger grindstones have more chance of being in their original position. A number of groups found in the same context suggest these areas were the place where preparation involving grinding actually took place.

Three grinders found on a work platform in Area 41 of Bldg 305 (322109, 05 and 06) may have been in the place where they were last used, along with part of a grindstone (322102). Another grindstone was found on a platform in the same area (322405), with further tools and fragments.

A grindstone was found on the floor of Area 414 in Bldg 304, along with a piece of grinder that had clearly had a long and useful life (331502/16/17, and 331513 respectively). Several other fragments found in the collapse above the occupation reinforce the impression of this as a work area.

Area 400 in Bldg 306 similarly had a grindstone on the floor, together with some fragments possibly belonging to it (350402 and 350417), and a grinder (350304). Again, several more fragments were found in the collapse immediately above the occupation horizon.

A floor of Area 29 in Bldg 8 yielded a partial grindstone (434807), two grinders (434807, 012101) and two grinder fragments, one reused for pounding (434808 and 13).

Tools for pounding, cutting and rubbing.
Stone tools held in the hand to pound, cut, abrade or polish took many forms and styles. A very large proportion were used for more than one action, so once again a meaningful classification is problematic, and of all the stone artefacts from Saar these are most in need of further study. Provisionally, and for convenience here, they have been divided into:

- 'Pounders', bearing marks of percussion;
- 'Choppers', with a cutting edge;
- 'Rubbers', bearing marks consistent with a gentler abrasion than that found on 'grinders'. This type merges into 'smoothers';
- 'Polishers', which obviously form a continuum with the above, but are distinguished by the shine they have acquired from the rubbing action;
- Multiple-purpose tools ('Multi-tools'), which bear marks from more than one kind of action.

There is also a large number of tools that were catalogued just as 'tool': Most of these come from the early excavation seasons and were not further classified at the time. Stocks has re-examined many, but full descriptions are not yet available for all, and they have been omitted from this summary, as have tools made of flint, which require further work.

Pounders
Of the tools specifically identified as pounders, 46 were on fossil bivalves (e.g. 532208, Fig. 5.30d, 158021) and 24 on fossil echinoids (such as K112103). Such fossils are fairly common in the Saar area. Just over 400 were made of other stone, of which over 65% were identified as limestone, and about 25% as being of the dark, close-grained igneous rock described above. The remainder include examples of quartzite and chert.

Of the limestone specimens, approximately 18% were made from the spheroid nodules that occur locally, and, along with the fossils, are much collected by schoolchildren and others. They range in diameter from 2 to 20 cm or more. It is difficult to be more precise about the number used as pounders, as the more worn the tool, the less its original shape is apparent. These spheroids were also used as rubbers and multi-purpose tools, and the careful shaping of some of them (e.g. Fig. 5.30b, f and g) led to the initial assumption that they were weights, which they might be (see below). The pounders range in size from 3–12 cm in diameter. Sometimes the wear was even all round, more often on two opposing ends, so the worn tool became a sphere flattened at the 'poles' (Fig. 5.30a), and when this was especially severe, it became a disc. Occasionally two patches adjacent to each other were worn, to produce a wedge-shape from the original sphere. Pounders made from other kinds of rock varied greatly in shape and size, but even larger specimens (e.g. Fig. 5.31a) only rarely exceeded 12.0 cm in length. If made of igneous rock, such pounders weighed between one and two kilos, and anything larger would have been difficult to lift repeatedly. Often more than one surface had been used for pounding, as with the double-ended pestle-shaped tool (Fig. 5.30c).

FIG. 5.30
5.30a 156705 Stone pounder. Dark grey, medium-coarse grained stone. Intact. Sub-cubic with rounded edges. Upper and lower faces have been worn smooth with one being larger than the other. Both have been subsequently abraded. The other sides have been continually abraded. Dimensions 6.45 × 6.2 × 5.3–5.8 cm. Bldg 203, Area 229, floor.
5.30b 658002 Stone weight or pounder. Carefully shaped large sub-spheroid with flattened top and bottom. Mottled light grey-pink limestone or marble, polished to a fairly smooth surface. The central zone of the circumference is abraded and slightly scarred. The rest of the surface has occasional scars and natural pitting. Weight reused as pounder, or trimmed/reworked? Intact. H. 7.6, diam. 12.5 cm. Weight approx. 1,250 gm. Bldg 60, Area 372, floor.
5.30c 173905 Stone pounder or pestle. Thick cylindrical nodule of banded grey-pink quartzite. Oval in section. Tool has scatter of abrading across entire surface with concentrated areas in long central zones of one face and two sides. The convex ends are very abraded and their edges are partly scarred. Intact and in good condition. L. 8.3, w. 6.7, th. 5.4 cm. Bldg 204, Area 232, sand.
5.30d 523208 Fossil bivalve possibly used as a pounder tool. Intact. Sub-ovoid light grey limestone. Surface is worn and abraded, particularly on the outer curved edge. L 4.6, w. 4.4, th. 3.5 cm. Bldg 220, Area 314, floor.
5.30e 658003 Cluster of 89 small stones/pebbles. (One fossil echinoid illustrated.) Most have worn irregular surfaces. 84 pale or light grey pebbles of various types: limestone, fossil, and farush. Dimensions range 2.2 × 1.7 × 0.9 to 6.7 × 3.7 × 1.1 cm. Total weight 723.7 gm. 4 blue-grey pebbles, all different varieties of stone. Dimensions range 2.0 × 1.7 × 0.5 to 33.6 × 2.4 × 1.0 cm. Total weight 19.2 gm. 1 tiny red-grey pebble. Dimensions 1.0 × 0.8 × 0.6 cm. Weight 6 gm. Bldg 60, Area 372, floor.
5.30f 501801 Stone pounder. Spherical nodule of grey coarse-grained stone. Intact. Carefully and finely abraded over all curved surfaces, except for two small opposite flat ends. A near perfect sphere. Diam. 7.1, h. 6.6 cm. Bldg 221, Area 301, floor.
5.30g 505617 Stone pounder. Large sub-ovoid (bun-shaped) nodule of light grey coarse grained stone. One wide face is flat with a worn concave hollow in the centre, the opposite is flat but at an angle to the first. The entire surface is abraded. Intact. Dimensions: 8.7 × 8.7 × 6.1 cm. Bldg 222, Area 304, floor.
Fig. 5.30 Scale 1:2
Choppers
Twenty-five tools were specifically identified as 'choppers', with narrow, relatively sharp edges designed to sever rather than crush. Shapes range widely: in some cases the whole stone has been deliberately shaped (Fig. 5.31c), in others just the edge is modified (Fig. 5.31d), and sometimes a broken tool of different type has been re-used (Fig. 5.31b), where a pounder has split longitudinally, and the resulting sharp edges utilized. Ten choppers were of limestone, nine of dark igneous rock, and six of other or undetermined stone. The majority were quite small, between 3 and 5 cm across, with about a quarter being larger, 7–10 cm across.

**FIG. 5.31**

5.31a 4028:19 Large pounder of light grey limestone. Half cylindrical in shape, with convex ends. Tool may have always been this shape as the flattish face is abraded, and all its edges scarred. All surfaces have a scatter of large peck marks and flattish scarring on the higher parts. The main convex surface is very abraded except for several natural shallow hollows. The two flattish/slightly convex ends are also abraded and deeply scarred. Possibly broken during use and reused? Dimensions 14.2 × 13.0 × 4.6–8.5 cm. Bldg 205, Area 235, floor.

5.31b 3302:03 Stone chopper made from smoother/pounder fragment. Oval flattish piece of dark grey close-grained igneous stone, with numerous tiny black inclusions. Possibly basalt. The original slightly convex face has been smoothed at each ends, with a concentration of shallow pitting across the central zone. In the smoothed areas there are fine unidirectional striations in the direction of each end. The other flat face is pitted. All the thin edges, especially the two convex ends, are bifacially scarred. Intact, a good example with a nice shape. Dimensions 9.9 × 7.2 × 2.1 cm. Weight 226.6 gm. Bldg 303, Area 411, occupation.

5.31c 3315:18 Stone chopper or knife. Deliberately shaped like a wide knife, the cortex providing a rounded a grip (similar in style to a flint tile knife). Sub-rectangular cobble of dark grey, igneous stone with close-grained matrix and larger greenish crystals. Possibly porphyritic basalt. The cortex is thick, smoothish and light yellowish brown with numerous small hollows. The cortex remains on one end of one side and on the larger end. The other end of the same side is flat and pitted. The two faces are fairly flat, one slightly convex, the other concave. The faces are pitted and the long slightly convex edge scarred, with a large scar in the centre (notch). The smaller end is pitted and scarred. Intact, a very good example and of unusual stone. L. 9.6; w. cortex end 5.9, small end 2.65; th. cortex end 2.55, small end 1.3; ends w. 5.05 and 2.55 cm. 169.8 gm. Bldg 304, Area 414, floor.

5.31d 7001:46 Stone chopper. Quartz pebble chopper. Sub-oval fragment or flake of milky white quartz nodule. Original convex face is smooth with slight patina. The broken face is flattish, with possible platform being the short straight edge. All edges of the fragment are scarred including the possible platform. One convex lateral edge is heavily worked, the other lateral edge is barely used. A good example in unusual material. Dimensions 4.1 × 4.2 × 1.4, main edge l. 4.2 cm. Weight 32.8 gm. Bldg 34, Area 600, collapse.
Fig. 5.31 Scale 1:2
Rubbers, smoothers and polishers

Rubbers and smoothers take many disparate forms, the only prerequisite being a smooth, broad surface to rub with, and a comfortable grip. Occasionally this was afforded by a protrusion opposite the rubbing face, in two cases sufficiently pronounced to give the tool the appearance of a pestle (3291:02, 3298:01). More often the tool was relatively flat, gripped around the edges, and the most common size was between 6 and 9 cm across in both planes. Only one much larger specimen was found (1854:14, 21.0 cm across).

Another very common size was 3 to 4 cm across, a good size to grip with thumb and first two fingers for fine work. A total of 125 rubbers/smoothers were identified, six of them double-sided. Limestone nodules (e.g. Fig. 5.32a–b) and natural pebbles (Fig. 5.32c) were used as well as other stones, and old tools re-used (Fig. 5.32d, made from a broken grinder).

All except two of the 11 tools identified as polishers were natural pebbles, their round surfaces needing no modification for their purpose (Fig. 5.32e–g). One or two were made from colourful stones of pleasing shape, as though the user had chosen a beautiful tool to put the finishing touches to something delicate (Fig. 5.32h).

FIG. 5.32

5.32a 1771:10 Stone rubber or smoother, of creamy-white limestone. Intact and in good condition. Shape approximately that of a pyramid or trapezoid. Base of pyramid, or largest face, worn very smooth with rounded edges and fine unidirectional striations. The sloping side faces are flat with continual abrading, especially concentrated along the rounded edges and the short upper straight edge. Some of these edges are lightly scarred. Dimensions 6.4 x 6.1 x 5.7 cm. Bldg 204, Area 233, floor.

5.32b 5055:12 Fine stone smoother or possible weight. Sub-rectangular nodule, with triangular section, of opaque white quartz. Smooth faces and edges. One rectangular side is worn or shaped very smooth and convex. The opposite side is hipped with roughly four smooth (worn or shaped) convex faces. Intact. Possibly for fine polishing work, a weight, or an ornament. Dimensions 4.4 x 2.9 x 2.8 cm. Weight 51.8 gm. Bldg 222, Area 304, collapse.

5.32c 6692:06 Stone whetstone or smoother. Possibly hafted. Used sideways, at an angle to the sides, across the surface of a tool or object. Elongated, very regular, rectangular large pebble with one convex end and the other end broken off with stepped scars across the width of the tool. Naturally weathered smooth surface, with both faces slightly convex, the sides straight. Both faces have the same use-wear. The surfaces adjacent to the sides are abraded/smoothed, with fine unidirectional striations across the width. These worn zones are uniformly parallel to the tool’s sides and convex end. Similar wear is beside the convex end, with striations perpendicular to it. Some of this wear continues right across the surface, particularly near the broken end. The broken end may have been used after it was broken, as its edges are scarred and one face near it is also pitted. There is less wear on the actual rounded edges. An unusual (unique?) example. Larger, similar in shape, but not obviously same use as 7001:43. Dimensions 8.2 x 3.4 x 1.5 cm. Average w. of wear along each side and convex end 1.05 cm. Weight 76.1 gm. Bldg 62, Area 376, floor.

5.32d 1770:02 Stone rubber or smoother. Sub-rectangular wedge-shaped light brown stone with numerous small quartz inclusions. One face worn smooth and flat. The stone is probably a reused fragment of a broken grindstone, otherwise intact. Dimensions 8.1 x 6.6 x 4.2 cm. Bldg 201, Area 220, floor.

5.32e 7500:11 Pebble polisher or smoother. Oval pebble of light creamy-brown, close-grained stone, possibly marble or limestone. Surface weathered smooth. One face is flat and polished around a central oval zone of fine unidirectional striations. The opposite face is slightly convex, with wear of the same kind in the central zone but less concentrated. There are a few small scars around the convex edge. Intact, a good example. Dimensions 4.4 x 3.75 x 2.2 cm. Weight 53.3 gm. Bldg 35, Area 655, sand.

5.32f 7509:05 Pebble polisher, or possible weight. Trapezoidal crystal/nodule of milky white quartz. The four slightly convex facets (one is smaller) are smooth, with at least two made through use. Intact, a good example. Dimensions 3.5 x 2.2 x 2.1, smoothest sub-oval face 3.35 x 1.05 cm. Weight 21.1 gm. Bldg 35, Area 653, from stone platform.

5.32g Q19:00:15 Stone polisher. Dense black thin stone, perfectly sub-rectangular. Very regular and even. Broad faces highly polished, short ends heavily pitted from pounding. Dimensions 5.5 x 4.9 x 2.2 cm. Weight 112.5 gm. Bldg 100, Area 103, sand.

5.32h 7001:42 Stone multi-purpose tool, for polishing and smoothing. Oval flattish pebble of attractive, unusual, close-grained stone, banded dark grey and light brown. Banding in form of asymmetrical concentric circles with ‘eye’. Pebble is weathered very smooth, with one face having fine unidirectional striations running at a slight angle to the width. Intact, a good example. Dimensions 3.0 x 2.15 x 0.9 cm. Weight 8.4 gm. Bldg 34, Area 600, collapse.
Fig. 5.32 Scale 1:2
Tools of multiple purpose
Almost any stone tool could have been used for more than one purpose on some occasions: a grinder or rubber might occasionally be used to hit and crush a stubborn particle before grinding it smooth, for instance, and it would be hard to identify such an action. However, nearly 300 of the Saar stone tools bear wear-marks from persistent and distinctly different actions, and have therefore been classified as being of multi-purpose. The vast majority (230) combined pounding and rubbing/smoothing (Fig. 5.33a–d). Other combinations were pounder with chopper/axe (Fig. 5.33e, Fig. 5.34a and d), or occasionally rubber/smisher with chopper/axe (Fig. 5.34c). Softer stone was more popular for combination tools than igneous rock, and as with pounders, local limestone spheroids and fossils (Fig. 5.33b, Fig. 5.34b) were pressed into service.

Concentrations of stone tools in buildings
Stone tools were, as mentioned, ubiquitous in the excavations at Saar, as inevitable potsherds in the finds repertory of any part of the site, in collapse and abandonment levels as well as stratified deposits. It is hard to be sure that any one piece found was in the place where it was last used, or just where it ended up at some point after discard. For some areas of occupation, however, the concentration of tools was enough to suggest that this was the place in which they were last of importance to their owners.

It might be assumed that courtyard and outer areas would be the places where grinding, chopping and abrading work took place, and this was certainly true of some buildings, specifically Bldgs 209 and 352 in the Western Quarter, Bldg 224 in the Northern, and Bldgs 64, 222, 60 and 56 in the Eastern. In the Southern Quarter Bldg 34 had the greatest single concentration of contemporary stone tools found in a single area at Saar: 20 in its outer area (Area 600), with 29 more found in the collapse above it, suggesting strongly that the occupants at this phase were engaged in the manufacture, storage or distribution of such tools. Bldgs 8, 211 and 304 again had concentrations in outer areas, as did Bldg 104 down in the Southeastern Quarter.

Elsewhere, on the other hand, the greater numbers of stone tools occurred in the inner rooms, e.g. in Bldgs 55, 35, 12, 210, 207, 101 and 102, and also in the row of houses along Janabiyah street (Bldgs 1, 2 and 4), although in Bldg 3 they were mainly in the rear yard. In some buildings there were roughly equal numbers in inner and outer areas, such as in Bldgs 220, 303 and 53, and in Bldg 51 the balance shifted over the lifetime of the house. Bldg 200, on the other hand, contained very few stone tools at all.

FIG. 5.33
5.33a 4019:10 Stone multi-purpose tool, for smoothing and pounding. Intact. Sub-ovoid nodule of light grey-brown crystallised limestone. One surface worn into a long smooth convex face, divided centrally lengthwise by a narrow band of pecking. The edges of this surface are slightly scarred. The remaining convex surfaces are abraded. Intact and in good condition. Dimensions 7.2 × 6.5 × 4.7 cm. Bldg 205, Area 236, floor.

5.33b 1621:06 Pounder/smisher, on pebble or bivalve fossil. Piece of light grey limestone, sub-ovoid (elliptical in section). One opposing surface is convex, the other is worn flat. The convex surface is slightly abraded with scarred edges, and fine unidirectional striations. The flat surface is scarred with a natural or pecked scar in the centre. The convex circumference is abraded and slightly scarred at the edges. Dimensions 3.8 × 3.6 × 2.5 – 3.2 cm. Bldg 203, Area 229, from stone platform.

5.33c 1567:13 Stone multi-purpose tool, for smoothing and pounding. Intact and in good condition. Light grey-brown crystalline limestone. Discoid to slightly oval with two opposing flattened surfaces and a wide convex circumference. Both upper and lower faces have been worn smooth and have fine unidirectional striations, particularly beside two edges. Both have occasional earlier rounded pecking and slightly scarred edges. The entire circumference is abraded. Dimensions 5.5 × 50 × 4.4 cm. Bldg 203, Area 229, floor.

5.33d 1567:06 Stone multi-purpose tool, for smoothing and pounding. Intact. Dark grey close-grained stone. Sub-wedge shaped and roughly trapezoid in section. All faces are fairly smooth to the touch. The upper surface has areas of unidirectional striations across the width of the tool. The lower opposite face has been smoothed after broken (rounded ripples). It has occasional fine unidirectional striations near the edges, but all the edges are scarred, the larger scars being at each end. These edges are steeply angled to the sides of the tool. The long sides and most of the wider end surface are smooth, with fine multidirectional striations. One long side has a central zone of pecking with gouged tails. There is some rounding between the upper surface and one long side. One edge of the wider end has been abraded, and its lower corner is scarred. The narrower end or butt has two zones of working visible. Both are abraded, with the butt itself having been abraded to vertical. Dimensions 9.45 × 4.9 – 5.2 × 3.9 – 6.4 cm. Bldg 203, Area 229, floor.

5.33e 4028:07 Stone multi-purpose tool. Pounder, axe and possible smoother. Intact. Sub-ovoid, slightly wedge-shaped, nodule of dark grey close-grained stone. Two opposing surfaces, one flat and one slightly convex, are smooth, probably natural patination. Some very fine multidirectional striations (natural?) on the convex face. All edges are abraded. The two convex ends are very scarred. One side has a long flake scar which may have been removed to facilitate hafting. Dimensions 7.7 × 5.7 × 3.75 cm. Bldg 205, Area 235, floor.
Groups of stone tools

Given their overall frequency, it is hardly surprising that several stone tools often occurred in a single context. However, there were also collections of tools that appeared to have been deliberately grouped. Some groups consisted of pebbles, some with wear use and some without, and it is hard to say whether they were collected together to form a surface, or for their use as tools.

Bldg 207 had a group in both rooms, and the tools from the collection in the inner room included many modified spheroids and items made from imported dark stone.

In Bldg 60, a floor of the outer area (Area 372) yielded a large group of small pebbles, not worked, but clearly deliberately grouped (Fig. 5.34c). Suggestions for their purpose have included gaming pieces. A small group came from same location on the floor above (6579:13).

In Bldg 10, a floor in the outer area (Area 48) had two groups, 4365:48 and 4365:49, on the same surface, including mainly pebbles, some with definite signs of wear, some not certainly used.

In Bldg 207, and inner room floor (Area 273) had two groups, 1870:47 and 48. The former is of definite tools, including modified spheroids and imported dark stone. The latter is similar, but includes a number of pebbles too.

In Bldg 207, occupation debris in the outer area (Area 372) produced pebbles and pebble tools, 1853:117, plus a stone disc (1853:65).

In Bldg 35, squatter occupation in an inner room (Area 604) had pebble tools, including several fossils, and a group of knapping flints (7533:53). A bitumen basket, possibly containing the flints (7533:07), and a cone shell bead (7533:16) were also associated.

In Bldg 300, wind-blown sand in the inner room (Area 400) had a group of pebbles, some with wear (3001:77), probably of no significance, as this was an abandonment level.

In Bldg 223, an outer room floor (Area 203) produced a group of four pebble tools (3001:77), all with obvious wear.

In Bldg 4, a floor of the inner room (Area 33) had four flint nodules used as pounders (2484:4). At this level (Block Level K2), this inner room was atypical in having cooking installations and two entrances.

In Bldg 222, a collapse level in the inner room (Area 304), had a group of eight pebble tools (3056:16).

FIG. 5.34

5.34a 1566:02 Stone multi-purpose tool, for chopping and pounding. Intact. Dark grey close-grained stone. Wedge- or axe-shaped. Stone originally had one (naturally?) broken flat face which has been subsequentialy scared and its edges pounded during use. The opposite convex face is smooth to the touch, with scattered abrading above earlier scars from edge pounding. One corner of the narrower butt end has fine short unidirectional striations. One of the two long sides has numerous unidirectional striations at 90 degrees to the length of the tool. The area beside the shorter end of this side has been abraded. The opposite side and the shorter end or butt of the tool have been continuually abraded. The wider end is convex and very scared through use (as an axe or chopper?). All edges have at least some scarring. Dimensions 14.7×8.9 – 12.6×6.2 – 6.5 cm. Bldg 203, Area 229, occupation.

5.34b 1771:05 Fossil bivalve shell utilized as pounder/smother. Intact. One side and all edges are abraded. Natural ridging and grey skin of fossil is more evident on one side. Dimensions 5.35×4.8×4.1 cm. Bldg 204, Area 233, floor

5.34c 3315:16 Stone multi-purpose tool, for smoothing and chopping. Tapered rectangular fragment of dark grey, close-grained igneous stone. Probably basalt. One rectangular face has been worn very smooth and flat, with obvious unidirectional striations across the width. All its edges, especially the ends, are scared. The opposite face is slightly convex, with sloping sides. The main rectangular area has been slightly smoothed, with fine unidirectional striations across the width. The sides are pitted. One convex end is smaller than the other. A good example. Dimensions 8.25×6.45 – 4.75×2.4 – 2.0; ends 6.2×2.1 and 4.75×2.0 cm. Weight 219.6 gm. Bldg 304, Area 414, floor.

5.34d 4019:09 Stone multi-purpose tool. Pounder/axe. Intact. Wedge-shaped tool of dark grey large-grained stone. Two opposite faces are worn smooth and flat, with a scattering of pecking. Both the sides and the convex ends are abraded, and partly scared. The widest end is the most worn and scared. Dimensions 9.8×7.3 – 8.2×3.0 – 3.6 cm. Bldg 205, Area 236, floor.

5.34e 6580:03 Cluster of 89 small stones and pebbles. Most have worn irregular surfaces. Bldg 60, Area 372, floor.
CHAPTER 5 TOOLS, WEAPONS, UTENSILS AND ORNAMENTS

Fig. 5.34 Scale 1:2
Small objects

Discs, loom weights and net sinkers

Small miscellaneous stone objects include a carefully made disc of dark, close-grained stone with a small central perforation (Fig. 5.35c), and two of limestone, more casually shaped, with a larger hole, of the form often interpreted as ‘net sinker’ or ‘loom weight’ (Fig. 5.35a–b). Apart from the former, which is from nearby Bldg 4, they are from related contexts in Area 1 of Bldg 1, along with a steatite spindle whorl (Fig. 5.35d), all of which are remarkable only in their rarity at Saar, for such items are fairly common in excavations of most periods in the Middle East. Their collection in the same room, along with the Mesopotamian weight described below, is therefore suggestive. Two other stone spindle whorls were found, both in buildings that contained other unusual or apparently luxury items, Bldg 53 (Fig. 5.35e) and Bldg 220 (Fig. 5.35f). There was a similar object from deposits above Bldg 35 (Fig. 5.35g).

Fig. 5.35

5.35a 289:02 Limestone disc, pierced through the centre. Just under half missing. Perforation intact. Upper and lower surfaces flattened and smoothed. Diam. 14.1, th. 2.0, diam. of the perforation 1.4 cm. Bldg 4, Area 9, floor.

5.35b F18:10:05 Stone pierced disc. Flat limestone circle with large perforation off centre, possibly water-worn. Max. diam. 7.7, max. h. 1.6, perforation max. diam. 2.2 cm. Bldg 1, Area 1, occupation.

5.35c F18:62:02 Grey stone disc with small central perforation. Max. diam. 6.5, h. 1.9, perforation diam. 0.8 cm. Bldg 1, Area 1, fill of pit.

5.35d F18:10:04 Steatite spindle whorl. Stone disc domed on one side, with central perforation. Greency-black mottled stone. Two parallel linear incisions on domed face. Similar to K18:20:02. Diam. 3.0 – 3.15, diam. of perforation 0.64 cm. Bldg 1, Area 1, occupation.

5.35e K18:20:02 Stone spindle whorl. Small stone object, circular in plan, one face flat, the other domed. Pierced through the centre of the faces. Similar to F18:10:04. Dimensions 2.3 × 2.2 × 0.8, diam. of central perforation 0.4 cm. Bldg 53, Area 58, occupation.

5.35f S138:06 Stone spindle whorl. Pierced disc with one domed face, presumably a spindle whorl. Dark stone. Diam. 2.0, th. 1.2, diam. of hole 0.6 cm. Bldg 220, Area 310, floor.

5.35g 7500:08 Stone spindle whorl. Pierced disc with one slightly domed face. Intact. Grey igneous stone, with large whitish inclusions. Large central hole shows fine circular drill marks. The surface has been ground or polished smooth, with fine striations visible. The edges and parts of both faces are slightly chipped. Diam. 3.31 – 3.38, th. 0.69, hole diam. 0.8 cm. Weight 11.9 gm. Bldg 35, Area 655, sand.
Fig. 5.35  Scale: a-c 1:2, e-g 1:1
Lids and stoppers
Twenty-nine round or oval-shaped lids were found, either shaped as discs (e.g. 5.36d and e), or flat on one side and domed on the other. They were identical in form to the disc-shaped and domed lids made of plaster (Figs. 5.21 and 5.22), though the distinction between the two types is perhaps a little more arbitrary with the stone examples, as the harder material made it more difficult to form such perfect discs. It was also hard to tell, in some cases, whether the material was in fact plaster or soft limestone. One or two lids were worn around the edges, and may have been re-used as abrasing tools. Two (210:24 and 247:02) were found in situ in the mouths of jars. There were two stone-closing devices of different form: a ‘mushroom-shaped’ stopper (Ks17:45:26), similar to one of the plaster ones (Fig. 5.22f) and a bung rather like a stone ‘cork’ (Fig. 5.36c).

Weights
The discovery of neatly shaped and polished pieces of stone of no obvious purpose often prompted the informal suggestion in the field that they might be weights. This is hard to verify, especially when the piece is incomplete and the intended weight cannot be ascertained. In a small number of cases, however, the conformity to shapes known to have been used for weights, as well as the actual number of grams, clearly confirmed the identification. Two weights of classic form were found. One was a standard Indus weight, a cube of chert weighing 6.7 gm (Fig. 5.36g), from a collapse level in Bldg 223. The other was a standard Babylonian-type weight, a tapered cylinder of black, polished stone, weighing 8.15 gm (Fig. 5.36h). This came from the same context in Bldg 1 as the collection of unusual or luxury small objects mentioned above. A similar stone, now with a small chip, came from a collapse level in Bldg 210 (Fig. 5.36i), and weighs 8 gm.

Two ‘international’ standards of weight in use in the Middle East in the early second millennium BC were the Ur Standard and the Dilmun Standard, the latter being the same as that used in the Indus. Weights of Indus style can therefore be expected to fit into the Dilmun Standard, in which the units were 1 mina (equivalent to 1,350 gm), 1/8 mina (169.75 gm), and 1/100 (13.50 gm). Our cubic weight, however, at 6.7 gm, could only represent 1/200 mina. An Ur mina was equivalent to 500 gm, of which 60 made up a talent. The mina was in turn divided in 60 shekels, each equivalent to 8.3 gm. Our cylindrical weights are close to this.

A curious find of a cube of quartz (Fig. 5.36j), broken or worn away in part, and found with a thin potsherd carefully shaped into a square of the same dimensions, puzzled us when found. One suggestion was that it was a cubic weight, and when it was broken the sherd had been made to make up the weight, but the cube itself weighs 8 gm as it is, close to a Babylonian shekel despite its Indus appearance.

In common with Qala’at al-Bahrain, Saar produced many stones shaped to be spheres with two opposing flattened ends. Spherical stones occur naturally in the area, but the flattening is the work of man, and many of those at Saar have signs of wear from percussion or abrasion, suggesting their use as pounders and rubbers. Stones thus shaped are, however, known to have been used as weights on the Dilmun Standard, and are also found at Indus valley sites (Qal-‘A, 1: 395–7 and references). A sample of the particularly regularly shaped ‘tools’ from Saar was weighed, but the results did not argue convincingly for their function as weights, as most did not fit into either weight system. One sub-spherical tool of igneous rock (324:01), found on a platform in Bldg 301, weighed 166.9 gm, making it a one-eighth Dilmun mina or a one-third Babylonia mina, and a very similar piece from a floor in Bldg 303 weighed a close 173 gm. The only other stone that approximated to a known weight was a large and not very regular one from Bldg 304, which at 1330 gm would have been a slightly short Dilmun mina, but a chopper from the same area (Fig. 5.36c) was 169.8 gm, a one-eighth of a mina again, so coincidence may well be the governing factor here.

FIG. 5.36

5.36a Q20:10.01 Pierced stone block. Block of dressed limestone, apparently half of a larger block. Rectangular in plan and section. Square hole made to about ¾ of the way through, midway between preserved opposing edges. Block has fractured neatly through the hole. Block 14.9 x 10.0 x 8.0, hole 4.2 x 6.0 cm. Bldg 102, Area 106, sand.

5.36b 5799:01 Pierced stone disk. Thick pierced disc, perhaps a weight, or a double-sided mortar/doorsocket that has worn right through. Otherwise intact. Discord piece of whitish oolitic limestone, roughly shaped. Two faces have been at least partly ground flat, and then pitted. They are pierced with a large central hole that tapers from each side towards the centre. Diam. 8.0 – 7.75, th. 3.95; hole diam. (top) 4.5 – 4.0, (bottom/centre) 1.55 – 1.2 cm. Area 665, collapse.

5.36c 2639:02 Stone stopper or bung. Light coloured stone, oval in plan, with one end larger than the other. The larger end is slightly domed, and is chipped along part of the edge. The smaller end is also chipped at the edge. Dimensions of larger end 8.3 x 7.6, dimensions of smaller end 6.1 x 5.4, th. 6.1 cm. Bldg 53, Area 64, floor.

5.36d 4017:07 Oval lid of light grey, coarse-grained stone. Intact. Reused as pounder, or deliberately shaped by abrading. Disc-shaped, one surface convex, the opposite one roughly flatish. Some zones appear polished but this is probably patina. Irregular, rounded circumference is abraded and scarred. There are several blobs of bitumen on almost all the surfaces, dripped on after the object was shaped. Diam. 9.7 – 10.1, h. 3.7 – 4.8 cm. Bldg 205, Area 236, occupation.

5.36e 259:04 Lid of lightweight, light coloured, gritty textured stone. Disc-shaped with rounded edges, with one flat surface and one very slightly convex side. Dimensions 9.3 x 9.1 x 2.8 cm. Bldg 4, Area 9, floor.

5.36f M16:02:02 Stone cube. Perhaps a weight of Indus Valley type. White quartz stone, apparently a cube broken approximately in half. Five highly polished faces, the sixth being the break. Dimensions 1.9 x 1.8 x 1.0 cm. Weight approx. 8 gm. Found in association with a small, squared sherd of approximately the same length and breadth, M16:02:03, weighing approx. 3 gm. (weights kindly supplied by Bahrain National Museum). Building 57, Area 75, collapse.


5.36h F18:10.06 Stone weight. Cylindrical stone with tapered ends. Black, polished stone, very close-grained, presumably a weight of Mesopotamian type. L 3.85, diam. 1.2 cm. Weight 8.15 gm (kindly supplied by Bahrain National Museum). Bldg 1, Area 1, occupation.

5.36i I14:16:16 Stone weight. Hard, black, highly polished stone, presumably a weight of Mesopotamian type. Cylindrical, tapering rounded ends. Small chip out of one side. Dimensions 3.3 x 1.0 x 1.0 cm. Weight approx. 8.0 gm (kindly supplied by Bahrain National Museum). Bldg 210, Area 206, collapse.
Fig. 5.36 Scale: a 1:4, b-e 1:2, f-i 1:1
Larger stone items and household fittings

The household fittings that survive for us at Saar were of course usually made from stone, or plaster, or a combination of both. Pottery was occasionally used too, for tannurs or vats, and sometimes broken pots re-used. Features built from stones and plaster are described above with the houses they were found in (Chapter 4). One or two, fashioned from solid stone, deserve individual mention, along with the larger free-standing stone objects recovered.

Blocks and anchors

Six carefully-squared blocks of stone were discovered, with no obvious clue as to their purpose. Two of them each had a square central indentation, in one case pierced all the way through. Another stone, this time carefully shaped to be oval, but squared off at one end, and with a square hole near the square end, is interpreted as an anchor (Fig. 5.36a). It is similar to two stones found at Qal’at al-Bahrain (Q.al-B.1:405), only they have round holes, and at the other end.

Hollowed and pierced stones and doorsockets

The traditional way of fixing a door in the Middle East is to attach a shaft of wood down one long edge of the door, the bottom of the shaft protruding a little and sharpened. This sharp end then fits into a hollow in the ground in the corner of the doorway, and pivots to allow the door to open and shut. One or more straps looped round the upper part of the shaft and fixed into the wall support the weight of the door at the top. The ground where the sharp end of the pole pivots is likely to become loose if not reinforced in some way, and a common device is the use of a doorsocket, a stone placed under the end of the pole and hollowed out slightly. In ancient Iraq and elsewhere these sockets could be made of very fine stone if they were for important buildings such as temples or palaces, even inscribed with the name of the (often royal) benefactor of the building. These days an empty tin can, easily renewable if not hard-wearing, is a common substitute.

Twenty-six hollowed out stones were identified at Saar, and presumed to be doorsockets, identified by circular abrasion marks and occasionally showing signs of having been plastered into position. It was not always possible to distinguish them from mortars, and at least one had probably done duty as both (Fig. 5.37b). Some were shaped in blocks, but broken pieces of basin were also commonly re-employed, and one socket was made from the underneath of a complete, small, square one (Fig. 5.37c). Two sockets had been used on both sides, and two others had double hollows, presumably from repositioning the stone when it had become too worn.

Basins

Basins to contain water or other household provision were very common, most made from mortared stones and usually lined with plaster. About 150 of these were encountered altogether during the excavation of the settlement, but in addition there were 20 complete examples of basins made by hollowing out a single piece of stone, and fragments of some 56 more. They were round to oval, or square to rectangular, mostly rather neatly finished. The most common size was around 35–40 cm in length, but there was a much smaller one (15 × 11 × 1 cm) found in an inner room of Bldg 53 (L17:08:23). This one was, however, very shallow, and may perhaps have served a different purpose from the larger ones, which are usually at least 20 cm deep. Bldg 53 also produced the finest example of a normal-sized stone trough found at Saar (Fig. 5.37f). It was found in one of the outer rooms (Area 61), upside down and serving as a step(!). One of the long sides is neatly ground down to base level, so it could not have been used for liquids, at least at that stage of its life. A similar well-made specimen came from Bldg 35, again rectangular (Fig. 5.37d), and Bldg 14 produced an unusual one, very long and thin (Fig. 5.37e). Many corner fragment of rectangular basins were found in collapse and re-used in walls; pieces from other parts, and from oval ones, would not have been recognizable.

FIG. 5.37

5.37a K17:29:02 Limestone anchor. Oval with squared off end, complete. Squared end has almost-square hole going right through. Rounded-off end has a slight concave depression on surface, as though a second hole has been started. L. 30, w. 16.5, h. 13, hole 9 × 8.5 cm. Area 59, collapse.

5.37b Q19:20:01 Doorsocket. Made from thick, circular limestone slab, hollowed out on one face. Hollow is deep and oval in plan, as though something had been rubbed back and forth as well as round and round. Perhaps a reused mortar. Diam. of top 24.5–25.5, diam. of base 22.0 × 24.0, height 10.8; hollow l.22.0, w. 13.0, depth 7.3 cm. Bldg 100, Area 102, feature.

5.37c F18:59:05 Stone socket. Sub-square limestone basin with shallow, small rim, complete in four pieces. Reverse has worked rectangular depression, approx. 19 × 8 cm, the centre of which was used as doorsocket. Another worked round depression also shows evidence of use as doorsocket. Dimensions 26 × 26, h. 7.4 cm. Bldg 1, Area 1, floor.

5.37d 7509:07 Stone basin. Rectangular basin made from light grey oolitic limestone. Intact. Underside of base reused as grindstone and part of a work platform. Grinder 7509:08 found above. Rectangular shape is slightly tapered in plan. Worn surface, with one corner broken off flat. The surfaces have numerous natural hollows, and were originally at least partly ground to shape. Some sloping chisel marks are visible on the rim and the exterior. Most of originally flat rim now irregular and rounded. Sides and ends are vertical. On the interior the ends are narrower with rounded corners. The lower parts of the walls are worn (light brown) and concave, curving to a concave base. On the exterior the walls turn at right angles to a flat base. The base has a large crack running lengthways and is worn on the upper zones. There are possible unidirectional striations running at an angle to the length. Dimensions 52.5 × 26.5 × 16.3–13.5; rim exterior 51.0 × 26.0–23.0, interior 40.5 × 19.0; base 49.2 × 24.5–22.5; interior depth 12.7 cm. Bldg 35, Area 653, feature.

5.37e F16:33:02 Limestone basin, long, thin and rectangular, edges chipped. Outside rather irregular. Dimensions 38.0 × 13.0 × 12.4, thickness of base 5.5 cm. Bldg 14, Area 17, floor.

5.37f L18:14:01 Limestone basin or trough, rectangular and neatly made. One long side broken or trimmed away almost completely. Base 52.0 × 24.0, top 64.0 × 29.0, inside 44.0 × 20.0, thickness of base 10.5 cm. Bldg 53, Area 61, floor.
Fig. 5.37 Scale 1:8
Chapter 6 Pottery vessels: typological analysis

Robert Carter

Introduction, terminology and methodology

The pottery from Saar belongs for the most part to a Bahraini ceramic tradition usually referred to as Barbar pottery, after the site where it was first defined. The tradition is well known from excavations at the major urban site of Qala‘at al-Bahrain, hundreds of tombs, the island of Failaka, Kuwait, and Barbar itself. The Saar assemblage, however, presents the first opportunity to examine the pottery of a well-preserved, well-stratified settlement where open-area excavation has fully exposed a large number of dwellings and other structures. This has enabled a high level of chronological definition, as well as allowing conclusions to be drawn regarding status, function and the conventions governing the usage of space in the settlement and within the housing units.

Regarding terminology, it should be noted that Barbar-style ceramics first came into use some time before the foundation of the site of Barbar. The Barbar tradition is associated with the Early Dilmun Period, which begins during the second half of the third millennium BC and ends some time during the Old Babylonian Period, before 1600 BC. Included in the Early Dilmun Period are two divisions of the sequence of Qala‘at al-Bahrain, usually referred to as the City I and City II Periods.

This chapter includes an illustrated catalogue of the ceramics of Saar with comparative details and statistical information for each pottery type, the pottery wares and manufacturing practices, a functional and spatial analysis, and discussion of the chronology of the ceramic sequence.

All pottery drawings in this chapter are at 2:5 unless otherwise indicated. Colours in drawings are indicative only.

The sample

All the excavated pottery from Bldgs 51, 53, 205 and 207 was recorded and analysed. Additionally, a large number of contexts and areas were randomly selected, providing significant quantities from Bldgs 208, 209, 220, 55, 64, 56 and 57. Lesser quantities of material were sampled from eleven other houses and the temple (Bldg 201). Contexts were only included in the sample if all their pottery could be examined, rather than a selection of it.

Additionally, a large number of other vessels from the ten years of excavation was examined and recorded. These vessels are not included in the quantification, periodisation and analysis of the material, but many are clearly significant. These are also illustrated, and where appropriate, types have been defined on the basis of them. These types do not occur in the seriation and quantitative analysis of the assemblage.

The recording and analysis

Vessels were recorded by pottery form and fabric, and quantified by Rim eve (see Orton et al. 1993, 168–71). Bases and Base eves were also recorded, but did not prove significant. Other attributes were also recorded for each entry. These include the presence and colour of slips, painted decoration, ridging, whether or not the sherd was burnt, and the thickness of the rim.

Pottery forms are initially defined according to Højlund and Andersen’s typology of Barbar pottery at the North City Wall at Qala‘at al-Bahrain (Q, al-B. 1). This typology is significantly modified, and new codes are given to replace Qala‘at al-Bahrain codes. It is indicated where a Saar form equates exactly or approximates to one of Højlund and Andersen’s types.

Because of the fragmentary nature of most of the assemblage, the Saar Type Series is fundamentally a typology of rim form. It is not strictly a formal typology, however, in that other criteria are occasionally used in distinguishing certain types, for example the presence of painted decoration or manufacture by wheel, in the case of small cups and bowls. The rim forms have been grouped into broad functional categories (e.g. cooking pots, dishes), here referred to as ‘Form Classes’. Table 6.3 shows the membership list of Forms and Form Classes, as well as the equivalent form at Qala‘at al-Bahrain, if any.

Many vessels are known only from rims, and it was noted that one variant of rim may belong to more than one type of complete vessel. In such circumstances, the variants of complete vessel are numbered and presented below as separate types, but were recorded using one code based on the rims only. For example, S8 and S9 are two jar types sharing the same rim form; they were recorded and appear in the charts and tables using the one code, S8/ S9. Additionally, there is often a continuum of formal variation, and even if complete vessels were always present, the division into types would not be easy. Such problems were particularly acute with certain bowls and cups (see p. 257).

A ‘Typology of Fabric’ was also employed. This is also a modified version of Qala‘at al-Bahrain typology (see p. 267). The tables and charts in this chapter are based on Rim eve totals for each type. eve totals were used to calculate percentages, except when only two examples of a given type are present, in which case the attributes are split 50/50.

A statistical transformation was used on the Rim eve totals to render the data suitable for comparative work in the spatial analysis of the site (see Orton and Tyers 1992: 167–70). Further details are given below (p. 271). For this spatial analysis, contexts were grouped by Areas (spatial units defined during excavation), Area Types, Buildings or Building Types.

The phasing of the pottery sequence

The sampled contexts and pottery forms were seriated using the Bonn Archaeological Statistics Package for Windows (WinBasp), Version 5.4. The seriation was run on abundance data (Rim eve totals for each pottery form from each context) rather than on presence/absence data. Some forms did not occur in the sample and are thus absent from the seriation. Certain forms and contexts were excluded from the seriation by the program, owing to insufficient occurrences.
The early Dilmun settlement at Saar

The results tallied well with both the ordering of equivalent pottery forms in the seriation of the Qala‘at al-Bahrain North City Wall sequence, and stratigraphic information from Saar. Fig. 6.3 shows the seriation: earlier forms are found at the top and later ones at the bottom, while earlier contexts are to the left and later ones to the right. The occurrences of the Saar pottery types within the seriation, compared to their equivalent occurrences at Qala‘at al-Bahrain and elsewhere, is covered in the discussions of each form.

The seriated contexts were divided into three phases (Saar Pottery Periods 1, 2, and 3), both on the basis of the internal development of the assemblage and according to external comparisons. Only contexts and pottery from the seriated sequence were used for calculating the relative percentages of types, manufacturing techniques and surface treatments in each pottery period.

Additionally, one pottery phase (Pottery Period 1) was designated for all material earlier than that subjected to examination and analysis during the production of this report. It therefore does not represent a true division of the sequence. Pottery Period 1 material is known only from test trenches and residual occurrences, and it comprises very little pottery. It largely corresponds to Phase 0 from the sounding in the temple (Saar Report 1: 77).

The rationale behind choosing the exact points at which to divide the sequence is fully discussed below (p. 274). The external evidence is mainly from Qala‘at al-Bahrain. In this report, Qala‘at al-Bahrain Periods are abbreviated to, for example, QB IIa. Højlund and Andersen’s revised sequence starts with QB IIa and ends with QB IIc at the North City Wall. To summarise, Saar Pottery Period 1 corresponds to the QB IIa and probably early QB IIb Periods. Saar Pottery Period 2 equates to QB IIb, though probably not the very beginning of QB IIb. Pottery Period 3 equates to QB IIc, while Pottery Period 4 falls between the QB IIc and the QB IIa. Saar’s chronological relationships with other sites and regions is shown in Table 6.1. The relationships between Qala‘at al-Bahrain, Failaka and the Barbar Temple are based on those given in Højlund and Andersen’s study of the North City Wall sequence (Q. al-B. 1: fig. 385).

The association between Saar pottery types and the Qala‘at al-Bahrain sequence is based on the seriation of the North City Wall pottery (Q. al-B. 1: fig. 388). This does not include the latest City II phase of Qala‘at al-Bahrain, QB IIIa, which is known from Excavation 410 at that site. QB IIIb is considered a late development of QB IIc (Q. al-B. 1: 129, and fig. 386), the authors choosing to retain the designation given in Højlund’s earlier (1986) analysis of Qala‘at al-Bahrain pottery. It is not fully published, though brief details are available in Højlund (1986) and the Failaka report (Højlund 1987: 154 – 5 and figs. 665 – 82).

Tombs at Saar and Karanah 1, and the Bronze Age sequence at Failaka were also useful in dating Saar’s pottery. Discussion of chronological associations with the Failaka types is based on tables and a seriation in the Failaka report (Højlund 1987: figs. 455, 456). Also important are chronological developments within the cemetery of Karanah 1, where an early and a late horizon are defined (Velde 1998). The late horizon proved relevant to the dating of the final occupation of Saar.

The rationale behind choosing the exact points at which to divide the sequence is fully discussed below (p. 274). The external evidence is mainly from Qala‘at al-Bahrain. In this report, Qala‘at al-Bahrain Periods are abbreviated to, for example, QB IIc. Højlund and Andersen’s revised sequence starts with QB IIa and ends with QB IIc at the North City Wall. To summarise, Saar Pottery Period 1 corresponds to the QB IIa and probably early QB IIb Periods. Saar Pottery Period 2 equates to QB IIb, though probably not the very beginning of QB IIb. Pottery Period 3 equates to QB IIc, while Pottery Period 4 falls between the QB IIc and the QB IIa. Saar’s chronological relationships with other sites and regions is shown in Table 6.1. The relationships between Qala‘at al-Bahrain, Failaka and the Barbar Temple are based on those given in Højlund and Andersen’s study of the North City Wall sequence (Q. al-B. 1: fig. 395).

Table 6.1 Chronological relationships
Cooking pots

The seven types described as cooking pots comprise the bulk of the assemblage, at 61% of the total sample. There is a small but significant difference in the percentage of cooking pots in Pottery Periods 2 and 3/4. This is accompanied by an increase in the percentage of portable jars in the Pottery Period 3 phases, perhaps indicating that these came to be increasingly used for cooking purposes.

All the vessels termed 'cooking pots' were hole-mouth jars. Where ascertainable, and with the exception of one S3 vessel, all had globular or oval bodies and round bases. Some occasionally have spouts (S1, S4, S5), and comparative evidence suggests that the other varieties may also sometimes have been spouted.

In terms of function, the purpose of most of these vessels is unequivocally as cooking pots. S4, S5 and S7 are possible exceptions. The rounded base is suitable for setting directly into a fire-pit, or on plastered stones that served as jar supports. Their abundance and mass-produced appearance shows them to be the most utilitarian of vessel classes at Saar. Taken as a whole, 87% showed signs of burning (S3: 98%; S1: 89%; S6: 87%; S2: 76%; S5: 61%; S7: 50%; S4: 45%).

Of the possible exceptions, examples of S7 are too fragmentary and rare to draw firm conclusions regarding function. S4 and S5, however are both unusual. Only 45% of S4 vessels showed signs of burning, and unusually high percentages of Wares 2 and 5 as well as Reserve Slip were noted. S5 showed a high proportion of Ware 2 and slips, plus a unique painted example with a flat base; only 61% was burnt. Despite these reservations, these vessels have been classed as cooking pots because of the formal similarities with the other varieties in this class.

All were handmade, and decoration is rare. Ware 1, the coarsest fabric, dominates the group, at 79%. Most of the rest are in Ware 2. Most were not slipped, though a majority of those in Ware 2 did bear slips. A very small minority of cooking pots were found in Ware 4.

As with the portable jars, certain cooking pot types can be seen to replace others as time passes at Saar. S1 dominates Pottery Period 2, comprising 46% of its assemblage. S3, absent from Pottery Period 2, increasingly becomes the most common type during Pottery Period 3, at the expense of S1. By Pottery Period 4, S3 accounts for 47% of the assemblage, an almost identical quantity to S1 in Pottery Period 2 (Fig. 6.2). The same phenomenon is evident at Qala’at al-Bahrain (Q. al-B. 1: fig. 392). In contrast to the situation at Saar, however, the percentage of B17 (equals S2) increases at Qala’at al-Bahrain during the Ilc phase. The decline in S2 at Saar largely accounts for the decrease in the overall contribution of cooking pots over time (Fig. 6.3).

The overwhelming percentage of cooking pots must be partially due to breakage rates. Vessels such as S33, S30, S26 etc. were probably a much more important part of the assemblage than their percentages suggest.

During recording at Saar, S1 and S2 were both experimentally split into smaller categories on the basis of minor differences in rim form, according to the angle of the inner side, and whether or not the inner side was indented. These differences did not prove significant, and the subcategories were eventually merged. Much of the variation in those respects was due to rough or variable finishing during manufacture, and individual vessels could some-
Type S1
S1 corresponds exactly to Højlund and Andersen’s B16 which they describe as having a ‘bevelled rim thicker than 0.9 cm, without ridges on shoulder’ (Q. al-B. 1: 81). There is often an indentation behind the rim. The angle of the inner face can be vertical, but is often pulled back up to 45 degrees from the vertical (any further tilt to either side, and the rim tends towards S3, S4 and S5).

The inner face may be convex, occasionally strongly indented. The whole vessel is globular or oval, with thin walls. The overall shape could be squat (Fig. 7.1c), or tapering (Fig. 7.1d). Occasionally S1 had a simple spout (Fig. 7.1e–f).

Over three-quarters of S1 examples are in Ware 1, most of which did not show traces of a slip. Nearly all of the remainder were in Ware 2. The fact that most of the Ware 2 examples did have a slip suggests that the low occurrence of slips on Ware 1 vessels was due to design, rather than because slips did not survive well on these vessels. When present, the slip is usually on the exterior, sometimes overlapping into the top of the interior of the vessels. One, however, showed an inner slip around the lower part but not at the rim (4034:09).

S1 is by far the commonest of all types at Saar, representing nearly half of the Pottery Period 2 assemblage. It becomes progressively less common during Pottery Period 3, as it is replaced by S3.

Parallels with B16 at Qala’at al-Bahrain for both rim and vessel form are excellent and plentiful (Q. al-B. 1: figs. 128–30, 648 et al.). At that site B16 is also sometimes found with a spout and is mainly in Ware 1, with some in Ware 2. It represents 54% of the North City Wall’s Ib assemblage by sherd count and 38% of the Ic assemblage. Interestingly, it is absent from Failaka, where similar cooking pots all have ridges, thus assigning them to Type S2.

It is also found in graves both at Saar (Gr.05:02:01) and around Dhahran in Saudi Arabia (Q. al-B. 1: 81), as well as at the Barbar Temple (Mortensen 1986: fig. 44).

![Graph of Type S1](image)

<table>
<thead>
<tr>
<th>S1</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>65</td>
<td>6</td>
<td></td>
<td></td>
<td>71</td>
</tr>
<tr>
<td>Slip only</td>
<td>12</td>
<td>17</td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>23</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12–20</td>
<td>16</td>
<td>24–39</td>
<td>24–30</td>
</tr>
</tbody>
</table>

Type S2
The rim form for S2 is as S1, but S2 is distinguished from S1 by the presence of one to three ridges below the rim (S2a). The ridges are restricted to the shoulder. Sometimes, the inner side of the rim is very strongly indented, giving the appearance of a vertical ridge on the top of the rim (S2b). Examples of S2 with spouts were not found at Saar.

 Ware 2 is more common in S2 than S1, and a very small proportion appears in Ware 5. Slips are also more frequent than in S1, in both the major wares.

S2 becomes steadily less common at Saar during Pottery Period 3, unlike at Qala’at al-Bahrain where B17 increases in frequency in Period IIc. The overall distribution of S2 is also different, in that the type is less common at Saar than B17 is at Qala’at al-Bahrain or at Failaka.

S2 equates well to Type B17 at Qala’at al-Bahrain (Q. al-B. 1: figs. 132–3) where it sometimes has a spout (ibid. 81). At Failaka, S2 equates to Type B14a which occurs in Periods 1 to 2b (Q. al-B. 2: figs. 70–2).

S2 appears to be essentially the same as S1 in overall appearance and usage. The purpose of the ridges may be aesthetic or they may be to strengthen the vessel. It is feasible that the two types are products of different workshops.

![Graph of Type S2](image)

<table>
<thead>
<tr>
<th>S2</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rridged only</td>
<td>29</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>40</td>
</tr>
<tr>
<td>Rridged w/ slip</td>
<td>40</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12–20</td>
<td>16</td>
<td>29</td>
<td>29</td>
</tr>
</tbody>
</table>

Type S3
S3 is similar to S1, but has its rim elongated upwards into a lip. It is never ridged. Some examples of S3 can resemble S1, and the criteria were followed that the elongation had to be marked and the angle of the inner side had to be vertical or tipped inwards. Equivocal cases were recorded as S1. The inner side could be indented. As far as can be ascertained, the body shape was globular and the base rounded.

An overwhelming percentage was in Ware 1 and unslipped, though anomalous examples existed with a slip, or in Wares 2 and 5.

S3 is identical to B19 at Qala’at al-Bahrain. It is S3 that is a key marker of Pottery Period 2 at Saar, as B19 is of Period Ic at Qala’at al-Bahrain. Its first appearance in the Saar seriation was used as the point at which to divide the sequence into Pottery Periods 2 and 3.

S3 almost entirely replaces S1 by the end of Pottery Period 4 (Fig. 6.2). Indeed, it was observed that certain contexts with plentiful cooking pots contained quantities of S3 but no examples of S1. The appearance of such contexts was one of the criteria for the division between Pottery Period 3 and 4 (see p. 277).

The parallels with B19 at the North City Wall are good (Q. al-B. 1: figs. 139, 672, 699–700). When found at Qala’at al-Bahrain B19 is exclusively from Period IIc, though always together with B16 (Saar S1). Its frequency during Period IIc at the North City Wall is given as 11% (Q. al-B. 1: fig. 392), which is similar to the 17% frequency of S3 during Saar Pottery Period 3. The frequency during Saar Pottery Period 4 is significantly higher (47%), providing evidence that the Pottery Period 3 sequence continues longer than the IIc phase at the North City Wall.

Højlund states that Period IIc at Qala’at al-Bahrain, Excavation 420, is characterised by “‘uptumed’ hole-mouth rims’, and the illustration supplied is as S2/B19 (Q. al-B. 1: 154, and fig. 667). The end of the Saar sequence thus bears similarities to Period IIc.
It appears that ridged pottery comparable to Types S2 (B17) and S5 (B18) was preferred on Failaka during the early second millennium. Its occurrence cannot be directly compared to Qala‘at al-Bahrain, where B18 is found equally in both phases. The formal comparisons there are good (Q. al-B. 1: figs. 136–7, 650 and 698), though B18 always appears in Ware 2 at that site, unlike Saar where Ware 1 is slightly more frequent in S4.

It does not appear to feature in the Failaka assemblage, but it is clearly present at the Barbar Temple in Phases IIb and III (Mortensen 1986: fig. 44), implying contemporaneity with QB Periods IIb and IIc.

<table>
<thead>
<tr>
<th>S3</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>97</td>
<td>-</td>
<td>1</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Slip only</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>-</td>
<td>1</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12–20</td>
<td>15</td>
<td>n/a</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

**Type S4**

S4 is the un-ridged variety of Qala‘at al-Bahrain Type B18. The top of the rim is fat and horizontal, or nearly horizontal, and is either flat or convex. Some bear short tubular spouts (see Fig. 7.6d). A reserve slip is occasionally found. Interestingly, the majority of examples of this type (55%) did not display signs of burning, and it is not entirely certain that this vessel should be regarded as a cooking pot.

No complete examples were found, but that it has a globular body and a rounded bottom may be inferred if it is regarded as a cooking pot. On the other hand, a spouted jar with a ‘rim related to Type B18’ from Qala‘at al Bahrain has a ring-base, giving it a flat underside (Q. al-B. 1: fig. 138).

This type is not common, and decreases steadily in quantity through time. It appears to be associated with the temple (see below p. 271). Its occurrence cannot be directly compared to Qala‘at al-Bahrain, where B18 is found equally in both phases. The formal comparisons there are good (Q. al-B. 1: figs. 136–7, 650 and 698), though B18 always appears in Ware 2 at that site, unlike Saar where Ware 1 is slightly more frequent in S4.

It does not appear to feature in the Failaka assemblage, but it is clearly present at the Barbar Temple in Phases IIb and III (Mortensen 1986: fig. 44), implying contemporaneity with QB Periods IIb and IIc.

<table>
<thead>
<tr>
<th>S4</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>40</td>
<td>16</td>
<td>-</td>
<td>2</td>
<td>58</td>
</tr>
<tr>
<td>Slip only</td>
<td>8</td>
<td>28</td>
<td>-</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Reserve slip</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>44</td>
<td>-</td>
<td>2</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14–18</td>
<td>16</td>
<td>n/a</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

**Type S5**

S5 is a ridged version of S4, and would be included in Qala‘at al-Bahrain Type B18. The rim forms are generally the same as S4 though the variant with the flat horizontal top is not found. It too may occur with a spout (not illustrated). Like S2, it has one to three ridges on the shoulder.
Unusually for the cooking pots, a majority is in Ware 2, and most examples are slipped. Additionally, like S4, the proportion of burnt examples is comparatively low (61%). The one complete example is unusual, bearing black paint on the rim and inside the vessel, as well as a slip (Fig. 7.6b). One other example (not illustrated) may also have been painted. The complete vessel is also notable in that it has a flat base rather than a rounded one. It is unknown whether this is characteristic of all S5 vessels.

Unlike S4, S5 is more common in Pottery Period 3 than Pottery Period 2, thus behaving more like Qala‘at al-Bahrain Type B18 which increases steadily between Periods IIa and IIc (see Q. al-B. 1: fig. 392). B18 is notable in that it occurs entirely in Ware 2, while S5 is made mostly but not exclusively in that ware. Only one ridged version is illustrated from Qala‘at al-Bahrain (Q. al-B. 1: fig. 671).

Some of the Type 14a rims from Failaka are approaching S5 in shape, but would have been classified as S2 at Saar (Højlund 1987: figs. 70–1).

S6 was extremely rare at Saar, probably for chronological reasons. Most examples of S6 compare best to B13 and B14 at Qala‘at al-Bahrain (Q. al-B. 1: figs. 124, 125, 583), both of which are early types. At that site, B13 and B15 are mainly found in Periods I and IIa, both with very rare occurrences in the early part of Period IIb. The distribution of B14 is similar, but with more frequent occurrences in Period IIIb; it therefore provides the closest match for the distribution of S6.

Two occurrences of S6 are found in Pottery Period 3 contexts at Saar. This may be due to contamination of the deposits. On the other hand, the existence of S7 implies that the tradition of simple-rimmed hole-mouth cooking pots was maintained during Pottery Period 3, so these rogue occurrences may be part of that continuing tradition. This interpretation is lent strength by the fact that all examples of Qala‘at al-Bahrain Types, B13, B14 and B15 are in Ware 1 and unslipped, whereas a minority of S6 are in Ware 2 and/or slipped, suggesting development within the type.

Type S6
S6 is an amalgamation of Qala‘at al-Bahrain Types B13, B14 and B15. It is a simple, unthickened, handmade rim to a hole-mouth jar. It is sometimes sharper at the top than the bottom, and not thicker than 0.9 cm. The Saar examples often had a shallow depression behind the rim, which is consistent with Qala‘at al-Bahrain Types B13–15 (Q. al-B. 1: 80). No complete examples were found, but it certainly had a thin-walled rounded body and base comparable to S1 and S3.
However, S7 compares well with a rim from level 15, Excavation 420 at Qala’at al-Bahrain (Q. al-B. 2: fig. 668). This level is assigned to the City IIb phase and is thought to postdate Period IIc. Similar rims are not reported from Failaka or Barbar.

Types S8 and S9

S8 and S9 have essentially the same rim form, which relates to two different types of vessel. It is a triangular rim, which sometimes tends to be rounded, and it corresponds to Qala’at al-Bahrain Type B3. The inner side of the rim is sometimes indented. Højlund and Andersen note that the outer face of B3 gradually changes from a convex to a straight aspect during the City II Period (Q. al-B. I: 76).

In their most distinctive manifestations S8 and S9 should clearly be considered different types, but there is in fact a continuity of form between the two extremes as illustrated below. Because it was usually impossible to infer the shape of the vessel during the recording of the sample, all occurrences were recorded as one type, appearing as S8/S9 in all the tables and charts.

The distinction between S8/S9 rims and S13 or S14 was not always clear-cut. In fact, the rim was assigned to S8/S9.

A Reserve Slip is occasionally present, while nearly a third show ridges. Only one example (Fig. 7.3a) showed traces of paint (decoration not depicted on illustration), a vessel with an unusually thin rim and a ridge resembling a small ledge at the shoulder.

The shape of S8 ranges from the globular to the tapering. The height of complete vessels ranges from 32–47 cm, and the width from 30–40 cm.

As a general rule of thumb, pronounced ridges over the whole body were associated with the more tapering examples of S8 (Fig. 7.2a, b), while fainter ridging on the upper body, single ridges below the neck, reserve slips, or an absence of ridges were features of the more globular vessels (Fig. 7.2a–c, f; Fig. 7.6b). The latter examples are beginning to approach the size and shape of S9.

S9 is smaller than S8, though rim diameters do not appear to differ significantly. It is distinguished by a squat, globular or carinated body, usually with ridges on the shoulder and sometimes with a high neck. Ridges are not seen on the main part of the body on pots from the Saar settlement. The overall height is usu-
ally between 20 and 25 cm, and the width between 14 to 24 cm. The largest example is 32 cm high and 29 cm wide.

Jars of Type S9 are in some cases similar to jars with the rim St4. In this case, the minor difference in rim form is certainly less significant than the similarity in overall vessel shape. None the less, in the overwhelming majority of cases the vessel shape could not be deduced, and it thus proved impractical to create a separate formal category for S9 and these St4 jars. The combined Type S8/S9 is found frequently in contexts of Pottery Periods 2 and 3 at Saar, just as B3 is found in IIb and IIc at Qala’at al-Bahrain (Q. al-B. 1: fig. 388). These jars are most frequent during Pottery Period 3, a phenomenon reflected in the percentages of combined Type Classes (Fig. 6.3).

Parallels with B3 at Qala’at al-Bahrain are better for Type S8 than for S9. Where it can be ascertained, nearly all the examples at Qala’at al-Bahrain conform to the former variety. Examples with pronounced ridging on the shoulder and body are found there, as well as smooth-bodied jars and a vessel from Period IIc with a Reserve Slip (Q. al-B. 1: figs. 111, 113, 664). At Failaka, S8 and S9 equate mainly to Types 1a and 1n, and sometimes 1c and 1b (Højland 1987: figs. 5, 7, 15, 16, 23, 462, 465, 468, 485, 488, 503, 504). Complete examples of these compare to S8 in shape and size rather than S9. The rim is also present in all phases of the Barbar Temple (Mortensen 1986: fig. 46).

Some of the best parallels for S8 are found in the Saar tumuli, where a number of complete vessels of the globular variety are found (Ibrahim 1982: fig. 36); as at the settlement, ridges are more pronounced on the upper part of the body of the globular versions. These graves also contain good parallels for S9 (ibid. fig. 38: 8, 9). One vessel from the Saar tombs (ibid. fig. 37: 1) is very similar to the illustrated S9 example, though its larger size puts it on the borderline between S8 and S9. Versions of S9 for which the bodies are entirely ridged are also found in the Saar tumuli (ibid. fig. 37: 2, 4–6). There is no evidence that this type was present at the Saar settlement; one appears to occur at Qala’at al-Bahrain, but in Period IIa, which predates the sampled material at Saar (Q. al-B. 1: fig. 580).

Wheel-made examples of S8 and S9 are not found at the Saar settlement, though sometimes the neck may have been separately formed by wheel, with the handmade rim and body then attached (see p. 269). Wheel-made vessels of this size and with this kind of rim are known in the Early Dilmun assemblage, however. One was found in the burial complex at Saar (Mughal 1983: fig. 19: 3) and another in level 15, Excavation 420 at Qala’at al-Bahrain (Q. al-B. 1: 677). It appears that this is a very late phenomenon, i.e. City IIIf, and its absence from Saar may be of chronological significance.

<table>
<thead>
<tr>
<th>S8/9</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>18</td>
<td>14</td>
<td>6</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Slip only</td>
<td>8</td>
<td>13</td>
<td>3</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Reserve slip</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Ridged</td>
<td>13</td>
<td>4</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ridged w. slip</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Painted w. slip</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>45</td>
<td>8</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8–22</td>
<td>12</td>
<td>24–47</td>
<td>14–40</td>
<td></td>
</tr>
</tbody>
</table>
Types S10 and S11
For S10 and S11, as with the vessels described above, a single rim form is associated with two types of jar. Both have rims equating to Type B9 at Qala‘at al-Bahrain. This simple rim is there described as a ‘rounded or bevelled rim on a flaring neck’ (Q. al-B. 1: 79), and is therefore something of a catch-all category. The rim was recorded and is represented in the tables and charts, as S10/ S11.

S10 has a flat base and a wide neck. The body can be globular, but more often tends to be elongated and ovoid, or with a shoulder, the best examples for illustration purposes being from graves near the settlement (S10a, b). Painted decoration, as on the example illustrated as S10, occurs very rarely, and in this case the paint is itself highly unusual, being red rather than black. The height ranges between 11 and 18 cm, and the width between 10 and 13 cm.

The other variety, S11, is globular and has a rounded base (Fig. 7.3d). Comparative material suggests that it may also have a flat or ring-base. It is sometimes slipped and burnished, often presenting a red surface. Højlund and Andersen draw attention to the distinctive red slip of B9 vessels at Qala‘at al-Bahrain (Q. al-B. 1: 79). At Saar, this type may be painted with horizontal black stripes and other designs, though painted globular vessels are more usually wheel-made at the site (see Type S40). The height of S11 is about 22 cm, and the width around 21 cm.

Some S10/S11 occurrences at Saar (and also the equivalent, B9, at Qala‘at al-Bahrain) may relate to other and different types of vessel. In particular, these may include badly-formed rims of vessels more closely related to S8 or S9.

S10/S11 was not exclusively associated with either phase at Saar, but its frequency drops sharply after Pottery Period 2. At Qala‘at al-Bahrain, B9 occurs throughout Period II (Q. al-B. 1: fig. 388).

Certain rims at Qala‘at al-Bahrain may be related to S10 rims and necks (ibid. fig. 555, 617). Other B9 rims may belong to the S11 variety, but many probably actually belong to Type B3 jars (i.e. the vessel forms of S8 and S9).

At Failaka, some examples of Type 8 are comparable in shape to Saar Type S11, with simple rims, globular bodies and slightly flattened or rounded bottoms (Højlund 1987: figs. 57–8). Most, but not all of Failaka Type 8 pots are wheel-made, however.

Both types are found in the Dilmun funerary assemblage. The best parallels for S10 are found in the plain ‘pear-shaped’ jars known from the Saar tumuli and grave complex (see especially Ibrahim 1982: fig. 39: 1–8, fig. 40: 1, 6; fig. 41: 1, 3, 5, 14). A rare painted S10, with an ovoid vessel shape, was found in Grave 9 at Saar (Stob), while another typical S10 jar was found in Grave 7 (Stoa). The type may be related to a (probably very late) form of jar found in the second phase at Karanah (Velde 1998: fig. 4: 9–13); these are much more elongated.

Globular vessels comparable to S11 are found at Karanah, in the earlier group of graves. Some are unpainted and with a plum-red slip (Velde 1998: fig. 2: 12–13), while others are decorated with parallel horizontal lines, wavy lines and the hourglass motif (ibid. fig. 15–17). These are not described as wheel-made, and so are comparable to S11 rather than S40. Additionally, some painted jars from the Dhahran tumuli may belong to this type (Zarins 1989: fig. 13).

The fall in frequency of S10 and S11 may reflect the move to painted and wheel-made jars such as S40 and S41 (Fig. 6.2). Indeed, it appears from the funerary assemblages that the simple and undecorated ‘pear-shaped and globular’ vessels (S10), and the handmade globular plain and painted ones (S11) were increas-ingly supplanted by wheel-made painted vessels in the latter part of the IIC Period. This is reflected in the relative occurrences of S10/S11 at Saar.

![Diagram](image-url)

**Table S10/S11**

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7–20</td>
<td>11</td>
<td>11–22</td>
<td>10–21</td>
<td></td>
</tr>
</tbody>
</table>

Type S12
S12 equates to B4 at Qala‘at al-Bahrain. It is another triangular rim, distinguished by the fact that its lower edge is drawn downwards. A slight indentation on the upper part of the outer side is often characteristic of the larger examples. The vessel shapes appear to be the same as those of S8, but unlike S8 and S9 the majority of S12 vessels are ridged, often with pronounced ridges. Reserve slips are not present, but the sample is comparatively small. It should be noted that a few of the vessels counted as B3 by Højlund and Andersen (e.g. Q. al-B. 1: figs. 665, 697) would have been recorded as S12 (B4) at Saar.

S12 is not common but is one of the key indicators of Pottery Periods 3 and 4 at Saar, with which it is exclusively associated, and within which it increases in frequency from Pottery Periods 3 to 4. At Qala‘at al-Bahrain, all but one B4 rim is from the IIC phase (Q. al-B. 1: fig. 388). Only one example is illustrated from there (ibid. fig. 114). Højlund and Andersen liken B4 to Failaka Type 1e, and two of the Failaka examples compare well with the larger of the illustrated Saar S12 rims (Højlund 1987: figs. 489, 506). Type 1e is found throughout the Failaka Bronze Age sequence, with a marked concentration in Period 2b (ibid. fig. 456).
**Type S13**

S13 is the same as Type B5 at Qala’at al-Bahrain. It is another triangular rim, characterised by an indentation in the outer face. The distinction between S8/S9 and S13 was not always easy, as the outer face of S8/S9 could sometimes be slightly concave. Højlund and Andersen’s criterion was followed, in that if the concavity of the outer face was ‘marked’ the rim should be recorded as S13. The shape of the complete vessels appears to be the same as that of S8 and S12, with one large ridged tapering example (Fig. 7.2c). Other parallels show that the body may also be globular. Reserve Slips are sometimes found on S13.

Like S12, S13 is rare but is a good indicator of Pottery Period 3 at Saar. Its equivalent at Qala’at al-Bahrain, B5, occurs only in the IIc phase (Q. al-B. 1: fig. 388). It is less common than S12 at Saar, and only two examples of B5 are known from the Qala’at al-Bahrain North City Wall excavations, one of which has a Reserve Slip (ibid. fig. 115, 666). Both are comparable to those from Saar. Højlund and Andersen compare B5 to Failaka Type 1f, though the angle of the outer face is tilted outwards at Failaka, rather than inwards as with the rims from Bahrain.

Further parallels for the rim are found in Phase III of the Barbar Temple (Mortensen 1986: fig. 46). Additionally, two good parallels with globular bodies and Reserve Slips are found in the Saar tumuli (Ibrahim 1982: fig. 38: 6 and 7).

<table>
<thead>
<tr>
<th>Size Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–18</td>
<td>14</td>
<td>44</td>
<td>32</td>
</tr>
</tbody>
</table>

**Type S14**

S14 corresponds exactly to B7 at Qala’at al-Bahrain, and is a sieve-neck with a triangular, sometimes slightly rounded rim. In effect, it comprises an S8 vessel with a ceramic sieve incorporated into its neck. Sieve holes are up to 0.5 – 1 cm wide, and can number up to 19, though the total is usually around half of that figure. The complete vessels are globular rather than tapering (Fig. 7.4b,c). None of those from the Saar sample bore ridges but other vessels from Saar show that ridges are occasionally found on the shoulder or body (Fig. 7.4a).

At Saar, S15 was associated only with Pottery Period 3, though it was not particularly common in the sampled material. At Qala’at al-Bahrain, however, most B7 occurrences are during the QB IIb phase, with a few appearing in both IIa and IIc (Q. al-B. 1: fig. 388). The IIa and IIb examples from Qala’at al-Bahrain show the sieve to be inserted at the junction between neck and shoulder, or just above (ibid. figs. 81, 616, 646). Most of those from Saar, however, and an illustrated IIc vessel from Qala’at al-Bahrain (ibid. fig. 667), show the sieve to be higher, built from or attached to the rim itself. The rim form of the IIc Qala’at al-Bahrain example is also closer to that of the Saar vessels. It is possible that inbuilt sieves were more a feature of the later phase at Saar than at Qala’at al-Bahrain. Detachable sieves are found in Pottery Period 2 at Saar (Fig. 7.4). One S14 vessel from outside the sample has its sieve at the lower level in the neck (Heinz 1994: 268, Nr. 40), and it is possible that this dates to Pottery Period 2.

**Type S15**

S15 corresponds exactly to B7 at Qala’at al-Bahrain, and is a sieve-neck with a triangular, sometimes slightly rounded rim. As noted above, they may alternatively be regarded as the same type as Saar Type S9. The complete shape of an S14 vessel is best illustrated by a jar with a borderline S14 or S8/S9 rim found in the Saar Temple (Saar Report 1: 78, fig. 53).

**The S14 rims have a fabric profile that is different from S8/S9, with a preponderance of Ware 2 and a high occurrence of Ware 5. Ridges and paint were not observed in the Saar sample, though a vessel from outside the sample shows a single ridge between the neck and shoulder (Fig. 7.3f). Reserve Slips are comparatively common, at 22%.**

S14 increases steadily in frequency at Saar, and all except one example is from Pottery Period 3. At Qala'at al-Bahrain North City Wall, most B6 occurrences are from the IIc phase (7 out of 11) with the rest from IIb (Q. al-B.-1: fig. 388). The rims of all the Saar vessels compare to Højlund and Andersen's two illustrated examples (ibid. figs. 116, 615). They compare these to Type 10 at Failaka, and although the rims of Saar S14 jars and Failaka Type 1g vessels are similar, it appears that the overall vessel shape at Failaka is large and tapering, having more in common with Type S8 at Saar (Højlund 1987: fig. 23).

|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
Højlund and Andersen draw attention to a similar vessel from a tomb at Ali (Q, al-B. 1: 78).

S15 is likely to have had a specialist function. Various seals, from Saar and elsewhere (Al-Sindi 1999: 58 – 80), show individuals drinking from jars with straws. It is logical to assume they are drinking from vessels such as S15 (and S16). The sieves in the neck would have been used to strain liquid being poured into the vessels. Such a liquid may have been some kind of milk product, in which case the sieve would perhaps have been used to separate curds from whey. It is more likely that beer was poured into these jars from fermenting vats (such as S20), the sieve being used to remove the barley husks from the liquid. Some S15 necks show signs of having been stopped with plaster, and it is possible that once the liquid had been strained into the vessels, they were stopped in order for the beer to mature and be preserved.

**Type S15**

S16, which corresponds to B8 at Qala’at al-Bahrain, is similar to S15 but has a much narrower neck, permitting only 4 or 5 holes in the sieve. S16 rims from Saar were triangular, with vertical outer side and a drawn-out lower edge like that of S12. The complete vessel shape is not known.

Only two examples were found in the sampled material, both in Pottery Period 4. The single (rim-less) example of B8 illustrated in the Qala’at al-Bahrain report (Q, al-B. 1: fig. 118) was associated with the IIc phase. Good parallels are found at Failaka, where Type 3 (‘the slender sieve-neck rim’) and Type 4 (‘the stout sieve-neck rim’) are both closely comparable (Højlund 1987: 20 –1, figs. 37–42). Type 3 is found from Periods 2b to 4a while Type 4 is mainly found in Period 2b, though there is an occurrence in Period 3.

Further evidence for a late date comes from the later group of tombs at Karanah 1, where a sieve neck with a narrow neck was found (Velde 1998: fig. 4: 15). This, however, appears to have been related to a jar with rippled shoulders, a very late feature of the Early Dilmun assemblage which was not recorded at Saar.

<table>
<thead>
<tr>
<th>S15</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>43</td>
<td>35</td>
<td>15</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>Slip only</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>35</td>
<td>15</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S16</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>Slip only</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–12</td>
<td>10</td>
<td>30–38</td>
<td>24–32</td>
<td></td>
</tr>
</tbody>
</table>
Type S17

S17 has an everted, flat-topped rim with a rectangular cross-section. Typically, the neck is vertical and there is a sharp transition between neck and shoulder, in some cases resembling a ledge. There were no ridged or painted occurrences, though the sample is small.

This type is mainly associated with Pottery Period 2 at Saar, and is seriated as the second earliest type, though there are rare occurrences in Pottery Period 3. It is very uncommon, and is not reported from Qala’at al-Bahrain, but B3 there may be regarded as a variant of S8 or S9.

No good comparanda are published, though superficial comparisons may be made at Qala’at al-Bahrain with ridged jars of Type B2 and B3 (Q. al-B. 1: figs. 546 and 547), and with Type 8 at Failaka (Højlund 1987: fig. 58).

Type S18

S18 is a simple rim with a flat top on a flaring neck. It is rare and is found in both Pottery Periods 2 and 3. The complete vessel form is unknown, but it should probably be regarded as a variant of S10. This type is very rare, and is found infrequently in all three ceramic phases.

Parallels for S18 are not found at Qala’at al-Bahrain. Type 5 at Failaka (the ‘simple flared rim’) is comparable, being similar in general shape, though lacking the flattened top (Højlund 1987: figs. 44–50, 518 and 519). It occurs from Failaka Period 1 to 4A. The best comparisons are with plain ‘globular and pear-shaped’ vessels from the Saar tombs (Mughal 1983: fig. 21: 5, 6, 8), which are otherwise generally comparable to S10.

Type S19

S19 is a triangular rim like a large and elongated version of S8, with a long and flat or slightly concave outer face.

This type did not appear in the sample, so statistics are not available. It is probably characteristic of the very end of the Saar sequence, being comparable to rims from Phase IIIf at Qala’at al-Bahrain, Excavation 420 (Højlund 1987: figs. 665 and 666). The best parallel from Failaka is from Period 2b (ibid. fig. 503), though Højlund equates QB IIIf with Period 3 at Failaka. The most comparable type at Failaka is Type 1b (‘the isosceles variant’), which is found from Periods 1 to 4A, but mainly in Periods 1–2b (Højlund 1987: 13–14, figs. 8–10 and Table 455).

Large vats and jars

This class comprises five varieties of large vessel, all except one of which are found at Qala’at al-Bahrain where they comprise Types B34, B35 and B20. Like S8/S9 and S10/S11 above, a single rim form was found to account for two kinds of vessel, in this case S20 and S21 (equalling B34).

Some of these vessels were probably used for storage. All have wide mouths and either no neck or a very short neck, so they do not resemble typical large storage jars which are often narrow at the rim to facilitate closure. In fact, in some cases these jars are certainly used for specialist functions other than storage (see S20).

One of the interesting features of the Saar assemblage is the rarity of large vessels such as these. Large vats or jars such as S20/S21 are highly visible at Saar on account of the size of their sherds, but actually account for a very small part of the assemblage. Large vessels tend to have very long life spans and may be used by several generations, which partially accounts for their scarcity. Furthermore, the size of the sherds when broken may have made them more likely to be cleared from the occupation areas and redeposited elsewhere, hence perhaps their rarity in the excavated settlement.

Such factors do not entirely account for the rarity of such vessels, and it may be significant that the proportion of small jars suitable for storage purposes is very high at Saar (i.e. S8–14). This is evidence, albeit tenuous, that storage was largely organized on an individual family basis, rather than there being such facilities available to the extended family or to the community as a whole.

Of these vessels, S22 and S23 show particular chronological significance. The former is found only in the last phase of the ceramic sequence. Although this is not true of the latter, some of its later occurrences show characteristics linking it to very late City II vessels from Qala’at al-Bahrain and contemporary Failaka.
Types S20 and S21
S20 and S21 both correspond to Qala‘at al-Bahrain Type B34. They cannot be distinguished by rim form, but there is a very important difference in their bases.

S20 is a vat with a bung-hole base of Type B41. It is a large wide-mouthed vessel with pronounced ridges, usually covering the whole body; the form may be either slightly closed or slightly open. The rim is drawn out and flat or slightly sloping outwards, and the sides are curved. The top of the rim has a thickness of over 3 cm.

S21 has the same rim, the same ridges and the same general dimensions as S20, but has a flat base suggesting a different function. The example shown is 1737:01, from Bldg 204.

S20/S21 rims are found in both sampled phases at Saar, though they are more common during Pottery Period 2. The equivalent B34 found between Periods IIa and IIc at Qala‘at al-Bahrain, and equates to Type 26 at Failaka where it is mainly found in Periods 1–2a.

Very exact parallels for S20 are found at Qala‘at al-Bahrain and Failaka (Q. al-B. 1: 170; Højlund 1987: fig. 111). Additionally, a number of rims at those sites and the Barbar Temple may relate either to the flat-based S21 or to S20 (Højlund 1987: fig. 110; Q. al-B. 1: figs. 169, 627, 656; Mortensen 1986: fig. 45). These comparanda imply usage throughout the City II Period.

Complete examples of S21 from sites other than Saar are not published.

It is unlikely that S20 and S21 performed the same function despite their similarities. S20 would have been used for the storage or processing of liquid, and some examples of the bung-hole base are found stopped with plaster. Sometimes the plaster has been bored through to make a narrow opening.

The design of S20’s base suggests that, once the base was unstopped, the liquid inside was to be poured out all in one episode. This strongly implies that it was used as a processing vessel rather than for storage, namely for the fermenting of beer. This conclusion is confirmed by the remarkable find at Failaka of a comparable rim (Failaka Type 26) which bears an inscription identifying it as a kakkullum. This is a kind of vat known from Mesopotamian sources for beer production, and had an opening in its base (Eidem J. in Højlund 1987: 179).

Because of the nature of its base and function, and by analogy with S22, S20 was probably suspended rather than set on the ground.

S21 may also have been used for storing or processing liquids, but the storage of dry goods such as grain is equally likely.

![Diagram of S20 and S21](image)

<table>
<thead>
<tr>
<th>S20/21</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridged only</td>
<td>7</td>
<td>4</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ridged w. slip</td>
<td>79</td>
<td>10</td>
<td>89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td>14</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30–60</td>
<td>32–38</td>
<td>40–48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Type S22
S22 is similar in size and appearance to S20/S21. The major difference is the lack of ridges. The rim is extended outwards, but is less flat and horizontal than S20, tending to slope downwards and often having a slightly convex or concave upper or outer surface. The one complete profile has a flat base, though the possibility that some S22 vessels had bung-hole bases cannot be ruled out.

Unless an S22 jar is found with a bung-hole base, it may be regarded as an un-ridged version of S21. It occurs only in Pottery Period 4 at Saar, perhaps being a late development of S20/S21, though it does not replace the latter. It does not appear at Qala‘at al-Bahrain, but appears to correspond to Failaka Type 30, ‘the thickened drawn-out rim’ (Højlund 1987: figs. 118–19). This is found in Failaka Periods 2b and 3a only.
the early dilmun settlement at saar

The shape of the complete vessel is unknown. Nearly all are slipped, and one example bore traces of black paint below the rim. A very unusual example from outside the sample has a flattened top, and was decorated with impressions probably made by the end of a date-stone (Heinz 1994: 293, Nr. 317). None of the Saar examples was definitely wheel-made, though some of the round examples bore inconclusive evidence of turning on a fast wheel.

Type S23 is comparatively rare, and is mainly associated with Pottery Period 3. It resembles B35 from Qala’at al-Bahrain (Q. al-B. 1: fig. 171). This is a round rim, and the one illustrated is painted on and below the rim. A much better parallel, which is wheel-made, is from level 15, Excavation 420 at Qala’at al-Bahrain (ibid. fig. 676). Højlund assigns that level to Phase IIIf, i.e. post-dating the North City Wall occupation. This suggests a very late date for the round-rimmed examples mentioned above.

Good parallels are found at Failaka with Type 28, a ‘round rim (without neck)’ (Højlund 1987: figs. 114–16, 494). These rims are found at Failaka from Periods 2A onwards, and often bear inscribed marks, which are possibly potters’ signs. The occurrence of paint on such large vessels is rare at Saar and Qala’at al Bahrain, but appears to be less unusual on Failaka.

The function of S23 remains uncertain, though the size of the vessels implies that it was used for storage.

<table>
<thead>
<tr>
<th>S22</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No treatment</td>
<td>5</td>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Slip only</td>
<td>65</td>
<td>30</td>
<td></td>
<td></td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40–52</td>
<td>46</td>
<td>30</td>
<td>33</td>
</tr>
</tbody>
</table>

**Type S23**

S23 is the rim of a large jar, with either no neck or a very short neck. Unlike S20 – 21, the walls of the vessel splay outwards below the rim. Its closest equivalent at Qala’at al-Bahrain is Type B35. The rim is generally round, but sometimes has a flattened top. It frequently has holes pierced immediately below the rim. The fact that these are invariably made before firing suggests that the vessel was specifically designed to be suspended. The shape of the complete vessel is unknown.

Nearly all are slipped, and one example bore traces of black paint below the rim. A very unusual example from outside the sample has a flattened top, and was decorated with impressions probably made by the end of a date-stone (Heinz 1994: 293, Nr. 317). None of the Saar examples was definitely wheel-made, though some of the round examples bore inconclusive evidence of turning on a fast wheel.

S23 is comparatively rare, and is mainly associated with Pottery Period 3. It resembles B35 from Qala’at al-Bahrain (Q. al-B. 1: fig. 171). This is a round rim, and the one illustrated is painted on and below the rim. A much better parallel, which is wheel-made, is from level 15, Excavation 420 at Qala’at al-Bahrain (ibid. fig. 676). Højlund assigns that level to Phase IIIf, i.e. post-dating the North City Wall occupation. This suggests a very late date for the round-rimmed examples mentioned above.

Good parallels are found at Failaka with Type 28, a ‘round rim (without neck)’ (Højlund 1987: figs. 114–16, 494). These rims are found at Failaka from Periods 2A onwards, and often bear inscribed marks, which are possibly potters’ signs. The occurrence of paint on such large vessels is rare at Saar and Qala’at al Bahrain, but appears to be less unusual on Failaka.

The function of S23 remains uncertain, though the size of the vessels implies that it was used for storage.
**Type S24**

S24 is a medium to large jar with ridges and no neck; the width of the rim is less than 3 cm thick. It sometimes resembles a small S20, and sometimes a distorted S2. It is therefore not entirely certain that this represents a genuine type at Saar, or even Qala’at al-Bahrain. No complete examples were found.

S24 is extremely rare, with only two occurrences. Both may be compared to Type B20 at Qala’at al-Bahrain and Type 15a at Failaka (Q. al-B. 1: fig. 557, 590; Højlund 1987: fig. 76). A complete vessel from Qala’at al-Bahrain is globular and has a hole in its base, resembling a rounded, more delicate and less heavily ridged version of an S20 vat (ibid. fig. 140).

**Type S25**

S25 is equivalent to Qala’at al-Bahrain Type B29. It is a dish with a bevelled outer face to the rim, with the lower edge of the rim drawn out and downwards. Separation from S26 was sometimes difficult, and the code S25 was only assigned if the drawing-out of the lower edge was marked.

S25 is a rare dish and is restricted to Pottery Period 2. At Qala’at al-Bahrain, B29 (S25) is absent from Period IIc but is found in Periods IIA and IIb. A good parallel for the Saar dishes is found there (Q. al-B. 1: fig. 596), though all examples from Qala’at al-Bahrain appear to be in Ware 1. (For discussion of wares see p.207 ff.)

**Type S26**

S26 is a large dish, usually in Ware 5. It is exactly equivalent to Qala’at al-Bahrain Type B30. It is always handmade, and a certain amount of variation can be seen in the profile of the body and the thickening of the rim.

The fabric is usually Ware 5, though it often edges into Wares 1 or 2. In some cases, the centre of the vessel would be classifiable as Ware 1 or 2, while the outside of the same dish would be Ware 5. This illustrates the difficulty sometimes experienced in separating the three major wares.

S26 is one of the commonest types in the Saar assemblage, after S8/S9 and most of the cooking pots. It decreases in frequency with each Pottery Period at Saar.

At Qala’at al-Bahrain North City Wall it is common in Periods IIA to IIc. Højlund and Andersen note that the Ware is either yellow, or reddish with a yellow surface or slip (Q. al-B. 1: 87). The same phenomenon is accounted for at Saar by the recording of Ware 5, as well as Wares 1 and 2. In the opinion of this author, S26 was never slipped.

The range of variation in rims, size, and angle of side seen at Saar is also present at Qala’at al-Bahrain where the parallels are good (Q. al-B. 1: figs. 162–5 et al.). It is also found at Failaka as Type 18, where it occurs in Periods 1, 2a and 3b (Højlund 1987: figs. 89–93).
Large bowls and large dishes
This is the rarest of local vessel classes at Saar, and is mainly restricted to Pottery Period 2. Only two types were defined, one of which has a possible equivalent at Qala’at al-Bahrain. A role in the processing of food or materials is the most likely function for vessels of this class, given their size and unsuitability for storage. S29 may have been a very large lid, however. Whereas S28 is a feature of the early assemblage at Saar, S29 is found only in the latest part of the sequence.

Type S28
S28 is a large bowl with a simple flat top to the rim. It is similar to Qala’at al-Bahrain Type B32, a ‘flat rim belonging to a vat’ with a diameter of around 40 cm. The sides are slightly curved, but sometimes straighten near the top. It has a flat base, and the one complete example is oval by design rather than circular (Fig. 7.5o).

Good parallels are found at Qala’at al-Bahrain (Q. al-B. 1: figs. 707, 708), where B32 is restricted to the IIC Period and is seriated as the second-latest type. Comparisons are also found with a dish from level 15, Excavation 420 at Qala’at al-Bahrain, i.e. the City IIIF Period (Højlund 1987: fig. 671).

<table>
<thead>
<tr>
<th>S26</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>10</td>
<td>21</td>
<td>69</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>21</td>
<td>69</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–49</td>
<td>32</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S27</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>24</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S28</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>81</td>
<td>5</td>
<td>4</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Slip only</td>
<td>10</td>
<td>5</td>
<td>4</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>5</td>
<td>4</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>25–48</td>
<td>37</td>
<td>9</td>
<td>n/a</td>
<td></td>
</tr>
</tbody>
</table>

Type S27
S27 is a wheel-made dish with a slight thickening and outwards change of angle close to the rim. It is equivalent to Qala’at al-Bahrain Type B67, and is the only wheel-made dish in the Early Dilmun assemblage. The single example from Saar was in Ware 2 and had a rare black slip.

As only one example was found, this type does not appear in the seriation. It occurred in a Pottery Period 4 context, and at Saar the technique of manufacture by wheel is almost entirely associated with the end of the sequence.

Good parallels are found at Qala’at al-Bahrain (Q. al-B. 1: figs. 707, 708), where B67 is restricted to the IIC Period and is seriated as the second-latest type. Comparisons are also found with a dish from level 15, Excavation 420 at Qala’at al-Bahrain, i.e. the City IIIF Period (Højlund 1987: fig. 671).
CHAPTER 6 POTTERY VESSELS: TYPOLOGICAL ANALYSIS

Type S29

S29 appears to be a very large handmade dish or shallow bowl; the rim may be rounded or slightly squared. An alternative function would be as a lid for large vessels such as S22 and S23, which are mainly, possibly exclusively, associated with the same chronological phase, and have comparable diameters.

The few occurrences of this type are entirely restricted to Pottery Period 4. Dishes or lids of this size are not reported from Qala’at al-Bahrain or Failaka.

<table>
<thead>
<tr>
<th>S29</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>100</td>
<td>100</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40–60</td>
<td>50</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Two of the bowl types have no particular chronological assignation, but S33 is a good marker of Pottery Period 2 while S33, overall the most frequent bowl type, declines steadily in importance over time. Interestingly, S33 was not recorded at Qala’at al-Bahrain North City Wall, though it is present at Barbar.

Type S30

S30 is a characteristic deep bowl or barrel-shaped jar. It is comparable to Qala’at al-Bahrain Type B22. It has a simple rim, rounded sides which are often thickened towards the rim, and usually a slightly closed form. The base is flat (see Fig. 7.4i). It is always handmade in Ware 5 and is never slipped. Occasionally, vertical wavy lines in red paint are found on the body (Heinz 1994: 294, Nr. 326), though this did not occur in the sampled pottery of this study.

At Saar, the frequency of S30 declines gradually in each phase (Fig. 6.3). Its equivalent, Type B2, is found at Qala’at al-Bahrain throughout Period II, slightly less frequently in Period IIc than in the earlier phases.

Lugs are present on some of Qala’at al-Bahrain examples (Q. al-B: figs. 142, 144), a feature not observed on the Saar vessels, while more of the North City Wall examples have surviving paint. Apart from this, the comparisons between the two sites are good, with the same shapes and decoration present (ibid. figs. 143, 651).

B22 at Qala’at al-Bahrain is in Ware 2 and ‘always yellow’, which equates to Ware 5. It does not appear to be present at Failaka.

Bowls

The following consist of handmade bowls of varying sizes. Two of these types, S30 and S31, are not easily described using conventional English terminology and might equally be classed as cups, or even jars.

These two varieties mirror types from Qala’at al-Bahrain. The two others however, S32 and S33, do not have exact equivalents at that site. The latter appears to be entirely absent at the North City Wall, while the former probably includes elements of more than one of Højlund and Andersen's types.

When taken as a class, the proportion of bowls in the assemblage falls steadily through time, particularly between Pottery Period 3 and 4. This may be in response to the rise in the quantity of special bowls/cups, just as the role of the jars S10 and S11 may have been taken over by the special jars.
Type S31
S31 is essentially the same as S30, but for the fact that the rim is slightly thickened or everted, often with an inward-sloping top. It is the same as Type B23 at Qala’at al-Bahrain. Like S30, it is entirely in Ware 5, unslipped and handmade.

This type is very rare and is associated only with Pottery Period 2 at Saar. Excellent parallels are found at the Qala’at al-Bahrain North City Wall (Q. al-B. 1: figs. 146, 147) where it is also restricted to Periods IIa–b.

Type S32
S32 is a handmade bowl with a simple rounded rim, slightly curved or straight sides and a diameter of between 15 and 30 cm. The form of the base is uncertain. It is found in Wares 1 and 2, and there is no decoration or slip.

S32 occurs in all phases at Saar, but peaks in Pottery Period 3.

Hejlund and Andersen’s Type B24 is a comparable bowl with a diameter of around 30 cm. It is associated only with the IIC Period at Qala’at al-Bahrain, and indeed is seriated as the latest type at that site (Q. al-B. 1: figs. 150, 702, 388). Additionally, the larger examples of Qala’at al-Bahrain Type 21 (a ‘simple rounded rim on a vertical shoulder’, with a diameter of 10–20 cm) would have been classified as S32 at Saar (for example, ibid. fig. 624). Type 19 at Failaka is also similar to S32 (Hejlund 1987: figs. 94–6). The best parallels, however, are probably at Karanah 1, in graves of the earlier phase (Velde 1998: fig. 2: 9–11).

Type S33
S33 is bowl with a drawn-out rim. The rim is always drawn outwards, and sometimes inwards too. The top of the rim may be either flat or convex. It has curved sides which are often vertical at the top. It probably has a simple flat base, though this is not certain. The diameter is typically around 30 cm. It is generally unslipped, and is often in the yellow Ware 5. When only a little of
the body is preserved, S33 can resemble tannur rims of Type S35. S33 is the commonest bowl at Saar, but decreases in frequency in each successive Pottery Period.

Some rims of Type 25 at Failaka are similar (Q. al-B. 1: figs. 107–9), though these are almost entirely wheel-made and some are decorated. Excellent parallels, however, are seen at the Barbar Temple in all phases (Mortensen 1986: fig. 45). It is therefore surprising that this type was not identified at the Qala’at al-Bahrain North City Wall excavations.

S33 is one of the clearest indicators of the difference between the assemblages of Saar and Qala’at al-Bahrain, as it is entirely absent from the latter site. While some other variations may be due to a slightly later element at Saar than at the Qala’at al-Bahrain North City Wall, S33’s appearance in Saar Pottery Periods 2 and 3 shows that the contemporary assemblages of the two sites possessed unmistakable differences.

Qala’at al-Bahrain North City Wall, though an example of their B47 would also have been included in S34 (Q. al-B. 1: fig. 630). At Saar this was found only in Pottery Period 2 contexts. Good parallels are found with B44 at Qala’at al-Bahrain (Q. al-B. 1: figs. 177–8, 602). B44 is found from Periods Ib to IIC, with decreasing frequency after IIA.

S33 is the commonest bowl at Saar, but decreases in frequency in each successive Pottery Period. Some rims of Type 25 at Failaka are similar (Q. al-B. 1: figs. 107–9), though these are almost entirely wheel-made and some are decorated. Excellent parallels, however, are seen at the Barbar Temple in all phases (Mortensen 1986: fig. 45). It is therefore surprising that this type was not identified at the Qala’at al-Bahrain North City Wall excavations.

S33 is one of the clearest indicators of the difference between the assemblages of Saar and Qala’at al-Bahrain, as it is entirely absent from the latter site. While some other variations may be due to a slightly later element at Saar than at the Qala’at al-Bahrain North City Wall, S33’s appearance in Saar Pottery Periods 2 and 3 shows that the contemporary assemblages of the two sites possessed unmistakable differences.

Tannurs

Tannur is the term used at Saar for an oven with a cylindrical pottery lining. The pottery lining consists of an open-ended cylinder, set into the ground or built into an installation. These are termed “bottomless cylinders” at Qala’at al-Bahrain and Failaka. They are almost invariably in a burnt and fragile condition, and heat has occasionally caused their thin sides to warp in the manner of kiln-wasters. This, perhaps, is what has given rise to the mistaken belief that there is evidence of pottery production at Saar (e.g. Grave et al. 1996, 186). The rims are also often distorted, either through manufacture or use, so diameters can be unreliable.

The types defined at Qala’at al-Bahrain were not followed exactly. The difference between B45 and S38 was hard to establish, and the former category was not used at Saar. Sometimes tannur rims could resemble the bowl rim S33 and even the large jar rim S22, but for their straight sides and signs of interior burning. Despite their utilitarian nature, tannurs were occasionally slipped.

Type S34 is similar to S34, but always lacks ridges and its rim is drawn more strongly outwards, and sometimes also inwards. It can sometimes resemble S33, a problem compounded by the fact that S35 is occasionally slipped around the rim, and found in Ware 5, a common ware for S33. The closest equivalent at Qala’at al-Bahrain is Type B47.

This is the most frequent of the tannur rims at Saar. It has good parallels with some, but not all, examples of B47 at the Qala’at al-Bahrain North City Wall (Q. al-B. 1: figs. 659, 703), which is found in Wares 1 and 2. It has no particular chronological association at either site, being common throughout Periods Ib and IIC. S35 can also be compared to bottomless cylinder rims of Type 38a and 38b at Failaka (Højlund 1987: figs.145–7).

Type S36

S36 is a large square tannur rim whose inner side is usually drawn inwards, and which has a flat top. It can resemble thick and exaggerated versions of Types S34 and S35. Diameters range from 28 to 32 cm. This type is rare and was not recorded in the sample, though some fragmentary examples may have been included in other types. Full statistics are therefore not available. It is, however, of chronological significance.
Parallels are not found at Qala’at al-Bahrain North City Wall, but excellent comparisons can be made with City II rims from level 15 at Qala’at al-Bahrain Excavation 420 (Højlund 1987: figs. 674, 675). This is further evidence that the last occupation at Saar extends later than that of the North City Wall.

**Type S37**

S37 is equivalent to B46, a ‘simple cut-off rim’, which may be from either the top or the bottom of a tannur. At Saar this type can be seen to decline in frequency during Pottery Periods 2 and 3, and it is not present during Pottery Period 4. It is relatively infrequent at Qala’at al-Bahrain North City Wall, where it occurs from Period Ib to IIc. The North City Wall examples match well those from Saar (Q. al-B. 1: figs. 179–82), though all Qala’at al-Bahrain ones are in Ware 1.

**Type S38**

S38 is the same as Qala’at al-Bahrain Type B48, a ‘coarsely worked lower rim to a bottomless cylinder’, and may thus be regarded as the base of Types S34–37. It is not always easy to distinguish it from S37. Its rarity is due to the facts that the buried bases of tannurs did not break off and become part of other archaeological deposits in the manner of tannur rims, and that tannurs tended to be left *in situ* by their excavators.

This type is rare and of little chronological significance. Good comparisons are found with B48 at Qala’at al-Bahrain, occurring in Wares 1 and 2 (Q. al-B. 1: figs. 631, 704).

The fact that the diameters of S38 tend to be smaller than those of the rims may indicate that the complete cylinders tapered towards the bottom; one example from Qala’at al-Bahrain does show a cylinder which is widest in the middle and tapers at the bottom (ibid. fig. 179).

### Table 1: Type S37

<table>
<thead>
<tr>
<th></th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>16</td>
<td>84</td>
<td>100</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>84</td>
<td>100</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rim diam.</td>
<td>18–60</td>
<td>46</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Table 2: Type S38

<table>
<thead>
<tr>
<th></th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No treatment</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rim diam.</td>
<td>26–30</td>
<td>28</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Special jars

This group comprises five varieties of painted, wheel-made or otherwise unusual jars. The three most common of these (S39–41) are also found at Qala‘at al-Bahrain, while the remaining two are not, but are very rare at Saar. The contribution of special jars increases considerably in Period 4, a reflection of the growing use of painted decoration and manufacture by wheel during Pottery Period 3. Without the preponderance in Pottery Period 2 of S39, the vessels with scored rims and rounded bottoms which are so characteristic of the Bahraini funerary assemblage, all special jar occurrences would have fallen into Pottery Period 3 at Saar.

The increasing use of special jars between Pottery Periods 2 and 3 is accompanied by a decline in rims of Type S10/S11 (Figs. 6.3 and 4). It is possible that vessels relating to the latter were being superseded by painted and/or wheel-made pottery in the tombs and settlements during the later part of the City II Period.

A further chronological observation is that the occurrence of painted and wheel-made jars at Saar (but not B73) is much more clearly confined to the late end of the sequence than at Qala‘at al-Bahrain North City Wall. At that site, wheel-made jars are found in the City IIb period (Saar Pottery Period 2). If the Saar sequence is to be preferred, a corollary to this observation is that many of the tombs around Dhabran and Abqa‘iq on the Saudi mainland date to the late City II Period, i.e. they are contemporary with Pottery Period 3 at Saar and Periods IIc and III at Qala‘at al-Bahrain.

Qala‘at al-Bahrain equivalents of S39 and S41 (B73 and B74 respectively) belong to Højlund and Andersen’s category of ‘special handmade’ pottery (Q, al-B., i: 96–7; 175–6). This distinction was not observed at Saar, and the rims were recorded as hand- or wheel-made as usual (see also p. 269).

Type S39

S39 is a very distinctive vessel with an oval or elongated body, a round base and a wide mouth. It corresponds exactly to Højlund and Andersen’s Type B73. Its most distinctive characteristic is the series of scored horizontal lines on the vertical outer side of the rim. No complete vessels were found at the settlement owing to the fragility of this type, but an estimated height of 15–20 cm is probable.

The majority of examples are in Ware 3, the rarest of the Barbar wares. Examples in Ware 2 are less common, while just one anomalous occurrence in Ware 5 was registered. This had a bright purplish slip that contrasted sharply with the yellow body. Another unusual rim, in Ware 2, appeared to be wheel-made. The occurrences in Ware 2 and manufacture by wheel are probably of chronological significance.

S39 was much more common at Saar during Pottery Period 2 than Pottery Period 3. At Qala‘at al-Bahrain, B73 (S39) rims are equally common in Periods IIb and IIc, though it is indicated that the distribution of body sherds implies that the vessel is more common during IIb (Q, al-B., i: 96, and figs. 221, 388).

Højlund and Andersen include B73 as one of the two Barbar types possibly inspired by a foreign prototype, in this case their Type M12 which they compare to Ur III vessels from the Nippur and Ur (Q, al-B., i: 96, 105).

Numerous examples of this type are known from Qala‘at al-Bahrain, and particularly from tombs in Bahrain, at Saar, Karanah 1, A‘ali and elsewhere (Velde 1998: fig. 2: 1–4, fig. 3: 1–8; Ibrahim 1982: figs. 33–5; Mughal 1983: fig. 18). At Failaka S39 and B73 equate to Type 17 (Højlund 1987: 32 and figs. 5, 470).

The presence of a wheel-made rim at Saar represents a Pottery Period 4 occurrence, probably post-dating the IIc levels at Qala‘at al-Bahrain North City Wall. At that site, all examples are hand-made, though perhaps with slow-turning on the rim (Q, al-B., i: 175). Slow-turning is also evident on many of the examples from the tombs at Saar and may also have been present on the settlement jars. Other comparable vessels from the Saar tombs, however, have wheel-made rims (i.e. on a fast wheel) attached to handmade bodies (Ibrahim 1982, 31). At Karanah 1, vessels from the earlier tombs had rims formed or re-shaped on a wheel; this is presumably from slow-turning like Qala‘at al-Bahrain examples. Some examples from the later Karanah tombs are entirely wheel-thrown, apart from the bases. Wheel-turned rims or entirely wheel-made vessels therefore appear to be a late development.

All of the B73 occurrences at Qala‘at al-Bahrain North City Wall are in Ware 3. All Saar Pottery Period 2 and 3 occurrences are also in Ware 3. Significantly, however, all those in Ware 2 at Saar fall into Pottery Period 4, a further indication of a date after the end of the North City Wall sequence.

The scoring on the rim may have a functional characteristic, in that it provides a suitable surface on which to fasten a cloth or leather top to the vessel. It may alternatively have provided purchase for being suspended rather than set on the ground. A related form with a cylindrical base (not found at Saar) has lugs for suspension (see, for example, Velde 1998: fig. 418).

S39 is strongly associated with graves on Bahrain. It is also one of the few types of Barbar pottery found outside the Central Gulf region (the Barbar material at Tell Abraq excepted), usually occurring in association with tombs, and found at Nud Ziba, Khatt, Shimal, Kalba and Munayi (de Cardi et al. 1994: 46; Kennet and Velde 1996: fig. 14; the other finds are unpublished). Its occurrence in such contexts, and usual manufacture in Ware 3, suggest that it or its contents were of high actual or symbolic value. It may have functioned as a storage container for a high-status liquid, or as a special kind of cup.
Type S40

S40 is a small to medium-sized wheel-made painted jar, generally with a simple rounded rim. It corresponds to Qala’at al-Bahrain Type B64. All examples are in a fine Ware 2, and nearly all bear paint in the form of horizontal black stripes. The outer surface is sometimes burnished. The single unpainted version is slightly unusual in that its slip is dark grey. It too may have originally borne paint.

The body shape is globular, sometimes flattened or carinated, as seen on an exceptionally small example (Fig. 7.6c). Although diameters are generally between 9 and 10 cm, this miniature version has a rim diameter of only 4 cm.

S40 is usually thin-walled and fragile, so although body sherds are relatively plentiful, complete or reconstructable vessels are rare; very often, it is indicated only by the presence of bases bearing striped decoration (see Fig. 7.6f).

Many parallels for S40 have rounded bottoms (see below), as may some of the Saar examples, given that the nature of round-bottomed bases is such that their presence is difficult to detect when broken. In such cases, S40 may be regarded as a wheel-made version of the handmade globular S11.

Several painted wheel-made body sherds depicting straight parallel lines, wavy lines, chevrons and opposed spirals may be from this type of vessel, but these may also relate to other types (see p. 264).

At Saar, S40 first appears in Pottery Period 3, with a sharp increase in frequency in Period 4. Most of the occurrences of B64 at Qala’at al-Bahrain are from the Ic Period, where three rims with horizontal stripes are illustrated (Q, al-B. t: figs. 204, 641, 689). It also occurs in Period IIb at Qala’at al-Bahrain.

Stripy jars with globular bodies and simple rims are also found at Failaka (Types 8 and 9, Højlund 1987: 25–7, figs. 55–6, 60–1). Type 8 is found in Failaka Periods 28 to 38.

The best parallels are from the tombs, which contain wheel-made globular round-based vessels with horizontal black lines and other characteristic Early Dilmun decoration (e.g. the hourglass motif, and wavy lines). These are known from the later phase at Karanah 1 and in the tumuli and burial complex at Saar (Velde 1998: fig. 3: 9–14; Mughal 1983: fig. 14; Ibrahim 1982: fig. 38: 4, 5).

The late Karanah 1 examples divide into two clear groups: one with globular bodies and round bases (Velde 1998: fig. 3: 9–14), and another with squat carinated bodies and ring-bases (ibid. fig. 3: 15–21). All are decorated with parallel horizontal lines. The first group (the globular jars) usually have additional wavy lines or other decoration.

Both types may have been present at Saar, included in Type S40. A wheel-made body sherd with spirals from a Pottery Period 4 context probably relates to the globular Karanah 1 group (Velde 1998: fig. 3: 9–10). The miniature carinated vessel (Fig. 7.6e) compares to the second Karanah 1 group. These parallels imply a very late date for the miniature vessel and the sherd with spirals.

Finally, various globular and carinated painted vessels from the Dhahran tumuli clearly relate to S40 (Zarins 1989: fig. 13).

<table>
<thead>
<tr>
<th>Type</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>S40</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>Slip only</td>
<td>0.00%</td>
<td>0.60%</td>
<td>1.80%</td>
<td>0.86%</td>
<td></td>
</tr>
</tbody>
</table>

Type S41

S41 is a small hole-mouthed vessel, usually bearing painted decoration, corresponding exactly to Højlund and Andersen’s Type B74. Plain examples have probably had their decoration eroded off. The body is globular, and a variety of simple rims are seen. Some or all had spouts attached (S41c), though no examples were recovered from Saar with spout, body and rim in one piece. Approximately two-thirds are handmade, with the rest appearing to be wheel-made. A few also occur in Ware 3, the special fine red ware which is otherwise entirely restricted to Type S39 and the very rare Types S52 and S43.

Two patterns dominate the decoration. In most instances (7 out of 11 decorated occurrences), decoration consists of a row of triangles with the apex upwards, hanging from a line below the rim. The triangles are mostly vertically hatched (5 out of 11; for example, S41a and b), and also cross-hatched (2 out of 11). Three out of eleven show concentric semicircles in panels separated by parallel vertical lines (S41c and d). One example shows pendant triangles with the apex of the triangle pointing downwards. In this case the triangles are actually cross-hatched, but the density of lines and the spreading of the paint makes them appear to be filled. There are no particular associations between the type of decoration and the method of manufacture or rim form.
S41 is a reliable marker of Pottery Period 3 at Saar, as B74 is of Period IIc at Qala’at al-Bahrain North City Wall. Like S40, it first appears in Pottery Period 3, but increases dramatically in frequency in Pottery Period 4, though it never amounts to more than 6% of the assemblage. S41 is a copy of a type of globular spouted vessel found in Southeast Arabia from the start of the Wadi Suq Period (ca. 2000 BC). Hojlund and Andersen note that B74 (S41), along with their Type B73 (S39), is one of only two Barbar types with definite foreign prototypes (Q. al-B. 1: 176).

The Southeast Arabian Wadi Suq version is extremely common in tombs of that area, and displays a much greater variety of decorative motifs than Type S41, both facts suggesting that the Bahraini version is a copy of the Wadi Suq vessel rather than vice versa.

Local comparanda, showing concentric semicircles and pendant hatched and cross-hatched triangles, are found in Period IIc at Qala’at al-Bahrain (Q. al-B. 1: figs. 222–4, 684). One of these has a spout. A good parallel for cross-hatched pendant triangles with the apex pointing downwards is also found there (ibid. fig. 693).

S41 is also found at Failaka (Højlund 1987: fig. 444), and some of the spouts of Failaka Type 41 may also be from such vessels.

The motif of concentric semicircles is very characteristic of the Wadi Suq assemblage (see, for example, Vogt and Franke-Vogt 1987: fig. 12: 16–18; Cleuziou 1989: pl. 31: 11). It also occurs on Barbar pottery other than S41 vessels, such as bowls and globular jars (e.g. Zarins 1989: fig. 14: 10). This probably reflects further Southeast Arabian influence. Hatched and cross-hatched triangles are also found on Southeast Arabian globular jars (Vogt and Franke-Vogt 1987: fig. 24: 2, 3).

Unlike Type S41 at Qala’at al-Bahrain, where all examples are ‘special handmade’, some of the Saar ones are completely wheel-made. Given that manufacture by wheel clearly becomes more common within the Barbar assemblage as time passes (Q. al-B. 1: fig. 391), this implies that elements of the Saar assemblage are later than Qala’at al-Bahrain North City Wall levels.

**Type S42**

S42 is a small to medium-sized jar with a very short neck, or no neck. In shape it closely resembles S41, but has been kept separate because it appears intentionally to lack decoration. Only two examples were found, both slipped and in Ware 2. The smaller (S42b) is certainly wheel-made, and the other is possibly wheel-made. The former is also unusual in that it has a dark grey or black slip.

S42 is very rare and only appears in Pottery Period 4. It may be a late wheel-made and unpainted development of S41, to which it is best compared within Qala’at al-Bahrain typology. A handmade Type 12 vessel from Failaka very closely matches the larger Saar example in both size and shape (Højlund 1987: fig. 67). Type 12 occurs in Periods 3b and 4a.

**Special bowls and cups**

This class of vessel increases in frequency with each successive Pottery Period at Saar, peaking at a respectable 5% of the assemblage (see Fig. 6.3). Like the special jars, the increase in frequency is most marked in Pottery Period 4, the final phase of the sequence.

The recording of these ten types (S44–53) proved problematic, as the gap between the pragmatic rim typology and a ‘true’ typology was very evident with these small bowls, cups and goblets. Only three types could easily be distinguished by rim alone during registration, all of which were very distinctive but very rare. These were S51–53.

Examination of all the evidence from Saar revealed the presence of at least seven other types of cup or small bowl. These could not usually be distinguished from each other in the sample, but clearly formed separate categories of vessel. These types are S44–50, of which only two (S44 and S45) could be securely identified at Qala’at al-Bahrain. The seven individual Type Codes proved unusable for the purposes of recording the sample, as the fragility of these vessels, coupled with the simple rim forms characteristic of all of them, meant that the overall vessel shape could not usually be distinguished.

Accordingly, three broad and highly artificial categories were used in the registration and analysis of these seven types. Even these are sometimes of doubtful validity, given the possibility of erosion removing paint and the difficulty in distinguishing handmade from wheel-made vessels. The three categories used for recording otherwise undifferentiated cups and small bowls are: **pntcup**, painted vessels, both wheel- and handmade; **wmdcup**, plain wheel-made vessels; and **plhcup**, plain handmade vessels. Their statistics are given below. The seven overlapping ‘true’ types within these three categories have been given normal Saar Type Codes and are discussed and illustrated individually, though statistics from the controlled sample are, of necessity, lacking.

### Table 6.1.2

<table>
<thead>
<tr>
<th>Type</th>
<th>Ware 1</th>
<th>Ware 2</th>
<th>Ware 3</th>
<th>Ware 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>S42</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Rim diam.</th>
<th>Mean</th>
<th>Height</th>
<th>Max diam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–18</td>
<td>14</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Type S42**

S42 is a small to medium-sized jar with a very short neck, or no neck. In shape it closely resembles S41, but has been kept separate because it appears intentionally to lack decoration. Only two examples were found, both slipped and in Ware 2. The smaller (S42b) is certainly wheel-made, and the other is possibly wheel-made. The former is also unusual in that it has a dark grey or black slip.

S42 is very rare and only appears in Pottery Period 4. It may be a late wheel-made and unpainted development of S41, to which it is best compared within Qala’at al-Bahrain typology. A handmade Type 12 vessel from Failaka very closely matches the larger Saar example in both size and shape (Højlund 1987: fig. 67). Type 12 occurs in Periods 3b and 4a.
PNTCUP
This comprises all painted cup or small bowl rims, excepting those relating to S30 (included in bowls, see above) and S51. Rims of S44, S47 and possibly S46 were probably the sole or major contributors to PNTCUP during registration of the sample.
All painted cups and bowls from the sample were in Ware 2, and most were also slipped.
Painted cups or small bowls are equally rare in all Pottery Periods at Saar, though marginally more common in Pottery Period 4. One Pottery Period 2 occurrence corresponds to a handmade, decorated Type S46. For comparative information relating to PNTCUP, see Types S44, S47 and S46 below.

WMDCUP
This includes all wheel-made unpainted cups and small bowls. Some are probably eroded or unpainted examples of S47, or perhaps of S44, and the wheel-made variety of S46.
WMDCUP is entirely restricted to Pottery Periods 3 and 4 at Saar, in accordance with the general observation that manufacture by wheel is characteristic of the later assemblage. There is a sharp increase between Pottery Periods 3 and 4.

PLHCUP
PLHCUP comprises plain handmade rims with a diameter below 15 cm, and may incorporate elements of the handmade goblet S45, as well as all of S50, and perhaps simple bowl rims comparable to Type B21 at Qala’a al-Bahrain. Some undecorated and handmade examples of the shallow bowl S46 may also be included.
Interestingly, despite the generalised nature of its criteria, PLHCUP is almost entirely restricted to Pottery Periods 3 and 4, especially 4, with just one occurring in a context seriated to Pottery Period 2. This suggests that small bowls or cups are a late development at Saar. The isolated early occurrence is from the same context (5567) as an isolated early occurrence of a painted bowl (of Type S46), though there is no other reason to suspect contamination of this occupation deposit.
Type S44
S44 corresponds to B62 at Qala’at al-Bahrain. It is a stemmed wheel-made goblet with a hemispherical bowl. The Saar examples were not slipped and had a diameter of 10 – 12 cm. They bore a line of triangles below the rim. On one example, the triangles are above a fine horizontal zigzag line (S44a), while on another the triangles are separated at one point by a vertical hourglass motif (S44b).

At Qala’at al-Bahrain this type is exclusively associated with Periods IIa – b. At least one example is also known from Failaka (Højlund 1987: fig. 80). Diagnostic examples from Saar were from outside the sample, though one was from a context with pottery comparable to that of Pottery Period 2 (3310). Although the distribution of \textit{pntcup} and \textit{wmdcup} suggests that manufacture by wheel and painted vessels are more characteristic of Pottery Period 3, S44 may therefore be associated with the earlier phase.

At Qala’at al-Bahrain, B62 is frequently found with caprid motifs (Q. al-B. 1: figs. 194 – 6, 633 – 5). Other finds from there and from tombs on Bahrain and the Saudi mainland show that a range of geometric motifs is also associated with such goblets, such as simple horizontal lines, hatched and cross-hatched panels and triangles, herring-bone patterns, hourglass motifs, circles and fronds (ibid. fig. 197 – 200; Rice 1985: pl. x; Ibrahim 1982: fig. 38: 1 – 2; During Caspers 1994: fig. 2; Zarins 1989: fig. 13: 6, 12, 18).

Similar imported goblets are present at Qala’at al-Bahrain North City Wall, which were identified as being ‘in the Eastern Tradition’ (see, for example, Q. al-B. 1: figs. 355 – 65). Some of the examples from the tombs may also be imports, and indeed the ware of one of the Saar settlement examples (S44b) was equivocal in this respect. Højlund and Andersen suggest that Qala’at al-Bahrain B62 goblets are imitations of imported foreign types (Q. al-B. 1: 94). During Caspers is more specific in this respect, and relates the Bahraini and Eastern Saudi goblets to the Murghabo-Bactrian archaeological complex of Central Asia (During Caspers 1992: 6 – 8). Imports and stylistic elements of this culture-complex can be seen spreading into the Southeast Iran, the Indo-Iranian borderlands and as far as Southeast Arabia from the late third millennium, and a similar presence in the Central Gulf is wholly feasible.

Type S45
This is a handmade stemmed hemispherical goblet. It is frequently crudely made, and may be considered a rough handmade version of S44. The illustrated example has a thick red-brown inner slip and a thinner exterior one, though a slip is absent from the other example. S45 is in Ware 2 at Saar, and has a diameter of 6 – 7 cm.

This type is associated with Period IIb at Qala’at al-Bahrain, where only two examples are found. It is equally rare at Saar, and the one example that can be ascribed to a phase is associated with Pottery Period 2.

The same type is found at the Barbar Temple in Phases IIa – b, also implying a City IIb date (Mortensen 1986: fig. 44).

Type S46
S46 is a small shallow bowl with a flat base. Its sides may flare or be slightly in-turned. It is usually handmade in Ware 2 and often decorated. A few are plain, however, and some appear to be wheel-made. The diameters range from 8 – 10 cm. Slips are usually found on the interior or on both sides. These slips can be brighter than is usual, and range from red to purple in colour.

Decoration consists of parallel black lines below the rim (S46a and b). In one case, this motif is accompanied by the frond pattern (S46c).

Plain examples include a rare wheel-made bowl (S46d), though handmade ones are more common (S46e, f).

Most bowls of Type S46 occur in Pottery Period 3, though at least one is from Pottery Period 2. Interestingly, the type appears to be absent from Qala’at al-Bahrain. This is not likely to be for entirely chronological reasons.

A number of similar bowls are found in the Dhahran tumuli, mostly with decoration consisting of parallel horizontal lines (Zarins 1989: fig. 14: 1 – 3, 7, 10, 13 – 15, 17 – 19, 22 – 3). Some of these have additional groups of vertical lines, and one shows concentric semicircles between groups of vertical lines, as often seen on Type S41 and on Wadi Suq pottery. The bases of the Dhahran bowls often differ from Saar Type S46 vessels, in that they can be rounded rather than flat. Additionally, some appear to be much larger than S46.

The parallel lines are a characteristic decoration for Barbar vessels. The frond motif is seen on a Bahraini goblet from Hamala North (During Caspers 1994: fig. 2) and on a Barbar sherd from Failaka (Højlund 1987: fig. 177). It is also common on contemporary ceramics in the Indus region (e.g. Rao 1965; fig. 88: Br1) and Wadi Suq pottery in Southeast Arabia, for example at Shimal (Vogt and Franke-Vogt 1987: fig. 13: 10).

Type S47
S47 is a small wheel-made beaker with curved sides and a slightly everted rim, often painted with black stripes. It is deeper than S46, and the diameter is around 10 cm. No complete examples exist from Saar, but several rims, both painted and plain, certainly belong to this type. The associated type of base is not known at Saar, but comparable vessels have both flat bases and ring bases (see below). Some of the Saar examples may possibly relate to rims of the goblet S44, though these tend not to be everted.

This variety probably accounts for the majority of \textit{pntcup} and \textit{wmdcup} occurrences at Saar. An example of a B63 beaker at Qala’at al-Bahrain North City Wall has comparable shape and decoration (Q. al-B. 1: fig. 201). Comparable vessels with both flat bases and ring-bases are seen in the later phase at Karanah 1 and in Tumulus 151 at Saar (Velde 1998: fig. 4: 1 – 4; Mughal 1983: fig. 19: 5, 8). It would therefore appear to be a late feature of the City II assemblage. Further comparisons can be made with vessels from the Dhahran tumuli, which show parallel horizontal lines, wavy lines and chevron decoration (Zarins 1989: fig. 14: 4 – 6).
Type S48
S48 is a spherical bowl with a simple, slightly everted rim and a rounded base. Two examples are known, one plain and one painted with a purple line (Killick et al. 1990: 128, fig. 20: 5). Neither is slipped, and both are handmade and in Ware 2. The two examples are of different sizes, with diameters of 5 and 15 cm and heights of 12 and 6 cm respectively.

The chronological associations of this vessel are not known. It is not reported from Qala’at al-Bahrain, though it may have been included in the category of B21, the simple bowl rim. There are no exact parallels from the Dilmun sphere, though the motif of a single, thick line below the rim is found in the Dhahran tumuli, on bowls and beakers akin to Types S46 and S47 (Zarins et al. 1984: pl. 36: 01, pl. 49: 1, 3).

Similarly shaped globular bowls or cups are known from the Wadi Suq assemblage in Southeast Arabia (e.g. Donaldson 1984: fig. 6: 45; de Cardi 1988: fig. 7: 55), though the form is too simple necessarily to imply Southeast Arabian influence on the Barbar assemblage, or vice versa.

Type S49
S49 is an open bowl with S-shaped sides. It is shallower than S47 and was not observed with paint. It has a diameter of 12–14 cm and is slipped and sometimes, probably always, wheel-made. One example is in Ware 5. The one occurrence with a complete profile has a ring-base.

Again, this is not present at Qala’at al-Bahrain, and is very rare at Saar. Parallels are also absent from Failaka.

Excellent parallels, however, are seen at Karanah 1, in the later group of graves (Velde 1998: fig. 4–8, especially 6, 7). Velde considers these vessels to belong to the latest part of the IIc phase at Karanah (ibid. 255), as they are associated with plastered collective burials. This would associate them with the IIc phase at Qala’at al-Bahrain Excavation 420 or Period 3 at Failaka.

Good parallels are also found in the Saar burial complex (Mughal 1983: fig. 19: 10, 13), one with a ring-base, and the other with a flat or shallow rounded base.

Type S50
S50 consists of all those undecorated, handmade cups or bowls with diameters less than 15 cm and which do not fall into any of the above categories. Some are clearly deep bowls or beakers. Others may belong to some of the above categories, but lack the diagnostic features to enable categorisation.

Some of these might equate to Qala’at al-Bahrain Type B24, the simple rounded bowl rim. This occurs only in Periods IIa and IIb at Qala’at al-Bahrain, however, while the Saar occurrences of small, plain handmade bowls are almost exclusively in the IIc Period (see plhcup above). Type 19 at Failaka includes some deep bowls or beakers similar to the Saar examples illustrated here (Højlund 1987: figs. 94–6); it occurs in Failaka 28 (ibid. fig. 455).

A tomb from the earlier group at Karanah 1 contains a small simple cup comparable to S50a. (Velde 1998: fig. 2: 7).

Type S51
S51 is a decorated beaker with thin walls. The nearest equivalent at Qala’at al-Bahrain is B63. S51 is wheel-made and in Ware 2. The largest sherd found of this type is painted with a bearded human figure. No whole examples were found, so the complete shape is unknown, though parallels from Qala’at al-Bahrain suggest it has a flat base.

S51 is seriated as the latest of the Saar types, and two of the three occurrences of B63 at Qala’at al-Bahrain are from Period IIc, the other being from IIb.

One example from Qala’at al-Bahrain is painted with horizontal stripes, perhaps suggesting an affinity with S47 rather than S51. A closer comparison for the bearded figure is found on a sherd from Failaka (Højlund 1987: fig. 478) which depicts a row of standing human figures. Other parallels for the bearded figure are found in the iconography of Dilmun seals (see, for example, Mughal 1983: fig. 23: 3).
**Type S52**

S52 is a vertical-walled handmade bowl in the special Ware 3. The rim is rounded and slightly thickened or extended outwards. One example is slightly inturned below the rim. The type is associated with rare body sherds in Ware 3 which show a carination, so as to suggest a lenticular shape or a broad rounded base. These rims were small or distorted, so their angle is uncertain and their diameters are unreliable. The example from the sample was not slipped. Another, however, showed a grey slip.

Two examples were recorded, of which only one was from a fully sampled context (4138, Pottery Period 2). Bahraini parallels are lacking, though there is a coincidental resemblance to Type B12 at the North City Wall of Qala'at al-Bahrain (Q. al-B. 1: fig. 123). B12, however, is in a very different ware and is restricted to Period I at Qala'at al-Bahrain. There is also a probably coincidental resemblance to late third millennium ledge-rim bowls from Southeast Arabia (e.g. Cleuziou 1989: pl. 30: 5).

It is possible that S52 rims are from a type of wide bowl, of which one complete example has been found at Saar (see Fig. 7.4). The bowl has not been examined by the author, so this remains speculative.

**Type S53**

Type S53 comprises two imitation softstone bowls, decorated with the dot-in-circle motif, in local pottery wares. One imitation is remarkably accurate (S53a). It is in Ware 2, is carefully smoothed, incised with dots in double-circles, slipped in grey and fired to give the impression of carved softstone. It cannot be ascertained whether it was wheel-made or handmade. Another example (S53b) is extremely crudely made in Ware 1, with two rows of circles punched below the rim.

S53 is very rare, and therefore did not appear in the seriation. The one example from the sample (S53a) occurs in a Pottery Period 3 context. It is best compared to softstone vessels from tombs at Saar (e.g. Ibrahim 1982: fig. 45: 2; Mughal 1983: fig. 24: 2). The style is in the tradition of Southeast Arabian third-millennium Umm an-Nar style softstone, but it seems that this style persists into the second millennium in Bahrain, perhaps indicating local production of both softstone vessels and ceramic copies.

**Bases**

Bases were recorded, using Base eve measurements, according to Qala'at al-Bahrain typology. They were not usually found to have any notable chronological or diagnostic characteristics, and will not be dealt with in detail here.

All of Højlund and Andersen's base types (B36–43, see Q. al-B. 1: 36–7) were observed at Saar, except for B37, a base showing chain-ridges.

New codes were not assigned to the Saar bases, and they are presented here under Højlund and Andersen's 1994: typology. In brief, Base Types may be summarised as follows:

- **B36**: a 'ring-base with a smooth belly', i.e. without ridges above it. The ring is not pronounced in Period II.
- **B38**: a 'ring-base with a ridged belly' (see, for example, the base of Fig. 7.2b).
- **B39**: a 'ring-base to plate of Type B30', i.e. Saar Type S26.
- **B40**: a 'marked base with a transition between belly and base that may be quite similar to ring-bases of Types B36–38, but which lacks the internal delimitation of the ring' (see, for example, Fig. 7.6a).
- **B41**: a 'large marked base that may have a bung-hole' (see Heinz 1994: Nr. 274).
- **B42**: a 'simple flattened base to yellow jars of Type B22', i.e. S30 (see, for example, Fig. 7.4i, h).
- **B43**: a 'simple flattened base' to vessels other than B22, i.e. S30 (see, for example, Fig. 7.3a).
To these can be added the rounded base, which cannot be detected or quantified other than in complete vessels. Associated as it is with the cooking pots, this would actually have been the most common type in the assemblage.

In practice it proved difficult to separate B36 (‘ring-base with smooth belly’) from B40 (similar to B36 but lacking the internal delimitation of the ring). B42 (base to the dish Type S26) could not always be distinguished from B36 and B40, while B43 (a simple flattened base) and B44 (a simple flattened base to Type S30) were also hard to tell apart. B41, however, the marked base which may have a bung-hole and relates to Type S20a, was easy to identify. It was sometimes found blocked with plaster.

Nearly all the cylindrical bases identified by Heinz (1994: figs. 264–72) are in fact rims, mainly of Type B3. The exceptions are one or two B41 bases (i.e. Nr. 274, and maybe 273).

Miscellaneous types, features and sherds

A variety of body sherds in the Saar assemblage display special characteristics. These include handmade sherds with chain-ridges, a feature that is mainly diagnostic of Periods I and IIa at Qala’at al-Bahrain, but which is also found in IIb. Such ridges are given the Type Codes B55a and B55b at Qala’at al-Bahrain, the two being distinguished by the height of the finger impressions. B55a, which is generally the earlier type, has impressions of over 1 cm in height, while those of B55b are under 1 cm.

Both varieties appear in Period IIb at Qala’at al-Bahrain, with B55b featuring regularly in the early part of that phase, and B55a being largely absent but having two slightly later occurrences (Q. al-B. 1: fig. 388). Neither are found in Period IIc. At Saar, both types are found (Heinz 1994: Nr. 284–8; Nr. 289–90). Chain-ridges only occurred twice in the sample, one in each variety, and both within Pottery Period 2 (contexts 4037 and 4040).

Other sherds at Saar showed ridging characteristic of Qala’at al-Bahrain Type B75, whereby vertical, diagonal and horizontal ridges are combined, possibly to give the impression of string tied around the neck (Q. al-B. 1: fig. 98, 177). At Saar this feature is associated with Pottery Period 2, while at Qala’at al-Bahrain it is found in Periods IIa and IIb. Højlund and Andersen also note the presence of incised ‘palm-branch’ motifs on ridged shoulders at the North City Wall (ibid. fig. 230). This is also seen at Saar, and appears to be an incised version of Type B75 rather than a copy of the palm-branch motif sometimes seen on painted vessels or inscribed on rims (see below).

A few sherds showed decoration made by impressing the ends of date-stones into the wet clay. The impressions are usually found in lines around the shoulder, occasionally on ridges, and in one case on the flat top of a rim (Heinz 1994: Nr. 317–19). This is also reported from Qala’at al-Bahrain where it appears to occur in both Periods IIb and IIc (Q. al-B. 1: 99 and fig. 237). Unfortunately this rare feature did not occur in the sampled material at Saar.

Inscribed motifs, perhaps potters’ marks, are also occasionally found at Saar: there is an inscribed square on the side of a Type B3 vessel (Heinz 1994: Nr. 480), the rim of a large ridged storage jar with an arrow mark (3514:17), and the rim fragment of a cooking pot with a parallelogram (3022:01). At Failaka, a variety of simple geometric motifs are found on the shoulders or rims of Barbar vessels, sometimes on the large jar rim Type 28 (which equals S23). These include squares, an arrow-shape in a square and the palm-branch motif (Højlund 1987: figs. 114–16, 712).

At Qala’at al-Bahrain, hand and wheel-made painted body sherds were also recorded with their own Type Codes (B61, B72). This practice was also followed at Saar where both were found to be overwhelmingly associated with Pottery Periods 3 and 4, especially the latter. In the case of the handmade Barbar sherds, decoration consisted of parallel horizontal black stripes. In the case of the wheel-made Barbar sherds, identical stripes were the most common decoration, a series of chevrons was noted on some (Heinz 1994: Nr. 367), and on others a wavy line was found with parallel lines (ibid. Nr. 372, 386). One important wheel-made body sherd, from Pottery Period 4, has a pair of spirals. This motif is found on wheel-made globular jars from the later phase of the Karanah 1 cemetery (Velde 1998: fig. 3: 9–10). It is not reported from the North City Wall at Qala’at al-Bahrain, though crude spirals are seen on pottery at Failaka as early as Period 2a (Højlund 1987: figs. 173, 500). The Karanah parallels suggest a late affinity for the Saar sherd, i.e. post-dating the North City Wall IIc occupation, or a City IIIf date.

It is worth noting that scored horizontal lines or ‘rippling’ on the shoulder were not noted on the Saar pottery, though these features are found at Qala’at al-Bahrain (Type B71) and Failaka (Types 47, 48) (Q. al-B. 1: 95 and fig. 642; Højlund 1987: figs. 169, 44, 45, 50). This is interesting because such decoration is seriated to the IIb and IIc Periods at Qala’at al-Bahrain North City Wall and thus would be expected to be found at Saar. On the other hand, ripped shoulders are strongly associated with wheel-made jars in Phase III, from Qala’at al-Bahrain Excavation 420 (Højlund 1987: 154), while vessels with ripped shoulders are found in the late phase at Karanah 1 (Velde 1998: 225 and figs. 14, 16). Thus, rippling may be chiefly a very late City II phenomenon, and its absence from Saar may for chronological reasons.

Imported ceramics

Indus-related pottery

The commonest variety of imported pottery at Saar relates to the Late Harappan horizon, sometimes referred to as the ‘Post-Urban’ or ‘Post-Mature’ Harappan. In particular, it relates to the Late Sorath Harappan, a ceramic facies found in the region of Saurashtra, Gujarat (Possehl and Herman 1990; Possehl and Mehta 1994). The best comparisons for the Saar material are consistently with Lothal Period B (ca. 2000–1800 BC) and Rojdi Period C (2000–1700 BC), with other parallels from Rangpur Period III B–C (1900–1500 BC).

Most of the vessels are large storage jars, frequently decorated. Unless otherwise specified below, they have a fine, reddish, dense, well-levigated and well-fired paste; small quantities of mica are also sometimes present. All are wheel-made. Of the parallels given below, the authors categorise those from Rojdi as ‘Sorath Harappan Fine Red Ware’, but the others are given more generic descriptions.

A fragmentary vessel from Bldg 225, Area 319 has a red-brown slip and eroded black paint (d). An exact comparison for the decoration was not found, but good formal parallels are present at Bhokli Dhar in Saurashtra (assigned to Rangpur IIB–C and III), as well as at Rojdi C and Lothal B (Possell and Raval 1989: fig. 16; 18; Possell and Raval 1989: fig. 71; Rao 1985: fig. 266b).

Excellent parallels for the shape and decoration of a similar jar (e), found in Area 63 of Bldg 53, can be found at Rojdi C (Possell and Raval 1989: figs. 70, 72). In the former, two black bands are also found at the shoulder below a red-slipped area and above an unslipped panel area with curved lines. In the latter, the rim form and slipped and unslipped panels match the Saar sherd, though the painted decoration does not. The combination of slipped and unslipped panels with wavy line decoration is also found at Lothal B (Rao 1985: fig. 90: B36). The jar rim illustrated as (l) may also come from this vessel.
Indus-related pottery (all at 1:5)
The same parallels may be applied to (j), from context K17:001, Bldg 53, Area 52, and to (k) (context K17:012, Bldg 52, Area 53). These are probably from a single vessel, despite apparent differences in the decoration and the fact that they were found in collapse levels of separate but adjoining houses. They have a thick, dark streaky slip, and (j) has a black line below an unslipped band beneath the rim. The colour of the slip ranges from red-brown through to purplish grey. The slip of (k) appears to extend up to the rim, with no painted line. On both, the bands of slip on the top of the rim are due to wear on a slightly polygonal surface rather than a feature of the original design.

Several other large vessels have parallels at Lothal, Rojdi and other Saurashtran sites. A rim with a straight neck (h), from context F17:001, Bldg 14, Area 11, has good parallels from two sites in Saurashtra dated to the Rangpur IIB–C phase, from Lothal B and from Rojdi C (Possehl 1980: fig. 18: 14, fig. 16: 9; Rao 1985: fig. 84; 266c; Possehl and Raval 1989: fig. 52: 17). The rim illustrated as (m), from context 2535, Bldg 51, Area 56, has a red-brown slip. Its shape can be compared to a buff-slipped vessel from Lothal B and to a sherd from Rajpipla VI, a Saurashtran site assigned to the Rangpur IIB–C phases (Rao 1985: fig. 84: 266; Possehl 1980: fig. 35: 2). The fabric is unusual, with a moderate quantity of large subangular red grits, and a body sherd in the same fabric has Jhukar parallels (see below). The rim form of (i) (context L17:001, Bldg 53, Area 51), which has a red-brown slip, finds further parallels at Lothal B and Rojdi C (Rao 1985: fig. 84: 266b; Possehl and Raval 1989: fig. 52: 10).

Several decorated body sherds underline Saar’s Late Harappan connections. The pattern of parallel vertical wavy lines meeting a straight line at right-angles, in black paint on a red slip, is seen on (f) (Bldg 225, Area 318). This design is common at Lothal B and other Saurashtran sites (see, for example, Rao 1985: fig. 91: B64–74; Possehl 1980: fig. 32: 4; Possehl and Raval 1989: fig. 52: 15). The same pattern features on a shoulder sherd, along with a wing-like motif (e) (from Bldg 51, Area 55). Again, the best parallel is with Lothal B (Rao 1985: fig. 93: B108). This sherd is from a Pottery Period 4 context. A previously published sherd from the same context bears a palmfront motif and a hatched hourglass pattern, and may also be Indus-related (Killick et al. 1991: fig. 20:8). A line of eye-like motifs between multiple parallel lines (a), from Bldg 53, Area 61, is found at Lothal B as well as at Nageswar (Rao 1985: fig. 94: B36, B357; Hegde et al. 1990: fig. D.II.3: 66).

Another sherd at Saar (b), from Bldg 9, Area 31, has a more complex combination of motifs and may be slightly earlier in date. The combination of straight and wavy lines at the top has an approximate parallel at Lothal, in Period A, where the palm-leaf motif is also found (Rao 1985: fig. 74: A2 and A20). A broad comparison may also be made, however, with a Jhukar sherd from Chanhu-Daro (Mackay 1943: pl. xliii: 22) which shares the combination of straight and wavy parallel lines and hatching, so a Late Harappan origin remains possible.

Most of the Indus-related pottery at Saar therefore suggests contacts with Late Harappan Gujarat, but there are a few indications of connections with the northerly Late Harappan complexes. A body-sherd (o) also has its closest decorative parallels within the Jhukar assemblage at Chanhu Daro (e.g. Mackay 1943: pl. xliii: 24, pl. xliv: 9–13); there is also a good parallel from Mohenjo Daro, Late Phase B (Dales and Kenoyer 1986: fig. 86: 5). Although similar patterns are also found at Lothal Period B (Rao 1985: fig. 93: B112, B113), the fabric of this sherd is unlike that of the typical Sorath Harappan pottery from Saar, being the same as that of (m).

Five of the 14 sherds discussed above occur in Bldg 53 (Areas 51, 52, 61, 63 and 87). They represent between 4 and 6 vessels, and amount to 1.6% of the house’s total assemblage. This is a significant concentration and there is no notable clustering elsewhere, though pairs are found in Bldg 51 (Areas 53, 56), Bldg 235 (Areas 318, 319) and Bldg 14 (Areas 11, 13). The strong association with Bldg 53 may indicate a specialized function for that building (see p. 271).

Chronologically, the Indus-related pottery of the sampled Saar assemblage is divided between Pottery Periods 2 and 3, amounting to 0.23% and 0.3% of the total respectively. It is effectively absent from Pottery Period 4, except for a couple of body sherds from Bldg 51.

**Probable Indo-Iranian pottery**

Two decorated beakers may have Indo-Iranian affinities. Neither occurred within the seriated sequence. Both can be broadly compared to Qala’at al-Bahrain Types E8 (painted beakers with Sorath Harappan parallels) and E9 (a miscellaneous category of painted beakers and other vessels with Eastern affinities). The two rims from Saar are also similar to Saar Type S44 (Type B62), which may have had a foreign derivation (see p. 259). Indeed, the fabric description of (a), which was not seen by the author, is compatible with Saar Ware 3, though other painted beakers in that fabric are unknown at Saar and Qala’at al-Bahrain. It is more likely to be an imported vessel. Lines of diamonds are common on Indo-Iranian vessels, usually cross-hatched rather than entirely infilled (see, for example, Possehl 1986: fig. xiii: MehI 1.1.1.4; de Cardi 1983: fig. 8: 1). Chevrons below the rim are also found in Indo-Iranian assemblages (see Possehl 1986: fig. xiii: MehI 7), though not bisected with a horizontal line. Part of a palm motif is present on (a), a common pattern on Harappan and Indo-Iranian vessels. This vessel may either be from the Indus region, perhaps another Sorath Harappan import, or from the Indo-Iranian borderlands.

The fragmentary beaker (b) is in a fine grey ware, with darker grey paint. A good Indo-Iranian parallel for the shape and the pattern of two horizontal lines at the rim above a motif of diamonds in reserve decoration is found on a beaker at Kulli (Possehl 1986: fig. xv: V.v.4), though this is in a red sand-tempered ware.
Mesopotamian pottery

Very little Mesopotamian pottery is found at Saar. It is best compared to Ur III and Isin-Larsa material from Tell ed-Der and Nippur, as well as to Mesopotamian material found at Qala‘at al-Bahrain. The fabrics are fine and pale, with very fine grit or sand inclusions, sometimes fine vegetal temper, and a chalky feel.

The rim of a long-necked jar (a) was found in a Pottery Period 2 context (4041, Bldg 208). It is comparable to vessels from Sondage A at Tell ed-Der (de Meyer et al. 1971: pl. 22: 4–6; de Meyer 1984: pl. 19: 2, 3). The latter parallel is ascribed to Ensemble II at Tell ed-Der, roughly corresponding to the Isin-Larsa Period. Parallels with elongated oval jars are also found in the Scribal Quarter at Nippur (McCown and Haines 1967: pl. 87: 1, 2; pl. 96: 12). The former is from an Isin-Larsa level, and is assigned to Type 19A which has a range from the late Ur III to the Isin-Larsa Periods. The latter is of a type derived from Type 19A, and its level is assigned to the Old Babylonian Period.

The simple everted jar rim (b) from context 7503 is comparable to those from Tell ed-Der and the Scribal Quarter at Nippur. Its parallels appear to be slightly earlier than those of the sherd described above, dating to the Ur III Period. Parallels at Tell ed-Der are ascribed to Ensemble IV, which falls into the last century of the third millennium (de Meyer 1984: pl. 8: 9–11). At Nippur, the same rim form is found on jars with sharp ridges below the rim, also ascribed to the Ur III Period (McCown and Haines 1967: pl. 85: 1–2). Additionally, Type M8 at Qala‘at al-Bahrain shares this type of rim (Q. al-B. 1: fig. 253); M8 is found from Period Ia to the beginning of Ib, also suggesting a date in the last century of the third or the very beginning of the second millennium.

A third example, a bowl with an indentation below a rim with a flattened top (c) (context 4019, Bldg 205) appears to be in a Mesopotamian fabric. It too belongs to Pottery Period 2, and its closest parallels are at Tell ed-Der, Ensemble III which dates to the end of the third millennium and the very beginning of the second (Meyer 1980: pl. 11: 1–6).

Mesopotamian pottery is all associated with Pottery Period 2, comprising 0.11% of that assemblage.

Southeast Arabian pottery

Pottery from Southeast Arabia is very rare at Saar. Occasional fragments of small decorated Umm an-Nar Period jars are present. Such vessels are found in late third millennium tombs on Bahrain and in Saudi Arabia. Umm an-Nar pottery is common in the early periods at Qala‘at al-Bahrain, with almost 500 sherds identified from the QB I strata, and a small handful from the QB IIa levels (Q. al-B. 1: 111–17 and fig. 388). The Saar examples are too fragmentary to draw realistic comparisons with Southeast Arabian material. The one illustrated here (a) is from the sounding in the temple and relates to the largely unexcavated Pottery Period 1 at Saar.

Three sherds are comparable to Southeast Arabian Wadi Suq Period pottery. That shown as (b) is a medium-sized jar with a typical Wadi Suq fabric, with a light brown exterior, light grey core, medium-fine vegetal temper and a soft, porous paste. It is wheel-made, with traces of a thin red-brown slip. The fabric is somewhat laminated, which also occurs in Wadi Suq pottery, albeit rarely. Its shape can be compared to several second millennium vessels from Tell Abraq, UAE (Potts 1990b: fig. 82: 6, 8, 87: 3, fig. 94: 10, fig. 97: 8, 97: 7).

Another medium-sized jar (c) comes from a Pottery Period 4 context, 2642, in Bldg 53. It too has a typical Wadi Suq fabric, being wheel-made, pale brown and with medium vegetal temper, this time with white flecks. The surfaces are eroded, but it appears to have traces of black paint. It is comparable to plain and painted vessels from Tell Abraq and Kalba (Potts 1990b: fig. 81: 2; Potts 1991: fig. 39: 3, fig. 46: 2, 4; Carter 1997: fig. 22: 10).

The identification of (d) from context 4332 is less certain. It was found at the surface above Bldg 7. It is a body sherd with a caprid in black paint, on a fine, light brown fabric. No slip is visible. It shares the same fabric as another published sherd from Saar which depicts two pairs of black painted legs in an unslipped area above a red-slipped panel (Killick et al. 1991: fig. 20: 2), and may be from the same vessel. The fabric is compatible with Wadi Suq fine ware ceramics. Zoomorphic designs are known in the Wadi Suq assemblage (e.g. Frifelt 1975: fig. 20b). The closest parallel is with a sherd from Khatt (de Cardi et al. 1994: fig. 6: 11) which depicts a caprid in similar pose. It is possible, however, that the two sherds from Saar are in fact Indo-Iranian. Horned caprids are a common motif on pottery from Bampur (e.g. de Cardi 1970: fig. 30: 22, 39), but date to the third millennium.

These sherds comprise the only imported Wadi Suq pottery known from Bahrain. It is not reported from Qala‘at al-Bahrain. It occurs late and infrequently in the sampled sequence at Saar, representing 0.3% of the Pottery Period 4 assemblage. The majority of the parallels from Tell Abraq fall into the Middle Wadi Suq
Period, as defined by Velde (1992), which begins some time after 1900 BC and continues to between 1600 and 1500 BC.

**Miscellaneous non-Barbar pottery**

Three sherds were not part of the Barbar tradition and their origin could not be ascertained. A context outside the sample (7508), but with ceramics comparable to Pottery Period 2, produced the sherd shown as (a). It is handmade in a soft, coarse red-brown fabric, and has a low ridge with diagonal rows of small indentations, giving a rope-like appearance. The fabric contained frequent small flat subangular grits or platelets. These distinctive inclusions are associated with pottery originating in Ras al-Khaimah in Southeast Arabia, but not before the Early Iron Age. Although the fabric of this vessel most closely resembles that of the Southeast Arabian Iron I Period, the indented ridge has no parallels from that area, and this vessel was stratified with material from early second millennium. The rim shape is similar to that of Late Wadi Suq jars (also known as 'Late Bronze Age') (e.g. Velde 1992: taf. 39; Carter 1997: figs. 31: 4, 31: 5), but this fabric is not associated with that period, which is also later in date than the Saar assemblage. The indented ridge has loose parallels at Qala‘at al-Bahrain where ridges with diagonal slashes are found (Type B38), but only during the third millennium QB Ia and Ib Periods (Q.al-B. 1: figs. 189, 412, 476, 388). This vessel may either be an aberrant Southeast Arabian vessel relating to the Wadi Suq Period, or perhaps an intrusive later element. Alternatively, it may be an Iranian vessel, as similar geology is found on both sides of the Straits of Hormuz.

The other two examples, (b) and (c), share a hard, fine, pale brown fabric with no visible temper. They appear to be handmade with a highly smoothed or burnished exterior surface. Their simple shape is reminiscent of Kassite pottery, though their fabric is not. One was found in a context from Bldg 53 assigned to Pottery Period 2, and the other was from outside the sample.

**Discussion of imported pottery**

The first observation regarding imported pottery at Saar is its scarcity when compared with the assemblage at Qala‘at al-Bahrain North City Wall. When added together, imported pottery at Saar represents 0.43%, 0.3% and 0.33% of the Pottery Period 2, 3 and 4 assemblages respectively. Because it is so rare, the fractional variation between these percentages is meaningless, but the consistent contribution of less than half a percent to the assemblage is significant. At Qala‘at al-Bahrain, imported pottery is around four times more frequent, accounting for 3% and 1.5% of QB IIb and IIc respectively (see Q.al-B. 1: fig. 390). This reflects Saar’s rural setting, in contrast to the cosmopolitan, urban status of Qala‘at al-Bahrain.

Secondly, Indus-related pottery is the commonest of imported types, with at least 7 separate vessels identifiable in total, compared to 1 Mesopotamian, 1 or 2 Indo-Iranian, and 2 or 3 Wadi Suq vessels. This underlines Bahrain’s second millennium orientation towards the Late Harappan centres in Saurashtra, Gujarat. This is also indicated at Qala‘at al-Bahrain where pottery ‘in the Eastern Tradition’ becomes quantitatively more significant than Mesopotamian pottery during QB IIb and IIc.

The Qala‘at al-Bahrain assemblage shows a progressive reduction in the quantity of imported wares through time. At Saar imported pottery is too rare to determine whether this was also the case. None the less, it may be observed that Mesopotamian ware is associated only with Pottery Period 2 and corresponds to the Ur III and/or Isin-Larsa Periods, implying that Pottery Period 2 ended around or before 1900 BC. At Qala‘at al-Bahrain, Mesopotamian pottery becomes scarce after the start of the second millennium, peaking at 19% during QB Ib and falling to 6% by QB IIa. By the second millennium, it drops to 0.8% and 0.4% in the QB IIb and IIc Periods respectively (Q.al-B. 1: fig. 390). The rapid fall-off at Qala‘at al-Bahrain at the turn of the millennium and the absence from Saar after Pottery Period 2 is due to the establishment of Failaka as Dilmun’s major locus of exchange with southern Mesopotamia.

Indus-related material at Saar is associated with Pottery Periods 2 and 3, and shows trading connections with the Late Sorath Harappan centres in Saurashtra, Gujarat. It is effectively absent from Pottery Period 4, implying that contacts between Saar and Saurashtra lapsed during or at the close of Pottery Period 3 (i.e. QB IIc). This may reflect the decline of the Late Harappan complex, a process probably contemporary with and intimately linked to the cessation of trading relations with Bahrain. If so, Pottery Period 3 may have ended as late as 1700 BC when Rojdi C terminated (Possehl and Raval 1989: 171), though an earlier end-point is more probable (see p. 277). At Qala‘at al-Bahrain, 23 sherds from the QB II Period are assigned to Types E7 (Jhukar Ware) and E8 (Sorath Harappan ware). The latter is present only in QB IIc (Q.al-B. 1: figs. 389 and 390). This broadly complements the evidence from Saar, though the absence of post-QB IIc levels at the North City Wall means that the disappearance of Sorath Harappan material towards the end of the Early Dilmun Period cannot be confirmed there.

The small quantities of Wadi Suq pottery relate to Pottery Period 4. Its rarity diminishes the significance of its absence from Pottery Period 3, especially given that Wadi Suq decorative elements were known to the inhabitants of Bahrain by QB IIc, contemporary with Pottery Period 3 at Saar. The tentative associations with Velde’s Middle Wadi Suq merely imply a date after 1900 and before 1600/1500 BC. The occurrence of these sherds at Saar is compatible with what is known from Tell Abra, UAE,
where contacts with Bahrain during the late third millennium and
the first part of the second are demonstrated by the presence
of Barbar sherds during the Early and Middle Wadi Suq phases
(Velde 1992: 95).

Wares, manufacture and surface treatments

Wares

Four wares were defined within the native Barbar pottery tradi-
tion. These largely follow the divisions defined by Højlund and
Andersen at Qala‘at al-Bahrain, North City Wall (Q. al-B. 1: 101).
Three of the same codes for the Qala‘at al-Bahrain series are used
(Wares 1, 2 and 3). Ware 4, a calcite-tempered ware present at
Qala‘at al-Bahrain during the third millennium, was not identified
during this analysis and is not used in this report.

Højlund and Andersen’s divisions were considered to be more
meaningful than Heinz’s (1994) ware classification, which was
over-detailed and heavily reliant on minor differences in colour,
producing numerous meaningless distinctions resulting from the
ancient potters’ frequently inconsistent approach to clay prepara-
tion and firing. Heinz failed to single out the most distinctive
Barbar ware (Ware 3), which is used only for special vessels and
in which the clay is carefully levigated and deliberately coloured
with a red mineral. On the other hand, Heinz’s Waregruppe V
has been accepted as a valid category, and corresponds to Ware 5 in
this report. This is a yellow ware associated with dishes and certain
bowls. Højlund and Andersen did not make a separate category
for this ware, including yellow fabrics mainly in their Ware 2, but
sometimes in their Ware 1. The wares are defined as follows.

Ware 1

Saar Ware 1 corresponds to Ware 1 at Qala‘at al-Bahrain. Its in-
cclusions consist of frequent grains of rounded quartz sand, and
crushed limestone or shell. It is not known whether these inclusions
were present in the raw clay or were added as temper. Højlund and
Andersen have identified the limestone or shell as calcium carbon-
ate (Q. al-B. 1: 101). The particles often (but not always) explode
into whitish ‘halos’, measuring 0.5–3.0 mm in diameter.

Ware 1 is moderately hard and has an abrasive, gritty feel, con-
taining many small voids. These tend to be flat or linear, often
giving a laminated effect, but do not appear to be the result of
tempering with vegetal material.

Ware 1 is usually red-brown, often with a grey core. Yellowish,
red, brown or grey patches or examples can occur. As noted by
Højlund and Andersen, a poorly-controlled firing atmosphere has
resulted in a wide range of colour variation in the ware. If the fab-
ric was entirely yellow, it was counted as Ware 5.

Vessels in Ware 1 are always handmade in all Pottery Periods at
Saar. The frequency of both slips and ridging on Ware 1 declines
significantly with each Pottery Period. A few painted examples
occur in Pottery Periods 2 and 3. Paint and Reserve Slips (see be-
low) are both very rare in Ware 1, however, and their chronological
distribution may not be significant.

Ware 1 corresponds to Failaka Wares A and B (Højlund 1987:
103).

Ware 2

Saar Ware 2 is a denser and finer version of Ware 1. It largely cor-
responds to Ware 2 at Qala‘at al-Bahrain, the difference being that
totally yellow or buff fabrics were assigned to Ware 5 at Saar but
included in Ware 2 at Qala‘at al-Bahrain.

The inclusions of Ware 2 are the same as Ware 1, but they are
usually much less frequent. Ware 2 is also denser, lacking the fre-
quent small voids of Ware 1. The colour is commonly brown, though
variation does occur. A very fine version of Ware 2 is used for the
production of the smaller and more delicate vessels which are often
also decorated or wheel-made. The finest Ware 2 barely contains any
quartz or lime, appearing as a smooth brown fabric with no im-
mediately visible inclusions. Isolated grains of rounded quartz can
nearly always be identified after closer examination.

It is usually slightly softer than Ware 1. It is over twice as frequent-
ly slipped as Ware 1. Ridges are slightly more frequent than on Ware 1.
Unlike Ware 1, the proportion of Ware 2 vessels which are painted and
wheel-made increases significantly and steadily. By Pottery Period 4,
8% is painted and fully 16% is wheel-made. This clearly pre-empts
towards later developments in the Bahraini assemblage, as seen in the QB II
pottery and elsewhere. The Reserve Slip is also most common in the
Ware 2 of Pottery Period 4.

Ware 2 corresponds to Failaka C-Ware.

Ware 3

Ware 3 is a very rare but distinctive fabric, associated with only a
few types. It corresponds exactly to Qala‘at al-Bahrain Ware 3.

Ware 3 is always red in colour. Højlund and Andersen state
that it contains ochre (Q. al-B. 1: 101), in which case the colour was
deliberately determined by the addition of that substance. The ad-
dition of ochre may have had another more esoteric significance.
The paste is hard and very smooth and fine. It is quite different to the fabrics of the other local wares, resembling more a hand-made version of Southeast Arabian Umm an-Nar ware. In fact, the clay is probably from the same sources or types of source as that of Wares 1, 2 and 5, as small and extremely rare quartz grains are occasionally evident, as well as less rare lime halos. For the production of Ware 3, the raw clay has been carefully levigated to remove nearly all inclusions and leave the finest clay. Ochre is then added, resulting in the occasional appearance of angular red inclusions of up to 2 mm in size.

Its rarity, the careful preparation of the paste and the addition of ochre attest to the special nature of Ware 3. It is not therefore surprising that it is the chief ware for the well-known Dilmun funerary jars with scored rims (Type S39), as well as occasionally being used for a few other painted and plain types (S41, S43, S52). The range of vessel types in Ware 3 at Saar is greater than that at Qala’at al-Bahrain where it is restricted to Types B73 (S39) and B74 (S41).

It does not appear to have been easy to work, however, and vessels in Ware 3 frequently have uneven or lumpy walls. It is never wheel-made at Saar, probably for this reason. Højlund and Andersen believe some examples of vessels in Ware 3 to have had their rims turned on a slow wheel (Q. al-B. 1: 96–7; 175–6).

By Pottery Period 4, all vessels in Ware 3 are slipped and painted. Interestingly, by that stage this ware is no longer used to make the scored-rim jars (S39) which are instead produced in Ware 2.

Ware 3 corresponds to Failaka H-Ware.

**Ware 5**

Ware 5 has the same inclusions as Wares 1 and 2, but is always yellow, buff or pale greenish in colour. It corresponds to Heinz’s (1994) Warengruppe V. To be counted as Ware 5, the pale colour had to extend throughout the sherd, i.e. not only on the surface, though some darkening of the core was acceptable. Occasionally, vessels were found which would be classified as Ware 5 on some parts of the vessel, but as Wares 1 or 2 if other parts only had been found. Sometimes it appeared that Ware 1 and 2 vessels were fired to produce a cream surface. This colour rarely continued more than 1 or 2 mm below the surface, in which case it was not counted as Ware 5.

Ware 5 was not given a separate category at Qala’at al-Bahrain where such fabrics are included in Ware 2. At Failaka such examples were included in C-Ware. This practice was not followed at Saar because the pale colours had clearly been deliberately attained through controlling the firing regime. In her analysis of the Saar pottery, Heinz states that the yellow colour of her Warengruppe V was achieved by using a higher firing temperature of ca. 1000°C, as opposed to ca. 700–900°C for the other wares (Heinz 1994: 211; Saar Report 1: 71). Ware 5 is also closely associated with certain forms (especially S26 and S30) and shows a consistent and very different configuration of surface treatments. The density of the fabric and quantity of inclusions were frequently closer to Ware 1 than to Ware 2.

Slips and ridges are very rare on Ware 5, though the Reserve Slip is relatively common. Paint never occurs and wheel-made examples make a rare appearance in Pottery Period 4. Where it is found ridged, this is always on aberrant vessels which are more usually found in Wares 1, 2 or 3.

**Discussion**

There is a significant degree of variation within Wares 1, 2 and 5, and these three types are sometimes hard to tell apart. Their inclusions are exactly the same, and they are therefore distinguished by differences in colour, density and the frequency of their inclusions. These differences between them are mostly related to differences in the treatment of the clay and in the firing regime, although Heinz suggests that different clay sources were used for cooking pots than for other types (Saar Report 1: 71). Potential clay sources have not yet been identified.

It is not known whether the three different major wares should be associated with separate kilns on the island. Single workshops may have been capable of producing any or all of the common three wares according to convention, the demands of their customers and the properties required of the vessel being made. It is probable, however, that different workshops did exist on the island, producing slightly different types of vessel. This may account for some of the differences between the Saar and Qala’at al-Bahrain assemblages. It may also explain the co-occurrence of some types at Saar which appear to be functionally identical but have consistent differences in ware and/or surface treatment. This is especially true of certain cooking pots.

**Surface treatments and manufacture**

Surface treatment was simply divided into four categories: Slip, Reserve Slip, Ridged and Paint. The figure below shows the frequencies of different surface treatments and manufacturing techniques at Saar by Pottery Period, calculated using Rim eve totals. Højlund and Andersen defined several different types of ridged or
decorated body sherds for use in their typology (Q. al-B. 1: 91–3, Types B34–61). This practice was not followed at Saar.

**Slips**

Slips, which become less common in the assemblage in each successive Pottery Period, are generally red to red-brown in colour, and possibly also cream. Usually they are thin and streaky, but occasionally thicker and redder slips are seen, often inside small bowls or cups. Occasionally slips can be purplish. A rare dark grey or black slip appears to be a late development in the sequence, being found mainly in Pottery Period 4. Greenish slips were very occasionally seen on overfired vessels.

Many vessels had cream surfaces and in some cases this appeared to be a slip. In other cases it was certainly not a slip, but the result of deliberate or accidental colouration during firing. Determining whether a cream surface was the result of a slip or firing was frequently impossible, in which case no slip was recorded.

**Reserve Slips**

This technique involves the application of a slip, usually red-brown, followed by dragging the fingers around the body in order to remove lines of the slip. The end result is similar to having painted the body in red-brown horizontal stripes, and in fact it is not always possible to tell which method has been used. The technique is closer to that used to produce ridging than to that used when painting horizontal stripes on the body.

Nearly all occurrences of the Reserve Slip are on portable jars of Type S8 or S9. One occurrence was on an S10/S11 rim, while others are seen on jars of Types S13 and S14. One anomalous vessel of Type S4 also bears a Reserve Slip.

The technique becomes more common through time, though it is always rare, never amounting to more than 2.3% of the assemblage. The Pottery Period 4 occurrences at Saar are unusual, as the Reserve Slip is generally associated with later phases. At Qala’at al-Bahrain North City Wall there are at least 3 occurrences on jars associated with QB IIC (Q. al-B. 1: figs. 115, 664, 697), while another good example is found in one of the late tombs at Karanah 1 (Velde 1998: fig. 4: 20). A further occurrence of this type of decoration is found in a tumulus incorporated into the burial complex at Saar; this is on a squat carinated wheel-made jar, which can be best compared to carinated vessels from the late phase at Karanah 1 or to a Type S40 vessel from the settlement (Fig. 26C). Other tumuli at Saar show vessels of the Pottery Period 3–4 Type S13 with a Reserve Slip (Ibrahim 1982: fig. 38: 6, 7). All these occurrences are restricted to a Saar Pottery Period 3/QB IIC date or later.

**Paint**

Paint is almost always black at Saar. Occasionally it will tend towards dark grey or dark brown. Very rarely, it is red or purple. At Saar, red or purple paint was seen only on vessels of Types S10 and S30. Painted decoration is present in all phases, and becomes more common through time. Even at its most frequent, during Pottery Period 4, painted decoration only occurs on 2.4% of local vessels.

**Ridges**

Chain ridges were very rare and were only found on a few body sherds in Pottery Period 2.

Low, thin horizontal ridges with triangular cross-sections are mainly found on the shoulders of portable jars and certain cooking pots. These ridges can be made by pressing with the finger tips while forming the vessel and turning it by hand. Some portable jars have relatively pronounced ridging all over, but often ridging becomes progressively fainter lower down on the body. Højlund states that ridges are formed on Barbar pottery by adding another layer of clay in the form of a thick slip and pressing that into ridges (1987: 167), though this does not always appear to be the case at Saar.

Diagonal ridging, comparable to Højlund and Andersen's Type B39, was also recorded on certain portable jars (Heinz 1994: Nr. 296).

Heavy accentuated ridges or corrugations are associated with certain large vessels, Types S20 and S21.

**Manufacture**

The description ‘wheel-made’ was only applied to vessels bearing unequivocal evidence of manufacture using the fast wheel. When recording fragmentary pottery, it is often hard to be sure of the technique used, especially since surfaces are often smoothed. Handmade vessels can be finished on turntables or a slow wheel, sometimes giving the impression of having been made on a fast wheel. If in doubt, the sherds were recorded as handmade.

The vast majority of the local pottery at Saar was handmade, as at Qala’at al-Bahrain. No definite wheel-made vessels were associated with Pottery Period 2, though it is possible that the wheel-made goblets S44 (B62), found outside the sample, belong to that phase. There is a very strong trend towards manufacture by wheel in Pottery Period 4, where the percentage rises sharply to 5.4% of the assemblage. This is a feature of the later development of the Early Dilmun assemblage. Local types from the sample which are sometimes or always wheel-made include S27, S39, S40, S41, S42, S51, and some painted cups or bowls (pntcup). From outside the sample, or included in the Types pntcup and wmdcup, are Types S44, S46, S47 and S49.

Wheel-made vessels appear to be much less common than at Qala’at al-Bahrain where the totals are 3% for QB IIb (compared with 0% for Saar Pottery Period 2) and 6% for QB IIC (compared with 0.9% for Saar Pottery Period 3). Højlund and Andersen report that manufacture by wheel is introduced at the start of the QB II period (Q. al-B. 1: 175), so the absence from sampled Pottery Period 2 material at Saar is surprising.

Handmade vessels were probably formed on a turntable in order to facilitate the finishing of the vessel, as reported by Højlund and Andersen (Q. al-B. 1: 175). The methods used for the production of handmade Barbar pottery are fully discussed by Højlund in the Failaka report (1987: 164–7). It appears that the vessels are initially built up by coil and then thinned by paring the surfaces. Some Saar vessels showed evidence of paring. The rounded bottoms of cooking pots, however, are unlikely to have been produced by this method. Such bases would have been rounded and thinned when the clay was partially dry. It is possible that a paddle was used to beat or tap these bases into shape against a rounded object or tool, the evidence for which was then removed by smoothing the surfaces.

Højlund and Andersen's category of ‘Special Handmade pottery’ was not used at Saar. At Qala’at al-Bahrain, this technique is said to occur in vessels made in the special Ware 3, in this case B73 (S39) and B74 (S41). In this category, the surfaces of lower part of the vessel are smoothed yet bumpy, i.e. of uneven thickness, while the rim is more evenly made, perhaps having been turned on a slow wheel. The same technique has been noted on various vessels of Type S39 (B73) from the tombs at Saar and Karanah 1. This distinction was not observed at the Saar settlement and examples of these vessels were categorised as handmade or wheel-made, as with the other types.
In rare cases at Saar, however, it could be seen that the neck of portable jars was made separately as an open-ended tube, possibly on a wheel. The bottom of this was then pressed together with wetter clay at the shoulder of the vessel. Finally, more clay was added by hand at the top of the tube to form a triangular rim, and this clay was then smeared downwards on the outside to cover the join between neck and shoulder.

**Modes of production**

Højlund and Andersen speculate that local pottery was produced by specialist potters during the QB II Period (Q, al-B. i: 176). Examination of the Saar pottery suggests this is true, though evidence is circumstantial.

The numerous cooking pots and portable jars are standardised in overall shape and appearance. There are variations in rim form, but these are caused by the sometimes rough-and-ready techniques used in the mass production of these vessels. There is also a degree of variation in colouration, providing evidence for inefficient or poorly controlled firing techniques or kilns. This is not evidence for household production, but is another example of the pragmatic approach taken by the Early Dilmun potters. The Early Dilmun assemblage was essentially a functional domestic assemblage. High quality finished or decorated pottery did exist, but formed only a small part of the assemblage, though it increased steadily in importance through time, especially during Pottery Period 4.

The strongest evidence for specialist production and against household production is the absence of kiln wasters from the Saar houses. Certain heated tannur body sherds could sometimes resemble wasters, but true examples were not found. Several vessels were patched with plaster and bitumen, showing that their owners found it easier or cheaper to repair a broken pot than replace it by making a new one. This suggests that household production was not the norm.

No kilns were found at Saar. The unpredictable firing regime evident in the pot fabrics may mean that kilns were not actually used at that time, but that pit or bonfire firing was preferred. If there was pot production at Saar, specialist or otherwise, it took place outside the confines of the excavated village.

**Variations in the assemblage**

**Chronological variation**

**Technical and stylistic variation**

Clear differences are evident between the assemblages of each Pottery Period: slips and ridging decline in frequency, for example, while the incidence of paint, Reserve Slip and manufacture by wheel increase. Trends within the overall frequency of the wares are less evident and are mainly indicative of the trends within the frequencies of common types of vessel (see Fig. 6.2). It appears that Wares 3 and 4 decline slightly through time, the former mainly because jars of Type S39 (B73) become less frequent, and the latter because of the fall in frequency of the dish S26 (B50). Pottery Period 3 sees an increase in Ware 1 over Ware 2; this is probably a reflection of the increasing importance of the cooking pot S3, at the expense of other cooking pots which have a higher occurrence of Ware 2.

Excluding imported material, four types are exclusively associated with Pottery Period 2 (S1, S2, S34, and S32). Mesopotamian material is also confined to this phase. Types found in subsequent periods but strongly associated with Pottery Period 2 include S4, S13, S39, S37, S38, and S7. Various other types are also relatively common during subsequent periods, but are most frequent in Pottery Period 2. These are S1, S2 and S10/S11.

Types strongly associated with Pottery Periods 3 and 4, but also occurring in 2, include portable jar S14, and large jar S23. No types are associated only with Pottery Period 3, though several are found in 2 and 3, but not 4 (S17, S28, S17 and S6). In these four there is also a reduction in frequency between Pottery Periods 2 and 3. A large number of types occur in all phases, but a few of these are especially frequent in Pottery Period 3. These include the very common portable jar S8/S9, as well as a type of ridged cooking pot S5.

Types only found in Pottery Period 4 include S22, S31, S26, S42, S7, S29, S27, S42 and S53. This is a high number of types and probably indicates that change within the assemblage was accelerating at that time. Those types strongly associated with Pottery Period 4 but also found earlier include those comprising the special bowls and cups (see Fig. 6.3). These include plain, handmade cups or small bowls (pLHCUP), wheel-made cups or small bowls (wDHCUP), S40, S41, S38, and S22. Special jars, mainly comprised of the screw-top jar S9 and the painted globular jar S41, also become much more common in Pottery Period 4.

Wadi Suq pottery is confined to Pottery Period 4, though Southeast Arabian influence is evident earlier, in the painted motifs of Pottery Period 3. Indus-related rims are absent from 4, though at least one body-sherd is present.

**Function and functional variation**

The designation of Types S1-7 as cooking pots, of Types S8-19 (‘portable jars’) as being suitable for storage or transportation, and of Types S34-38 as ovens (tannurs) is in agreement with the conclusions reached by Højlund and Andersen (Q, al-B. i: 177). Additionally, they plausibly suggest that vessels in yellow Ware 2 (i.e. Saar Ware 5, mainly the dish S2 and bowl S30, as well as some of S33) were used for serving food.

The (apparently) superficial differences between contemporary and (apparently) functionally identical vessels (e.g. between the cooking pots, or between S8, S9, S12 and S13) are possibly due to chance. Differences in surface treatment of types, and minor variation in rim morphology, itself possibly a sign of different motor habits among potters rather than aesthetic or utilitarian choice, may indicate the existence of different ceramic workshops in Bahrain.

Additionally, differences which seem trivial to us may have been part of a larger package of features or associations linked to that particular ceramic style, which carried a specific meaning to the ancient inhabitants. Numerous ethnographic examples may be given where a society assigns very specific roles to different types of vessel, which may differ only in seemingly trivial decorative or formal aspects (see David et al. 1988 for examples within the Mafa and Bulahay assemblage in Cameroon). Certain Barbar vessels probably had specific associations with specific uses or contents. Without residue analysis, this information is largely lost to us, and the true functions of individual types can only be guessed at; such guesses are alluded to in the discussions of each type. The spatial analysis given below provides some clues, for example that the cooking pot
S4 and portable jar S14 are associated with the temple. They or their contents may therefore have special or even ritual significance.

The data extracted from the variations in proportions of form classes is potentially more useful. Fig. 6.3 shows how the proportions of the broad functional classes change through time. The membership list showing which rim forms belong to which form class is given in Table 6.3. These are broad groupings, and strictly more indicative of gross formal and technical variation than known functional intent.

Portable jars are more common during Pottery Period 3 than during Pottery Period 2. Dishes decline in relative frequency. A decline in bowls is accompanied by an increase special bowls/cups. Likewise, the increase in special jars in Pottery Period 4 is accompanied by a fall in the proportion of portable jars between Pottery Periods 3 and 4. The other Type Classes either show no clear trends or are too rare to draw significant conclusions.

It is not certain that these patterns are wholly due to chronologically related stylistic change, though comparative evidence from Karanah 1 and QB IIIf shows that there was a general shift towards painted pottery and manufacture by wheel. At Saar such trends may be emphasised by a greater quantity of high-status ceramics in certain houses with late occupation. Contexts from Bldgs 53 and 56 contribute significantly to Pottery Period 4 and the later half of 3; these houses are architecturally anomalous and there is additional ceramic evidence that these were high status households or played a specialist role (see below).

It is clear, however, that there is no dramatic change in the broad functional make-up of the Saar assemblage. Although there are clear changes in styles and techniques, the functional structure underpinning the Saar assemblage did not significantly alter during the occupation of the site, and there is no direct ceramic evidence for changes in eating habits, food production or preparation, or social configurations.

If the stylistic or decorative alterations in the assemblage are mainly chronologically related, particularly the increase in painted pottery, it may be speculated that the decline of Bahrain's Eastern trading relationships towards the end of the QB II Period led to fewer imported decorated ceramics. This may have stimulated an internal market for locally-made painted pottery.

The changing technical trends in the assemblage defy detailed interpretation. Societal stress can lead to more rapid evolution and diversification of material culture, on the principle that continuity is the desired norm within communities, and that change tends to occur when the normal routine is suspended (see, for example, Shennan 1989: 337–8; Rice 1984: 234). This may account for the changes in manufacturing techniques within the assemblage, as well as the high number of new shapes, during Pottery Period 4. Widespread changes in economic and social relationships, triggered by the decline of Dilmun's QB II Period trading empire, would have impacted upon the potters and pottery production centres of Bahrain, perhaps leading to more rapid evolution within the Barbar tradition.

Overall, it is interesting that large storage vessels (large vat or jar) are rare, while portable jars are very common. This implies that storage was largely organized on an individual family basis, rather than there being such facilities available to the extended family or community as a whole. This may not be true if Bldg 53, which has a high proportion of large (imported) storage jars, is regarded as a public building rather than a wealthy household.

### Spatial variation

#### Inter-site

Clear differences are evident between the three Saar assemblages and the contemporary assemblages of other sites. In summary, the proportion of imported pottery is lower at Saar than at Qala'at al-Bahrain, amounting to only about 0.32% (or one in three hundred pots), compared to a lowest value of 1.5% of the total in Period IIc at the North City Wall (Q, al-B. r: fig. 390). S33, a common and distinctive bowl at Saar which is found in all Pottery Periods, is entirely absent from Qala'at al-Bahrain, though it is present at Barbar. Ridged cooking pots (especially S2) are more common at Qala'at al-Bahrain and Failaka than at Saar. Ripples on the shoulder of jars are not seen at Saar, even in the latest phase, while the concentration of wheel-made and painted pottery is more marked at the end of the Saar sequence and less common in the earlier phases than at other sites.

Some of these phenomena relate to Saar having a more ‘local’ and perhaps more utilitarian assemblage than those of the more cosmopolitan trading ports of Qala’at al-Bahrain and Failaka. Others may be due to local connections to different pottery workshops.

#### Intra-site spatial analysis

For the intra-site analysis, the archaeological statistical program ‘Pie–slice’ was used. This has been developed specifically for pottery analysis (see Orton et al. 1993: 173–8; Orton and Tyers 1990; Orton and Tyers 1991; Orton and Tyers 1993). Pie–slice transforms the data so that it is best suited to statistical analysis, deletes very uncommon types, groups together those that have comparable distributions, and then conducts a correspondence analysis. In this case, the program was used to examine associations between spatial units and pottery types.

Several configurations of the data were tested in the analysis. Spatial units were variously entered by Area, or by Area Type, by Building or by Building Type, and pottery forms by Form or by Form Class. Form Class refers to the broad functional group (e.g. cooking pot, portable jar) to which individual types (e.g. S1, S2) were assigned. Building Type refers to a simple division into those buildings that have only one inner room, those that have two, and those that have many rooms.

The membership lists used in the Pie–slice analysis are given in Tables 6.2 and 6.3. The original data generated by this programme, together with a discussion of procedures and methodology, can be found in the Saar electronic archive, along with the different configurations and full explanations of how the data were interpreted to reach the conclusions below.

The most useful configurations turned out to be variations on Area Type by Form Class, and Building or Building Type by Form Class. It was found to be better to use the ten Form Classes in the analysis rather than the single types. This enabled a detailed examination of functional relationships, and made interpretation easier by reducing the number of variables. If Forms (as opposed to Form Classes) were used on the whole dataset, chronological developments within the assemblage dominated the correspondence analysis. This largely agreed with the sequence of types and units suggested by the seriation and is not further discussed.

The classification of the different sorts of room or areas into Area Types is explained overleaf.
## The Early Dilmun Settlement at Saar

Table 6.2 Context, building and area membership

<table>
<thead>
<tr>
<th>Context</th>
<th>Pottery</th>
<th>Area</th>
<th>Number</th>
<th>Area Type</th>
<th>Bldg</th>
<th>Bldg Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6619</td>
<td>2</td>
<td>376</td>
<td>InnerA</td>
<td></td>
<td>62</td>
<td>3–roomed</td>
</tr>
<tr>
<td>6612</td>
<td>n/a</td>
<td>377</td>
<td>Lb</td>
<td></td>
<td>6697</td>
<td>2–roomed</td>
</tr>
<tr>
<td>6616</td>
<td>n/a</td>
<td>377</td>
<td>Lb</td>
<td></td>
<td>6701</td>
<td>3–roomed</td>
</tr>
<tr>
<td>6617</td>
<td>2</td>
<td>382</td>
<td>BR</td>
<td></td>
<td>6073</td>
<td>3–roomed</td>
</tr>
<tr>
<td>6081</td>
<td>n/a</td>
<td>333</td>
<td>La</td>
<td></td>
<td>1843</td>
<td>2–roomed</td>
</tr>
<tr>
<td>6084</td>
<td>n/a</td>
<td>220</td>
<td>Temple</td>
<td></td>
<td>1844</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4030</td>
<td>2</td>
<td>235</td>
<td>InnerB</td>
<td></td>
<td>4026</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4028</td>
<td>2</td>
<td>235</td>
<td>InnerB</td>
<td></td>
<td>4020</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4024</td>
<td>n/a</td>
<td>235</td>
<td>InnerB</td>
<td></td>
<td>4032</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4035</td>
<td>2</td>
<td>236</td>
<td>Lb</td>
<td></td>
<td>4025</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4016</td>
<td>n/a</td>
<td>236</td>
<td>Lb</td>
<td></td>
<td>4017</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4019</td>
<td>2</td>
<td>236</td>
<td>Lb</td>
<td></td>
<td>4088</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4099</td>
<td>2</td>
<td>237</td>
<td>BR</td>
<td></td>
<td>4116</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4115</td>
<td>n/a</td>
<td>237</td>
<td>BR</td>
<td></td>
<td>4109</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4106</td>
<td>3</td>
<td>237</td>
<td>BR</td>
<td></td>
<td>4105</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4103</td>
<td>3</td>
<td>237</td>
<td>BR</td>
<td></td>
<td>4097</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4092</td>
<td>2</td>
<td>237</td>
<td>BR</td>
<td></td>
<td>4086</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4083</td>
<td>3</td>
<td>237</td>
<td>BR</td>
<td></td>
<td>4096</td>
<td>2–roomed</td>
</tr>
<tr>
<td>1866</td>
<td>n/a</td>
<td>272</td>
<td>La</td>
<td></td>
<td>1894</td>
<td>2–roomed</td>
</tr>
<tr>
<td>1854</td>
<td>n/a</td>
<td>272</td>
<td>La</td>
<td></td>
<td>1853</td>
<td>2–roomed</td>
</tr>
<tr>
<td>1870</td>
<td>3</td>
<td>273</td>
<td>InnerA</td>
<td></td>
<td>1864</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4109</td>
<td>2</td>
<td>238</td>
<td>BR</td>
<td></td>
<td>4129</td>
<td>3–roomed</td>
</tr>
<tr>
<td>4138</td>
<td>2</td>
<td>242</td>
<td>Lb</td>
<td></td>
<td>4130</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4040</td>
<td>2</td>
<td>242</td>
<td>Lb</td>
<td></td>
<td>4165</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4142</td>
<td>2</td>
<td>245</td>
<td>Outside</td>
<td></td>
<td>4145</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4135</td>
<td>2</td>
<td>245</td>
<td>Outside</td>
<td></td>
<td>4131</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4132</td>
<td>2</td>
<td>246</td>
<td>InnerB</td>
<td></td>
<td>4135</td>
<td>2–roomed</td>
</tr>
<tr>
<td>4034</td>
<td>3</td>
<td>241</td>
<td>Lb</td>
<td></td>
<td>4037</td>
<td>2–roomed</td>
</tr>
<tr>
<td>5018</td>
<td>n/a</td>
<td>301</td>
<td>La</td>
<td></td>
<td>5021</td>
<td>2–roomed</td>
</tr>
<tr>
<td>5021</td>
<td>2</td>
<td>303</td>
<td>Lb</td>
<td></td>
<td>5510</td>
<td>3–roomed</td>
</tr>
<tr>
<td>5571</td>
<td>2</td>
<td>318</td>
<td>La</td>
<td></td>
<td>5567</td>
<td>2–roomed</td>
</tr>
<tr>
<td>5599</td>
<td>2</td>
<td>319</td>
<td>InnerA</td>
<td></td>
<td>5568</td>
<td>2–roomed</td>
</tr>
<tr>
<td>5614</td>
<td>n/a</td>
<td>322</td>
<td>InnerA</td>
<td></td>
<td>5614</td>
<td>2–roomed</td>
</tr>
</tbody>
</table>

### Outer rooms (La and Lb)
These are the enclosed outer rooms that open out onto the streets and alleys. They contain domestic installations such as hearths and tannurs. In order to investigate variations in the use of space between different types of buildings, outer rooms of buildings that have only one inner room (La) were examined separately from those that had more than one (Lb).

### Inner Rooms (InnerA and InnerB)
These are the inner rooms of the building, accessed from the outer room. Usually, they do not contain domestic installations. As with the outer rooms, they have been subdivided into those that belong to buildings that have only one inner room (InnerA) and those that have more than one (InnerB).

### Rear yards (BR)
Some buildings have an additional area at the back of the building, accessed from the outer room.

### Small Rooms (SR)
This category comprise a single row of small chambers found only in Bldg 53.

### External areas (Outside)
These are areas at the back of buildings or between buildings.

### Temple (Temple)
A single room in the temple was sampled (Area 220).

### Miscellaneous (Uncertain)
Some areas that were sampled did not fit into the above categories and have been left as of uncertain affiliation.
<table>
<thead>
<tr>
<th>Saar code</th>
<th>Qala'at al Bahrain equivalent</th>
<th>Form Class</th>
<th>Form Class Abbreviation</th>
<th>Occurrence in Pie-slice Dataset</th>
<th>Occurrence in Winbasp Seriation</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>B16 cooking pot</td>
<td>CP</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>B17 cooking pot</td>
<td>CP</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S3</td>
<td>B19 cooking pot</td>
<td>CP</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>B18 cooking pot</td>
<td>CP</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td>B18 cooking pot</td>
<td>CP</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S6</td>
<td>B13–B15 cooking pot</td>
<td>CP</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S7</td>
<td>cooking pot</td>
<td>CP</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S8/S9</td>
<td>B3 portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S10/S11</td>
<td>B9 portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S12</td>
<td>B4 portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S13</td>
<td>B5 portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S14</td>
<td>B6 portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S15</td>
<td>B7 portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S16</td>
<td>B8 portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S17</td>
<td>portable jar</td>
<td>PJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S18</td>
<td>portable jar</td>
<td>PJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S19</td>
<td>portable jar</td>
<td>PJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S20/S21</td>
<td>B34 large vat/jar</td>
<td>LVJ</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S22</td>
<td>large vat/jar</td>
<td>LVJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S23</td>
<td>B35 large vat/jar</td>
<td>LVJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S24</td>
<td>B20 large vat/jar</td>
<td>LVJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S25</td>
<td>B29 dish</td>
<td>D</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S26</td>
<td>B30 dish</td>
<td>D</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S27</td>
<td>B67 dish</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S28</td>
<td>B32 large bowl</td>
<td>LB</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S29</td>
<td>large bowl</td>
<td>LB</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S30</td>
<td>B22 bowl</td>
<td>B</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S31</td>
<td>B23 bowl</td>
<td>B</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S32</td>
<td>bowl</td>
<td>B</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S33</td>
<td>bowl</td>
<td>B</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S34</td>
<td>B44 tannur</td>
<td>T</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S35</td>
<td>B47 tannur</td>
<td>T</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S36</td>
<td>tannur</td>
<td>T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S37</td>
<td>B46 tannur</td>
<td>T</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S38</td>
<td>B48 tannur</td>
<td>T</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S39</td>
<td>B73 special jar</td>
<td>SJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S40</td>
<td>B64 special jar</td>
<td>SJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S41</td>
<td>B74 special jar</td>
<td>SJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S42</td>
<td>special jar</td>
<td>SJ</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S43</td>
<td>special jar</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S44</td>
<td>special bowl/cup</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S45</td>
<td>special bowl/cup</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S46</td>
<td>special bowl/cup</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S47</td>
<td>special bowl/cup</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S48</td>
<td>special bowl/cup</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S49</td>
<td>special bowl/cup</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S50</td>
<td>special bowl/cup</td>
<td>SJ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S51</td>
<td>B63 special bowl/cup</td>
<td>SBC</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S52</td>
<td>special bowl/cup</td>
<td>SBC</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>S53</td>
<td>special bowl/cup</td>
<td>SBC</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>WMDCUP</td>
<td>special bowl/cup</td>
<td>SBC</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>PNTCUP</td>
<td>special bowl/cup</td>
<td>SBC</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>PLHCUP</td>
<td>special bowl/cup</td>
<td>SBC</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Indus</td>
<td>import</td>
<td>import</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesop</td>
<td>import</td>
<td>import</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WadiSuq</td>
<td>import</td>
<td>import</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>import</td>
<td>import</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.3 Form and form classes
Results of the Pie-slice analysis

The analysis revealed a standardised use of space within the buildings, enabled functional relationships between pottery types and architectural areas to be defined, and suggested that there were social distinctions between the inhabitants of buildings of different architectural complexity.

The best results were attained after excluding post-occupation deposits, i.e. material collected from collapse deposits, overlying sand and later midden material. All the conclusions reached below are from analyses where such material was excluded. These post-occupational deposits accounted for 45% of the sampled assemblage (using EVE totals derived from the raw data). As well as improving the analysis, this is archaeologically sensible, reducing the possibility of contamination by deposits of different chronological and spatial origin. Some of the pottery found in post-occupational deposits may have originated from the roofs of the buildings. Material may have been stored or processed there, it being a dry space, open to the air and the sunshine, and clear of dust, debris and livestock.

The results of the analysis are summarised below.

1. Outer Rooms (both La and Lb) were used for cooking and possibly serving food, and probably as general living areas. They are particularly associated with serving vessels (bowls and dishes), and with tannurs (Configuration 1.2). The use of outer rooms in two-roomed buildings (La) was not markedly different from those in three-roomed or multi-roomed buildings (Lb) (Configurations 1.1 and 1.2). Their assemblage has some elements in common with food/drink storage areas (rear yards, and the small rooms of Bldg 56), and the cooking pot storage areas (both types of inner rooms). Ceramics from both kinds of storage areas would have been brought together in the outer rooms for the preparation and possibly consumption of food. If food was not served in the outer rooms, the serving vessels were certainly stored there.

2. Inner Rooms in two-roomed buildings (InnerA) were used for general storage. Cooking pots, portable jars and other form classes also occur there, but the associations are less marked than with other Area Types.

3. In buildings with one inner room, less of a distinction is made between Area Types in terms of what is found where: the assemblages of both rooms, the outer (La) and the inner (InnerA), are almost identical. This may reflect an opportunistic use of areas due to a lack of storage space in these dwellings.

4. Inner Rooms in two-roomed buildings (InnerA) were used for general storage. Cooking pots, portable jars and other Form Classes all occur there, but the associations are less marked than with other Area Types. In fact, the assemblages of both the outer (La) and the inner rooms (InnerA) are almost identical (Configuration 1.3). This may reflect an opportunistic use of areas due to a lack of storage space in these dwellings.

5. Inner rooms in three-roomed and multi-roomed buildings (InnerB), however, were used overwhelmingly for the storage of cooking vessels (Configuration 1.2).

6. Rear yards (BR) were used for holding storage jars and their contents, and possibly for brewing, judging from an association with large vats/jars (Configuration 1.2).

7. The small rooms of Bldg 53 (SR) were used in a similar way to the rear yards of other buildings (BR), but also contained unusual quantities of imported storage jars and exotic local ceramics (Configuration 1.2).

8. The assemblage of the temple storeroom (Area 220) is comparable to that of the small rooms of Bldg 53 (SR) and the rear yards (BR) when the analysis is conducted by Form Class (Configuration 1.2). When Forms themselves are used, the temple storeroom assemblage shows anomalous concentrations of S4 and to a lesser extent S4, perhaps indicating a special role for those types (Other Configurations). The latter has a higher occurrence of Reserve Slips than any other type, at 22%.

9. Spaces immediately outside the buildings were used in a similar manner to the outer rooms of buildings, but were possibly also used as midden areas (Configuration 1.1). Alternatively, neighbouring areas outside buildings may sometimes have been used to store pottery.

10. There appears to be a relationship between complexity of domestic architecture and wealth or status. Complex multi-roomed buildings have a higher quantity of storage vessels, imports and painted or wheel-made wares (Configuration 2.1). Buildings with only one or two rooms have a more utilitarian assemblage consisting mainly of cooking pots, dishes, bowls, large vats/jars and tannurs. This conclusion must be qualified by the observation that chronological issues may have influenced these associations: some multi-roomed buildings, especially Bldgs 53 and 56, have a late occupation, when painting and manufacture by wheel become more common (see also points 11 and 12 below).

11. No significant differences were noted between the overall assemblages of buildings with one or two inner rooms (though as noted above, the use of space within these two types of building differed) (Configuration 2.2).

12. Bldg 53 has an unusual assemblage, high in storage vessels, imports and probable high-status ceramics (Configuration 2.1). These findings complement the unusual architecture of the building, which has a large number of chambers, incorporating at least two living units and a series of storerooms. It may be a wealthy merchant’s household (see Moon and Killick 1995).

13. Bldg 56, particularly Area 68, has a highly unusual assemblage. This is perhaps indicative of a high-status household in Bldg 56, or is suggestive of a specialist function for this building (Configuration 1.1). There may, however, be a chronological dimension to its anomalous assemblage.

One of the most interesting observations is that different classes of vessel were consistently stored in different types of area; specifically, that storage and possibly brewing vessels were kept in the extra rear yards of the buildings (BR) and in the small storage rooms of Bldg 53 (SR), with cooking vessels preferentially kept in the inner rooms (InnerB), and serving vessels found in the outer rooms.

Complementary data from other artefact classes confirms that inner rooms were more closely associated with items connected to cooking activities than the storage rooms. For example, the incidence of stone tools used for food preparation (rubbers, grindstones, pounders), is around 3 times higher in inner rooms (ca. 30% of their non-ceramic artefactual assemblage) than in the rear yards (ca. 9% of their non-ceramic artefactual assemblage). The outer rooms actually have a lower quantity of stone tools than inner ones, (ca. 20% of their non-ceramic artefactual assemblage), an observation complemented by the lower frequency of cooking pots in outer rooms than inner ones (see above).

There may be architectural reasons behind the separation of food preparation materials and storage vessels. For example, it is possible that some storage rooms (BR, SR) may have had different roofing, in order to guarantee cooler or more constant temperatures, suitable for storing foodstuffs and beer or date wine. That it was not a simple matter of accessibility is evident from the plans, which show that rear yards are no further away from the cooking installations than the inner rooms.
Alternatively, there may be a symbolic dimension to this division. Dietary taboos sometimes play a part in the separation of cooked and uncooked food; ethnographic analogies for this can be found in India and Africa. In certain sections of modern Indian society, strict distinctions are made between prepared food and unprepared food (Douglas 1966: 34–5). In this case, the purpose is to avoid contamination: prepared food is liable to pass on ritual pollution, while unprepared food is not. Important distinctions are also made between raw and cooked food amongst some African societies (Braithwaite 1982: 83–4). In this latter case, gender is also significant, with both types of vessel and types of food having specific associations with either sex: the concern for regulation of contact between the sexes is manifested in the storage, use and decoration of the ceramics. Whether this pertained at Saar cannot yet be established.
Pottery chronology

Pottery period 1
Pottery Period 1 pottery is known mainly from Test Pit 1, the sounding in the temple at Saar (Saar Report 1: 76–8). Most of the examples illustrated in the report can be compared to material from Qal‘at al-Bahrain North City Wall (Q. al-B. 1). Pottery Period I may not be a true pottery phase, and is used here simply to include all the ceramics which predate the fully excavated and sampled assemblages at Saar.

Certain bowl rims are of chronological significance (Saar Report 1: fig. 67; f, g, h). These are of Type S31 whose equivalent, B23, is found only in QB IIa (Q. al-B. 1: figs. 145–8). A bowl rim, S30, comparable to B22, is also found (Saar Report 1: fig. 67: l–o). B22 is common throughout the latest QB II sequence, with just one appearance in the latest QB Ib context (Q. al-B. 1: fig. 388). Another parallel from Phase O.2 is between simple and unthickened cooking pot rims with a sharp upper edge (Saar Report 1: fig. 67: r-t), equating to Saar Type 6, and Qal‘at al-Bahrain Types B13 or B14 (Q. al-B. 1: figs. 393, 344, 466, 518, 583). B13 and B14 are found from QB Ia to IIb, though very rarely in QB Ib. The very closed form of the rims of the Saar samples may indicate that they are late in the developmental sequence of Types B13 and B14 (see Q. al-B. 1: 177).

Also found in the Test Pit, in Phase O.2, are examples of chain-ridge ware. Both of Højlund and Andersen’s Types B5a and B5b were represented (Saar Report 1: 77 and fig. 69). Both are found from QB Ia to IIb at the North City Wall, but rarely in the latter.

The lowest phase of Test Pit 1 (Phase O.1) also yielded pottery comparable to Type S6 (Saar Report 1: fig. 68: b), as found in Pottery Period 2. The closest parallels are with a B13 rim from the North City Wall, QB Ia (Q. al-B. 1: fig. 583). Another S6 cooking pot rim from Phase 0.1 compares to Type S25 (B29) (Saar Report 1: fig. 68: f, h; Q. al-B. 1: fig. 388). Excellent parallels with pottery from this level are also found with Type S31 (B23) (Saar Report 1: fig. 68: f, h; Q. al-B. 1: figs. 147–8).

These parallels all show an affinity with QB Ia and IIb at Qal‘at al-Bahrain. Decorated Umm an-Nar sherd from Test Pit 1 (Saar Report 1: fig. 69: i), and residual occurrences elsewhere on the site, show that the Pottery Period 1 occupation of Saar goes back at least to QB Ia. Umm an-Nar material is not present after that phase at the North City Wall.

There is only slight evidence for any occupation earlier than QB Ia at Saar. The apparent absence of Qal‘at al-Bahrain Ware 4 and its associated types (Bro–12) from the sampled pottery would suggest that there is no City I element. However, it should be noted that material from the Saar Temple sounding was not directly examined by this author, and that at least one reliable observer has previously noted the presence of Ware 4 at Saar (pers. comm. Fleming Højlund). The absence of Qal‘at al-Bahrain Types B1 and B2 may be significant. The former, in particular, is a very major element of the QB I occupation (see Q. al-B. 1: figs. 388, 391). It is unexpected that comparatively rare types such as Umm an-Nar pottery should make residual appearances in the sequence, but not Qal‘at al-Bahrain Types B1, B2 and B3, if the latter are present anywhere in the Saar sequence.

An origin during the City I Period cannot be absolutely ruled out because of the reported presence of Ware 4. On the evidence available from this study, however, Saar Pottery Period I should be dated to QB Ia and possibly the start of QB IIb. QB Ia dates to the last century of the third millennium BC. This is considerably later than the date previously suggested (Heinze 1994; Saar Report 1: 78). Although most of the pottery could be either QB Ia or IIb in date, the presence of Umm an-Nar material and chain-ridges of Type B3a imply that occupation began during QB IIa rather than IIb. Pottery Period I at Saar ends at or shortly after the start of the QB IIb Period, i.e. around the start of the first century of the second millennium BC.

Pottery period 2
Saar Pottery Period 2 begins during the QB IIb Period, as demonstrated by the presence of Types S31 (B23) and S25 (B29). Both are found only in QB Ia and IIb at Qal‘at al-Bahrain. The similarity between S31 and S25, which is only found in the QB I Period at the North City Wall, is not deemed sufficient to push the date back further, especially in the light of the absence of otherQB I types at Saar. S34 occurs only in Pottery Period 2, and is similar to Qal‘at al-Bahrain Type B44. B44 is almost exclusively associated with QB IIb–IIb. Furthermore, the presence of chain-ridges in Pottery Period 2 contexts at Saar indicates a QB IIb date, or earlier.

No types were found in the sample which indicated a QB Ia date for Saar Pottery Period 2. Qal‘at al-Bahrain Types B1 and B2 are both common in QB Ia at the North City Wall, but are not found at Saar. Furthermore, Saar Type S6, an amalgamation of Types B13, B14 and B15, is rare at Saar. Qal‘at al-Bahrain equivalents are extremely common during QB Ia to IIa, but are uncommon during QB IIb, being superseded by B16 (i.e. S1). In Saar Pottery Period 2, S6 is even more rare than B13–15 are during QB IIb at the North City Wall.

Unless they are all residual, the presence of chain-ridges and S6 (B13–15) implies that the start of Pottery Period 2 is contemporary with the earlier phases of QB IIb. Their rarity, however, suggests that Pottery Period 2 begins later than the very start of the QB IIb Period.

The end of Pottery Period 2 was fixed at the first appearance of Type S3 (B19), which indicates contemporaneity with the start of QB IIc at the North City Wall. At Saar, a number of other new types also appear close to this point, making it a logical one to define the a new pottery phase.

One C14 determination, from Context 4310, can be related to the said pottery Period 2 material: at 95% confidence, this falls between 2140–1960 BC (see Appendix 3 for further details). The later part of this range corresponds to the date suggested by Højlund and Andersen for QB IIb (Q. al-B. 1: fig. 395). They place Qal‘at IIb at the very start of the second millennium BC.

The Mesopotamian pottery associated with Pottery Period 2 confirms a date in the first century of the second millennium BC. A probable date range for the period is ca. 2000–1950 BC.

The majority of deposits from Bldgs 205, 207, 208 and 209 belonged to Pottery Period 2. Also included are all contexts from some less fully sampled houses, such as Bldgs 7, 52, 67, 62, 222, 223 and 225. Elements of Bldgs 55, 51 and 53, which were predominantly later houses, also fall into Pottery Period 2.

Pottery period 3
Pottery Period 3 coincides with the QB IIc occupation at the North City Wall. At Saar it is defined by the first appearance of Type S3 (B19). Types S22 (B4) and S13 (B5) begin to occur very shortly afterwards. All three are significant elements of the QB IIc assemblage and, apart from one occurrence of B4, all are exclusively found in QB IIc at Qal‘at al-Bahrain. S13 also compares to vessels from Barbar Temple III.

Certain types which appear in the QB IIb Period at the North City Wall and Pottery Period 2 at Saar, such as S31 (B23), S25 (B29)
and chain-ridged sherds, are absent from Pottery Period 3. One aberration is the presence in Pottery Period 3 of S6, whose North City Wall equivalents would be restricted to the early QB IIb Period. Similar rims are also found in Pottery Period 4 (Type S7), so it appears that very simple cooking pot rims had a longer life span at Saar than at the North City Wall.

There are also parallels between Pottery Period 3 material with pottery from Failaka. In particular, S12 (B4) has parallels with Type 11, which is associated with Failaka Period 1–2a.

Although the start of Pottery Period 3 is easily defined, both internally and by analogy with QB IIc, its end is easy to pinpoint. The end of Pottery Period 3 is contemporary with or slightly later than the end of QB IIc. The division between 3 and 4 is made partly on the basis of the disappearance of certain types, and partly on variations in existing types and treatment. A number of new types do appear in Pottery Period 4, but most of these are too rare to use alone as reliable chronological markers (see below).

QB IIc is placed at around 1900 BC by Højlund and Andersen (Q-al-B. 1: fig. 393). However, a C14 determination from context 550, seriated into Pottery Period 3, is considerably later, at 1750–1590 BC.

The Late Sorath Harappan material from Pottery Periods 2 and 3 gives a potential range of 2000–1700 BC. The end of Pottery Period 3 may therefore be as late as 1700 BC, in which case the carbon 14 date is not so anomalous. In the light of the dating of Pottery Period 4, however, Pottery Period 3 is likely to end by ca. 1850 BC.

Pottery Period 4

The criteria for locating the division in the seriated sequence between Pottery Periods 3 and 4 were chiefly based on: 1) the appearance of contexts where the cooking pot rim S3 has entirely replaced S1; and 2) the appearance of rim types which are absent from the QB IIc assemblage, but which have later parallels at Failaka, at Karanah 1, and with material from QB IIb at Excavation 420, Qala’at al-Bahrain.

Regarding the preponderance of Type S1, it must be noted that it does not completely replace S3 in all contexts in Pottery Period 4. S1 still represents 6.7% of the Pottery Period 4 assemblage. This ratio is very different to that of QB IIc at the North City Wall, which is 1% for S19 (S3) to 38% for B66 (S1). This compares well with the ratio in the Saar Pottery Period 3 assemblage, at 17% (S3) to 28% (S1). The progressive elimination of Type S3 is significant in that Højlund states that QB IIb at Excavation 420 is characterised by... upturned hole-mouth rims', among other types, and the illustrated example is clearly an S1 rim (Højlund 1987: 154 and fig. 667).

Other Pottery Period 4 forms and features showing chronological proximity to QB IIc include the rims S7 and S27, both of which can be compared to QB IIc examples illustrated in the Failaka volume. S27, however, also appears in the QB IIc phase, as B67.

Parallels can also be drawn between painted spirals from Pottery Period 4, as well as the sieve-neck S16, and vessels from the later phase at Karanah. Other comparisons also exist with the later Karanah phase, but unfortunately these are from outside the sample. Velde dates the later phase at Karanah 1 from ca. 1800 to after 1700 BC (Velde 1998: 255).

Other indications that Pottery Period 4 is later than QB IIc include the appearance of Type S39 (B73) jars in Ware 2, and the presence of wheel-made examples of Types S39 and S41 (B74). Neither of these combinations occur at Qala’at al-Bahrain and both are associated with Pottery Period 4 at Saar. Some rounded rims of the large jar S23 may also have been wheel-made in Pottery Period 4, further suggesting chronological affinity with QB IIc.
Abbreviations in catalogue

L.  length
Th.  thickness
W.  width
Diam.  diameter

All measurements in the catalogue are in centimetres.
Colours in pottery drawings are indicative only.

FIG. 7.1

7.1a  6015:01 Cooking pot, found complete and in situ, upside down, but badly fractured. Small gap in body. Much of outer surface abraded. Crisp pink clay, temper of fine lime particles (but not the usual circular speckles) on the surface. Occasional large particles. Outside is smoke-blackened. Hole mouth, edge thickened and very slightly pulled up to give perfunctory, uneven pinched rim. Body ovoid, terminating in blunt pointed base. H. 39.0, rim diam. 15.2 – 16.5, max. w. 31.4. Bldg 500, Area 501, collapse.


7.1c  4028:22 Cooking pot, rim complete, profile of rest to near base. Brown clay, sandy temper, dark brown surface out, inside rim, and inside lower body – appears to be deliberate surface treatment, now mostly flaked off. Rim slightly swollen and pulled up, body spherical. Pres. h. 24.6, estimated original ht. 25, rim diam. 14.6, max. w. (reconstructed.) 31.2. Bldg 205, Area 235, floor.


7.1f  K17:04:04 Part of rim and body of spouted vessel, including spout. Friable grey clay, pink core, vegetable. Inner and outer surfaces blackened. Everted rim, no neck, globular body. Not very regular or well-finished. Short broad spout attached just under rim. Present h. 11.8, rim diam. 11.4 (reconstructed). Bldg 51, Area 55, midden.

7.1g  6711:01 Cooking pot. Complete, but badly cracked. Very slight distortion, therefore, to max. w. Red clay, circular white inclusions. Outside smoothed diagonally. Smoke-blackened out. Rim diam. 13.9 – 14.9, max. w. approx. 32.5, h. 27.8. Bldg 60, Area 370, cooking pot support.
Chapter 7  Pottery vessels: individual examples

Jane Moon

Introduction

The purpose of this chapter is to supplement the foregoing one by illustrating vessels found in contexts not included in the sample chosen for sherd analysis. In some cases they provide more complete examples of their type, while in others they further illustrate the range of variation. A few are unique or atypical. Our purpose is essentially one of illustration, so while the shapes are cross-referenced, where appropriate, to the Types assigned by Carter in Chapter 6, they are presented here in larger, more generalized groups, divided into plain and painted.

Most pottery vessels found at Saar, as elsewhere, survive only as sherds. A good number, however, are sufficiently preserved to give reasonable certainty as to the complete form, as opposed to just the fabric, or the shape of one part, such as the rim. In common with standard practice, these were given individual, numbered catalogue entries in the field, while most sherds were not. Fragments that seemed to merit individual attention, such as sherds with unusual decoration, were given individual numbers too. It will be appreciated, especially by those familiar with archaeological field operations, that there is an inevitable continuum between these individually described items and the general sherd assemblage. Items considered unusual during early seasons later proved to be standard. Similarly, pieces of what seemed to be a reconstructible pot sometimes turned out, after cleaning, to be unrelated. Perfectly complete pottery vessels may be rare in settlement archaeology, but often there is enough to make out the original vessel shape, and to reconstruct it in drawing. Here such pieces, even if very fragmentary, have the catalogue description ‘plate’, ‘jar’, or whatever, rather than just ‘fragment(s)’, this latter label only being used as a last resort, where nothing could be made of the vessel shape at all.

Plain pottery (Figs. 7.1 – 7.5)

Cooking pots (Fig. 7.1)

Several complete, even intact, specimens of Saar’s commonest pottery type, cooking pots, of rim Types S1 to S6 of the sherd sample, survived, showing the range of body shapes this vessel form could have. The fact that they were used for cooking is presumed from the globular, non-angular shape, which would minimize danger of cracking from heat, and from the great frequency with which pots and sherds were soot-blackened. The size and roundness of the base is also ideal for fitting onto the cooking pot supports/hearths that commonly occur in the buildings at Saar. These vessels no doubt served other purposes too: one was found in an abandonment level with a plaster lid still on (b); one contained six sealings (d), and another was found in the well, upside down but intact (a). Despite the overall homogeneity of the basic design, there is considerable variation in the shape of the body, as well as that of the rim, and a few examples with spouts (e–f).
Portable jars

Ridged jars (Fig. 7.2)
Jars with ribs or ridges are characteristic of the Dilmun assemblage. The distinction between the two terms is not useful here, and the full range of variations is subsumed under the term ‘ridged’. These handsome vessels were common at Saar, and pieces were plentiful in the sherd assemblage. The rim types are of S 8/9, and S12 to S14, which they share with some of their smooth-surfaced relations among the plain jars. The body forms tend to be either globular (d–e) or drawn out towards the base (a–c). Some are of an intermediate body shape, but with the same rim type. One such example appears to have a hole cut out deliberately (f). One of the round ones (d) has the neck completely bunged with plaster.
7.2a 2694:01 Large ridged jar, complete except for half of rim. Cracked as found in situ. Red clay with circular white inclusions. Red slip or wash outside, and inside neck. Horizontal ribs over entire body. Everted rim, very short neck, rounded body, small flat base. One side heavily discoloured, slip fired to white, with dark brown to black patches – presumably a firing effect. H. 45.8, rim diam. 15.2, max. w. 38.3, base diam. 7.4. Bldg 54, Area 65, set in pit.


7.2c 2658:02 Large ridged jar. Complete except for small piece missing from central body, and rim chipped in places. Reddish – brown sandy clay. No obvious inclusions, except occasional grits. Pink slip out, flaking in places. Band rim, short neck, body swells gently then tapers gradually to small uneven flat base, with a bulge in the middle – pot will not stand on a flat surface. Surface from neck to below max. w. has horizontal ridges, presumably made by finger smearing. Ridging on inside of upper body suggest pot was coil-made. H. 43.6, rim diam. 13.2, max. w. 33.5, base diam. 8. Found with large sherd, acting as lid (2658:01). Bldg 53, Area 64, set in pit.

7.2d 1850:26 Upper part of ridged jar. Base and much of body missing. Red clay, cream slip out, circular white inclusions. Everted rim, short, waisted neck, rounded shoulder and body. Parallel ridges from base of neck to well below maximum width. Slip and ridges have largely flaked off. Neck bunged with ashy plaster, probably deliberate, as rest of pot free from encrustation. H. 30.9, rim diam. 10.4, max. w. (reconstr.) 26.4. Bldg 207, Area 272, collapse.

7.2e 7508:13 Ridged jar. Almost complete, with a few gaps in body. Hard pink clay, cream surface out. Rim bevelled to outside, neck very slightly waisted, shoulder rounded, lower body slightly elongated, tapering to convex base. H. 40.8, rim diam. 11, max. w. 35.4, base diam. approx. 7.8. Bldg 35, Area 655, occupation.

7.2f 6012:01 Partial ridged jar: complete profile. Most of rim extant, about half of body, and a fragment of the base. Red clay, white grit temper, cream surface, yellower near base. Outer surface ‘ribbed’ by roughly horizontal finger smears, fading out on lower body. Hole apparently deliberately cut out of body. Large grey patch on one side of outer body. H. 46.8, max. w. 40.4, rim diam. 15.2 – 15.6, base diam. (reconstr.) 4.2. Diam. of hole approx. 7 × 7. Bldg 64, Area 332, sand.
Larger plain jars (Fig. 7.3)
Larger plain jars are not dissimilar to the rounder-bodied members of the ridged jar collection, and some have the same bevelled rims (e). Some, like this one, also have the shoulder surface smeared into a pattern, accentuating their similarity to the ridged jars, and two particular examples are so nearly identical as to suggest a single workshop, if not the same craftsman (b and c, both S8). Other jars of the same general type have less obviously treated rims, and among the examples we have, the less attention is paid to the rim, the shorter becomes the neck, the rounder the body, and the less the flattening of the base, with the most extreme form being almost as round as a cooking pot, but with a small neck to it (d, S11). There is a complete spectrum of shape in-between (a, f).
Fig. 7.3 (1:5)
Sieve-necked jars (Fig. 7.4a – d)
The larger types of plain jar just described are sometimes fitted with a saucer-shaped sieve fastened to the inside of the rim, and effectivley closing off the neck of the vessel to anything that would not fit through the sieve-holes (S33). Two such jars survive in a near-complete state, both wide-bodied with short necks (b – c). From sherds and fragments it is clear that ribbed jars were also made with this modification (a), also jars with much longer necks (see S6). Occasional finds of small sieves and fragments of them often have rough or unfinished rims which suggest they have fallen out of jars necks (d). These possibly came from Failaka (Hejlund 1987: fig. 36), but are not reported from Qala’at al-Bahrain. Instead, square sieves or filters are found at that site, as well as bowl-shaped sieves (Q, al-B. i: figs. 186, 168, 635). These are not known from Saar.

Small-to-medium sized jars (Fig. 7.4e – h)
Several small-to-medium sized jars were found in condition. They were generally squat in form, bases flat where they survived, with plain or lightly bevelled rims on generally shortish necks (g (S30), h). One or two are more wide-bodied (f, S24) and one has a longer, bulging neck (e).

FIG. 7.4

7.4a 6635:08 Upper part of sieve-necked jar, rim, neck and part of upper body extant. Red clay, white grits, cream slip out. Rim rounded and swollen, neck slightly waisted. Shoulder rounded with blunt ridges. Sieve built into neck, stopped up with plaster from underneath, so presumably post-breakage. Preserved h. 18.2, rim diam. 11.2 – 11.6. Bldg 62, Area 377, collapse.

7.4b F17:05:01 Sieve-necked jar, with base complete, most of shoulder and body extant, and about a quarter of rim. Pink clay, fine grit and veg. temper, buff surface. Swollen rim, neck flares with slight ridge at base. Round body, tapering to flat base. Inside of base very rough from finger-marks. Sieve made separately and set into neck. Neck made separately and stuck onto body. H. 27.7, rim diam. c. 9.5 (reconstr.), max. w. 24.8. base diam. 7 – 7.2. Bldg 14, Area 11, collapse.


7.4e 4307:16 Small squat jar. Base, lower body, and part of shoulder. Non-joining piece gives part of rim, neck and shoulder. No join, but severely eroded just where join would occur, and full profile can be estimated from drawing. Brown clay, circular white inclusions, red surface, scorched marks on rim and shoulder. Rim bevelled to outside, neck waisted high up then swells. Short shoulder, high carination. Body dumpy, tapering to wide flat base. Preserved h. lower part 8.8, rim portion 6.5, estimated h. of jar 15.3, rim diam. approx. 9.8, base diam. 6.6. Bldg 10, Area 47, collapse.

7.4f 5275:05 Part of small jar: profile to near base. Red clay with many circular white inclusions. Outer surface has buff and black patches. Plain rim, slightly swollen and pulled out. Short, waisted neck, swelling to squat rounded body. Body curves in towards (missing) base. Diam. approx. 9.0, probable h. 12.2, max. w. (reconstr.) 15.2. Bldg 220, Area 314, sand.

7.4g K16:51:08 Small jar, complete except for chips at rim, also badly cracked on one side. Red clay, occasional black grit. Plain rim, waisted neck, rounded body, flat base. Small hole in lower body, presumably deliberate. H. 10.4, rim diam. 6.3, max. w. 9.8, base diam. 3.5. Bldg 51, Area 55, occupation.

7.4h 4136:01 Small jar: gaps in body and rim, and several chips. Dense pink clay, sparse lime temper. Most of lower body blackened out, also black patches under rim. Rim bevelled, neck swells to globular body, which tapers to a narrow, flat base. Dense and heavy. H. 14.8 – 16.2, rim diam. 9 – 9.3, base diam. 4.5 – 4.7. Bldg 208, Area 238, fill.


7.4l 1762:01 Pottery bowl, complete except for small hole in side, possibly deliberate. Pink clay, buff surface out and over rim, grit temper. Rim plain, sides swell very slightly, body tapers abruptly to perfunctory ‘flat’ base. Does not stand well. H. 9.5, rim diam. 8.6 – 9.2. Bldg 203, Area 229, make-up.

Plain bowls and cups (Fig. 7.4i – l)
Bowls of the deeper kind, as opposed to shallow open vessels (see ‘plates’ below), were not common as complete specimens, but there were a few examples of small ones of approximately hemispherical shape, with a flattened base and usually with a plain, incurved rim (i – j), to add to those illustrated as S45 and 46. Among the medium-sized ones there was another example of S52, with carinated sides and a plain pinched rim (l). A rounded bowl with more gently shaped sides and the rim flattened completely on top belongs to S33 (k).

Altogether, the collection of bowls, as exemplified by the more complete specimens recovered, is a variety of individuals rather than an assemblage of repeating types. The general impression is that such vessels were made or acquired for special purposes, and did not form part of the standard household assemblage.
Fig. 7.4
Plates (Fig. 7.5)

In contrast to the deeper kind of bowl, shallow ones must have been regular domestic items. Their shape variation could cover 'shallow bowl', 'dish' and 'plate' in general English usage, but for clarity they have all been designated 'plate' here. Most fit with Sz6/27 of the sherd typology. All have a more-or-less flat, disc-type base, and widely flaring sides. Treatment of the rim varies slightly from a perfunctory rounding or squaring off of the rim's edge (as with a, j and k) through a slight bevel (d, f, and n) to a definite overhang on the outside (b, e and i), or thickening on the inside to form a curved inner lip (g, h). Exceptionally there is a suggestion of a bulge below the rim (m) or even a definite carination (l).

FIG. 7.5


7.5d 4373:04 Plate. About a third preserved. Hard pink clay, grit temper, cream slip, which worn away on inside. Rim bevelled to outside, sides very straight and shallow, flat base. H. 4.0, rim diam. (reconstr.) 32.8, base diam. approx. 8.0. Bldg 13, Area 131, occupation.


Other open forms (Fig. 7.5)

Forms so shallow and low-sided they would be termed ‘tray’ or ‘dish’ were lacking at Saar, except for one heavy oval dish, with a solid flat base (o).
Fig. 7.5 (1:5)
Painted pottery (Figs. 7.6 and 7.7a – e)

Standard types with added painted decoration

Certain instances of decoration being applied to otherwise standard vessels are detailed in Chapter 6 above. Additional examples (Fig. 7.6) include: (a) a small portable jar found intact on a floor in Area 220 at the back of the temple, smeared all over with a streaky wash ranging from red to black. It is similar to the example illustrated for S14 above; (b) a larger portable jar (with a rim which places it with Type S17), also smeared with a rather perfunctory wash, this time black, and slopped over the upper body and inside the rim; and (c) a vessel of the usual cooking-pot shape, but painted all over with black encircling stripes over a white slip.

Small painted types (Figs. 7.6e – f)

Small, carefully made vessels of Type S46 contrast in their neatness with the sometimes crude paint effects of the larger pottery types. Additional examples include a broken bowl likely to have been of the same shape as the example given as S46a, but with black stripes over a red wash (f). Variant forms include a miniature hole-mouth vessel, almost like a toy cooking pot, with a band of purple paint around the rim (Type S48, Killick et al. 1990: 28, fig. 20: 5), and a small wheel-thrown flask with an all-over plum wash, and neat black stripes over the upper body (e, Type S40).

Larger painted types (Figs. 7.6d, g – h)

A few more complete examples of Type S41, neckless, globular vessels with painted decoration round the top were extant (Fig. 7.6c), also ones with further variations on designs using triangles (g – h). There was at least one further example of the spouted variety (d).
CHAPTER 7 POTTERY VESSELS: INDIVIDUAL EXAMPLES

Fig. 7.6
Painted sherds (Fig. 7.7a – e)

Nearly all the painted fragments found repeated the general painted range of stripes and areas of plain wash, but there was the occasional glimpse into a repertory of more imaginative patterns such as the piece illustrated as S1 above, with a human head. One showed a scheme of three colours, red, black and orange, and a file of legged creatures (e). Others show a more intricate use of geometric patterns (c – d). A small number of fragments reinforces the corpus of Indus-related pottery (a – b).

Pots with leaks, holes and repairs (Fig. 7.7f – h)

Unglazed pottery has a natural porosity, which decreases the harder the firing. Sometimes this quality is useful, as for water storage jars, which are kept cool by evaporation of the leaking water. For other uses porosity is a nuisance to be minimized. Burning and polishing of the vessel surface can help with leakproofing. Few Saar pots exhibit this technique, however, and the most commonly burned sherds are the giant Indus-related storage jars such as the one illustrated in Chapter 6. A coating of bitumen, which would also help to waterproof, can sometimes be observed (S21 is an example), though it is frequently hard to determine whether it is in fact a decayed bitumen coating that was responsible for the blackening, or from post-depositional circumstances whereby the sherds have been lying with bitumen or ash.

Occasionally, a jar was found with evidence of a deliberate hole cut out (e.g. 6012:01, and the re-used 7507:04). More often, an attempt had been made to repair holes or breaks. The simplest way was just a large sherd placed over the mouth (5099:34, 2658:01). An un-fired clay disc may also have been a lid (i).

Lids and stoppers (Fig. 7.7i – l)

Most lids for pottery vessels used at Saar were made of plaster or bitumen (see Chapter 5), but a few were made of clay or pottery. The simplest kind was a sherd of convenient size placed over the mouth of a jar (e.g. 5099:34). Two bungs or stoppers, similar to those made from bitumen, were found, made of roughly-shaped sealing clay (j). They were obviously meant to stop up something with an opening of only a couple of centimetres’ diameter. Four substantial pottery discs, on the other hand, are of about the right diameter to fit over a Dilmun jar rim, and all bear a scar in the centre of one face, presumably where the handle has come away (l). An otherwise unexplained clay object might have been such a handle 2024:03 (k). These are not known from Qala’at al-Bahrain, where pottery lids appear to have central holes (Q, al-B. i fig. 184).

Jars were also closed by less formal means: two were found with just a large sherd placed over the mouth (5099:34, 2658:01). An un-fired clay disc may also have been a lid (i).
drilled holes along broken edges, two on one side, two preserved on opposite side. Presumably an ancient repair. Bldg 14, Area 11, collapse.

7.7i 5571:07 Sub-circular disc of unfired clay. Buff coloured with rare fine black and white inclusions. Both surfaces are flat to slightly convex with rounded rim. The rim is deeply cracked and at one part broken off. Possibly used as a lid. Presumably made by hand-patting the clay into shape. Diam. 4.7, thickness 1.4. Bldg 225, Area 318, floor.

7.7j 5208:15 Lid or stopper of roughly shaped unbaked clay, in the shape of a waisted, truncated cone. Base oval, flat to slightly concave. Top worn or broken away, otherwise intact. The clay is similar to that used for clay sealings, mottled grey-green with no really visible inclusions. H. 2.8, base diam. 2.9 – 3.6. Bldg 220, Area 314, sand.

7.7k 2024:03 Knob? Short, waisted, cylindrical piece of baked clay. One end is slightly convex, the other slightly hollowed out. Outer surfaces all smoothed. Perhaps the broken-off knob to a lid or similar. Diam. at one end 2.9, at other 3.7, length 3.9. Bldg 55, Area 81, collapse.

7.7l K16:51:26 Pottery disc, presumably a lid. One surface has a rough patch in the centre, presumably the attachment for a knob, now missing. Brown clay. Diam.10 × 10, thickness 1.2. Bldg 51, Area 55, occupation.
Chapter 8 Animal bone finds and their relevance to the ecology and economy of Saar

Margarethe Uerpmann and Hans-Peter Uerpmann

Introduction

A large amount of animal remains was collected during the excavations at Saar. This material has, over the course of the project, been examined by more than one specialist. The mollusc shells were studied by Emily Glover, the mammal bones by Keith Dobney and Debbie Jaques, and the fish remains from the temple by Brian Irving. The report subsequently published by Dobney and Jaques (1994) outlined the general features of the bone finds and the characteristic traits of the animal economy of Saar, such as the importance of marine resources for subsistence and the predominance of sheep and goats in animal husbandry. Our subsequent work, presented here, has confirmed most of the results of this report, and their results are incorporated into this account without individual citation.

A report on the fish remains from the temple has also been published (Moon and Irving 1997). This was of great value to us, not only for the information provided on the temple assemblage but also for the general remarks on the different fish species represented at Saar.

The present authors started their work on the faunal remains from Saar during the 1997 season of excavations.¹ Another visit to the site followed in 1999. Materials that needed to be studied in more detail or could not be identified in the field were temporarily exported to Germany with the kind agreement of the National Museum of Bahrain. The aim of our studies was a detailed evaluation of the bone remains from particular buildings, including all vertebrates from fish to mammals. Bldgs 205, 207, 208 and 209 were chosen for this purpose. The finds from the temple and from Bldg 53, as well as a number of other contexts, were examined for additional information on particular topics. Of special interest was a correlation of our observations with the results of the micromorphological studies of floors (see Chapter 10). Apart from these site-specific questions, we were also interested in the comparative aspects of the Saar fauna in relation to other sites in Bahrain and southeast Arabia.

Vertebrate remains from particular buildings at Saar

According to microstratigraphic observations (Matthews et al. 1997), house floors at Saar consist of foundation material and other deposits deliberately brought in to form the floor. On and within the surface of this floor occupational debris and wind-blown sand accumulated afterwards. Together these materials created the matrix embedding the preserved faunal remains. The condition of the bone finds is fairly good due to the presence of calcareous materials which had a buffering effect, balancing the negative influence that sand generally has on bone preservation. Nevertheless, the texture of most bones is soft and chalky. It has to be taken into account that this type of sedimentation favours small and flat pieces of bone, because larger and thicker pieces often take too long to become embedded and thus protected from decay. In any case, large bones would not have been deposited on the floors of living spaces where they would have had obstacles for walking or sitting. Thus, some bias towards the proportional presence of bones of smaller rather than larger animals is to be expected in this kind of deposit. To some extent this may by counterbalanced by the fact that some of the buildings also contain layers that formed during periods of non-occupation. These layers, labelled collapse or sand in the excavation database, contain typical bone waste—such as whole or partial carcasses—which accumulated in areas that were not active living spaces during the time of layer formation.

As a general observation, bone finds are not evenly distributed within the building deposits at Saar. Within the floor and occupation layers of Bldgs 205 and 207, which were particularly evaluated for this purpose, bones accumulated mostly towards the walls. As might be expected, the corridors and central parts of the rooms, which must have been the main walking areas, were less strewn with bone fragments (Figs. 8.2 and 3).

Most of the vertebrate bones from Bldgs 205 and 207 is marine fish remains. As shown in Table 8.1, mammals only make up 12% (Bldg 205) and 20% (Bldg 207) of the total bone weight from these two buildings.² Bldgs 208 and 209 are even poorer in mammal re-

---

Table 8.1 Total amount of fish and mammal remains from buildings (total weight of dry unwashed bone finds)

<table>
<thead>
<tr>
<th>Bldg</th>
<th>Fish (gm)</th>
<th>Mammal (gm)</th>
<th>Total (gm)</th>
<th>%Mammal</th>
</tr>
</thead>
<tbody>
<tr>
<td>205</td>
<td>4,106</td>
<td>580</td>
<td>4,686</td>
<td>12.4%</td>
</tr>
<tr>
<td>207</td>
<td>2,433</td>
<td>644</td>
<td>3,077</td>
<td>20.9%</td>
</tr>
<tr>
<td>208</td>
<td>3,361</td>
<td>118</td>
<td>2,479</td>
<td>3.4%</td>
</tr>
<tr>
<td>209</td>
<td>5,397</td>
<td>228</td>
<td>5,735</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

---

¹ Referenced in the text.
² Referenced in the text.
The figures in Table 8.1 are total weights of unwashed bone finds which were not further identified at this point of the analysis. They include the finds from all deposits within the buildings.

The finds from Bldgs 205 and 207 were then further quantified separately according to the one metre grid used for the microstratigraphic analysis. The diameters of the sector-diagrams within each square of Figs. 8.1 and 2 represent the total amount of finds in terms of their weight, and the proportion of fish versus mammal bones is indicated by the respective sectors in the diagrams.

The two buildings both have an outer room, part corridor and part living space, and a single inner room. The outer rooms were perhaps partly roofed and the inner rooms roofed entirely (see Chapter 10).

Bldg 205 has an additional unroofed rear yard, where the quantities of bone finds were highest. Mammal remains are more frequent in the rear part of this area. This is explicable along the lines of reasoning used before: the entrance area and pathway around the central basin have the smallest overall quantities of discarded bones and the least proportions of mammal remains. These have an overall tendency to be more frequent in the less circulated parts of the rear yard. The paucity of bone in the northeastern corner (Square 3) may have to do with erosion and the accumulation of coarse wind laid sand in this area (Matthews et al. 1997).

The comparatively high amount of mammal bones in the rear yard of Bldg 205 is due to the dispersed partial skeletons of at least two sheep. In the occupation layers of Square 2 parts of the front and hind limbs of a subadult sheep were found together with some vertebræ of an adult sheep or goat. An almost complete skeleton of a young sheep (c. 3–6 months old) was dispersed in the occupation layers of Squares 6 and 8. In addition there was a gazelle bone and some ribs of unidentified small ruminants in Square 6. Square 8 also contained a radius of a cormorant. These last finds indicate disarticulated food remains whereas the skeletons, although dispersed, may have come from discarded carcasses. This is most likely for another partial skeleton of a new- or still-born sheep from Square 5 which was found in the sand above the occupation layer.

Within the outer rooms of both buildings the total amount of bone also mirrors the circulation patterns. The entrance corridor and the central area of the outer room have the least accumulation of bone, while the corners beside the ovens and other structures, as well as the peripheral parts of the hall, have accumulated more animals remains. The inner rooms with their plastered floors are comparatively rich in bone finds. A common feature of both buildings is the remarkably high proportion of mammal remains in the inner rooms. While this may be due to reduced circulation in these parts of the buildings, it might also be connected to the differential consumption of meat versus fish in the functional units of the buildings.

Differences in the spatial distribution of mammal versus fish remains might be related to the nutritional properties of these two sources of protein for human consumption. The red meat of mammals and birds is commonly more appreciated than fish, which has to do with its additional value as a source of easily digestible iron. Such iron is in particularly high demand among people suffering from chronic anaemia. To some extent this can be assumed in most sedentary pre- and proto-historic populations, because malaria and other parasitic infestations were common in more densely inhabited areas.

If there was a nutrition-related background to the larger proportion of mammalian remains in the inner rooms, one could assume that those household members who regularly received more red meat than the others ate their meals in the inner chambers. Without further indications it is difficult to determine which part of a population this might have been. It may have been the chil-
dren, who would certainly have benefited from an iron-rich diet. However, given common human behaviour-patterns this seems unlikely. Women also have an increased demand of iron because of their periodic loss of haemoglobin, but awareness of this demand is again probably a modern phenomenon. It is most likely that personal status rather than physiological considerations determined the amount of red meat that was normally given to a particular household member. Whoever this was, the distribution of mammal versus fish remains in Bldgs 205 and 207 might suggest that he or she regularly ate in the inner room, leaving a representative portion of the bone waste on the floor where it became embedded in the archaeological layers.

Differences could probably also be expected in the distribution of fish-bones within the buildings, if status-related consumption is reflected by the discarded remains. As indicated by today’s market prices, some fish species are more appreciated than others. Unfortunately for our purposes, all of the major fish families found in the bone remains from Saar are excellent food fish. The most important family is the emperors (Lethrinidae) of which *Lethrinus nebulosus* (the *sha’ari* fish on the fish markets in the Arabian Gulf area) is highly esteemed as fillet fish. *Epinephelus coioides*, local name *hamour*, is the most appreciated member of the groupers (Serranidae) in this area today. Together these two families produced almost two thirds of those fish remains from Bldg 207 that could be evaluated with regard to their spatial distribution. The remaining third of the fish remains comes mostly from seabreams (Sparidae) and kingfishes (Carangidae), which also comprise excellent food fish. A fish highly esteemed in Bahrain today, the rabbitfish or *safi* (*Siganus spec.*) is only found in small numbers at Saar and cannot be used as an indicator for a differentiation of food habits, nor are less valued groups such as rays frequent enough to provide spatial evidence for the consumption of low status food. Fig. 8.4 documents the amount and proportions of the major fish families represented among the fish-bones from Bldg 207 in terms of their bone weight.

We see no indication in Fig. 8.4 of any peculiarities in the distribution of fish species throughout Bldg 207 that might suggest preferential consumption of certain kinds of fish in the inner room. As will be discussed later, the fish that might have been more appreciated than others were the Lethrinids and the Carangids. The latter in particular are certainly not over-represented in the inner room. Unless other kinds of evidence corroborate such conclusions we prefer to argue against consumption-related interpretations of the spatial distribution of certain kinds of bone waste within the buildings. The differences visible in Figs. 8.2 and 3 are more likely to be related to circulation patterns within the buildings. More and thicker bone waste could accumulate in those parts of the buildings that were less often entered than others.

There is direct evidence that bone waste was tolerated on floors during the occupation of the buildings. Three accumulations of articulated fish-bones were observed and documented during the excavation of Bldg 207 (marked A, B, and C in Fig. 8.4). They were consolidated *in situ* and excavated as blocks.

**Group A**

This was an agglomeration of a piece of a vertebra-column and several head bones (Fig. 8.6) found in the western corner of the hall (left of Square 15). The connected vertebrae (a) are from the transition between the precaudal and the caudal segment of the vertebral column of a golden trevally (*Gnathanodon speciosus*). The cleithrum (b) might be from the same individual as well as some hardly visible vertebrae beside it (c). The premaxilla next to it (d) is from a different fish. It belonged to a grouper (*Epinephelus* spec.). The same is true for an articular bone (e) and a hyoid (f).

**Group B**

This group also consists of the remains of several fishes (Fig. 8.7). There is a big piece of the vertebral column (a) of a grouper (*Epinephelus* spec.) consisting of 12 segments beginning with the proatlas. Between the spines the pterigophora of the dorsal fin are still in place, indicating that the piece was fresh with coherent soft tissues when it was discarded. The same seems to have been the case with the tail (b) of a big emperor (*Lethrinus cf. nebulosus*).
the early Dilmun settlement at Saar

296

the anal fin (c) of a golden (?) trevally (cf. *Gnathanodon speciosus*). Some isolated head parts of an emperor, seemingly deposited later, lay on top of this fin.

**Group C**

Group C is the tail of a large seabream (Sparidae) which was also deposited while it was still coherent. Contrary to the fin parts in B, which would have fallen apart in a cooked fish, this tail may be the remnant of a prepared meal.

**Fish remains**

Fish-bones form the bulk of the faunal material excavated at Saar. As funds and time were limited, it was impossible to attempt a quantitative analysis of the entire collection of fish-bones from all the excavated areas. Even the material from the buildings selected for our study had to be sampled. The aim of our study of this part of the animal remains was to contribute observations on the role of fish to the formation of ideas about day-to-day economy of the settlement. The effort put into the identification of individual finds was therefore mainly directed towards including as many skeletal parts as possible of the frequent species. Less effort was put into the zoological identification of smaller fish which were of minor economic importance at Saar. It might, therefore, have been possible to lengthen the list of identified fish species, but as the comparative collection used for the identification of the fish remains from Saar consists almost completely of recent specimens from the Arabian coasts of the Gulf and Oman, we would in any case not have been able to identify species beyond the range of the present ichthyofauna of the area. Our comparative collection comprises all fish families found in the Gulf today containing species which reach a length of more than 25 cm (according to Carpenter et al. 1997), with the exception of Elopidae, Megalopidae, Polynemidae and Molidae. Many smaller fish are represented as well, but not in a systematic fashion.

Recovery of fish remains during the excavation of the buildings selected for our study was exceptional because most of the sediments from the floor and occupation levels were sieved (using a 3 mm mesh for dry sieving and a 1 mm mesh for wet sieving). A large number of very small fragments could still be identified as fish because of their laminar structure or their particular morphology. When counted, fish remains would therefore have reached almost 100% of the finds. The quantification by weight, as used for analysing the spatial distribution (see above), gives a more realistic image.

Specific identification of fragments of fish-bone is limited by fragment size. Many of the small specimens found by sieving could not be identified further. Fig. 8.9 relates the weight of the identified specimens to the total amount of fish remains from individual squares of the excavation grid in Bldg 207. The total amounts were determined during preliminary sorting of the sieved bone material. On average, one third of the weight of the middle of the walking area of Bldg 207 (Group B) indicates fairly soft underground conditions that allowed the spines to become embedded quickly, protecting them, as well as the feet of the inhabitants, from any damage.

**Fig. 8.8 Golden trevally (*Gnathanodon speciosus*)**
### Table 8.2 Identified fish remains from Bldgs 205, 207 and 208 (numbers of identified specimens)

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Bldg 205</th>
<th>Bldg 207</th>
<th>Bldg 208</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHONDRICHTHYES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARCHARHINIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RHINOBATIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MYLIOBATIDIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cf. Aetobatus narinari</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified CHONDRICHTHYES</td>
<td>2</td>
<td>19</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>OSTEICHTHYES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLupeidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHANIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARIIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cf. Aetobatus narinari</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified CHONDRICHTHYES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSTEICHTHYES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SERRANIDAE</td>
<td>133</td>
<td>127</td>
<td>194</td>
<td>387</td>
</tr>
<tr>
<td>Epinephelus spec.</td>
<td>133</td>
<td>127</td>
<td>194</td>
<td>387</td>
</tr>
<tr>
<td>CARANGIDAE</td>
<td>52</td>
<td>136</td>
<td>29</td>
<td>217</td>
</tr>
<tr>
<td>CARANOIDES chrysophrys</td>
<td>4</td>
<td>2</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>CARANOIDES spec.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>CARANX spec.</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Gnanathanodon speciosus</td>
<td>33</td>
<td>74</td>
<td>19</td>
<td>126</td>
</tr>
<tr>
<td>Scomberoides spec.</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Seler crumenophthalmus</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Seriola dumerilii</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>LUTJANIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GERREIDAE</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>HAEMULIDAE</td>
<td>3</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Plectorynchus spec.</td>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Pomadasys spec.</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>LETHRINIDAE</td>
<td>412</td>
<td>567</td>
<td>777</td>
<td>1756</td>
</tr>
<tr>
<td>Lethinus spec.</td>
<td>412</td>
<td>567</td>
<td>777</td>
<td>1756</td>
</tr>
<tr>
<td>SPARIDAE</td>
<td>89</td>
<td>289</td>
<td>72</td>
<td>450</td>
</tr>
<tr>
<td>Acanthopagrus spec.</td>
<td>8</td>
<td>6</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>Argyrops spec.</td>
<td>6</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Rhabdasargus spec.</td>
<td>20</td>
<td>122</td>
<td>19</td>
<td>161</td>
</tr>
<tr>
<td>Sparidentex hasta</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>EPHIPPIDAE</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Platax spec.</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>MUGILIDAE</td>
<td>4</td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Sphyraenidae</td>
<td>4</td>
<td>13</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Sphyraena spec.</td>
<td></td>
<td>13</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>SCARIDAE</td>
<td>15</td>
<td>22</td>
<td>4</td>
<td>41</td>
</tr>
<tr>
<td>Siganus spec.</td>
<td>15</td>
<td>22</td>
<td>4</td>
<td>41</td>
</tr>
<tr>
<td>SIGANIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scombridae</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Euthynnus affinis</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>TETRAODONTIDAE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identified Osteichthyes</td>
<td>715</td>
<td>1232</td>
<td>943</td>
<td>2893</td>
</tr>
<tr>
<td>Unidentified small Osteichthyes</td>
<td>66</td>
<td>118</td>
<td>7</td>
<td>191</td>
</tr>
<tr>
<td>Unidentified medium Osteichthyes</td>
<td></td>
<td></td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Unidentified large Osteichthyes</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>793</td>
<td>1395</td>
<td>950</td>
<td>3141</td>
</tr>
</tbody>
</table>

Table 8.2 Identified fish remains from Bldgs 205, 207 and 208 (numbers of identified specimens)
unwashed samples shows up in the quantification of the identified fragments. As these specimens were cleaned during the identification process, there is an unmeasured quantity of dirt included as a loss of weight. We assume that in reality about half of the fragments could be further identified. The unidentified remains in Table 8.2 comprise only those specimens whose anatomy could be determined but where no agreement was found with any of our comparative specimens.

All fish remains from Bldg 207 were analysed further, while from Bldg 205 only a random selection of grid-squares could be studied in detail. Some of them had several superimposed layers. From Bldg 208 about a quarter of the fish remains was further analysed. These were sieved samples from the floor level. A quantitative list of the fish taxa identified within these complexes is given in Table 8.2. The column for the totals includes three bones from other contexts at Saar that represent fish families not found in the buildings mentioned above. It should be mentioned that, in addition to the taxa listed in Table 8.2, the report of Brian Irving on the fish remains from the temple also lists goatfishes (Mullidae) and angelfishes (Pomacanthidae) as being represented at Saar.

The majority of the fishes found in Saar belong to the demersal fish fauna living in the coastal waters around Bahrain (based mainly on Al-Baharna 1986). They correspond to the same species that could be identified at other sites on the island from where fish remains were studied (Al Markh: Driesch and Manhart 2000; Qala‘at al Bahrain: Excavation 519, M. Uerpmann and H.-P. Uerpmann 1999; Excavation 520, Van Neer and Uerpmann 1994; French excavations, Desse-Berset 1995).

At Saar, the most esteemed fishes were the emperors or Lethrinidae, mainly represented by the species locally called sha’ari (Lethrinus nebulosus). Next in importance were the groupers (Serranidae), of which the hamour (Epinephelus coioides) is highly appreciated on the local fish markets today. Seabreams (Sparidae) were of equal importance. Other important food fishes were some members of the Carangidae (jacks or trevallies), particularly those species which reach sizes of up to 100 cm. Finds of the most esteemed food fish in Bahrain today, the rabbitfish (Siganidae), local name safe, are less frequent. Most probably they are under-represented in the faunal remains for taphonomic reasons. Compared to the families mentioned before, the rabbitfishes are relatively small and have light facial bones, which do not preserve as well as those of larger or more robust fishes, like the spardis with their heavy jaws. Nevertheless, the proportion of rabbitfish in the diet of the inhabitants of Saar seems to have been rather low. Otherwise more vertebrae would have been found, as these do not suffer as much from differential taphonomic loss as the head bones of this family. Of the other species found at Saar only the barracudas (Sphyraenidae) yielded more then a dozen bone finds. Like the remaining fish on the species list, they were numerically and by weight only of minimal importance for the diet.

As previously mentioned, the fish spectrum of Saar closely reflects the range on offer at present-day fish markets in the region. What is missing or under-represented in the ancient spectrum are the nowadays important catches of mackerels (Scomberomorinae), and tunas (Euthynnus affinis and Thunnus spec.), and sardines and herrings (Clupeidae). These fishes are either caught with techniques not available during ancient times (such as trawling) or are caught in the open sea, further away from the coast than the ancient fishermen of Saar seem to have ventured. Coastal fishing was most commonly practised at Saar. It can be assume that fishing with hook and line was the usual technique to catch the big specimens of jacks, groupers and emperors which are generally in the upper size range of today’s catches or even larger. Fish-hooks of copper or bronze, from floors, occupation levels and even pits in some buildings, including Bldg 207, display variation in size and shape. There are barbed and unbarbed hooks, with flat to round cross-sections, ranging in length from under 2 cm to 7 cm and in thickness from under 1 to 7 mm (see Fig. 5.3). Since most of them are fragmentated or bent it is not easy to reconstruct their original shape, but it is the presence of such variation that is significant. It shows that at Saar they fished for a variety of fishes and had knowledge about the behaviour of the targeted fish groups.

Today, the use of haddrahs (big stationary fish traps made of wood and palm-fronds) remains characteristic of the fishing industry of Bahrain (Desse-Berset 1995). Fish entering the intertidal zone at high tide are caught in the enclosures and are kept there when the waters retreat during low tide. Haddrahs are extremely suitable for the waters around Bahrain, where the sea bed is flat and the intertidal zone is quite extended. In such environments haddrahs are very effective for catching demersal fishes. Many of the fishes represented in Saar could have been caught in haddrahs: emperors, groupers, seabreams, rabbitfishes, parrotfishes, sea catfishes, and also young barracudas enter the intertidal zone at high tide. The rabbitfishes in particular, which have a small mouth and are normally not caught by hook and line, and small barracudas, which are not so rare in Saar, might indicate such installations. The use of nets for catching these fishes cannot, of course, be excluded.

It is not possible to catch pelagic or semipelagic species of the Scombridae family (tunas and mackerels) in haddrahs. In ancient times they must have been caught mainly by hook and line, because drift-nets large enough to catch these species were probably not in use. Their proportion within the fish remains of Saar is so low that offshore fishing must have been insignificant. On the other hand, fishing in very shallow coastal waters and lagoons must be assumed and seems to have been of some importance. Such habitats are represented at Saar by seabreams of the genus Rhabdosargus, which are numerically significant. Other species of these habitats, like guitar fishes (Rhinobatidae), flatheads (cf. Platicephalus indicus) or silver biddies (Gerreidae) are mostly represented by single finds only.

Some of the well represented species, such as emperors (Lethrinidae), large sea-breams (Acanthopagrus spec.), golden trevallies (Gnathanodon speciosus), and also barracudas (Sphyraena spec.) and snapping lujians (Lutjanidae), hatch in such inshore habitats. However, juveniles of these species are rarely found in Saar. This is in contrast to the situation at the late fifth millennium BC site of al-Markh on the west coast of Bahrain, where fishing in lagoons or shallow waters was the prevailing form of fishing (Driesch and Manhart 2000). This problem will be considered again when dealing with the geographical origin of the fishes found at Saar.

Fishing practices at Saar can be compared to the contemporary situation at Qala‘at al Bahrain. One has to keep in mind, though, that the fish remains from the Danish excavations 519 and 520 at Qala‘at al Bahrain derive from handpicked bone finds and are therefore not directly comparable with those from Saar where sieving was applied.

Differences in quantitative proportions of major fish species (Fig. 8.1) from Qala‘at al Bahrain and Saar should therefore be interpreted with caution. On the other hand, one may assume that fish-bones above a certain size and with good diagnostic features would have the same chance of being retrieved with or without sieving. This should be particularly true for the big bones of large specimens of the King soldier bream, Argyros spinifer. Their jaw bones and the characteristic hyperostotic bones on top of the skull are quite common at Qala‘at al Bahrain but hardly to be found in Saar. The same is true for bigger shark vertebrae from
requiem and hammerhead sharks. One may conclude that these fishes were either not esteemed as food or not easily available to consumers at Saar. The first possibility is not likely because sea breams in particular range among the excellent food fish, and the big size of *Argyrops* would have made this species even more desirable. It is more probable, therefore, that these fish were not in easy reach for the people of Saar. This indicates that they did not get their fish from the same sources as the inhabitants of Qala’at al-Bahrain but rather from coasts closer to the site. Big soldier breams as well as larger sharks would more likely have been caught in the open waters north of the island, which are the natural fishing grounds for Qala’at al-Bahrain. To the west and northwest of Bahrain, where fishermen based at Saar would have gone first, the waters are divided by small islands and stay shallow for a long distance. To a minor extent, the observed differences between Saar and Qala’at al-Bahrain may also have been caused by divergent socio-economic conditions. Differences in status or wealth and different sizes of consumer groups or households are only two possible explanations for varying preferences with regard to fish consumption.

Differences not only exist between the two compared sites but also between different buildings within Saar itself. While the differences between Saar and Qala’at al-Bahrain could be influenced by the sampling techniques, this should not be the case between the different buildings of Saar because they were excavated in the same manner. Numerically the emperors or Lethrinidae were the most frequent fish in all buildings. The inhabitants of Bldg 208 seem to have been especially fond of this fish (Fig. 8.10). Interestingly, this is not only expressed in the amount of finds but also in a preference for particularly large fish (Fig. 8.11). The preferred size in Bldg 208 was well over 35 cm and up to 50 cm standard length, whereas in Bldg 207 emperors of about 35 cm were the most abundant size class together with some larger specimens. In Bldg 205 there is a marked variability of size classes. At Qala’at al-Bahrain 519 the size distribution of the emperors was similar to that of Bldg 208 in Saar.

How can these differences be explained? As the bone assemblages from all buildings represent a fairly long time of bone accumulation, one would expect an even distribution of fish species and sizes if every building had the same opportunity to receive every kind of fish. Theoretically, this assumption could be tested but, in the present case, a meaningful statistical test is excluded by the fact that realistic numbers of fish-individuals cannot be produced from the numbers or weights of the isolated bone finds. It seems reasonable, nevertheless, to assume that the variation in quantity and size of the emperors is due to some kind of more-or-less conscious selection by the inhabitants of the respective buildings.

In a larger number of unselected catches of emperors, their size variation would reflect the demography of the exploited population, depending, of course, on the fishing grounds and the fishery techniques. The majority of the emperors found in Saar were probably caught in fish traps together with a large range of other species. Among the species that are likely to enter traps, there is no further selection except for the minimum size of the retained individuals, which depends on the mesh-size of the screening used for the particular trap. A time-span of several decades, which is certainly the case here, would most likely have levelled out the natural differences between the individual catches. The taphonomic processes would have had an additional effect on eliminating particularities, thus leading to a high degree of uniformity of the resulting bone waste embedded in the archaeological layers. Therefore, causes related to the behaviour of the consumers of the fish are the most likely explanation for the differences observed from building to building at Saar. Recent observations about traditional fishing communities in Pakistan support this assumption. They show that means and preferences of fish consumers do lead to different selections of species, sizes and body parts of the consumed fish (Belcher 1998).

An attempt to apply this to the interpretation of the Saar observations requires an initial assumption that the inhabitants of the various buildings were able to select the fishes they wanted. Although most fishing techniques are selective to some extent, they generally produce a broad range of more-or-less wanted species and size classes of fishes. Thus, conscious selection means that only particular specimens out of the ‘natural’ catches were used. Probably this means that the inhabitants of the buildings under study did not catch their fish themselves or, if they did so, they did not use their complete catches. A possible, though unlikely explanation might be that every household did its own fishing and then exchanged the unwanted part of the catches with other households. Given the fact that Saar is situated 3.5 km from the west coast of the island, another explanation seems more likely: fishermen from the coast may have offered their catches as exchange goods to the inhabitants of Saar, who in turn had an opportunity to select what they wanted. This might indicate some sort of a market system. As an alternative, fish caught by specialized parts of the population could have been distributed to the households at Saar according to what they deserved within the context of the prevailing social rules. Status- or value-related distribution systems of food items are clearly indicated by the spatial pattern of bone waste at Qala’at al-Bahrain (M. Uerpmann and H.-P. Uerpmann 1997).
As the differences between the sampled buildings at Saar reflect long-term conditions, individual food preferences may not be the best explanation for the observed selection. Social differences between households, on the other hand, may have been stable for several generations. In any case, a controlled system of fish distribution, perhaps some kind of fish marketing, is the most likely explanation for the observed differences between the studied samples.

It was assumed above that the fish consumed at Saar came from the northwest coast of Bahrain, which is the shore nearest to the ancient town. However, this assumption requires some consideration. The hydrological situation of Saar during its time of occupation may have been quite different from what it is now. Marine sediments were found to the east of Saar where an inlet reaching towards the site from the east coast may have provided a direct connection to the sea in this direction (see Chapter 11). If this inlet was contemporary with the occupation of the site, it would have implications for the whole economy of Saar. The east coast, which is farther away from Saar today than the west coast—8 km as opposed to only half that distance—would then have been accessible by boat from close to the ancient town. In addition, the former inlet might also have been a local fishing ground for the inhabitants of Saar. Unfortunately, the geological investigations were not conclusive with regard to the dating of the ancient inlet. In any case, the fish remains found at Saar do not indicate to any degree a source such as an inlet or lagoon, or even the east coast of the island.

Although a postulated market situation or a socially-controlled system of fish distribution at Saar may conceal to a large extent the geographical origin of the consumed fish, some indications for fishing in an inlet should have remained visible. It has already been pointed out that fishing in inlets, estuaries and lagoons is indicated not only by the predominance of certain species, but also by the occurrence of smaller size classes of those fishes which favour such habitats as juveniles. As an example, the high proportion of small emperors within the fish-bone assemblage from the ‘fish-layer’ at Tell Abraq (Uerpmann 2002) indicates the extensive use of the nearby lagoon as a fishing ground by fishermen of the second millennium BC on the eastern coast of the Gulf (Fig. 8.12). At Saar, however, there is little evidence for fishing in protected water.

Looking at today’s fishery statistics (Directorate of Fisheries 1995), the catches on the east coast differ from those on the west coast of Bahrain (Fig. 8.23). Although these statistics clearly depend on modern fishing technologies, they still indicate some basic ecological traits of the waters around the island. In particular, the high catches of rabbitfish (Siganidae) and the low proportion of emperors (Lethrinidae) landed at the port of Jaw on the east coast clearly contradict our quantitative observations at Saar. Taking all lines of evidence together, it seems most likely that the inhabitants of Saar received most of their fishes from the northwest coast of the island, which is adjacent to rich and varied marine environments. This implies that the observed features of the fish economy at Saar are valid and not a result of different ecological conditions in the past.

Remains of amphibians and reptiles

The finds of cold-blooded terrestrial vertebrates from Saar are rare and have little relevance for the economy of the ancient settlement. As they are of particular zoological and ecological interest, however, not only the finds from the buildings studied in detail are presented here but also those that were encountered from other contexts examined during our work at the site. There are 23 amphibian vertebrae, some of them with preserved lateral processes typical of the Anura (frogs and toads). There is also a shaft of a long bone with the tubular structure of amphibian bones (I13:001:01, from Bldg 200). The animals represented by these bones were larger than an adult toad (Bufo bufo) in our comparative collection, and the vertebrae were different from those of the toad. As observed by Gallagher (1971 and pers. comm.), the lake frog, Rana ridibunda, is the only amphibian on Bahrain today. There was no comparative material of this large frog at our disposal, but the large size of the vertebrae may well indicate that they actually represent this species. Another vertebra of the same kind was found in the temple (in context 1504). The presence of a frog bone in the temple may have to do with the already attested use of freshwater in this context (Glover 1997: 8ff.).

Most of the few reptile bones from Saar derive from marine turtles, which—as animals of economic importance—will be dealt with separately below. In addition, however, there are two small pieces of the bony carapace of a freshwater tortoise. The specimens were found in Bldg 53 (I17:006:04; I17:006:01). They may be from the same individual and do not appear to be intrusive to the layers. One of them is from the sharp posterior margin of the ventral carapace (plastron), and the other is from the inguinal area where the plastron is connected to the dorsal carapace. According to Gallagher (ibid.) the Caspian terrapin, Mauremys caspica, occurs on Bahrain today. Although it is dif-

\[
\begin{array}{c|c|c|c}
\text{W} & \text{N} & \text{E} \\
\hline
\text{Carangidae} & \text{Lethrinus} & \text{Epinephelus} & \text{Siganus} & \text{Sparidae} \\
\end{array}
\]

Fig. 8.13 Catches of major fish families in 1995 at villages on the west, north, and east coasts of Bahrain, and from the Saar settlement. (The Saar data is expressed as bone-weight percentages of the respective fish families among the total bone finds from Bldgs 205, 207, and 208)
ficult to compare the young specimen of this taxon in our com-
parative collection with the Saar bones (which indicate a much
larger animal), there is agreement to the extent that this appears
to be the most probable identification for the finds from Bldg
53. The identification is important, because it indicates that the
occurrence of the Caspian terrapin is autochthonous. This sug-
ests that open freshwater ponds or streams were close to the
settlement, where terrapins could reach their adult size and their
population could thrive and propagate in spite of the general
desert climate of the island.

There are three vertebrae belonging to one or more snakes
which could not be identified further because of lack of compara-
tive skeletons (Ki:6:02:0:20, from the inner room of Bldg 53). It
does not seem to be one of the marine snakes of the Arabian Gulf,
however, which have fairly high spinal processes not present in the
Saar specimen.

Compared to other sites in the Gulf area the frequency of
marine turtle remain is remarkably low at Saar. Among the
bone finds from the buildings evaluated for this study there are
only four bones with a total weight of 75 gm, indicating that tur-
to were not of importance for the subsistence of the inhabit-
ants. Except for Bldg 209, there were only occasional finds of
small bone fragments of turtles: one piece (2 gm) of the bony
carapace from Bldg 205, and one small radius fragment (1.1 gm)
from the deep sounding in the temple. Bldg 209 yielded a left
radius fragment (1.1 gm), a left ulna fragment (0.7 gm) and a
left bone fragment (0.7 gm) of a turtle. Fifteen bird bone fragments
were found, more in absolute numbers and weights as well as in
relation to other vertebrates (M. Uerpmann and H.-P. Uerpmann
1994, 1997). During the fourth and third millennia bc turtles were
of even greater importance at sites in southeastern Arabia (e.g. M.

Possible reasons for the scarcity of turtle remains at Saar may be
found in simple environmental causes related to the distance be-
tween site and coast. Turtle meat, like that of sea-cows, may have
been brought to Saar without bones, leaving no material evidence
for the nutritional importance of these animals. Given the difficul-
ties of defleshing a turtle, such is unlikely to have been the case.
Cultural avoidance of this kind of food should also be considered
as a possibility.⁴

Table 8.3 Amphibian, reptile and bird remains

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Bldg 53</th>
<th>Bldg 205</th>
<th>Bldg 207</th>
<th>Bldg 208</th>
<th>Bldg 209</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unidentified frog, Anura indet. (Rana ridibunda?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Hawksbill turtle, Eretmochelys imbricata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Caspian terrapine, Mauremys caspica</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Unidentified snakes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Cormorant, Phalacrocorax spec.</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>*23</td>
<td></td>
</tr>
<tr>
<td>Houbara bustard, Chlamydotis undulata</td>
<td>*1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified birds</td>
<td>2</td>
<td>3</td>
<td></td>
<td>2</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

*Includes specimens mentioned by Dobney and Jaques (1994), and Moon and Irving (1997)

**Bird remains**

At Saar, as at other sites of the third and second millennia bc in
the Arabian Gulf area, cormorant bones are not rare. While a sin-
gle bone has been identified as common cormorant, Phalacrocorax
carbo (Dobney and Jaques 1994: 116), those well enough preserved
for specific identification in our material belong to the Socotra
cormorant, P. nigrogularis. This latter species is a breeding resident
in the southern Gulf area (Aspinall 1995), while the former is a
winter migrant from the north. In total, 32 cormorant bones were
identified, with a weight of 27.9 gm. Fifteen bird bone fragments
with a weight of 7.1 gm remained unidentified, none of which indi-
cated the presence of another bird species. With the exception of
Bldg 207 a few cormorant bones were present in all the buildings
examined.

Cormorants are less frequent at Saar than at Qal'a't al-
Bahrain, and are rare in comparison with coastal sites of the Umm
an-Nar culture, e.g. Umm an-Nar Island itself (Hoch 1979: 1995)
or Tell Abraq (M. Uerpmann 2001: 228). Cormorant bones are
light and easily carried inside a bird carcass. The distance from
the coast, where the birds must have been taken, cannot be the
reason for their scarcity at Saar. On the eastern coast of the Gulf
they were transported as far inland as Mleiha (Gautier and Van
Neer 1999: 110). Like the scarcity of turtle bones, the low number of
cormorant remains at Saar might indicate local food traditions
diverging from those of comparable sites along the southeastern
Arabian Gulf coast.

In addition to cormorants a single bone find from the temple
was identified as Houbara bustard, Chlamydotis undulata, (Moon
and Irving 1997: Fig. 82).
Remains of wild mammals

There are two categories of wild mammals represented among the bone finds from Saar: animals hunted for their meat or skin, and more or less commensal animals that lived and died in the settlement without contributing to human subsistence or economy. The last category is mainly represented by many rodent bones, most of which can be attributed to the black rat (*Rattus rattus*). Evidently the ancient township already suffered from this pest, which is assumed to have spread with early sea trade from its original range on the Indian subcontinent (Niethammer 1975, Mosseri-Marlio 2003). In addition to rat bones, there are gnaw-marks on other bone finds indicating that the rats lived in the settlement itself. In Bldgs 205 and 207, where detailed provenience of the gnawed specimens is known, they were mainly found in the inner rooms. Rats obviously closely shared the domestic space in the settlement with the human inhabitants. The gnaw marks on bone refuse also indicate that the occurrence of the rats was contemporary with the ancient settlement and that the rat bones are not—as might be assumed—later intrusions to the archaeological layers.

This may in fact be the case with the other rodent whose bones were found at Saar. The lesser jerboa, *Jaculus jaculus*, was found in two contexts. In Area 20 of Bldg 5 there were the bones of the two hind legs, femura, tibiae, metatarsals and some phalanges of a subadult individual with open epiphyses distal at the femur and proximal at the tibia (F16:008:02). From the open area around the well, there was a single femur of an adult jerboa (context 6005). Jerboas are digging animals. The two hind legs in particular look like the remains of an animal that died in its burrow. On the other hand, it is reported that jerboas are eaten by the bedouin in Iraq (Harrison 1972: 425). It cannot be excluded, therefore, that the bones found in Saar derive from human consumption.

Other animals that may have entered the archaeological layers by their own burrowing activities are the mongooses, *Herpestes auropunctatus* and *H. edwardsii*. There is a left mandible from the temple (context 1780) which belongs to the smaller gold-spotted mongoose, *H. auropunctatus*. A maxilla and two mandibles of this species have already been illustrated by Dobney and Jaques (1994: 116), identified, however, as grey mongoose, *H. edwardsii*, which is the only known mongoose on Bahrain today. Based on their

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Bldg 53</th>
<th>Bldg 205</th>
<th>Bldg 207</th>
<th>Bldg 208</th>
<th>Bldg 209</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle, <em>BOS</em></td>
<td>15</td>
<td>12</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>84</td>
</tr>
<tr>
<td>Sheep, <em>OVIS</em></td>
<td>32</td>
<td>10</td>
<td>18</td>
<td>3</td>
<td>9</td>
<td>236</td>
</tr>
<tr>
<td>Goat, <em>CAPRA</em></td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Sheep or goat, <em>OVIS</em> s. <em>CAPRA</em></td>
<td>52</td>
<td>24</td>
<td>130</td>
<td>18</td>
<td>15</td>
<td>372</td>
</tr>
<tr>
<td>Sheep and goat, <em>OVIS</em> et <em>CAPRA</em></td>
<td>91</td>
<td>36</td>
<td>150</td>
<td>21</td>
<td>26</td>
<td>688</td>
</tr>
<tr>
<td>Donkey, <em>ASINUS</em></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Domestic animals, total</td>
<td>108</td>
<td>48</td>
<td>153</td>
<td>25</td>
<td>30</td>
<td>780</td>
</tr>
<tr>
<td>Unident. small ruminants</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Wild or domestic mammals, total</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Black rat, <em>Rattus rattus</em></td>
<td>2</td>
<td>10</td>
<td>17</td>
<td></td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Lesser jerboa, <em>Jaculus jaculus</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Spotted mongoose, <em>Herpestes auropunctatus auropunctatus</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Grey mongoose, <em>Herpestes edwardsii</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Mongoose, <em>Herpestes spec.</em></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Red fox, <em>Vulpes vulpes</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Unident. dolphin, <em>Delphinidae</em> indet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Seacow, <em>Dugong dugon</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Wild camel, <em>Camelus dromedarius</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>White oryx, <em>Oryx leucoryx</em></td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Sand gazelle, <em>Gazella subgutturosa</em></td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Gazelle, <em>Gazella spec.</em></td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>2</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Wild mammals, total</td>
<td>21</td>
<td>19</td>
<td>24</td>
<td>0</td>
<td>4</td>
<td>153</td>
</tr>
</tbody>
</table>

| Unidentified mammal remains: | | | | | | |
| Small mammal | 1 | | | | | 1 |
| Small to medium sized mammal | 2 | 1 | | | | 3 |
| Medium sized mammal | 41 | 40 | 160 | 7 | 10 | 314 |
| Medium to large mammal | 8 | 4 | 25 | 1 | | 33 |
| Large mammal | 18 | 14 | 3 | 5 | | 38 |
| Undetermined bones | 9 | | | | | 9 |
| Unidentified, total | 68 | 67 | 190 | 9 | 16 | 350 |

**Table 8.4 Mammal remains**

| Fish (Table 8.2) | 793 | 1395 | 950 | | 3141 |
| Amphibians and reptiles (Table 8.3) | 2 | 1 | 2 | 35 |
| Birds (Table 8.3) | 5 | 7 | 1 | 5 | 39 |
| Total number | 204 | 936 | 1766 | 984 | 57 | 4503 |

*includes specimens mentioned by Dobney and Jaques (1994: 107, Table 1)
small size these specimens have subsequently been reassigned to the smaller gold-spotted mongoose (M. Uerpmann 1995) which was also found at Qala’at al-Bahrain, but is not known to occur on the island today. The additional find from the temple confirms the identification of this species at Saar. However, the grey mongoose does also occur. There are two slightly larger mandibles, one with teeth and the other badly damaged. The former (1159:02 from Bldg 200) is better preserved. It has a carnassial tooth that differs from the specimen found in the temple and agrees with the specimens of H. edwardsi from Qala’at al-Bahrain. The latter is not really identifiable but fits the comparative material from Qala’at al-Bahrain in its preserved features.⁵ Fig. 8.14 depicts one of the two identifiable mandibles from Saar in comparison with a specimen from Qala’at al-Bahrain (Exc. 519, context TO). The difference in size and shape is obvious between the specimen from the temple (Fig. 8.14a) and the one from Qala’at al-Bahrain (Fig. 8.14b). The other identifiable mandible from Saar is from a juvenile animal. The permanent premolars in front of the carnassial are just breaking through. The carnassial has the same configuration and size as the one from Qala’at al-Bahrain and differs from the shorter tooth of the temple specimen. The occurrence of both species of mongooses at Saar is interesting with regard to the hypothesis that the smaller H. auropunctatus was indigenous to Bahrain and had been replaced by H. edwardsi in proto-historic times, when people brought this animal in a semi-domesticated state from the Indian subcontinent (M. Uerpmann 1995). The finds from Saar indicate that this process started as early as the beginning of the second millennium BCE. The intentional spread of the grey mongoose may have been related to the inadvertent spread of rats and other commensal animal pests that accompanied early sea trade.

The identification of postcranial remains of mongooses is not as easy as the size difference between the mandibles suggests. Bldg 53 yielded small fragments of a skull and of the major bones of a left foreleg (context 2666), and a single right tibia was found in Bldg 220 (5215:01). Although these finds are slightly smaller than the respective elements of H. edwardsi from Qala’at al-Bahrain, we prefer to leave their specific identification open.

Some bones of foxes, which have already been described and illustrated (Dobney and Jaques 1994: Fig. 13), probably belong to the anthropogenic fauna of the site. The mandible fragment from Bldg 14 is charred (F17:020:01), and it may be noted that foxes were eaten regularly at many sites in the Middle East. The finds from Saar clearly represent the red fox, Vulpes vulpes. One of the bones, a calcaneus, is from a very young individual, the other bones represent one or two adults. Fox is not mentioned for Bahrain by Harrison and Bates (1991). As one of the most common small carnivores in Arabia today and during the Holocene, it must, however, have reached the island before it was cut off from the mainland. According to Dobney and Jaques (1994), there are indications that foxes are present on Bahrain today, but it is unclear whether these animals are newcomers via the recent causeway from the Saudi Arabian mainland or whether they are remnants of an original population.

A single bone represents a medium-sized dolphin. It is a loose ventral arch and medial process of a tail vertebra of an animal between 2 and 4 m in length. As such, it is a typical piece of bone that remains in the flesh of an animal butchered on the beach. The same is likely for the pieces of dugong ribs mentioned by Dobney and Jaques (1994: 114). Compared to other sites of the third and second millennia BCE along the Arabian Gulf coast, sea mammals are very rarely represented at Saar. It is possible, though, that their contribution to the diet of the inhabitants was higher than indicated by the faunal remains. Large and heavy animals like sea-cows or dolphins would have had to be butchered on the beach. As stated by Dobney and Jaques (1994), only small pieces of bone left in the butchered meat would have had a chance to get into the archaeological layers in Saar.

The camel, Camelus dromedarius, is one of the most interesting animals discovered at Saar. It is considered here to have been a wild animal on the island in the second millennium BCE, hunted by the people of Saar for its meat. Apart from fish, the camel was actually the most important source of ‘wild’ protein, if bone weight is used as a parameter for the contribution of particular animals to the diet. There is no reason to assume that the wild camels of the island were overexploited as early as the beginning of the second millennium BCE. As today, early settlements on Bahrain were concentrated in the north, leaving enough space for viable populations of wild ungulates in the larger and desert-like southern half. On the other hand, wild camels are prone to overhunting because of their slow reproduction. At Tell Abraq on the eastern Gulf coast, heavy exploitation of wild dromedaries in the Early Bronze Age led to their decrease and local extermination towards the end of the Bronze Age (M. Uerpmann 2001). There, camel bones re-appear in the archaeological sequence during the Iron Age 2 with a somewhat smaller form, considered to represent the domestic dromedary (H.-P. Uerpmann and M. Uerpmann 2002).

The camel species present at Saar is the one-humped camel, Camelus dromedarius, as documented by the slender shape of the posterior first phalanx illustrated by Dobney and Jaques (1994: Fig. 13), which is the best-preserved find of this species at Saar. Apart from several long-bone shaft fragments there is one other first phalanx of large size. As observed at Tell Abraq and Umm-an-Nar (H.-P. Uerpmann and M. Uerpmann 2002), some of the wild dromedaries—probably the males—were much heavier than most modern dromedaries. The occurrence of such a large specimen is evidence for the wild nature of the dromedaries present at Saar. It must, however, be clearly stated that such a small complex of finds does not by itself allow conclusions to be drawn about domestication. Without reference to the much larger complexes of camel remains from the UAE, the status of the Saar dromedaries would have had to be left open. Within the larger context of sites in the central and eastern Gulf area of Arabia, the position of Saar clearly corresponds to other second and third millennia settlements where the wild camel population of the surroundings was used as a source of additional meat.

The sand gazelle (Gazella subgutturosa marica) and the oryx antelope (Oryx leucoryx) are the classic game animals of the Arabian desert. Remains of these animals are more frequent at Saar than at Qala’at al-Bahrain. Hunting contributed more to the diet at Saar,
which is situated closer to the more desert-like south of the island, than at Dilmun’s capital, which lay directly on the north coast. If the assumption of an inlet reaching towards Saar from the east coast is correct, Saar would also have controlled the bottleneck area for movements of the wild fauna between the well-watered north of the island and the dryer south.

While the identification of the oryx bones is unproblematic because of the clear morphological characters of most skeletal parts of this species, the positive identification of the Arabian rheem or sand gazelle was only possible in a complete male horn core with preserved base and a piece of the frontal bone. The position of the horn base close to the median suture of the frontal is typical for \textit{G. subgutturosa} and the slenderness and shape, together with a slight homonym twist, is typical for the Arabian subspecies. The characteristic female horn cores of \textit{G. s. marica} were not among the finds of the buildings studied, nor could they be isolated among the other materials looked through by the present authors.

![Fig. 8.15 Seal from Saar with donkey and rider (2144:01)](image)

**Domestic animals**

The list of domestic animals found at Saar is short, comprising only the donkey and the three domestic ruminants, sheep, goat and cattle.⁶ The donkey remains from Saar are as problematic as the camel remains. There is no morphological evidence for their domestic status, and they could derive from wild animals. The wild ass, \textit{Equus africanus}, occurred naturally on the adjacent mainland (Uerpmann 1987: 1991) and could have reached Bahrain before it became an island. However, there is a seal from Saar showing a rider on an animal that must have been a donkey.⁷ This seal is evidence enough that domestic donkeys were known at Saar. Therefore it is more likely that the equid remains from the site are from a domestic rather than a wild ass. In southern Mesopotamia the evidence for domestic donkeys goes back to the end of the fourth millennium BC. In southeastern Arabia the use of donkeys seems to have begun during the Umm an-Nar period and was clearly established in the second millennium BC. Thus, the position of Bahrain in the middle of a zone of early use of donkeys further increases the probability of a domestic status for the asi-

![Fig. 8.16 A bull depicted on a seal from Saar (5168:01)](image)

nine remains from Saar. As can be seen from the number of finds (Table 8.4), equids were not important for meat production in Saar. However, the bones of animals used for riding or as beasts of burden do not necessarily end up as kitchen refuse. The scarcity of donkey remains may therefore not reflect accurately the economic importance of donkeys at Saar.

With regard to their potential products, cattle (\textit{bos}) are the most versatile domesticates found at Saar. Their meat is highly appreciated and their skin, horns and other substances from their body are important raw materials that can be extracted from the slaughtered animal. In addition, they produce milk and can be used for labour. While there is little doubt that the bodily products of slaughtered cattle were used at Saar, evidence for the use of their lifetime products is not obvious.⁸

Draught cattle often have bone alterations which indicate that they have been used for labour. Among the cattle bones from Saar, which were checked for such indications, there were only two first phalanges where the tuberosities for the axial ligaments of the distal articulation were somewhat hypertrophic. This may indicate that these animals had to work occasionally, but it can also be the result of other mild forms of stress. On the whole there are no indications for intense labour visible in the cattle bones from Saar. This is in accordance with the fact that the average size of cattle at Saar is comparatively low — lower in any case than at Tell Abraq or at Qala’at al-Bahrain where clear indications for draught cattle were found (M. Uerpmann and H.-P. Uerpmann 1994: 427).

Indications for milking have to be derived from the demography of the slaughtered animals. Dairy animals are normally kept for several years while their offspring, in particular the males, are killed early in order to reserve the milk for human consumption. This leads to a particular age profile in the bone finds: there has to be a substantial proportion of skeletal remains from fully adult cows before milking can be postulated. This is not the case at Saar. There are only two vertebra with the fused epiphyses that indicate

![Fig. 8.17 Bovid skull found in Bldg 220](image)
adult cattle. In addition, all the calves seem to have lived beyond their first year. Slaughtering took place mainly from the second to the beginning of the fourth year. This kind of age-profile is considered typical for beef production. Thus, neither milk nor labour seem to have been major motivations for cattle husbandry at Saar.

As will be discussed later, beef was a much less important constituent of the meat eaten at Saar than mutton. On the whole, cattle were a minor factor in the subsistence and economy of the settlement. Nevertheless, there is one bone find of bos from Bldg 53 which deserves further discussion: a small lateral fragment of the distal end of a left humerus of an animal larger than all other cattle identified in the bone sample. It was recorded in the field as ‘wild or domestic cattle’. Not enough of the bone was preserved for measurements to be taken, but its morphology was compared with that of aurochs and water buffalo. However, it is not big enough to be from a wild bovine and morphologically does not fit with buffaloes. Instead the closest fit is with zebu cattle. The bone has a particular exostosis above the verticillus of the trochlea humeri similar to that found in our comparative material of Arabian zebus, one that is a different shape or completely lacking in our taurine skeletons. Consequently, the possibility that this find from Saar might provide osteological evidence for the import of zebu bulls from India for breeding purposes required further investigation.

As has been shown convincingly by MacHugh et al. (1998), the spread of zebu characteristics among African cattle populations is due almost exclusively to the use of imported zebu bulls for breeding. Such imports must inevitably also have been the origin of the spread of zebus from their centre of domestication in the larger Indus valley to Mesopotamia, the Arabian shores of the Gulf, and Oman, from where they may have been taken along the coast of the Indian Ocean towards Dhofar, the Yemen and over to Africa.

In order to test the potential origin of the animal represented by the humerus fragment from Saar, a sample was submitted for DNA extraction. According to preliminary results, the animal did not have a zebu mother. Whether it had a zebu father—and hence looked like a zebu itself—is still a matter of further investigation. According to figurines and pottery decorations from Mesopotamia and the Gulf area, humped cattle were already widespread by the beginning of the second millennium BC. Judging by the morphological similarity of the find from Saar to recent humped cattle from southeastern Arabia, most of these animals originated from a basic stock of taurine cattle crossed with imported zebu bulls of Indian origin.

The main milking animal at Saar was the goat (Capra). Before dealing with milking, however, a few words should be said about the type of goats found at Saar. They were a small breed, similar in size to those found at Qala‘at al-Bahrain and on Bronze Age sites on the coast of the Emirates and across the Oman Peninsula, and were probably not very different from the local goats kept in the Arabian Gulf area today. There is a clear size difference between these goats and those from southern Mesopotamia (M. Uerpmann and H.-P. Uerpmann 1994, 1997). Extrapolating from the few complete metapodials, the shoulder height of the goats at Saar can be calculated as around 60 cm, which is similar to unimproved local breeds today. There were no indications from our analysis of the bone material that the management of goats at Saar went beyond the requirements of individual households.

Unfortunately, the number of well-identified goat remains from the buildings studied in detail is insufficient to provide clear evidence for milking. As expected, there are some bones of very young goats from Saar—indicating the early slaughtering of some kids—in addition to a higher proportion of adult females, but the numerical evidence is inconclusive and statistically insignificant. Although they are more abundant, the same is true for the well-identified sheep bones. In any case, as juvenile bones of sheep and goat are more difficult to identify at the level of species than those of adults, the relative proportions of young ones are more difficult to evaluate. Therefore the demography of the small domestic ruminants has often to be dealt with by considered both species together. According to 185 age-classified sheep/goat bones, less than 15% of the animals were slaughtered as juveniles, and almost 45% became adult before they were consumed. This is a fairly high percentage of adults, indicating the use of lifetime products of the small ruminants. As the well-identified sheep and goat bones do not indicate a clear difference in the age profile of the two species, it may well have been the case that both were used for milking. However, the lifetime product of sheep may have been wool rather than milk, while the use of goat hair for textile production can not be excluded.

As has been pointed out elsewhere (M. Uerpmann and H.-P. Uerpmann 1999), the sheep from Saar mainly represent a local breed. They differ remarkably in size from the contemporary stock of sheep kept at Qala‘at al-Bahrain. The metrical evaluation of sheep bones from that site—thought to have been the ancient capital of Dilmun—indicates that a large breed was kept there, similar to contemporary Mesopotamian sheep.

At Saar, the majority of the sheep bones do not come from this large breed. Comparison of the sheep size indices between the two sites (Fig. 8.18) clearly indicates that a smaller breed was dominant at Saar. The larger race was of secondary importance. Accordingly, the size-index curve for the sheep of Saar has two peaks. The more important one is in the lower range and outside the curve for the sheep of Qala‘at al-Bahrain. The second peak is at the same position as the peak of the Qala‘at al-Bahrain sheep. This means that the inhabitants of Saar also slaughtered some of the larger sheep. It is possible that they were not only consumed but also kept at Saar, because the broad outline and the flat top of the size-index curve might indicate some interbreeding took place. However, the same form of the curve can also be obtained by the addition of two independent curves for the two breeds as indicated by the hypothetical curves ‘a’ and ‘b’ of Fig. 8.18.

Bone finds of the large sheep were not evenly distributed at Saar. In the buildings studied in detail (Bldgs 205, 207–9) they were not found at all: only the small type of sheep was present. The large breed was first encountered when studying a sample from Bldg 53, a large and unusual complex which was occupied until relatively late in the history of the settlement. It remains an objective of further studies to find out whether the uneven distri-
bution of the large sheep may be due to chronological differences or to a degree of social stratification.

According to provisional information, the sheep remains found by the Danish excavations at the Barbar Temple in the northwestern corner of Bahrain represent the small type of sheep. Apparently no remains of the large type were found there. This adds a further facet to the differentiated picture of ancient stockbreeding in Bahrain, which will probably become clearer once the wealth of archaeozoological data from continuing excavations at Qala’at al-Bahrain becomes available.

The smaller sheep at Saar may represent the local stock, which is known from older sites in the general area such as Tepe Yahya on the northern side of the Lower Gulf (Meadow 1986), and al-Buhais 18 (M. Uerpmann and H.-P. Uerpmann 2000), Hili 8 and Tell Abraq (Uerpmann in prep.) on its southern side. The larger breed seems to have been imported in the early second millennium BC and may have been a fat-tail sheep (H.-P. Uerpmann and M. Uerpmann, in press). With regard to sheep husbandry at Saar, it should be added that there are several finds of horn cores which most probably represent castrates (Fig. 8.19, a–b). Size-wise they are smaller than a single obvious ram horn core (Fig. 8.19, c). Their cross-section is semicircular and they are not twisted. At least the basal quarter is pneumatized, which is typical for wethers (Hatting 1983). Evidence for the castration of male sheep accords well with the assumption of wool production as mentioned in the context of age distributions. Although horn size and body size are not necessarily closely correlated, it seems more likely that these horn cores pertain to the small breed of sheep.

Domestic animal economy at Saar

An interesting figure when considering socio-economic conditions at an ancient settlement is the ratio between the remains of cattle, sheep and goats. To some extent all three species of domestic ruminants can replace each other, depending on the particular system of animal economy. The ratio between these species is determined by the natural environment on the one hand, and by social factors and the particular needs of the consumers on the other. Animal bone finds from settlements reflect a long term average of how the former inhabitants balanced their animal economy to meet these needs and conditions. The relative quantities of different species can be used as parameters to determine certain aspects of human behaviour.

The main products of cattle are meat, milk and labour. Of these, meat and milk can be replaced by the other two species. Goats are especially productive with regard to milk, sheep are more esteemed for their meat. The non-replaceable product of sheep is wool, although the hair of some goat breeds can also be used for textiles. As cow milk is often preferred over goat milk, and mutton and beef over goat meat, the goat is normally the least represented animal among the three species. Goats, however, are well adapted to aridity. As unspecialized browsers they can exploit even sparse desert vegetation. In addition, they do not require much health care and are therefore a sort of insurance, providing a basic stability to human subsistence in a dry environment. Sheep are less well adapted to conditions in the Gulf area, because they are grazers rather than browsers, and better protected against cold than against heat. Losses are higher, as illustrated at Saar by the whole skeletons of infantile and juvenile sheep disposed of in the rubble and sand of disused buildings. The fairly lush environment around Saar was nevertheless quite suitable for the locally bred sheep.

The cattle kept on Bahrain in the early second millennium BC were probably well adapted to the heat, because they most probably derived from the local stock which had been interféed with imported zebus since the third millennium BC. Their usefulness for the subsistence economy of Saar therefore depended more on the capability of the consumers to make optimal use of cattle products than on the ability of the animals to be productive. Generally speaking, the comparatively larger size of cattle requires greater input by animal keepers but leads to higher output by the animals. The human side of the system must be able to afford the input and be prepared to consume the output. With particular regard to cattle, this means that the group size of the consumers must correlate with the amount produced for consumption. In an open market economy the number of potential consumers is not strictly limited. In self-contained household units, however, the sheer amount of meat provided by a single slaughtering event of an ox can be a severe problem — especially in a hot environment like Bahrain where the preservation of meat is difficult. Milk and labour — as the other main products of cattle — are less problematic, because a ‘surplus’ of milk can to some extent be converted into cheese or be given to the calves, and labour is only produced when it is needed. Thus, no products will be wasted, but not using them means wasting some of the fodder and care which cattle nevertheless need for their own well-being. If milk and labour are not really needed, and the amount of beef is creating problems, it is more economical to have goats and sheep instead of cattle. It must also be kept in mind that animal husbandry always requires a certain herd size to keep reproduction going. The problem of large quantities posed by having cattle could therefore not be solved by keeping fewer and fewer individuals.

The relatively low proportion of cattle remains found at Saar, as seen in Fig. 8.20, might indicate that there was not enough demand for cattle products, in particular for beef, to sustain a constant supply. Cattle may only have been slaughtered at Saar on particular occasions, such as festive days, which brought together the necessary number of consumers. Normally, sheep slaughtered by individual households would have provided manageable amounts of meat, and goats were the normal providers of milk for the same sort of consumer units. However, as also indicated in Fig. 8.20, there is quite some variation from building to building. In addition, low densities of mammal remains, especially in Bldgs 208 and 209 (see Table 8.1), severely decrease the reliability of our estimations. On the whole it must be kept in mind that fish, and
not the meat of the domestic artiodactyls, was the main source of protein for the inhabitants of Saar.

Concluding remarks

The vertebrate remains from Saar have provided insights into various aspects of the environmental setting of the site and of the use made of this environment by the inhabitants. The relative abundance of freshwater in the close vicinity of Saar is corroborated by the remains of frogs and freshwater terrapins. Otherwise, the bone finds of wild terrestrial animals are more indicative of the general desert-like environment still prevailing in the area today. There is a fair number of remains deriving from hunted animals, ranging from wild dromedaries to oryx antelopes, and gazelles to foxes, and perhaps jerboas, which indicate that hunting was a regular occupation of the inhabitants. In spite of this obvious exploitation of the ‘wild’ environment, and contrary to other archaeological sites in the Lower Gulf area, the people of Saar do not seem to have made much use of marine resources other than fish. There are the occasional finds of sea-cows, dolphins and turtles, but their numbers are lower than expected at a site where marine fish remains are most abundant, and where the direct distance from the coast is only about 4 km. While the rarity of bones of these heavy marine creatures might be explained as a consequence of butchering the animals on the beach and leaving their bones behind, the similarly rare bones of cormorants are more indicative of a reluctance to consume these marine forms.

Speaking of ‘reluctance’ in this context indicates the possibility of exercising consumer choice between the various resources on offer. This may not have been so simple in ancient Dilmun, however. Distribution systems for food harvested at sea may already have been developed. At Saar, the uneven occurrence of fish species and fish sizes between the buildings provides evidence for some sort of non-random distribution of the fish, which seem to have been brought to the settlement from the west coast of Bahrain. Although finds of fish-hooks at several buildings in Saar indicate that some fishing was done by the inhabitants of the settlement themselves, some households seem to have received a special selection of fishes over a long enough period to be reflected in the archaeological bone finds.

However, any conclusive quantification of the contribution of fish or any other specific category of human food towards the diet of the ancient inhabitants of Saar remains unrealistic without including an analysis of the skeletal remains of these people as well. The indigestible leftovers of the various food items suffer from highly differential degrees of taphonomic loss. The quantification of these remains, therefore, reflects neither the absolute nor even the correct relative abundance of the various kinds of food consumed at an archaeological site. Notwithstanding, it is obvious that marine fish was a major source of protein, more important in any case than the meat of all mammals or birds together.

The high amount of fish, and the modest contribution of higher vertebrates to the diet of the ancient inhabitants, does not seem to reflect a well-balanced nutrition. Taking into account the indications of a fairly lush micro-environment, a greater contribution from the side of the domestic artiodactyls might have been expected. This would have made sense with regard to the provision of red meat and fat. As neither these domestic resources nor the marine mammals seem to have been fully exploited with regard to their potential contributions to a balanced diet, it is plausible that the respective food constituents came from the vegetal side of the subsistence economy. As the plant remains from Saar provided only very limited evidence, this statement too can only be corroborated by an analysis of the human skeletal remains.

While the general pattern of subsistence seems to have been quite similar in the different buildings examined at Saar, gradual differences are nevertheless visible. This refers to differences in the relative amount of fish versus mammal remains and to the differing proportions of both the consumed fish species and of the exploited domesticates. It should also be noted that on the whole Saar is different with regard to its animal economy from the contemporary settlement at Qala’at al-Bahrain, which at the present state of archaeo-zoological research is the only other comparable site on the island.

Apart from insights into the subsistence system, the vertebrate remains from the buildings also provide evidence for the way of life of the ancient inhabitants of Saar. Bone remains embedded in floors and skeletons of discarded dead animals in the yards do not indicate an overdeveloped awareness of hygiene. The occurrence of rat bones and gnaw-marks of rats on bone finds from the inner rooms of the buildings point in the same direction. Counteraction against this pest may have been taken by introducing the grey mongoose. Nevertheless, an inevitable deterioration of the hygiene conditions in the settlement may have contributed to the final abandonment of the site.

Notes

1 Our work on establishing the broad database that underpins this study was supported by grants to M. Uerpmann by the National Geographic Society and by the Deutsche Forschungsgemeinschaft (AZ: Ue 29/3–1).
2 Not all the data collected could be presented in this chapter.
3 Bone weight will generally be used for bone quantification throughout this chapter because it is less affected by fragmentation than bone numbers. An anatomically complete bone can often be broken into more than
a dozen retrievable and identifiable fragments. While this increases the number of finds, the total weight of the original bone will not be affected except for the slight loss of small splinters, which may not be identifiable or irretrievable.

³Standard length (SL) can best be visualised as body length without the tail fin.

⁴The use of turtles in the wider context of ancient Dilmun has been discussed in great detail by E. Olijdam (2001). For a more biological approach see Frazier (2003).

⁵This find was first tentatively ascribed to a small cat (Dobney and Jaques 1994: 113), probably because of its size being larger than that of the then assumed grey mongoose mandibles.

⁶The dog may be represented in the sample by a fragment of a humerus shaft that could not be identified with certainty. Whether dogs were really kept at Saar remains questionable. There are no clear indications of dog-gnawing on the bones.

⁷While head and neck are difficult to interpret, the body and the legs are those of an equid. Horses were still unknown in the Gulf region at the beginning of the second millennium BC and do not fit the size-relation shown on the seal between man and animal. As for hemiones, it is unlikely that these could have been ridden. Donkey, therefore, is the most probable identification for the animal on the seal.

⁸Lifetime products of animals are also referred to as secondary products. As these products are often more valuable than the slaughtered carcass, and as they are produced earlier, it would be more appropriate to call them primary products (which would, however, create confusion). Therefore we prefer to call them lifetime products.

⁹Thanks are due to Dr E. M. Geigl, Institut Jaques Monod, Paris, for including this sample in her research.

¹⁰Dobney and Jaques (1994) also elaborate on the two kinds of sheep present at Saar. As no basis for regional comparisons was available at that time, they mainly developed models of site-internal management of the different breeds.

¹¹Thanks are due to Flemming Højland and Pernille Bangsgaard for providing us with a copy of the latter's manuscript entitled 'Animal bones from the Barbar Temple'.
Chapter 9 Archaeometallurgical studies

Lloyd Weeks and Ken Collerson

Compositional analyses (Lloyd Weeks)

In this section, the results of the chemical analysis of 38 copper-base samples from Saar are presented and discussed. The samples include finished objects (e.g. rings and pins/awls), semi-processed products such as copper ingots, and the debris of metalworking activities. The latter samples are designated by the term ‘waste/spill’ and are typologically differentiable from finished objects. They are generally amorphous lumps, often showing areas covered by green copper corrosion products, and are most probably the by-products of processes such as refining of raw copper and casting of objects.

Analysed objects from Saar are listed in Table 9.1 (finished objects and ingots) and Table 9.2 (waste/spill samples). The majority of objects are of City IIB date, however material from Bldgs 51, 53, 57, 200 and 221 is of City IIC date, as indicated by shading in Tables 9.1 and 2.

<table>
<thead>
<tr>
<th>Reg. No.</th>
<th>Technique</th>
<th>Context</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>292:02</td>
<td>PIXE</td>
<td>Bldg 8, Area 29</td>
<td>Flat fragment</td>
</tr>
<tr>
<td>1139:02</td>
<td>PIXE</td>
<td>Bldg 200, Area 204</td>
<td>Ingot</td>
</tr>
<tr>
<td>1159:03</td>
<td>PIXE</td>
<td>Bldg 200, Area 204</td>
<td>Ingot</td>
</tr>
<tr>
<td>1612:08</td>
<td>PIXE</td>
<td>Temple, Area 200</td>
<td>Flat fragment</td>
</tr>
<tr>
<td>1853:70f</td>
<td>PIXE</td>
<td>Bldg 207, Area 272</td>
<td>Flat fragment</td>
</tr>
<tr>
<td>1853:70r</td>
<td>PIXE</td>
<td>Bldg 207, Area 272</td>
<td>Ring</td>
</tr>
<tr>
<td>1864:42</td>
<td>PIXE</td>
<td>Bldg 207, Area 273</td>
<td>Pin/awl</td>
</tr>
<tr>
<td>1905:03</td>
<td>PIXE</td>
<td>Temple, Area 200</td>
<td>Spill/object</td>
</tr>
<tr>
<td>2174:03f</td>
<td>PIXE</td>
<td>Bldg 57, Area 74</td>
<td>Flat fragment</td>
</tr>
<tr>
<td>2174:03p</td>
<td>PIXE</td>
<td>Bldg 57, Area 74</td>
<td>Pin/hook</td>
</tr>
<tr>
<td>2669:06</td>
<td>PIXE</td>
<td>Bldg 54, Area 65</td>
<td>Pin/awl</td>
</tr>
<tr>
<td>5088:02</td>
<td>PIXE</td>
<td>Bldg 221, Area 301</td>
<td>Flat fragment</td>
</tr>
<tr>
<td>5104:10</td>
<td>PIXE</td>
<td>Bldg 220, Area 309</td>
<td>Tongue-shaped frag.</td>
</tr>
<tr>
<td>5177:08</td>
<td>PIXE</td>
<td>Bldg 220, Area 311</td>
<td>Flat fragment</td>
</tr>
<tr>
<td>K16:29:39</td>
<td>PIXE</td>
<td>Bldg 51, Area 55</td>
<td>Spill/object</td>
</tr>
<tr>
<td>1864:20</td>
<td>EDS</td>
<td>Bldg 201, Area 273</td>
<td>Hook (?)</td>
</tr>
<tr>
<td>4086:15</td>
<td>EDS</td>
<td>Bldg 205, Area 237</td>
<td>Ring</td>
</tr>
<tr>
<td>5111:07</td>
<td>EDS</td>
<td>Bldg 220, Area 310</td>
<td>Ring</td>
</tr>
<tr>
<td>K16:51:01</td>
<td>EDS</td>
<td>Bldg 51, Area 55</td>
<td>Ingot</td>
</tr>
</tbody>
</table>

Table 9.1 Finished objects and ingots from Saar analysed by PIXE and EDS. Shaded cells are from contexts dated to Qala’at al-Bahrain IIC; clear cells are Qala’at al-Bahrain IIB.

<table>
<thead>
<tr>
<th>Reg. No.</th>
<th>Context</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>1108:05</td>
<td>Bldg 50, Area 57</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>1604:05</td>
<td>Temple, Area 200</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>1612:08</td>
<td>Temple, Area 200</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>1860:03</td>
<td>Bldg 207, Area 272</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>1864:37</td>
<td>Bldg 207, Area 273</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>1864:40</td>
<td>Bldg 207, Area 273</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>2619:07</td>
<td>Bldg 53, Area 85</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>2665:08</td>
<td>Bldg 53, Area 84</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>2673:03</td>
<td>Bldg 54, Area 65</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>2674:03</td>
<td>Bldg 54, Area 66</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>2681:03</td>
<td>Bldg 54, Area 92</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>4197:06</td>
<td>Bldg 209, Area 247</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>5138:03</td>
<td>Bldg 220, Area 312</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>5143:18</td>
<td>Bldg 220, Area 311</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>5147:10</td>
<td>Bldg 220, Area 310</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>5155:24</td>
<td>Bldg 220, Area 311</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>5595:07</td>
<td>Bldg 225, Area 318</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>6075:02</td>
<td>Bldg 64, Area 333</td>
<td>Spill/waste</td>
</tr>
<tr>
<td>K16:29:43</td>
<td>Bldg 51, Area 55</td>
<td>Spill/waste</td>
</tr>
</tbody>
</table>

Table 9.2 Metallurgical waste/spill samples from Saar analysed by PIXE. Shaded cells are from contexts dated to Qala’at al-Bahrain IIC; clear cells are Qala’at al-Bahrain IIB.

Due to corrosion, the composition of the archaeological samples may have changed significantly from their original period of use (Scott 1991: 43 – 7). In particular, corrosion processes can lead to major changes in the relative amounts of tin and copper in the archaeological sample, a fact which must be considered when examining the results of the compositional analyses.

Compositional data for finished objects and ingots

Normalised PIXE data for finished objects and ingots are presented in Table 9.3 and the results of the EDS analyses in Table 9.4. Statistical summaries of the normalised PIXE and EDS data for finished objects (ingots not included) are given in Table 9.5. The raw PIXE data for all samples has been published already (Weeks 2000: table B.16).

Sulfur (PIXE and EDS)

As illustrated in Fig. 9.1a and summarised in Table 9.5, sulfur concentrations in the Saar material are relatively high. Median S concentrations are approximately 0.9‰, with a 10th–90th percentile range of 0.4 – 2.1‰ S. Three objects contain in excess of 2‰ S, including a flat fragment (5177:08), a hook (1864:20) and a spill/object fragment (K16:29:39). As seen in Fig. 9.1a, there is a mode in the distribution in the 0.4 – 0.59‰ S range.

Iron (PIXE and EDS)

The majority of finished copper-base objects contain less than 2‰ Fe (see Fig. 9.1b), including a group of seven copper and Ni-copper...
objects with low Fe concentrations of less than 0.4%, and a group with Fe concentrations of 0.8–2.0% which includes all the analysed tin-bronzes. Iron levels are very high in four of the Saar samples, with Fe concentrations of 0.8–2.0% which includes all the analysed Saar objects. A total of five of the finished objects analysed by pixe and eds contain more than 2% tin, and can be classified as tin-bronzes, as illustrated in Table 9.5. A strong mode can be seen in the 0–0.09% As range, and another in the 0.4–0.49% As range. All objects with more than 1% As are, in fact, tin-bronzes and are best described as ternary Cu-Sn-As alloys.

Nickel (PIXE and EDS)

Although nickel concentrations in some of the finished objects are relatively high, only one object can be classified as a Ni-copper alloy (flat fragment 1905:03, 500 ppm Ni). As illustrated in Fig. 9.1d, 11 Saar objects contain less than 0.3% Ni, with a mode in the 0–0.09% range. This group includes both copper and tin-bronzes. A second group of seven samples contains higher Ni concentrations in the 0.4–0.89% range. This group also contains copper and tin-bronzes, including all three copper ingots (1139:02, 10.8% Fe; 1159:03, 3.8% Fe; K16:51:01, 9.9% Fe) and flat fragment 5177:08 (22.8% Fe).

Zinc (PIXE only)

Zinc concentrations in all the Saar objects range between 0.07 and 0.26%. Given the proximity of the copper and zinc X-ray peaks measured by pixe, it seems likely that Zn concentrations below ca. 0.15% are artefacts of sample matrix effects rather than measures of the true Zn concentration, and are thus unreliable. The strong correlation between copper and zinc concentrations in the Saar waste/spill objects (see Table 9.6) supports this conclusion. The zinc data will not be discussed further.

Arsenic (PIXE and EDS)

The majority of Saar finished objects and ingots (12 of 19) contain less than 0.5% arsenic, as illustrated in Fig. 9.1e. Within this lower range, there appear to be two modes: one in the 0–0.09% As range, and another in the 0.4–0.49% As range. All objects with more than 1% As are, in fact, tin-bronzes and are best described as ternary Cu-Sn-As alloys.

Selenium (PIXE only)

Concentrations of selenium in the Saar finished objects range between 100 and 600 ppm, as illustrated in Fig. 9.1f and summarised in Table 9.5. A strong mode can be seen in the 400–449 ppm range, with the highest Se concentrations seen in the flat fragments 2174:03f (500 ppm Se) and 5177:08 (42.8% Fe).

Zinc (PIXE only)

Zinc concentrations in all the Saar objects range between 0.07 and 0.26%. Given the proximity of the copper and zinc X-ray peaks measured by pixe, it seems likely that Zn concentrations below ca. 0.15% are artefacts of sample matrix effects rather than measures of the true Zn concentration, and are thus unreliable. The strong correlation between copper and zinc concentrations in the Saar waste/spill objects (see Table 9.6) supports this conclusion. The zinc data will not be discussed further.

Table 9.3 Normalised PIXE data for finished objects from Saar. Empty squares denote element concentration below average minimum detectable level (Avg. MDL)

<table>
<thead>
<tr>
<th>Reg. No.</th>
<th>Object</th>
<th>SK FeK NiK CuK AsK AgL SnL</th>
</tr>
</thead>
<tbody>
<tr>
<td>292:02</td>
<td>Flat frag.</td>
<td>1.02 200 0.99 1100 0.50 96.5 0.10 0.71 200</td>
</tr>
<tr>
<td>1139:02</td>
<td>Ingot</td>
<td>1.48 10.8 3950 0.84 86.0 0.14 0.33 150</td>
</tr>
<tr>
<td>1159:03</td>
<td>Ingot</td>
<td>1.58 3.79 3150 0.63 92.8 0.10 0.43 250</td>
</tr>
<tr>
<td>1612:8</td>
<td>Flat frag.</td>
<td>0.41 0.23 500 0.09 98.9 0.09 0.14 300</td>
</tr>
<tr>
<td>1853:70F</td>
<td>Flat frag.</td>
<td>0.63 1.29 600 0.09 89.9 0.10 0.43 250</td>
</tr>
<tr>
<td>1853:70R</td>
<td>Ring</td>
<td>0.40 1.11 500 0.20 70.7 0.10 1.41 350</td>
</tr>
<tr>
<td>1864:42</td>
<td>Pin/awl</td>
<td>0.27 1.62 350 0.28 44.7 0.07 1.27 200 250</td>
</tr>
<tr>
<td>1905:03</td>
<td>Spill/object</td>
<td>1.25 0.29 800 0.19 97.6 0.11 0.27 400 200</td>
</tr>
<tr>
<td>2174:03F</td>
<td>Flat frag.</td>
<td>0.52 0.18 550 1.73 96.8 0.09 0.49 500</td>
</tr>
<tr>
<td>2174:03P</td>
<td>Pin/hook</td>
<td>1.60 0.93 500 0.09 97.2 0.08 0.02 350</td>
</tr>
<tr>
<td>2669:06</td>
<td>Pin/awl</td>
<td>1.01 0.18 400 0.02 98.5 0.09 0.09 400</td>
</tr>
<tr>
<td>5088:02</td>
<td>Flat frag.</td>
<td>0.57 0.13 300 0.03 99.0 0.09 0.05 400</td>
</tr>
<tr>
<td>5104:10</td>
<td>Fragment</td>
<td>0.42 150 1.23 500 0.05 97.4 0.09 0.37 300</td>
</tr>
<tr>
<td>5177:08</td>
<td>Flat frag.</td>
<td>2.07 250 22.8 1900 0.13 73.7 0.07 0.40 600 3850 200</td>
</tr>
<tr>
<td>K16:51:01</td>
<td>Ingot</td>
<td>0.64 9.91 0.66 88.8 0.00 0.00 0.00</td>
</tr>
</tbody>
</table>

Table 9.4 Normalised EDS data for Saar samples

<table>
<thead>
<tr>
<th>Reg. No.</th>
<th>Object</th>
<th>S (%) Mn (ppm) Fe (%) Co (ppm) Ni (%) Cu (%) Zn (%) As (%) Se (ppm) Br (ppm) Ag (ppm) Sn (%) Pb (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1864:20</td>
<td>Hook?</td>
<td>2.05 0.09 0.26 96.7 0.51 0.20 0.18</td>
</tr>
<tr>
<td>4086:15</td>
<td>Ring</td>
<td>0.82 0.82 0.69 73.2 1.93 0.44 22.1</td>
</tr>
<tr>
<td>5111:07</td>
<td>Ring</td>
<td>1.30 1.86 0.43 83.1 1.48 0.41 11.4</td>
</tr>
<tr>
<td>K16:51:01</td>
<td>Ingot</td>
<td>0.64 9.91 0.66 88.8 0.00 0.00 0.00</td>
</tr>
</tbody>
</table>

Table 9.5 Statistical summaries of PIXE and EDS data (finished objects)
All the objects from Saar that were analysed were significantly corroded, and it is likely that the very high levels of Sn seen in some of the finished objects (i.e. those in excess of ca. 20% Sn) are the result of compositional changes induced by the processes of corrosion. One exception may be sample 1864:42 which revealed a unique microstructure under SEM examination (Fig. 9.2). EDS analyses of the different phases indicated 'islands' of high-Sn/high-Fe/low-Cu metal in a matrix of low-Sn/high-copper metal, similar to microstructures known from high-tin bronzes (i.e. tin-bronzes with ca. 20% Sn or more; Scott 1991: figs. 43–5).
Fig. 9.2 SEM (secondary electron) images of the microstructure of sample 1864:42, a high-tin bronze. According to EDS spot analyses, the lighter metallic phase in the images is high-tin/high-iron/low-copper, while the darker major phase is high-copper/low-tin.

**Lead and Silver (PIXE only)**

Lead concentrations in the Saar objects are generally very low, with only four of 15 objects analysed by PIXE containing in excess of 300 ppm Pb, as illustrated in Fig. 9.2h. The three highest Pb levels are found in the three tin-bronzes analysed by PIXE (flat fragment 1853:70F, 600 ppm Pb; ring 1853:70R, 1.93% Pb; pin/awl 1864:42, 2550 ppm Pb).

Although the silver concentrations of the majority of analysed finished objects from Saar were very low (frequently below the average MdL of 110 ppm), the highest Ag concentrations were recorded in the three tin-bronzes analysed by PIXE (flat fragment 1853:70F, 350 ppm Ag; ring 1853:70R, 250 ppm Ag; pin/awl 1864:42, 6850 ppm Ag). There is thus a clear correlation between tin, lead and silver in the analysed Saar objects, and arsenic also appears in higher concentrations in the tin-bronzes than in other finished objects.

**Discussion**

**The ingots**

The plano-convex copper ingots from the Saar settlement analysed in this study are an important guide to the quality of the copper that was being traded to Saar in the early second millennium BC. All the ingots contain high concentrations of iron, in the 3–10% range, and sulfur (0.5–1.5%). The high iron contents of the Saar ingots match those of other Bronze Age copper ingots from the Gulf region at Qala‘at al-Bahrain (Hauptmann 1994), Maysar 1 and Wadi Bahla in the Sultanate of Oman (Hauptmann 1987, 1995; Hauptmann et al. 1988: table 4.2), and raw copper produced at other primary smelting sites in Western Asia such as Timna (Craddock 1980; Craddock and Giuimlia-Mair 1988: fig. 82). Slightly lower Fe concentrations are seen in a contemporary plano-convex copper ingot from Failaka Tell F6 (Hurtel and Tallon 1990: 52), whilst Fe levels in copper ingots from the Barbar Temple are significantly lower than at Saar (Heskel n.d. table 1). Heskel (n.d. 121) notes, however, that some of the Barbar ingots contained ‘a large amount of slag and other impurities’. Iron concentrations in raw copper as high as those seen in the Saar ingots would have had a strongly deleterious effect on the working properties of the metal.

Iron was frequently included in furnace charges in early smelting operations, either as a component of the ore being smelted (e.g. in chalcopyrite, bornite, or arsenopyrite) or as a flux used to aid the separation of copper from siliceous gangue (e.g. haematite). The transfer of significant amounts of this iron to the raw copper produced at the end of the smelt is controlled in part by the extraction process that is used (Craddock and Meeks 1987; Lechtman and Klein 1999: 517). Copper smelted using a slagging process incorporating iron-bearing fluxes is likely to contain significant amounts of iron, and experimental reconstructions have produced raw copper with from 10–50% Fe (Merkel 1983). This is because iron is soluble in copper and dissolves readily into the newly formed copper droplets as they drain to the bottom of the furnace through the iron-rich slag (Craddock 1995: fig. 4.6).

Like iron, sulfur can be introduced to the furnace charge as a component of the copper ore, or through the slagging and fluxing components (Rapp 1989: 107; Tylecote 1977: table 5). The high sulfur levels (from ca. 0.2–1.2%) in copper ingots from the near-contemporary settlement of Maysar 1 in Oman result from the presence of matte (Cu-(Fe)-sulfide) inclusions in the objects, which are demonstrated to have resulted from the use of sulfur-bearing ores as well as oxidised ores in the smelting charge (Hauptmann et al. 1988: 36–7). Matte inclusions have been observed in finished objects from the Gulf as well as in ingots, for example at Tell Abraq (Pedersen and Buchwald 1991: 7; Weeks 1997: figs. 34–6).

Analysis of the Saar ingots using SEM and EDS has indicated that the majority of the sulfur and at least part of the iron present in the ingots from Saar results from the presence of matte inclusions. The microstructure of ingot 1139:02 is illustrated in Fig. 9.3, and EDS indicates that the larger inclusions are pure copper sulfides, while the smaller inclusions are copper-iron sulfides. Very similar inclusions were observed in ingot 1159:03. The high sulfur content of the Saar samples may thus be a result of their production from mixed oxide and sulfur-bearing copper ores, and the incomplete separation of metallic copper from the matte which was produced during the smelting process (Hauptmann 1985).

It is an interesting feature of early metal use and trade that raw copper in ingot form frequently contained significant amounts of impurities such as iron and sulfur. The purity or otherwise of the metal produced in finished metal objects was an important guide to the quality of the metal at its source (Moorey 1994: 243 and 249; Craddock and Giuimlia-Mair 1988: 318). This was prob-
ably undertaken to avoid the further use of fuel in source areas with limited wood supplies, and facilitated by the ease of purification of the metal at its destination (Heskel n.d.). Iron concentrations could easily be reduced to ca. 0.5% by the refining of the raw copper in a crucible (Craddock and Meeks 1987: 192). With the addition of sand or crushed quartz to the molten metal, an iron-rich crucible slag would form and float to the surface of the metal, where it could be removed by skimming (Tylecote and Boydell 1978).

A number of forms of evidence suggest that such secondary copper refining was regularly practised in the Gulf in the Bronze Age. Firstly, the widespread presence of metallurgical waste at settlements on Bahrain (e.g. Heskel n.d. 81; Højlund and Andersen 1994: 378), Tell Abu Hureyra (Hurtel and Tallon 1990), and in southeastern Arabia (Weeks 1997) suggests that copper refining was undertaken away from areas of primary production. Secondly, the relatively low iron concentrations of most of the finished objects from Saar in comparison with the raw copper ingots are suggestive of a refining stage between smelting and object fabrication. The compositional data for typologically similar waste samples from Tell Abraq (Weeks 1997) indicate that refining was carried out primarily to remove impurities of iron and sulfur from the raw copper. As discussed further below, the same situation seems to have prevailed at Saar.

### Alloy use

Copper alloys incorporating tin, lead, arsenic and nickel were used at the Saar settlement. The definition of an alloy used here is based purely upon composition. All copper-base finished objects with more than 1% arsenic, nickel or lead, or more than 3% tin, are regarded as alloys. The designation takes no account of the likelihood that some of these ‘alloys’ may have been inadvertently produced during smelting. The issue of intentional production is discussed below, particularly with regard to the early arsenical/nickel-copper alloys that feature prominently in the Bronze Age metal assemblages of the Gulf region (e.g. Heskel n.d.; Craddock 1985; Hauptmann et al. 1988).

As can be seen in Fig. 9.4, the most common metal used at Saar was unalloyed copper. Ten of the 16 analysed finished objects and all three ingots were of copper, although most are of relatively impure metal. Six of the 13 copper objects contain more than 1% S, two contain more than 1% Fe, and three contain more than 1% Fe and 1% S. Only two objects (flat fragments 1612:08, 5112:07) are of relatively pure copper containing less than 1% of any alloying element or contaminant.

Five of the finished objects are tin-bronzes, although the majority of these samples also contain other alloying elements in concentrations of greater than 1%. The flat fragment 1853:70F (7.3% Sn) is the only simple tin-bronze. Two ring fragments (4086:15, 5112:07) and one pin/awl fragment (1864:42) contain 1–5% As in addition to more than 10% tin. One ring fragment (1853:70R) contains 1.4% As and 1.9% Pb in addition to more than 10% Sn. The original tin concentrations of the tin-bronzes are difficult to quantify, as all the samples are corroded, but as noted above there is some microstructural evidence to suggest very high original tin concentrations (more than ca. 20% Sn) in object 1864.42.

In addition to the high arsenic levels seen in the tin-bronzes, one object from Saar (flat fragment 2174:03F) is of a copper-nickel alloy, with 1.7% Ni. The results of the Saar analyses concur with previous analyses of material from the Gulf, and more generally with studies of early metal objects from many areas of the world, which have indicated that copper objects with significant levels of arsenic and other elements such as antimony and nickel were a common feature of early metallurgy (e.g. Cheng and Schwitter 1957; Junghans et al. 1968; Eaton and McKerrell 1976: 9; Heskel and Lamberg-Karlovsky 1980; Lechtman and Klein 1999; Chernykh 1992; Tadmor et al. 1995).

It is most likely that the levels of As and Ni (ca. 1–2%) seen in the Saar objects are an inadvertent by-product of the use of copper ores which contained significant concentrations of these elements (cf. Prange et al. 1999: 190). Ores of copper, arsenic and nickel are associated in mineral deposits from many parts of the world (Charles 1980: 168–9; Rapp 1988: 29; Budd et al. 1992: 680), including Iran (Pigott 1999: 112; Bariand et al. 1993; Heskel and Lamberg-Karlovsky 1980) and southeastern Arabia (Hauptmann 1985: 32 and table 2; Hauptmann et al. 1988; Hauptmann 1995: 246–8; Lorand 1988; Prange et al. 1999). Studies of early copper extraction procedures have demonstrated that arsenical copper, and very probably nickel-rich copper, could have been produced by smelting oxide ores, by smelting carefully roasted sulfidic ores, or by co-smelting mixtures of oxide and sulfide ores which contained these elements (Lechtman and Klein 1999).

It seems clear that the As/Ni-copper alloys found at Saar are not true alloys in the modern metallurgical sense of the word; they were not intentionally produced through the admixture of separate components with the aim of creating a material with specific properties. Nevertheless, these alloys may have had properties which would have allowed their differentiation from pure copper after their production in the primary smelt. Various studies suggest that these properties may have included enhanced strength and workability (Cheng and Schwitter 1957; Charles 1980, 1985), improved casting properties (Craddock 1995: 291), and changes in the colour of the metal (Eaton 1977; Northover 1989). However, given the low levels of arsenic and nickel seen in the Saar objects, it is highly likely that both the producers and users of these ‘alloys’ were unaware of their compositional difference from the raw copper more commonly found in the region.

In contrast, the tin-bronzes from Saar are more likely to have been produced through the intentional melting together of metallic copper and tin, a process that is recorded in a number of third millennium texts from Western Asia (Waetzoldt and Bachmann 1984; Muhly 1985, 1973: 243–4). Tin and copper ores are much more rarely associated in nature than copper, arsenic and nickel ores, and other than in the earliest periods of tin-bronze use in the third millennium BC, such alloys are generally regarded as products of the mixing of their two major metallic components. However, some doubt is cast upon this assumption by recent research at tin sources in Central Asia (Alimov et al. 1998). The ore deposit at Muštoton on the Zeravshan River, in particular, has a mixture of copper and tin ores that could have produced a natural tin-bronze upon smelting (Alimov et al. 1998: 166 and 184), and the deposit shows evidence of second millennium BC working. Thus, the status as intentional alloys of even the tin-bronzes from Saar remains uncertain.

![Fig. 9.4 The copper alloys used at Saar for finished objects (based on PIXE and EDS analyses)](image_url)
Comparison with contemporary metal objects from the Gulf region

Comparison with metalwork from other sites on Bahrain is somewhat hampered by the limited number of compositional analyses available. In particular, finished objects from the important site of Qala‘at al-Bahrain have not been analysed (with one exception—see Højlund and Andersen 1994: 378, n.77). Analyses have been conducted on copper-base objects from the Barbar Temple (Heskel n.d.), and 30 early second millennium BC objects from Bahrain have been analysed by Prange et al. (1999), although the compositional data themselves are not presented.

Looking further afield, eleven copper-base objects from Failaka Tell F6 have been analysed (Hurtel and Tallon 1990), and large numbers of analyses of copper-base objects from late third and early second millennium BC contexts at Susa are also available for comparison (Berthoud et al. 1980; Malfoy and Menu 1987). From regions to the south, a significant number of late third millennium objects from southeastern Arabia has also been analysed (Berthoud et al. 1980; Hauptmann et al. 1988; Weeks 1997, 2000).

As noted above, five of the finished objects from Saar are tin-bronzes. This represents just under one-third of the 16 analysed finished objects from the site. The presence of tin-bronze at contemporary sites on Bahrain has been demonstrated by previous compositional analyses of metal objects. Analysis of five objects from Bahrain tumuli undertaken by Peake (1928: 454) revealed that they were all tin-bronzes with high tin concentrations. Although these objects were originally claimed to date to ca. 1200 BC (Peake 1928: 454), it is likely that they came from either Mackay’s excavations at A‘ali or those of the Bents at A‘ali in 1889 (Reade and Burleigh 1978) and date to the early second millennium. Peake’s analyses provide good evidence for tin-bronze use on Bahrain contemporary with the Early Dilmun settlement at Saar.

In contrast, only two of the 30 objects analysed by Prange et al. (1999: 191 and fig. 6) contained in excess of 1% Sn, with a maximum tin concentration of ca. 6% in an object from the Saar burial field. Furthermore, 30 metal objects from Bahrain analysed by the Studien zur der Anfänge der Metallurgie (SAM) project show no evidence for the use of tin-bronze (McKerrell 1977: 167). These objects were attributed by McKerrell (1977) to Qala‘at al-Bahrain, but in fact came from the Barbar Temple (Højlund and Andersen 1994: 378). Overall, analyses of more than 100 copper-base objects from the Barbar Temple (Heskel n.d.) have revealed tin concentrations of 1% or higher in only five objects. Only one low-tin bronze (ca. 1% Sn) was found among the 11 analysed objects from the Temple I period at Barbar, whilst in the Temple II period, contemporary with the occupation of Saar, three of 27 analysed objects were made of tin-bronze (Heskel n.d. 118).

The infrequent use of tin-bronze at Barbar may partly reflect the samples that were available for analysis: many were sheets or nails used to decorate the temple and seem to have been preferentially made of pure copper. Less than 40 of the Barbar analyses are of known finished objects that are not sheet or nails, and the ratio of tin-bronze to copper might therefore be higher than the overall figures would suggest. Nevertheless, there seems a significant discrepancy in the frequency of tin-bronze use at Saar and Barbar. Tin-bronze is also absent in the assemblage from Failaka Tell F6, although only 11 objects (including an ingot and waste samples) have been analysed (Hurtel and Tallon 1990).

The evidence from Saar and elsewhere on Early Dilmun Bahrain parallels the use of tin-bronze in nearby regions of Iran. At Susa, tin-bronze is present but relatively uncommon until the VB period, contemporary with the occupation of Saar (Malfoy and Menu 1987: table D). At Tal‘i Malayan, the first use of tin-bronze can be dated to the early Kaftari period in the late third or early second millennium BC (Pigott et al. 2003). Assessing the period in which tin-bronze is first used with regularity on Bahrain is difficult, as so few analyses of third millennium material have been undertaken.

The apparent chronology for the introduction of tin-bronze in the Central Gulf is significantly different from that seen in the northern Oman Peninsula, largely due to the dearth of analyses from third millennium Bahrain and Eastern Saudi Arabia. In southeastern Arabia, at least on the northern coast of the UAE, tin-bronze is used in significant quantities already by the last centuries of the third millennium BC (Weeks 1997 and 2000). The Saar analyses can be profitably compared with these slightly earlier metal assemblages, specifically those from Umm an-Nar tombs in the northern United Arab Emirates at Tell Abraq and Shimial (Unar 2). These tombs appear to have been used in the final centuries of the third millennium and perhaps the very early second millennium BC (Potts and Weeks 1999; Velde 1999; Blau 1999).

A number of features of the metallurgy of the Saar objects can be matched at Tell Abraq and Unar 2. In particular, the ternary Cu-Sn-As alloy found at Saar is also seen in seven objects from Unar 2 and one from Tell Abraq. The majority of these objects are rings (three of four Saar examples and five of eight UAE examples). The Cu-Sn-As alloy is also seen elsewhere on Bahrain: at Barbar in the Temple II period, which has, in addition, produced an example of a complex Cu-Sn-Pb-Ag alloy (Heskel n.d. 118). The clear association between tin, silver, and lead concentrations in the Saar objects is also found in the Umm an-Nar material (Weeks 2000: 115).

Median iron concentrations are higher in the Saar objects than in the Umm an-Nar material, but the differences are relatively small and objects with more than 1% Fe are commonly found at Unar 2 and Tell Abraq, as they are at Saar. Additionally, although the analytical data are limited, it seems that the differences in the iron concentrations of copper objects and tin-bronzes seen at Tell Abraq and Unar 2 (Weeks 2000) are also seen at Saar. Specifically, whilst the range of Fe concentrations in copper objects from all three sites tends to be larger than the range of Fe concentrations in tin-bronzes, median Fe levels are higher in tin-bronzes than copper objects. This pattern also occurs in the small number of tin-bronzes analysed from the Barbar Temple (Heskel n.d. 92).

The main differences between the metallurgy seen at Saar and the Umm an-Nar sites relate to the frequency of use of different alloys. In the assemblages from Unar 2 and Tell Abraq, tin-bronze was used for more than 50% of finished objects, and alloys incorporating more than 1% of arsenic and/or nickel were also more common than at Saar. Additionally, arsenic and nickel-copper alloys are more commonly reported in the corpus of contemporary Bahraini material analysed by Prange et al. (1999: fig. 5), and arsenical copper was also more commonly used at the Barbar Temple (where As-copper ingots are reported) than at Saar (Heskel n.d.). Objects with very low Ni and As concentrations (less than 0.1%) are more common at Saar than in the Bahraini samples analysed by Prange et al. (1999: fig. 5), although samples with low Ni and As concentrations occur commonly at Unar 2 and especially Tell Abraq.
Metallurgical waste/spill samples

This section presents the results of the compositional analysis of 19 waste/spill samples from Saar. Compositional analyses were carried out on these objects in order to determine their place in the production and use of copper at the settlement. Evidence of crucible fragments, moulds and waste samples from Qala’at al-Bahrain (Northover 1994) and the Barbar Temple (Heskel n.d.) has suggested that both secondary copper refining and casting of copper-base objects were undertaken on Bahrain at this time, and it is of interest to know the range of metallurgical activities which were undertaken at Saar. The normalised pixe data are presented in Table 9.6, and a statistical summary is presented in Table 9.7.

Silicon and associated elements

At Saar, the elements silicon, calcium, potassium, titanium and strontium appear in significantly higher concentrations in waste/spill samples than in finished objects. For example, a number of waste/spill pieces have Si concentrations in the 10–30% range (see Fig. 9.5), whereas the highest Si concentration in a finished object is 7.0%.

Most evidence suggests that these waste/spill samples were produced as a result of the refining of raw copper high in impurities such as iron and perhaps sulfur. As noted above, iron can be readily removed from metallic copper by the addition of silicon-rich material (such as sand or crushed quartz) to the molten material in a crucible, which may account for the increased concentration of Si in the waste/spill samples. Silicon could also have been introduced into the waste/spill samples as surface contamination by surrounding soil particles. Such contamination could have introduced other impurities such as K, Ca, Ti and Sr into the waste samples, and would account for the strong correlations between these elements seen in the compositional data.
Iron and sulfur

As summarised in Table 9.7, median iron concentrations in waste/spill samples from Saar are approximately 2.8% Fe, three times higher than in the finished objects. The range of iron concentrations in the waste/spill samples is also generally higher than in finished objects, reaching more than 20% Fe in two cases (1604:05 and 1681:03). An electron microscope image of sample 1604:05 (Fig. 9.6) illustrates the presence of a light phase (pure copper with < 1% Fe) in a matrix of darker material (ca. 90% Fe with some copper).

Average sulfur concentrations in waste/spill samples (see Fig. 9.7) are more than twice as high as in finished objects, and waste/spill samples with more than 2% S are common. The highest sulfur concentration recorded is 12.0% S, in sample 2673:03, and a SEM image of this sample (Fig. 9.8) reveals large, light grey areas of copper sulfide matte in addition to iron-rich and copper-rich components. Where both Fe and S concentrations in raw copper are high, refining will lead to the production of residues high in iron and sulfur. The increased concentrations of iron and sulfur in many of the Saar waste/spill samples support the idea that they are by-products of secondary copper refining.

Arsenic and nickel

It is interesting to examine the distribution of nickel and arsenic in the waste/spill samples (see Fig. 9.9). In general, Ni concentrations are similar in waste/spill samples and finished objects, and although median As concentrations are higher in finished objects than waste/spill samples, the ranges reported are comparable (see Tables 5 and 7). In particular, five waste/spill samples with 1 – 2% of As or Ni are reported, matching the upper As and Ni concentrations of the finished objects.

One metallurgical waste/spill sample from Saar deserves special discussion. Sample 1864:40 contains ca. 20% As, 75% Cu and 2.5% Fe, and has a very bright, metallic silvery appearance typical of high arsenic alloys (Eaton 1977; Northover 1989). The PIXE analyses have been confirmed by EDX analyses, which indicated the presence of a predominant metallic phase consistent with such a composition (Cu₃As), and a number of sulfide inclusions. The sample thus appears radically different in composition to the remaining waste/spill pieces from Saar, and indeed to any of the finished objects analysed in previous studies of Gulf metallurgy (see Weeks 1997, 2000). Given the high metallic content of the piece, it is likely to be casting debris rather than a refining slag. The piece from Saar might represent the by-product of a primary smelting operation at its point of origin, in which a particularly high concentration of As-bearing minerals was included in the furnace charge (cf. Budd et al. 1992: 680). Alternatively, the use of copper arsenides such as algonodite (Cu₅As) or domeykite (Cu₃As), as known from the Anarak mining district in Iran (Heskel and Lamberg-Karlovsky 1980; Pigott 1999b: 78–9), might be indicated. Whether the alloy was intentionally produced remains uncertain.

Copper

Copper concentrations on Saar waste/spill samples are relatively high, as summarised in Table 9.7 and illustrated in Fig. 9.10. Median concentrations are close to 90% Cu, with the lowest value of 44.5% Cu reported in sample 1604:05. As discussed below, the high copper content of the waste/spill samples from Saar is an important indicator of their place in the production of copper objects at the settlement.

Tin

Tin concentrations in the waste/spill samples are in all cases well below the detection limit for PIXE analyses at ANSTO, of ca. 890 ppm.
It is thus clear that these objects were not by-products of the refining or casting of tin-bronze alloys. As a number of the waste pieces might represent spills from the casting process (see below), the analyses of the waste samples also provide no evidence for the casting of tin-bronze objects at Saar. A similar situation was noted in the analyses of waste/spill samples from Tell Abraq, where very few pieces (5 out of 60) contained more than 1% tin (Weeks 1997). The implication of the data is that, whilst raw copper and As/Ni-copper were commonly worked at Bronze Age settlements in the Gulf region, tin-bronze was not. In fact, some evidence exists to suggest that tin-bronze was traded pre-alloyed, in the form of finished objects. This theory is discussed in the section on lead isotope analyses presented below.

**Establishing the place of the Saar waste/spill samples in the production process**

A number of the waste/spill samples have high levels of Si and Fe which are commonly found in primary slag samples, and the possibility that primary smelting was undertaken at Saar must be considered. However, a number of pieces of evidence suggest that this was not the case.

Firstly, examples of metal ores being transported long distances for smelting are very rare in early Western Asia, which might lead us to expect, a priori, that primary smelting was not practised on Bahrain. No pieces of copper ore have been found at Saar, as one would expect if craftworkers were undertaking primary copper extraction at the site. Secondly, the relative impurity of the raw copper ingots being obtained by the Saar metalworkers indicates the necessity of a refining stage prior to object fabrication (cf. Heskel n.d. 121). The composition of the Saar waste/spill samples is precisely what might be expected to result from the purification of such high-Fe, high-S ingots.

Thirdly, copper concentrations in the Saar waste/spill samples are very high, with a median value of 90% Cu (see Table 9.7). Such copper levels are higher than those in primary copper slags from any prehistoric period in southeastern Arabia (Hauptmann 1985) or other sites in Western Asia. High copper concentrations in association with significant levels of Fe, Si and S may indicate that the Saar waste/spill samples are crucible slags from the refining of raw copper (following Tylecote and Boydell 1978). Alternatively, as the composition of some of the Saar waste samples is essentially the same as some of the finished copper objects from the site, the waste samples may be pieces of metal split during the production of finished objects by casting. Analyses of crucible fragments and crucible slags from Qala‘at al-Bahrain Period I b have suggested that melting of copper, rather than secondary refining, was the primary activity undertaken there (Northover 1994). At Saar, it is clear that at least some of the amorphous metallurgical waste pieces are by-products of secondary copper refining, and it is likely that spillage from casting operations is also present.

The compositional analyses of the waste/spill samples are thus able to demonstrate the nature of the activities that were undertaken by metalworkers at Saar as part of the production of copper alloy objects. Additionally, the study of waste/spill samples and finished objects from the site has demonstrated the essential compositional similarity of raw copper (ingots and waste/spill pieces) and finished objects in terms of arsenic and nickel concentrations. This evidence supports the hypothesis that the As/Ni-copper alloys produced in the Bronze Age Gulf were products of the primary smelt, not subsequent alloying processes (see also Prange et al. 1999: 190).

![Fig. 9.10 Copper in waste/spill samples](image-url)

Table 9.8 Lead isotope data for objects from Saar. The column entitled *Composition* lists all elements present in the object in concentrations of greater than 1%, in order of concentration.
Lead isotope analysis (Ken Collerson)

Lead isotope analysis (lia) involves the measurement of the proportions of the four stable isotopes of lead ([sup204Pb], [sup206Pb], [sup207Pb], [sup208Pb]) in an archaeological object. Small amounts of lead are commonly found in copper-base artefacts, not due to intentional additions, but as a result of their origin in Pb-bearing copper ores (Gale and Stos-Gale 1982). Analysis of the isotopic characteristics of this lead offers the potential to determine the geological source of the metal used in a copper-base object. This is because the lead isotope characteristics of different ore bodies are determined by their formation processes and their age, and thus can vary considerably from mine to mine, and region to region, forming distinctive ‘fingerprints’. As lead isotope ratios of finished objects are the same as the ore from which they were produced (discounting instances of mixing of metal from separate sources), isotopic data for archaeological objects can be related to data from potential ore sources to identify those with similar lead isotope characteristics. Comparisons can also be drawn between the isotopic characteristics of finished objects from different sites or areas. Such approaches allow the investigation of a variety of archaeological questions beyond the determination of absolute provenance, particularly variation through time of raw material sources. An introduction to the theoretical and technical aspects of lia can be found in Gulson (1986), whilst the application of lia to archaeology is reviewed by Gale and Stos-Gale (1982), Stos-Gale and Gale (1994) and Pollard and Heron (1996).

A total of 13 archaeological copper-base objects from Saar were analysed to determine their lead isotopic composition. Samples were analysed by thermal ionization mass spectrometry (tims) at the Advanced Centre for Queensland University Isotope Research Excellence (acquire) in Brisbane, Australia. Details of sample preparation and analytical techniques are given above, and the data are listed in Table 9.8.

Results

The lead isotope ratios of the analysed objects from Saar are illustrated in Fig. 9.11. As data for each object reflect variation in three isotopic ratios ([sup204Pb]/[sup206Pb], [sup207Pb]/[sup206Pb] and [sup208Pb]/[sup206Pb]), pairs of graphs are required to show the full isotopic variation of the objects. On such figures, objects have matching isotopic signatures if they overlap on both of the graphs, whereas it is necessary to note differences on only one of the graphs in order to demonstrate isotopic disparity. As discussed below, the objects are divisible into four groups based upon their isotopic characteristics. This is a basic but important finding that suggests copper-base objects from Saar were probably derived from a number of sources.

Saar Isotopic Group 1

This group includes of five objects, all tin-bronzes, and falls in the upper right hand corner of the graphs in Fig. 9.11, with [sup207Pb]/[sup206Pb] ratios of greater than 0.85. Four of the tin-bronzes (1853:70R, 4086:15, 5111:07) are relatively tightly grouped, suggesting a possible shared source (as discussed below) whereas the fifth tin-bronze (1864:42) has a slightly divergent and less radiogenic signature.

Saar Isotopic Group 2

A second group of samples has [sup207Pb]/[sup206Pb] ratios ranging from 0.835–0.845 and [sup208Pb]/[sup206Pb] ratios of 2.07–2.09. The group includes two copper ingots (1139:02, 1159:03), the two copper finished objects (2174:03F, 2669:06), and a sample of arsenic-rich waste/spill (1864:40). The isotopic similarity of Group 2 objects suggests the possibility that they had a shared provenance, although the divergence of sample 1864:40 from the remainder of Group 2 may reflect a separate source.

Saar Isotopic Group 3

The third group comprises a copper ingot (K16:51:01) and a piece of copper refining waste (1604:05). These objects define a field with significantly depleted [sup208Pb]/[sup206Pb] ratios (2.05–2.06) compared with Isotopic Group 2. It is interesting to note that both samples have very low levels of arsenic (0.01%, the lowest of any Saar samples characterised by lia) and high levels of iron (µ9.9% Fe).

Saar Isotopic Group 4

This ‘group’ is defined by only one object, waste/spill sample 2681:03. It has the most radiogenic isotopic characteristics of the analysed Saar objects, and was most probably extracted from a separate and distinctive ore source. It is also distinguished from the rest of the Saar waste samples by high concentrations of nickel (1.74%) and cobalt (1.17%).

Conclusions regarding the isotopic diversity of the Saar objects

Claims of shared or separate provenance for artefacts are very difficult to evaluate without comparable isotopic data for relevant ores. This is because copper sources can be characterized by very limited (‘conformable’) or very divergent (‘anomalous’) isotopic ratios. Consequently, copper objects from one source can be isotopically homogeneous or heterogeneous. However, having noted this qualification, the isotopic diversity of the 13 analysed Saar objects is of such a degree that the use of metal from multiple ore sources is almost certainly indicated.
Important information can be extracted from the Saar analyses without recourse to comparisons with external ore and artefact data. For example, it can be seen that some of the isotopic diversity in the Saar assemblage can be correlated with compositional differences. Thus, objects in Isotopic Group 3 have low arsenic and high iron concentrations relative to the other Saar objects, and high-tin objects are all found in Isotopic Group 1, distinct from copper objects and ingots. The isotopic disparity of the Isotopic Group 1 tin-bronzes could reflect a number of different histories for the objects concerned:

a) different metal sources supplied the copper and tin-bronze used at Saar, or
b) the tin contained sufficient lead to modify the isotopic composition of the copper with which it was alloyed.

The second possibility is often disregarded in archaeological discussions, as tin rarely contains significant amounts of lead (Gale and Stos-Gale 1982; Stos-Gale 1989; Permicka et al. 1990). However, as Pb concentrations in the Saar copper are very low (generally less than 300 ppm), even a small contribution of Pb by the tin in a tin-bronze could serve to change the isotopic composition of the resulting alloy. With regard to this issue, it is interesting to note that the tin-bronzes from Saar have significantly higher Pb concentrations than the copper objects from the site. If metallic tin with lead isotope ratios of a non-radiogenic nature (i.e. in the upper right hand corner of the graphs on Fig. 9.13), was alloyed with copper of Saar Isotopic Group 2 type, the resulting tin-bronzes would possess isotopic ratios intermediate between the two. However, the only Bronze Age tin object known from the Gulf region, the ring from the Umm an-Nar tomb at Tell Abraq, does not have such non-radiogenic ratios (see Fig. 9.13). It is therefore uncertain if lead from tin caused the isotopic discrepancy between tin-bronzes and copper objects at Saar.

The tin-bronzes group in the upper right hand corner of the graphs on Fig. 9.11, and Table 1 suggests that one source supplied all the tin-bronze used at Saar, or that one alloying event produced the tin-bronze used in all the analysed objects (as it is difficult to imagine separate alloying events producing tin-bronzes with such a uniform isotopic composition). The exception is object 1864:42, the least radiogenic of the analysed Saar objects, which is perhaps divergent enough from the remainder of the Saar tin-bronzes to indicate an origin in a different ore body, or a different alloying event.

Comparison with other archaeological samples

The isotopic data for the Saar objects can be compared with lead isotope data for archaeological objects from Tell Abraq in the UAE (Weeks 1999) and from other sites in southeastern Arabia (Prange et al. 1999). Comparisons given here incorporate material from Tell Abraq contexts roughly contemporary with Saar (Umm an-Nar II/ Wadi Suq II, ca. 2100–1600 BC, using the chronology in Weeks 1997, table 1). The ages of the objects from southeastern Arabia analysed by Prange et al. (1999) are not individually defined, but they date broadly to the Umm an-Nar Period. Comparisons between all of the Saar objects and copper objects from southeastern Arabia are shown in Fig. 9.12, and in Fig. 9.13 the tin-bronzes from Saar are compared with those from Tell Abraq. The isotopic analyses from the very important study by Prange et al. (1999: fig. 7) are not fully published and they can only be shown in one of the graphs in Fig. 9.12.

As can be seen in Fig. 9.12, the copper finished objects, ingots and waste/spill samples from Saar Isotopic Group 2 have generally similar isotopic characteristics to some of the late third/early second millennium BC copper objects from Tell Abraq, and to a portion of the southeastern Arabian artefacts analysed by Prange et al. (1999: fig. 7). The copper ingot and waste/spill sample from Saar Isotopic Group 3 are not matched by any copper samples from Tell Abraq, but show broadly similar isotopic characteristics (a depleted thorogenic component) to some Bronze Age copper ingots, prills and fragments from southeastern Arabia.

A number of copper samples from Tell Abraq are distinct from the Saar copper samples (possessing lower radiogenic 207Pb/206Pb ratios of 0.845–0.85), and can be seen at the top right of the graphs in Fig. 9.12. At least one of these Tin Abraq copper objects is, however, isotopically similar to the tin-bronze objects from Saar, and a copper prill from Oman also has similar characteristics.

The general isotopic similarity of material from the various sites suggests that the societies of the Central and Southern Gulf were part of the same Bronze Age exchange system, which allowed access to the same range of metal sources. Copper with isotopic characteristics similar to Saar Isotopic Group 2 in particular appears to be common throughout the Gulf region in the Bronze Age. However, other Saar objects have less common isotopic signatures. For example, there are no isotopic matches between Saar waste sample 268:03 from Group 4 and any of the analysed objects from southeastern Arabia, and the isotopic parallels between Saar Isotopic Group 3 and some of the southeastern Arabian artefacts are of a very general nature. These examples may indicate that the people of Saar had access to metal of a different origin from that used in the Southern Gulf.

With regard to the tin-bronzes illustrated in Fig. 9.13, it is immediately clear that the tin-bronzes of Saar Isotopic Group 1 cover only a small part of the isotopic range seen in the tin-bronzes from Tell Abraq. Four of the five Saar tin-bronzes analysed are similar to a group of Umm an-Nar and Wadi Suq tin-bronzes.
from Tell Abraq, with $^{207}\text{Pb}/^{206}\text{Pb}$ ratios in the $0.845-0.855$ range. This isotopic group also includes the tin ring from the Umm an-Nar collective tomb at Tell Abraq. The outlying tin-bronze from Saar, the pin/awl 1864:42, has isotopic characteristics intermediate between the remaining Saar tin-bronzes and the least radiogenic tin-bronzes from Tell Abraq (in the upper right hand corner of the Fig. 9.13 graphs). The isotopic analyses suggest that at least some of the tin-bronze being used at Saar came from the same source(s) as that used at contemporary Tell Abraq.

In some respects, the isotopic data for tin-bronzes from Saar show a pattern similar to that of the analyses from Tell Abraq. These similarities include the observations that:

a) tin-bronzes are characterized by somewhat less radiogenic $^{208}\text{Pb}$ and $^{206}\text{Pb}$ isotopic compositions than copper objects, and

b) tin-bronzes from Saar fall on the same mixing line on the $^{207}\text{Pb}/^{206}\text{Pb}$ vs. $^{208}\text{Pb}/^{206}\text{Pb}$ and $^{207}\text{Pb}/^{206}\text{Pb}$ vs. $^{204}\text{Pb}/^{206}\text{Pb}$ plots as data from Tell Abraq (and a number of other Bronze Age sites in Western Asia; see Fig. 9.13 and Weeks 1999).

It has been suggested that the isotopic diversity of the Tell Abraq tin-bronzes conceals a very limited number of sources for this material (Weeks 1999), an argument based upon the isotopic similarity of early tin-bronzes from widely separated regions of Western Asia and the Aegean. The similarity of the Saar isotopic data with these broader patterns may reflect the participation of the Saar population in the long-distance tin and tin-bronze trade which seems to have existed in Western Asia at this time, although such a claim is speculative.

Unlike the Tell Abraq data, which showed significant overlap of the isotopic characteristics of copper and tin-bronze objects, no such overlap exists for the Saar objects. The conclusion that different metal sources supplied the raw material for each of the major compositional groups (copper objects and tin-bronzes) thus seems clearer for Saar than for Tell Abraq, where the possibility of lead contribution by the tin in the tin-bronzes must also be considered.

**Comparison with ore data**

It has usually been accepted that the copper used on Bahrain in the Early Dilmun period came from southeastern Arabia (e.g. Crawford et al. 1997: 11). This interpretation is based upon four factors:

a) the lack of copper sources on Bahrain itself, or on the nearby Arabian mainland,

b) textual and archaeological evidence indicating large-scale copper production in southeastern Arabia (ancient Magan), the trade in which was partly controlled by merchants from Dilmun (e.g. Potts 1990a; Hauptmann et al. 1988),

c) the presence on Bahrain of bun-shaped copper ingots similar to those produced in Bronze Age Oman (Crawford 1998: 100), and

d) compositional similarities between the copper used in Early Dilmun and contemporary southeastern Arabia (Northover 1994; Prange et al. 1999: 190).

To this list can be added the isotopic findings presented in Fig. 9.13, whereby many Saar copper objects had isotopic ratios matching copper objects from southeastern Arabia. Given that so much copper was produced in Bronze Age southeastern Arabia, it is likely that local metal was being used at southeastern Arabian sites, and the isotopic similarity of Saar and southeastern Arabian cop-

---

**Fig. 9.13 Lead isotope characteristics of tin-bronzes from Saar and Tell Abraq, and a tin-ring from Tell Abraq (Weeks 1999)**

**Fig. 9.14 Lead isotope characteristics of Saar objects in comparison to massive sulfide copper ores from Oman (Stos-Gale et al. 1997; Calvez and Lescuyer 1991; Chen and Pallister 1981) and Omani copper ores from unspecified locations (Prange et al. 1999: Fig. 7)**
per-base objects seen in Fig. 9.13 can be taken as evidence for the use of Omani metal on Bahrain.

However, there is no reason to think that the copper used at Saar came exclusively from southeastern Arabia. It is quite plausible that small quantities of copper from Iran, Pakistan or India were available on Bahrain in the Early Dilmun period, particularly given the wide-ranging trade contacts the island enjoyed at this time. Indeed, there are cuneiform references to the trade of copper from Meluhha (the Indus Valley) through the Gulf in the third millennium BC (Leemans 1960: 161). In support of this possibility, the lead isotope data presented above indicate strongly that the Saar metal was obtained from multiple sources, some of which seem to have been different than those available to the southeastern Arabian population.

In considering this issue, it is also of critical importance to understand the logical limitations of the lead isotope approach to provenance. Although negative conclusions regarding provenance can be strong, positive assignations are by their nature weaker, and dependent upon the extent of isotopic sampling of potential ore sources. In short, it is much easier to rule out potential sources than to confidently state that a particular deposit or region was the source of the metal used in an object.

Unfortunately, lead isotope data for the copper deposits in Oman, Iran, Pakistan and India are scarce. The most obvious comparison of the Saar material, for the reasons outlined above, is with copper ores from southeastern Arabia. These data were largely collected during geological research in the region (Gale et al. 1981; Chen and Pallister 1981; Calvez and Lescuyer 1991), although archaeological studies have been undertaken in more recent years (Stos-Gale et al. 1997; Prange et al. 1999: 191 and fig. 7).

The Saar data and isotopic ratios for copper ores from Oman are illustrated in Fig. 9.14. It is clear that the majority of objects from Saar do not have similar isotopic characteristics to the massive sulfide copper ores from Oman analysed in geological studies. Only one Saar object (ingot 1139:02) has isotopic characteristics directly matching the massive sulfide ores, the match being with the most radiogenic of the two sulfide fields including ores from the Raki and Hayl-as-Safil deposits. The results indicate that the largest massive sulfide deposits in southeastern Arabia at Lasail, Bayda and ‘Arja, did not supply the a significant amount of the copper used at Saar in the Early Dilmun period. In contrast, some of the Omani ore samples analysed by Prange et al. (1999: fig. 7) show isotopic characteristics similar to the copper objects in Saar Isotopic Group 2. As the provenance for these ore samples is not given, it is difficult to know whether they are from massive sulfide deposits or smaller mineral occurrences lower in the ophiolite mantle sequence, a geological unit that hosts many Omani copper deposits of the type preferentially exploited during the Bronze Age (Hauptmann et al. 1988).

Significantly, none of the analysed copper ores from Oman have isotopic signatures compatible with Saar objects from Groups 1, 3 and 4. While these objects may have come from an as-yet characterised ore source in Oman (cf. Prange et al. 1999: 190), other areas of Western and South Asia must also be considered as potential sources for the copper used at Early Dilmun Saar.

Numerous copper deposits are known from India and extensive copper production is thought to have begun there by the early third millennium BC (Chakrabarti 1998: 52 and 143–4), although the earliest evidence for mining cannot be placed before the mid-second millennium (Hegde and Ericson 1985). The Indian deposits most likely to have supplied copper to the Gulf trading system are those of the Aravalli Hills in Gujarat and Rajasthan. Some Pb isotope data for copper and lead ores from these areas have been published (Hegde and Ericson 1985; Srinivasan 1999), and the comparison with the Saar copper samples is illustrated in Fig. 9.15. It is clear from the data that the deposits of the Aravalli Hills were not supplying metal to Saar; these ores are hosted by Precambrian rocks, and have distinctive radiogenic $^{206}$Pb/$^{204}$Pb and unradiogenic $^{208}$Pb/$^{204}$Pb compositions, whereas the Pb isotopic composition of the Saar artefacts suggests that the metal was probably extracted from much younger deposits.

Many other copper sources with the potential to have supplied copper to the Gulf region occur further to the west, in Pakistan and Iran. The Iranian Plateau, in particular, has been regarded as
one of the most important areas for the development of metallurgy in ancient Western Asia (Caldwell 1967; Berthoud et al. 1980, 1982: 40; Pigott 1999a, 1999b). Important copper deposits are recorded in central and southwestern Iran and Iranian Makran (Haidtisch 1986: fig. 1; Samani 1998: fig. 2), and there is evidence for copper production in the region as early as the fifth millennium bc (Caldwell 1967; Heskel and Lamborghini 1980; Pigott 1999a).

Unfortunately, very few lead isotopic data are available for Iranian copper ores or Bronze Age copper slags. Three samples from the plateau sites of Tepe Sialk, Arisman and the Veshnoveh mine have recently been analysed as part of an Iranian-German research programme in the region (Chegini et al. 2000), and they can be supplemented by isotopic analyses from the Sar-Cheshmeh deposit in Kerman, the largest copper deposit in Iran (Shahabpour and Kramers 1987). The Sar-Cheshmeh data consist of analyses on sulphide concentrates from the rocks hosting the deposit rather than from copper ore samples, whereas the Tepe Sialk and Arisman analyses are on copper slags and the Veshnoveh sample is copper ore.

The data from the plateau sites and Sar-Cheshmeh are illustrated in Fig. 9.16. The closest match is between Sar Cheshmeh 1599:03 and the slag sample from Tepe Sialk, although this ingot also has similar isotopic ratios to one of the sulphide concentrates from Sar-Cheshmeh. Additionally, the high-As waste sample (1864:40) falls into the general area occupied by the Sar Cheshmeh samples and the two remaining Group 2 copper samples (2742:03F and 2669:06) have similar isotopic characteristics. The Iranian samples, as a group, have isotopic ratios ranging from those found in Sar Isotopic Group 2 (and commonly in southeastern Arabian ores and artefacts) to more radiogenic values than seen in the Saar assemblage, with the exception of Group 4 object 2681:07. Again, the Iranian data, although extremely limited, show no correspondence with objects from Saar Isotopic Groups 1, 3, or 4.

The isotopic data presented in Figs. 14 and 16 suggest that delineating the metal produced in Iran and southeastern Arabia using LIA may be difficult. Parallels can be drawn with the problems facing attempts to determine metal provenience in the eastern Mediterranean using the same technique (Budd et al. 1995 and subsequent comments; Budd et al. 1996). The combination of isotopic and compositional data has been suggested as a useful technique for the discussion of metal provenance (e.g. Pernicka 1999, 1995: 61; Stos-Gale et al. 1997: 109), however a further possible barrier to delineation of the metal sources used in the Gulf in the Bronze Age is provided by geology. A number of the copper deposits of Iran occur in geologically similar contexts to those of Oman (e.g. the ophiolite-hosted massive sulphide deposits of the Makran), and differentiating the metal produced from these Iranian and Omani deposits by compositional means may also be difficult (Hauptmann 1987: Abb. 3 and 6; Samani 1998).

As few lead isotope studies have been carried out in the Gulf, the potential of the technique to aid archaeological interpretation of the early trading systems of the region cannot yet be fully exploited. Although the Iranian data may be an early indicator of difficulties ahead, the reconnaissance isotopic data presented in this chapter indicate the complexity of the early metal trade in the Gulf region, and serve as a useful data set independent of, and complementary to, reconstructions of Gulf trade based upon Mesopotamian cuneiform sources. The conclusive reconstruction of the Gulf metals trade remains an enormous and incomplete task: further compositional and isotopic data are clearly required, in addition to archaeometallurgical fieldwork to establish areas of early copper extraction over the vast area from central Iran to northwest India.

**Summary (Lloyd Weeks)**

Thirty-eight objects from Saar were analysed in this programme of archaeometallurgical research. This included 16 finished objects, three copper ingots and 19 pieces of metallurgical debris from refining and casting operations at the site. The conclusions summarised here are predicated upon the assumption that the analyses are representative of the range of metal-related activities and objects at Saar. However, as the absolute numbers of samples are small, conclusions may change with further analyses. This is particularly true of the conclusions from LIA, where only 13 objects (seven finished objects, three ingots and three waste/spill pieces) were analysed. Having noted this caveat, the major findings of the programme of metallurgical analyses are summarised below.

Compositional analyses of the finished objects from Saar indicated the use of a range of copper alloys, including tin-bronze, nickel-copper and unalloyed copper. A number of the tin-bronzes were complex ternary alloys incorporating 1–5% tin. In addition to tin, the alloys used at Saar fit comfortably within the range of metal alloys reported in previous studies of Bronze Age metallurgy in the Gulf region, and comparisons can also be drawn with the use of specific alloys for particular object categories. For example, the majority of the tin-bronzes from Saar were rings. Comparison of the Saar analyses with material from southeastern Arabia confirms that, among the Bronze Age societies of the Gulf, tin-bronze tended to be preferentially used for small decorative items such as rings.

However, although a number of different copper-base alloys were produced by the people of Saar, it is uncertain whether any alloying ever took place at Saar itself. Firstly, there is growing evidence from southeastern Arabia and other areas that copper-base alloys with concentrations of arsenic and nickel like those found at Saar were probably (inadvertently) produced at the primary smelting stage, as a result of the chemical and mineralogical composition of the ores that were available for exploitation (Weeks 2000). The raw metal traded to Saar in ingot form seems to have, occasionally, included such As/Ni-copper alloys: significant impurities of Ni and As (sometimes exceeding %) are commonly seen in the Saar metallurgical waste and ingots analysed in this study. Secondly, there is a distinct lack of evidence for the melting or casting of tin-bronze (as opposed to copper) at Saar and southeastern Arabian sites, and no tin objects are known from Early Dilmun Bahrain. Thus it could be suggested that tin-bronze was traded to settlements in the Gulf in the form of finished objects. As noted above, small decorative objects such as rings appear to dominate tin-bronze metal assemblages from the Bronze Age Gulf, and they may represent the form in which tin-bronze was usually exchanged within the Gulf.

The copper ingots from Saar have similar impurity patterns to the finished copper objects from the site, but are distinguished by much higher concentrations of sulfur and, in particular, iron. These elements, present in concentrations of up to 10% in the ingots, result from the use of mixed oxide and sulfur-bearing ores in the production of the raw copper and the incomplete separation of the copper and matte produced during the primary smelt. The high level of impurities in the Saar ingots is matched by analyses of other ingots from the Gulf region, and indicates the need for a refining stage prior to the production of finished objects at Saar.

Abundant evidence of such secondary refining is provided by the waste/spill samples from the Saar settlement. These samples are differentiable from the majority of finished objects at Saar not only by their appearance and shape, but by their composition. The debris from casting and particularly refining operations undertaken at Saar generally possessed higher concentrations of silicon, sulfur, iron and cobalt than finished objects. A number of factors suggest that most
of the analysed waste samples from Saar are by-products of the refining of raw copper (probably ingots) high in impurities, prior to object fabrication. A number of the waste/spill samples, however, are almost pure metallic copper, which suggests that they were spills created during the casting of objects at Saar. The waste/spill samples are thus a useful guide to the range of metallurgical activities which were undertaken by the inhabitants of the Saar settlement. The similar impurity patterns of the waste/spill samples and finished copper objects provide a further link between the raw metal imported into the site and the objects which were produced there.

The source of the metals used at Saar is an issue of primary interest. Most reconstructions of the Bronze Age metals trade in the Gulf posit that the copper used in settlements of the region was produced in southeastern Arabia, the location of the copper-supplying land of Magan mentioned in contemporary cuneiform sources. The compositional characteristics of most of the copper objects from Saar, especially their arsenic and nickel concentrations, are compatible with an origin in southeastern Arabia. One exception is the waste/spill sample 1864:40, with ca. 20% As, which may have come from a region such as Anarak on the Iranian plateau where high-arsenic ores are commonly found (Heskel and Lamborg-Karlowsky 1986). The tin-bronzes from Saar are also clear candidates for an absolute provenance outside southeastern Arabia: the presence of tin indicates that they must include at least some non-Omani metal (as tin is not found in southeastern Arabia), and they are also distinct from the majority of the Saar copper objects in their arsenic, lead, and silver concentrations. However, it has been demonstrated that whilst some trace elements in copper-base objects are a reflection of the provenance of the metal (Pernicka 1999), compositional analyses are rarely able to provide specific and reliable information on provenance (Cradock and Giumlia-Mair 1988). The issue of provenance for the Saar metals was therefore addressed through a combination of compositional and lead isotope data.

Given the prevailing hypotheses regarding metal production and exchange in the region, it is interesting to note that the U1A of the Saar objects suggests the possibility of four different sources for the metal used at the site, labelled here as Saar Isotopic Groups 1–4. It seems clear that the tin-bronzes from Saar (Isotopic Group 1) came from a different source than any of the copper objects, ingots or waste samples. The isotopic characteristics of the tin-bronzes are relatively homogeneous, which may indicate that only one source supplied the tin-bronze used at Saar. Geological and textual information would suggest that the ultimate origin of these tin-bronze items lay far to the east of Saar, within the areas of modern Afghanistan or Central Asia (Weeks 1999). The many intermediaries between the source and the eventual users of the tin-bronze at Saar remain unknown, as do the mechanisms of the exchange systems by which this material was distributed in the Bronze Age Gulf. As noted above, it is possible that the tin-bronze used at Saar was found in the form in which it was actually traded, as small decorative objects such as rings are particularly common among early tin-bronzes from the Gulf region. Alternatively, such items of display may have been manufactured locally in the Gulf, as an appropriate use of a metal alloy with distinctive elite associations in wider Bronze Age Western Asia (e.g. Stech and Pigott 1986).

Among the copper objects, it is significant that the isotopic characteristics of one of the ingots (K65:101) are different enough from the remaining ingots to suggest a separate source. This indicates that not only finished objects, but also raw copper was reaching Saar from multiple ore sources.

Whether the isotopically heterogeneous metal used at Saar was obtained through multi-directional trade is, however, a very different question. For example, the Ur version of the myth of Enki and Ninhursag dating from ca. 2000 BCE (Kramer 1977: 59), indicates that eight countries transported their wares to Dilmun: Tukrish, Meluhha, Marhashi, Magan, the Sealand, Zalangar, Elam and Sumer. It is tempting to correlate the use of multiple metal sources at Saar with such multi-directional trade contacts, but this may not necessarily be the case. As an illustration of the distinction, the more than 100 copper deposits recorded in southeastern Arabia occur in a number of different geological contexts, and would be expected to have differing isotopic characteristics related to their individual histories of formation. The study by Prange et al. (1999) has indeed demonstrated the great isotopic diversity of copper ores and Bronze Age objects from southeastern Arabia. Isotopically heterogeneous copper from a number of different Omani sources could have been channelled through a small number of coastal trading centres, and obtained by traders from Saar at a single settlement such as Tell Abraq, on the northern coast of the Oman Peninsula.

The delineation of such issues depends upon the comparison of the isotopic data for the Saar artefacts with that for ores and artefacts from potential source regions. A comparison of the Saar objects with other Bronze Age objects from southeastern Arabia highlights a general isotopic similarity, suggesting that copper from the same sources was utilized throughout the Gulf region. Such statements can be made without recourse to ore data and the investigation of absolute provenance. Comparisons with U1A data for copper ores from Oman suggest that southeastern Arabia was a major producer of the copper circulating in the Gulf, a claim that is supported by the compositional analyses of the Saar copper objects. Thus, the isotopic diversity of the Saar metal assemblage can, in theory, be reconciled with the predominant use of metal from southeastern Arabia on Early Dilmun Bahrain.

Such a finding is in accord with most thinking on the Bronze Age copper trade in the Gulf but, interestingly, is most strongly refuted by the evidence from southeastern Arabia itself. Research since the late 1970s has outlined a highly periodic history of primary copper extraction in Oman, within which there is little or no evidence for production in the early second millennium BCE (Weisgerber 1988: Abb. 4; Hauptmann 1985: Abb. 1). This is the period during which the Dilmun copper trade with Mesopotamia reached its peak, and the absence of evidence for primary extraction in southeastern Arabia has led at least one scholar (Carter 2001) to question whether most Dilmun copper was really coming from southeastern Arabia at this time.

The little evidence from southeastern Arabia that does exist consists of one radiocarbon date of ca. 1800 BCE from a copper mine on Masirah Island (Weisgerber 1988), about which nothing else is published. If copper production had, in fact, ceased at this time in southeastern Arabia, then the use of Omani copper by the metalworkers at Saar could reflect recycling of metal obtained earlier. However, given the compositional and isotopic similarities between Early Dilmun copper and some Bronze Age objects and ores from southeastern Arabia reported in this and other studies (esp. Prange et al. 1999), it seems more likely that copper production in southeastern Arabia did in fact continue into the Wadi Suq Period. One possible explanation for the failure to recognise Wadi Suq smelting in southeastern Arabia is that primary extraction slags from this period are not differentiable from those of the Umm an-Nar Period on typological or technological grounds, and have been classified as Umm an-Nar smelting remains. The resolution of this issue is obviously critical for archaeometallurgical studies in southeastern Arabia and for the Gulf metals trade in general.

Given such uncertainties, it is perhaps unsurprising that a number of the Bronze Age objects and ingots from Saar (and Oman) are
isotopically distinct from the Omani copper ores so far analysed. Although similar ores may eventually be recorded in Oman, especially at sites like Masirah Island, the LIA forces us to examine the possibility that copper sources in India, Pakistan, or Iran may have provided some of the copper used at Saar. Few very LIA data are available for these regions, but they suggest that Indian copper sources in Gujarat and Rajasthan were unlikely to have supplied the metal used at Saar. However, many of the copper deposits likely to have been exploited in the Indus region remain unanalysed. In contrast, some of the Saar copper objects are isotopically compatible with an Iranian origin, although it appears that differentiating copper produced in Oman and Iran using LIA may prove to be problematic.

Clearly, the measured amount of isotopic data available for copper deposits from India to Iran is entirely inadequate to allow a satisfactory investigation of this issue. Nevertheless, LIA of the Saar objects and contemporary material from southeastern Arabia has provided a first indication of the complexity of the early metal exchange in the Gulf region and the wide-ranging trade contacts it may have incorporated.

**Note on analytical techniques**

**Proton-induced X-ray emission (PIXE)**

Samples were invariably heavily corroded on the surface, and corrosion commonly extended a significant way into the core. For PIXE analysis, material from the centre of the sample was exposed by abrasion, and polished using wet-and-dry sandpaper grades 120–1200. The samples were cleaned in distilled water and mounted on Cr-coated iron brackets on the long target stick just prior to analysis. Analyses were conducted at the Australian Nuclear Science and Technology Organisation (ANSTO), and supported by grants from the Australian Institute for Nuclear Science and Engineering (AINSE). Thanks are due to Dr. Grahame Bailey and Mr. Philip Johnston (ANSTO) for the collection and processing of the data. Utilising the PIXE technique, compositional data were collected for 26 elements: silicon (Si), phosphorus (P), sulfur (S), chlorine (Cl), potassium (K), calcium (Ca), titanium (Ti), vanadium (V), manganese (Mn), chromium (Cr), iron (Fe), cobalt (Co), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), selenium (Se), bromine (Br), rubidium (Rb), strontium (Sr), silver (Ag), tin (Sn), antimony (Sb), lead (Pb), gold (Au) and bismuth (Bi). All measured P, Ti, V, Sn, As, Bi concentrations were below levels required for acceptable analytical precision, and are not discussed further in this section. All chromium determinations have been disregarded due to the possibility of spurious Cr peaks in some samples due to instrumental errors (see Weeks 2000: 302). The PIXE data are presented in normalised weight percent, following processes outlined in Weeks (2000).

The sensitivity of the PIXE technique is represented by a quantity known as the Minimum Detectable Level (MDL), which is calculated for each quantified element in each analysed sample. The MDL is the minimum amount of an element that can be measured by the PIXE analytical technique, and is dependent upon the atomic weight of the individual element, the compositional matrix of the analysed sample, and the particular instrumental set-up employed in the laboratory (Fleming and Swann 1988). The MDL values presented for each element are a statistical simplification of the raw MDL data collected during the Saar analyses, and represent an average MDL value calculated from the MDL data for all the Saar samples. The higher the concentration of a particular element above the MDL, the better the precision that can be associated with the measurement. Values below the MDL, although frequently produced by the quantification software (Clayton et al. 1987), are highly unreliable and shown as blank cells on Tables 9.3 and 9.6. At levels of one to three times the MDL, percentage standard deviations are generally in the 15–40% range. At concentrations of more than five times the MDL, precision is better than ca. 20% for most elements. Due to problems in the detection system, measured Fe concentrations in the Saar samples have been slightly modified prior to normalisation (see Weeks 2000: 302). The overall accuracy of the PIXE system at ANSTO is approximately ±10% (Dr. R. Siegle, ANSTO, pers. comm). PIXE is not as commonly used for the analysis of metal objects as other techniques, such as neutron activation analysis (NAA) or atomic absorption spectrometry (AAS), but PIXE has been used successfully in the analysis of archaeological copper-base objects in studies by Grave et al. (1996), Balthazar (1986) and Mommsen et al. (1979), among others.

**Energy dispersive spectrometry (EDS)**

Samples were set in epoxy resin in one-inch diameter plastic moulds. After drying (ca. 48 hrs) the samples underwent grinding using wet-and-dry sandpaper grades 320–1200. The samples were then polished by hand on a cloth-covered, mechanised rotary polisher using 6 micron and 1 micron diamond paste. Samples were cleaned in ethanol in a sonic bath between the 6 micron and 1 micron polishes and at the end of the polishing process. Samples were coated with a thin surface layer of carbon to facilitate EDS analysis, which was undertaken on a Sony XL30 scanning electron microscope (SEM) at the Electron Microscope Unit, University of Sydney. Compositional data for up to 14 elements, comprising magnesium (Mg), Si, S, Cl, Ca, Fe, Co, Ni, Cu, Zn, As, Br, Ag and Sn, were collected. Lead was not recorded at detectable levels in any sample. EDS data are presented in normalised weight percent for individual elemental components. Further information on EDS sample preparation and data treatment can be found in Weeks (2000). Thanks are due to Dr. Clive Nockolds and Ian Kaplin for assistance in conducting the EDS analyses.

**Lead isotope analyses (LIA)**

Analyses were undertaken at the Advanced Centre for Queensland University Isotope Research Excellence (ACQUIRE) in Brisbane, Australia, supported by a grant from the British School of Archaeology in Iraq. Small shavings from each artefact (tin-bronze, copper, copper ingots and metallurgical waste) were retrieved and stored in clean teflon Savillex® beakers. Each sample was cleaned using deionized water and acetone in ultra sonic bath prior to dissolution with hot HCl-doped 7 N HNO₃. Following evaporation to dryness on a hot plate at ~75 °C residues were converted to chloride using 74% of 6 N HCl.

Samples were taken up with 3 μl HBr for loading on ion-exchange columns. Lead separations were carried out using standard HBr–HCl chemistry on columns filled with 100 ml AG-1x8, 200–400 mesh anion exchange resin prior to elution with 6 N HCl (Tilton 1973). Pb isotopic compositions were measured in static mode on a Fison-VG Micromass 34–30 multi-collector mass spectrometer. Purified Pb fractions were dissolved in H₃PO₄ and a small fraction was loaded with silica gel on single degassed Re-filament. Pb data were obtained at 1350°C and data were corrected for instrumental mass fractionation of 1‰ per atomic mass unit using the values of Todt et al. (1996). The fractionation factor was determined by measuring multiple loads of NBS-981 standard during sample analysis.

Replicate analyses of common lead standard NBS-981 by multi-collector thermal ionization mass spectrometry at UQ yielded 208Pb/206Pb 2.1676 ±0.0018 (2-sigma) 207Pb/206Pb 0.9148 ±0.0004, 208Pb/206Pb 16.935 ±0.003, 207Pb/206Pb 15.492 ±0.016, 208Pb/206Pb 56.708 ±0.003. These results are identical, within error, to double spiked TIMS data of Todt et al. (1996), namely 208Pb/206Pb 2.1670 ±0.0004, 207Pb/206Pb 0.91435 ±0.00014, 208Pb/206Pb 16.9356 ±0.0024, 207Pb/206Pb 15.491 ±0.0000, 208Pb/206Pb 56.7006 ±0.0012. The amount of lead required for each analysis was ca. 50 to 100 ng (10⁻¹⁰ g). Procedural blanks during the study ranged from 65 pg to 100 pg Pb. The blank introduced during sample loading onto the mass spectrometer filament ranged between 20 to 50 fg (10⁻¹⁵ g).
Chapter 10 Domestic space at Saar: the microstratigraphic evidence

Wendy Matthews and Charles French

Introduction

Ethnoarchaeological and geoarchaeological research has demonstrated that all materials in archaeological deposits, including sediments, are potentially informative about human behaviour, settlement history and micro-environment. During ethnoarchaeological research in Iran, Kramer observed that:

‘The floor of each area within a house compound is peculiar to that kind of area and therefore diagnostic of primary function… it is likely that an excavator could readily distinguish between roofed and unroofed areas, [and] identify stables, storerooms, kitchens and living rooms… by evaluating variations in floors’ (1979: 148–9).

Anthropological studies illustrate that within houses and settlements there is a ‘maze of spatial conventions’ through which economic and social relationships and organisation are represented and (re-)negotiated during the life cycle and history of the settlement and each inhabitant (Moore 1986; Carsten and Hugh-Jones 1995: 4; Parker Pearson and Richards 1999). They have demonstrated that architectural materials and space are powerful media through which relationships are expressed and materialised (De Merais et al. 1996), and that the domestic household is a key arena in economic and social history. In many ancient and more recent settlements, few artefacts are found on floors to indicate what different rooms or areas were used for (Fig. 10.1). Those that do remain, as at Saar, often relate to the latest use of a building and discard or abandonment activities, and may have been disturbed (Cameron and Tomka 1993; LaMotta and Schiffer 1999). The McKellar hypothesis states that it is the smaller artefactual remains which are ‘more likely to become primary refuse’ even in areas that are periodically cleaned (Schiffer 1987).

Microstratigraphic analysis of sequences of floors and accumulated residues from activities offers new potential for detecting and interpreting these conventions, by permitting high resolution analysis of floors and the often sparse traces of activities on them, throughout the life-history of each building and its inhabitants (Matthews 1995; Matthews et al. 1997b). One specific objective is to identify the wide range of burnt and unburnt plant materials, parts and taxa, which are often preserved in thin-sections of archaeological sediments, in order to contribute to interpretation of the taphonomy and use of plants.

Methodology

Saar was one of three settlements that were selected to study site formation processes and traces of uses of space in different socio-cultural and environmental contexts, on a transect through different geobotanical zones in Western Asia (Matthews et al. 1997b). The other sites selected were the Neolithic settlement of Çatalhöyük in central Turkey in the Konya Plain, on the edge of the Early Mediterranean woodland climax zone, c. 7,400–6,200 BC, in an area characterised by Pleistocene lake sediments and Holocene alluvium and back-swamp deposits; and the Bronze Age city of Tell Brak, in northeastern Syria, in Mesopotamian steppe region of extensive Quaternary calcareous colluvium and alluvial silts and sandy silts, levels c. 4,000–1,300 BC.

Saar is located in the Sub-Sudanian vegetation zone in the Gulf with mosaics of Haloxylon salicornic and Suaeda retorti (Zohary 1973), and is sited on a limestone ridge between sand-dunes and deposits of calcareous silty clay in the remnants of an adjacent shallow bay (Doornkamp et al. 1980; Chapter 11 this volume).

<table>
<thead>
<tr>
<th>Bldg</th>
<th>Phase</th>
<th>Area</th>
<th>m²</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>205</td>
<td>2.1</td>
<td>235</td>
<td>8</td>
<td>235</td>
</tr>
<tr>
<td></td>
<td>236</td>
<td>21</td>
<td></td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>237</td>
<td>22</td>
<td>51</td>
<td>288</td>
</tr>
<tr>
<td>207</td>
<td>2.1</td>
<td>272</td>
<td>30</td>
<td>302</td>
</tr>
<tr>
<td></td>
<td>273</td>
<td>13</td>
<td>43</td>
<td>316</td>
</tr>
</tbody>
</table>

Table 10.1 Dimensions of Bldgs 205 and 207

The large number of well-defined fixtures and fittings within the buildings at Saar provided a particularly good set of controls for independent evaluation and verification of the micromorphological characteristics of depositional sequences and traces of uses of space, and for establishing sets of characteristic attributes that could be used in comparative study of other settlements. The buildings selected for detailed micromorphological study at Saar (Bldgs 205 and 207) had only two or three rooms, and were less than 20% of...
In order to detect variation within these buildings, and to compare depositional sequences adjacent to each feature, it was decided to apply ‘Palaeolithic’ excavation techniques to settlement archaeology, by excavation and sampling in one-metre grid-squares. Bldgs 205 and 207 in the Western Quarter were selected as the principal case-studies in order to compare a two-roomed and a three-roomed building from the same quarter (Fig. 10.2).

The grid-squares were excavated alternately, progressing from the latest deposits of wind-blown sand, down through the occupation and floor levels, and into the underlying foundation deposit of sand which separated the latest building level from the underlying ones. This enabled controlled spatial analysis of the distribution of artefacts and micro-residues within each area. The profiles enabled study of both horizontal (spatial) and vertical (temporal) variation in boundaries, and in floors and occupation deposits, throughout the history of each area of the buildings, at a resolution not permitted by routine open-area excavation. Deposits were excavated following standard excavation recognition, definition and execution procedures within each grid-square. The extent of each excavation unit was planned within each square, and on an overall base plan,
for major building phases. The field-sections were tagged with excavation unit numbers to enable correlation of field, wet-sieving, flotation, and microscopic observations and data. All major finds were plotted within each grid-square.

Bulk samples for wet-sieving and flotation were collected from each excavation unit. The micro-residues from wet-sieving were quantified as grams per litre, for each of the five sieve sizes, in order to identify contextual variation in the concentrations and degrees of fragmentation of pottery, metal fragments, bitumen, burnt aggregates, bone, shell and other micro-artefacts and bio-archaeological remains. The sieve sizes were arbitrary, based on what was available.

Each of the four vertical sections of every one-metre grid-square was photographed, drawn at 1:5, and described adapting standard soil science and archaeological description methods (Hodgson 1976; Court et al. 1980; Matthews 1992).

Blocks of sediment c. 13.5 x 6.5 x 9.0 cm were collected in large resin-impregnated thin-sections, at one to two metre intervals throughout the buildings from the edge of these grid-squares, in order to study micromorphological data on the origin, deposition and post-depositional alteration of deposits in each area. Spot samples were collected adjacent to micromorphological blocks for future targeted phytolith, organic, mineralogical and SEM EDX analysis.

The remaining one metre grid-squares were excavated and sampled following the same procedures. Key features, such as fire installations, were cross-sectioned in order to study sequences of deposits within them in the same way, and to compare them to surrounding deposits.

Micromorphology

The micromorphological block samples were impregnated with unsaturated cryptic polyester, and cut, ground and polished into large thin-sections, 13.5 x 6.5 cm, of standard geological thickness 25–30 microns (Murphy 1986). They were analysed using internationally standardised procedures (Bullock et al. 1985). Components were identified and interpreted by reference to a wide range of atlases and case-studies from the natural sciences, including geology (Mackenzie & Guilford 1980; Kerr 1977), plant anatomy (Jaggiela and Kurscener 1987; Metcalfe 1960; Pearsall & Piperno 1993; Rosen 1992), and soil science (Fedorkoff et al. 1987). Comparative archaeological, ethnarchaeological and experimental data were available from the other sites studied as well as published data (Court et al. 1980; Kramer 1979; Schiffer 1987). Thirty-one thin-sections were analysed from Bldg 205, 23 from Bldg 207, four from streets and middens, and 11 from the temple, including two from the sounding (Matthews et al. 1997a).

Plant remains

One major result of the analysis has been the identification of surprisingly abundant and well-preserved plant remains in thin-section. Many of these are preserved, not as charred plant remains, but as fragile articulated phytoliths and other siliceous remains of plants, particularly date-palm leaflets and rachis (Figs. 10.5–8). This result has helped to explain the sparsity of charred plant remains retrieved by water flotation in the early stages of excavations at Saar (Nesbitt 1993), and perhaps more widely in the Gulf region (Willcox 1990; Gale 1994). Of 6,800 litres of deposit initially floated at Saar, only a handful (62 gm) of charred plant remains were recovered (Nesbitt 1993). At Saar, concentrations of charred plant remains recovered by flotation are not only low in fire installations, but also in other contexts, including occupation deposits on floors and middens, ranging from 0.015–0.094 grams per litre.

Nesbitt suggested that this may have been due either to the sparsity of plant remains used or deposited within the settlement at Saar, or to poor preservation conditions (1993). In thin section, however, it is evident that this sparsity is not due to poor preservation, as plant remains constitute up to 86% of deposits. Rather, it is due largely to the extensive use of date-palm leaflets and rachis (Phoenix dactylifera) as the principal source of fuel. These tend to burn leaving little residual carbon and charred remains. Up to 90% of the deposits preserved in fire installations were calcitic ashes, siliceous remains (phytoliths) of date-palm leaflets, <5% charred plant remains. The date-palm leaflets are remarkably well preserved (Fig. 10.8). They range in thickness from 180–480 μm, and in length from 100 μm to more than 1 cm. Individual silica nodules, phytoliths, are small with a diameter of usually ½–24 μm, and are round with distinctive spiky protrusions (Fig. 10.5). The largest fragments of date-palm leaflets preserved occur in in situ fuel in fire installations, and in discard areas, e.g. Bldg 205 grid-square C. The smallest occur in the central part of the outer room of Bldg 205 (grid-square L), <0.2 mm, coincident with the smallest fragments of bone and pottery and heavily trampled deposits lying en route between the internal room and the entrance to the rear yard, Area 237.

Silica is also generally abundant in grasses, reeds and cereals, variously in stem, leaf, rachis, husk, awns and other florescence parts (Pearsall and Piperno 1993; Rosen 1992). The sparsity of phytoliths and other plant remains of these taxa at Saar is surprising, and cannot be due to poor preservation conditions, given the abun-
silecious, and possibly desiccated leaf and rachis remains in both domestic and ritual contexts have been identified (Matthews et al. 1997a, 1997b). The date-palm was used extensively for fuel, and also for mats or loose-leaf coverings on floors, and in roofing.

It is also evident in thin-section that charred date-palm kernels are poorly preserved, and have fragmented in situ due to re-precipitation of salts, as well as trampling and settling of plant remains in the unconsolidated sandy surfaces. These are also likely to have fragmented and crumbled during routine excavation and water-flotation. Other plant remains in thin-section include: calcitic ashes, impressions of plant remains that have since decayed, particularly in plasters, and charred seeds (Figs. 10.6–7). In thin-section, the most diverse range of plant materials and genera encountered was in a street/midden which included a range of charred seeds and monocotyledon leaf segments, in addition to charred and silecious remains of date-palm (45%), and calcitic ashes (30%).

Dung
Herbivore dung, with calcareous spherulites 5–25μm in diameter, that form in the guts of animals during digestions (Canti 1999), has been identified next to the plastered basin in the rear yard of Bldg 205 (grid-square 18), and in burnt fuel in the semicircular hearth in Bldg 207 (Figs. 10.6–7). This suggests the inhabitants of Saar had access to dung from animals that were kept off-settlement somewhere, as no possible animal pens or stables have been identified within the excavated area. Some of the amorphous organic residues may be omnivore dung from humans, dog, or pig (Courty et al. 1989), particularly where they include spherulites, as in the latest phases of the internal rooms of both buildings. This scarcity of dung is in contrast to many Neolithic and Bronze Age sites in alluvial, steppe or basin areas in Turkey, Syria and Iraq.

Other residues from human activity in thin-section
Other residues from human activity identified in the micromorphological thin-sections include: burnt and unburnt fish-bone and scales, animal bone, shell, pottery, metal and grindstone fragments, burnt aggregates, bitumen fragments, and building material aggregates (plasters and mortar). Amorphous organic staining has been identified in a range of fire installations, and resembles experimental residues of fat from cooking meat (Courty pers. comm.).

Post-depositional alterations
Post-depositional alterations include: re-precipitation of gypsum salts; bioturbation from root and insect activity; and re-working by trampling, which is part of an ongoing process of deposition and alteration.

Fire installations: hearths, ovens and food cooking
Date-palm leaflets and rachis are the principal source of fuel traditionally used on the island today. They are a highly sustainable source of fuel and readily available from pruning of date-palm trees. The leaves in particular, however, tend to generate considerable quantities of smoke when burnt, which can be acrid and irritating to the eyes and respiratory system. Most of the fire installations at Saar were not located inside the small inner room, but in the larger outer room where smoke may have more readily dissipated. The sparsity of wind and water-laid deposits in these outer rooms in comparison to the rear yard of Bldg 205 suggest
the former may have been at least lightly roofed with date-palm fronds, and parts of the latter more open.

Many of the buildings at Saar contain three different types of fire installation; a semicircular hearth; a cooking pot support/hearth made up of three or more plastered stones; and a tannur. The first two are often found together (see Chapter 5). The principal source of fuel in all three types was date-palm leaflings and rachis (Fig. 10.4, 10.8). The range of micro-residues and post-depositional alterations associated with each type of installation are listed in Table 10.2.

The structure of all three resembles traditional fire installations in current villages on the island, in which date-palm leaflings and rachis are also burnt. Traditionally, each of the three fire installations is designed to create and control different temperatures, and conditions and duration of burning, even when a single source of fuel like the date-palm cuttings is used (Table 10.2; Zayani 1988; Yousif Al-Nashaba pers. comm.). The presence of metal fragments in ancient semicircular hearths; the dimensions of cooking pots in relation to the supports, and the clay lining in the tannur all suggest that the fire installations at Saar may have enabled similar variations in the type, temperature and duration of cooking, including baking, grilling, stewing and roasting (Tables 10.2 and 3).

Translating the proportions of different plant remains and their degrees of preservation into estimates of burning temperatures and regimes of combustion is still highly problematic, due to the wide range of potential variables. These include moisture, duration of burning, and oxidising and reducing conditions. Further controlled experiment and ethnoarchaeological research is required (Boardman and Jones 1990).

The highest quantities and proportions of calcitic ash in in situ fuel were generated in the cooking pot support/hearths and the tannurs, and in adjacent rafe-out deposits, perhaps from more sustained/longer burning required for stewing and roasting. Melted siliceous plant remains are also most abundant in these two types of fire installation, and have also been identified in the street/midden deposit, and deposits next to a grindstone. The silica is likely to have melted at comparatively high temperatures of c. 800–1,000 °C (Courtay et al. 1989, 106–9). Both cooking pot support/hearths have organic staining, perhaps from dripping/boiled over fats (Courtay pers. comm.). The semicircular hearths also include brown stained ashes, and lenses of 2–5% bone, suggesting periodic discard into the hearth.

**Architectural materials**

A range of architectural materials have been characterised in thin-section.

**Walls**

The walls were built from the limestone readily available on the flanks of the ridge on which the settlement lay, composed of Eocene West Rifa Flint formation and Al Buhayr Carbonate Formation. The mortar in the walls was made from a firm slightly sandy silty clay loam with sand and small calcareous rock inclusions. The internal surface of the northwestern wall in Area 236, the outer room of Bldg 205, had been repaired with a rough mortar made from calcitic date-palm ash and siliceous remains.

**Packing**

The foundations for the grindstone setting in Bldg 205, Area 237, and for some street surfaces, were made from a slightly sandy silty clay loam, with rock fragments, similar to the mortar from the walls. In many of the rooms, clean sand was used as a levelling/packing material.
Plaster floors
Patches of plaster floor were identified in the inner rooms of both buildings and in the outer room of Bldg 205 next to the external door into the street and in an arc around the plastered hearth. Plaster was not present in other areas of the outer room of Bldg 205 or in the rear yard. The floors were made from a silty clay, rich in diatoms and occasionally gypsum crystals, which was probably excavated from the shallow mud bays to the east towards Tubli Bay (Chapter 3). The presence/absence of a plaster floor may be considered a material indicator or signifier of variation in activity and in spatial and social conventions. In the case of Saar, this highlights differences in use and function both within the same room (the outer room of Bldg 205) and between rooms (the inner room and rear yard of the same building).

Gypsum plasters
The white plastered basins in the doorways of Bldgs 205 and 207 were made from alternating layers of gypsum plaster, c. 5 mm thick, and calcitic date-palm ash and siliceous remains, mounted on a stone and silty-clay loam mortar base (Figs. 10.10 – 11). Gypsum plaster is made by heating alabaster or gypsum (CaSO₄·2H₂O) at comparatively low temperatures, 150–400°C, to produce a powdered hemihydrate (CaSO₄·½H₂O) (Kingery et al. 1988). When this is rehydrated with water it reforms the dihydrate (CaSO₄·2H₂O), and can be mixed to form a paste and applied as a plaster, which sets quickly. Gypsum plaster, unlike calcareous lime plaster, absorbs water and would not, on its own, have been suitable as a basin lining. Calcitic plant ashes, however, are hydrophobic. They often cause problems, for example,
in forested areas after fire, where they lead to high surface runoff. The c. 5 mm layers of calcitic date-palm ash and siliceous remains would have provided a vital lining that was resistant to water permeation. The hydrophobic properties of date-palm ash are known traditionally on the island. Basins in traditional houses are made from similar alternating layers of gypsum and calcitic date-palm ash (Yousif Al-Nashaba pers. comm.). A range of other features in the buildings were coated with gypsum, including small solid platforms/work-surfaces and larger basins. Excavations at Saar identified a gypsum kiln, constructed late on in the life of the settlement (Bldg 36).

**Contextual analysis**

Striking differences in the character of occupation sequences were observed within the space of 1–2 metres throughout the rooms of Bldgs 205 and 207, despite the smallness of the buildings and areas. These characteristics have enabled identification and delineation of a wide range of activity areas (Fig. 10.9). There was remarkable continuity in the type, thickness, frequency and cyclicity of deposit within each activity area in both buildings. As a consequence, all micro–phases within the main occupation level of each building are discussed together.

Many of these characteristics were independently identified and corroborated during multi–scalar and interdisciplinary analysis of data from field excavation, analysis of field–section drawings and photographs of the one metre grid–squares, micromorphological thin–sections, and micro–residues from wet–sieving and flotation (Table 10.4). They also correspond with the range of artefacts and bioarchaeological remains within these buildings.

**Building 205**

Bldg 205 was the northernmost building of Block A which lay north of the temple and formed part of the Western Quarter. The only access into the building was through a doorway in the southwestern corner that led in from Diraz Square. The absence of a door at the eastern end, which fronted Main Street, suggests a degree of social distance or privacy from anyone approaching the entrance to the temple along this street. Bldg 205 had three areas: an outer room (Area 236), an inner room (Area 235) and a rear yard (Area 237).
The outer room (Area 236)
Deposits immediately inside the entrance way (grid-square W) were largely unoriented from trampling and included heterogeneous aggregates and sand from the open area.

Fine compacted water-splashed lenses, <2 mm thick, had repeatedly accumulated in a c. 60 cm arc around the gypsum plastered bench-and-basin in the passageway (grid-squares X–Y, Figs. 10.10–12). In thin-section, these deposits were slightly greenish in colour, suggesting moist damp conditions and frequent use. The presence of these deposits either side of the basin suggest it was in use both from the entrance and from the cooking area immediately adjacent. Micromorphological residues in this area include <2% bone, shell, and periodic sandier layers. The basin had been replastered five times with alternating layers of calcitic date-palm ash and gypsum plaster.

The surviving fuel in both the semicircular hearth and the cooking pot support/hearth (grid-squares G and K) was almost entirely of date-palm leaflets and rachis. The form of these installations and associated residues suggest that the semicircular hearth may have been used for cooking on an open fire or metal tray, and the cooking pot support/hearth for cooking more slowly in pots (Table 10.3). The surface in front of these hearths was occasionally covered in a thin plaster, often corresponding to replastering of the stones of the cooking pot support/hearth and of the lip of the semicircular hearth, perhaps at times of feasting or social/ritual festivals. Accumulated rake-out deposits include multiple lenses of date-palm ash and siliceous remains, <1.25–5 mm thick, fish-bone, teeth and scales, and salts (Figs. 10.14–15). Areas used for temporary discard of ashes include a small space next to the cooking pot support/hearth, against the wall, and the northern corner of the room. Dumped refuse was unoriented and had not been compacted or trampled (grid-square C). Other deposits close to the wall included grit and silty clay, probably from ongoing erosion or abrasion of the wall and mortar (grid-square B, Fig. 10.17).

The most unoriented and fragmented deposits in thin-section were in the central part (grid-square H), where they had been trampled and re-worked into the underlying layers of sand (Fig.
These deposits demarcated a walking route between the doors to Area 235 and Area 237, and from the hearths to the discard area in the north corner (Fig. 10.9). The doorway into the small internal room, Area 235, had been plastered at least three times, with a pale brown fine silty clay plaster, 5–30 mm thick (grid-squares A–B; Fig. 10.18). Overlying deposits were cleaner than those elsewhere in Area 236, and only included sparse aggregates of ash and bone.

**The rear yard (Area 237)**

The raised stone threshold between the outer room and the rear yard may have been to prevent the abundant wind-blown sands and other deposits from entering the outer room. The presence of water-laid surface crusts across much of this area (Fig. 10.21) suggest it may have been unroofed or only lightly roofed. This space is characterised by a range of installations close to the doorway (grid-squares 16–19). These include a raised plaster-lined basin, a sunken circular basin, and stone platform or work-surface. The earliest sequence in this area includes a silty clay loam plaster floor, <1 cm thick, and sands with occasional water-laid crusts, date-palm and sparse Gramineae phytoliths and burnt bone. Traces of herbivore dung may either have been from dung burnt as fuel or perhaps from a tethered animal. One sheep/goat pellet rich in spherulites was intact. The general scarcity of this dung, however, suggests animals were not (or were only rarely) kept within the settlement or nearby pens. Animal pen and stabling deposits are readily recognisable in thin-section, and have been identified in a range of sites from the Neolithic and Bronze Age (Matthews et al. 1997b).

A large grindstone was set immediately to the north of the entrance (grid-square 13; Fig. 10.22). The surfaces in front of this were plastered with a thick gritty plaster and foundation material similar to mortar, and would have provided a clean work area, probably for food preparation. There are frequent calcareous rock fragments in these deposits, and gypsum salt crystals and aggregates.

The presence of periodic and scattered water-laid crusts (Fig. 10.21) in a one metre strip along both the eastern and western walls suggest these areas were not heavily trampled and therefore may have been used for storage of a range of items. There may also have

**The inner room (Area 235)**

This room had been plastered several times, with sandy silty-clay to silty clay loam plasters (Fig. 10.19). An internal doorsocket indicates that this room could be closed off from the outer area. Accumulated residues of date-palm ash and pottery occur in a discrete location in grid-square S, perhaps for temporary refuse, and include Gramineae phytoliths. The presence of water-laid layers in the southwest corner of this room may suggest either that washing was done in this more private area, or that the roof may have leaked on occasion. This area also has fine compacted layers, suggestive of compaction below floor coverings (Fig. 10.20). There has been quite extensive post-depositional disturbance by bioturbation, much of which is from roots.
been mats laid on these surfaces. At least some of the silty clay particles in these water-laid crusts are likely to have come from rain-splashed and eroded mortar from the wall surfaces.

An area of in situ burning, ca. 60 cm in diameter, in the sand (grid-square 3) suggests fire-related activities were conducted here (Figs. 10.22–3). Micromorphological residues indicate that date-palm was the principal source of fuel, which included more charred remains than in constructed fire installations (5–10%). Fragments of pottery and bone are also well preserved in thin-section, and burnt. As in Area 236, temporary refuse was discarded in the furthest recesses against the northern wall, where it was least likely to have been trampled (grid-square 4). The northeastern corner of this area had been eroded by wind, and deposits replaced by coarse wind-sorted and rounded sands (Fig. 10.24).

Building 207

Bldg 207 lay on the south side of Diraz Square, forming part of Block P of the Western Quarter. Unlike Bldg 205, it lacked a rear yard and had only two rooms. It also had two entrances, one to the south which led out into South Alley and along the southern side of the temple to Main Street, and one at the north which opened on to Diraz Square.

The Outer room (Area 272)

Deposits immediately inside the southeastern entrance were of comparatively coarse grain size (grid-squares 1–2). The well-built gypsum plaster basin, part of the installation in the passageway, was surrounded by thin water-splashed deposits, <1.5 mm thick (grid-squares 3–4), as in Bldg 205.

The clay-lined tannur was constructed at the junction between the passageway and the main part of the room. The fuel left in the base of the oven was predominantly of calcitic ashes and siliceous remains of date-palm leaflets. It included sparse and rare Gramineae phytoliths, and 2–5% fragments of bone, some of which was fish. A layer of sand with fragments of pottery and calcareous rock separated at least two separatefirings. Adjacent lenses of rake out, against the southern side of the tannur and the wall, were also rich in burnt date-palm leaflets, and included <3% calcareous spherulites from dung, and some bone.

Deposits between this oven and the northeastern entrance way were much cleaner, and were predominantly of moderately oriented sandy deposits, with occasional compacted layers (grid-squares 7, 8, 10, 12). The semicircular hearth and cooking pot support/hearth were constructed against the external wall of this area, rather than the wall of the internal room. The principal fuel in both hearths was date-palm leaflets and rachis. The semicircular hearth included sparse siliceous remains of herbivore dung, 2%; the cooking pot support/hearth had more calcitic ashes (Fig. 10.27). There was less hearth rake-out in front
of these than in front of those of Bldg 205. Deposits were sandier and more trampled. They included sparse yellow amorphous organic material with spherulites, which is likely to be traces of omnivore dung.

Closer to the internal room, deposits included aggregates of fine plaster floor and sparse organic deposits. Sparse water-laid crusts were detected between a silty clay lined depression in the centre and a gypsum plastered platform/work-surface in the far northeastern corner (grid-squares 13, 18–19). A low bench was constructed along the southwestern wall.

**The inner room (Area 273)**

The area immediately inside the entrance was characterised by a series of compacted lenses, perhaps formed below floor coverings (grid-square 29). Thin and thick plaster floors of slightly greenish silty clay-silt loam plaster floor were laid here during the latter half of the occupation of the room. Sparse traces of occupation material include aggregates of date-palm ash. Yellowish stained salts are also present. The latest accumulated occupation deposit includes aggregates of amorphous organic material with spherulites, probably from omnivore coprolites.

Opposite the entrance, in the southwestern corner, there was a stone platform with a small setting for a hearth (grid-squares 33–4). The latest fuel left in this setting was of date-palm leaflets, most of which were siliceous with some charred remains and ashes. These were very well preserved. Two small fragments of bone were also present.

At the western end, there were periodic lenses of silty clay water-laid crusts and fine silty-clay loam plaster floors, with intervening layers of comparatively clean sand. Pottery sherds and stone tools were scattered across the latest floor.

**Abandonment**

In the internal rooms of both Bldgs 205 and 207, sparse traces of omnivore dung accumulated in the latest use of the room, suggesting perhaps a period of increasing disuse, as frequently observed in ethnoarchaeological analysis of settlement abandonment (David and Kramer 2003). Many buildings, including Bldg 205, have scattered traces of fires and temporary re-use. Detailed analysis of the infill of Bldg 207, has identified a sequence of wind-blown deposits, erosion of walls and roof collapse, before the buildings were finally infilled with more than one metre of wind-blown sand.

**Building 53 Area 85**

Bldg 53 was one of the largest buildings in the settlement with 11 separate areas. Area 85 was one of the four rooms located along the southeastern side of a rear courtyard (Fig. 3.155) and interpreted as a storeroom. The thin-section included unoriented sandy silt loam
<table>
<thead>
<tr>
<th>Floors</th>
<th>Occupation deposits</th>
<th>Wet sieving data</th>
<th>Adjacent feature</th>
<th>Location</th>
<th>Interpretation</th>
</tr>
</thead>
</table>
| Fine, silty clay plaster | sparse date-palm ash  
 sparse 'reed' and grass | highest concentration of pottery (in corners of rooms) | Stone bench       | Inner room                         | Sitting and sleeping area            |
| Fine, silty clay plaster | sparse water-laid crusts | lowest concentration of bone  
 lowest concentration of pottery | Plastered 'table'                             | Outer room, corner | ?Food preparation                   |
| Gypsum plaster | sandy loam, sparse ash, water-laid crusts | highest concentration of bone  
 highest concentration of pottery  
 highest concentration of shell  
 highest concentration of burnt aggregates  
 highest concentration of copper | Hearth | Outer room, edge | Food preparation and cooking  
 Fuel rake-out |
| Occasional thin plaster | thin lenses of fish-bone and scales  
 moderate parallel-oriented date-palm ash, salts | highest concentration of bone  
 highest concentration of pottery  
 highest concentration of shell  
 highest concentration of burnt aggregates  
 highest concentration of copper | Outdoor room, entrance to inner | Clean area in entrance to sitting and sleeping area |                       |
| Lenses of sand | lenses of water-splashed deposits with sparse ash | highest concentration of flint | Plaster basin | Outer room, passageway close to main door | Water storage  
 Washing |
| Thick sandy packing | fish-bone, including tails  
 unoriented, uncompacted date-palm ash, fish-bone, mortar | largest fragments of bone | Outer room, corner | Temporary refuse area |                       |
| Thick sandy packing | thick homogeneous layer  
 unoriented sandy loam with sparse date-palm ash and fish-bone | smallest fragments of bone  
 small fragments of shell | Outer room, central area | Heavily trampled walkway within building |                       |
| Thick fine plaster | gritty  
 sand, rock fragments, salts, fish-bone, Gramineae | moderately high concentration of bone | Grindstone setting | Rear yard, near doorway | Grinding of ?Gramineae  
 and ?Fish |
| Thick fine plaster | ashy  
 sandy ash with organic aggregates, salts, bone, and water-laid crusts | Rear yard, centre | ?Food processing near to grindstone |                       |
| Thick sandy packing | ashy sand  
 herbivore dung, grasses, salts, water-laid silt | Plaster basins | Rear yard, corner | ?Tethering, feeding, watering of herbivore(s) |                       |
| Thick sandy packing | dark ash  
 parallel-oriented charred date-palm, bone and pot fragments | highest concentration of pottery  
 highest concentration of shell | Rear yard, central edge | In situ low-temperature burning |                       |
| Thick sandy packing | ashy sand, gritty  
 unoriented loamy sand and ash, unoriented bone, 2 – 5% | moderately high concentration of bone  
 highest concentration of copper | Rear yard, corner | Temporary discard of domestic refuse |                       |
| Thick sandy packing | sand and rocks  
 lenses of wind and water-laid deposits | lowest concentration of bone | Rear yard, edge | More sterile area with eroded wall materials  
 ?Storage of large bulky items against wall?  
 ?Hanging of nets |                       |
| Thick sandy packing | sand  
 coarse, sterile wind-blown sand | | Rear yard, corner | Eroded corner |                       |

Table 10.4 Microstratigraphic, micromorphological and wet-sieving attributes diagnostic of different uses of space in Bldgs 205 and 207  
(field observations are given in Roman type; micromorphological ones in *Italic* type)

deposits with 2–5% bone fragments, some burnt date-palm remains, a charred cereal grain, sparse Gramineae phyloliths, pottery fragments and organic staining and salts.

Street and midden deposits

**Area 239**

Area 239 lay outside Bldg 209 at the northern end of Diraz Square. The context sampled (4045) comprised unoriented heterogeneous sandy deposits with sparse date-palm ash and siliceous remains, and charred flecks, which had been partially re-worked by bioturbation. These deposits are comparatively clean. There are no discrete water-laid lenses, perhaps due to trampling.

**Main Street**

Two samples from Main Street mainly comprised moderately oriented sandy loam with calcareous rock fragments 5–10 mm in size, with sparse date-palm ashes, charred flecks and siliceous remains (TS 128 and 132). Like Area 239, these deposits are perhaps surprisingly clean for streets, and include grit and flecks of sandy silt loam that have probably eroded from the mortar in walls.

One sample (TS 127) is from deposits which are stratigraphically earlier than the outer wall of the latest building. The deposits from this sample more closely resemble midden deposits. Some layers,
after abandonment of Bldg 207 suggests both rooms may have been roofed. It is conceivable that some of the thinner lenses of sand or water-laid deposits, not associated with basins, accumulated during periods of less intensive occupation and trampling in these buildings.

Analysis of the micro-residues provided specific support for many of the micromorphological interpretations. The most fragmented bone and shell occur in the centre of the outer rooms of both buildings where deposits are heavily trampled. The least fragmented bone and shell occurs in corners used for temporary refuse. The highest concentrations of metal fragments occur around the hearths. The largest fragments and highest concentrations of pottery occur in the corners, where fuel rake-out and other refuse has been dumped. The highest concentrations of flint occur in entrances.

Conclusions

Although many of the predicted activities in the buildings were not separated by walls in individual rooms, a wide range of distinct activity areas could be identified within the two- and three-roomed buildings at Saar. Far from being homogenised, the deposits and microstratigraphic sequences showed very distinctive characteristics within each room, which changed within the space of 1–2 m. The remarkable repetition and cyclicity of the same type of distinctive surfaces and residues in each area argues for continuity in the concepts and uses of, and the presence of well-defined spatial and social conventions. The general recurrence and similarity of these microstratigraphic characteristics in the two buildings studied, as well as many similarities in the layout of many of the other buildings excavated across the sites, argues for community-wide spatial and social conventions.

The study has also established that the sparsity of charred plant materials retrieved by flotation at Saar (and probably at other sites in the Gulf) is not due to the sparse use of plant remains nor poor conditions of preservation, but to abundant use of date-palm leaflets and rachis which are preserved principally as fragile siliceous and possibly desiccated remains, and burn leaving little residual carbon. The well-defined architectural units and range of fixtures and fittings within the buildings at Saar provided invaluable data for independent verification of the validity of micromorphological observations and the characteristics in the material surfaces and residues. The results suggest that microstratigraphic sequences do vary significantly according to human activities and concepts of space as well as micro-environment, even within confined areas. In the past, as in the present for archaeologists investigating it, the material nature of architectural surfaces and sediments were significant media and indicators of a wide range of spatial and socio-cultural conventions and concepts.

Acknowledgements

The micromorphological research was conducted at Saar from 1993 to 1996, as part of a three-year NERC-funded research project. We are deeply indebted to many people, not only for their collaboration but also for their kindness and friendship: Martin Hicks, who excavated Bldg 205 so well, and Tim Lawrence, who identified the plant remains from the temple at Saar and other material within the NERC project, both alas no longer with us; Shahina Farid for excavating Bldg 207 in such detail; the Friends of Saar who sorted and weighed the micro-residues; Yousif Al-Nashaba for discussing the ethnarchaeology of Bahrain; and Professor Martin Jones, Cambridge University, and Dr David Cutler, Jodrell Laboratory, Kew, who were also members of the NERC team.
Chapter 11  Geological investigations
Peter Bush, Graham Evans and Emily Glover

Introduction

The Early Dilmun settlement at Saar lies on the flanks of a low north-south trending ridge (the Hamala Ridge) composed of rocks of the Eocene West Rifa Flint Formation and the Al Buhayr Carbonate Formation, the surface of which is covered with a wind-swept gravel pavement (Fig. 11.1). Below the flanks of the ridge is an inactive dune field which, to the east, overlooks a low, flat, relatively featureless depression. This depression is bounded on the north by another low ridge, composed of intensively modified aeolian sand with few natural features preserved; and to the south, by the gentle slopes of the northern flanks of the central periclinal core of the island, composed of rocks of the Eocene West Rifa Flint Formation and the Al Buhayr Carbonate Formation.

In its eastern part, the low featureless surface of the depression passes into intertidal flats and mangrove thickets bordering a small tidal inlet extending from Tubli Bay. This inlet once stretched further to the west, towards Saar, as revealed by the traces of infilled ancient creeks which can be seen on aerial photographs. Even in the 1970s, when the writers visited the area, the system was more extensive than it is today (Fig. 11.2).

In contrast, a westward extension of the creek running from Tubli Bay would have provided a very sheltered site, protected from the northwest shimal wind and its associated waves. Such an inlet would have been a more reliable haven than the exposed west coast, particularly during the winter storms.

Geological investigations

As part of the geological study, the records of boreholes drilled during engineering works by the Technical Services Directorate of the Ministry of Works and Agriculture were examined. In addition, in the low depression between Saar and the coast at Tubli Bay, three trenches were excavated using a mechanical digger, and two boreholes were drilled (Fig. 11.3).

The records of the engineering boreholes revealed that a brown (black below the water-table), well-sorted quartzose sand, containing small amounts of carbonate, underlies the whole area of the depression east of Saar and extends up its flanks. Generally, increasing amounts of gypsum occur in the sands of the westerly part of the depression. No definite marine skeletal debris was found in any of the material examined, although some borehole records mentioned shell—possibly marine shell. However, the original material was not examined by a specialist, nor was it available for re-inspection, so whether or not it was truly marine cannot be ascertained with any degree of confidence.

The three mechanically excavated trenches and the two boreholes sunk in 1999 showed that a wedge of marine sediment, a muddy carbonate sand identical to that being deposited in and around Tubli Bay today, extends westward for approximately 4–5 km from Tubli Bay. These marine sediments overlie a black aeolian sand, equivalent to the brown sand above the water-table and similar to the sands seen in the engineering boreholes. However, the marine deposits only extend westward to approxi-
mately 1.5 km from Saar, still a considerable distance from the ancient site.

The sediments revealed in the various sub-surface investigations were described in the field, and further laboratory studies, including the determination of carbonate content, mineralogy and grain size of the sediments, were made to check the field descriptions. In addition, the macrofauna was studied and a preliminary examination of the microfauna of some samples was carried out. The results of these examinations are shown in Tables 1–3. A sample of marine shells from BH2 at a depth of 2.0–2.55 m was submitted to the Oxford Research Laboratory for Archaeology and History of Art for radiocarbon dating (see Fig. 11.7).

Description of sub-surface samples

Trench JCB1

In Trench JCB1, coarse gypseous sand (0.0–1.5 m) and gypseous mud (1.5–1.75 m) overlie a creamy white carbonate mud (1.75–1.80 m) with thin layers of cyanobacteria, an old ‘algal mat’, and reed stems (Fig. 11.4). A few badly preserved individuals of the marine gastropod *Potamides conicus*, and many shells of a freshwater Hydrobiid gastropod, possibly *Paludostrina* sp, were recorded at 1.80–1.95 m (Table 11.1). These were accompanied by the frequent remains of smooth-shelled ostracods, possibly a freshwater species, one worn peneropolid foraminifera which appears to be derived, and two likely brackish water foraminifera *Ammonia* sp and *Cibicides* sp.

This association is characteristic of a supratidal/high intertidal flat environment or shallow depression that was brackish/fresh for the majority of the time of its accumulation but was occasionally invaded by marine waters, probably during shimal-driven storms which developed over an aeolian sand field. Subsequent precipitation of gypsum from interstitial waters, drawn to the surface by capillary action, has produced the coarse gypsum sand and mud which occurs just beneath the surface.

Fig. 11.3 Aerial Mosaic from Saar to Tubli Bay, with location of boreholes and trenches

Fig. 11.4 Cyanobacterial films with plant stems in JCB1
Trench JCB2

In Trench JCB2, cemented gypsum passes downwards at 1.23 m into loose gypsum sand and then, at 1.55 m, into a thin white carbonate (calcite) mud with gypsum and quartz, containing a few faint organic laminations, which may be the equivalent of the cyanobacterial layer seen in JCB1. The above sequence at 1.65 m passes down into a greenish, and then grey silty quartzose sand with subsidiary carbonate.

This sequence seems to represent the most landward extent of marine influence as indicated by the traces of cyanobacterial mat overlying aeolian deposits. Subsequently, precipitation of gypsum from groundwater drawn to the surface by capillary action has produced the gypseous capping.

Table 11.1 Molluscs, forams and ostracods from Trench JCB1

<table>
<thead>
<tr>
<th>Mollusca (marine)</th>
<th>1.80–1.95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potamides conicus (Blainville 1826)</td>
<td>**</td>
</tr>
<tr>
<td>Mollusca (freshwater)</td>
<td></td>
</tr>
<tr>
<td>Hydrobiids</td>
<td>***</td>
</tr>
<tr>
<td>Foraminifera (?brackish/hypersaline)</td>
<td></td>
</tr>
<tr>
<td>Ammonia sp</td>
<td>#</td>
</tr>
<tr>
<td>cf Cibicides sp</td>
<td>#</td>
</tr>
<tr>
<td>Ostracoda (?freshwater)</td>
<td>#</td>
</tr>
</tbody>
</table>

Table 11.2 Molluscs, forams and ostracods from Borehole BH1

<table>
<thead>
<tr>
<th>Mollusca (marine)</th>
<th>1.00–1.55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melanoidea tuberculata (Müller)</td>
<td>*</td>
</tr>
<tr>
<td>Hydrobiids</td>
<td>*</td>
</tr>
<tr>
<td>Foraminifera (not identifiable)</td>
<td># # # #</td>
</tr>
<tr>
<td>Ostracoda (not identifiable)</td>
<td>#</td>
</tr>
</tbody>
</table>

Trench JCB3

In Trench JCB3, the entire section below a thin soil layer (0–0.68 m) consists of slightly gypseous, fine to very fine, quartzose sand, admixed with coarse silt. A thin gypseous crust occurs at 1.9 m. No faunal remains were found in this sediment.

The sediment in this excavation is interpreted as an aeolian sand similar to that which covers most of the adjacent area and is found beneath the marine and marine marginal deposits in the depression to the east. In other excavations, this brown sand assumes a grey/black colour beneath the modern water-table.

Borehole BH1

In the BH1 borehole, buff white silty gypseous mud, with some humic horizons and occasional seed cases, passes downwards at 0.55 m into a buff silty carbonate mud with a few shell fragments (Fig. 11.5). Below is a white silty mud with cemented horizons. BH1 contained very few organic remains, in contrast to BH2 where they were abundant. Between 0.55–1.00 m there were a few tiny shell fragments that could not be identified with certainty. Although some unidentified shell was reported in the field, laboratory examination of samples from 1.00–1.55 m revealed only one unidentified shell fragment (possibly marine) and a few foraminifera (Table 11.2). Between 1.55 m and 2 m the sediment becomes richer in quartz and gypsum, and below 2 m consists of slightly calcareous and gypseous quartzose sand with small amounts of dolomite (3%). This lowest layer contains one gastropod (a single shell of the brackish/freshwater Melanoidea tuberculata) together with a few small unidentified foraminifera, hydrobiid molluscs and ostracods, and some small cemented fragments.

The buff white gypseous mud is clearly the continuation of the unit seen in BH2, although containing an almost complete absence of identifiable marine fauna.

In conclusion, this section is interpreted as a marginal deposit produced by a marine transgression over an aeolian sand, and by subsequent aggradation and progradation of coastal near-shore sediment, combined with precipitation of gypsum from groundwaters in its terrestrial upper parts. The absence of remains of marine fauna in this borehole suggests that the marine carbonate silty mud which formed further seaward in the Tubli Bay inlet was probably driven landward onto the margins of the inlet.

Borehole BH2

In BH2, the most seaward location, buff silty carbonate mud extends to the present-day surface (Fig. 11.6). This mud contains cemented fragments, seed pods and other plant and algal material, together with small freshwater hydrobiid gastropods of several species, including, possibly, Hydrobia ventrosa Montagu (see Brown, 1985).
At depths between 0.45 and 0.55 m, *Melanoides tuberculata* and *Gangetic milicia* occur, both of which are brackish-water forms. Below 1 m, similar sediment with rock fragments and seed cases contains shells of the marine gastropods *Potamides conicus* and *Cerithium sabridium*, some freshwater/brackish species including *Melanoides tuberculata*, *Gangetic milicia* and *Travonida quadras**, together with crustacean fragments and fragments of organic matter (Table 11.3).

The sediment becomes sandier below 2.0 m but still contains an admixture of carbonate mud (aragonite and calcite both occur in approximately equal proportions); it has an abundance of skeletal debris and many of the shells are completely preserved. The most common species are the marine gastropods *Potamides conicus* and *Cerithidea cingulata*, with other small gastropods and the marine bivalves *Marcia cf. flamea* and *Anodontia philippiana*. The majority of the marine species are typical of a mid to low intertidal habitat. Again, as above, there is considerable algal material and crustacean fragments. There are several species of ostracods present, together with the foraminifera *Ammonia beccarii*, *Elphidium reticulum* and *Quinqueloculina* spp. The foraminifera looked ‘fossilsied’ and may have been reworked. In addition, there are rare oogonia of three species of freshwater charophytes, which were probably transported from elsewhere. Marine shells (*Marcia cf. flamea*) from this horizon, between 2.0 and 2.55 m, gave a radiocarbon determination of 6010 ± 588 BP (see Fig. 11.7).

From 3.0 to 3.55 m, the sediment is similar to that above, but the fauna is both less abundant and less diverse: *Potamides conicus*, *Cerithidea cingulata* and *Cerithium sabridium* occur, with only a few examples of *Marcia cf. flamea* and some juvenile marine species. However there are still nine species of marine molluscs, especially intertidal mud-flat species.

Below 3.55 m, the sediment consists of a grey-black quartzose sand with small amounts of carbonate. Skeletal fragments were found all the way down to the bottom of the borehole, but were only present in small amounts in the final interval sampled. Again, as with BH1, it is impossible to ascertain with any degree of confidence whether this material is *in situ* or has fallen down the hole.

Most of the sampled interval is a marine sequence which contains a less diverse marine fauna in its lowest part and passes up into a fresh/brackish horizon near the surface. It is uncertain whether the base of the marine interval was reached, as the scattered shells found in the lowermost sampled intervals were possibly displaced during drilling. However, the quartzose sand in the lower part of the borehole is similar to sands seen in the other boreholes and excavations, where it has been interpreted as an aeolian sand.

The entire sequence is the result of a marine transgression over an aeolian dune-sand field similar to the one that still exists close to Saar. The earlier marine sediments were likely to have been deposited on supratidal/intertidal flats; as the sea-level rose the area became inundated by the shallow marine waters of a small inlet or gulf. Progradation and aggradation led to an infilling of the latter and the emergence produced a supratidal/intertidal flat that remained fresh/brackish for much of the time, but was periodically inundated by marine waters.

**Discussion of borehole and excavation data**

Both the micro-fauna and the macro-fauna show evidence of marine and brackish/freshwater assemblages. This suggests that, unlike other parts of the Arabian Gulf, there was sufficient influx of freshwater to modify the salinity of the waters of the coastal inlets (see Victor and Victor 1997; Victor, Victor and Clarke 1997).

The possibility of the influx of fresh/brackish water is also supported by the fact that much of the calcium carbonate of the sediments in the marine wedge is composed of calcite, not aragonite as is common elsewhere in the coastal areas of the Arabian Gulf. This may have been because the sediment was originally calcitic or else the original aragonitic sediment has been converted to calcite by diagenetic processes as a result of reactions between the sediment and interstitial water. Such a conversion is only likely to occur in young sediments where the original marine waters have been replaced by brackish waters or freshwaters. The relative paucity of dolomite (never more than 5%), a common mineral in similar deposits elsewhere in the Arabian Gulf, (Illing, Wells and Taylor 1965; Bush 1973) also indicates a lack of persistent hypersaline conditions. In addition, the small amount of dolomite that does occur is ferroan dolomite, indicating that it has probably been derived by erosion of older rocks and was not produced by *in situ* replacement.

The palaeontological and sedimentological evidence for mixing of fresh and marine waters is perhaps not surprising. Today, freshwater springs are found on the north side of Tubli Bay. It is generally acknowledged that the groundwater table has fallen and the waters have become more brackish because of the over-pumping that has accompanied a rise in population and an expansion of agricultural activity (Cooke and Goudie 1980). Presumably, in the past, when freshwater was more abundant, the salinity of any inlet would have been lower than the adjacent marine waters after heavy rain or groundwater influx, but hypersaline during periods of low rainfall and high evaporation, as happens today.

**Sea-level changes**

There is considerable debate about Holocene sea-levels in the Arabian Gulf (Lambeck 1996). Today the surface levels at the sites of JCH1, 2 and 3 are all approximately 3–5 m above Mean Sea-level whereas those of BH1 and BH2 are 2–3 m above Mean Sea-level. As Mean High Water Spring Level (MHWs) is only approximately 1 m above the latter, they are unlikely to be flooded by marine water today except during very strong shamal winds, when sea-levels
have been known to rise by more than two metres above their normal levels (i.e. approximately 3 m above Mean Sea-level).

There is very little evidence from dated material of sea-level changes in the Tubli Bay/Saar area. The one available radiocarbon determination of 6010 ±55bp from skeletal debris in BH2 indicates that the sea entered the area during the final phase of the Flandrian Transgression (Sarnthein 1972) around 6000bp to form an inlet. This led to the drowning of the aeolian sand field which cloaked the depression between the northern coastal ridge and the flanks of the central periclinal ridge of the main island of Bahrain.

The inlet was probably a complex of tidal creeks, with bordering cyanobacterial (algal) flats similar to those shown on Fig. 11.3, which extended as far west as the site of jcb1 and occasionally probably jcb2. Interestingly, although there are mangrove thickets around the present Tubli Bay no evidence of mangrove roots has been found in the subsurface investigations. It is also of note that

<table>
<thead>
<tr>
<th>BH2</th>
<th>metres below surface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.00–0.40</td>
</tr>
<tr>
<td>Mollusca (marine)</td>
<td></td>
</tr>
<tr>
<td>Cerithidea cingulata (Gmelin 1791)</td>
<td>***</td>
</tr>
<tr>
<td>Potamides conicus (Blainville 1826)</td>
<td>**</td>
</tr>
<tr>
<td>Cerithium scabridum (Philippi 1848)</td>
<td>*</td>
</tr>
<tr>
<td>Clypeomorus bifasciatus persicus (Houbrick 1985)</td>
<td>***</td>
</tr>
<tr>
<td>Priotrochus obscurus (Wood 1828)</td>
<td>**</td>
</tr>
<tr>
<td>Osilinus kotschyi (Philippi 1849)</td>
<td>**</td>
</tr>
<tr>
<td>Mitrella blanda (Sowerby 1844)</td>
<td>**</td>
</tr>
<tr>
<td>Dentalium octangulatum (Donovan 1803)</td>
<td>**</td>
</tr>
<tr>
<td>Atys sp</td>
<td>*</td>
</tr>
<tr>
<td>Brachidontes variabilis (Krauss 1848)</td>
<td>*</td>
</tr>
<tr>
<td>Fulvia cf australe (Sowerby 1834)</td>
<td>*</td>
</tr>
<tr>
<td>Marcia cf flammea (Gmelin 1791)</td>
<td>***</td>
</tr>
<tr>
<td>Tellina sp</td>
<td>**</td>
</tr>
<tr>
<td>Pinguitellina pinguis (Hanley 1844)</td>
<td>**</td>
</tr>
<tr>
<td>Pillucina angela (Melvill 1899)</td>
<td>*</td>
</tr>
<tr>
<td>Anodontia philippiana (Reeve 1850)</td>
<td>***</td>
</tr>
<tr>
<td>Rissoina sp</td>
<td>*</td>
</tr>
<tr>
<td>Rissoidea?</td>
<td>*</td>
</tr>
<tr>
<td>Dialidae</td>
<td>*</td>
</tr>
<tr>
<td>Marine taxa (N)</td>
<td>0</td>
</tr>
<tr>
<td>Mollusca (brackish water)</td>
<td></td>
</tr>
<tr>
<td>Melanoides tuberculata (Müller)</td>
<td>**</td>
</tr>
<tr>
<td>Gangetia milicea (Nevill)</td>
<td>**</td>
</tr>
<tr>
<td>Iravadia quadrasi (Böttinger)</td>
<td>*</td>
</tr>
<tr>
<td>Brackish water taxa (N)</td>
<td>0</td>
</tr>
<tr>
<td>Mollusca (freshwater)</td>
<td></td>
</tr>
<tr>
<td>Hydrobiids</td>
<td>*</td>
</tr>
<tr>
<td>Foraminifera (marine)</td>
<td></td>
</tr>
<tr>
<td>Ammonia beccari</td>
<td>#</td>
</tr>
<tr>
<td>Elphidium advenum</td>
<td>#</td>
</tr>
<tr>
<td>E. reticulosum</td>
<td>#</td>
</tr>
<tr>
<td>Quinqueloculina spp</td>
<td>#</td>
</tr>
<tr>
<td>Ostracoda several spp (marine)</td>
<td>#</td>
</tr>
</tbody>
</table>

Table 11.3 Molluscs, forams and ostracods from Borehole BH2
(*** = Common; ** = Occasional; * = Rare; # = Present)
there is not much aeolian sediment overlying the marine sediment. Presumably this has been fixed on the ridge to the north of the Tubli Bay/Saar depression by date palms during and after deposition of the sequence found in the boreholes.

This sequence of events is in agreement with evidence from other drilled sections in the Southern Arabian Gulf (Evans et al. 1969; Kenig 1991). Because of the lack of other dated material, the exact height and extent of the transgression into the inlet can only be surmised from the geological evidence.

The drilled sections show a westward thinning tongue of marine sediment, which persists out into a thin cyanobacterial mat horizon with a mixture of marine, brackish and freshwater faunal remains (jc81) and finally into a poorly developed cyanobacterial horizon (jc82). If the latter, which was probably formed around the level of mhws, is taken to be the limit of the marine influence, it indicates that the sea-level at the time was approximately 1 m above that of today. In such a situation, there could have been a maximum depth of water at the sites of bh1 and bh2 of approximately 1.0 and 3.0 m respectively (or if jc81 is taken as the landward limit of marine influence 0.5 and 2.5 m respectively).

Although there is a paucity of dated material from the Tubli Bay/Saar area there are radiocarbon determinations available from other parts of Bahrain (Evans, Bush and Temple 1980; Dalongeville and Sanlaville 1987; Sanlaville and Paskoff 1986). Four determinations from the southwestern sabkha give evidence for sea-level (i.e. Mean Sea-level) of approximately 0.5–1.5 m above that of the present between 4000 and 3300 BP (Evans, Bush and Temple 1980). However, as the latter determinations were obtained from cerithid shells in beach ridges it could be argued that they indicate a level close to mhws level. If this was the case, it would indicate a sea-level at that time around or just above that of today (0.5 m). In the latter case the maximum depth of seawater at the site of bh1 and bh2 would have been approximately 0.5 and 2.0 m respectively.

For the time around 4000 BP, sea-levels of approximately 1–2 m above present have been suggested (using materials and controls that are of variable quality) from Abu Dhabi (Evans et al. 1969; Kenig 1991), Qatar (Taylor and Illing 1969; Vita Finzi 1978), Bahrain (Evans, Bush and Temple 1980; Sanlaville and Paskoff 1986), Saudi Arabia (Felber et al. 1978; Ridley and Seeley 1979; McClure and Vita Finzi 1982) and Umm Al-Quwain (Bernier et al. 1993). Archaeological evidence from the north of Bahrain indicates a higher Holocene sea-level of approximately 1 m around 4000 BP (Sanlaville and Paskoff 1986; Dalongeville and Sanlaville 1987).

However, some authors have suggested that sea-level may have reached that level or been even higher at an earlier date, around 6000 BP. Lambek, in one of the most recent reviews of sea-level changes in the Arabian Gulf (Lambek 1996), has compared field estimates of sea-level changes with those derived from glacio-hydro-isostatic models. The modification to the suggested date of the maximum high-stand at approximately 6000 BP suggested by the model, produced by considering that the melting of the last ice sheet continued after 6000 BP and had not ceased by that date, delays the time of maximum high-stand to approximately 5000 BP, which is closer to that suggested by many of the researchers mentioned above.

The only dated evidence of such a higher sea-level on Bahrain comes from Ra’s Hayyan on the east coast of the island where shells from an apparent beach deposit at a height of 2 m above mhws provided determinations of 6940 ± 160 BP (Evans, Bush and Temple 1980). French researchers obtained a similar determination from the deposit (Sanlaville and Paskoff 1986: a sample at 1.7 m provided a determination of 5070 ± 160 BP (Evin, Ly, 2872). Although there are various other morphological features at a simi-
lar height around the island the age of these has never been determined.

Many researchers have explained such apparent earlier higher sea-levels as being the result of local tectonics (Vita Finzi 1978; Ridley and Seeley 1979; Evans, Bush and Temple 1980; McClure and Vita Finzi 1982 and Bernier et al. 1995), although there has been little definite proof of neo-tectonic movement in the area (McClure and Vita Finzi 1982; Lambek 1996). The Arabian Gulf has probably not been as tectonically active during the Holocene as suggested by earlier researchers except locally around salt plugs (Kassler 1977).

If the sea did reach such a high level at this time it would mean that the maximum water depth at the sites of BH1 and BH2 would have been approximately 2 and 4 m respectively. Furthermore, this would have meant there could have been water depths of as much as 1 m as far west as the site of JCB2. However, no evidence of this has been found on the drilled section.

Some researchers have proposed a more complex sequence of changes of sea-level. Sanlaville and Paskoff (1986) have even suggested fluctuating sea-levels since 6000 BP. However, the data from the Tubli Bay/Saar area are insufficient to support such an idea, and at present the various scenarios outlined above are all that can be sensibly considered.

Whatever the exact timing of the acme of the transgression that invaded the low-lying tract of land east of Saar, it appears that sea-level continued to rise, as the contact between the terrestrial gypsum capping, which from the evidence of the section was deposited by precipitation from local groundwater, climbs seaward. Finally, sea-level fell to that of today.

Progradation of the bordering intertidal flats and aggradation in the inlet-channels led to their infilling and the decay of the inlet as sea-level fell. In places gypsum continued to be precipitated from groundwater as it was drawn to the surface and formed a surface layer best developed in JCB1 and JCB2. The exposed area was cultivated, as there are traces of old drainage ditches and boundaries of date gardens over large areas of the depression. Date gardens still persist in the most western parts of the depression. The surface has obviously been greatly affected by human activity since that time and provides little evidence of its former character.

Conclusion

The geological investigations have confirmed that at some time in the past the inlet running from Tubli Bay towards Saar was more extensive than today and that it came as close as 1.5 km to the Saar ridge. It appears to have been at its maximum extent around 6,000 BP (as recorded in BH2). For the period of the Saar settlement, some two millennia later, the evidence from the boreholes and surrounding areas suggests that the marine conditions produced by the Flandrian transgression either still remained or were being displaced eastward by the deposition of supra-tidal sediments. Remnants of more active creek systems elsewhere in the inlet, and away from the line of the drilled section, may have existed for a long time after 4,000 BP and provided some navigable access to the site.

The geological evidence supports, though at present inconclusively in the absence of further radiocarbon determinations, the hypothesis that the inhabitants of Saar had relatively easy access eastward to the sea through a series of small channels and creeks that led out into Tubli Bay. This possibility was first suggested by the archaeological evidence for a heavy dependence on marine resources and by observations about the difficulties of getting through the mound-field and down to the west coast.

Acknowledgements

The authors would like to acknowledge with gratitude the support of Mr Yousef Nayem, Manager, Geotechnical Engineering Department, Technical Services Directorate, Ministry of Works and Agriculture, Bahrain, who generously allowed access to departmental records and provided the staff and equipment to drill two boreholes. This study would not have been possible without his kind support. Thanks are also due to the late Dr David Brown of the Natural History Museum, London who helped with the identification of the fresh and brackish water species of the molluscs, Professor John Murray of Southampton University who identified the foraminifera, and Dr Eric Robinson, formerly of University College London, who identified the ostracoda.
Chapter 12 Social and economic organization

Robert Killick and Jane Moon

Saar and the Dilmun polity

Around 2,000 BC there must have been far-reaching changes in Dilmun, leading to the formation at this time of a Dilmun state (Højlund 1989; Eidem and Højlund 1993). This observation is based mainly on architectural developments. The major settlement of Qala‘at al-Bahrain grew in size and was fortified at this time, perhaps containing even a Dilmun palace (Q, al-B. 2: 16). Temples were built at Barbar, Diraz and Saar and burial mounds and tombs proliferated, including the giant ‘royal’ tombs at A’ali. Further clues come from finds: the appearance and widespread use of a Dilmun seal style and the decline of Mesopotamian influence on pottery styles in favour of the development of local styles.

The capital of this state was certainly the town represented today by the site of Qala‘at al-Bahrain. Saar, by contrast, has no indications of an urban lifestyle, but all the hallmarks of a prosperous village. We can assume that a capital city within walking distance was not without influence, even if it is unlikely that the exact nature of the relationship between the two places will ever be clear. It is Saar, however, with its extensive and exceptional preservation of the Early Dilmun levels, that provides us with the clearest picture of everyday life on Bahrain 4,000 years ago.

Households at Saar

In the excavation of Saar, it proved relatively easy to identify discrete self-contained buildings, each with their own living areas and suites of domestic installations. Most of our buildings of two rooms (Group A in Chapter 4), and those with three rooms (Group D), can be so distinguished. For the purposes of this discussion, we shall assume that where we can identify such a unit it corresponds to the residence of a single household and that, in turn, such a household reflects accurately the composition of the basic social/family group at Saar, however that is constituted. Needless to say, the ethnoarchaeological and anthropological literature offers examples to dispute these assumptions (e.g. Horne 1994: 186-190).

There are exceptions at Saar to this one-to-one correlation. In some cases, most notably that of Bldg 301, a single interconnecting architectural unit may have accommodated more than one household, while elsewhere the complexities of the building plan make the equation with household(s) problematic (e.g. interconnecting Bldgs 11, 12 and 13).

The use of space in a household

Thanks to the work carried out on the different components of the archaeological assemblage from Saar, and the detailed analysis of the contents of Bldgs 205 and 207, we have a good idea of how each of the rooms in a ‘standard’ household was utilized.

The small inner room of the house was generally devoid of installations and domestic refuse, hence the supposition from excavation that it was used primarily for storage. In addition, because of the relatively private nature of the inner room, not usually visible directly from the main external door, it was the more secluded space in the house. The inner rooms were also roofed areas. In some cases, the contents allowed a more specific interpretation: one inner room in Bldg 220 contained a stone platform and several stone tools and so must have been used for food preparation, while on the floor of the second inner room were 13 broken fragments of clay sealings, indicating use as a storage area. Additional suggested uses for the inner room, derived from the micromorphological work, include sitting, sleeping, and possibly washing (p.333 and Table 10.4). The spatial analysis of the various pottery forms (p.274) did not reveal major differences in the assemblages of the outer and inner rooms in two-roomed buildings, but it did suggest that in larger buildings cooking vessels were usually stored in the inner rooms. The rooms were also used for dining, but while the pattern of fish consumption was uniform through the house, for whatever reason there was a preference for eating red meat in the inner rooms (p.294).

The outer room of the house was a multi-purpose ‘living room’ where many of the household chores associated with food preparation and cooking were undertaken. In excavation, these were always the rooms with the dirty floors and occupation debris, where ash spilled out from the hearths and ovens, and domestic refuse was dumped in the corners. The outer room was used also for washing, perhaps of food, and for the storage of water, as indicated by the frequent presence in the passageway area of a plastered bench-and-basin (Type 400, p.159). Food was also consumed in the outer room: serving vessels and food waste were common items. The pattern of butresses in the walls of the outer rooms suggests that these areas were at least partly roofed, as was also suggested by the micromorphological work.

The rear yards of three-roomed buildings may have duplicated some of the functions of the outer rooms, such as food preparation, but certainly not all. The evidence of the architecture (lack of butresses to support roof beams), and of the micromorphology (water-laid crusts across the yard), suggest that they were not roofed, but open to the elements, and so functioned differently. Rather intriguingly, the spatial analysis of the pottery suggests a possible connection between rear yards and brewing vessels. At the least, the rear yard was where large pottery vessels (and their contents) were kept.

The micromorphological work was able to suggest, with varying degrees of certainty, some very specific uses for the rear yard: food processing with a grindstone; tethering and feeding of animals; temporary discard of domestic refuse; and storage of bulk items.

Household size and composition

Most attempts to estimate from archaeological evidence the number of people that might have dwelt in a house assume that there is a relatively precise correlation between space available and number of inhabitants. The studies are drawn from modern habi-
tation, and the most frequently quoted ratio is 10 sq. m of living space per person (following Naroll 1962).

Ethnographic studies carried out with archaeological parallels in mind have been conducted at Hasanabad in northwestern Iran where the amount of space per person was calculated as being between 7.5 and 11 sq. m (Watson 1979: 291). However, at Baghestan, a village in northeastern Iran, household size did not account for variations in house area (Horne 1994: 158), offering a salutary caveat to such calculations.

A more relevant example, though from an urban context, may be the important Babylonian city of Nippur, in southern Iraq. At Nippur it is known from textual evidence that nuclear families of this period occupied individual houses. There, a roofed area of 23 sq. m was average for a house, plus courtyard space (Stone 1987: 29). At Saar, the average size of our simplest buildings, the two-roofed units of Group A, is 31 sq. m. This rises to 52 sq. m for the larger three-roofed buildings of Group B, which have an additional unroofed yard. On these figures, an average Saar household would have comprised only a few individuals, perhaps, as at Nippur, a small family unit. At the other end of the scale, Bldg 53 exceptionally occupies 149 sq. m of which 75 sq. m was roofed living and storage space—double the capacity of the standard household.

Studying the spatial organization of a modern Iranian village, Kramer observed that ‘circulation between homes is an important consideration for villagers, and the location of their homes with respect to those of friends and relatives also appears to be a matter of concern’ (Kramer 1983: 353). She noticed that brothers living in separate houses liked them to be adjacent, or across a narrow alley from each other, with the doors directly opposite, a circumstance that was otherwise usually avoided. The block construction at Saar is striking, and it is tempting to view these as indicating kinship groups. Certainly, living in the same block necessitated close cooperation, especially when renovations were needed. The sharing, and sometimes re-division, of spaces in the blocks, for example the shared rear yard of Block A and the subdivided kitchen area at the rear of Bldg 5, also reinforce the idea that relatives occupied contiguous buildings. Consequently, we may infer that the people occupying the buildings of, for example, the Southeastern Quarter were more likely to be related to each other than to those in Block A, who in turn were more likely to be related to other people with residences opening on out to the shared communal area of Diraz Square.

**Social organization of the community**

Approximately 80 contemporary households have been identified at Saar, and somewhere between one third and one half of the total area of the settlement has been excavated. The total number of households in the settlement can thus be calculated as being between 160 and 240. If we assume two adults per household, then the adult population at Saar comprised a minimum of 320 individuals.

Within this community, there is some limited evidence for variation in wealth and/or status. Buildings generally, though by no means invariably, reflect the status of the owner. At Saar most of our households occupied just two or three rooms, but there are at least four larger buildings with more rooms that appear to have accommodated a single household each. The two clearest examples are Bldgs 35 and 53, followed by Bldg 220 and possibly the complex of Bldgs 10–12, if that is what it was (all belonging to Group F, see p.152). Bldg 53 has a dedicated row of storage rooms and two large walled courtyards, and its pottery assemblage included a high percentage of storage vessels, and imported and high-status pots. Bldg 220, on the other hand, was relatively rich in seals and seal impressions (Saar Report 2: 41). All four of these buildings are candidates for the residences of wealthier members of Saar society.

Corroborative evidence for variations in status can be found in the cemeteries adjoining the settlement, though these were presumably not exclusively for the inhabitants of Saar. Nevertheless, the range of burial types, from the rare and labour-intensive double-chambered tomb to the commoner single burial mound, shows that individuals and groups were treated differently, at least in death.

The types of artefacts found in the graves and the settlement are sufficiently similar to establish that they were in use at the same time, but there is an unusual direct connection too. A group of sealing fragments from Bldg 207 represent several different impressions made by the same seal (Saar Report 2: 86, registration no.1853–97, the reconstructed composite drawing needs slight correction). It shows a gazelle-like animal, birds, a net, a shield or hide, and a man in the centre—almost a pictorial summary of life in Dilmun. The very seal that made those impressions has now been found in a grave in the mound-field (Al-Sindi 1999: 218, no.154): the pattern matches exactly. The precise nature of the connection could be interpreted in several ways, but it looks very much as though the person who during his lifetime sent sealed goods to the people of Bldg 207 was eventually buried nearby, and took his seal with him to the grave.

**Activities and occupations**

**Subsistence activities**

**Crops**

Indications of crop farming at Saar are limited. A rigorous sampling programme was conducted to recover plant remains, but the local soil conditions do not preserve them well. (See Nesbitt 1993 for a discussion of plant remains and diet at Saar.) Although only very small quantities of barley and wheat were recovered, barley was present in 58% of samples, suggesting that it was a relatively important foodstuff, while wheat was present in only 13%. No other fruits or vegetables were recovered, with the exception of dates, for which there was overwhelming evidence in the form of charred pits. Dates have been cultivated in the Middle East since at least the fifth millennium BC, and until very recently formed an important part of the diet in Bahrain. Dates from Dilmun had a reputation in ancient times for being particularly good.

As well as providing a fruit with a high carbohydrate content and desirable sweetness, the date-palm provided nearly all the wood that was used at Saar. Wood, of course, only normally survives if burnt, but there were enough charred samples and phytoliths (see p.327) to show that it was the usual cooking fuel, and impressions in plaster fragments indicate that it was also used to support the roofs of the buildings.

**Animal husbandry, hunting and fishing**

Soil conditions at Saar were much kinder to animal than to plant remains, so evidence for animal husbandry was much more abundant than that for crop growing. Goats and sheep, mainly of a small local breed, were the most important domestic animals, followed by cattle (see Chapter 8). The cattle were kept primarily for their meat, rather than for their milk, and there is some evidence that they may have been used for draught work. The sheep/goats, on the other hand, were kept for their ‘lifetime products’, such as
hair and milk, as well as being eaten. The presence of animal droppings in the rear yard of one building suggest that an animal had been kept there, but otherwise we are not sure whether the domestic animals were generally stabled with the household, or kept outside the village somewhere.

Donkey and camel bones were found too, and while there is nothing from the skeletal evidence to confirm that they were domesticated, a seal with a picture of a man riding a donkey (Fig. 8.15) show that the donkeys were certainly tame. The camels are thought to have been wild ones, hunted for their meat, along with oryx and gazelle.

Fish were the main protein item on the Saar menu, and the people were skilled fishermen. They probably used traps (given the size range and species present at Saar), and they certainly used hooks of different sizes and shapes, showing that they knew their quarry. The range of fish caught and eaten was very similar to that found in local fish markets today, except that at Saar there were relatively few rabbitfish, perhaps because the bones of this fish do not preserve well, and significantly fewer tuna and mackerel, which have to be caught in deep water. It would appear that Saar’s fishermen stuck to lagoon and shallow-water fishing, and the catch pattern, compared with modern ones, corresponds best to that of the northwest coast of Bahrain. Different households seem to have favoured different types of fish.

Shell normally preserves very well, and communities that rely heavily on shellfish leave vast midden of shell behind. Although the quantities of shell found in some areas of Saar appeared considerable, they are not enough to indicate heavy reliance on shellfish. The commonest shell was that of the pearl oyster, with smaller numbers of clams, scallops, cockles, spiny oysters and the gastropod _Siratus_. The latter is sometimes used to make purple dye, but there is no evidence for this from Saar. (See Glover 1995 for a discussion of the shellfish found at the settlement.)

**Cooking and eating**

There were various types of hearth and cooking installation in the settlement: open ones that could have been used for roasting, tannurs for bread and slow baking, and hearths with jar supports of the right size to support one of the common round-bottomed cooking pots. The latter are the only vessels that were frequently found with smoke-blackening on the base, and we may assume that what was not eaten raw, or roasted whole, was stewed in one of these. As for preparation prior to cooking, it would be reasonable to suppose that the grinders and grindstones, and perhaps some of the pounders and choppers, were used for food preparation, even if this cannot be proven. Few cutting implements made of copper were recovered; perhaps they were too expensive for everyday use and the kitchen usually made do with flint or chert cutting implements. The hearths were fuelled by various parts of the date-palm, and other types of wood (see Gale 1995).

For serving food, no single type of open vessel was common enough to suggest use as an individual eating vessel, so perhaps the picture we should conjure of a Dilmun meal time is of the diners sitting around a large palm-leaf mat and all eating from it, in the manner still traditional in parts of the Middle East.

Jars were of course used to transport and store the liquids necessary for life: water, milk, and possibly some special festive brew, if that is what is shown in the ‘drinking scenes’ on seals. From contemporary Iraq there is textual evidence for beer brewing from barley, and the vats found at Saar may indicate something similar.

The demographic profile of the sheep/goats suggests that they were kept for milk, and given the hot local climate it can be suggested suggest that yoghurt was part of the diet.

**Building activities**

It is self-evident that the people of Saar built houses. These were made of stone quarried from the limestone ridge on which the settlement sits. In addition to the houses, there were nearby tombs, at least some of which were surely constructed by the inhabitants of the settlement. Whether we can go further and suggest that some members of the Saar community may have worked as professional stonemasons, or even as tomb-builders, is hard to say. It is certain, however, that they manufactured their own gypsum, as a kiln for producing this material was found (p.128), and that they made mortar of it, with ash and grit, and used it to plaster and roof.

**Manufacturing and crafts**

**Metal-working**

Copper ingots were found at Saar, and their composition suggests that they would require secondary refining to produce usable metal (see Chapter 9). Pieces of spilt and waste bear out this assumption, and also suggest that small items such as fish-hooks and finger-rings were produced in the settlement, although no actual crucibles or moulds were found.

**Basketry**

Palm-leaf does not survive intact in the archaeological record at Saar, but its impression on other materials shows that the population made much use of woven palm-leaf products, such as roof-mats, probably floor-mats, and woven vessels coated with bitumen.

**Textile manufacture**

Impressions of cloth on clay, and pictures on seals of people wearing what look like woven garments, reinforce the presumption that such were made and worn, though in the absence of an actual weaving pit it cannot be certain that textiles were definitely woven in the settlement rather than acquired from elsewhere. Some perforated clay and stone objects may have been loom weights and there are a few examples of probable spindle whorls (p.228), but they are rare and of imported stone. One does not, therefore, get a picture of women and girls spinning as a habitual pastime while they sat in the shade or heeded the goats, as is still seen in parts of the Middle East.

**Pottery-making**

No actual pottery-kiln was found in or around the settlement, so there is no absolute proof that pottery manufacturing occurred there. Nor were any unequivocal kiln wasters noted. Some stone burnishing tools may have been used by potters, but might equally have served in leather-working, a craft that was probably practised but for which we can expect no physical evidence. With the exception of some obvious imports, however, the pottery at Saar all belongs to the local Dilmun style, and if it was not made at Saar itself, then it was made not far away.

**Bone, shell and ivory crafts**

Bone implements and possible whistles were found, as well as shell seals, shell beads, and a very few items of ivory. The bone artefacts are perhaps the most likely to have been made locally, as discarded bone was clearly plentiful in the settlement, to judge from how much was still left after 4,000 years. The same goes for clam and cockle-shells, pierced to make personal ornaments, or modified to make simple tools. Pieces made from imported shells are more problematic: did they come ready-made, or were they made at Saar from shells obtained from travellers or traders? Three pieces of
<table>
<thead>
<tr>
<th>PRODUCT/ACTIVITY</th>
<th>EVIDENCE</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUBSISTENCE ACTIVITIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivation:</td>
<td>Dates</td>
<td>Carbonized date-stones</td>
</tr>
<tr>
<td></td>
<td>Wheat</td>
<td>Carbonized grains</td>
</tr>
<tr>
<td></td>
<td>Barley</td>
<td>Carbonized grains</td>
</tr>
<tr>
<td>Animal husbandry:</td>
<td>Cattle</td>
<td>Bones; shown on seals</td>
</tr>
<tr>
<td></td>
<td>Sheep</td>
<td>Bones</td>
</tr>
<tr>
<td></td>
<td>Goat</td>
<td>Bones</td>
</tr>
<tr>
<td></td>
<td>Donkey(?)</td>
<td>Bones</td>
</tr>
<tr>
<td>Hunting:</td>
<td>Wild camel</td>
<td>Bones</td>
</tr>
<tr>
<td></td>
<td>Oryx</td>
<td>Bones, probably shown on seals</td>
</tr>
<tr>
<td></td>
<td>Gazelle</td>
<td>Bones</td>
</tr>
<tr>
<td></td>
<td>Birds(?)</td>
<td>Bones</td>
</tr>
<tr>
<td>Fishing:</td>
<td>Vertebrate fish</td>
<td>Fish-hooks, bones</td>
</tr>
<tr>
<td></td>
<td>Dugong</td>
<td>Bones</td>
</tr>
<tr>
<td></td>
<td>Dolphin</td>
<td>Bones</td>
</tr>
<tr>
<td></td>
<td>Shell-fish</td>
<td>Shells</td>
</tr>
<tr>
<td>Food preparation:</td>
<td>Cooking</td>
<td>Hearth, cooking pots, burnt fish-bone</td>
</tr>
<tr>
<td></td>
<td>Grinding</td>
<td>Grinders, grindstones,</td>
</tr>
<tr>
<td></td>
<td>Beer or wine-making(?)</td>
<td>Shown on seals, fermenting vats</td>
</tr>
<tr>
<td><strong>BUILDING ACTIVITIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stone quarrying</td>
<td>Buildings of local stone</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Construction work</td>
<td>Stone-built houses, temple and tombs</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Gypsum production</td>
<td>Kiln</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Plastering</td>
<td>Gypsum plaster on walls and installations</td>
<td>Chapter 3</td>
</tr>
<tr>
<td><strong>MANUFACTURING AND CRAFTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper casting and secondary refining</td>
<td>Waste/spill samples, copper objects</td>
<td>Chapters 5 and 9</td>
</tr>
<tr>
<td>Basket and mat weaving</td>
<td>Impressions of woven palm-leaf in residual bitumen coatings</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Textile-making</td>
<td>Impressions of cloth, possible loom weights and spindle whorls</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Pottery-making</td>
<td>Pottery vessels, presumed to be of local manufacture</td>
<td>Chapters 6 and 7</td>
</tr>
<tr>
<td>Shell-working</td>
<td>Objects made from modified local shells</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Bone-working</td>
<td>Bone tools and musical instruments(?)</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Ivory-cutting</td>
<td>Unfinished pieces</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Seal-cutting</td>
<td>Unfinished seal shells, local design on steatite seals</td>
<td>Saar Report 2</td>
</tr>
<tr>
<td>Stone-carving?</td>
<td>Steatite vessels, possibly locally-made.</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Working with clay</td>
<td>Clay beads and figurines</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Working with bitumen</td>
<td>Bitumen beads, vessels and lids</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Working with plaster</td>
<td>Lids and other objects</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Making stone tools</td>
<td>Stone tools</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Painting</td>
<td>Painted plaster and ceramics</td>
<td>Chapters 5, 6 and 7</td>
</tr>
<tr>
<td><strong>TRADING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling</td>
<td>Weights on both Dilmun and Ur standards</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Sealing</td>
<td>Seals and seal impressions</td>
<td>Saar Report 2</td>
</tr>
<tr>
<td>Importing</td>
<td>Indus pottery</td>
<td>Chapters 6 and 7</td>
</tr>
<tr>
<td></td>
<td>Carnelian</td>
<td>Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Lapis lazuli</td>
<td>Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Stone, non-local, for tools</td>
<td>Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Copper, including ingots</td>
<td>Chapters 5 and 9; Connan 1998</td>
</tr>
<tr>
<td></td>
<td>Bitumen</td>
<td>Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Elephant ivory</td>
<td>Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Steatite</td>
<td>Chapter 5</td>
</tr>
<tr>
<td><strong>OTHER ACTIVITIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worshipping</td>
<td>Temple; shown on seals</td>
<td>Saar Reports 1 and 2</td>
</tr>
<tr>
<td>Dancing(?)</td>
<td>Shown on seals</td>
<td>Saar Report 2</td>
</tr>
<tr>
<td>Music-making(?)</td>
<td>Possible instruments</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Gaming(?)</td>
<td>Possible gaming pieces</td>
<td>Chapter 5</td>
</tr>
</tbody>
</table>

Table 12.1 Activities and occupations at Saar
ivory seem to show working, but were not recognisable as finished pieces. At least one of these was elephant ivory, as opposed to locally available dugong, so this is one firm example of raw material imported to be worked by local craftsmen. The possibility, therefore, that exotic shell was treated the same way is strengthened.

**Seal-cutting and stone-carving**

The steatite used for most seals, and for vessels, lids, and some small objects does not occur locally, but it seems reasonable to assume that the very individual designs, that are peculiar to Dilmun, represent the skill of local lapidarists who imported the uncut stone. Unfinished shells seals were found too. One cannot feel the same confidence about the steatite vessels and lids, however. These occur in much greater quantities at sites on the Arabian mainland, and it seems reasonable to suppose that they were in fact made there. The question remains open, however. Dilmun seal-cutters certainly had the demonstrable range of skills, and the necessary tools to make these ornate vessels themselves. The same might be said of the beads made from exotic stones such as carnelian: there is no way of determining whether it was the carnelian or the bead that was brought from outside. (For a full discussion of the seals found, see Saar Report 2.)

**Working with clay, bitumen, plaster and stone**

The making of clay beads and animal figurines does not require the same practised skill as drilling stone beads or cutting seals, and these simple objects may not have been made by specialized craftsmen. Modification of broken pieces of pottery to make household items and tools is another activity that lies on the border between craftsmanship and standard domestic skill, and the same might be said of bitumen- and plaster-working: almost anyone could manufacture a bitumen bead or a plaster bung, while fashioning plaster lids to the correct size, and coating woven vessels with bitumen may have been more specialized. The making of stone tools can require much skill, but many of those found at Saar were so simple that they might have been just useful-shaped pieces of natural stone. Analogy with village communities of almost any time or place would suggest that there was usually someone with a reputation for being particularly good at this or that minor skill, and could be persuaded, one way or another, to employ it on behalf of others. Where this sort of arrangement crosses into professional craftsmanship is a moot point.

**Trading**

Dilmun is synonymous with trade, and there is certainly plenty of evidence at Saar for goods, or at least raw materials, that have come from somewhere else: bitumen, copper, steatite, carnelian, exotic stone and shell, and ivory. A special study of the bitumen shows it came from western Iran (Connan et al. 1998). Oman has long been considered the primary source of copper for the Middle East at this period, but the picture is now known to be more complex (see Chapter 9 and Carter 2003). The Arabian mainland probably provided the hard igneous rock of which many of the stone tools are fashioned, and some of the shells came from its coastal waters (Glover 1999). Contact with the Indus valley civilization is obvious from the presence of carnelian, probably some of the other exotic stones, and certainly from the richly-decorated pottery vessels (p.265). Lapis lazuli has its origins in Afghanistan.

Does all this mean that the community was actively involved in overseas trade, or that they obtained these items from other islanders who were? The proximity of the contemporary urban settlement of Qala‘at al-Bahrain, which would certainly have had access to international markets, makes it difficult to be sure. The presence of weights, especially of weights on two different international standards, perhaps tips the argument in favour of direct involvement. Neighbouring indigenous communities do not usually feel the need to use international standards to control their mutual transactions.

The evidence for trading in at least one material, bitumen, shows that the people of Saar were not always dependent on Qala‘at al-Bahrain for their goods. Analysis has shown that the bitumen from Saar was sourced in western Iran, whereas that from contemporary Qala‘at al Bahrain originated in Iraq (Connan et al. 1999). This curious anomaly offers a tantalising glimpse of the true complexities of trade at this time.

The significance of the clay sealings found at Saar is difficult to interpret. Broken sealings tell us that goods sealed and stamped with local Dilmun seals were being opened at Saar. The fact that they were sealed with a local style of seal suggests their origin was on the island, but it does not tell us why they were so marked. The sealing-up may be connected with local exchange, or it may have some other meaning entirely. The sealings found in the back room of the temple, for instance, showing that packages or pots had been opened up in there, might have identified particular donations or tithes (Saar Report 1: 53).

**Sports, pleasure and other activities**

Studies of ancient societies have a tendency to concentrate on the necessary aspects of life, such as the economy. They can also emphasize, without really meaning to, the less enjoyable side of human existence. We find settlements in a state of decay, at a point after they have in fact failed as settlements, either by destruction or abandonment. There is, however, evidence at Saar for enjoyment and entertainment, if one looks carefully: the seals show us pictures that look very like scenes of dancing and feasting; tiny clay artefacts and caches of pebbles may have been gaming pieces; and there are remnants of bird-bone whistles or flutes. Hunting has been mentioned as a subsistence activity, but it was surely more that just that, or it would not feature so prominently on the seals, with hunters, frequently apparently nude, sporting spears, slings, and nets to catch birds. We know from the seals that copper spears of the kind found at Saar were certainly used in hunting. We do not know whether they were also routinely used against other humans, but there is nothing else in the archaeology of the settlement that points in the direction of warfare, or expected danger from aggressors.

It is true that all these activities may have had ritual or religious significance, but to separate that from entertainment is probably to put too much of a modern western bias on our interpretation. Certainly there was religious activity too, as evidenced by the grand, long-lived, and much repaired temple, surely a focus for what was once a thriving, peaceable, well-housed and well-fed community.


Gallagher, M. D. (1971), _The Amphibians and Reptiles of Bahrain_ (private publication, Bahrain).
Hadditch, G. (1986), Metallogenetic features of lead-zinc and copper deposits in Iran, in W. E. Petrascheck and S. Jankovic (eds.), _Geotectonic Evolution and Metallogeny of the Mediterranean Area and Western Asia_, (Schriftenreihe der Erdwissenschaftlichen Kommissionen 8), 59–73.
—and et al. (1990), _Excavations at Nageswar, Gujarat: a Harappan shell working site on the Gulf of Khatch_ (Department of Archaeology and Ancient History, University of Baroda, Baroda).


— (ed.) (1993), Harappan Civilisation, a Recent Perspective (New Delhi).


—and et al. (1997), 'Lead isotope characteristics of the Cyprus copper ore deposits applied to provenance studies of copper oxide ingots', Archaeometry, 39/1: 83–123.


Uerpmann, H.-P. (1987), The ancient distribution of ungulate mammals in the Middle East (Beiehfe zum TAVO, Reihe A, Nr. 27, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).

—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).

—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


—and (2003), Stone Age Sites and their Natural Environment. The Capital Area of Northern Oman Part III (Beiehfe zum TAVO, Reihe A Nr. 1/3, Dr Ludwig Reichert, Wiesbaden).


Appendix 1 Corporate and institutional support, individual supporters, staff and volunteers

Corporate and institutional supporters

Abdal Latif Al-Aujan Group
ABN Amro Bank
ad-shop
Adel Fakhrho Enterprises
Aeradio Technical Services
African & Eastern
Airbus Industrie
Airmech
AJM Koheji & Sons
Al Ahli Commercial Bank
Al Ahlia Insurance
Al Hilal Group
Al Jazzira Cold Store
Al Uba’f Arab International Bank
Al Zamil Group
ALBA
American Women’s Association
Arab Banking Corporation
Arab British Chamber of Commerce
AT&T
Australian Meat & Livestock Corp.
Awal Plastics
Bahrain Airport Services
Bahrain Centre for Studies & Research
Bahrain Fibreglass
Bahrain Financing
Bahrain Flour Mills
Bahrain International Bank
Bahrain Jewellery Centre
Bahrain Kuwait Insurance
Bahrain National Holding
BANAGAS
Bank of Bahrain & Kuwait
Banque Nationale de Paris
BANZ
BAPCO
BASREC
BATELCO
BMIM
The British Academy
British Aerospace
The British Bank
The British Council
British School of Archaeology in Iraq
Brown & Root
BTTTC
Budget Rent-A-Car
Buehler International
CALTEX Bahrain
Cathay Pacific
Charlotte Bonham Carter Memorial Trust
Chase Manhattan Bank NA
Chemical Bank
Citibank
Clifford Chance
Credit Suisse
Denis Buxton Trust
Dilmun Investments
Diplomat Hotel
EMIC
Ernst & Young
Fakhro Electronics
FAM Supermarket
Flemings
Foreign & Commonwealth Office, UK
Fortune Promoseven
Garmco
General Accident Insurance
Global One
GPIC
GP Zachariades (Overseas) Ltd
Grindlays Bahrain Bank
Gulf Air
Gulf Business Machines
Gulf Colour Laboratories
Gulf Daily News
Gulf-Tech International
Halliburton Worldwide
Hasan Mansouri
Hempel’s Marine Paints (Bahrain)
Inchcape Marketing Services
Intergraph
International Agencies
Investcorp
Jalal Costain
Jardines Insurance Brokers
Jahanmals
Kazerouni Contracting
Kimberly-Clark Regional Services (Bahrain)
KPMG Fakhro
Linacre Associates
Lloyds Register of Shipping
Mansouri McInerney
McDonald Institute for Archaeological Research
Memac
Merrill Lynch International Bank
Ministry of Foreign Affairs, Germany
Ministry of Cabinet Affairs
Mohammed Jalal & Sons
Morrison International
Nass Scaffold
National Bank of Bahrain
National Geographic Society
National Imports and Exports
National Insurance
National Motor Company
NCR Corporation
Oriental Press
Palmer Cowen
Qantas Airways
Philip Morris Services Inc.
Saad Investment Company
Sanwa Bank
Serco-IAL
Standard Chartered Bank
Swiss Bank Corporation
Tele-Gulf Directory Publications
Thomas De La Rue & Company
UCO Marine Contracting
Unitag
United Gulf Bank
United Gulf Industries
United Insurance
Yaqubi Stores
Yateem Brothers
YBA Kanoo
Yousuf Mahmood Husain

Individual supporters

Mr Salman Abbasi
Mr A. Abdulghaffar
Mr Ghazi Abdul-Jawad
Mrs Irene Abu Hamad
Ms Deyana Ahmed
Mr Mohamed G. Akhtarzadeh
Mr Adli Alaseeri
Mr Hussain Al-Ansari
Mr Abdul Latif K. Al-Aujan
Dr Wajeeha Al-Baharna
Mr Samar Al-Gailani
Mr Saad Al-Hooti
Mr Mostafa Al-Hussaini
Mr Fawzi Al-Jaber
Mr Ibrahim Al-Jowder
Shaykh Dana Al-Khalifa
Shaykh Haya Ali Al-Khalifa
Shaykh Nayla Ali Al-Khalifa
Sheikh Rashid bin Khalifa Al-Khalifa
HE Sh. Mohamed bin Sultan Al-Khalifa
Dr Sheikh Mohammed bin Khalifa Al-Khalifa
Mr John Al-Khair
Mr Saleh Al-Kowary
Mr Mahmoud Al-Mahmoud
Mr Mohammed A. Al-Mannai
Dr Abdulla Al-Mojil
Mr Khalid Al-Moayed
Mr Nabeel Al-Moayed
Mr Salman Al-Moosawi
Mr Abdulla Al-Muqla
Mr Younis Al-Nashaba
Mr Adel Al-Safar
Mr Maan Al-Sanea
Mr Mustafa Al-Sayed
Mr Khaled Al-Sendi
Mr Mohammed Al-Shroogi
Mr Khalil Al-Thawadi
Dr Hala Al-Umran
Mr Shamsan Al-Waswasi
Mr Abdul Rahman Ali Al-Wazzan
Mrs Lynne Al-Wazzan
Mr Sameer Al-Wazzan
Mr Mohammed Al-Zamil
Mr Walid Al-Zamil
Mr Mohammed Issa Al-Zeera
Mr Eric Alexander
Mr Adil Ali
Ms Fatima Alireza
Dr Essa Amin
Mr Ismail Amin
Mr Y Ando
Mr Eric Arnaud
Mrs Inge Ashraf
Mr Alex Askew
Ms Bola Awoyinka
Mr Beshara Ayyash
Mr Mohammed Bahman Ali
Mr Gordon Bailey
Mr Abdulla Bakr
Mr Arvind Baliga
Mr Mukhtar Baquer
Mr Bisharah G. Baroudi
Mr John Bartley
Dr Phil Basson
Mr Bill Beckett
Mr William Beddall
Mr Vinay Benjamin
Mr Ian Best
Mrs Valerie Best
Mrs Robin Brill
Mr Derek Brown
Mrs Pat Brown
Mr Ahmed Bubshair
Mr Claus Buchi
Mr Abdulla Buhindi
Mr Gunter Bühr
Mr Mohamed J. Buzizi
Mr Jan Bylund
Ms Alison Bywater
Ms Mavis Callanan
Mr Peter Callenfels
Mr Paul Carty
Mr Jeremy Carver
Mr Richard Chalkley
Mr Nicholas Chapman
Ms Diane Chapman
Ms Yan Chew
Mrs Kathy Chouai
Ms Angela Clarke

Mr Eric Cockerill
Mr Jeremy Cooper
Sir Colin Craig
Mr Jonathan Crosse
Mr Bruno Daher
Mr Basil Dandara
Mr K. Mohan Das
Mr Alan Davies
Mr Brian Davis
Mr Gordon Davis
Mr Sadiq Dawani
Mr Tony Dawes
Mr Harry Dawkins
Mr Mahmoud Daylami
Mrs Lucie Deane
Mr Paul Dean
Mr Iqbal Dhanse
Mr Neil Dinan
Mr Jean Claude Doge
Ms Carol Dunk
Mr David Easons
Sir Stephen Egerton
Mr Bassem El-Hibri
Mr Cyrus Elliott
Mrs Joy Elliott
Ms Otilie English
Mr Ebrahim Ishraq
Mr Jan-Peter Faberij de Jonge
Ms Jane Faberij de Jonge-Fuller
Mr Adel Fakhro
Mrs Bakia Fakhro
Mr Jamal Fakhro
Mr Malcolm Faren
Mr Zbisch Fedorowicz
Mr Mohammed Ferhan
Mr Brian Fox
Mr Steven Fullenkamp
Mr Michael Fuller
Mr John Fullerton
Mr Peter Gartrell
Mr Tony Gillet
Mr Ali A. Gindy
Mr Patrick Grant
Mr Steven Green
Mr Michael Grieve
Mr Alok Gupta
Mr Hussain Haider
Mr Jamil Hajjar
Mr Per Halberg
Mr Jonathan Hann
Mr Mohammed Haroon
Professor David Harris
Mr Nicholas Harrison
Mr Chris Hart
Mr Abdulrazak Hassan
Mr Kypros Hassabis
Mr Andrew Hearnd
Mr Norbert Heinze
Mr Don Hepburn
Mr Tetsu Hirano
Mr John Hogan
Mrs Marly Hogan
Mr Graham Honeybill

Mr Les Horton
Ms Ridha Hourani
Mr Alan Hume
Mr Mahmood Hussein
Mr Patrick Irwin
Mr Steven Jackson
Mr Clive Jacques
Mr Abdulrahman Jaffer
Mr Mohammed Jalal
Mrs Diane James
Mr Tony James
Mr Rodney James
Mr Abdul-Rahman Jamsheer
Mr Bharat Jashanmal
Mr Eric Jenkinson
Mr Clarke Johncox
Mr Peter Johnson
Mr John Jones
Mr Roger Jordan
Lt. Col. Tim Jordan
Mr Hassan Ali Juma
Mr Bader Ahmed Kaikows
Mr K. Kamath
Mr Mubarak Kanoo
Mr George E. Karam
Mrs Adriene Kathchadurian
Mr Abdul Rahman Kazerooni
Mr Stephen Key
Mr George Khamis
Mr William Khouri
Mr Roy Kietzman
Mr Howard King
Mr Fraser King
Mr Nemir Kirdar
Mr Sam Knight
Mr David Knights
Mr Mahmood Kooleghi
Mr Andrew Kopec
Mr Ganesh Krishnamoorthy
Mr Sunil Kumar
Dr Mark Lawson-Statham
Mr Keith Levers
Mr Ian Lewty
Mrs Mary Lewty
Mr Graham Lindsay
Mr David Lloyd
Mr Jeremy Long
Mr Kevin Lovegrove
Mr Paul Lovell
Mrs Bridget Lubbe
Mr Johann Lubbe
Ms Frances Luff
Mr Nick Lumsden
Mr Edward Lutley
Mr Ahmed Majid
Mr Mark Mansour
Mr Karim Mansour
Mr Keith Marron
Ms Pauline Marron
Mr Suhail Mathlab
Mr Christopher McGonigal
Mr Robin McIlvenny
Mr Dave Merrey
Mrs Marthe Merrey
Mr Ronnie Middleton
Mr Akram Miknas
Mr Geoffrey Milne
Mr Ishu Mirchandani
Mr Abdul-Hussain Mirza
Mr Peter Moon
Dr Roger Moorey
Mr Osman Morad
Mr AbdulRahman Morshed
Mr George Morton
Mr Eddie Moutrand
Mr Gerard Mulvey
Mr Khamis Muqla
Mr Murad Ali Murad
Mr Yusuf Nayem
Mr Paul Nevin
Mr Ebrahim Nonoo
Miss Elizabeth Ollard
Mr John Pastorel
Mrs Kay Patience
Mrs Gladys Perreiru
Mr Hakim Pettigrew
Mr Brian Pickering
Mr Adrian Pinto
Mr Denzil Pinto
Mr Danny Pratt
Mr Chris Prece
Mr Brian Prosser
Dr Kadhim E. Rajab
Mr Babu Rajan
Mr Richard P. Reavey
Mr Mohammed Redha
Mr Michael Rice
Mr John Riddick
Mr Peter Rooke
Mr Barry Rowe
Mr Jim Ruehling
Mr Kerim Salimi
Mr Jalil Samahi
Mr Sirvat Sakr
Dr Jaime Samour
Mr David Sampson
Mr John Samuels
Mr Malik Sarwar
Dr May Seikaly
Dr Chris Scarre
Mr Alan Schofield
Mr Barry Seddon
Mr Majeed Shafea
Mr Mohammed Shehabi
Mr Joe Shehadeh
Sir John Shepherd
Mt Tracey Shiels
Mr Youisf Ahmed Shirawi
Mr John Shorter
Mr John Simpson
Mr Peter Smith
Mr Peter Spink
Mr Peter Spink
Mr Sreekumar
Mr David Stephenson
Mrs Renate de Klein Stephenson
Mr Peter F. Stevenson
Mrs Ginny Stigter
Mr Katsuki Tanaka
Mr Peter Taylor
Mr Zuhair Tawfiqi
Mr Timothy Thom
Mr John Tidy
Mr Godwin Tofte
Mr Peter Tomkings
Mrs Wendy Toorani
Mr George Towns
Mr Hugh Tunnell
Mrs Toni Underwood
Dr Krishna Vasdev
Mr Jamil Wafa
Mr John Warren
Mr Brian Waywell
Mrs Linda Waywell
Mr John Weir
Mr Mel White
Mr Daid Wilkie
Mr Guy Wilson
Mr John Wright
Mr Patrick Wright
Mr Peter Wynne
Dr Abdulla Yamem
Mr Hussain Ali Yamem
Mr Mohammed Yamem
Mr Colin Young
Mr Jalil Zainal
Mr Khalil Zaman
Mr Fred Zaziski

Staff members

Mrs Fiona Al-Rawlaie
Mr Nabil Al-Shaikh
Mr George Anelay
Ms Adele Arthur
Ms Jane Ashdown
Mr David Bartlett
Mr Daniel Barrett
Mr Ben Bellefroid
Mr Lou Best
Ms Sarah Blakeney
Ms Kathryn Blythe
Ms Amanda Brady
Dr Peter Bush
Dr Robert Carter
Dr Harriet Crawford
Dr Dominique de Moulins
Dr Branwen Denton
Mr Rupert Detheridge
Dr Keith Dobney
Professor Graham Evans
Ms Kate Flavin
Ms Shahina Farid
Ms Rowena Gale
Mr Jonathan Gillan
Mrs Hilu Ginger
Mrs Emily Glover
Neil Gorsuch
Mr Jonathan Gower

Ms Frances Halahan
Mr Cassian Hall
Ms Amanda Haughhey
Dr Marlies Heinze
Mrs Alison Hicks
Mr Martin Hicks
Mr David Hopkins
Mr Brian Irving
Ms Deborah Jaques
Ms Yvonne Jenkins
Dr David Jennings
Ms Shelagh Jordan
Ms Jennifer Kiely
Ms Indunn Kvalo
Dr Alan Lupton
Ms Ishbel MacDonald
Dr Wendy Matthews
Mr Bill Moffat
Ms Rebecca Montague
Ms Wendy Murphy
Dr Mark Nesbitt
Ms Loretta Nikolic
Ms Kirsty Norman
Mr David Phillips
Dr Lewis Somers
Ms Robyn Stocks
Prof. Hans-Peter Uerpmann
Dr Margarethte Uerpmann
Mr David Underwood
Ms Chantelle Waddingham
Mr Alex Wasse
Ms Erica-Jane Waters
Mr Duncan Woodburn
Mr Marcus Woodburn

Bahraini colleagues

Dawood Youisf Ahmed Folath
Khalil Ibrahim Alfaraj
Mohammed Jaffar Esse
Abdulkarim Jassim Alaradi
Ali Ibrahim Kadeem
Saleeh Ali Mohammed
Abbas Ahmed Salman
Mustafa Ibrahim Salman
Jaffar Jawad Taher
Abdulla Hassan Yahya
Ali Omran Youisf

Volunteers

Fred Adkins
Christopher Appel
Marie Appel
Robert Bradley
Jan Cumming
Claire Dallmore
Disa Fedorowicz
Ruti Fedorowicz
Steven Green
Traudel Halang
Dale Halderman
Izzaladin A. Al Hassan
<table>
<thead>
<tr>
<th>Juliet Hutchinson</th>
<th>Carol McCoy</th>
<th>Edwina Riddell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sophie Jalal</td>
<td>Chris Meritzis</td>
<td>Dale Rose</td>
</tr>
<tr>
<td>Helen Jones</td>
<td>George Morton</td>
<td>June Seddon</td>
</tr>
<tr>
<td>Shelagh Jordan</td>
<td>Lauren Mendeeck</td>
<td>Sue Stankevicius</td>
</tr>
<tr>
<td>Corinne Khouri</td>
<td>Meg Mendeeck</td>
<td>Chantelle Wadingham</td>
</tr>
<tr>
<td>Renate de Kleine Stephenson</td>
<td>Aida Mendez</td>
<td>Anita Walker</td>
</tr>
<tr>
<td>Jill Leonard</td>
<td>Dee Mills</td>
<td>Sandy Warringer</td>
</tr>
<tr>
<td>Liz Lovell</td>
<td>Brigitte Opitz</td>
<td>Eriko Yoshino</td>
</tr>
<tr>
<td>Jill Markham</td>
<td>Kae Pratt</td>
<td>Roseanne Zaziski</td>
</tr>
<tr>
<td>Suzanne Martinchalk</td>
<td>Fiona Price</td>
<td></td>
</tr>
<tr>
<td>Dee Mills</td>
<td>Helen Raymont</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2  The Saar archive

Contents

The Saar archive contains all the original excavation records of the project. It has two main components: paper-based records and electronic ones.

The paper records
The principal components of the paper records are given below.

Context/unit sheets
These were used in the field as the basic recording tool for the archaeological layers. Each context is recorded on one or more preprinted A4 sheets. They number approximately 4,500. Colour coding of sheets was introduced during the project: white sheets for general contexts, yellow sheets for walls, and blue sheets for installations. They are organized in blocks of sequential numbers assigned to buildings and areas of excavation and are kept in numbered A4 binders. The basic details of each context can also be found in the site database.

Site supervisors plans
These are plans of floors, installations and finds made by the excavators in the field. They were first drawn in pencil onto drafting film (usually A3 sheets), and most were subsequently inked. These are kept in numbered A4/A3 plastic wallets and are described in the site database. There are 469 plans, including some outsize ones of the entire site.

Architect’s building plans
The walls of the buildings were planned by the site architect. These were mapped onto A2 sheets of drafting film, each sheet representing either the southern half or the northern half of a 10 x 10 m square within the planning grid that was laid across the site. These number 174 and are kept in A3 plastic wallets. Details are listed in the site database.

Drawings of pottery and finds
Pottery was drawn in pencil onto A4 (occasionally A3) graph paper. A selection of pottery was also inked onto film. Finds were drawn in pencil (or directly in ink) onto A4 graph paper (or film). All drawings were numbered and details entered into the site database. There are 755 drawings of objects and 347 sheets of sherd drawings. The pencil drawings are kept in A4 files and the inked drawings in A3 plastic wallets. Details are listed in the site database.

Photographs
The Saar photographic archive comprises 1,549 black-and-white images and 4,650 colour ones. The former mostly duplicate the latter. From 1995 onwards only colour photographs were taken. The photographs are a mix of 35mm and 120 medium-format black-and-white negatives, colour negatives and transparencies. They are numbered sequentially and kept in hanging plastic files (35mm transparencies) and A4 files (all other material), and full details are contained in the site database.

Miscellaneous
The paper record also contains the paper version of the end-of-season reports prepared in the field by the excavators; copies of reports on site conservation; the annual reports prepared for the National Museum of Bahrain; audited annual financial statements; and some miscellaneous papers.

The electronic archive
The main components of the electronic archive are the site database, the site GIS and a collection of digital images.

The Saar database.
During the period of excavation (1990–1999) the site database migrated through several formats before ending up in Access 2000 (mdb). It consists of linked sets of data (tables), with customised queries, views and reports. The main tables are devoted to the finds and to the contexts. From the finds database, it is possible to retrieve a full description of each object, with the relevant context information, and to see if it has been drawn or photographed, but not currently the image itself. The context database has a description of the context. Subsidiary tables hold information on the photographic record, drawing numbers for objects, site supervisors’ plans, architect’s plans, and phase, block and site level designations.
The Saar GIS
The Saar Geographical Information System currently contains the digitised plans of all buildings and installations, together with the location of all finds plotted in situ. The installations and finds are linked to a database derived from the one above and this allows the information to be interrogated graphically. It is possible, for example, to plot the distribution across the site of particular types of installations or finds, in any combination. There are currently no photographs or drawings attached to the GIS. This is because of current time and resource constraints; images may be added at a later date.

Digital images
Over 900 photographs of the buildings and finds have been professionally digitised and are available at different resolutions (maximum 72 mb size). The originals are on CD-ROMs (Kodak Photo CD format). A set will be lodged with the National Museum of Bahrain and ADS. Many of these images have subsequently been manipulated (rotated, scaled or colour corrected, for example). Where this has happened, these images too have been archived electronically. All of the inked pottery and finds drawings have also been digitised and stored electronically in the archive.

Deposition
The archive will be deposited in the National Museum of Bahrain and researchers who wish to consult it should write to:

The Director
The National Museum of Bahrain
Culture and National Heritage
Directorate of Museums
Kingdom of Bahrain
P. O. Box: 2199
Tel: +973 17298777
Fax: +973 17293820
e-mail: musbah@batelco.com.bh

This information is current at the time of publication of this book (2005). In addition, a copy of the electronic archive will be deposited with the UK Archaeological Data Service (www.ads.ahds.ac.uk) where it will be available for on-line consultation. Deposition of material will begin in 2006.
Appendix 3  C14 determinations from Saar

<table>
<thead>
<tr>
<th>Saar Site Level</th>
<th>Sample no.</th>
<th>Sample details</th>
<th>Uncalibrated (BP)</th>
<th>Calibrated probability 95% (BC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAAR 1</td>
<td>BM-2873</td>
<td>1533:06 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>4000±50</td>
<td>2865–2815 or 2695–2680 or 2665–2450 or 2425–2395 or 2370–2370</td>
</tr>
<tr>
<td>SAAR 2</td>
<td>BM-2872</td>
<td>1516:02 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>3740±40</td>
<td>2290–2035</td>
</tr>
<tr>
<td></td>
<td>BM-2870</td>
<td>1512:02 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>3700±80</td>
<td>2455–2445 or 2355–1885</td>
</tr>
<tr>
<td></td>
<td>OxA-5913</td>
<td>1923:01 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>3320±130</td>
<td>1950–1250</td>
</tr>
<tr>
<td></td>
<td>OxA-8275</td>
<td>4130:06 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>3665±30</td>
<td>2140–1940</td>
</tr>
<tr>
<td>SAAR 3</td>
<td>OxA-8276</td>
<td>3041:27 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>3670±50</td>
<td>2200–1890</td>
</tr>
<tr>
<td></td>
<td>OxA-8277</td>
<td>5111:05 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>3595±45</td>
<td>2130–1770</td>
</tr>
<tr>
<td></td>
<td>OxA-8278</td>
<td>5510:103 Charred seeds, <em>Phoenix dactylifera</em></td>
<td>3355±35</td>
<td>1740–1520</td>
</tr>
</tbody>
</table>

M. Stuiver and R.S. Kra eds. 1986 Radiocarbon 28(2B): 805-1030; OxCal v3.0d cub r4 sd:12
Corrections

The following corrections to the published volume have already been made to this electronic version:

pp. 2 & 3, excavated Saar settlement incorrectly identified in text as No. 4 on Fig. 1.3, instead of No. 1.

p. 23, Table 2.2e, incorrect phasing of Block I;

p. 127, Fig. 3.236, caption transposed with Fig. 3.238;

p. 128, Fig. 3.238, caption transposed with Fig. 3.236;

p. 164, Fig. 5.1j, wrong catalogue description;

p. 170 Fig. 5.4b incorrect catalogue number and description;

p. 171 Fig. 5.4b incorrectly scaled;

p. 204, Fig. 5.23f, catalogue details missing;

p. 218, Fig. 5.30g, incorrect object number;

p. 284 Fig. 7.4h and j catalogue details transposed;

p. 285, Fig. 7.4d, drawing distorted;

p. 291, Fig. 7.7l; drawing distorted;

p. 343, Table 11.3, incorrect totals in table.

7 April 2017