RELENTLESSLY PLAIN

Seventh Millennium Ceramics at Tell Sabi Abyad, Syria

Edited by Olivier P. Nieuwenhuyse

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With contributions by

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Front cover: Plain vessels ('Standard Ware') from later seventh-millennium Tell Sabi Abyad. © Tell Sabi Abyad Project.
Back cover: Prehistoric pottery from Tell Sabi Abyad. © Tell Sabi Abyad Project.

S·N·M·A·P

This book is dedicated to all of the many peoples of Syria. Their warm hospitality and support over the years made this project possible. As war has come once more to the ancient lands of Upper Mesopotamia, this book reminds us that nine millennia ago their ancestors invented the first pottery of the Old World, shaping the world to come. This book looks forward to a brighter future: *We'll be back*.

Contents

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The study of the ceramics from Tell Sabi Abyad rests on the sound, detailed stratigraphic analysis made available by Akemi Kaneda, a study which forms part of her PhD project. Students and colleagues at the Faculty of Archaeology of Leiden University, the Faculty of Archaeology at Damascus University, the Freie Universität Berlin, Tsukuba University Tokyo and the Universitat Autònoma de Barcelona have provided welcome feedback. I owe much to the reviewers for their invaluable help in pointing out inconsistencies and mistakes, and for their precious feedback: Dennis Braekmans, Epko Bult, Catherine Breniquet, Stuart Campbell, Martin Godon, Maikel Kuijpers, Hans van der Plicht, Takahiro Odaka, and Walter Cruells.

A study visit to Damascus by van As and Jacobs was made possible by the generous support of the Foundation Friends of Sabi Abyad (FOSA), facilitated by Astrid Rijbroek, the director of the Netherlands Institute for Academic Studies in Damascus. Sadly, the Dutch academic bureaucrats decided against continuing the important work of this institute. Renate van Oosterhout carried out microscopic fabric analysis at the Faculty of Archaeology in Leiden for her MA thesis. The thin-sections were made at the Vrije Universiteit Amsterdam (VU); we wish to thank the director of the Institute for Geo- and Bioarchaeology Prof. Henk Kars, and Wynanda Koot for his support at the Geotechnical laboratory. Dr. Luc Megens allowed us to use the great facilities of the Netherlands Cultural Heritage Agency in Amsterdam.

As PauI Bahn observed (1989, 11–12), members of the supporting staff of any Faculty of Archaeology ‘are the most important people in academic archaeology, as they are usually the sanest individuals in the subject, they do all the hard work, and without them most academics and departments would simply fall apart’. While I am not entirely sure they do *all* the hard work, Bahn’s statement certainly hits the mark. Erik Dullaart and Tjaco Mast occasionally managed to bring my computer back to life and save crucial data. Jaap Hoff, Ilone de Vries, Erik Dullaart and Claudia Regoor contributed to an efficient, enjoyable working atmosphere during my years at Leiden. The Stichting Nederlands Museum voor Anthropologie en Praehistorie (SNMAP) graciously contributed financially.

My family and friends have all suffered at times because of this report. Lotte and Lili certainly made our life much less plain; this book is theirs as much as it is mine. Finally, I dedicate this book to the people of Tell Hammam et-Turkman, the dust-swept little village in the middle of nowhere where our team spent much of its fieldwork. No other dust-swept little village has ever come so close to our hearts.

Chapter 1

The emergence of pottery in Upper Mesopotamia

Olivier Nieuwenhuyse

1.1. Introduction

Over the past three decades or so, archaeological research on Late Neolithic societies in the area known as Upper Mesopotamia has evolved into a vibrant field of scholarly investigation (Nieuwenhuyse *et al.*, eds., 2013). The term '*Upper Mesopotamia*' refers to a rather loosely defined geographic area that includes parts of the Northern Levant, southeastern Turkey, northern Syria, and northern Iraq (Fig. 1.1). While there was tremendous geographic, environmental, and cultural diversity across this huge area, recent research shows that in prehistoric times its inhabitants shared a range of cultural traits that reflect an array of shared or at least mutually comparable cultural practices (Akkermans and Schwartz 2003). The term *Late Neolithic* simply serves to distinguish this period from what came before and after. The Neolithic period as a whole is generally held to be culturally distinct from the subsequent Ubaid or Chalcolithic period, which took off around 5300 cal BC (Carter and Phillip, eds., 2010). The Late Neolithic in Upper Mesopotamia, then, lasted from 7000 to 5300 cal BC, a period of almost two millennia. In Upper Mesopotamia the period is also known as the *Pottery* Neolithic, after the adoption of ceramic containers around 7000 cal BC (Akkermans and Schwartz 2003; Gopher 1995; Nieuwenhuyse and Campbell 2017).

This book aims to make a contribution to this field with a study of the 7th millennium ceramics excavated at Tell Sabi Abyad, a 4-ha prehistoric site in northern Syria (Fig. 1.2). Since 1986, investigations at this site have produced a richly-documented and well-researched data-set for the 7th and early 6th millennia. In the early decades of work, excavation concentrated upon the southeastern slopes of this mound, designated Operation I (Akkermans 1993; Akkermans, ed., 1989, 1996; Akkermans *et al.*, eds., 2014; Akkermans and Verhoeven 1995; Akkermans and Le Mière 1992). This yielded important insights on the emergence of the Halaf culture in the early 6th millennium (Akkermans 1993; Nieuwenhuyse 2007). Since 2001, the focus has shifted to the western parts of the mound, Operations III, IV, and V (Akkermans *et al.* 2006). Much earlier periods have come to light from these areas. While the exposures in Operations IV and V were very limited, Operation III yielded large lateral exposures and a cultural sequence extending back in time to the very start of the 7th millennium. With every campaign it became increasingly clear that Late Neolithic societies in Upper Mesopotamia experienced significant transformations in the 7th millennium. We also began to appreciate the extent to which pottery containers were implicated in these changes.[1]

Everyone who has ever taught a class on ancient Mesopotamian materials and industries has observed the fluctuating enthusiasm of students regarding prehistoric pottery. Students become keen and sharply alert as soon as the Halaf period is introduced, given its fantastic painted styles, intriguing figurative compositions, and its propensity to loom large in theoretical discussions on the nature of style, the constitution of social identity and prehistoric social boundaries. To students of archaeology and established scholars alike, there is something deeply gratifying in working on elaborately-fashioned categories of material culture such as Halaf pottery (Frankel 1979). Yet, as soon as one descends into the 7th millennium, eyes grow dull, frantic notes are no longer scribbled down, questions no longer asked. The class has entered the era of relentlessly plain, remorselessly uninteresting coarse ceramics, which many find to be of significance only to entrenched nerds.

This negative stereotyping is undeserved. Arguably, if ever there was a field of archaeological research for which ceramic studies matter it is precisely the 7th millennium in Upper Mesopotamia. It would be no exaggeration to

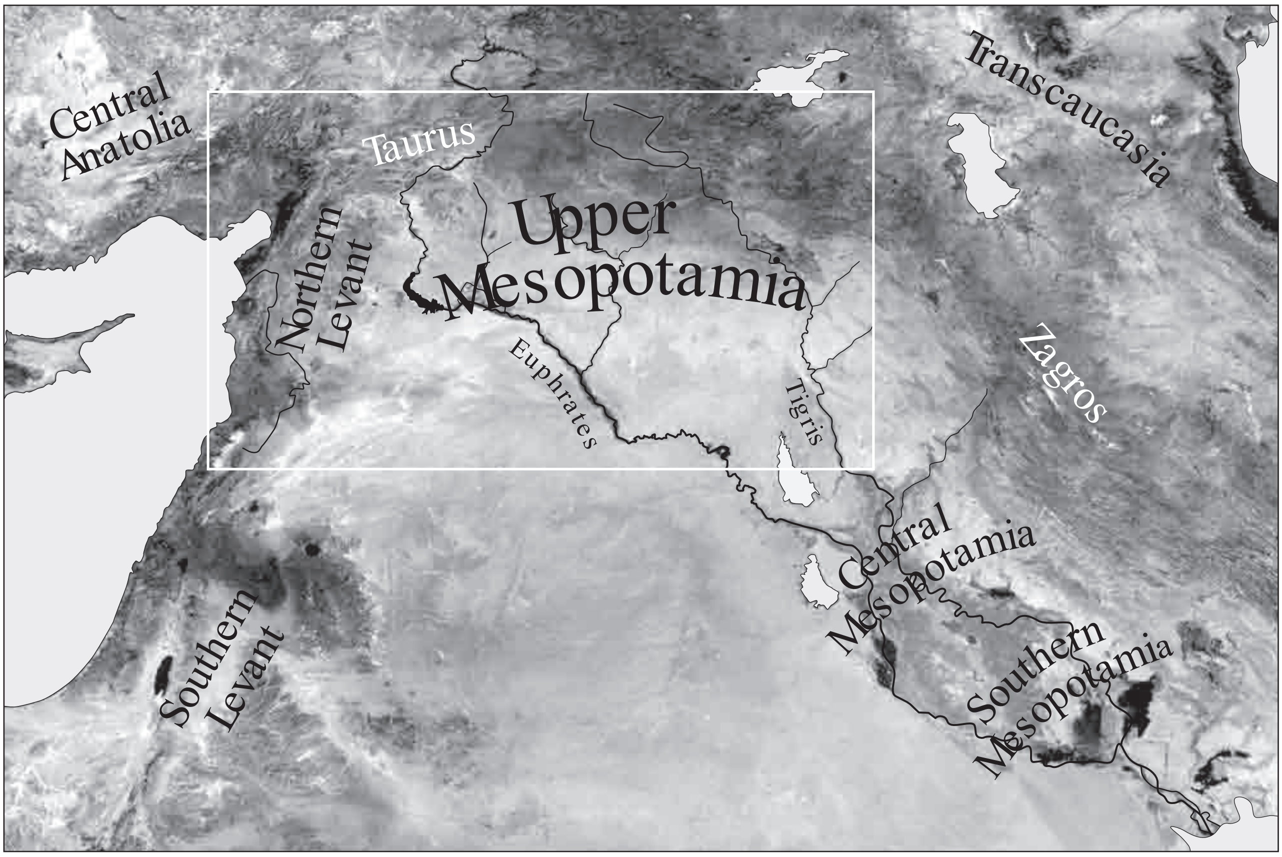


Fig. 1.1 Map of the Middle East showing the location of Upper Mesopotamia and surrounding sub-regions. Frame: area covered by Fig. 1.2.

say that the prehistoric communities in this era laid down crucial foundations on which all later societies would build – with apologies for the worn-out metaphor. With the innovation of portable, durable containers, they not only *invented* pottery quite early on in the Holocene, but over many generations they firmly established this new technology as part of everyday life. In the course of the 7th millennium, pottery was transformed from an esoteric novelty used for specific occasions to a mass product employed for an expanding array of tasks conducted by the whole community. In the course of this trajectory pottery containers themselves transformed dramatically, reflecting profound social and economic changes; *vice versa* the introduction of this new technology contributed to transforming Late Neolithic communities beyond recognition (Pl. 1).

Tell Sabi Abyad provides a unique vantage point from which to study these transformations in detail. In the course of the project a vast quantity of ceramic material has been analysed, documenting over a millennium of ceramic innovation. The carefully documented contexts and the exceptionally well-dated stratigraphic sequences make this an irresistible sample, an archaeologists' Valhalla. The rich material evidence allows the exploration of a wide range of themes. Here we shall outline some themes that guided this book and to which we shall return in the final chapter. These include: the adoption of pottery containers, the subsequent development of ceramics as a mass product, the use of pottery containers for, specifically, storage and cooking, and the role of style.

1.2. The adoption of pottery

Until a decade ago our understanding of the earliest pottery production in Upper Mesopotamia rested upon a mere handful of early Pottery Neolithic sites. Characteristic of these sites was their limited excavation, problematic stratigraphy and poor absolute dating. Sites documenting a clear, unequivocal transition from the Pre-Pottery into the Pottery Neolithic were virtually non-existent. There was always the possibility of a hiatus and there remained lingering doubt that the 'earliest' pottery, 'primitive' as it certainly looked, might not be the earliest pottery made and used in the region. Several early Pottery Neolithic sites had yielded a coarsely-made, plant-tempered plain ware (CMPT Ware). This ceramic horizon was generally accepted as the earliest in the region, with absolute dates estimated to range between ca. 6800 and 6500 cal BC (Akkermans 1988; Le Mière 1979, 1986; Nieuwenhuyse 2000b; Özdoğan 2009; van As *et al.* 2005). This interpretation found firm support in the coarse, 'primitive' character of these containers; it was generally thought to be self-evident that they must have been close to the initial 'experiments' with pottery making.

Investigations over the past decade have radically altered archaeologists' understanding of the initial adoption

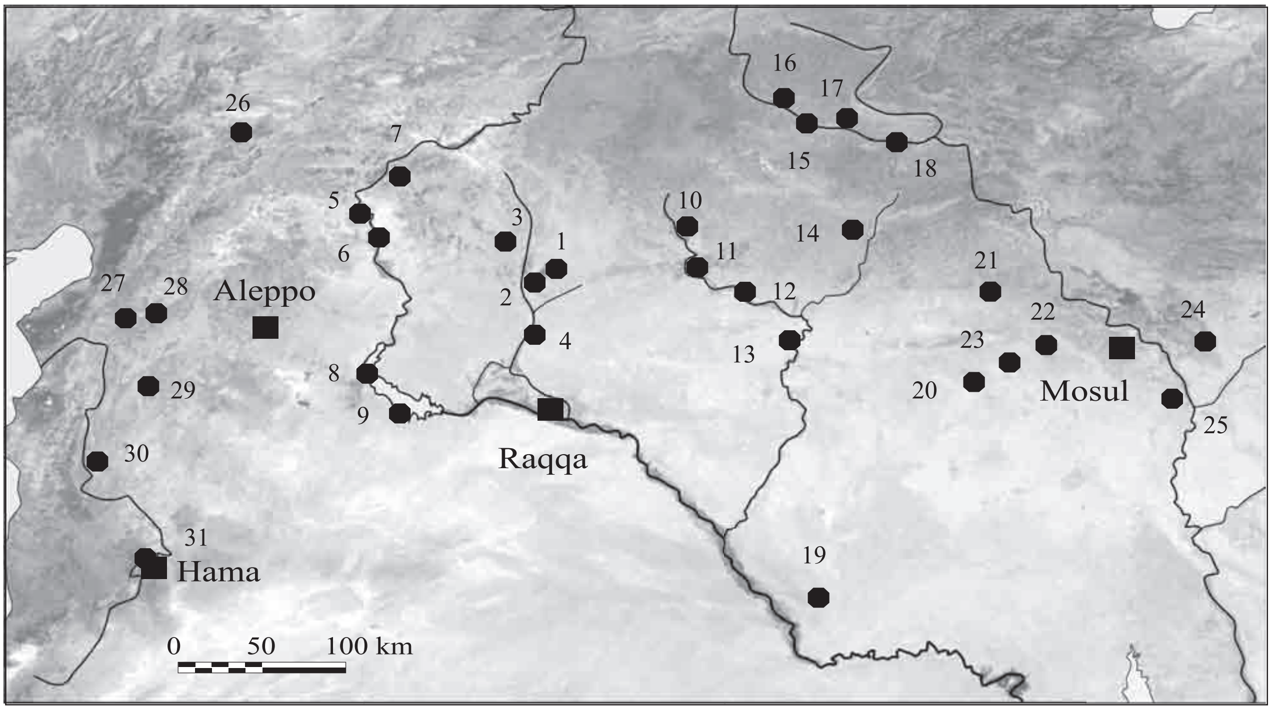


Fig. 1.2 Map of Upper Mesopotamia showing the location of the sites mentioned in this book. 1. Tell Sabi Abyad; 2. Damishliyah; 3. Tell Assouad; 4. Mounbateh; 5. Mezraa Teleilat; 6. Akarcay; 7. Kumar Tepe; 8. Tell Halula; 9. Abu Hureyra; 10. Tell Halaf; 11. Seker al-Aheimar; 12. Feyda; 13. Tell Boueid II; 14. Chagar Bazar; 15. Hakemi Use; 16. Salat Cami Yanı; 17. Sumaki Höyük; 18. Kortik Tepe; 19. Tell Baghouz; 20. Umm Dabaghiyah; 21. Magzalia; 22. Yarim Tepe; 23. Sotto; 24. Tell Arpachiyah; 25. Tell Hassuna; 26. Domuz Tepe; 27. Tell Judaideh; 28. Tell Kurdu; 29. Tell el-Kerkh; 30. Shir; 31. Hama (image O. Nieuwenhuyse).

of pottery, especially as a result of excavating a number of early Pottery Neolithic sites (Fig. 1.2). Key sites in Upper Mesopotamia include Tell Seker al-Aheimar (Nishiaki and Le Mière 2005, 2008, 2017), Tell Halula (Cruells *et al.* 2017; Faura 1996; Faura and Le Mière 1999), Mezraa Teleilat (Karul *et al.* 2002; Özdoğan 2009; Özdoğan *et al.* 2011), Akarçay Tepe (Arimura *et al.* 2000, 2001; Balkan-Atlı 2002, 2004; Cruells *et al.* 2017), Salat Camii Yanı (Miyake 2005, 2007, 2010, 2017), and, in the Northern Levant, Tell el-Kerkh (Miyake 2003; Odaka 2013b, 2017; Tsuneki *et al.* 2007; Tsuneki and Miyake 1996), Tell Nebi Mend (Badreshany 2016; Mathias 2015) and Shir (Bartl *et al.* 2008, 2009; Nieuwenhuyse 2009a, 2017, b). Since 2005 the excavations at Tell Sabi Abyad, too, have exposed occupation layers representing the very earliest stages of pottery use in the region (Akkermans *et al.* 2006; Nieuwenhuyse 2006, 2017a; Nieuwenhuyse *et al.* 2010).

Work at these sites offers a heterogeneous picture of early pottery production and consumption. It now appears that the earliest ceramics in Upper Mesopotamia fall into a fairly well-dated cultural horizon between ca. 7000 and 6700 cal BC (Campbell 2017), several centuries earlier than was previously thought. What is more, in stark contrast to earlier, primitivist views, the earliest pottery was mineral-tempered, carefully crafted, and occasionally decorated (Nieuwenhuyse *et al.* 2010). In this initial stage, ceramic vessels were not yet very common; sherd frequencies across Upper Mesopotamian early Late Neolithic sites are invariably very low. Further, notwithstanding a fair amount of variation in the shape and size of these earliest pottery containers, morphological diversity was in fact minimal; most of them belong to a single broad category, the 'bowl' (Tsuneki 2017). These insights have provoked new questions with regard to how and where pottery was first adopted, the degree to which Neolithic communities embraced or rejected this new technology once it became available, and, of course, the actual *uses* of the new objects.

The first issue touches on the *interconnectedness* of different crafts for making containers. In our own modern society, pottery has turned into the ultimate 'black box' (Latour 1987): something so much taken for granted that it has moved into the realm of the invisible. Only people such as lab technicians, plumbers, or the occasional studio potter are consciously aware of the ubiquity and relevance of this material even today. The role of ceramics was far less self-evident at the start of the 7th millennium in Upper Mesopotamia. The adoption of pottery, on second thought, appears remarkably *late*, given that all the raw materials, helpful conceptual 'stepping stones', even the specialist knowledge of the necessary components of the ceramic *chaîne opératoire* had all been available for many centuries (Le Mière and Picon 1998; Özdoğan 2009; Thissen 2007). Indeed, as the oft-cited burnt buildings of Ganj Dareh in the Zagros (7950–7850 cal BC), and the accidentally-fired clay containers of Mureybet on the Syrian Euphrates (early 10th millennium) clearly show, Upper Mesopotamian communities had been experimenting with making containers of clay for several millennia (Le Mière and Picon 1998; Schmidt 1968, 1974, 1976, 1990).

The idea of tempering a soft, plastic material to make it stronger and to improve cohesion could be copied from preparing bread (Amiran 1965), from making clay figurines (Schmandt-Besserat 1977), or erecting pisé architecture (Budja 2009; Özdoğan 2009; Le Mière and Picon 1998). The presence of containers made of plaster or gypsum at many a-ceramic sites, so-called *vaisselle blanche* or White Ware, is significant (Fig. 1.3). These raw materials were occasionally tempered before being shaped into containers that often resembled those of coarse pottery in form (Nilhamn and Koek 2013). For the production of plaster, moreover, sophisticated pyro-technology is required (Gourdin and Kingery 1975; Kingery *et al.* 1988; Maréchal 1982). People had been making flint and ground stone tools for millennia, implying a knowledge of stone reduction techniques essential for preparing a mineral temper, while the delicate, colourful stone vessels were a category of containers amenable to emulation in fired clay (Adams 1983).

Basketry production in particular has often been considered as a major stepping stone towards pottery production (Frankfort 1924, 12; Childe 1936, 76). As baskets are made of 'natural' materials, they have often been interpreted as 'pristine' types of containers, precursors to the more 'artificial' pottery. The shapes of the earliest pottery vessels have often been compared with those of basketry. Ethnographic comparisons show that reed baskets can be an inviting medium for impregnating with clay (Gheorgiu 2009). This may then accidentally yield 'pottery' when these clay-lined baskets dry out or are accidentally fired. The British potter Dora Lunn (1945, 9) writes, 'One day the basket may have caught fire and so led to the discovery that whereas the basket perished in the flames, the clay lining was made more durable and hardened by the fire into a vessel needing no basket for its support'. Or the Dutch potter Eppens-van Veen (1963, 7), 'After the water evaporated, the clay lining shrunk and came off the basket. So one could remove this clay lining as a roughly-shaped vessel.' Even if, to my knowledge, no accidentally-fired clay-plastered-basket has ever been found anywhere in Upper Mesopotamia, such an 'accidental invention' has often been proposed as a model for the invention of pottery.

However, upon further examination, the relationship between the different Neolithic crafts appears to be less self-evident. As elaborated by Koen Berghuijs (Chapter 10), the notion of organic baskets being the logical, 'natural' stepping stone for the more 'advanced' pottery can be deconstructed as simplistic, and even prejudiced. The excavations at Tell Sabi Abyad offer a welcome opportunity to investigate these inter-craft relationships. Containers made of materials other than pottery are well attested at the site. These include White Ware and stone vessels (Fig. 1.3), but also bitumen-coated basketry and bins of unfired clay (Akkermans *et al.* 2006). Occasionally, pottery sherds preserve imprints of basketry, attesting to a technological cross-over. Focusing specifically on the *ceramics*, we shall shall offer a reconstruction of the operational chain of the earliest pottery containers from Tell Sabi Abyad, to gain insights into the connections between craft technologies embraced by the earliest potters and alternative and pre-existing technologies for making containers.

The second theme concerns *provenance*. Where in Upper Mesopotamia was pottery first invented? Several models have recently been suggested, on a continuum ranging from 'exclusively local' to 'entirely non-local'. The former rests on the idea that the fragile early pottery vessels would have been difficult to transport over large distances without breaking, as well as the observation that pottery apparently emerged virtually simultaneously over large parts of the Upper Mesopotamian region (Nieuwenhuyse 2017a). In this region, the various elements of the necessary operational chain were well in place long before the Pre-Pottery Neolithic. Interacting craft persons across the region began production simultaneously, as soon as the social and economic conditions in Upper Mesopotamia favoured the sustained adoption of pottery. This model would predict an emphasis on *local* products in provenance studies at various early Pottery Neolithic sites.

An opposite view argues that an 'experimental' stage *must* have existed (Le Mière 2017). Marie Le Mière in particular has outlined a long, drawn-out trajectory leading to the first sustained pottery production (Le Mière 1986; Le Mière and Picon 1991, 1998, 2003). Chronologically, the transitional sequences from Pre-Pottery to Pottery Neolithic now available for the Upper Mesopotamian plains no longer leave much space for such an intermediate stage. Consequently, it must be sought elsewhere (Le Mière and Picon 1998, 11). Candidates may include the Zagros (Bernbeck 2017; Le Mière and Picon 1998, 11), or the area northwest of the Turkish Euphrates (Özdoğan 2009, 30). Recently, scholars have even suggested an origin much further away. Taking the recent finds of pottery among Pleistocene Eurasian hunter-gatherers into consideration (Barnett 2009, 559; Jordan and Zvelebil 2009, 71; Jordan *et al.* 2016), might the earliest pottery vessels have reached Upper Mesopotamia via long-distance exchange with hunter-gatherers in Transcaucasia? To elucidate this issue as far as Tell Sabi Abyad is concerned, the compositional signature of its early pottery was investigated using WD-XRF, comparing it with later ceramics from the site, local clay sources from the Balikh Valley, and contemporaneous materials from other sites (Chapter 9).

Why would Upper Mesopotamian communities have adopted pottery at all? The new discoveries have stimulated much debate regarding the various uses and functions of early pottery containers. It has often been assumed that cooking and storage were the primary roles of early ceramics (Moore 1995; Redman 1978), as these practices presumably had the greatest adaptive edge. Indeed, pottery vessels figure prominently in such activities in later stages. However, as Brown (1989) already noted, the reasons for initially adopting pottery may have been different from those that the craft would develop in subsequent stages. Recent research show that reasons for adopting pottery

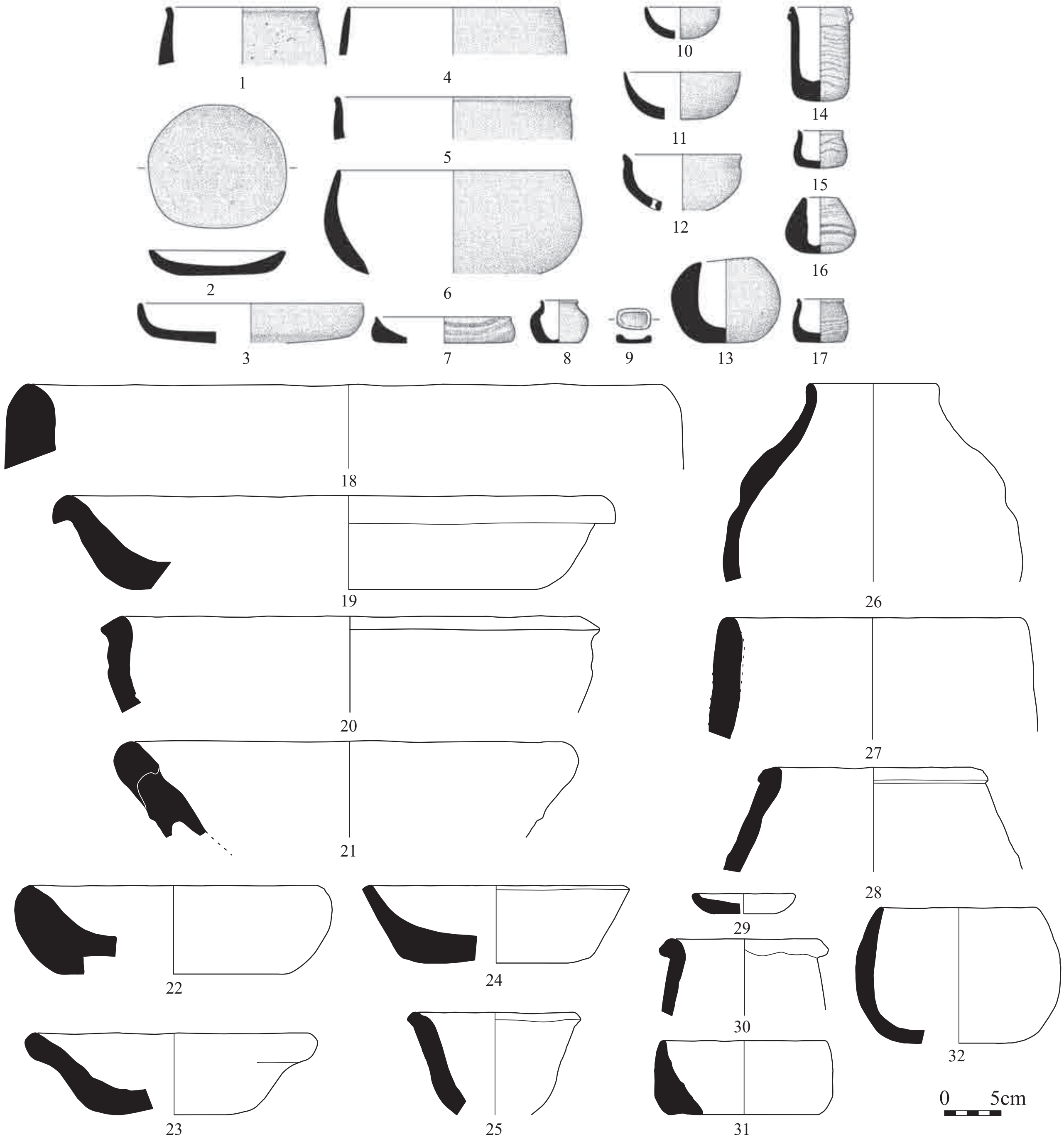


Fig. 1.3 Tell Sabi Abyad, Operation III. Late Neolithic alternatives to pottery containers. Nos. 1–17: stone vessels; nos. 18–32: containers made of gypsum or plasters, so-called White Ware (after Akkermans et al. *2006; Nieuwenhuyse and Nilhamn 2010).*

in its initial stages were more complex than simply for storing and producing food. An association with storage is problematic, as the small size and open shape of the earliest pottery containers make them unlikely facilitators for bulk storage (Tsuneki 2017). Their carefully crafted and occasionally decorated appearance suggests instead that they functioned in less utilitarian realms, such as serving foodstuffs or display (Bernbeck 2017; Nieuwenhuyse *et al.* 2010; Nieuwenhuyse 2017a). As to the association with cooking, the dense mineral temper allowed them to be used as cooking vessels (Le Mière 2017; Odaka 2017). On the other hand, the very low numbers with which they are present in the archaeological record argue against a whole-sale 'culinary revolution'. This report will discuss their potential uses from the perspective of the containers themselves. What activities may have been facilitated by the various shapes and sizes, the presence or absence of appendages, the outward appearance, the provenances, and the technological performance properties of the early pottery vessels?

A final issue touched upon in this book concerns the social *receptivity* of Late Neolithic societies with regard to the new craft. It has been a long-standing conundrum in archaeological thinking that having pottery was essentially beneficial in an adaptive sense. This long history of thought goes back to the armchair speculations of 19th century social scientists such as Lewis Henry Morgan (1877), for whom the invention of pottery marked the progression from the Lower Barbarism to the Middle Barbarism stage. Archaeologists and anthropologists have indeed demonstrated a wide range of economic benefits derived from having pottery, especially from its presumed primary functions of cooking and storage (see below). In processual modelling, the introduction of pottery therefore ranks as a cultural watershed initiating a series of crucial feed-backs towards population increase and rising social complexity (Redman 1978). One might expect, therefore, that once pottery was invented Late Neolithic communities would immediately embrace this welcome novelty. In the field this should be reflected by rapidly increasing amounts of pottery directly after its first appearance.

However, current research suggests that when pottery was finally adopted in Upper Mesopotamia, it did not make an immediate, complete break-through. In the first stages of pottery production this novelty may either have been resisted, or its uses were limited to specific occasions (Bernbeck 2017; Nieuwenhuyse *et al.* 2010; Nieuwenhuyse 2017a). A famous case is Jarmo in the western Zagros (Braidwood 1983). At Jarmo the use of early pottery was spatially limited, suggesting that other parts of the community rejected pottery containers (Adams 1983; Bernbeck 2017). Across Upper Mesopotamia pottery remained quite rare in the earliest stages of the Pottery Neolithic; the number of pottery vessels in daily use may have been very limited for many generations (Nieuwenhuyse *et al.* 2010). These low amounts may be taken as indicators that their use was confined to specific social groups, perhaps to special, non-everyday activities, or to particular types of food and drink.

A crucial analytical issue, then, concerns the question: How much pottery? Excavations across Upper Mesopotamia yield very low sherd counts from early ceramic contexts. At the same time, many excavations of early Pottery Neolithic contexts are limited in their spatial extent. It is important to recognise the degree to which the recovery rate of early ceramics depends on the *volume* of archaeological exposures. Wide excavations may give misleadingly high sherd frequencies; *vice versa* narrow soundings may miss entirely the low amounts of fired sherds deposited there. Shallow excavations may even attribute contexts erroneously to the a-ceramic Neolithic. Even if they are recorded, limited numbers of sherds of a type previously unknown can be easily misinterpreted as ‘out of context’, as has indeed happened at Tell Sabi Abyad (Chapter 4). In short, methods of excavating and find processing may contribute to a fuzzy distinction between the Pre-Pottery and the Pottery Neolithic (Özdoğan 2009, 28–29). In this case, density measurements become a valuable tool. Densities are a statistic that compensate for variability in excavated volumes (Bernbeck and Pollock 2003; Pollock 2013). In this study we shall compute densities to explore the quantities of pots in circulation, and to gain insight into how pottery vessels increasingly became part of everyday life.

1.3. The development of a mass product

At first glance, the development of pottery following the initial stages looks remarkably uneventful, even monotonous. Adjectives such as ‘plain’ and ‘coarse’ are no understatements for the relentlessly plain material that presents itself in massive quantities at sites dated to the 7th millennium. At Tell Sabi Abyad the pottery team adopted the term ‘Coarsely-Made Plant-Tempered’ Ware (Nieuwenhuyse 2000b, 2006). Lacking well-articulated forms or intricate painted styles, what should one *do* with such material? Yet, counter-intuitively at first sight, this long 7th millennium represents a crucial period in the history of pottery making in the ancient Near East. In the half millennium or so following the initial adoption of pottery, ceramic containers for the first time became truly central to daily life. In the course of the 7th millennium, pottery became a virtual mass product. Not only did pottery become much more common quantitatively but transformations in the technology, organisation of production, morphology, and pottery usage laid the foundation for the diverse assemblages of the later 7th and early 6th millennium. This process deserves to be studied in detail.

The establishment of pottery as a major craft is reflected primarily in the increasing numbers of pottery vessels found at archaeological sites. Across Upper Mesopotamia archaeologists have observed the increase of pottery vessels in 7th millennium contexts: at Mezraa Teleilat (phase II; Karul *et al.* 2002; Özdoğan 2009), Akarçay Tepe (phase II; Arimura *et al.* 2000), Salat Yani Camı (phase 2; Miyake 2005), Tell Halula (Ceramic Phase 2; Cruells *et al.* 2017; Faura and Molist 2017), and Seker al-Aheimar (Proto-Hassuna phase; Nishiaki and Le Mière 2005, 2008). Further east in the Central Zagros, the excavators of Jarmo had already noticed that the use of pottery expanded rapidly in the uppermost levels (Adams 1983, 213). In the Northern Levant, too, the later parts of the 7th millennium are characterised by increasing amounts of pottery (Nieuwenhuyse 2009a). At Tell Sabi Abyad itself, profound differences separate the extreme paucity of pottery vessels when the craft was first adopted, from the situation documented at the end of the 7th millennium. Here pottery sherds have come to constitute the largest find category (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007).

The increasing sherd quantities raise a methodological issue: how to deal with the stupefying quantities of pottery in the field? Ceramic specialists involved with an Initial Pottery Neolithic excavation may treat the rare pottery fragments almost as if they came from an Epi-Palaeolithic site. All fragments are carefully collected and studied one by one in detail. This strategy becomes utterly impossible for later 7th or early 6th millennium contexts. Here excavations typically yield a tsunami of sherds, which choke the often tenuous storage capacities and limited resources of the research project. Strategies for pottery processing should be adapted accordingly, especially in the realm of sampling. At Tell Sabi Abyad we opted for a differentiated approach that allowed for both rapid quantification of the bulk and detailed description of a representative diagnostic sample (Chapter 3).

The increase in pottery numbers also raises several interpretative issues. One question concerns the exact *timing* of this process: at which point in time can we demonstrate major increases in pottery usage, and what was the rate of change? Did the advent of pottery follow a gradual, linear progression, or was it characterised by episodes of abrupt increase? Did people suddenly begin to use pottery containers in greater numbers? Or was this a development that only archaeologists may perceive retrospectively? Would Late Neolithic communities have been aware that each generation used more vessels than before? The key question, of course, is: What causal factors might explain this transformation? We would want to know if quantitative increases in the availability of pottery containers coincide with changes in the composition of the ceramic assemblage, or if they synchronise with broader changes in village lay out, material culture, or the exploitation of specific plants and animals.

At Tell Sabi Abyad the high-resolution stratigraphy of the long cultural sequence (Chapter 2) allows us to move beyond the relatively coarse-grained culture-historical framework currently available for the region. At many 7th millennium sites the sequences remain poorly dated and rely on relative chronologies (Bernbeck and Nieuwenhuyse 2013). Lacking fine-tuned, chronologically-differentiated stratigraphies, the long stage in which we should seek the emergence of pottery as a mass product is often compressed to just a single chronological unit. While this may be sufficient to discuss differences between ceramic assemblages 'before' and 'after' at a broad level, it does not allow a close reading of ceramic change. Pottery studies so far have usefully provided *qualitative* impressions of increasing amounts of pottery vessels in daily use, simply observing that progressively there was 'more' of it than before. To arrive at *quantified* estimations in this report we shall employ both frequencies and density measures to identify the amounts of pottery in use through time.

1.4. Pottery for storage

There has always been a strong tradition of thought that views the two primary reasons for adopting ceramics in the Near East to be cooking and storage. The presumed importance of storage as a catalyst for early pottery goes back to the ideas of social evolutionists such as Tylor (1871) and Morgan (1877), who both already made the linkage between pottery, sedentarism and farming economies. Scholars assumed that pottery is simply superior to other types of containers for storage. Containers made of fired clay have the technological advantage. While many other materials – wood, leather, unfired clay, basketry – can function as very useful containers too, most of these are either small, limited in shape, permeable to liquids, and easily targeted by vermin, rodents or people. In contrast, clay can be moulded into almost any shape and size, and, when fired, provides durable, impermeable containers suitable for packaging and transporting agricultural produce, water, and other substances (Arnold 1985, 138–141). Pottery is cheaper to produce and pots are more easily replaced than many other types of storage containers (Arnold 1985, 141; Redman 1978, 179).

The introduction of pottery has therefore often been seen as a crucial factor contributing to the success of early farming villages. The introduction of well-fired pottery storage vessels in particular made farming more attractive, facilitating a gradual expansion of the agricultural way of life (Redman 1978, 179). The durability and permanence of ceramic storage capacity stimulated populations to become more sedentary (Arnold 1985, 141). A heavier dependence on storage allowed prehistoric communities to preserve surpluses that otherwise would have to be consumed immediately (Arnold 1985, 141). Using new, ceramic opportunities for storage, this surplus could either serve as resources for the lean parts of the year or it could be exchanged with other communities in systems of delayed storage.

This emphasis on the importance of storage in the Neolithic has led many to assume that the earliest pottery containers in the Near East *must* have been used for storage. Pottery has come to represent a key component of the Neolithic 'technocomplex' (Rice 1987, 9–10, 1999), a concept referring to the assemblage of tools and containers used for the preparation and storage of food. In the prehistory of the ancient Near East, of course, the discovery of Pre-Pottery Neolithic cultures broke this neat connection between sedentarism, agriculture, and pottery production. Pre-Pottery Neolithic communities already knew very efficient storage technologies (Bartl 2004). But the idea that the unrivalled potential of ceramic containers for efficient storage was a determining factor in their initial adoption has persisted. Subsequently, the main role of the coarse wares dominating early ceramic assemblages was thought to be the storage of grains and pulses (Moore 1995, 47–48). Reviewing the information available at the time, Moore (1995) proposed that coarse pottery storage containers gradually replaced White Ware in the Pottery Neolithic.

For a long time, this view found support in the limited information available on ceramic assemblages prior to the Halaf period. Until quite recently the earliest ceramics known from Upper Mesopotamia were those of the Proto-Hassuna culture (Bader 1975, 1993a, 1993b, 1993c; Bader and Le Mière 2013; Merpert *et al.* 1978,). The ceramic assemblage recovered from the earliest levels of Tell

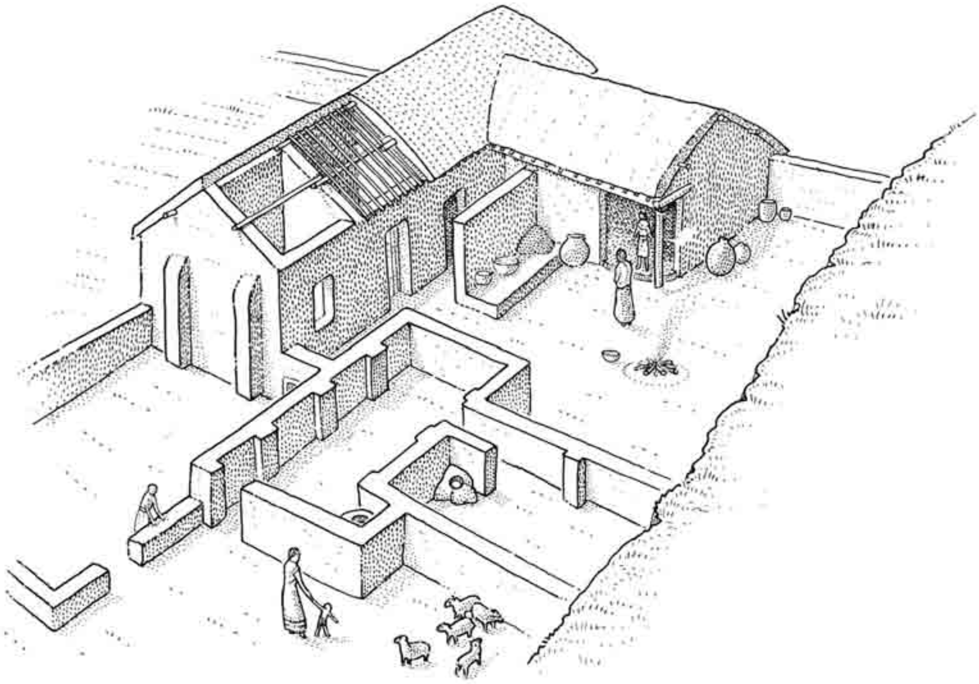


Fig. 1.4 Reconstruction of an Upper Mesopotamian later 7th-millennium 'advanced' early farming village showing several pottery storage jars in various contexts (Tell Hassuna, level 4, after Lloyd and Safar 1945, fig. 36, adapted by Redman 1978: 191).

Hassuna (Lloyd and Safar 1945), then the oldest known pottery from Iraq, consisted mostly of large, coarse, straw-tempered storage vessels (Flannery 2002; Lloyd and Safar 1945; Redman 1978, 190). A well-developed ceramic storage technology was therefore seen as an essential part of the tool kit of the earliest inhabitants of Upper Mesopotamia. Right from the start, storage jars were an essential component of the 'advanced farming village' economy (Redman 1978). In northern Syria, too, storage vessels ('vessels with necks') were seen as a key component of the culture-historical definition of the earliest ceramic assemblage known, that of the Pre-Halaf period (Kozlowski and Aurenche 2005; Le Mière and Nieuwenhuyse 1996).

Archaeological work in the southern Levant, interestingly, has tended to corroborate this view. In the southern Levant, as we now know, pottery appeared relatively late in comparison with Upper Mesopotamia (Gopher 1995; Gopher and Gophna 1993). When it was finally adopted in the second half of the 7th millennium, the ceramic assemblage was already quite well developed and included a diverse series of jars, jugs, pots, and other characteristic pottery storage containers (al-Daire 2011; Garfinkel 1999; Homès-Fredericq and Franken 1986, 51). The strong southern-Levantine perspective adopted in some overviews of the Neolithic in the Near East (e.g. Simmons 2007), may have obscured the vast differences between the southern Levant and Upper Mesopotamia in the trajectories of early ceramics.

Thus, in his great handbook on Mesopotamian prehistory, Charles Redman (1978, 191) offers a valuable artistic reconstruction of an archetypal successfully advanced farming village in Upper Mesopotamia (Fig. 1.4). This image faithfully portrays the excavated remains of Late Neolithic Tell Hassuna as it may have looked like in the past. Scattered amongst loam buildings and open courtyards there are fire places, ovens, animals, people tending unruly kids, and no less than nine pottery vessels, all plain and coarse. Significantly, over half of them are large closed shapes, presumably used for storage.

There is no denying that at some point in the Upper Mesopotamian Late Neolithic we *do* find the superior pottery storage containers firmly attested in the archaeological record. One question guiding this book, however, is: *when* did this begin? And *how* did pottery vessels gain this role? For if the discovery of early ceramic assemblages has made one thing clear, the earliest pottery containers in Upper Mesopotamia were *not* used for significant storage. In the initial stages of the Pottery Neolithic communities seem to have continued with time-honoured, pre-ceramic traditions for storing goods, relying on pits, silos, and confined architectural spaces (Bartl 2004). The practice of storing stuff in pottery containers in bulk and over prolonged periods of time must have emerged sometime *after* the initial adoption of pottery.

One useful proxy for monitoring the emergence of pots for storage has been to follow the development of the one artefact that was the most practical for efficient long-term bulk storage, the pottery jar. Pottery jars were durable, relatively impermeable, voluminous containers with the advantage of a sophisticated add-on that facilitated its efficient closure: a *neck*. Two teams have made valuable reconstructions of how storage jars came to be present in the Near Eastern Neolithic: the Chicago

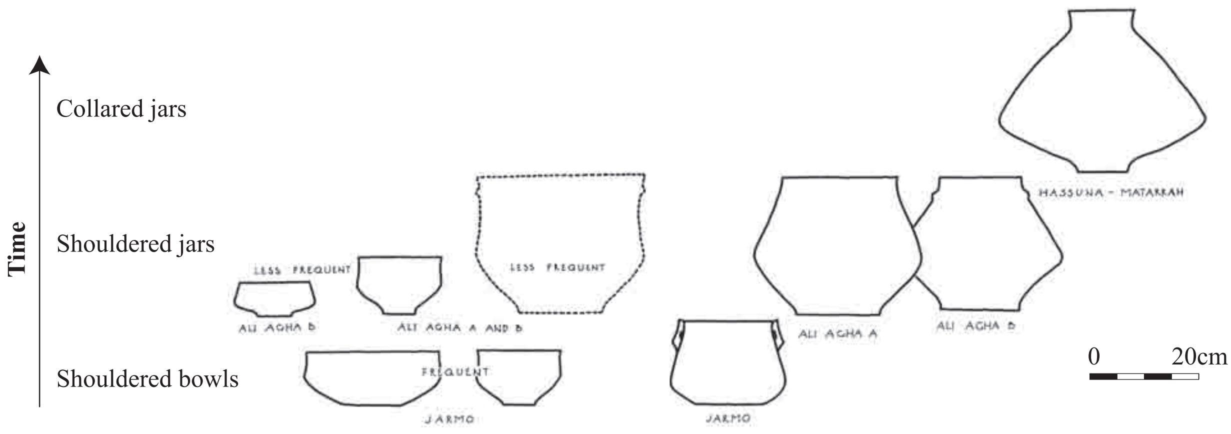


Fig. 1.5 The development of pottery jars in Iraqi Kurdistan (after Caldwell 1983, 664, fig. 232).

team led by Braidwood working in the western Zagros, and the Russian team working in the Sinjar region of northern Iraq.

Exploring the first appearance of settled village-farming communities in the Near East, the Oriental Institute of Chicago excavated a range of prehistoric sites in Iraqi Kurdistan at a time when virtually nothing was known of the Late Neolithic of the region (Braidwood and Howe, eds., 1960). In the final publication (Braidwood *et al.* 1983), Joseph Caldwell (1983) presented the ceramic material excavated at Gird Ali Agha and al-Khan. The excavations at these two sites were restricted and the assemblages recovered from them were not very large. Nonetheless, Caldwell was able to place these assemblages in a developmental scheme together with the earlier assemblage from Jarmo and the later assemblages from Tell Hassuna and Matarrah (Fig. 1.5). Dating them remained very problematic; Caldwell had no radiocarbon dates, and all he could offer was a well-argued relative chronology.

Remarkably, in spite of these obstructions Caldwell was convincingly able to outline the gradual emancipation of the pottery jar as a distinct vessel type. In the earliest phases, exemplified by the coarse pottery from the upper levels of Jarmo, jars did not yet exist. However, some of the open shapes, the so-called 'shouldered bowls', already had a somewhat closed, S-shaped contour. In the next phase, represented by the lower levels of Ali Agha, these shapes persisted, but some of them became taller, gradually developing into 'shouldered jars'.[2] In the later levels of Ali Agha, at al-Khan, in the basal levels of Tell Hassuna, and at Matarrah this shape developed further into a closed shape with a distinct, well-articulated neck, the 'collared jar' (Fig 1.5). The advanced farming village at Tell Hassuna depicted by Redman (Fig 1.4) shows several of such 'collared jars' in full swing. Not only was Caldwell able to outline an important development in vessel shape, he also keenly observed that through time vessels overall became larger, and that the most significant increase in size was within the category of collared storage vessels (Caldwell 1983, 652, 658).

The Russian mission in the Sinjar region of northern Iraq excavated at several Neolithic sites in the 1960s and 1970s (Bader 1993a, 1993b, 1993c; Merpert and Munchaev 1993a, 1993b; Merpert *et al.* 1976, 1977, 1978). These excavations yielded what at the time appeared to be the earliest stage of the Pottery Neolithic in the region, which became known as the Proto-Hassuna period (Bader 1975; Bader and Le Mière 2013). Intriguingly, the Proto-Hassuna ceramic assemblage was found to be already remarkably advanced, including a series of different wares, decorative styles, and vessel types. Large jars of the kind shown in Redman's reconstruction (Fig. 1.4) formed a distinct element of the Proto-Hassuna repertoire. But was this diverse assemblage really the earliest to be found in northern Iraq? Recent work at Tell Seker al-Aheimar in northeastern Syria has documented an even earlier stage, intermediate between the Pre-Pottery Neolithic and the Proto-Hassuna. This new stage has been dubbed the 'Pre-Proto-Hassuna' phase (Nishiaki and Le Mière 2005; Nishiaki 2007). Placing the various site sequences in a developmental scheme, Bader and Le Mière (2013) showed that pottery jars were a relatively late development. Tall, closed vessels carrying necks appeared only at the end of the Proto-Hassuna phase (Fig. 1.6).

These case studies offer valuable models for exploring shifts in vessel typology in the later Neolithic. They also leave a range of issues to be further explored. First, the absolute dates of the various stages remain problematic: when *exactly* did jars first appear? Also, these models capture important developments in massive jumps, relying on comparative culture-historical frameworks, which themselves are composed of rather long, undifferentiated chronological units. This may create the impression of abrupt ceramic change: suddenly jars appeared. Further,

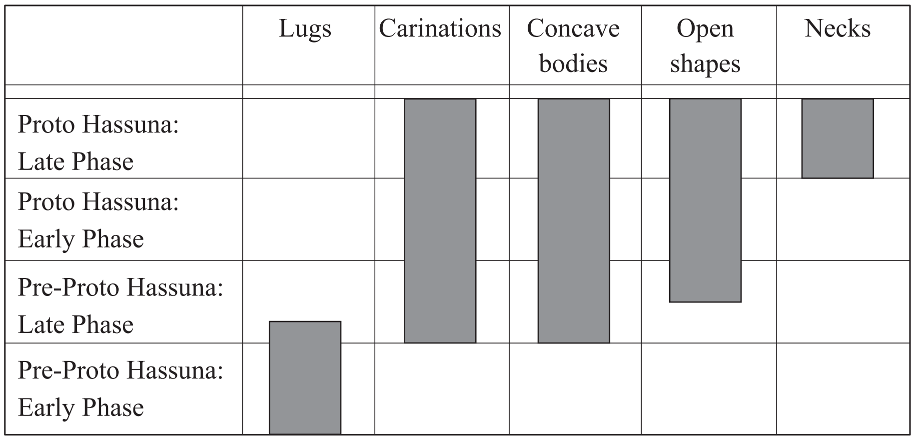


Fig. 1.6 The development of various morphological traits in the Pre-Proto-Hassuna to Proto-Hassuna ceramic assemblages. The presence of a neck points to the existence of pottery jars (after Bader and Le Mière 2013, 519, table 46.2).

importantly, it is emphasised here that necks were not the *only* way to enhance the storage potential of a ceramic vessel. Late Neolithic communities would have had additional tricks to help them store things inside pots efficiently. These included alternatives to the neck, such as appliqué bands to facilitate closure, as I shall argue in this report. There were various ways of making the vessel wall less permeable, for instance by burnishing or plastering the surface. Such strategies, well attested in the 7th millennium, should be drawn into the discussion of ceramic storage practices.

Finally, pointing out progressive innovation in pottery form is by itself insufficient to explain how pottery vessels became key to Late Neolithic storage practices. It has become accepted somewhat too easily that Late Neolithic communities would just start making large, voluminous storage containers as soon as the need arose. From a ceramic-technological perspective, however, this innovation was far from self-evident. It is a long way indeed from the earliest small-sized bowls at the start of the Pottery Neolithic to the huge jars from the Proto-Hassuna and Pre-Halaf stages. Several requirements had to be met before potters were able to make such containers successfully. This already began with preparing the clay with the right kinds of temper. The mineral tempers that characterised the earliest pottery were wholly unsuitable, as these fabrics did not allow for the production of tall, heavy vessels. As a major alternative, potters across Upper Mesopotamia adopted organic tempers. Even so, they were confronted with a latitude of technological choice: chopped straw, dung, or even grass (Le Mière and Picon 1998; Matson 1983). Different tempering strategies affected the degrees of cohesion between individual coils or slabs during the shaping as well as the risk of having cracks when the vessel was put aside to dry.

These interlocking technological requirements became especially salient when the potters turned to making *large* storage vessels. The larger the vessel, the *heavier* it becomes. From a Late Neolithic potter's perspective, the major difference between a shallow hand-held bowl and a one-metre-tall jar would have been the mass of clay that went into the object. Larger vessels would have become so heavy that pre-emptive counter-measures were required in order to prevent sagging during the shaping. Simply increasing the thickness of the lower parts as a support for the weighty upper parts of the vessel would not help. This not only added, literally, to the problem, but also increased the risk of cracking during drying. In short, the development of large, heavy storage containers made of pottery required a whole suite of adjustments in the organisation of pottery production and the accumulation of specialist knowledge (Roux and Corbetta 1989).

Vere Gordon Childe himself was keenly aware of this when he wrote about the contribution of ceramics to the Neolithic 'revolution'. As he observed in his *Man Makes Himself* (Childe 1936, 78–79):

> The shaping of the pot itself is not as easy as it sounds. … If anything larger is desired, or a vessel with a narrow neck like a bottle or jug, such elementary processes no longer suffice: the vessel must be built up. .. It is a slow process. The rings must be fairly wet and plastic when they are put on. But as soon as one ring is in place, you must pause and let it dry and harden – but not too much – before adding the next story. The mere construction of a large pot may take several days.

So how did this play out at Tell Sabi Abyad?

1.5. Pots for cooking

Cooking food with pottery is often implied in the concept of a Neolithic 'package'. Both in Europe and the Near East this concept points to a more or less fixed constellation of cultural traits and practices that revolutionised human life as it spread across the continent (Childe 1936; Foster-McCarter 2007, 116–119; Hodder 1990; Rice 1987, 1999). The preparation of food and drink is intimately tied to primal aspects of human existence. Involving essential physical nourishment as well as the creation of a sociable home base for the close family group, commensality ties together two complementary aspects of human life, the social person and the biological organism (Jones 2007, 10; Wrangham 2009). Perhaps even more so than storage, the adoption of cultural practices involving pot-boiled food has therefore often been considered to be a prime reason for the spread of pottery (Hoopes and Barnett 1995, 3; Moore 1995, 47; Rice 1999).

Archaeologists and anthropologists have demonstrated an impressive array of social, economic and demographic advantages that accrue to those societies who practised pot-boiled food. As listed in detail by Arnold (1985) and others, cooking was instrumental in detoxifying otherwise inedible plant foods, making them palatable and opening up new food resources (Foster-McCarter 2007, 116–119). Cooking prolonged the time that foods could be stored, and it was an essential prerequisite for the processing of certain types of food such as dairy products. There were important social benefits, too. Shifting to cooking rather than other types of food preparation is more time and energy-efficient. It requires less constant attention from the cook, leaving the individual more time for other activities such as socialising or child care (Atalay and Hastorf 2005, 119). Over the long term there were clear demographic benefits as well. Heating food and drink prior to consumption increased levels of health, by significantly lowering the risk of diseases. It offered new types of softened food, especially valuable for the young and the very old. This gave mothers the option to wean their children earlier, increasing their fertility rates. Cooking ushered in a reduced mortality rate and supported slower population growth (Arnold 1985).

In Upper Mesopotamia studies of dental attrition show that Late Neolithic groups benefitted from the introduction of cooked food. At Abu Hureyra on the Syrian Euphrates, prior to the adoption of ceramics (period 2a), the teeth of the site's inhabitants were severely worn down by the regular consumption of grains prepared as dry, gritty muesli or bread (Molleson and Jones 1991; Molleson 2000; Molleson *et al.* 1993). Prolonged chewing on dried, dusty gazelle meat only contributed to the detrimental effect. Cooking pots came into use at the site by period 2b. Beginning in this period and continuing into period 2c, food preparation was modified in ways that reduced dental wear significantly (Molleson *et al.* 1993, 465).

These observations would lead to the expectation that from the very moment Upper Mesopotamian communities hit upon the idea of cooking with pots they would have embraced this new technology wholeheartedly. A rapid shift to cooked food would have allowed them to profit maximally from such benefits. Interestingly, the archaeological record suggests a complex, more challenging sequence of events. At Tell Sabi Abyad, the earliest pottery containers found at the site (7000–6700 cal BC) were indeed suitable for being used over a fire; traces of soot show that people did in fact use them that way (Le Mière 2017; Nieuwenhuyse *et al.* 2010). However, these receptacles remained small and had limited capacities, and they were present in very small quantities. This was not a whole-sale, community-wide culinary 'revolution'. What is more, following this initial stage, the early cooking-facilitating pottery was abandoned totally. For several subsequent centuries people shifted to coarsely made plant-tempered wares, the performance properties of which made it rather unsuitable for sustained cooking. If some people had been cooking some things for specific occasions in the initial stages of the Pottery Neolithic, they apparently stopped doing so soon afterwards.

A similar pattern is emerging at sites across Upper Mesopotamia. At Tell Halula on the Syrian Euphrates, for instance, the earliest levels in which pottery appears are characterised by a high proportion of calcite-tempered pottery well suited for cooking. This proportion drops dramatically from over 40% of the ceramic assemblage to a mere 2% in the later levels (Faura 1996; Le Mière and Picon 1991, 1998, 18). Also, at Tell Seker al-Aheimar, Mezraa Teleilat, Akarçay Tepe, and Salat Yanı Camii, the earlier mineral-tempered wares gave way to coarsely-made plant-tempered wares that were rather poorly qualified for cooking over a fire (Bader and Le Mière 2013; Balkan-Atlıı 2004; Miyake 2010; Özdoğan 2009). Did Upper Mesopotamian communities move away from boiled food after they had their first taste of it?

We do know that several new types of mineral-tempered, burnished wares existed in the final stages of the 7th millennium (Fig. 1.7). At Tell Sabi Abyad, the later 7th millennium levels at Operation III, IV, and V yielded so-called Fine Mineral Tempered Ware and Grey-Black Ware, both characterised by a mineral temper, burnished surfaces, and lugs (Akkermans *et al.* 2006). In the Pre-Halaf and Transitional Period levels we find so-called Dark-Faced Burnished Ware, a ceramic category unsurpassed as a cooking ware (Le Mière and Picon 1998). In the subsequent Early Halaf levels the ceramic assemblage includes so-called Mineral Coarse Ware, which was densely tempered with crushed and carefully size-selected calcite (Le Mière and Nieuwenhuyse 1996). The presence of these wares suggests a shift in culinary practices towards food cooked with pottery containers at some point in the later 7th millennium. What we would like to know is precisely *when* this happened, and how this important cultural transformation came about.

In the chapters that follow we shall chart the various properties of the ceramic assemblages from the 7th millennium levels at Tell Sabi Abyad in order to assess the availability of pottery containers for cooking. To qualify as potential 'cooking ware', a specific ceramic category should be distinct, and it should have a mineral temper, preferably of a type known for its good thermal-expansion properties (Bronitsky and Hamer 1986; Le Mière and Picon 1991, 1998, 2003). For some of the ceramic wares identified at Tell Sabi Abyad we conducted fabric analyses to clarify the nature of the mineral inclusions (Chapter 5). They were likely to have been fired at low temperatures, as this resulted in a loose body texture better able to absorb tensile stresses (Le Mière and Picon 1991, 67). Further, we would expect an avoidance of angular points in the vessel wall, burnished surfaces to limit energy-loss

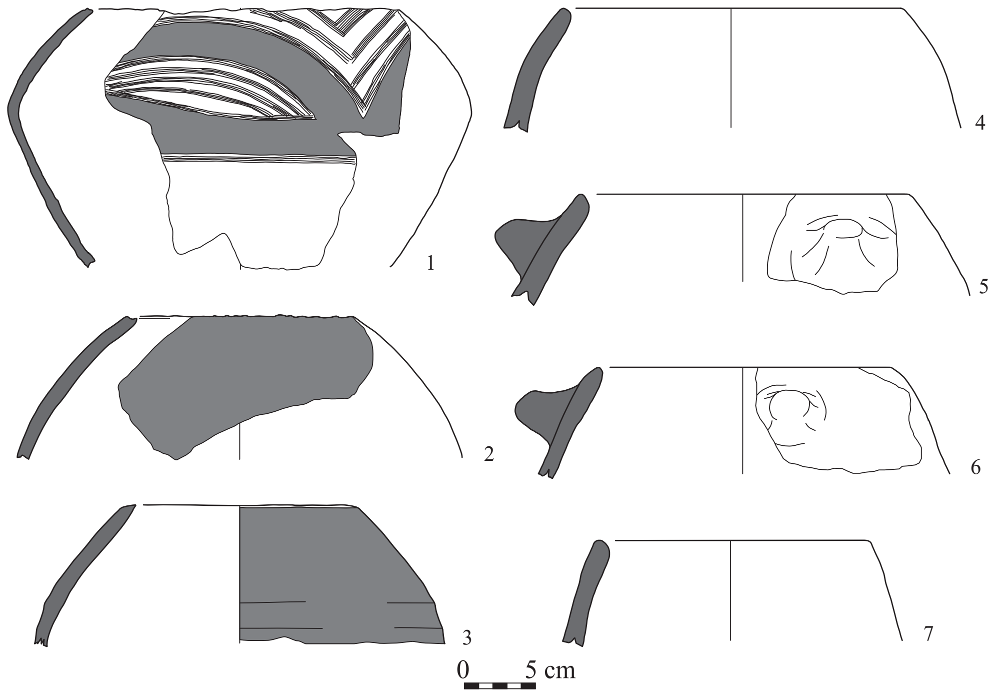


Fig. 1.7 Later 7th millennium and early 6th millennium cooking wares from Tell Sabi Abyad. Nos. 1–3: Dark-Faced Burnished Ware (Operation I, Pre-Halaf and Transitional periods); nos. 4–7: Mineral Coarse Ware (Operation I, Early Halaf period) (after Nieuwenhuyse 2007).

by water absorption and evaporation, and lugs for easy handling. While these traits reflect performance potential, and hence give information on the inherent suitability of pottery vessels for cooking, they do not unequivocally tell us whether or not the prehistoric inhabitants of the site *used* this potential. Residue trace analyses have become a routinised means to elucidate the actual uses of pottery containers, as well as to gain insight in the prehistoric diet and types of food and drink available to prehistoric communities (Copley *et al.* 2006; Evershed *et al.* 2008; Gregg 2010; Gregg *et al.* 2009; Pitter *et al.* 2013; Thissen *et al.* 2010; Türkekul-Bıyık 2009; Türkekul-Bıyık and Özbal 2008). Our team was fortunate to participate in a study initiated by Andrew Sherrat and Richard Evershed comprising the analysis of residue traces from pot sherds from Tell Sabi Abyad (Evershed *et al.* 2008; Nieuwenhuyse *et al.* 2015). Here we present the full results of this study.

1.6. The role of style

One particularly strong focus of research over the past two decades has been the emergence of the Halaf pottery style and its relationships to earlier pottery styles in the later 7th and early 6th millennium (Akkermans 1993; Bernbeck 1994; Campbell 1992; Cruells and Nieuwenhuyse 2005; Mottramm 2013; Nieuwenhuyse 2007, 2013a). Already Peter Akkermans (1993) and Stuart Campbell (1992) had observed that in northern Syria the Halaf pottery style traced its roots to local ceramic traditions bearing strong affiliations with what is known as Hassuna and Samarra pottery from Central and northern Iraq. These researchers showed that between ca. 6100 and ca. 5900 cal BC the Halaf pottery style gradually emerged from these earlier painted pottery traditions. This occurred during a short-lived 'Transitional' stage (Le Mière and Nieuwenhuyse 1996), alternatively dubbed the Proto-Halaf phase (Cruells and Nieuwenhuyse 2005). The Transitional/Proto-Halaf stage was characterised by the introduction and subsequently rapid rise of painted Fine Ware pottery (Nieuwenhuyse 2007).

Subsequent work at Tell Sabi Abyad went even further. The analysis of Pre-Halaf ceramic assemblages from Operation I (Nieuwenhuyse 2007), showed that in terms of pottery consumption and the role of decorated pottery, the Fine Ware pottery from the Transitional stage traced its roots to the painted Standard Ware of the Pre-Halaf stage. In the Pre-Halaf to Early Halaf sequence the proportion of decorated pottery increased steadily. In terms of decorative technique there was a gradual shift away from an earlier situation in the Pre-Halaf stage that was characterised by a rich diversity in impressing, incising, appliqué, slipping and painting, towards an Early Halaf ceramic assemblage dominated by just one technique, painting. Furthermore, there was an increasing complexity of the design structure, in terms of motif diversity and the organisation of the vessel surface into zones for decoration (Fig. 1.8). Importantly, the social uses of decorative styles were shown to be structured according to generalised vessel use. Specifically, repetitive linear band patterns were associated with the technique of painting; this decorative technique favoured vessels suitable for serving and display. In contrast, non-repetitive, singular patterns made with the techniques of incising and appliqué were

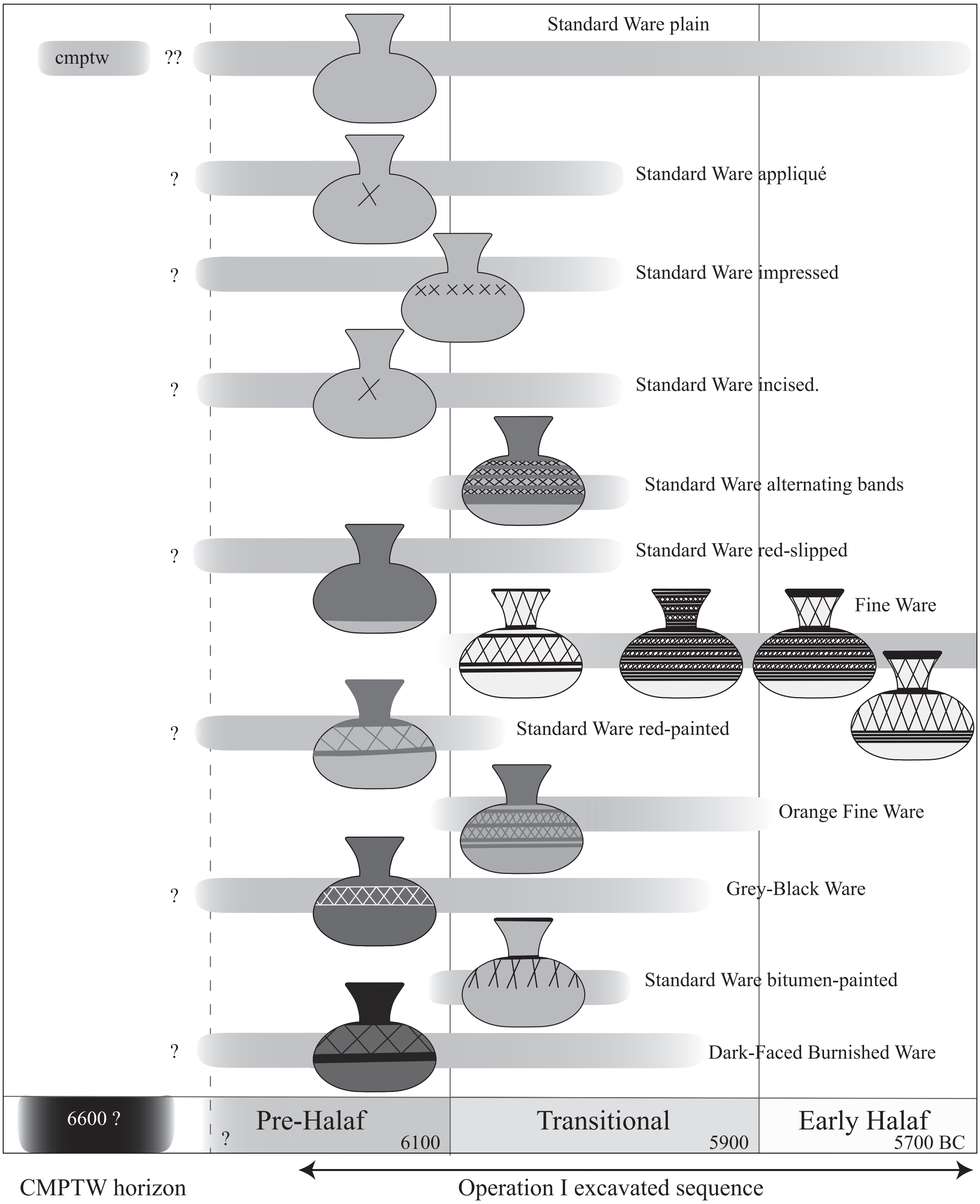


Fig. 1.8 Stylistic developments of decorated pottery types in the Pre-Halaf to Early Halaf stages as they were understood at the close of the excavations at Operation I (after Nieuwenhuyse 2007, 202, fig. 7.9.6).

associated with larger, closed vessels mainly intended for storage (Nieuwenhuyse 2007, 157–205).

Importantly, there were no abrupt shifts or ruptures at any point in the continuous ceramic sequence. Certainly, each sub-phase in the Operation I sequence can fairly easily be identified on the basis of the properties of the ceramics (Nieuwenhuyse 2014), yet a continuum of ceramic-technological and stylistic innovation led from the Pre-Halaf phase through the Transitional (Proto-Halaf), and into the Early Halaf (Fig. 1.8). But when did these Pre-Halaf decorated pottery styles first manifest themselves? When the work in Operation I came to a close, the beginnings of the Pre-Halaf ceramic complex remained frustratingly obscure. The earliest radiocarbon dates from Operation I came from the ultimate Pre-Halaf level 8a and dated to 6125–6075 cal BC (Akkermans 2014, 26, table 1.2). Akkermans (2014, 27) suggests a date around 6200 cal BC for the oldest Pre-Halaf strata excavated in Operation I. However, these were not in fact the earliest Pre-Halaf levels at the site (Akkermans 1996, 2014, 27).

We did know that the Pre-Halaf phase was preceded by an earlier phase characterised by plain, coarsely-made plant-tempered (CMPTW) pottery. This is also known as the Assouad-Damishliyah type after the names of two excavated prehistoric sites in the Balikh Valley where this distinctive pottery was first excavated (Akkermans 1988, 1993; Le Mière 1986; Le Mière and Nieuwenhuyse 1996; Van As *et al.* 2005). But this horizon remained exceptionally poorly dated. The very few available radiocarbon dates pointed to a date in the mid-7th millennium, perhaps between 6600 and 6400 cal BC (Akkermans 1989a, 1989b, 1993; Akkermans and Verhoeven 2000, 2). When this CMPTW phase ended, or how it related to the Pre-Halaf ceramic assemblage remained clouded in speculation (Fig. 1.8).

When the excavations at Operations III, IV, and V commenced at first it was assumed that the new sequence corroborated the impressions gained from earlier work: below strata containing ceramics typical for the Pre-Halaf and subsequent periods there appeared 'early 7th millennium' strata containing CMPTW in large numbers. It was assumed that a hiatus separated these two episodes, and that subsequent excavating would reveal a lengthy Pre-Halaf sequence to fill the gap. When radiocarbon dates became available they certainly raised a few eyebrows (Akkermans *et al.* 2006; van der Plicht *et al.* 2011). Strata dominated by coarse, plain, plant-tempered vessels previously held to be typical for sites such as Damishliyah and Assouad unequivocally and consistently dated to the *latter* half of the 7th millennium. It meant that the so-called Pre-Halaf phase must have been relatively short-lived. As will be discussed below, current work in Operation III suggests that at Tell Sabi Abyad the Pre-Halaf phase formally started with level A1 (6335–6225 cal BC). The 'CMPTW horizon' is now part of the Early Pottery Neolithic phase, which at Tell Sabi Abyad lasted for four centuries or more between ca. 6700 and 6300 cal BC.

These new insights call for a reconceptualisation of the role of decorated pottery in the Upper Mesopotamian later Neolithic. Apparently, decorating pottery vessels was far from self-evident. For many centuries after its introduction pottery vessels were rigorously kept plain. This insight became even more intriguing when the excavation of Initial Pottery Neolithic levels showed that the very first pottery in the Balikh was occasionally painted (Nieuwenhuyse *et al.* 2010). After the initial stage, people apparently abandoned the use of decorated pottery containers. Which social, economic, or ideological factors affected the role of decorative ceramics at Tell Sabi Abyad?

In this book we shall explore a number of issues pertaining to the role of decorated pottery containers. When did decorated pottery styles first emerge? What decorative techniques and styles were the earliest to be developed? How did these subsequently evolve towards the complex constellation that we know as the Pre-Halaf ceramic assemblage? What were the social uses of these early decorated pottery styles? From which contexts were plain and painted ceramics recovered in Operation III? With what functional categories were plain and painted pottery vessels associated during the 7th millennium?

1.7. About this book

To some extent this book is a 'prequel' to earlier reports on the prehistoric ceramics from Tell Sabi Abyad (Akkermans 1989b; Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007). These covered the later parts of the 7th and early stages of the 6th millennium, the so-called Pre-Halaf, Transitional, and Early Halaf periods. Here we shall be concerned with the much earlier phases that led up to these later stages, starting with the introduction of pottery around 7000 cal BC. This report presents a detailed study of the ceramic assemblages recovered from the prehistoric occupation levels in what is termed Operations III, IV, and V. Chapter 2 presents the excavations at Tell Sabi Abyad. Given the stratigraphic complexity of the mound, dedicated readers are advised to return to the various maps and tables presented in this chapter while digesting the data presented in subsequent chapters. Chapter 3 outlines the methodologies and terminologies adopted for the pottery study.

Chapter 4 presents the various prehistoric wares identified at the mound in detail. The emphasis in this chapter lies on a quantified analysis of each ceramic ware individually. Within this framework I will discuss for each ware its ceramic-technological operational chain, the range of vessel shapes and the decoration, and I shall explore changes in these properties through time. This chapter relies on data from Operation III exclusively; the pottery recovered from Operations IV and V is discussed separately in Chapter 12. The collections from Operations IV and V were much less impressive than those from Operation III, while their stratigraphic context remains far less secure. Chapter 12 shall therefore refrain from lengthy typological exercises but instead limit itself to summarising the main properties in a comparative perspective. In Chapter 4, the greater part is taken up by a single ware, the so-called Standard Ware, which represents the massive bulk of the pottery recovered from the 7th millennium levels at Tell Sabi Abyad. The remaining wares discussed in this chapter were recovered in relatively small samples and/or they have already been discussed in great detail in previous publications. This includes Early Mineral Ware, Fine Mineral Tempered Ware, Grey-Black

Ware, Orange Fine Ware and Halaf Fine Ware. These groups shall be treated much more summarily.

Following the definitions of the wares, Chapters 5–10 present several specialist studies – as if a whole book devoted to mostly plain, coarse pottery is not already somewhat of a niche. Bonnie Nilhamn, Bram van As and Loe Jacobs investigate the clay fabrics of Early Mineral Ware, Standard Ware, Fine Mineral Tempered Ware and Grey-Black Ware (Chapter 5). Ewout Koek explores the raw materials used for plastering coarse vessels; we present his analyses together with a study of the typology of plastered Standard Ware (Chapter 6). Luc Megens looks at the ceramic technology for white-slipped-and-painted Standard Ware (Chapter 7). Renske Dooijes discusses what may well be the oldest pottery repairs currently known from the ancient Near East in Chapter 8. Marie Le Mière, Valérie Thirion-Merle and the late Maurice Picon report their provenance studies of 7th millennium ceramics from Tell Sabi Abyad in Chapter 9. Koen Berghuijs identifies impressions of basketry on the prehistoric pottery (Chapter 10).

Chapter 11 reassembles these categories to look at the changing composition of the ceramic assemblages recovered from stratigraphically superimposed depositions in Operation III. Together these cover the time from the earliest adoption of pottery into the Halaf period. The proportions with which the individual wares are represented will be assessed using different quantification estimates. In this chapter we shall also explore sherd densities. The chapter concludes with providing definitions for the periodisation and culture-historical terminology developed at the site of Tell Sabi Abyad, and it provides a comparative review of the supra-regional setting in which this sequence should be placed.

Chapters 13–15 move beyond the ceramic analysis proper to look into patterns of deposition, spatial context, and vessel use. Chapter 13 discusses the fragmentation of ceramic containers. In Chapter 14, Hannah Plug analyses pottery containers given with the dead either as grave goods or as containers for burial. In Chapter 15, Mélanie Roffet-Salque, Richard Evershed and Anna Russell present their investigation of residue traces. In the concluding Chapter I shall wrap this all up and return to the themes addressed in this introduction. From dust to dust; may the Force be with us all.

Notes

1 The study of the ceramics began in 2001 immediately after the start of the excavations in Operations III, IV, and V, and the necessary fieldwork was completed by 2008. In the years 2006–2010 this study formed part of the project *Material Continuities, Renewals and Cultural Transformation*.

2 To be precise, Caldwell defined S-shaped vessels with a closed contour and with the portion of the wall above the shoulder higher than the portion of the vessel below the shoulder as ‘shouldered jars’; S-shaped profiles with an open or vertical contour and with the portion of the wall above the shoulder about the same height as the wall below the shoulder were defined as ‘shouldered bowls’ (Caldwell 1983, 652).

Chapter 2

The excavations at Tell Sabi Abyad

Olivier Nieuwenhuyse

2.1. Introduction

Tell Sabi Abyad, Arabic for the 'mound of the white boy', lies in the valley of the Balikh River, a tributary of the Euphrates in northern Syria, some thirty kilometres south of the Turkish border. Tell Sabi Abyad, or more precisely: Tell Sabi Abyad I, forms part of a cluster of four prehistoric mounds located a marginal distance from each other (Fig. 2.1). Tell Sabi Abyad I to IV are discrete mounds and not over-arching phases on a single mound. The local community refers to this cluster collectively as *Khirbet Sabi Abyad*. A white-plastered shrine to a local holy man at Tell Sabi Abyad IV perhaps gave the cluster its present name; alternatively, rumour has it that a white ghost roams the mound at night.

The Balikh River is a regionally important perennial water source that gathers its waters in southeastern Turkey and joins the Euphrates at the bristling boom-town of Raqqa. Until recent economic developments made motor-pump irrigation widely available, the Balikh formed the only major water source in the immediate region. In the past, dense riverine forests and extensive swamps surrounded this slowly meandering river. In prehistory this landscape was home to a wide range of now-extinct animals which occasionally figure painted onto the prehistoric ceramics or sculpted as clay figurines, and include wild boar, aurochs, deer and the cheetah (Cavallo 2000; Erdalkıran 2017; Russell 2010). The terraces surrounding the valley rise steeply, giving way to limitless expanses of gently undulating semi-arid steppe – '… seas of grassland pasture. … as far as the eye could see' in the words of Hole and Johnson (1987, 178). In the past, the steppe sheltered various animals that were hunted, including gazelle, onager, lion, and leopard (Cavallo 2000; Russell 2010).

At the location of Tell Sabi Abyad, the valley broadens to several kilometres before narrowing again further south. With rainfall averaging between 220–300 mm a year, village-farming societies have long found this fertile part of the valley attractive for settlement. Several surveys conducted by the University of Amsterdam in the 1980s began to document sedentary communities in the form of *tell* settlements from the 8th millennium (Middle PPNB) onwards (Akkermans 1993; Wilkinson 1996). These vigorously interacting local communities maintained contacts with the outside world as demonstrated by the steady flow of foreign goods into the valley, including obsidian, precious stone objects, and bitumen. With a total area of about 4 ha, Late Neolithic Tell Sabi Abyad was among the larger settlements in the area, and likely offered central domestic, social and ritual facilities to a larger population. Several smaller contemporaneous villages and hamlets are known in the near vicinity. Some of these have been excavated, including Tell Damshliyah (Akkermans 1988), Tell Assouad (Cauvin 1972) and Khirbet es-Shenef (Akkermans 1993; Akkermans and Wittmann 1993).

From 1988 onwards, research focused on Tell Sabi Abyad, and excavations have continued on three of the four mounds, namely Tell Sabi Abyad I, II and III. These excavations initially concentrated on Tell Sabi Abyad I (Fig. 2.2). Extensive exposures between 1988 and 1999 on the southeastern slopes of this mound (now designated as Operation I) revealed a lengthy, continuous sequence of inhabitation from the Pre-Halaf into the Early Halaf period (Akkermans 1989a, 1993; Akkermans, ed., 1996; Akkermans and Le Mière 1992; Akkermans and Verhoeven 1995; Verhoeven 1999). A series of trenches on the northeastern slopes (Operation II) documented a contemporaneous sequence, although the inhabitation at Operation II may have ended slightly later than in Operation I (Akkermans 1989a; Nieuwenhuyse 1997).

In these early years the team discovered that the conical bulge that covered the higher, western half of the mound

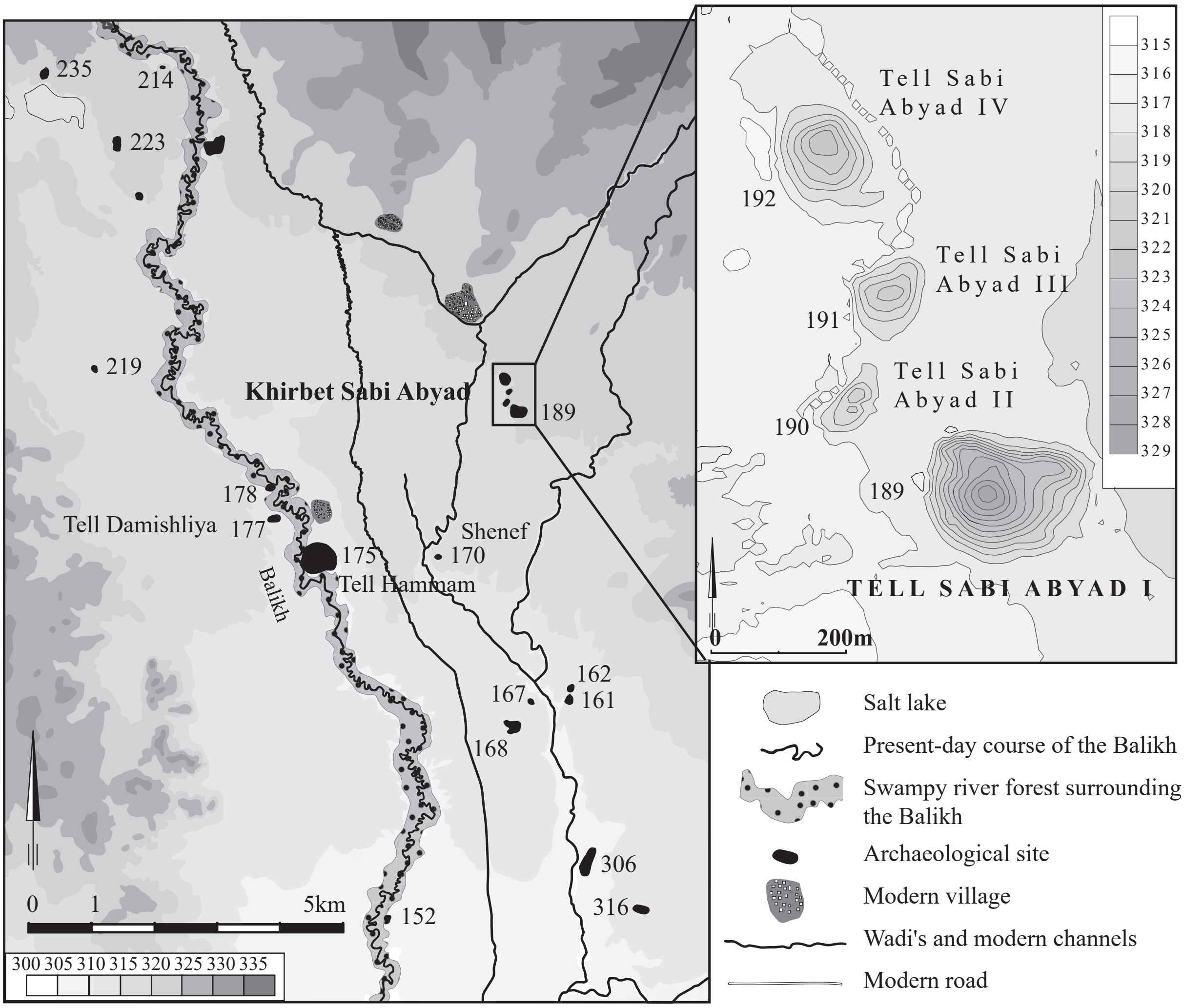


Fig. 2.1 Left: Tell Sabi Abyad in its regional context, showing the cluster of four prehistoric mounds currently known as Khirbet Sabi Abyad, and contemporaneous Late Neolithic sites in the immediate vicinity. Tell Sabi Abyad I is BS 189 (image O. Nieuwenhuyse; Tell Sabi Abyad Project).

was, in fact, a well-preserved Late Bronze Age fortified settlement. This mound understandably became the focus of subsequent excavation seasons and the Middle Assyrian *dunnu* was excavated almost in its entirety (Akkermans and Rossmeisl 1990; Akkermans, Limpens and Spoor 1993; Akkermans and Wiggermann 1999; Duistermaat 2008; Klinkenberg 2016). In 2001, the team began to explore the prehistoric strata directly below the Late Bronze Age remains. Limited excavations were made on the southwestern slopes (Operation V) and on the western slopes (Operation IV). The main area of work, however, became what was later classified as Operation III, situated on the northwestern part of the mound (Fig. 2.2). The pottery from these three 'western' areas of work shall be presented in this book.

The earliest levels presently known from Tell Sabi Abyad I date to the very early stages of the Pottery Neolithic, ca. 7000–6700 cal BC. These were reached in Operation III at the base of a narrow sounding. Here the excavations became obstructed by rising ground water levels making further work impossible. No virgin soil has as yet been reached at this part of the mound, but geomorphological studies have made it clear that several meters of stratified deposits lie below the earliest strata reached (Akkermans 2014). Earlier periods have been excavated at two other mounds of Tell Sabi Abyad, the mounds of Tell Sabi Abyad II and III, and these excavations give evidence of the transition from Pre-Pottery Neolithic B into the Pottery Neolithic (Akkermans 2014; Nieuwenhuyse 2000b; Verhoeven and Akkermans 2000). The complex stratigraphic relationships between the three mounds and between the various Operations at Tell Sabi Abyad I are shown in Figure 2.3.

2.2. The stratigraphy of Operation III

The excavations in Operation III yielded the bulk of the material discussed in this book. Although a detailed discussion of these excavations falls beyond the scope of this book, some introduction is warranted. I shall briefly outline the complex stratigraphic situation and present the corresponding absolute dates. Subsequent sections of this

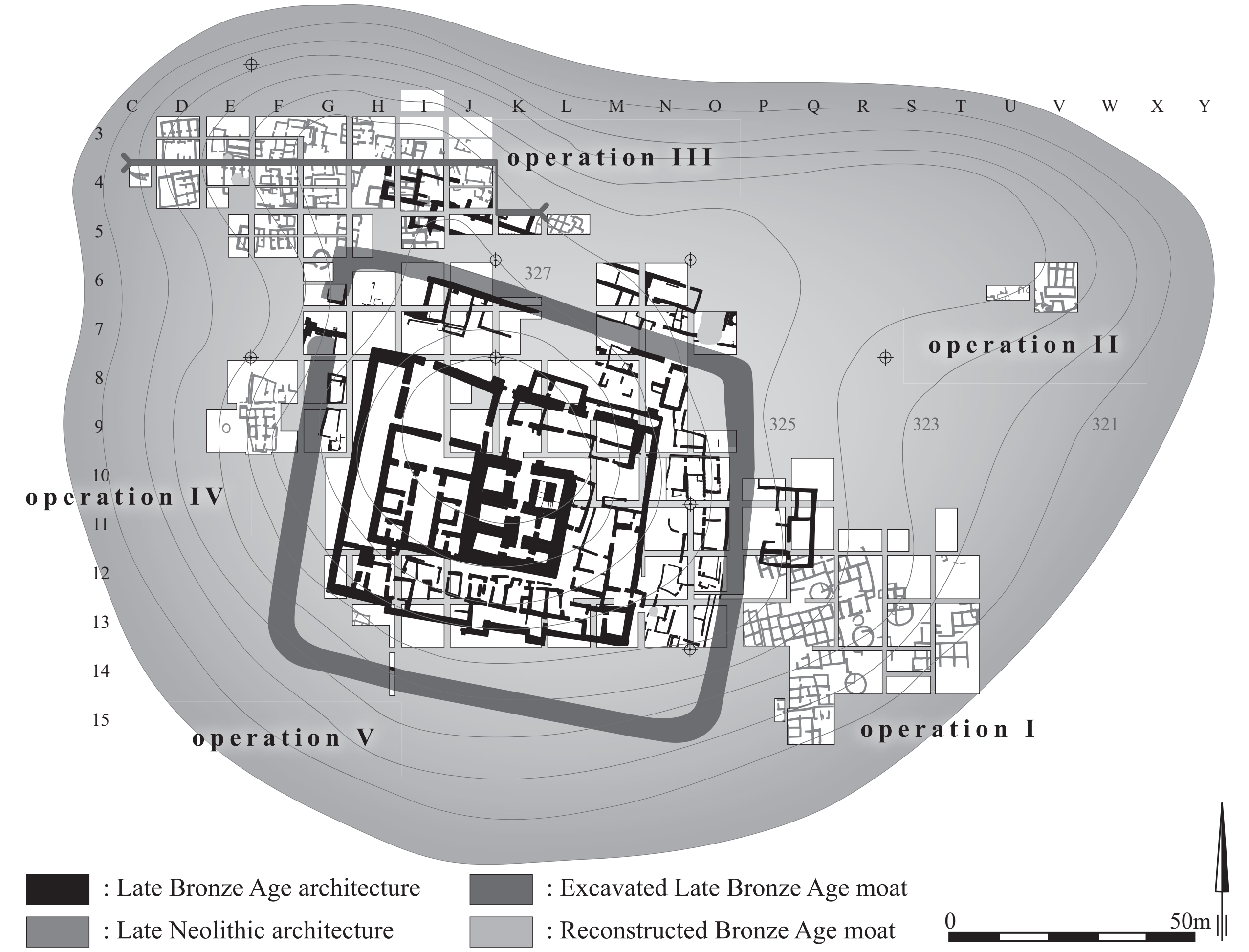


Fig. 2.2 Tell Sabi Abyad I, showing the locations of the areas of excavating. The solid line indicates the position of the section presented in Fig. 2.4 (image Tell Sabi Abyad Project).

chapter shall discuss the building sequence and the types of contexts excavated.

Operation III constitutes a large area, stretching 100 m east–west, and 50 m north–south, covering trenches C2 to L6 in terms of the site's grid system. Operation III is situated on the northwestern part of Tell Sabi Abyad I, on the open area directly in front of, and partly below, the Late Bronze Age (LBA) fortress. Strata from the LBA were exposed in many of the excavated trenches (Fig. 2.5). Although a few Assyrian buildings were found in this area that covered the prehistoric strata, there was no significant architectural overburden. There were, however, major disturbances of the LBA period, in the form of many pits and burials. Also, the northwestern parts of a massive ditch created to encircle the Assyrian fortress cut across the southern part of Operation III (Fig. 2.2, Fig. 2.11). Penetrating several metres deep into the Neolithic remains, this ditch had caused a massive amount of soil relocation. However, its contours were fairly well identified in the field, and the fill of the ditch could be fairly well separated from the surrounding soil. Finally, it appears that the mound of Tell Sabi Abyad had been used as a burial place for the Roman-Byzantine period; this funerary function continued into the Medieval period for the nearby village of Tell Hammam et-Turkman. The many burials excavated from this phase have been collectively termed 'Islamic period' in the stratigraphy as further description falls outside the limits of this study (Fig. 2.5). These Medieval and Roman-Byzantine burials, too, have often left deep scars in the prehistoric remains.

In the face of this dynamic site history, it comes as no surprise that the stratigraphy of Operation III is complex. The area was continuously inhabited from the early 7th millennium onwards into the Halaf period, but location preferences were far from static. Specifically, the excavations have documented a gradual eastward movement of the locus of building activities. By and large this long-term process was gradual and continuous. However, it does show punctuations, accelerations, and cyclical patterns of abandonment and reuse. Such shifts are reflected in the vertical stratigraphy as clusters of trenches where successive phases of occupation do not suggest a continuity of building events. Thus, four cascading, continuous sequences of occupation have been identified at Operation III, termed sequence A to sequence D (Fig. 2.4).

A long and continuous vertical build-up of occupation remains on the northwestern part of the mound forms

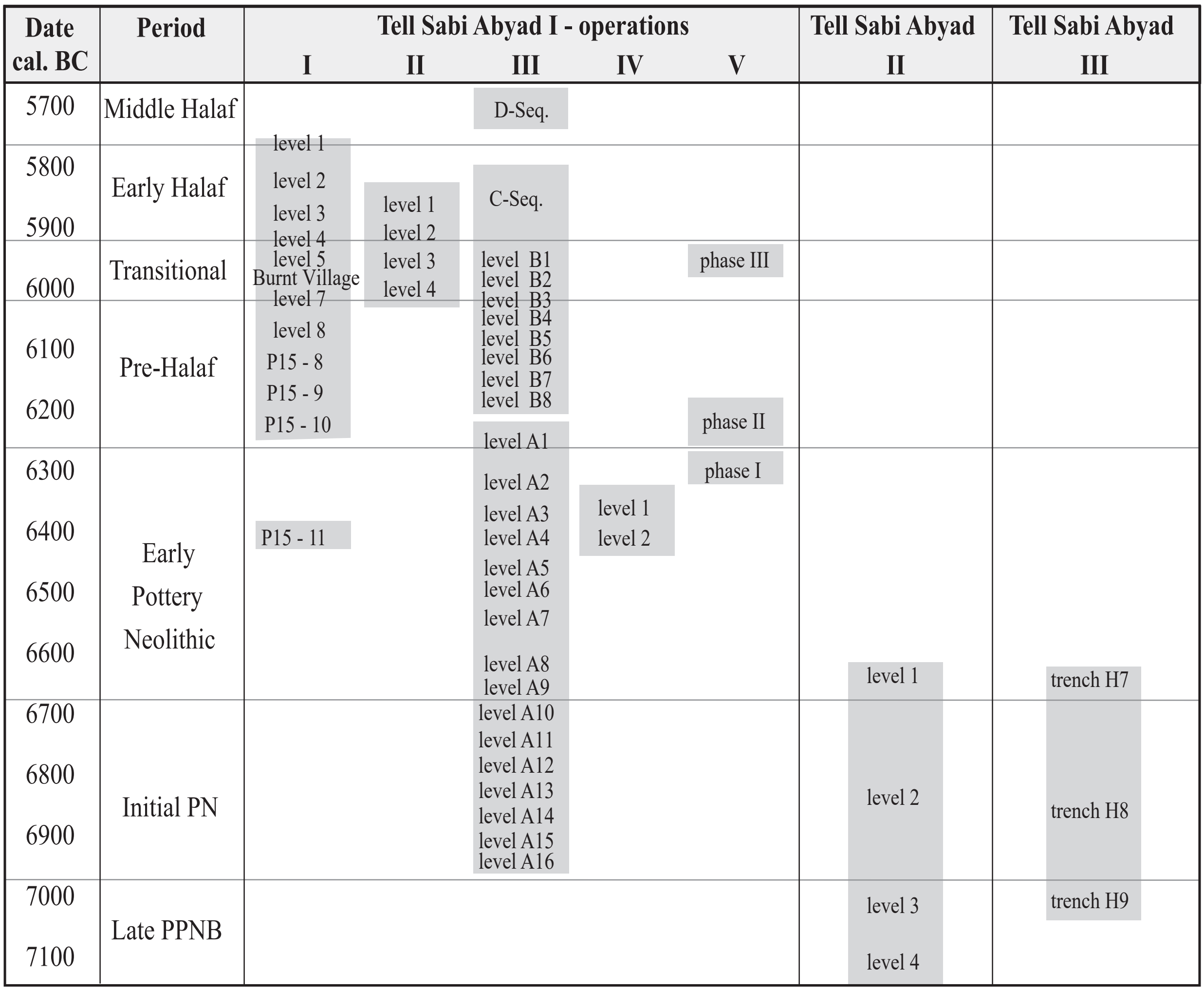


Fig. 2.3 The complex occupational sequence of Khirbet Sabi Abyad, indicating the relationships between the various Operations at Tell Sabi Abyad I, the excavations at Tell Sabi Abyad II and III, culture-historical attributions and absolute dates cal BC (image A. Kaneda; Tell Sabi Abyad Project).

the 'A-sequence'. The earliest attested occupation of the A-sequence dates to the Initial Pottery Neolithic, ca. 7000 cal BC. Moving from Initial Pottery Neolithic through Early Pottery Neolithic into, finally, the Pre-Halaf period, a total of sixteen distinct levels have been distinguished, termed level A16 to A1 from base to top. The latest of these, level A1, marking the start of the Pre-Halaf period, is dated to 6335–6225 cal BC. These levels represent a massive accumulation of eroded buildings, activity areas, courtyards, and sloping open areas. All together these depositions constitute what is today the highest part of the mound of Tell Sabi Abyad I, rising some ten meters above the level of the surrounding plain.

After level A1, new buildings were no longer erected in the same area and this part of the mound was no longer used for residential purposes. Operation III was not totally abandoned, however, but instead gained new use as a place for burial, implying a clear separation between the living and the dead (Akkermans 2008; Plug *et al.* 2014). Excavations at this cemetery – or rather at the sequence of consecutive cemeteries (Chapter 14) – have yielded the remains of almost 200 men, women, and children. The location was used as a resting place for the dead for several centuries between ca. 6405–6345 and 6090–5985 cal BC, or from the final stages of the Early Pottery Neolithic to the Early Halaf. In some of these burials pottery containers or fragments thereof were given with the dead: these, too, will be discussed in this book (Chapter 14).[1]

The mound as a whole certainly was not abandoned. People shifted the location of the village slightly eastward, culminating with the gradual shift in village location, the initial phases of which can be observed as early as level A5. New buildings were constructed on the eastern slopes of the A-mound, created after eight hundred years of occupation; these structures constitute the B-Sequence. In Operation III, the earliest B-level (level B9) lies directly on top of the eroded eastern slope of the A-mound. A total of nine distinct levels have been distinguished, termed level B9 to B1. The B-levels date to the Pre-Halaf and Transitional periods as defined by earlier work in Operation I (Nieuwenhuyse 2007). In addition to this, some fifty metres farther to the southeast, the earliest constructions were erected at the bottom of the old tell, that constitute Operation I (Akkermans 2014).

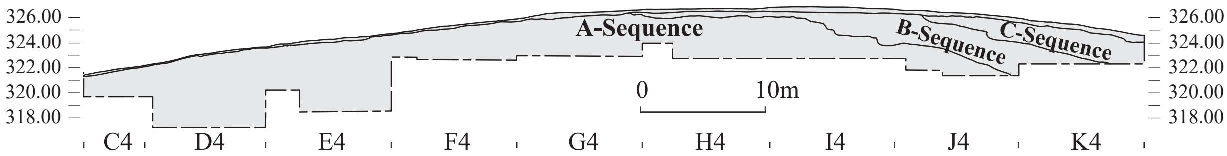


Fig. 2.4 Section west–east through Operation III (to scale), showing the superposition of occupation sequences (A, B, and C-sequences) and the position of trenches. The D-Sequence is not indicated but its shallow deposits fall within the range of trenches H4 to K4. For the location of this section: see Fig. 2.2 above (image A. Kaneda; Tell Sabi Abyad Project).

Although no stratigraphic continuity exists between the various areas, the absolute dating from each operation make it clear that the B-Sequence is contemporary with the Pre-Halaf and Transitional period material excavated in Operation I; this material also finds its contemporary counterpart within the northeast part of the mound, in Operation II (Fig. 2.3).

People constructed new structures on Operation III during the Early Halaf period, as is demonstrated by the fairly well-preserved remains from the Early Halaf excavated on its northern slopes. The Halaf strata were deposited directly on top of and partly dug into the much older remains originating from the Early Pottery Neolithic. This implies another local stratigraphic discontinuity, which led to the designating these levels C-sequence. On the basis of the ceramics and associated material culture the C-Sequence can be dated to the Early Halaf period; it must have been approximately contemporaneous with levels 3–1 of Operation I. At the time of writing no stratigraphic-contextual analysis has as yet been carried out of the C-Sequence, but a small sample of its pottery was studied and this shall be discussed in this book. Here we shall simply treat is as a chronological and contextual unity.

Interestingly, the work in Operation III also yielded poorly preserved remains dating to the Middle Halaf period (Fig. 2.14). Previously, this stage had been attested at Tell Sabi Abyad *in situ* on a very limited scale only in the uppermost strata of Operation II, the so-called 'North-East mound' (Nieuwenhuyse 1997). To be sure, the many campaigns of work in the Assyrian fortress at the western part of Tell Sabi Abyad had already yielded thousands of well-preserved Middle Halaf painted pottery sherds, but these all came from the eroded Late Bronze Age mud bricks (Chapter 13). The Middle Halaf remains of Operation III represent the D-sequence. This chronological attribution rests entirely on the painted ceramics associated with these strata; no absolute dates have so far been recovered from the D-Sequence. Late Bronze Age building activities have scraped away almost all of the Middle-Late Halaf buildings, causing severe disturbance to what remained of these depositions. As with the C-Sequence, in this report we shall treat the ceramics from the D-strata as a chronological and contextual unity.

It will be clear, then, that not all periods are equally well represented in the excavations at Operation III. In terms of lateral extent, the level exposures vary strongly from one level to the next (Fig. 2.6). Levels A5–B8, corresponding to the later stages of the Early Pottery Neolithic and the start of the Pre-Halaf period, are undoubtedly the best represented. These were excavated over a rather large area, extending over 1000 m^2 for some levels. The remains were often relatively well preserved, and yielded exceptional plans of the settlement. The earlier phases of the Early Pottery Neolithic in contrast are much less represented in terms of area. The Initial Pottery Neolithic strata (levels A16–A11) were only excavated in a limited number of narrow soundings. On the other side of the chronological spectrum, the exposures of the final parts of the B-Sequence – dated to the Transitional Period – were equally limited. The Halaf levels in Operation III, (C-Sequence and D-Sequence), were also exposed on a limited scale. These discrepancies have obvious repercussions for our understanding of ceramic developments. The broader exposures yielded a vastly larger ceramic data set, skewing our impressions of relative quantities and affecting relative degrees of ceramic variability (Chapter 11).

A strong programme of absolute dating corroborates the stratigraphic analysis (Van der Plicht *et al.* 2011). For the 7th–early 6th millennium layers of Tell Sabi Abyad, a grand total of more than 300 ^{14}C dates have been currently obtained. All ^{14}C dates were measured at the Center for Isotope Research of Groningen University. Closed context samples were taken from bin fills, ovens, hearths and habitation rooms. Samples were also taken from pits and open areas, but these were seen as less reliable in terms of primary association. For Operation III a total of 249 samples were selected as a 'first choice' dataset. Of these, 242 were measured using AMS (GrA); seven large samples were dated by radiometry (GrN). In the subsequent statistical treatment of the data, the samples deriving from charcoal and charred seeds were given priority, as these provide more certainty for stratigraphic (Bayesian) analysis (van der Plicht *et al.* 2011).

Calibration of single dates yielded complex and sometimes broad probability distributions. The temporal resolution on the calendar timescale remains insufficient to come to very exact chronological precision. In order to improve temporal resolution, the data were combined and analysed applying Bayesian statistical models. This incorporates relative chronological information gained from the site stratigraphy to the analysis of the calibrated ^{14}C dates (Bayliss 2009; Bronk Ramsey 2001; Reimer *et al.* 2009). In the case of Tell Sabi Abyad, a total of 148 samples were deemed to be of sufficient quality for Baysian analysis, both from the ^{14}C laboratory's point

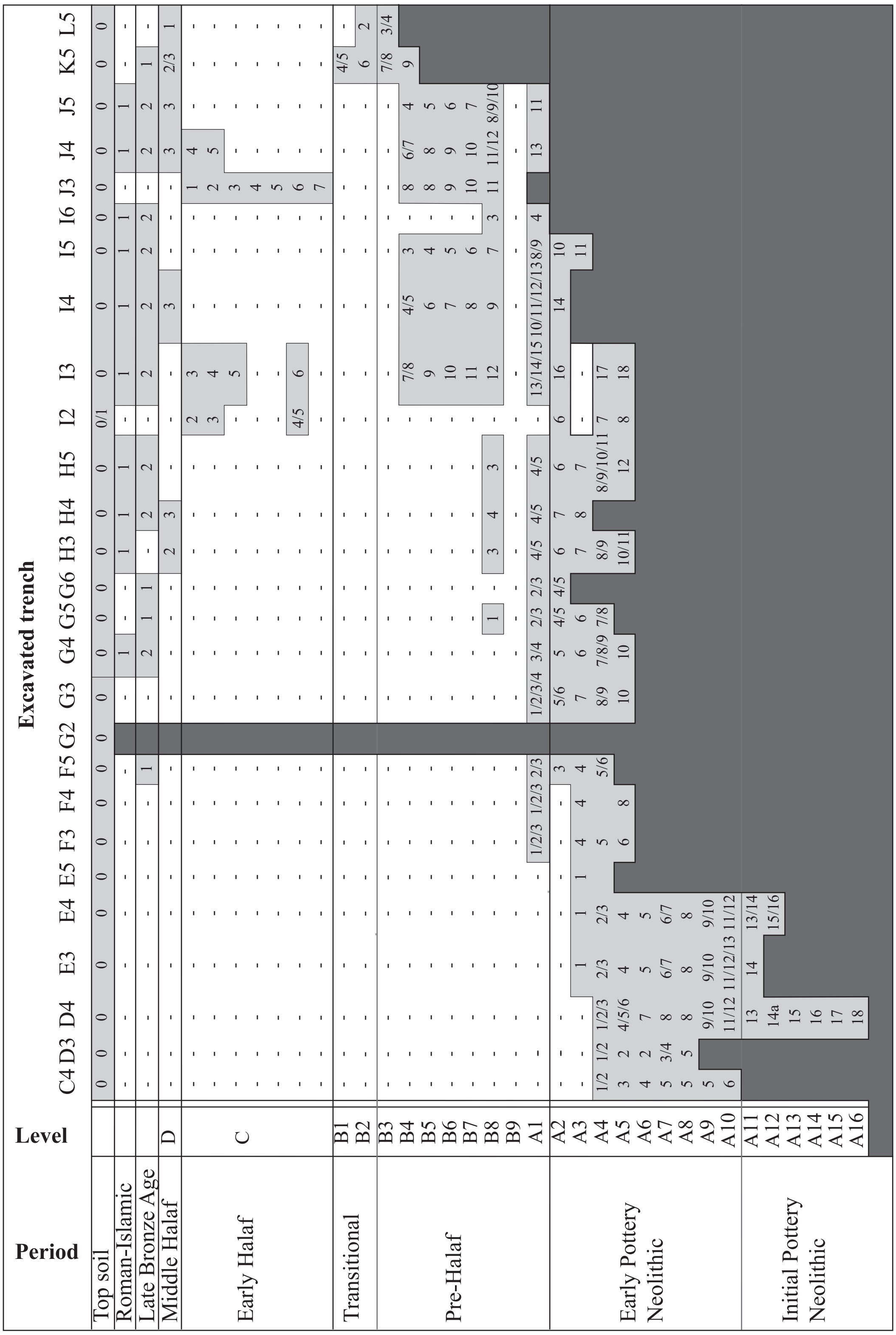


Fig. 2.5 Tell Sabi Abyad. The stratigraphy of Operation III, showing the cultural-historical framework, stratigraphic sequences, building levels, and strata for each excavated trench. Light shade: excavated; dark shade: unexcavated. Empty slots with strokes: no corresponding stratum attested. Black horizontal: stratigraphic boundary; grey horizontal: culture-historical boundary (image A. Kaneda; Tell Sabi Abyad Project).

of view as well as from an archaeological perspective; thus, samples must have a clear context (e.g., van der Plicht *et al.* 2009). The Bayesian analysis of the two main sequences of the Operation II excavations – the A-Sequence and the B-Sequence – was performed using OxCal Version 4.1.7 (Bronk Ramsey 2009). The dates were grouped per level separated by boundaries. The results for the A-Sequence and the B-sequence are

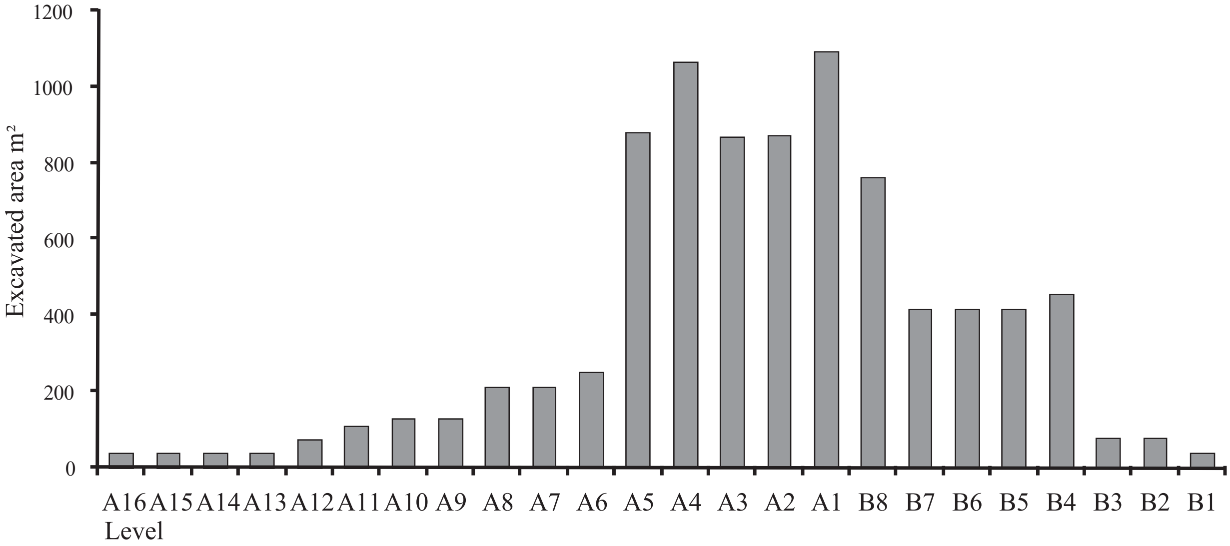


Fig. 2.6 Tell Sabi Abyad, Operation III. The lateral extent in m² of building levels from the Operation III A–B sequence (image A. Kaneda; Tell Sabi Abyad Project).

Table 2.1 The results of Bayesian analysis for the A-Sequence and B-Sequence at Tell Sabi Abyad Operation III showing levels, number of ^{14}C dates used per level, and the calibrated date ranges (1-sigma level and rounded to 6) in cal BC, as calculated by OxCal (van der Plicht et al. 2011).

Level	*No. of ^{14}C dates*	*Date cal BC*	*Range in years*
B1	0	n/a	n/a
B2	0	n/a	n/a
B3	2	6040–5995	45
B4	4	6050–6015	35
B5	6	6075–6040	35
B6	5	6095–6065	30
B7	6	6125–6080	45
B8	13	6180–6105	75
B9	0	n/a	0
A1	23	6335–6225	110
A2	17	6385–6330	55
A3	6	6395–6375	20
A4	16	6455–6390	65
A5	9	6495–6455	40
A6	2	6505–6485	20
A7	14	6605–6495	110
A8	7	6630–6590	40
A9	4	6675–6620	55
A10	6	6750–6675	75
A11	4	6825–6740	85
A12	4	6865–6770	95
A13–A–16	0	n/a	n/a

summarised here (Table 2.1). No radiocarbon dates are available for the C and D levels; these levels can currently only be dated on the basis of the pottery.

The results show a consistent and continuous chronology from the Late Neolithic levels. The calculated age

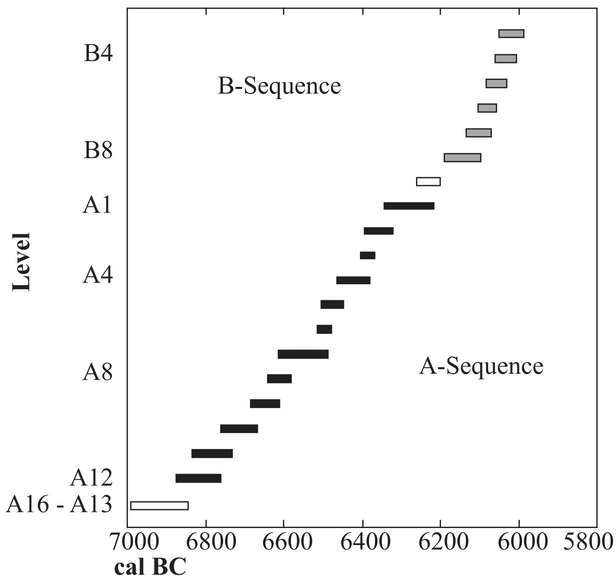


Fig. 2.7 Tell Sabi Abyad. High temporal resolution ^{14}C chronology of the archaeological levels of Operation III, Black: A-Sequence; grey: B-Sequence (after van der Plicht et al. *2011).*

ranges have been reproduced graphically in Figure 2.7. In Operation III, the inhabitation is continuous; the chronology of sequence A is followed by sequence B with no hiatus. The final stages of the A-Sequence overlap with the beginning of the B-Sequence (level B9). Admittedly, for the lowest B-level, level B9, no radiocarbon dates exist as yet. However, as level B9 stratigraphically lies between levels A1 and B8, it is calculated to fall between 6250 and 6220 cal BC (all numbers at the 1-sigma confidence level). In two cases – in levels A1 and B8 – stratigraphical sub-divisions are possible, based on typology of ovens/hearths. These sub-phases find support in the absolute chronology, but are not directly relevant here and hence they shall be largely ignored in this book. Here we shall take the level as the basis temporal unit.

The earliest levels in Operation III so far have not been radiocarbon dated. However, a tentative *terminus post quem* is provided by the dates available from the stratigraphic sequence of Tell Sabi Abyad III: these place the start of the Initial Pottery Neolithic at 7000 cal BC (Nieuwenhuyse *et al.* 2010). As A-16, the lowest level in Operation III, already contained small amounts of pottery, we may take the approximate date of 7000 cal BC as the start of this level (Fig. 2.7). Future work is likely to shift this boundary somewhat, but this shift is not expected to be significant.

2.3. The Operation III prehistoric building sequence

Here we shall briefly present the prehistoric material from Operation III in a broad outline, mainly to give some contextual backbone to the subsequent presentation of the pottery. The architecture of the village shall be presented elsewhere in detail.

The earliest levels of Operation III, A16–A13, were exposed solely in one small sounding (trench) and hardly yielded any architecture. The subsequent four building levels (A12–A9) may be grouped together on the basis of their remarkable continuity of architectural design and location. Importantly, this building continuity cuts across the terminological and culture-historical boundary (level A10) between the Initial Pottery Neolithic and the Early Pottery Neolithic phases. Exposed on a limited scale, the main feature of these levels is an alternating superimposed sequence of platform-building-platform. In effect, the same building, of which only a portion was exposed, was erected four times in succession following a very similar size and layout (Akkermans 2011). For each new reconstruction people used the filled-in remains of the earlier building as a supporting platform. The accumulated height of these repeated activities reached several meters. The principle of buildings alternating with platforms was quite nicely illustrated at nearby Tell Sabi Abyad III where excavations of contemporaneous levels yielded very similar buildings (Fig. 2.8). In Operation III, interestingly, directly west of this rectilinear structure, the partially preserved remains of a circular structure were found. This building currently represents the earliest tholos attested so far at Operation III, and in fact the earliest at Tell Sabi Abyad. The area surrounding these two buildings and the space between them revealed a densely used open area packed with small fireplaces, hearths and pits (Akkermans 2013a).

After level A9 this long-lasting building was abandoned. Subsequently the area remained almost completely devoid of architecture for twice the temporal extent of the earlier levels (levels A8 and A7). Instead, the trenches demonstrated a heavily used open area with scattered fragments of walls (level A8) and, predominantly, pits of various shapes and sizes, fireplaces, hearths and kilns. The associated buildings must have stood nearby, perhaps to the south of the excavated area. This spatial arrangement continued to change, as a huge platform was laid out in this area that measured ca. 70 m^2 with a height of some 90 cm (level A6). A large rectilinear building was subsequently (level A5) constructed on this platform, and the structure as a whole remained in use into level A4. By now, however, we gain a broader picture of the village layout. If level A6 was exposed over a relatively limited scale, the exposure of the subsequent level A5 was more extended. In level A5 we find numerous rectilinear buildings of various sizes, with the majority furnished with white-plastered floors. The various structures were situated closely together but were rarely contiguous: people carefully kept open space between them. These open areas held a few massive kilns, as well as the

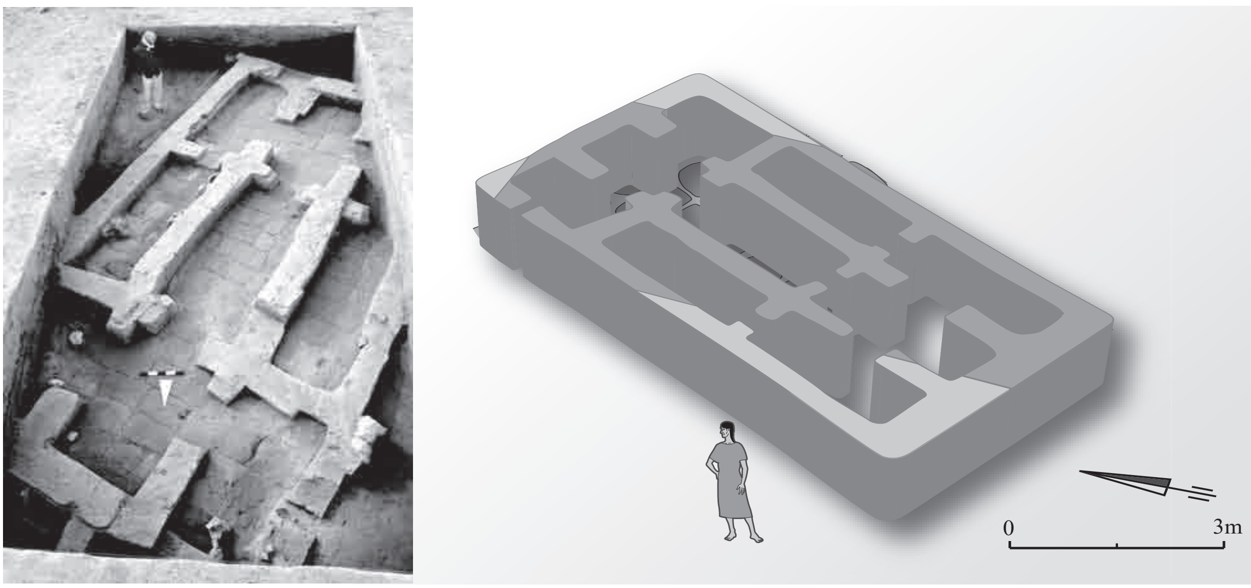


Fig. 2.8 Tell Sabi Abyad III. Example of a final PPNB to Initial Pottery Neolithic tri-partite building erected on a platform (image Tell Sabi Abyad Project).

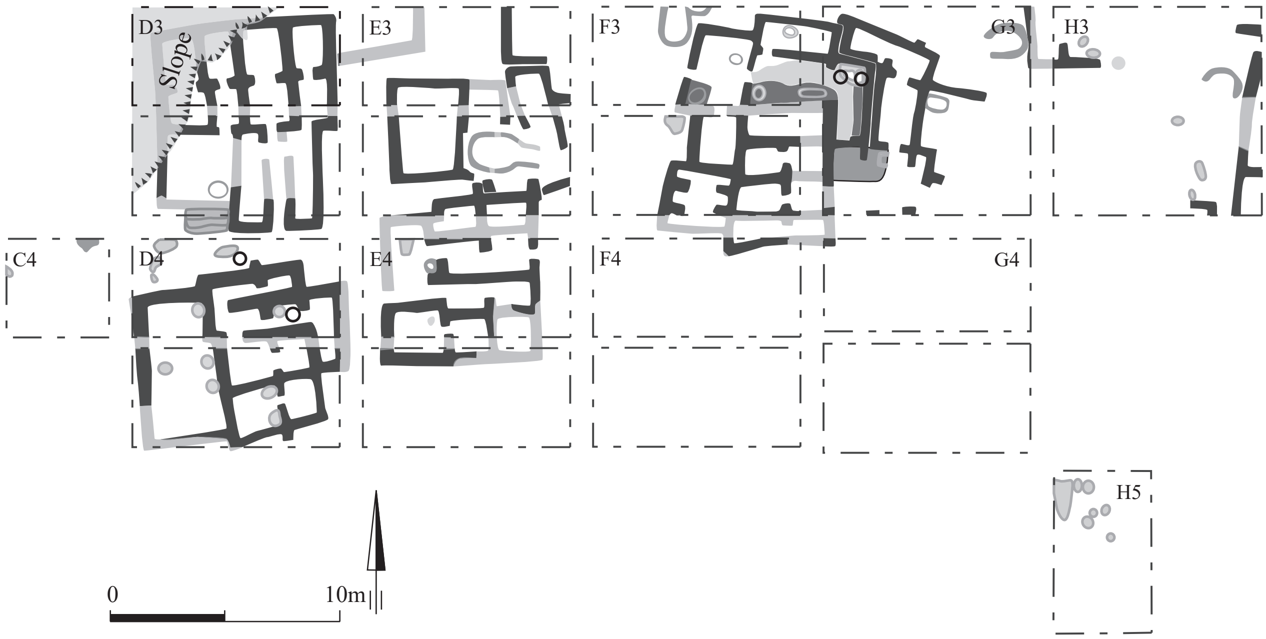


Fig. 2.9 Tell Sabi Abyad, Operation III. Plan of level A5 (sub phase A5-A; image A. Kaneda; Tell Sabi Abyad Project).

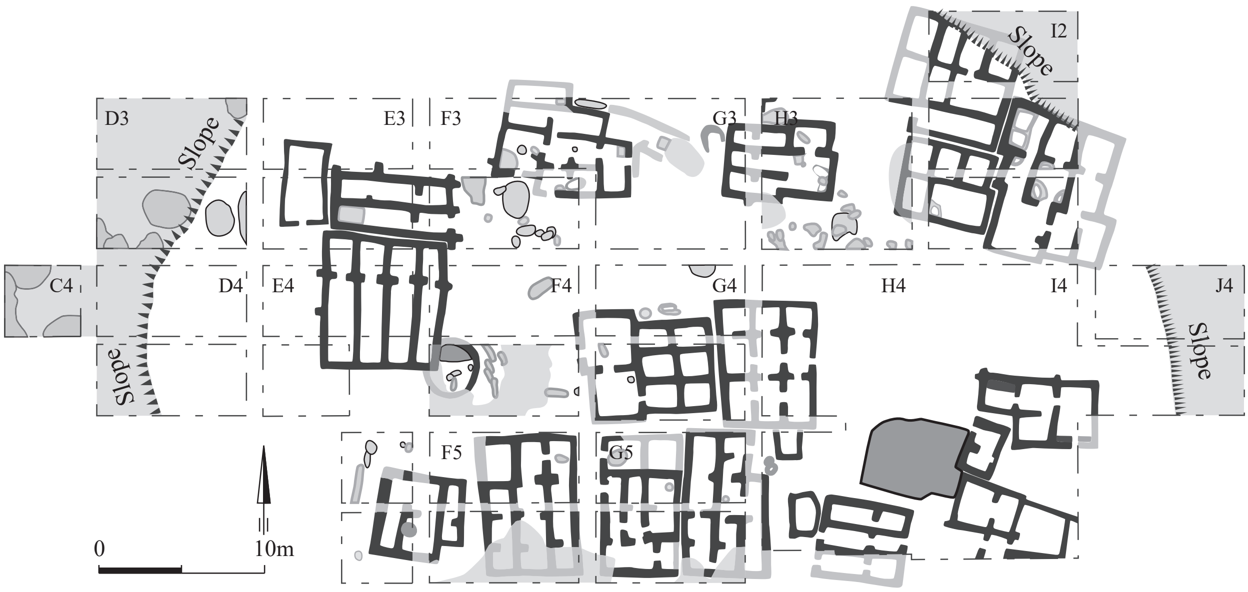


Fig. 2.10 Tell Sabi Abyad, Operation III. Plan of level A4 (sub phase A4-B; image A. Kaneda; Tell Sabi Abyad Project).

common repertoire of pits, small fireplaces and hearths as in the earlier levels (Fig. 2.9).

The subsequent level, A4, is the second-largest exposure across multiple trenches of any level in Operation III. In the initial stages of level A4, the ruins of some of the earlier (level A5) buildings in the western part of the village plan must still have been visible, but gradually these decayed with the area becoming mostly open. The core of the village slowly began to move eastward at this time, and the space covered by the westernmost archaeological trenches was eventually abandoned for good. A large number of individual buildings may be distinguished in level A4. They differ vastly in shape, size, and organisational complexity. Characteristic of many of these buildings is the presence of one or two larger rectangular rooms, adjoined by numerous smaller square spaces. As in the earlier levels, several of these buildings were erected upon clay platforms specially-constructed for the purpose. In addition to rectilinear buildings, the village layout included a large circular tholos (in trench F4). As before, open spaces separated most of the buildings, but some of the buildings were placed with their exterior walls facing each other to form larger clusters. Various activities were carried out in the large courtyards between these clusters, as indicated by numerous larger and smaller pits and ash-filled fireplaces (Fig. 2.10).

In the subsequent levels A3 and A2, the village layout changed again. Most of the area attributed to level A3 in fact consists of open spaces, pocketed with pits of various shapes and sizes. A single large building cluster lies centrally situated in the exposure. This cluster was not erected at once, but grew over time and perhaps incorporated several pre-existing individual buildings. In spite of the enormous labour investment in establishing this cluster, it appears not to have been inhabited for an extended period of time. Already in the subsequent level A2, the buildings dispersed again and the village reassumed its former structure, showing several smaller buildings separated by vast expanses of heavily used open courtyards. Level A2 yet again included a newly built single large tholos.

What is termed level A1 represents the final building episode of the so-called A-Sequence, and on the basis of ceramic changes, it represents the earliest Pre-Halaf level in Operation III. Level A1 consists of four distinct sub-levels, which in total lasted longer than the other occupation levels combined (i.e. more than a century). Only in several structures within these four sub-levels is there architectural continuity. Additionally, at least one of the earliest buildings in level A1 shows continuity with an earlier structure in level A2. Level A1 therefore does not represent a dramatic rupture with earlier inhabitation patterns, but rather a snapshot in a continuous, dynamic sequence of architectural change. While in each phase the village plan as a whole changed, there was always some linkage with what had come before. Each of the sub-phases presents freestanding buildings consisting of rooms of various sizes. Some of these are square one-room structures measuring no more than 4 m^2, but the larger buildings may contain as many as seven rooms of unequal sizes, measuring up to 50 m^2 or more. As in many of the preceding levels, a single tholos is present in level A1 (in trench G5; Fig. 2.11).

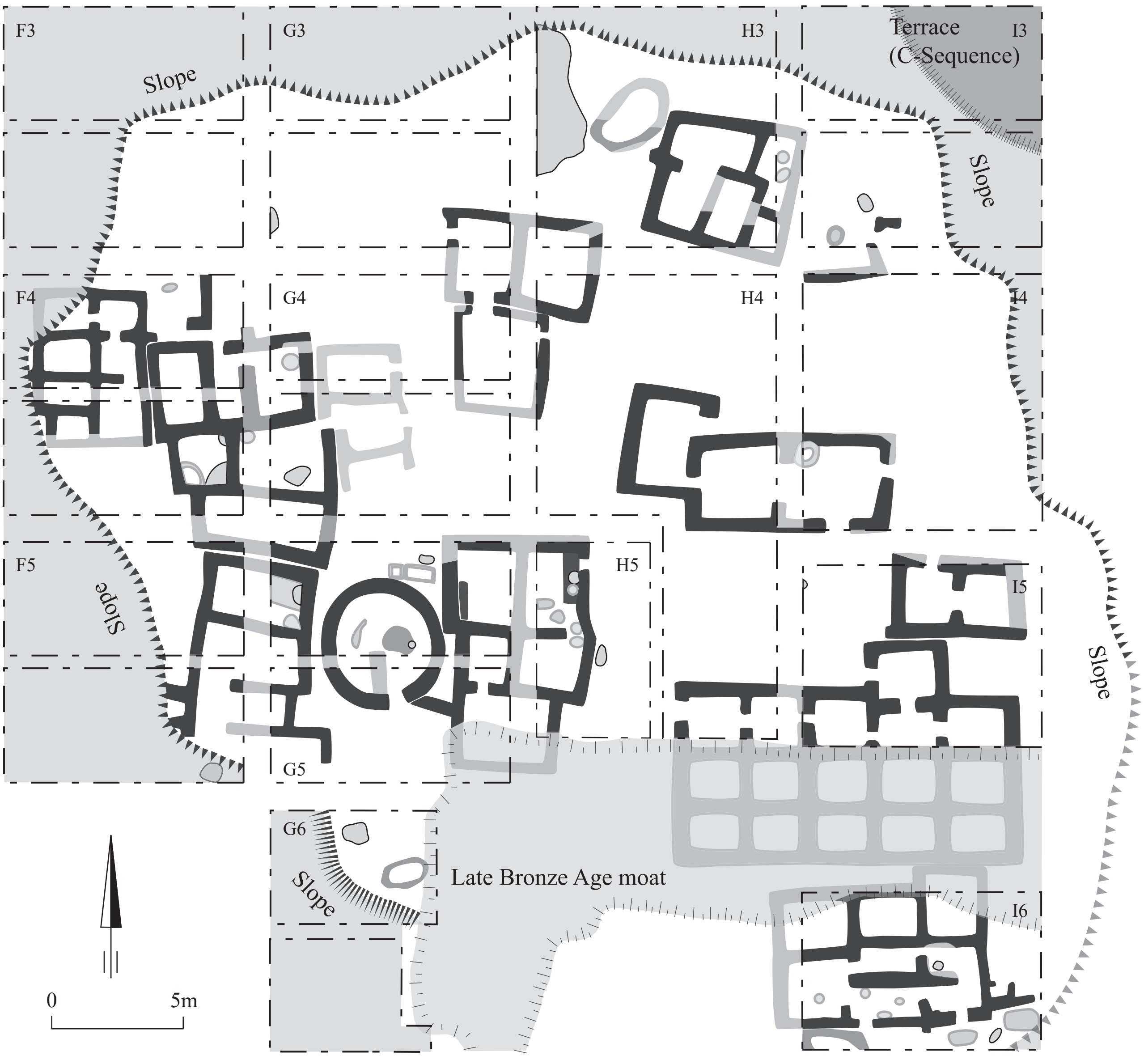


Fig. 2.11 Tell Sabi Abyad, Operation III. Plan of level A1 (sub phase A1-C; image A. Kaneda; Tell Sabi Abyad Project).

In Operation III, the earliest excavated levels of the B-Sequence have not yielded substantial architecture. Levels B9–B7, superimposed upon the eastern slope of the Early Pottery Neolithic tell, were almost entirely devoid of architecture. Levels B8 and B7 on the other hand each yielded a round tholos building. The strongly sloping outdoor spaces exposed in these trenches were full of ashy pits and fireplaces with red-burnt walls (Fig. 2.12). The earliest rectilinear buildings in this area date from level B6, and are large buildings consisting of two larger rectangular rooms plus several smaller square rooms. This building was abandoned soon after its construction, and in levels B5 and B4 the exposures again show open space; this area contained sloping ashy debris layers, pits and small fireplaces, with the occasional larger kiln, and a few irregular stumps of walls. The very limited exposures for the uppermost levels, B3–B1, also revealed evidence of rectilinear architecture, which likely comprises the corner of a rectangular building that extends beyond the trench.

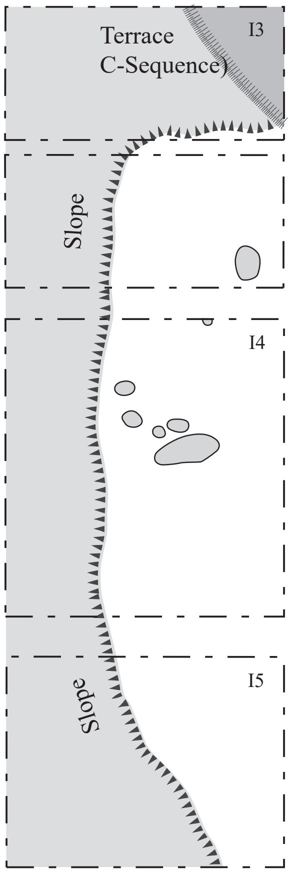


Fig. 2.12 Tell Sabi Abyad, Operation III. Plan of B6 (sub phases B6-B; after image A. Kaneda; Tell Sabi Abyad Project).

The last prehistoric occupational episodes attested so far at Operation III, have been termed the C-Sequence and the D-Sequence. The C-Sequence strata have been excavated in trenches I3 to K4 on the northern and north-western slopes of the old mound formed by the A-B Sequences. At this location people built terraces into the mound to establish an even level for constructing several rectangular buildings and a number of round tholoi (Fig. 2.13). As described in subsequent chapters, on the basis of the ceramic evidence these buildings date to the Early Halaf period, contemporaneous to levels 3-1 at Operation I. The D-sequence, finally, forms a stratigraphically distinct deposition that covers the underlying Pre-Halaf material in trenches H3 to L5. These layers were severely disturbed by Late Bronze Age building activities, which resulted in a horizontal levelling of the prehistoric mound; this disturbance is particularly clear, where the LBA construction severely maltreated the stone foundations of two likely tholoi immediately below it (Fig. 2.14). The associated ceramics point to a Middle-Late Halaf date for these circular buildings, but unfortunately their stratigraphy has been extremely mixed

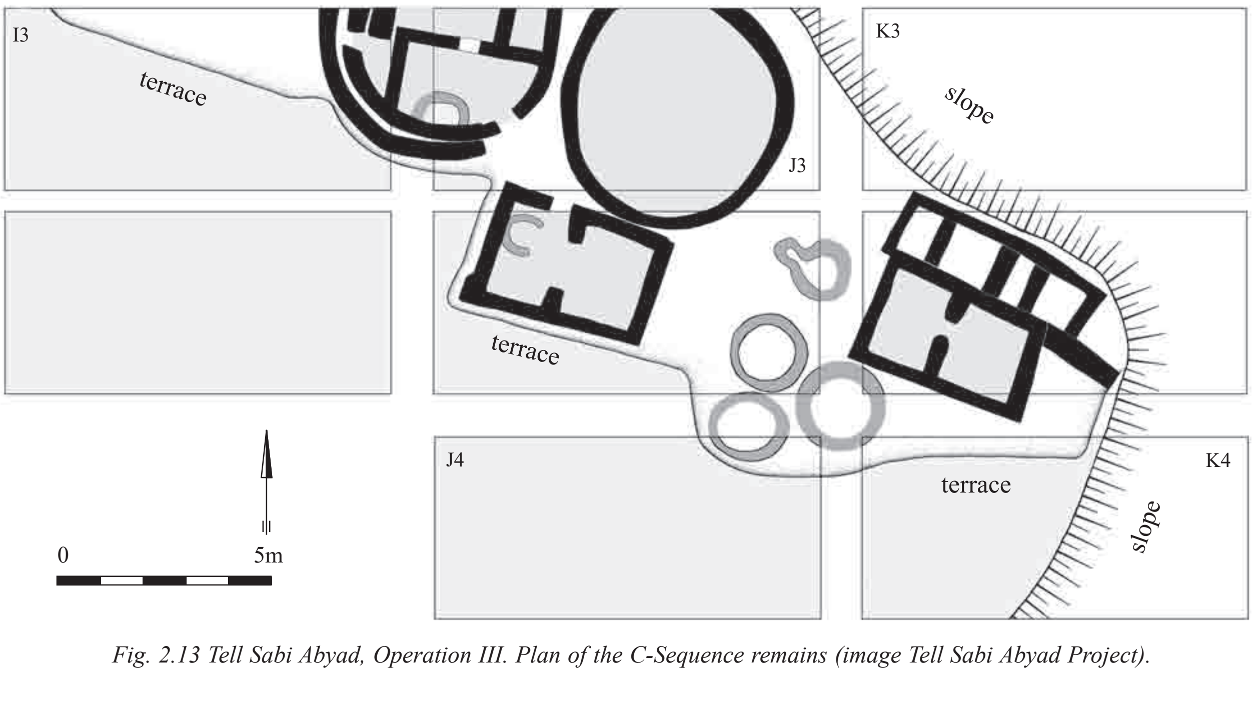


Fig. 2.13 Tell Sabi Abyad, Operation III. Plan of the C-Sequence remains (image Tell Sabi Abyad Project).

Fig. 2.14 Tell Sabi Abyad, Operation III (trench J4). The D-Sequence: the severely eroded remains of stone foundations of circular buildings from the Halaf period (image Tell Sabi Abyad Project).

with the Pre-Halaf strata underneath. This hypothesis is fully corroborated by the ceramic analysis, which points to heavy disturbance of the D-Sequence layer (Chapter 11).

Apart from the limited traces of Pre-Halaf and Halaf domestic occupation, perhaps the most significant use of the domestic areas of the western mound of Tell Sabi Abyad (after the Early Pottery Neolithic) was as a formal place for burial. Several hundred Late Neolithic burials have been excavated at Operation III (Akkermans 2008; Plug *et al.* 2014). The area covered by trenches J3 and J4 forms the core of this cemetery, but many burials were recovered from the surrounding trenches as well. Most of the graves could be incorporated into the stratigraphic framework with some certainty (Plug *et al.* 2014). Operation III was maintained as a burial place for several centuries starting in the final stages of the Early Pottery Neolithic (A-Sequence) and lasting into the Early Halaf period (C-Sequence). The majority of these were dated to the Pre-Halaf period (B-Sequence). Many of the burials yielded grave goods, which occasionally included pottery. The ceramic vessels recovered from these burial contexts will be addressed separately (Chapter 14).[2]

2.4. The contextual composition of Operation III

As the preceding review makes clear, the excavations in Operation III have yielded a broad range of prehistoric contexts that span more than a millennium of human inhabitation. On top of this, several millennia later, in the Late Bronze Age and afterwards, people returned to this location and transformed it. Altogether, this resulted in a complex and heterogeneous mixture of context types identified during the stratigraphic analysis. Already during the excavations, it was noted that very little of the excavated depositions should be ranked as primary. The subsequent study of the faunal material from Operation III yielded high fragmentation indices across context types and between levels (Russell 2010, 98). This fits well with conclusions gained from earlier work on Operation I pertaining to the ceramics (Nieuwenhuyse 2007, 55–61), faunal evidence (Cavallo 2000) and small finds (Verhoeven 1999). These studies consistently show that severe fragmentation is rife, suggesting that secondary–tertiary conditions prevailed throughout prehistoric Tell Sabi Abyad. Nonetheless, this earlier work also demonstrated that subtle differences in ceramic-taphonomic conditions may be found between context types, for instance between open areas and enclosed spaces such as room fills (Nieuwenhuyse 2007, 59; Verhoeven 1999, 184–186). Moreover, the excavations yielded *in situ* finds, such as ceramic vessels deposited in burials or large storage vessels present inside buildings. As part of the pottery analysis this book shall seek to investigate if the contextual composition of Operation III is reflected in different fragmentation patterns of the ceramic assemblages recovered from the various levels (Chapter 11).

The broad range of contexts distinguished during the stratigraphic analysis can be simplified into eleven broad categories (Table 2.2; also Russell 2010, 19). These context types have been distinguished on the basis of re-occurring spatial arrangements of architecture or small-scale features. These contextual categories occur in diverse proportions in each level. To gain a rough insight in the contextual composition for each level, we

Table 2.2 Tell Sabi Abyad, Operation III. Description of contextual categories

Open areas	Open areas occupy most of the excavated spaces in most levels. The open areas in Operation III are perforated by fireplaces, pits, and ovens. The faunal evidence attests to a wide range of activities, including butchery and preparing daily meals (Cavallo 2000, Russell 2010, 245). In addition, much of the social life of the village will have taken place here (Pollock 2013, Verhoeven 1999, 176). While they were filled with much refuse, the spatial analysis of Operation I has suggested that much refuse was also thrown out at the edge of the village, down the slopes of the mound (Verhoeven 1999, 174–175), or within the ruins of abandoned buildings. In Operation III such areas may be located on the sloping edges of the excavated settlement, where, unfortunately, the stratigraphic situation is usually less secure.
Room	The preservation of walls differed strongly between levels and between buildings, making this context type quite diverse, and analytically problematic. Most rooms are rather small and without easy access, and will have been used largely for storage during the active life of the building (Verhoeven 1999). Most buildings also contained one or more larger rooms, which may have been used for living and manufacturing goods. Fragmentation of the faunal material suggests that these rooms were kept quite clean during their lifetime (Russell 2010: 246); finds began to accumulate in these spaces only *after* the rooms were abandoned for their primary uses. However, in some of the Operation III buildings, large storage vessels were found, presumably left *in situ*.
Floor	Room floors were identified in the field by changes in soil colour and consistency. As floors were repeatedly renewed and often grew organically during the lifetime of the building, the ten to fifteen centimetres above the surface was analytically included in this context type. In practice, floors were often defined by increasing find densities on a horizontal plane. This may include the occasional larger piece of pottery, perhaps even a complete vessel. There is a risk of circular reasoning in the definition of a floor. Analytically it remains difficult to disentangle objects potentially left *in situ* from items deposited on the floor after abandonment (Verhoeven 1999).
Pits	Any depression deeper than a few centimetres was called a pit. As a context type, they show a huge variety in shape as well as in size, depth and volume. Pits in Operation III contain mostly depositions of waste derived from butchering and meals (Cavallo 2000: 136, Russell 2010, 245). In Operation III the contextual category of pits became more common in the upper A-levels. This may be due to the slow eastward shifting of the village, and previously built-up areas were transformed into open areas used intensively for activities involving pits of all shapes and sizes.
Hearth	A hearth was defined as any shallow depression below surface level, or level spot coloured dark grey to black, with ashy remains pointing to the application of heat. Often they have red-burnt walls attesting to intense, if often short-lived heating. Burnt and calcinated bones are over-represented in hearths, perhaps reflecting their use as fuel (Russell 2010: 98). The contextual category of hearths fluctuates strongly from one level to the next, and depends on the amount of excavated domestic architecture.
Oven	The term oven refers to above ground structures used for heat-related activities. They are identified by their red-burnt interior wall faces; various types and sizes of ovens existed at Tell Sabi Abyad. Some of these might have been used for firing pottery. Occasionally, ovens were found filled with ashy deposits.
Basin, bin	The plastered depressions occasionally found inside structures of the Operation III building plans are rather exceptional features. Sometimes they were remarkably large and were termed 'basins'. Mostly they are comparatively small, in which case they were termed 'bins'. Some basins have special features such as sloping edges that may have served to facilitate the flow of liquid substances.
Construction	The term construction refers to the excavation of architectural elements, with the notable exception of platforms. This category includes walls, buttresses, benches, and the occasional stone pavement. Previous analyses showed that such contexts regularly include bone and other materials, suggesting that they were constructed from soil extracted from the mound itself. In some constructions large pottery containers were embedded *in situ*.
Platform	Platforms constitute a characteristic type of architectural construction in Operation III. They were square or rectangular, up to ten by seven metres in area, and they could reach a height of one metre (Akkermans 2011). Platforms could be constructed in different ways. Some were made from solid layers of bricks, others by filling a retaining wall with soil and architectural debris, yet others by levelling a building and filling it up with soil, bricks or alternating layers of brick and soil. Platforms often acted as foundations for new buildings, which sometimes resulted in alternating building-demolishing-rebuilding sequences of remarkable duration. Platforms at Operation III are mainly a feature of the earlier A-levels but some were found as late as level A2.
Burials	In the later 7th millennium Operation III became used as a formal resting place for the dead. Operation III yielded prehistoric burials as well as numerous Assyrian, Roman-Byzantine and even modern burials as well.
General	The category of 'general' refers to contexts that could not be attributed with certainty to any of the contexts above.

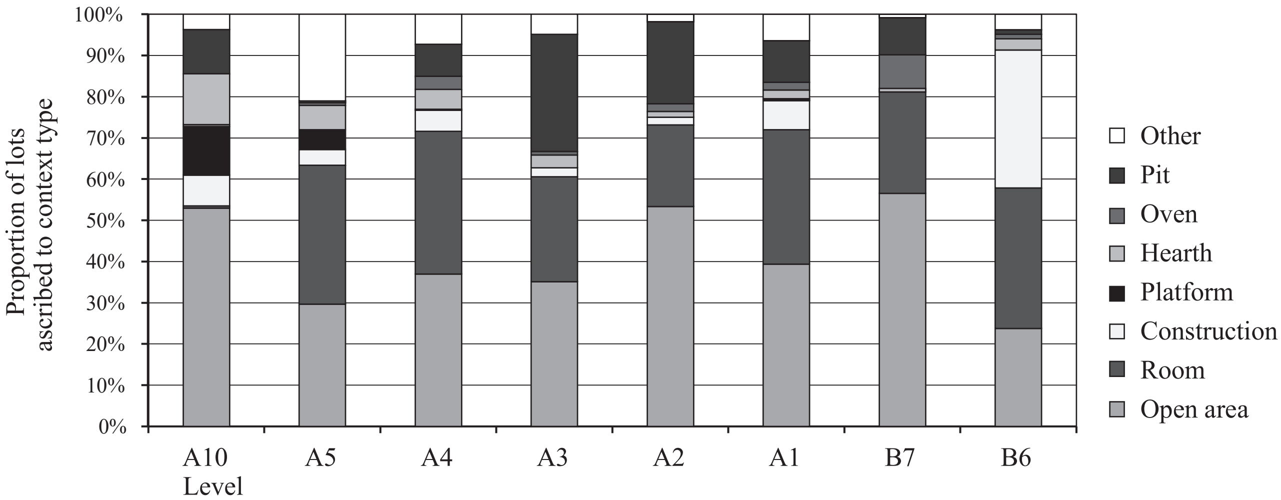


Fig. 2.15 Tell Sabi Abyad, Operation III. Comparison of broad contextual composition of levels A10, A5, A4, A2, A1, and B6 based on counts of lots attributed to each context type (image A. Kaneda; Tell Sabi Abyad Project).

simply counted the number of lots attributed to each broad context type during the stratigraphic analysis. Figure 2.15 visualises these estimates for the building levels shown above. In most levels, open areas constitute the largest context category, followed closely by room fills. Unequivocal floors, however, were quite rare. An important component in many levels, also, is the broad category of 'construction'. The so-called platforms make their presence felt especially in the Initial Pottery Neolithic and lower Early Pottery Neolithic levels (Akkermans 2011). Pits, finally, are present in all levels, yet exist in differing quantities in some levels.

2.5. The excavations at Operations IV and V

The excavations in Operation IV (the western slopes) and in Operation V (the southwestern slopes) were quite modest in comparison to the vast undertakings of Operation III. Operations IV and V measured about 250 m² and 170 m² in area, respectively (Akkermans *et al.* 2006). These two areas represent the highest parts of the prehistoric mound of Tell Sabi Abyad I. Operations IV and V rise some 4–6 m above the present-day level of the surrounding plains, somewhat below the level reached by Operation III but overlooking Operation I farther to the southeast. As with Operation III, habitation at this location began much earlier than at Operation I, and most likely originated in the Initial Pottery Neolithic or earlier. The excavations did not penetrate too deeply into the soft sides of the mound, but however were restricted to the upper prehistoric levels immediately below the sorry remains of the Late Bronze Age fortress.

Both areas had suffered extensive damage from Late Bronze Age activities, such as the digging of numerous pits. Part of the massive protective ditch that surrounded the Assyrian settlement crossed both areas, perforating several metres into the Neolithic strata. Perhaps the most destructive was the large-scale levelling of the prehistoric mound in the Late Bronze Age to prepare an even surface

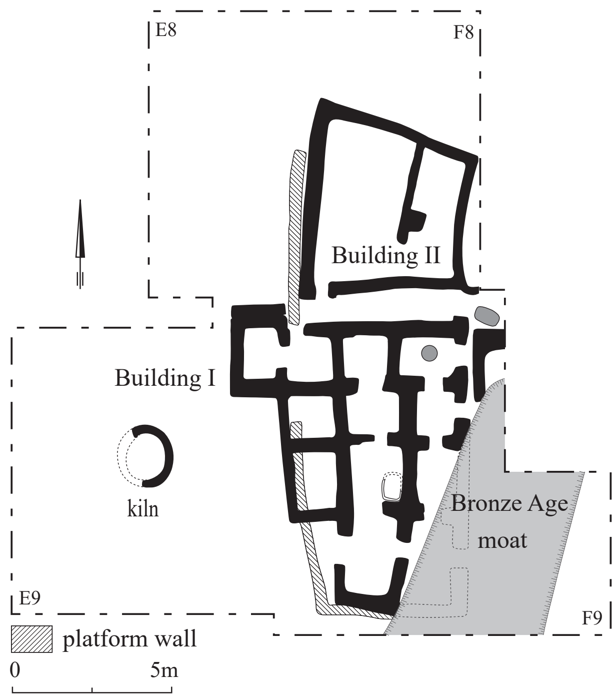


Fig. 2.16 Tell Sabi Abyad, Operation IV. Plan of second building phase (after Akkermans et al. *2006).*

for the large buildings. Operation V was excavated, in fact, immediately below the lowest floors of the Assyrian buildings. Looking at this from the positive side, the Assyrian architects made the prehistoric remains more easily accessible by removing the natural topsoil. On the down side, the excavations found many buildings to have been sharply truncated with their upper parts removed. In some instances only the lower parts of *in situ* installations or ceramic vessels were all that remained.

What is termed Operation IV comprises trenches E8–F9 (Fig. 2.16). Trenches G8 and G9 also yielded prehistoric remains, but were so greatly disturbed by Late Bronze Age activities that ceramic analysis became virtually meaningless. The work in operation IV revealed habitation material very similar to those from operation III (Akkermans *et al.* 2006), and two distinct phases were identified. The earlier of the two phases revealed the outline of a rectangular mud-brick building. In the second phase, this building was intentionally dismantled and its interior filled-up to create a platform as a foundation for a second rectangular, multi-roomed building. It might be possible to distinguish two separate buildings, termed building I and building II that were separated by a narrow alley. However, the platform on which these buildings stand and the surrounding courtyard unites them. The constructions may therefore well have been part of a single, large building (Fig. 2.16). The prehistoric remains from Operation IV shall be treated here as a temporal unity (Chapter 12).

Operation V was stratigraphically more complex. Operation V includes trenches G12, H12, and H13 (Fig. 2.17). This area includes the southwest corner of the Middle Assyrian fortress, more precisely it is where the Assyrians had located the bathroom and toilet facilities of a representational building, perhaps a palace. Although the Late Bronze Age architecture in these trenches was much less preserved than elsewhere at the site, thick, solid mud brick walls had to be removed in order to probe the underlying prehistoric deposits. Trench H12 was excavated to a depth of about 1.5 m below the Assyrian layers. Trench G12 was smaller and was excavated to a shallow depth of some 60 cm only. Work in trench H13 started with a rectangular exposure to which was added a narrow sounding extending 10 m to the south, where it hit the Assyrian moat (Fig. 2.2).

Both stratigraphically and in terms of the ceramics, the prehistoric exposures in Operation V include three distinct occupational episodes, *viz*. the Early Pottery Neolithic, the Pre-Halaf, and the Transitional Period (Akkermans *et al.* 2006). The earliest phase, exposed in trench G12 only, consists exclusively of many thin and sloping ash layers without any traces of architecture. The ceramics from these layers suggest a date roughly contemporaneous with operation IV and with the final stages of the Operation III A-Sequence. The second phase, attested in both H12 and H13, show several building levels dated to the Pre-Halaf period (Fig. 2.17). Two distinct building levels were recognised. The upper level remained poorly understood given its almost complete annihilation by Assyrian building activities. The lower level however was better preserved, and several small, rectilinear pisé buildings were excavated (Fig. 2.17). The third prehistoric phase, finally, represented only in H13,

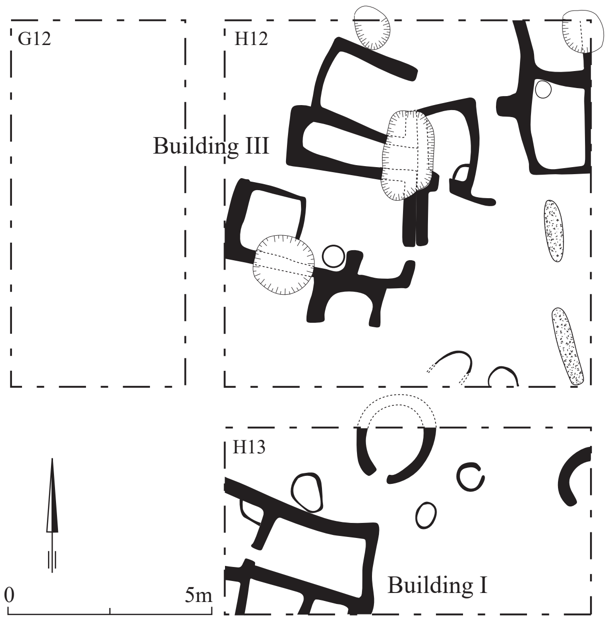


Fig. 2.17 Tell Sabi Abyad, Operation V. Plan of the second Pre-Halaf phase (after Akkermans et al. 2006).

consists of heavily sloping debris layers covering the Pre-Halaf remains. These layers likely were all that remained from a settlement at the top of the mound that is now gone, ascribed to the Assyrians. The associated pottery belongs to the later stage of the Transitional period.

Notes

1 The burial objects discussed in this chapter were excavated in successive field campaigns between 2005 and 2009. The finds from the 2005 to 2008 campaigns were included in the statistics presented elsewhere in this book. This included 22 burial finds. For this report an additional 28 pottery objects excavated in the 2009 campaign were included to allow us to present this artifact category as a whole. This pottery was not studied in the field by the authors; they were added to the database on the basis of descriptions contained in the field documentation (the 'object forms').

2 The cemetery was excavated over the years 2005–2009, and yielded a total of 48 pottery vessels. The finds from the 2005–2008 campaigns (22 vessels) are included in the description and statistics presented in this report. The remaining 26 vessels from the final 2009 campaign became available only after this statistical analysis had been completed. However, the present discussion of pottery vessels as a contextually distinct category of grave goods is based on all pottery recovered from the burials.

Chapter 3

Analytical procedures

Olivier Nieuwenhuyse

3.1. Introduction

This chapter sets out the procedures and methods employed for studying the prehistoric ceramics excavated at Tell Sabi Abyad during the 2001–2008 campaigns. The methodology closely follows the procedures developed in previous work at the site (Nieuwenhuyse 2007) but a few revisions and modifications perhaps deserve mentioning. This chapter starts with describing the route that excavated sherds travel from the moment of discovery to their final description by a specialist. Decisions at this stage must be made explicit, as they have a significant influence on the final results (section 3.2). The issues of quantification (section 3.3) and fragmentation (section 3.4) will be assessed separately. Special attention is given to a major conceptual issue dealt with in this study: that of defining a ceramic ware (section 3.5). I shall then briefly outline the procedures followed in the description of pottery shape (section 3.6) and decoration (section 3.7), providing definitions of the various terms used in this report.

3.2. The way of the sherds

The bulk processing of the excavated ceramics occurred in the dig house of Tell Sabi Abyad, located in the busy little village of Hammam et-Turkman, a few kilometres from the site. Entirely constructed of traditional materials and techniques, this cosy mud brick house was a walled compound with two sequentially-arranged courtyards that connected the various rooms and working spaces. The first courtyard upon entering the house opened directly onto the main village street, and was the place where the ceramicists and other specialists worked: faunal specialists, physical anthropologists, and restorers. In this somewhat cramped, partially covered area the main stages in the ceramic processing took place (Fig. 3.1).

Importantly, the study of the material did not start in the dig house. The material described in this book was studied together with the day-to-day archaeological excavations. Decisions taken during the primary excavation of the material influenced subsequent procedures and results. The excavations were conducted by teams of five Syrian workmen, all of whom were highly specialised after decades of working at the site, and together with a student of archaeology assisting each of these teams. These were highly experienced excavation squads that rarely overlooked material. Sieves were never used during the excavations. This is likely to have diminished the proportions of thin-walled, small-sized pottery types somewhat, but it is doubtful if sieving would have significantly altered the overall range of types present (Orton *et al.* 1993, 47). Sieving would have resulted in an additional corpus of very small, severely fragmented undiagnostic items that, possibly, we would only be able to identify as 'pottery' without any further identification of ware, shape or decoration (Bernbeck 2010, 65).

Finds were collected in low, open buckets made of reused tyres known in Arabic as *zambils*. At the end of the day these were piled high onto a local means of transport – a three-wheeled vehicle known as a *trezina* – together with equipment and exhausted students, and conveyed to the dig house. This 2-km ride and the sometimes rough handling of the *zambils* occasionally will have led to mixing of material from different contexts. The '*trezina* factor' may account for some 1% of sherd mixing (Nieuwenhuyse 2007, 56) and it may be responsible for sherds turning up in unlikely places, such as the occasional Late Bronze Age sherd in a closed Initial Pottery Neolithic context at the base of a three-metre deep sounding.

During excavation, the field team must decide on the spot what to do with 'special' pottery finds, such as architectural features incorporating reused sherds

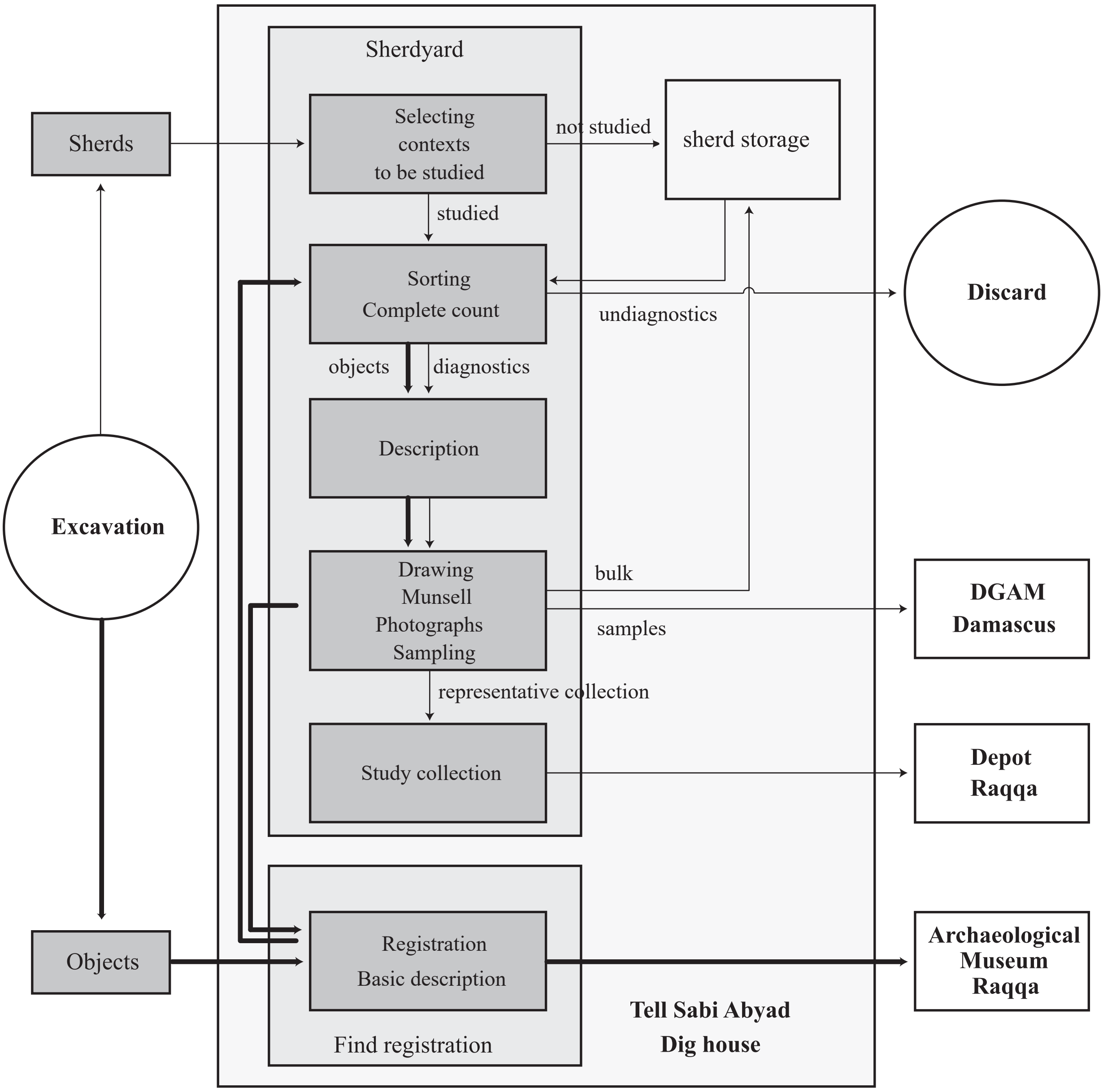


Fig. 3.1 Tell Sabi Abyad 2001–2008 campaigns. Sherdyardogram schematically summarising the 'sherd flow', the spatial arrangement of the ceramic processing. Bold lines represent the separate trajectory of pottery 'objects' (image O. Nieuwenhuyse).

(e.g. a kiln floor), large, well-preserved fragments, or the occasional complete vessel, or 'very special' pieces of pottery. These decisions matter to the specialist. For instance, while 'sherds' were packed in bags and reserved for specialist's eyes only, 'objects' were kept apart, given a separate identification tag (a 'Masterfile number') and were formally handed over to the museum after each campaign. Items formally kept as 'objects' were kept apart already in the field and put on a different track through the find processing system (Fig. 3.1). Pottery objects were everything the trench supervisor considered remarkable, from the intact masterpiece to a stylised 'figurine'-shaped 'something' that, on closer inspection, turned out to be simply a lug. As a formal rule, pottery objects included all ceramic items that happened to have a complete profile, including both rim and base. This included the exceptionally complete painted jar from a Halaf burial, but also boxes full of husking tray profiles: thick-walled sturdy containers whose impact-resistant nature made it likely that upon breakage they would keep some rim and base. By the time they reached the pottery specialist it had usually become impossible to search for fitting sherds in the relevant *zambils*, as these would already have been packed into storage. For the typological description of the individual items, this makes little difference, but it introduces a slight bias in estimates of fragmentation.

A basic decision is defining which material should be collected at all? It was the practice at Tell Sabi Abyad to collect *all* material recovered from the field. This had immediate repercussions for the 'sherd flow'. As Orton *et al.* (1993, 3) eloquently put it, pottery in such situations becomes 'the most common of archaeological

Fig. 3.2 Tell Sabi Abyad 2001–2008 campaigns, zambils *with washed sherds from a single day of excavating drying in the sun within the courtyard of the excavation house (image O. Nieuwenhuyse; Tell Sabi Abyad Project).*

materials, whose main functions are to slow down the real business of digging, fill up stores, and behave as an archaeological 'black box' for post-excavation resources'. One important and pragmatic goal of the pottery processing was to organise the efficient discard of non-diagnostic material, and to optimise the valuable storage space, while not compromising the scientific aims of the project. For excavations of this size it is utterly impossible, and methodologically absurd, to attempt the detailed study of each excavated fragment. In consultancy with the project director we made a selection of excavated trenches to be studied (see Fig. 11.1). These were kept at hand for immediate further work, whereas the pottery from remaining trenches was put away to be stored. Criteria that guided us in the selections included the (preliminary) understanding of the stratigraphy and the estimated degree of disturbance, and the approximate time-period covered in the trench. Material from selected trenches was arranged context by context, spread out and searched for fits, sorted into categories, counted and weighed. Subsequently, all 'undiagnostic' sherds were discarded, while only the 'diagnostic' sherds were kept. The latter included all complete profiles, all rims, bases and appendages, and all decorated sherds.[1]

One important obstacle resulting from working alongside the ongoing excavations was the absence of a firm, fine-tuned stratigraphic framework to guide our selections; these lacunae presented difficulties in sorting material vertically (separating by period) and horizontally (separating it by context). This threatened our aim of working contextually. Fortunately, the excavating teams were always able to provide preliminary, yet thorough descriptions of their trench. Using their field notes and sketches, material belonging from the same room, pit or open area was studied as a unity as much as was practically possible. We made the attempt to assemble material by context, spreading it out collectively to search for fitting sherds.[2]

Fig. 3.3 Tell Sabi Abyad 2001–2008 campaigns. The sad but colourful result of porous coarse pottery stored in plastic bags while still damp: diverse fungi have digested the paper label identifying the unfortunate victims of an unexpected rain shower (image O. Nieuwenhuyse).

After they were brought to the dig house, the *zambils* were first checked for administrative consistency – did they really all have a label? This reduced the number of orphaned find bags to almost zero. Subsequently, the material was washed and dried in the sun. We took special care with the washing, making the local persons hired for this tedious job aware of the vulnerability of certain types of post-firing treatments. In principle a thorough washing may eliminate most of a plastered-and-painted surface, but in practice this risk proved to be negligible. Drying the material for storage occasionally posed some problems, however. The excavations took place either at the end of the summer or in spring, and damp, rainy weather conditions were common. With the excavations continuing at full speed, there was not always sufficient space to lay out *zambils* with washed sherds until the previous ones had all dried properly (Fig. 3.2). Sometimes sherds had to be stored in plastic while they were still damp. When these bags were later recovered for study, a number of the paper labels inside had rotted to the degree that they had become indecipherable (Fig. 3.3). We counted the sherds contained in each of these bags to assess the potential bias in the overall counts. This showed the percentage of rain-orphaned sherds to be so small as to be statistically meaningless.[3]

After being counted, undiagnostic body sherds were discarded. We did not rebury them on the site, but

Fig. 3.4 Tell Sabi Abyad. Archaeology student Eliza Girotto of the University of Venice studying a large Standard Ware jar (image O. Nieuwenhuyse; Tell Sabi Abyad Project).

Fig. 3.5 Tell Sabi Abyad. Restorer Renske Dooijes of the National Museum of Archaeology Leiden reconstructing the base of a large Standard Ware vessel (image O. Nieuwenhuyse; Tell Sabi Abyad Project).

deposited them at a specially assigned location close to the dig house.[4] Diagnostic sherds kept for future study were stored in the dig house itself at the end of each campaign. At the start of each new campaign these rooms were used for living by the team, and the sherds evacuated. It is likely that the annual emptying and refilling of rooms influenced the degree of fragmentation of the low-fired, soft-bodied pottery sherds, but this remains impossible to calculate with any precision. After they had been studied, most diagnostics were repacked, to be kept as a safety measure until after their publication, after which they, too, shall find their own little *stairways to heaven* (i.e. they shall be discarded). A good, representative selection of diagnostic material was put apart as part of the reference collection of pottery from Tell Sabi Abyad. This collection was handed over to the depot of the archaeological museum of Raqqa (Fig. 3.4, Fig. 3.5).

3.3. How much pottery?

How much pottery? This simple question is central to any ceramic analysis. In this report I rely on three different ways of quantifying the excavated material: Raw Counts, Estimated Vessels Represented (EVR), and Estimated Vessel Equivalent (EVE). As these are each calculated on the basis of different subsets of material, they give very different outcomes in absolute terms (Orton 1993). In addition, we took estimates of sherd density. None of these estimates present the exact number of ceramic vessels originally present in the systemic context. The relationship between the parent population (i.e. the numbers of vessels used in the past) and the sample thereof (i.e. the excavated pottery) remains highly complex (Orton 1980, 162, 1993, 178); all these statistics offer are different ways for statistical comparison between contexts, phases or sites.

The simplest measure to calculate is the Raw Counts. Sherds were spread out one excavation unit after the other, grouped by ware, decoration type and fragmentation, and the numbers in each category counted.[5] Raw Counts remains the most widely used way of quantifying pottery assemblages. However, their simplicity of measurement hides deeper complexities when one considers that different wares, different vessel shapes, and different excavated contexts produce varying conditions for fragmentation (Orton 1993; Rice 1987, 291). An intact bowl from a burial counts as one fragment, whereas the same bowl dispersed across an open area breaks into many sherds; a miniature goblet yields far less sherds than a huge storage jar, and so on. It has become conventional in ceramic studies to estimate some measure of the minimal number of individual pottery vessels present in the excavated units (Orton *et al.* 1993, 172; Thissen 2001). This goal may be reached in various ways; at Tell Sabi Abyad we used the number of rim sherds to estimate the minimum number of vessels represented (EVR). After taking the Raw Counts, all rim fragments that were attributed to the same vessel with some confidence (despite not always fitting together on grounds of form), were estimated to represent one single vessel in the subsequent analysis.

Both statistics, however, belie the fact that pottery fragments vary in terms of how severely they can fragment. In the EVR, each insignificant piece of rim gains as much weight as a complete artefact. The EVR, furthermore, is dependent on how much of the site or context has been excavated (Orton 1980, 163–164). The Estimated Vessel Equivalent (EVE) has been proposed as a compensation for these distorting results (Orton 1980, 164–167, 1985; Orton *et al.* 1993, 169–171). This statistical method estimates the maximum number of vessels that might theoretically be reconstructed from the excavated sample by adding the preserved proportions of the available fragments. The EVE is calculated by estimating the proportion of the original vessel that each fragment represents, then, adding these measurements and finally dividing this total by the number of fragments. In practice, this is impossible to do with body sherds as these yield few fits. Here we used rim sherds for calculating

EVE's.[6] Of each rim fragment for which a diameter measurement could be reconstructed, we also estimated the proportion of the original orifice this rim represented.

The procedure of weighing the excavated pottery was introduced at Tell Sabi Abyad in 2004.[7] Weight offers an interesting piece of information in itself. Clearly, in order to assess vessel function it is useful to have information regarding its weight, as this relates directly to key issues such as portability and durability. If the degree of fragmentation of a broken pot can be estimated with some certainty, it is sometimes possible to reconstruct the original weight of the vessel. Furthermore, the introduction of weight gives a new dynamic to the issue of absolute and *relative* quantity. Weight measurements offer a complementary statistic to the three estimates discussed above. Raw Counts, EVR and EVE may all be computed on the basis of both counts and weights. In theory, as with EVR and EVE, weights may compensate for differential preservation: no matter how many sherds a pot fragments into (Raw Counts), their net weight remains the same. In practice, the more fragmented the artefact, the less likely it is that all sherds are recollected.

While all of these measurements may reflect *relative* quantities, they do not indicate *absolute* quantities. This is, simply, because excavated volumes are hugely dissimilar from one context to another. Archaeological contexts vary widely in lateral extent and depth. Choices made by the excavators determine how much of each context or stratum is excavated and, hence, how much material reaches the specialists. Comparisons of raw artefact counts across contexts are therefore meaningless (Pollock 1999, 137). For this reason, we usually employ relative quantities for such comparisons (e.g. percentages and proportions). This, however, is problematic as well, because the percentage of any one category depends on the percentages of all the others (Pollock 1999, 137). At Tell Sabi Abyad the investigation of changes in the absolute quantities of ceramic containers formed an important research goal in itself. In short, we needed a measure of artefact density. Density measures have so far been slow to make an impact in Near Eastern research (Bernbeck 2010, 96ff; Bernbeck and Pollock 2003; Gopher and Eyal 2012; Parker and Kennedy 2010; Pollock 1999; Wright *et al.* 1980). One conceptual barrier may be the strong emphasis on fast, large-scale excavating that still dominates the field, which resists the development of such fine-tuned, but time-consuming procedures (Pollock 1999, 132). A major practical obstacle to most excavators is the efficient incorporation of procedures for calculating soil volumes into the excavation process.

At Tell Sabi Abyad no soil volume counts were taken during the excavations. In order to arrive at approximate artefact densities, we computed the excavated volume post hoc on the basis of field drawings and measurements of size and elevation. We fully acknowledge that this introduces a fair amount of imprecision, but on the other hand it gives us an acknowledged data set to work with. We did not compute densities for each level in every trench. Instead we selected trenches that met two criteria. Firstly, they had to be trenches in which the excavated pottery was counted in its totality. Secondly, their vertical stratigraphy had to be deemed relatively secure to minimise the statistical 'loss' of sherds due to their allocation to stratigraphically 'mixed' levels. A total of ten trenches initially met both of these conditions. Soil volumes were then calculated for each level within each trench by treating them as simplified geometrical volumes in a GIS programme, using the three-dimensional coordinates from the field plans and section baulks. This yielded volume estimates, but several ensuing density calculations were either suspiciously low or unrealistically high. Closer inspection exposed instances of outliers caused by incomplete ceramic processing or by the relatively frequent allocations to 'mixed' levels for specific levels within some trenches, which we had overlooked when we matched trenches to our second criterion; these two factors contributed to erroneously low-density values. A few instances of conspicuously high sherd densities were attributed to discrepancies between the stratigraphic analysis itself (on the basis of which sherds were statistically distributed), and its visualisation through reconstructed floor plans and drawn section baulks. We omitted both types of outliers from the analysis. Further distortions were caused by deviation from the simplistic assumption of the computer program of neat geometric volumes, in the form of pits and elevation irregularities within trenches. This bias was not something we could easily solve at this stage in the analysis and it will simply be factored into our interpretation. In the end we gained a series of density measurements of sufficient validity for each level gathered from multiple excavated trenches. We will discuss these densities at the scale of the stratigraphic level (Chapter 11).

3.4. Measuring fragmentation

The pottery analysis potentially gives valuable information concerning depositional practices and post-depositional, taphonomic processes that formed a site. After the first introduction of pottery usage around 7000 cal BC, the formation of *any* site in the Near East would include a fair amount of pottery sherds in its soil matrix. Apart from human agency and culturally-determined discard practices, pottery sherds did not escape the broad spectrum of post-depositional taphonomic processes that form Near Eastern tells. Some aspects of fragmentation can easily be included in the analytical procedures at no great cost of time.

In practice, ceramic fragmentation remains analytically problematic. Firstly, although there has been a vast amount of work on fragmentation processes in archaeology, this work has not yielded ready-made, universally applicable models that can conveniently be transposed onto all archaeological sites. So far, very few prehistoric ceramic analyses in Near Eastern archaeology have included a quantified discussion of fragmentation (but see Bernbeck

2010; Nieuwenhuyse 2007; Verhoeven 1999). As a result, comparative data from the region hardly exists. Due to lack of funding and time, moreover, the geological strata of areas investigated by Near Eastern archaeology usually remain poorly investigated. At Tell Sabi Abyad geomorphological or micro-stratigraphic studies were not part of the research framework. While we may confidently reconstruct the various settlement plans and stratification histories (Chapter 2), these remain poorly understood from a site-formation perspective. It is possible to pin-point the ceramic data onto a simplified axis of fragmentation from 'presumably primary' to 'probably tertiary', but it remains impossible to unravel the complex constellation of specific taphonomic processes involved.[8] Finally, it is evident that ceramic patterns by themselves give a rather one-sided 'tunnel perspective'. Eventually these patterns should be integrated in a fuller, contextualised picture of artefact fragmentation and deposition that includes the study of alternative artefact categories excavated at the site. In sum, I shall discuss aspects of ceramic fragmentation, however these are presented in a largely descriptive manner, and act as a preliminary contribution towards understanding ceramic deposition and the taphonomic forces of the site.

In the counts, we divided the material into categories of completeness. All excavated pottery items were classified as: complete, incomplete but having an intact section (having both rim and base), a fragmented rim, body, base, or as 'other'. Certain small, thick-walled and shock-resistant pottery types, such as husking trays, tend to be over-represented in the category of 'complete'. Some fragile wares on the other hand, produced almost no complete shapes whatsoever. To overcome this bias, we measured the proportion of the original circumference preserved of each rim and base, called the 'radius' (Orton 1980, 165).[9] This offers a subtler, quantified measure of fragmentation. Earlier work at Tell Sabi Abyad has shown that the radius offers useful information for contextually exploring differences in deposition (Nieuwenhuyse 2007, 59–60). Rims and bases differ hugely in their preservation: bases are thicker, stronger, and on the whole preserve much better (Nieuwenhuyse 2007, 60; Orton 1980, 166–167). Here we shall mainly rely on the rim radius for measuring fragmentation.[10]

An additional potentially useful fragmentation index is the *Body Mass Index* (BMI). This term refers to the average preserved weight of the excavated body sherds, calculated simply by dividing the aggregate weight of the body sherds from each excavation unit by the total body count. This statistic closely resembles the average sherd weight (Bernbeck 2010, 105). However, one issue in computing the average sherd weight is the potential outlier effect of the occasional complete pottery vessel. Formally, a complete vessel is just another 'sherd', but in terms of preservation, size and weight, and presumably also with regard to its depositional biography, it deviates strongly from the far majority of body sherds. To avoid this bias, we calculated the BMI on the basis of body sherds only, excluding complete vessels and fragments of rims and bases.

As with average sherd weight, BMI may reveal processes of abandonment that characterise specific contexts as well as overall taphonomic processes. Generally, the BMI is expected to decrease when moving from primary to secondary and into tertiary contexts (Bernbeck 2010; Verhoeven 1999). It should be kept in mind, however, that as far as taphonomy is concerned, BMI is the most straight-forward when comparing contexts from the same site, from roughly the same period, and for the same type of pottery. If measured across wares or over time-scales characterised by significant ceramic change, factors other than deposition intervene to complicate BMI. For instance, as suggested by data from Operation III, the BMI may change as a result of innovations in ceramic technology.

Various post-depositional processes leave traces that may be observed on sherds in the field. Fracture erosion may serve as an indication for the freshness of the break and the degree of post-depositional movement. Sherds from tertiary contexts may be expected to show softened, rounded fractures whereas those from primary contexts tend to be sharper. Crusts may have accumulated at the surface of the sherd, indicating specific soil conditions during deposition. At Tell Sabi Abyad, thick, plaster-like crusts often betray deposition for extended periods close to the surface of the mound, where fluctuating moisture conditions cause significant movement of salts though the soil matrix. Such accretions often caused the painted decoration to wear off. Sherds may be damaged by heat, for instance after deposition in kilns or fire places, or when destroyed by fire. The burnt tholos at Arpachiyah and the Burnt Village at Tell Sabi Abyad represent well-known case studies of the latter (Campbell 1992; Nieuwenhuyse 2007, 61–64). We included such observations in the descriptions.

3.5. Defining pottery wares

A major concept structuring both the ceramic analysis at Tell Sabi Abyad and the presentation in this report is that of defining a ceramic ware. The ware concept has gained a wide currency in Near Eastern archaeology, but it is often rather ambiguously applied. Stylistic impressions have traditionally played an important role in defining ceramic wares and separate Late Neolithic culture groups in the Near East. The Late Neolithic of Upper Mesopotamia was characterised by a profusion of pottery styles, some of which have become the defining element for entire culture groups (Bernbeck 1994; Bernbeck and Nieuwenhuyse 2013; Campbell 1992; Gut 1995; Nieuwenhuyse 2007). Presently, a plethora of terminology exists but there is an unfortunate lack of agreement on these terms, or even on the criteria for distinguishing wares. Very similar-looking wares sometimes receive different terms, whereas similar terms may carry very different meanings to different scholars. Part of the confusion arises from the poor understanding of the ceramic technology underlying the various ceramic categories, and the often implicit mixing of technological, functional and stylistic properties in the definitions. To steer away from terminological confusion, it is important to be

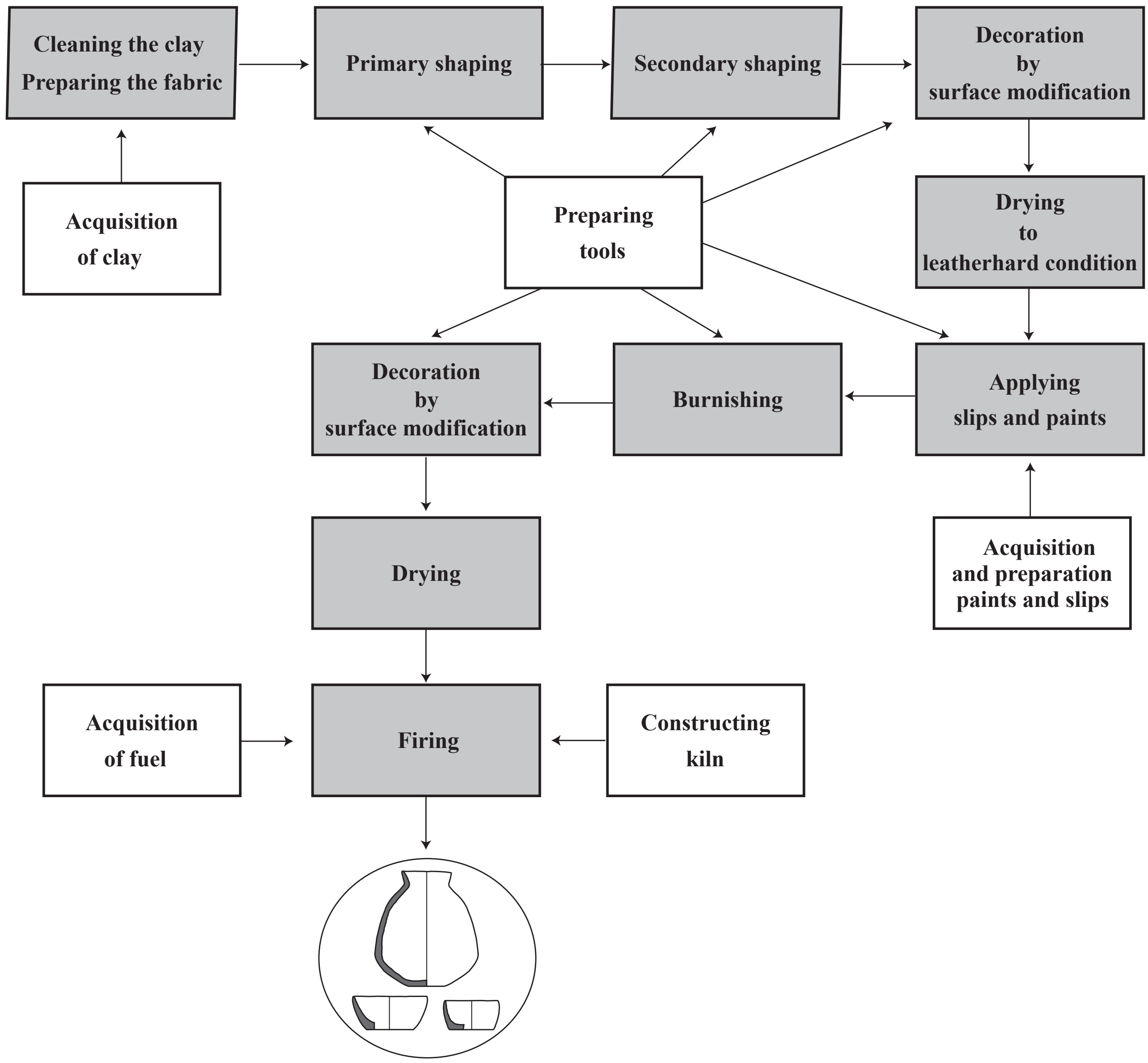


Fig. 3.6 Tell Sabi Abyad. Generalised Late Neolithic ceramic chaîne opératoire *(image O. Nieuwenhuyse).*

explicit, and to keep analyses of style analytically separate from those considering ceramic technology.

In this report the definition of a ware rests on the concept of the *chaîne opératoire*. Adopted originally from Leroi-Gourhan's work on lithic tools (1964), the concept consists of reconstructing the series of operations which transform raw materials into a manufactured finished product (Van der Leeuw 1993, 240). Each step is irreversible and influences the range of possibilities for the next stages. The *chaîne opératoire* has emerged as a major analytical tool in studies of prehistoric ceramics in the Near East (Bernbeck 1994, 2010; Godon 2010; Le Mière 1979, 2001; Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007; Robert 2010; Rosen and Roux (eds.) 2009; Roux and Corbetta 1989; Roux and Courty 2016).

The concept was implicit in what has been called the 'Leiden approach' to pottery studies, founded in the 1960's by Franken (Franken 1995; van As 1992, 2004). Franken criticised the persistent tendency in his days to construct pottery typologies and ensuing cultural classifications on the basis of pottery shape. Instead, Franken sought to understand the potter's craft by reconstructing the choices made by the potter: from selecting certain raw materials and preparing the clay fabric, to using particular shaping methods and decorative techniques, to the firing (Franken and Kalsbeek 1969, 1975). Franken understood that these choices leave distinct traces on the material. These may often be observed without the use of complicated machinery or costly specialist procedures: much of the potter's craft can be reconstructed by adopting a 'low tech' approach (Godon 2010; Rye 1981; van As 2004). Franken and his followers initiated a fair amount of valuable ethno-archaeological study of traditional and non-western potters, published annually in the *Leiden Journal of Pottery Studies*.

A ceramic *chaîne opératoire* – in Franken's terms, the choices made by the potter – is in its very essence culturally specific (Fig. 3.6). Potters were not 'free' to act as they like. Potters must be keenly aware of the natural properties of the available raw materials, and ceramic production is always embedded within complex socio-economic and ecological frameworks (Arnold 1985). However, pottery production typically allows for a wide range of technological choices (Mahias 1993; van der Leeuw 1993). Specific choices made by the potters vary cross-culturally depending on systems of technological knowledge, gender relations, social representations of technology, and factors of consumption and demand. This makes the *chaîne opératoire* a useful tool not only for categorisation and definition, but also as an essential first step towards the further investigation of the social and ideological aspects of technology (Dobres 2000; Gosselain 1998; Hoffman and Dobres 1999; Jones 2002; Lemonnier 1989, 1993).

Investigators should explicitly state which elements of the production chain are included in the categorisations resulting from the ceramic *chaîne opératoire*, and which ones are deemed to be of lesser importance. In this report, key elements in the definition of a ware are: the raw materials used for making pottery, the preparation of the fabric, and the firing techniques. Although primary and secondary shaping methods varied, these were not used to define distinct ware categories. Similarly, decorative style was not a requisite factor to distinguish separate wares. Some wares were left entirely undecorated while others received a range of decorative techniques; these variations shall be presented separately for each ware (Chapter 4). Finally, although the availability of tools or productive facilities such as kilns looms large in the definition of the operational chain (Fig. 3.6), these shall not be discussed in this report; for present purposes the ware definitions rest on observations on the material itself, the pottery sherds.

3.6. Reconstructing vessel shape

Broadly speaking, two mutually exclusive approaches to analysing and classifying Late Neolithic pottery shapes are currently *en vogue* amongst prehistoric pottery specialists working in Upper Mesopotamia, and in this report I shall be using them both.

One approach, the oldest, relies on a set of idealised, standardised shapes. Using a type list, the researcher attributes individual fragments to the proper type on the basis of the presence/absence of a neck, the shape of the rim, the relative size, and so on. Mallowan already pioneered this methodology with such standardised type lists (Mallowan and Cruickshank-Rose 1935, fig. 25), and afterwards this approach has successfully been applied to ceramic assemblages from the Halaf period (e.g. Campbell 1995; Cruells 2004; Davidson 1977; Gomez *et al.* 2014; Le Mière and Nieuwenhuyse 1996; Watson and Leblanc 1990). Indeed, for the Halaf period, statistical analysis of associations between individual morphological properties of Halaf Fine Ware pottery has supported the existence of such discrete morphological categories (Amirov and Deopak 1997). Some Halaf types have gained generally accepted names, such as the *Trichterrandbecher* and *Büchsen* (both Middle-Late Halaf), or the 'short-collared bowl' (Transitional Period). At Tell Sabi Abyad as well we have constructed a set of ideal categories of shape which are used in the analysis. Three issues, however, point to the necessity of using the alternative method as well: fragmentation, the reduction of meaningful variation, and the assumption of standardisation.

First, idealised lists face great challenges when confronted with severely fragmented material. Typically, complete profiles are rare for any prehistoric site. It cannot simply be assumed that ideal types equally lose their recognition during fragmentation. A cream bowl, for instance, becomes instantly unrecognisable as soon as its body becomes separated from the rim, whereas a convex-sided bowl remains identifiable even when most of the vessel has disappeared. Contextual differences in the frequencies of specific ideal types may potentially reflect differential fragmentation rather than different activities in the past. In the field, facing a discouraging pile of what are euphemistically termed 'rim fragments', the researcher faces a tough decision what to do with fragments that may belong to multiple ideal types. Should there be an arbitrary 'rule of thumb' for including such fragments to type categories, or rather to use some hierarchical system of classifying shapes (e.g. Nieuwenhuyse 2000a)?

Secondly, the high degree of reduction inherent in the idealised type lists is by itself problematic. In practice, few researchers of the prehistoric Near East take the trouble of showing the degree to which closely-resembling pottery types are indeed discrete, and it is rare for typological descriptions to show the internal variation of individual types. Idealised lists reduce much meaningful variation to a simplified set of fixed shapes, potentially reifying morphological continuity into a rigid set of discrete, artificial categories. Often this variation is exactly what makes the material so interesting. Idealised lists have difficulties dealing with transitional states: shapes that do not fit either type, or perhaps both. They are ill-equipped to deal with gradual morphological change through time. In Upper Mesopotamia, ceramic production in the 7th millennium was characterised by a series of meaningful long-term changes in the morphology that would be entirely invisible if the type-list were the only method

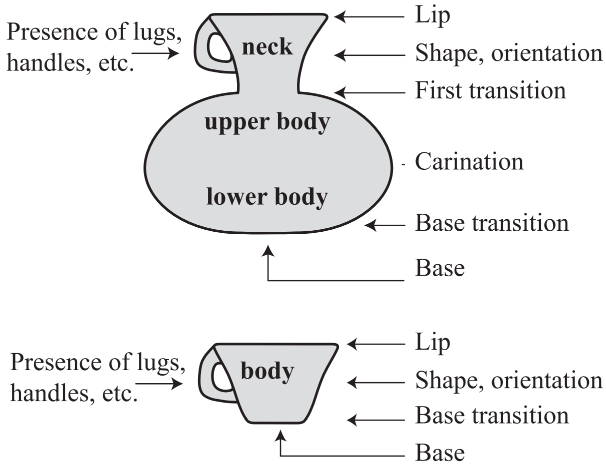


Fig. 3.7 Tell Sabi Abyad. Definitions of terms for describing vessel shape. Upper: complex shapes. Lower: simple shapes (after Nieuwenhuyse 2008: fig. 6.3.1).

used. At Tell Sabi Abyad the ‘abrupt’ introduction of the jar in level A1 is just one example: the type list approach yields an image of rapid change whereas a fine-tuned morphological analysis in fact shows a much more gradual development.

Finally, the idealised type lists may work to some degree with Halaf Fine Ware, but they become meaningless when applied to the less-standardised wares that characterise the various ceramic assemblages prior to the Halaf period in Upper Mesopotamia. Applied uncritically to a mid-7th millennium ceramic assemblage, the type list approach yields a single, if heterogeneous type: the ‘plain-rim bowl’! This is certainly not to say that the earlier assemblage was entirely undifferentiated, but its internal variation simply does not correspond to the patterns seen in later stages. Instead of comparing contexts and sites on the basis of presence/absence of items on type lists, quantified estimates of morphological variation on multiple axes may be more valuable.

A useful alternative to the type-list approach is to describe the elementary properties of vessel shape. In this method of analysis, each of these may be explored separately, or they may be investigated jointly, searching for meaningful statistical correlations between them. The latter may be conducted using elaborate statistical tools; here we shall stay at a more basic level. Marie Le Mière has been among the pioneers propagating this method for the study of Late Neolithic ceramics (Le Mière 1979, 1986). It has been applied most successfully to a suite of 7th–6th millennium sites (e.g. Le Mière 1986; Le Mière and Nieuwenhuyse 1996; Faura 1996).

In this report, then, we employ both strategies. We began the morphological analysis by exploring the individual elements of shape, moving from lip to base (Figs 3.7–Fig. 3.9). For each diagnostic rim fragment, both its shape and orientation were measured as separate states (Fig. 3.8). If appendages were present, these were described separately (Fig. 3.10), so that their presence could be explored independently of vessel type. The

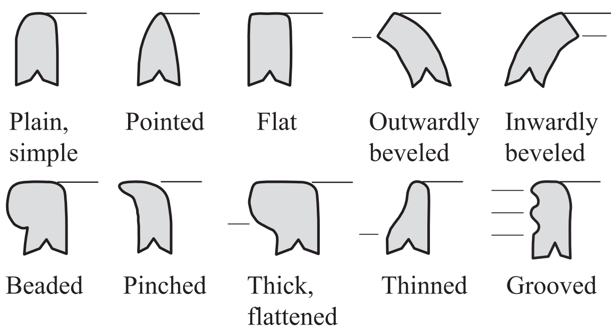


Fig. 3.8 Tell Sabi Abyad. Definitions of terms for describing rim shape (after Nieuwenhuyse 2008: fig. 6.3.2).

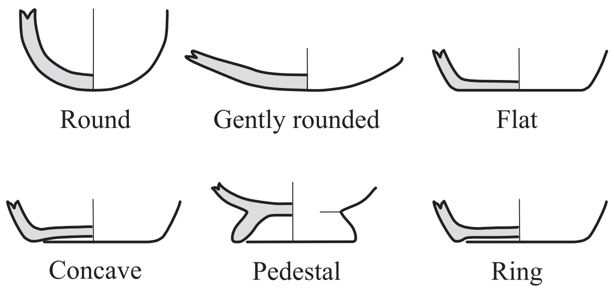


Fig. 3.9 Tell Sabi Abyad. Definitions of terms for describing base shape (after Nieuwenhuyse 2008: fig. 6.3.3).

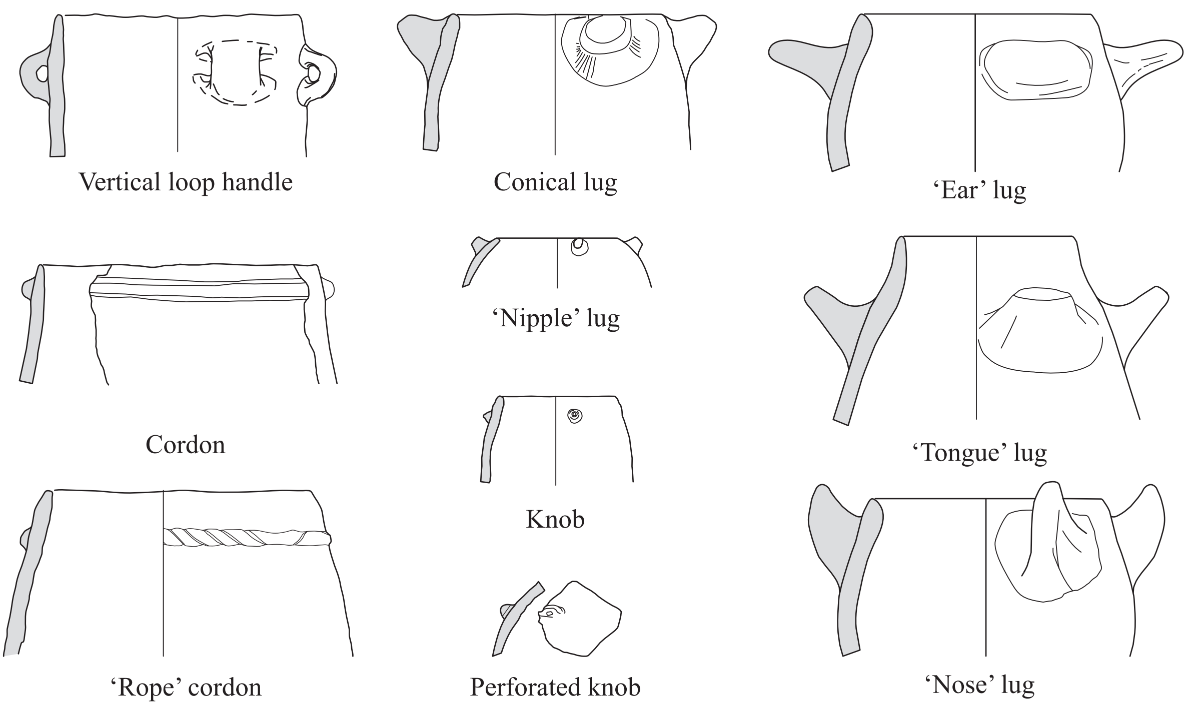


Fig. 3.10 Tell Sabi Abyad. Definitions of terms for describing appendages (image O. Nieuwenhuyse).

´ideal´ types were defined on the basis of the geometrical characteristics of the vessel profile (Shepard 1954). In addition to shape, we used size to establish typological distinctions, in particular: rim diameter, vessel height and collar height (for jars). Elaborate typologies resulting from previous work (Akkermans 1989b, 1993; Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007) were retained, but in each case we inspected the newly-excavated material to see if it fitted the earlier typological straight-jackets. This resulted in a complex series of types, which shall be discussed for each ware separately (Chapter 4).

3.7. Estimating vessel volume

Potentially, volumes allow the possibility of alternative typological classifications, one based on capacity rather than overall size (Henrickson and McDonald 1983; Roaf 1989; Thalmann 2007). Clearly, in order to discuss the potential roles of pottery containers had in the past it is crucial to have an estimate of their capacities: how much stuff did people contain in them? In practice, integrating volume estimates in pottery studies are challenging. First, typically only a small portion of all excavated vessels is sufficiently complete to allow a reliable estimate of its volumes (Thalmann 2007, 431). In this study, a total of 473 complete or almost intact shapes allowed the reconstruction of their volume; these represent no more than 7% of all diagnostic rim sherds (and a much smaller, minute fraction of the bulk). This almost negligible portion can hardly be said to be fully representative. Further, the list is biased towards *smaller* types of containers, simply because these sturdy objects more often tend to have both a rim and a base intact to facilitate the reconstruction of profile. Finally, the non-circularity of the vessel shapes may pose problems (Rodriguez and Hastorf 2013). Oval shapes were common at prehistoric Tell Sabi Abyad, but they were hardly ever sufficiently preserved to allow reliable estimates of their width and length. Hence, the capacities of important oval types such as the husking tray could be measured only in exceptional cases. Measurements given in this book are not so much presented as an accurate reflection of the range of vessel volumes in the past but rather as a general indication for broader trends.

The calculation of vessel volume posed a methodological challenge. The archaeological literature offers several well-established methods, including approaching the container as if it were an abstract geometric shape (Ericson and Stickel 1973; Orton *et al.* 1993, 158; Rice 1987, 219), dividing the profile *by hand* in stacked geometric cylinders or truncated cones, computing the volume of each of them and adding the results (Duistermaat 2008, 40–41; Nelson 1985; Orton *et al.* 1993, 157–158; Rice 1987, 221–222; Roaf 1989; Smith 1983) or filling the (complete) vessel with a substance and measuring the volume of that substance (e.g. Nieuwenhuyse 2009a; Rodriguez and Hastorf 2013). While these approaches work fairly well, they share two major shortcomings: they tend to be time consuming and on the whole they are rather inaccurate (Duistermaat 2008, 41; Rodriguez and Hastorf 2013, 1183; Thalmann 2007, 431–432). The third approach, evidently, works only with intact pottery objects.

More recent methods take the reconstructed contour of the vessel as a starting point. One much used piece of software has been the 'pot utility tool' developed for the ARCANE project by Jean-Paul Thalmann in 2006, still circulating on the web (Thalmann 2007). This program approximated the volume of the vessel by treating it as a stack of truncated cones. The operator entered the drawing into the computer, marking the interior contour with the graphics cursor by adding as many points as is deemed necessary for a good approximation. This valuable program, however, did not incorporate the reduction in volume if vessels had a strongly concave base pressing upward the elevation of the central part of the base.

For these reasons, a new program was built especially for the *Relentlessly* project by E. H. Dooijes (University of Amsterdam). Similar to Thalmann's tool, using the graphics cursor and starting at the central bottom position (lower end of the virtual axis), the operator constructs a straight-line approximation of the contour by putting as many breakpoints along as necessary. These breakpoints then determine the subdivision of the virtual volume into a stack of cone-slices. Computing the full virtual volume is now a simple matter. In this program, the operator has the choice to determine the scale either from the given height or rim diameter.[11] The tool corrects automatically for concavity of the base by subtracting the volume space of the interior base surface. If the vessel's rim is oval (ellipsoid-like) with smallest diameter a and largest diameter b, the program can still give useful results if instead of the rim diameter d, the value d' = sqrt(a*b) is entered.[12] Figure 3.11 shows a complete marking.

Usefully, the output of the program lists values for volume (litres), rim diameter, height, maximum (interior) body diameter, and the possible elevation of the bottom.

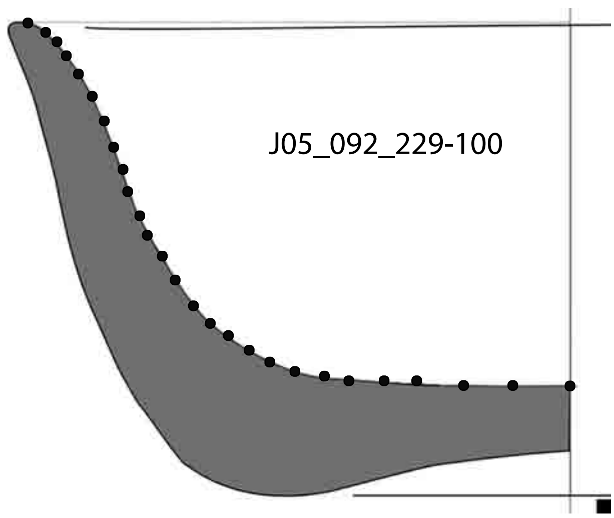


Fig. 3.11 Tell Sabi Abyad. Reconstructing vessel volume of a bowl with concave base (image E. H. Dooijes).

In theory all of these should match the measures as shown on the pottery drawing; hence, the program gives the opportunity to check and correct these parameters. A degree of scepticism is warranted with the rather exact-looking volume measurements, however. It should always be taken into account that relative errors in any of these linear dimensions will result in errors in the estimated volume three times as large. For instance, if the error (uncertainty) in reconstructing the rim diameters is, say, of the order 5%, which is probably quite optimistic, the resulting error in the computed volume will be 15%. The program furthermore assumes there are no systematic errors in the vertical axis position of the fragment as reconstructed on the drawing. This assumption may not be entirely realistic in the case of the irregularly-shaped, coarsely-made Late Neolithic pottery. The volume measurements presented in this book should therefore be seen as useful approximations of value mostly in a relative manner.

3.8. Deconstructing decoration

After the excavations in Operations III, IV, and V had begun, it was initially thought that the analysis of decorative style would be largely non-relevant to this report. This was due to the limited quantity of decorated pottery awaiting study. The little bit of decorated pottery from Operation V all came from poorly understood contexts, and could conveniently be summarised (Chapter 12). The title of this book accurately reflects one of the main characteristics of the ceramics excavated in Operation III. Decorated pottery forms a significant part of the ceramic assemblage only after 6200 cal BC, and post-6200 cal BC levels (Pre-Halaf and subsequent periods) were excavated on a restricted scale at Operation III. The Early Halaf levels attributed to the C-Sequence was studied only marginally for this report, while the Halaf Fine Ware attributed to the D-Sequence is stratigraphically problematic, making it an unreliable source for a detailed style analysis. In short, why bother with a concise presentation of decorative techniques, design 'grammars' and motifs?

First, simply, we *did* have some post-6200 cal BC decorated ceramics from secure contexts, and we felt we should document their decoration properly. Even if the sample remains quite small, it adds depth to the growing database at Tell Sabi Abyad, and if properly described will enable comparisons with contexts excavated elsewhere. Furthermore, we discovered that the very earliest stages of the post-6200 cal BC period, the approximate time represented by level A1, yielded an intriguing decorative technique not previously attested at the site – the so-called plastered-and-painted Standard Ware (see Chapter 4). Moreover, it dawned upon our team that already during the Pre-Halaf period some decorated categories displayed significant style change, foreshadowing and perhaps setting the stage for subsequent developments during the Transitional Period. In previous work, the start of the Pre-Halaf period had always remained enigmatic (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007); the work in Operation III now gave us the opportunity to study the very start of the 'painted pottery revolution' in detail. Finally, surprisingly, we observed that the earliest, mineral-tempered wares at the very beginning of the Pottery Neolithic were sometimes decorated. We wished to integrate their decorative style within the style analysis as a whole.

The method for describing decorative style during these years was essentially the same as developed in earlier work on Operation I (Nieuwenhuyse 2007, 157–159), and shall be briefly summarised. Following ethnographic work (Hardin-Friedrich 1970, 1983; Miller 1985) and archaeological applications thereof (Graves 1982; Akkermans 1989b; Bernbeck 1994, 1999; Hole 1984; Thissen 1992), we adopted a two-level framework of analysis, distinguishing between design *structure* and content. The term *structure* refers to those aspects of the painted decoration that relate to the way the still-empty surface of the vessel is conceived of as a surface to be divided by placing horizontal and, occasionally, vertical lines. For each decorated item, we counted the number of such structural lines, and we noted where they were placed: at the rim, shoulder or point of maximum vessel diameter, or as additional lines on the neck or body (Fig. 3.12). These lines both define and delimit zones of decoration: the painted design configurations ('motifs') were as a rule always contained within such zones. For each individual motif observed we noted the precise manner it was placed within its zone: either bounded to the structural lines or 'free floating'. In the case of multiple motifs on the same vessel, we also coded the order in which they occurred.

The *content* of the design refers to the specific design unit, or motif, chosen by the potter. We made use of a long (and growing) type list of motifs. In principle, the term design unit refers to the minimum arrangement of elements that comprise the full range of variation of element combinations within a spatial division (Hardin-Friedrich 1983; Pollock 1983). In practice, motifs and higher-level design configurations at an archaeological site are often fragmented beyond recognition. In order for a motif to be identifiable, it should have at least the original unit visible and, preferably, one copy of it using rules of symmetry (Washburn and Crowe 1988, 53). If this minimum requirement is not met, it is coded as 'lost'.

Anthropologists studying linear painted decoration styles have sometimes maintained that potters conceived of their work hierarchically. That is: structure first, content second (Hardin-Friedrich 1970, 1983). Potters began with delineating decoration zones on the empty vessel surface, which they then filled with motifs. We initially assumed that Pre-Halaf to Early Halaf potters, too, must have worked hierarchically (Akkermans 1989b; Nieuwenhuyse 2007, 157). This assumption has been shown to be overly naive. When Gaby Castro-Gessner (2008, 2013) put it to the test, she found that only about one-third of the Early Halaf painted sherds followed the

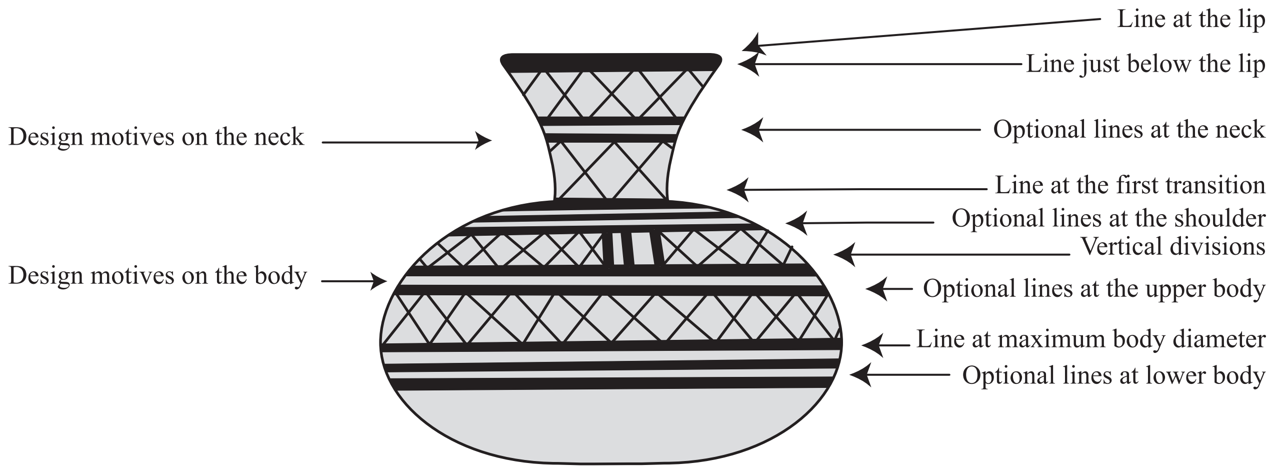


Fig. 3.12 Tell Sabi Abyad. Spatial units distinguished in the stylistic analysis (after Nieuwenhuyse 2007: fig. 7.2.1).

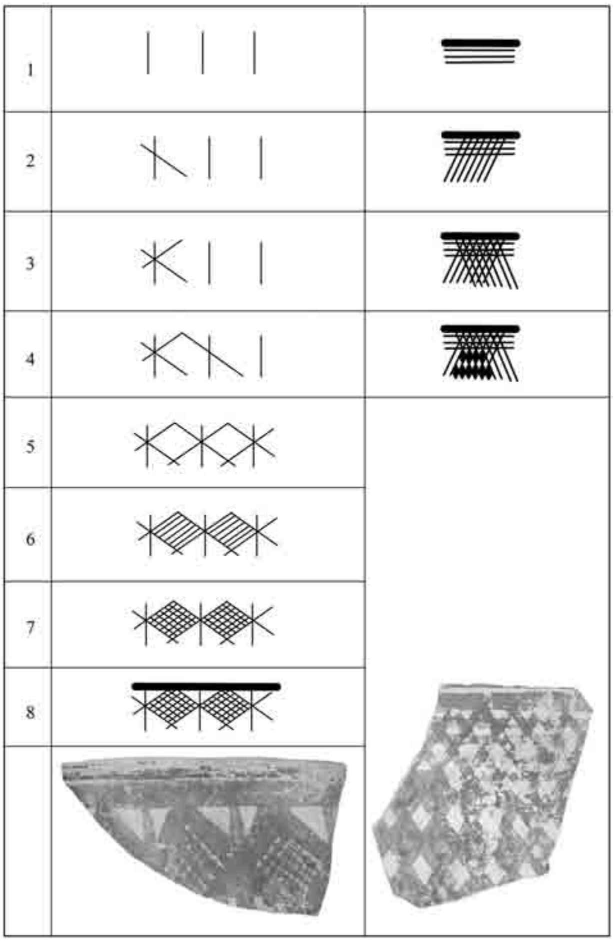


Fig. 3.13 Tell Sabi Abyad (Operation I, Early Halaf levels). The anatomy of a brush stroke. Right: Halaf Fine Ware body sherd. The horizontal structural band was painted first, the crosshatching afterwards (after Castro-Gessner 2008: 318, 540, fig. 6.25, table c.2, S.54). Left: Halaf Fine Ware rim fragment. The crosshatched lozenges were painted first, the horizontal band afterwards (after Castro-Gessner 2008: 320, 543, fig. 6.27, table c.4, S.51).

hierarchical prescription. In many instances Early Halaf potters worked exactly the other way around, painting the motifs first and the structural lines afterwards (Castro-Gessner 2008, 314).[13] Castro-Gessner has devised an ingenious system of exploring the *chaîne opératoire* of the painted designs, effectively opening up a whole new territory for style analysis (Fig. 3.13). This level of stylistic analysis fell outside the boundaries of the present study. As a compromise, this report no longer makes any claims regarding the working order in which the designs were created. The analytical framework merely functions as a useful heuristic device for decoding the painted styles into measurable units suitable for analysis.

Importantly, while the procedure described in this section was originally devised for decoding complex painted design structures, it works equally well for far simpler, non-painted decorative styles. A simple knob applied onto the shoulder of a big storage vessel, for instance, can be analysed accordingly; applied decoration as a whole may be understood as having been subjected to a design 'grammar', albeit a very basic one. There remains an understandable tendency in studies of Late Neolithic pottery style to prioritise the intricate painted designs at the neglect of other, much less attractive decorative styles that often formed part of the same assemblages. However, a nuanced understanding of the social and symbolic meanings of any decorative style can only be gained by placing it in perspective. The non-painted decorative styles, too, were subjected to rules and expectations, and these should be studied as such. In this book we shall analyse each decorative style with the same analytical tools.

Notes

1 An exception was made for poorly-stratified material from Operation V that closely resembled Transitional Period contexts previously studied: here we limited ourselves to a selection of 'typical' sherds (Chapter 12).

2 All fits were recorded in the pottery Dbase, and may provide insights on site formation processes. Fitting sherds were put together after the counting, thus decreasing their fragmentation measurements and lowering the number of estimated vessels from that particular context.

3 To minimise loss caused by rotted labels, the identification information was subsequently copied with black marker on each sherd bag.

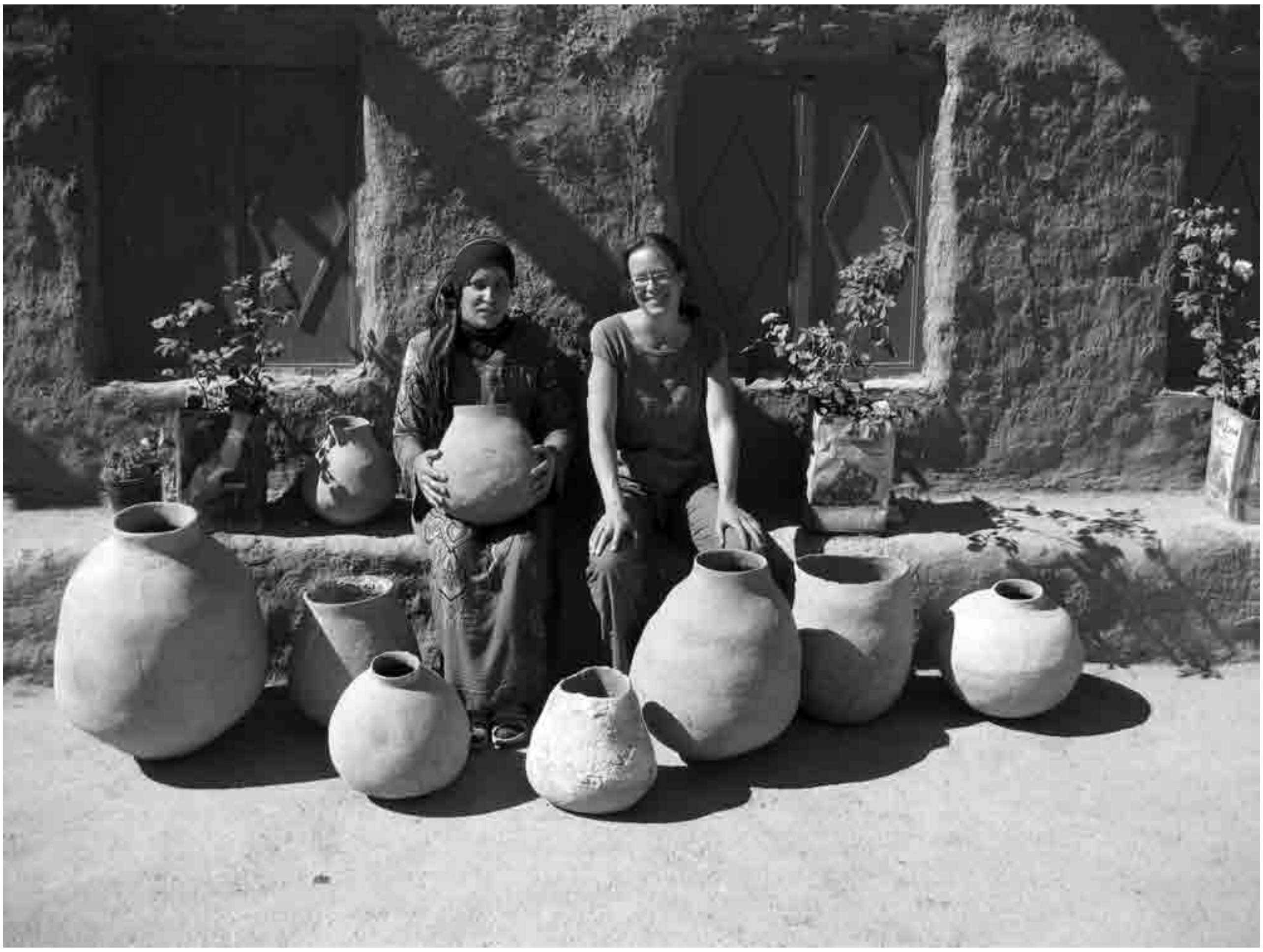


Fig. 3.14 Tell Sabi Abyad 2008. A collection of fully restored plain Standard Ware vessels in the Tell Sabi Abyad excavation house (left: project staff member Fatima al-Salim al-Mughlif; right: Renske Dooijes, National Museum of Antiquities Leiden) (image P. Akkermans; Tell Sabi Abyad project).

4 *Dust to dust:* discarded pottery sherds were left behind the dig house compound wall, at the location of the underground toilet pits. Here they are likely to bewilder future excavators of the village of Hammam et-Turkman.

5 While counting individual units ('pottery lots'), we searched for fitting sherds between units of the same spatial context. Fitting sherds were always counted separately with the unit in which they were excavated. After the counting they were combined in one unit, and henceforward treated as a single item.

6 In principle, bases may be used as an alternative to rims. However, indistinct, irregularly-shaped coarse bases were sometimes difficult to recognise as such, and bases are almost certainly under-represented in Raw Counts and EVR.

7 In the field, we included the weight measurements with the initial counting. After the quantity of each discrete category had been taken, each category in the count was weighed individually.

8 Faunal specialists at Tell Sabi Abyad face similar problems (Cavallo 2000; Russell 2010, 67–71).

9 We measured the radius in degrees. A complete rim or base has an intact circular radius of 360°. A vessel cut exactly in half has a preserved radius of 180°. A rim fragment with a radius of 45° represents 1/8 of the original vessel orifice, and so on.

10 Measuring the radius is not entirely unproblematic. It can only be done if a diameter can also be measured. With husking trays, which are always oval, no good estimate of the original circumference is usually possible. Hence, their degree of fragmentation remains difficult to assess quantitatively.

11 Alternatively, any other part of the drawing whose linear size is known beforehand may be used, as long as this distance is indicated with its endpoints.

12 The program has been written on a Macintosh computer in Free Pascal and uses the X11 graphics library. For entering and outputting textual and numerical data the Mac's Terminal facility is conveniently used.

13 In Castro-Gessner's analysis, the proportion of 'motif first, structural bands second' was found to vary by motif. This non-hierarchical working order was especially common with horizontal crosshatching (Castro-Gessner 2008, 314ff). This was the most popular motif in the Early Halaf level 3 (Operation I) from which Castro-Gessner took most of her style samples. Future work should investigate the relative importance of hierarchical working order in earlier stages.

Chapter 4

Analysing the prehistoric ceramic wares

Olivier Nieuwenhuyse

4.1. Introduction

In this chapter, I shall present definitions and quantified descriptions for the various prehistoric ceramic wares distinguished at Operation III. In total we identified ten distinct wares for the prehistoric period, plus a general category of 'Late Bronze Age'. In order of presentation these are: Standard Ware, Early Mineral Ware, Fine Mineral Tempered Ware, Grey-Black Ware, Mineral Coarse Ware, Dark-Faced Burnished Ware, Fine Painted Ware, Orange Fine Ware, Standard Fine Ware and, finally, Halaf Fine Ware. In addition to these prehistoric pottery groups we shall also present a very brief description of the Middle Assyrian pottery that we so frequently encountered in Operation III. This chapter is concerned with the pottery from Operation III exclusively, leaving apart the material from Operations IV and V. The ceramic assemblages excavated in Operations IV and V shall be discussed separately (Chapter 12).

I shall follow a roughly similar format for presenting each ware. Each section starts with a formal definition, listing the criteria we used in the field for attributing individual sherds to this specific category. None of these definitions is entirely unproblematic. The terminology we adopted in the field for categorising the ceramics from Tell Sabi Abyad arose from the extensive prior history of field research, both at Tell Sabi Abyad itself and elsewhere in Upper Mesopotamia. Scholars coming from different methodological and theoretical backgrounds have often presented widely divergent views, and ongoing research is continuously changing our insights in Late Neolithic pottery terminology. It is important that we make our formal definitions explicit, in order to allow comparisons with categorisations established at other excavated sites and to avoid terminological confusion. Following a formal definition, for each category I shall briefly discuss the stratigraphic background of the sample, and its degree of fragmentation. I then discuss the ware's *chaîne opératoire*, followed by vessel shape and, if relevant, decoration.

The various sections in this chapter are far from equal in length and detail. I shall mainly focus on the A-Sequence for teasing out long-term trends in detail. This is because the ceramic assemblage recovered from the A-Sequence at Tell Sabi Abyad – and the period it represents – has so far not been reported in any detail. The ceramic categories making up the ceramic assemblage in the A-levels include Standard Ware, Grey-Black Ware, Early Mineral Ware and Fine Mineral Tempered Ware. These groups were recovered in relatively large samples, allowing for a quantified analysis. In contrast, the groups characteristic for subsequent stages of the ceramic sequence were recovered in much more limited quantities. These wares, moreover, have already been discussed in detail elsewhere (Akkermans 1988; Nieuwenhuyse 2007). The Mineral Coarse Ware, Dark-Faced Burnished Ware, Fine Painted Ware, Orange Fine Ware and Standard Fine Ware shall therefore be treated much more briefly. The Halaf Fine Ware pottery from the C and D Sequences shall receive a somewhat more extended discussion, as the Middle-Late Halaf pottery from the D-Sequence has not previously been attested at Tell Sabi Abyad.

This chapter, then, aims to offer an analytical discussion of each ware separately. Evidently, a focus on individual wares in isolation is artificial. At no point in the ceramic sequence (with the exception of the earliest, Initial Pottery Neolithic levels A16 to A11) did the ceramic assemblage consist of solely a single ware. The complex composition of the ceramic assemblage is discussed in Chapter 11.

4.2. Standard Ware

4.2.1. The field definition of Standard Ware

Various specialist terms exist for the great bulk of coarse pottery recovered from Tell Sabi Abyad and many other 7th and early 6th millennium sites in the Upper Mesopotamian *Jezira*: Coarse Ware, Standard Ware, Coarsely-Made Plant-Tempered Ware, Hassuna 1a-type, Later Manifestation, or Assouad-Type pottery, to name but the most common (Adams 1983; Akkermans 1988, 1993; Caldwell 1983; Le Mière 1986, 2001; Le Mière and Nieuwenhuyse 1996, 129, 147, 184–185; Nieuwenhuyse 2000b, 2006, 2007; Lloyd and Safar 1945). To non-specialists these terms may all refer to what appears to be basically the same type of coarse, plant-tempered pottery, but apart from the existing regional variation, this terminological heterogeneity reflects significant technological innovation which transformed Coarse Ware ceramic production in the course of the 7th millennium B.C. In other words, these terms may not in reality refer to the same type of pottery.

For the purposes of this report we shall use the catch-all term *Standard Ware* (Le Mière and Nieuwenhuyse 1996). This reflects two considerations. Firstly, this great unrelenting mass of unprepossessing pottery is what remains after all other identifiable wares have been set apart (Le Mière and Nieuwenhuyse 1996, 129) – it is in many ways the 'standard' bulk of ceramics. Secondly, at Tell Sabi Abyad this category as a whole represents a long, uninterrupted chain of technological and stylistic development that would eventually result in the type of pottery that had already been termed Standard Ware in previous work (Le Mière and Nieuwenhuyse 1996; Le Mière 2000; Nieuwenhuyse 2007). The Standard Ware from the upper levels documented in Operation III is in fact virtually identical to the eponymous group described from the Pre-Halaf levels of Operation I. We judged it to be unwise to introduce new terminology for the earlier stages, if only to avoid reifying into discrete categories what at this stage appears to have been a continuous development.

In earlier work on Pre-Halaf and Transitional-period assemblages from Tell Sabi Abyad, Standard Ware was defined by having the combination of: 1) a plant-tempered fabric; 2) a buff-to-brown to pinkish-red surface colour; 3) a high degree of burnishing as a surface treatment; 4) characteristic techniques and styles of decoration (Le Mière 2001; Le Mière and Nieuwenhuyse 1996, 129, 147, 184–185; Nieuwenhuyse 2007). To these we may add a fifth: importantly, the Standard Ware as known from earlier work is characterised by a structural association between technological, morphological and stylistic properties leading to a diffuse boundary between 'finer' and 'coarser' varieties of Standard Ware (Le Mière and Nieuwenhuyse 1996, 129). This general definition still holds, then, to the degree that the time-factor is taken into account: it properly fits the production of coarse, plant-tempered pottery *after* ca. 6300 cal BC. During the long preceding era which we termed Early Pottery Neolithic, there were long-term changes in each of these general properties that would call for a different formal definition; below we shall follow each of these in detail.

4.2.2. The Standard Ware sample

Standard Ware constitutes the major part of the ceramic assemblage in all levels excavated in Operation III except for the lowest levels. Virtually no Standard Ware sherds were recovered from the earliest A-levels prior to level A10. Limited numbers of Standard Ware sherds were recovered from level A10 but this category only appears in serious numbers from level A9 onwards. As always, the great majority of this are body sherds (Table 4.1). A reasonable number of complete vessels and intact profiles were recovered from Operation III, most fortunate for establishing a typology, but these still comprise a minute fraction of the bulk.

The average radius measured on Standard Ware rim fragments from Operation III is 46^{o}, meaning that on average no more than about 13% of the rim is preserved. This is definitely higher than most of the other wares, but it includes many complete profiles that have larger parts of their orifices preserved. The proportion of complete vessels may reflect the effects of depositional circumstances in addition to propensity to breakage. If we wish to minimise the effects of the former, and omit complete items as outliers, the average rim radius drops to 38^{o} (or 11% of the rim), which would no longer be exceptionally high compared to other wares. These blunt averages obscure the wild fluctuations of the average radiuses of Standard Ware rims from level to level (Fig. 4.1: upper). Interestingly, long-term increases of the average rim preservation can be observed. Within the earliest levels (A9 to A5), the Standard Ware rim radius falls below the average for Operation III as a whole. In younger levels it often lies above this average. The statistics for the B-levels are erratic, probably due to the small sample sizes from some of these levels. Nonetheless all B-levels together produce an average rim radius of 66^{o}, against only 49^{o} for levels A4–A1 together, and a mere 33^{o} for levels A9 to A5 together (Fig. 4.1: upper).

At least two factors may be involved in the increasing values in average radius. Perhaps the simplest explanation is that different depositional and post-depositional regimes prevailed in various levels, effecting more sustained fragmentation of Standard Ware rim fragments in the earliest levels and, *vice versa*, better preservation in the upper levels. However, there is so far no independent evidence to suggest improved conditions for preservation in the upper levels. A more likely explanation is the increased tensile strength and mechanic shock resistance of Standard Ware vessels after level A4. The role of increased cohesive strength as a factor influencing post-depositional fragmentation is also suggested by the increasing height and wall-thickness of the Standard Ware vessels in the upper A-levels. As shall be elaborated below, increasing the size of the vessel meant that the potters had to improve their tempering strategies and shaping

Table 4.1 Tell Sabi Abyad, Operation III. The chronological distribution of Standard Ware by level (Raw Counts)

Level	*Complete*	*Section*	*Rim sherd*	*Body sherd*	*Base sherd*	*Other*	*Total*
D-Sequence	–	3	147	2–513	31	1	2–695
C-Sequence	1	3	54	732	12	–	802
Mixed B	2	21	673	5–599	110	8	6–413
B1	–	1	16	155	5	–	177
B2	–	1	37	257	3	1	299
B3	3	1	21	170	5	1	201
B4	1	2	99	1–039	18	1	1–160
B5	–	1	38	314	9	1	363
B6	2	1	11	11	–	–	25
B7	1	3	16	168	4	–	192
B8	5	7	276	3–103	66	4	3–461
Mixed A	3	8	–	3–109	294	44	3–922
A1	27	76	1–547	21–894	623	43	24–210
A2	2	31	413	4–692	203	11	5–352
A3	5	27	541	4–113	175	31	4–892
A4	14	30	605	4–236	278	46	5–209
A5	–	15	392	3–028	204	43	3–682
A6	–	6	519	3–074	250	34	3–883
A7	–	5	202	1–165	92	19	1–483
A8	–	1	107	501	63	9	681
A9	–	–	100	522	63	9	694
A10	–	–	2	14	6	–	22
A11	–	–	–	–	1	–	1
A12	–	–	1	–	–	–	1
Total	66	243	6.281	60.409	2.515	306	69.820

methods, in order to prevent sagging and cracking. They did so by adding coarse fibrous plant materials as a temper, which provided greater cohesive strength. Apparently, the development of stronger Standard Ware vessel walls from level A4 onwards is manifested by the survival and preservation of the rim fragments.

Increased cohesive strength and thicker walls of Standard Ware may also explain, at least partly, the increase in BMI measured for Standard Ware. The 'Body Mass Index' offers an estimate of relative fragmentation (Chapter 3). On average, a SW body sherd from Operation III weighs 44 grs, which is significantly heavier than BMI values of contemporaneous wares. This statistic, however, was far from constant. A clear trend towards rising BMI values is visible in Operation III Standard Ware, especially after level A5 (Fig. 4.1: lower). For the A-Sequence, the average BMI measures for some levels might be considered biased due to the outlier effect of a handful of exceptionally heavy body sherds. BMI values of over 1 kg are found in levels A5, A2 and A1, for instance, whereas level A5 yielded a BMI value of over 800 g. If we simply exclude all BMI values exceeding 500 g as statistical outliers, the results become somewhat less extreme but still show the same trend of increasing Standard Ware BMI through time (Fig. 4.1: lower).

At first sight this trend might appear counter-intuitive, as it contradicts the expectations resulting from the long-term changes observed in clay preparation. Potters moved away from using grit-tempered fabrics towards more porous, less compact, exclusively plant-tempered fabrics that, presumably, carried less mass. We might therefore expect pottery sherds to become *lighter*. Apparently, increasing body size and wall thickness as factors contributing to BMI overruled changes in clay preparation pushing in the opposite direction. Through time Standard Ware sherds became thicker, heavier, stronger and somewhat less fragmented.

4.2.3. The Standard Ware chaîne opératoire

4.2.3.1. Standard Ware clay preparation

Standard Ware was generally produced from clay characterised by a heavy presence of non-plastic inclusions of a vegetal kind. In addition, mineral inclusions can be observed macroscopically in most of the sherds. Both densities and sizes of these non-plastics varied *synchronously*: within every level we find significant diversity in the amounts, the sizes and the combinations of the vegetal and mineral inclusions. As will be shown, in the later stages of the sequence, the variation in non-plastic relates systematically to vessel size and surface

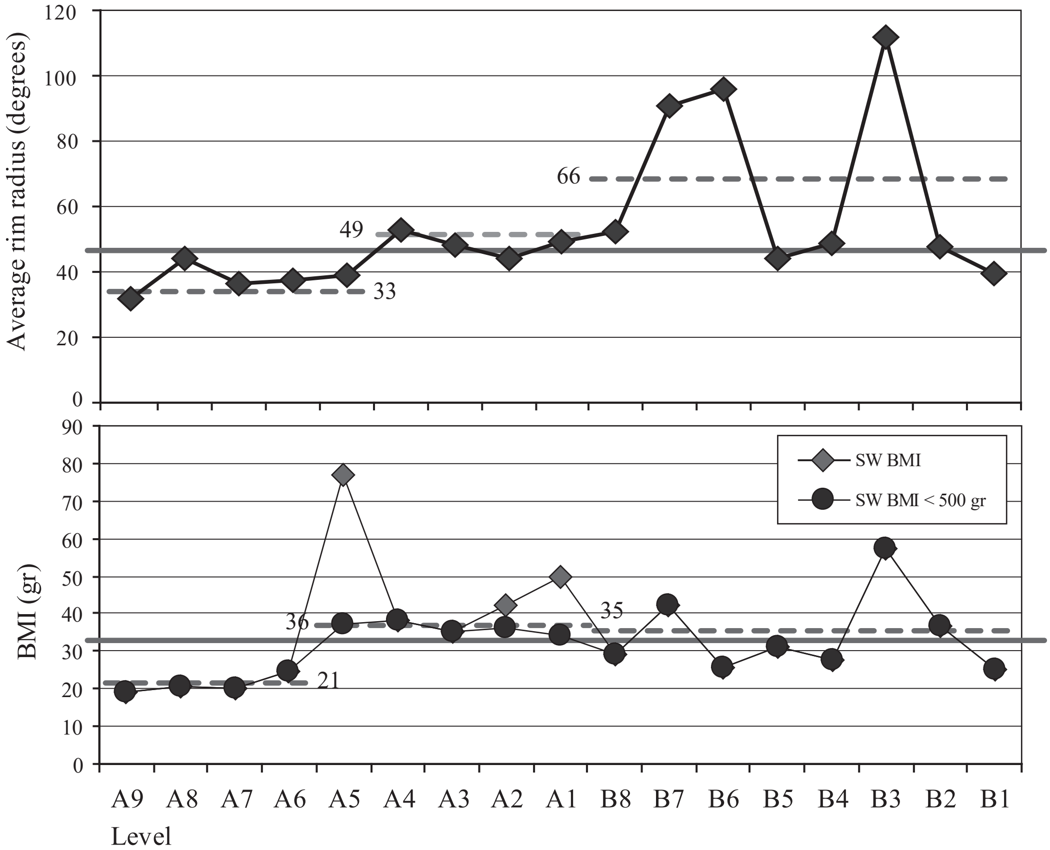


Fig. 4.1 Tell Sabi Abyad, Operation III. Changes in Standard Ware preservation through time as expressed in preserved rim radius and body sherd weight. Upper: average rim radius (in degrees) of Standard Ware rim fragments in the A–B Sequences. Grey solid line: average radius for Standard Ware rims from Operation III as a whole. Dotted lines: average radius for levels A9–A5, levels A4–A1 and the B-levels together (complete vessels with a radius of 360° were omitted). Below: Standard Ware BMI values in the A–B Sequences. Grey solid line: average BMI for Standard Ware rims from Operation III as a whole (BMI <500 g). Dotted lines: average radius for levels A9–A6, levels A5–A1 and the B-levels together.

treatment, and certain Standard Ware vessel shapes can be systematically associated with either a 'fine' or a 'coarse' fabric. This does not mean, however, that it is possible to divide the Standard Ware into discrete sub-categories on the basis of this variation. Instead this variability is accepted simply as characteristic of the broad, heterogenous group called Standard Ware (Le Mière and Nieuwenhuyse 1996, 129–133; Nieuwenhuyse 2007, 74–75).

Furthermore, Standard Ware clay preparation varied *diachronically*. The comparatively coarse-grained (macroscopic) description system utilised in the field reveals very clear shifts through time, pointing to an important technological change taking place in Standard Ware production. The Standard Ware assemblages recovered from the A and B Sequences are qualitatively quite different, in terms of clay fabric. The discrepancy becomes more outspoken as one moves back in time into the earlier stages of the A-Sequence. The key trend is the gradual increase of coarse plant tempers. In the earliest A-levels in which Standard Ware is present (levels A10 and A9), the potters did not yet employ clay mixed with much plant material. The densities of the plant inclusions were fairly low, and a fair proportion of sherds have no visible plant inclusions at all.

In stark contrast to the coarse mineral-tempered pottery from the preceding levels A16 to A11 (see below, section 4.3), these low-plant-density sherds mostly show not much mineral inclusions either. Indeed, some of the early sherds have virtually no macroscopically visible non-plastics whatsoever! Subsequently (levels A8–A3), the potters increasingly often employed a clay prepared with a good dose of coarse plant inclusions. The adoption of plant particles as a deliberate temper is seen in the rising proportions of Standard Ware containing large amounts of plant particles, in a variety of sizes (Fig. 4.2). Standard Ware sherds showing no plant inclusions at all are virtually absent after level A6. If in the earliest A-levels it may be doubted if the macroscopically observed plant inclusions were always purposely added as a temper, there is little doubt left in later stages of the sequence.

It remains unclear precisely what the different types of plant inclusions mean in terms of the *chaîne opératoire*. A dense amount of *large* plant inclusions could mean that the potters added chopped straw or chaff as a tempering agent (Rye 1981, 33). A dense amount of *small* vegetal particles, on the other hand, perhaps reflects the use of dung (Abbink 1999, 125ff; Bobrinsky 1999, 2003; London 1981; Matson 1963; Petrova 2012; Rye 1981, 34; Skibo *et al.* 1989, 124). Both types of temper are well compatible

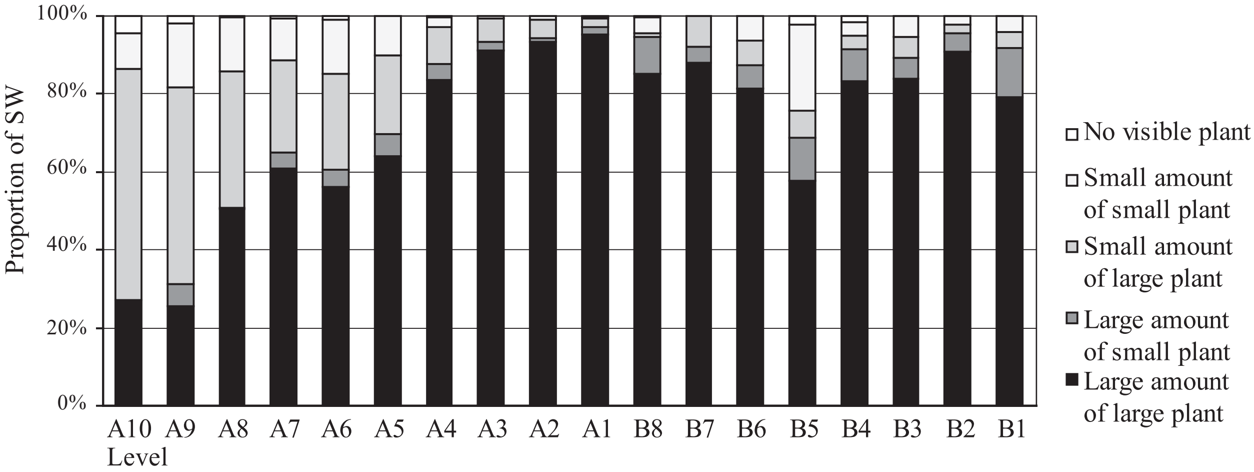


Fig. 4.2 Tell Sabi Abyad, Operation III. Shifts in the use of plant temper for Standard Ware from the A–B sequences. Upper: densities and sizes of macroscopically-observed plant inclusions. Lower: tentative reconstruction of long-term trends in the application of plant temper (Strong plant temper: large amounts of plant particles, either large or small. No plant temper: small amounts of small particles, or no macroscopically visible particles. Light temper: small amounts of larger particles).

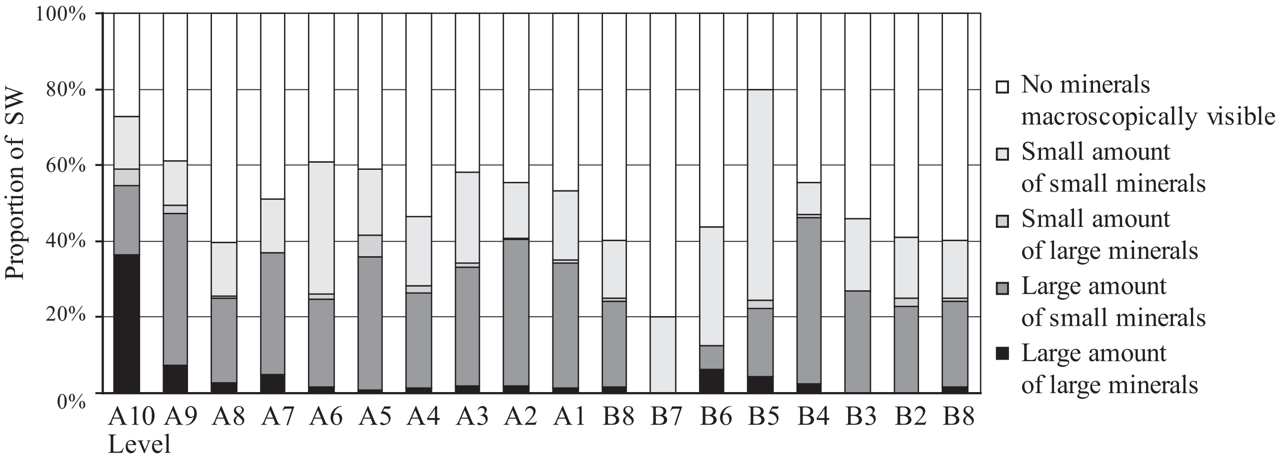


Fig. 4.3 Tell Sabi Abyad, Operation III. Densities and sizes of macroscopically-observed mineral inclusions in Standard Ware from the A–B sequences.

with the village-based farming economy as attested at Tell Sabi Abyad. Dung would have been available throughout the year. This valuable resource almost certainly figured as fuel for firing pottery and for heating up the many firing places and small *tannurs* found in the village (Matthews 2003, 2010; Matthews *et al.* 1994; Sillar 2000). As a by-product of the harvest, the use of chaff may point to clay preparation taking place after the grain harvest in spring, narrowing-down the window of production time to summer through early fall (Bernbeck 2010, 69). In contrast, in the case of fairly low densities of plant inclusions this could either mean the use of small amounts of tempering material, or simply that these particles were naturally present in the clay beds selected by the potters.

In addition to plant inclusions, mineral non-plastic inclusions occur. These also show diachronic variation, even if their pattern is less clear than from the plant inclusions (Fig 4.3). Coarse mineral inclusions are associated with Standard Ware only in the earliest A-levels. They occur in level A10, much less often in levels A9–A6, and thereafter largely disappear. In the earliest levels these inclusions may have constituted a deliberate temper to improve the workability of the clay; from level A9 onwards potters preferred to use plant temper instead. In contrast, small-sized mineral inclusions in low densities are a constant element of the Standard Ware fabrics throughout the sequence. It is uncertain if these should be seen as a deliberate tempering; mostly these fine mineral inclusions would appear to have been naturally part of the clays selected by the potters (Chapter 5). Macroscopic analysis reveals light-coloured calcium carbonate as the most common type of mineral, which almost certainly was a common element of the alluvial clays available to potters working in the Balikh Valley. Light-grey 'sandy' minerals often occur. Small particles of a dark-coloured mineral are macroscopically observed occasionally in levels A10–A5, disappearing thereafter; possibly these were grains of basalt (see Chapter 5).

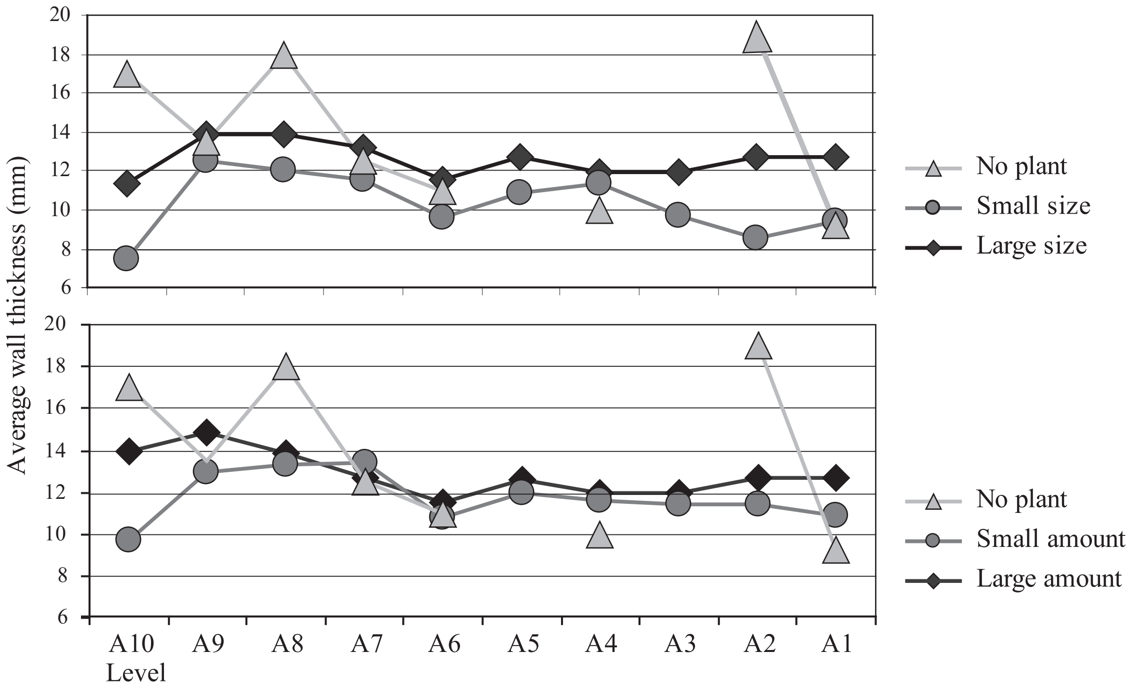


Fig. 4.4 Relationship between Standard Ware average wall thickness (mm) as an indicator of vessel size and the size (upper) and amounts (lower) of plant inclusions in the A-Sequence.

Importantly, the variability in plant temper varies systematically with properties that reflect vessel *size*, such as wall thickness, rim diameter and vessel height. These associations may testify to changes in pottery production and developing ceramic-technological knowledge in the 7th millennium B.C. If we explore the relationships between, on the one hand, the *size* and the *amounts* of the macroscopically observed plant particles and, on the other hand, average wall thickness, rim diameter and vessel height of Standard Ware from the A-Sequence, a consistent pattern emerges. For all three size-related properties, the available data suggest a positive correlation with a coarse plant temper, specifically with a large amount of large-size plant particles. On visual inspection, the association is somewhat stronger for *size* than for the *amounts* of plant inclusions, especially when it comes to wall thickness (Figs. 4.4 and 4.5). The differences are admittedly far from dramatic – for instance, for average wall thickness the differences are in the range of a few millimetres – but they are significant and consistent.

What is more, this relationship itself shows a chronological trend. The associations seem to be characteristic for Standard Ware from around levels A6 or A5 onwards. Especially in the final A-levels (levels A2 and A1) the differences between coarser and finer plant-tempered fabrics become more identifiable. In sharp contrast, in the earlier levels (levels A9–A7) the relationship is much less pronounced or is altogether absent. If the identifications made above are clear, chaff was preferentially used as a temper for larger vessels, whereas dung was more often used for making smaller vessels after level A6.

We may draw two tentative conclusions from these associations. Firstly, starting in levels A6–A5, the Late Neolithic potters were apparently keenly aware of the workability and drying-firing behaviour of different types of clay. They appreciated the potential of using alternative tempering strategies for making different kinds of containers. In particular, they exploited the effects of tempers for making pottery containers of different *size*. To the Late Neolithic potter, at least, size mattered. Secondly, this essential expertise of the potter with regard to preparing the proper kind of clay did not come about suddenly. Potters did not 'invent' the application of coarse plant tempers at the end of the 7th millennium when huge, voluminous and heavy jars became a regular component of the Standard Ware repertoire (see below, section 4.2.4.7). Rather, the necessary specialist expertise seems to have been available quite early in the sequence, at least by the material represented by levels A6–A5.

4.2.3.2. *Standard Ware shaping methods*

In comparison with the other ceramic groups distinguished at Tell Sabi Abyad, Standard Ware sherds often preserve traces of the primary and secondary shaping stages. These allow us to reconstruct the shaping stages of the operational chain. Within these, there appears to have been considerable latitude regarding the choice of alternative pathways to creating what was, in our eyes, essentially the same type of pot. In part, this seems to reflect functional differentiation within Standard Ware: different shaping methods were appropriate for pottery containers intended for different purposes. Bases shaped in pits and coarsely finished surfaces, for instance, are associated largely with

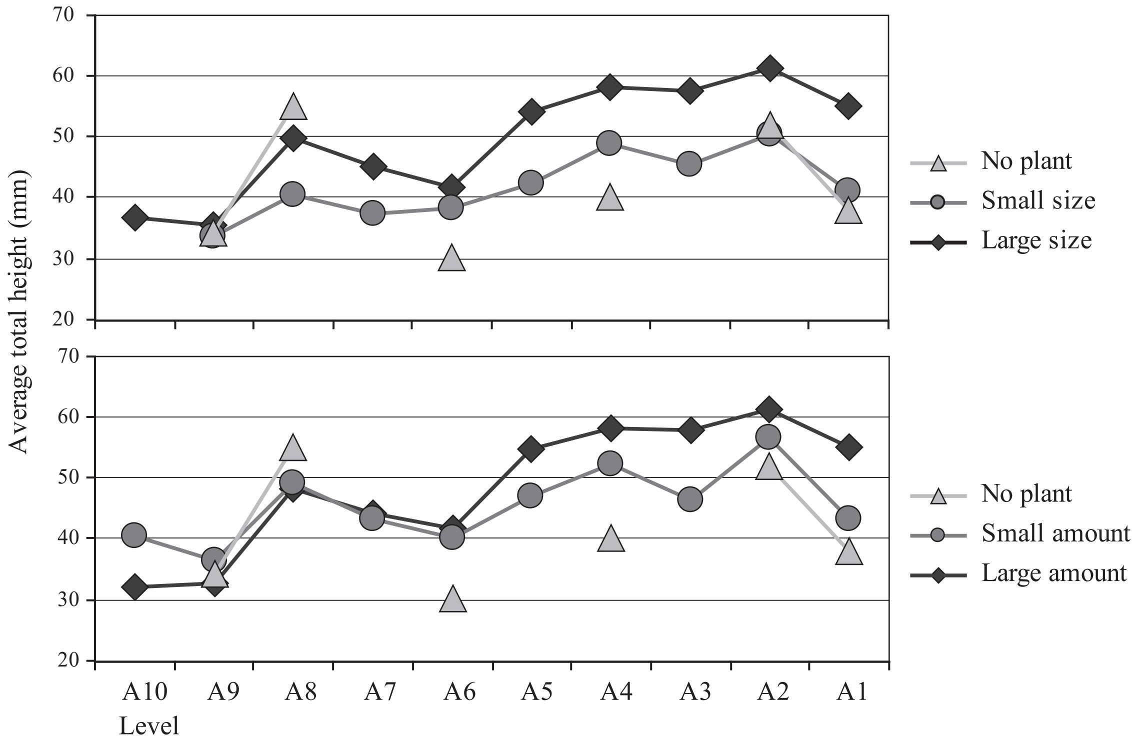


Fig. 4.5 Relationship between Standard Ware average total (preserved) height (mm) as an indicator of vessel size and the size (upper) and amount (lower) of plant inclusions in the A-Sequence.

large, closed vessels for storage, while carinated vessels shaped on moulds tend to be open, serving vessels. Technological choices in shaping Standard Ware vessels may also reflect the social networks in which potters were taught their craft. In several cases this variability led to outcomes that were relatively conspicuous and visible to others, in which case it may have played a role in overt identity formation. In many cases, however, they were not so conspicuous in the end products and differences in the operational sequence can be observed only at close distance using modern analytical methods.

The potters began by shaping the base. A basic decision to be made at this stage was to select a suitable foundation for shaping the base. This choice determined a number of following steps (Figs. 4.6 and 4.7). Perhaps the most straight-forward way of making the base was to put a ball of clay on a flat, solid surface and press it into shape (Fig. 4.6: 1a–c). Often the potters would have pre-shaped the ball into a flattened slab. Depending on the intended size of the vessel, multiple slabs could be added (Fig. 4.8). The result was a flat base with a mostly regular thickness from its centre towards the edge. Many flat bases show clear traces of finger pressing and kneading of the soft clay at the interior, as well as traces of scraping the clay with some tool. Occasionally impressions of sand or vegetal matter at the exterior surface of the base can still be seen. This perhaps reflects a deliberate roughening of the foundation surface before starting the base (Fig. 4.6:1a). Adding some sand or straw below the pot would have facilitated its easy removal after shaping.

The potter then decided on preparing this base for the subsequent build-up of the lower body. A suite of alternatives was available. Whatever strategy the potter would follow, it remained crucial to achieve sufficient overlap between the edge of the base and the lowest coil of the body. Failure to observe this basic rule could result in poor bonding, easy breakage, and poor-quality pottery. The evidence from Operation III – at least in its later stages – suggests that Late Neolithic potters were well aware of this requirement and developed different methods to negotiate such difficulties. For instance, the edge of the base could be turned upwards somewhat, offering a convenient area of contact for the lowest coil of the wall (Fig. 4.6: 1f). Alternatively, the edge of the flat base was smoothed down towards the ground surface. In this case the potter might decide to place the wall directly onto the base close to its edge, but then the space for smearing-out the first coil would be minimal. Presumably to improve the bonding between base and wall, the lowest coil of the wall was often placed on the base some distance away from its edge, leaving more space to smear-out both surfaces. This resulted in a so-called disc-base (Fig.4.6:1e). Disc bases (Fig. 4.104: 10–12) form a minor but consistent characteristic of Standard Ware shapes (Table 4.3). Yet another strategy to improve bonding was to turn the pre-shaped base upside-down. The convex edge of the base increased the overlap between wall and base (Fig. 4.6:1h–i).

A somewhat more elaborate method is indicated by Standard Ware bases with a convex shape. These may have been shaped by using a mould as a foundation support (Van As *et al.* 1998, 32–34; Van As and Jacobs

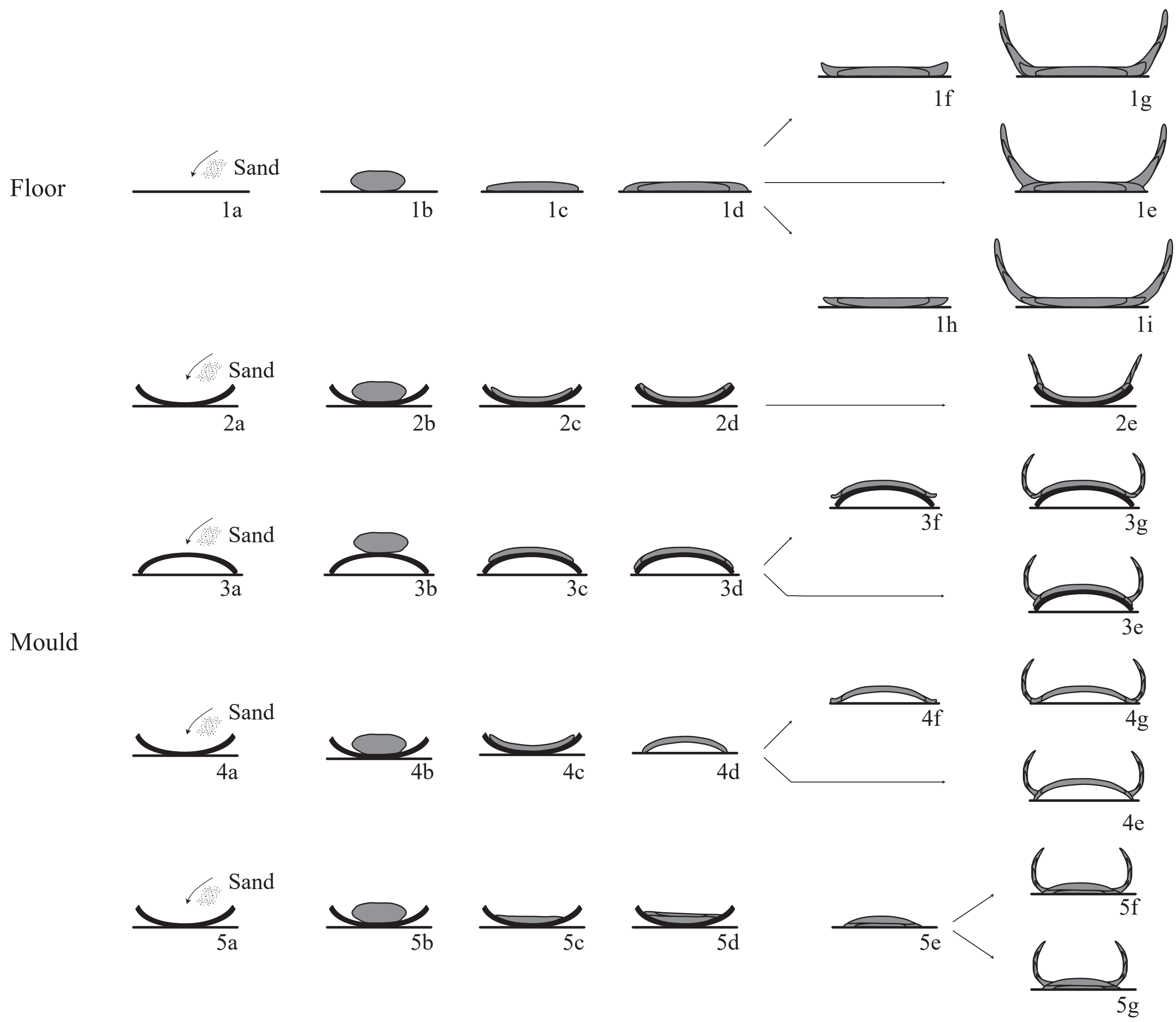


Fig. 4.6 Tell Sabi Abyad, Operation III. Different strategies for shaping a Standard Ware base. Strategy 1: Using a solid surface. Strategies 2–5: using a mould (image O. Nieuwenhuyse).

1989, 220; Nieuwenhuyse 2007, 91). The 'mould' may have been simply a shallow hollow in the ground, but it is more likely that the potters took a piece of broken pottery, for instance a low base fragment or a large body sherd. They used this make-shift tool with the concave side upwards as a foundation for the base (Fig. 4.6:2a–e). Convex bases occur throughout the later part of the Operation III sequence, first appearing in level A6 (Table 4.3; e.g. Figs. 4.64: 8, 4.67: 7). The use of a mould to make convex bases may have become slightly more common at the end of the A-Sequence and into the B-Sequence (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007), but convex bases never became really common with Standard Ware (Fig. 4.9).[1] A vessel having a convex base is less stable than one with a flat base, and unless the vessel was relatively low and wide it might have had difficulties standing by itself. Convex, mould-shaped bases are far more typically present in the Fine Wares from the Transitional period onwards in association with the development of carinated serving vessels (e.g. Figs. 4.124: 13, 4.126: 8–13, 4.127: 4–7; Nieuwenhuyse 2007, 91–93).

The exact opposite strategy, which probably used the same types of mould, is demonstrated by the concave bases. Concave bases are quite common features of Standard Ware already from the earliest A-levels (Table 4.3; Fig. 4.9). Often the concavity is not very outspoken, or occasionally barely visible (e.g. Fig. 64: 10, Fig. 4.65: 12), but some examples show a remarkable concavity, with the centre of the base sometimes being lifted a few centimetres above the ground surface (Fig. 3.66: 2, Fig. 4.67: 2–5). These concave bases were likely shaped with a mould. This may again have been a large re-used piece of body sherd, but in this case placed with its convex side turned *upwards* (Fig. 4.6: 3a–g). Alternatively, the potter may have sculpted the earth surface into a low convexity, using this as a base for the base. A concave shape offered a number of advantages over flat bases. It was less prone to cracks during the drying (Reijnders 2005, 134), and it enhanced the stability of a vessel positioned on a wobbly, uneven surface. In making such bases, however, the potter had to keep a keen eye on the correct timing of the various steps. The base had to be removed from its mould in time

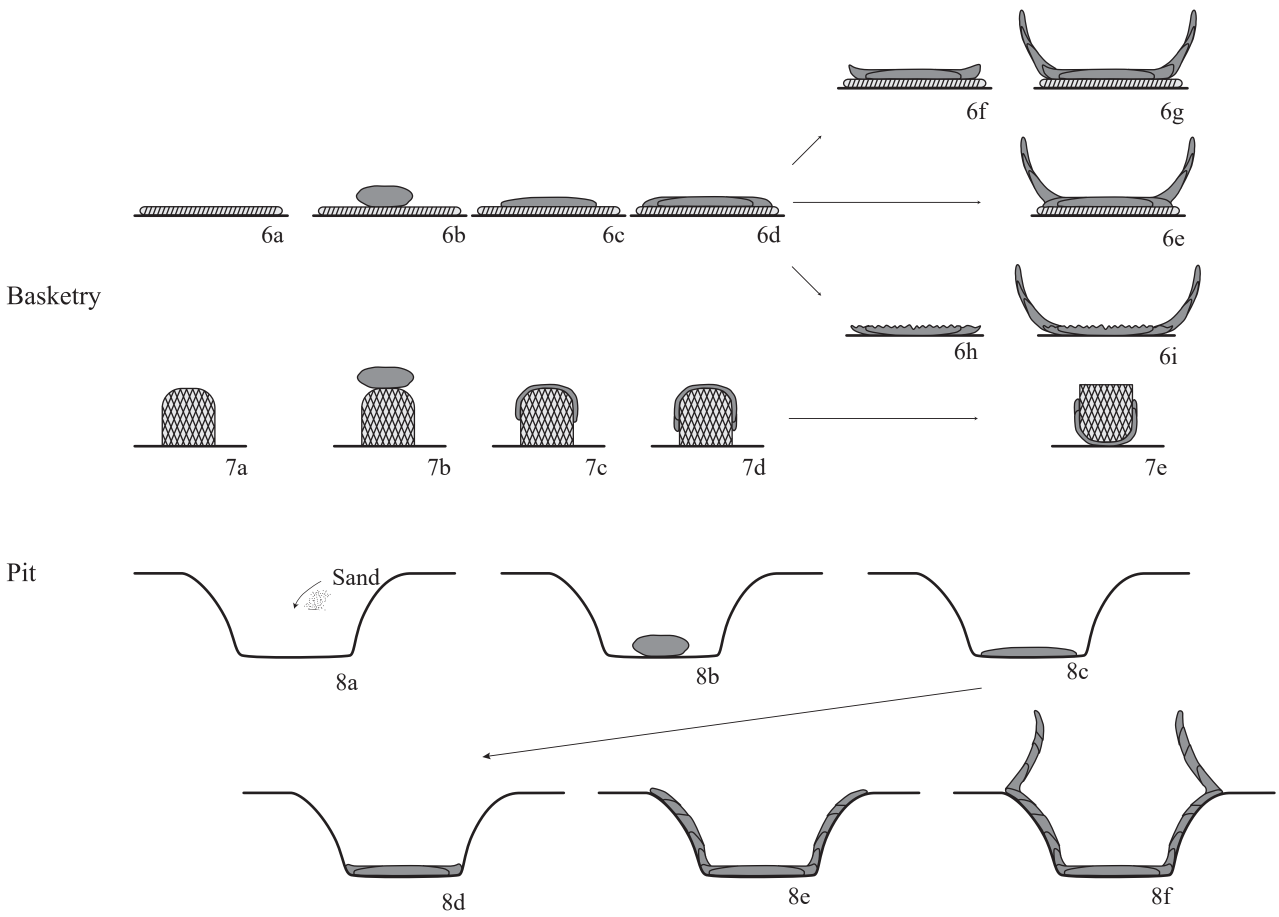


Fig. 4.7 Tell Sabi Abyad, Operation III. Different strategies for shaping a Standard Ware base. Strategies 6–7: using basketry. Strategy 8: using a pit (image O. Nieuwenhuyse).

before shrinkage during drying caused tensions with the more solid mould, causing the base to crack (Godon 2010).

Knowledge of even more complicated approaches is illustrated by a number of bases that may have been mould-shaped while kept in *upside-down position*.[2] Although this cannot be supported unequivocally, it is possible that some of the concave bases were shaped by pressing clay into a concave mould. But instead of using the result as a convex base, the potter would have turned it into a concave one by removing it from the mould and turning it upside down before continuing with the wall (Fig. 4.6:4a-g). At first sight this might look cumbersome, but this strategy would have offered the increased stability and strength of a concave shape while at the same time side-stepping the risk of developing drying cracks as the base lay stretched over the mould. A very regular *interior* (convex) surface of some concave bases, in combination with traces of finger-pressing on the exterior (concave) surface suggests that this strategy was known and practised.

Further, quite a number of Standard Ware bases show a remarkable thickening of the centre (e.g. Figs. 4.64:9, 4.78:2, 4.104:16). These too, possibly were shaped in a mould as well (Godon 2010, fig. 13). In this case, the mould would have been more or less similar to what was used for shaping convex bases, either a hollow depression in the ground, or a large re-used body sherd. In this case, however, the potter intended this to be a flat base. Instead of following the curvature of the mould, as for a convex base, the potters pressed more clay into the hollow curvature, largely filling it up. After a drying spell the whole mass was taken out, turned upside-down, and henceforward treated as a flat base (Fig. 4.6:5a-g). We have not distinguished this type as a separate category of bases during our fieldwork; they are contained in the general category of 'flat bases' (Table 4.3). On the grounds of the available descriptions, the chronological distribution of flat-and-thickened-near-the-centre bases appears to be largely limited to levels A4 to A1. So far, we have not identified them in the Standard Ware recovered from Operation I (Nieuwenhuyse 2007).

Interestingly, instead of a flattened piece of soil, the potters occasionally took a reed mat as a foundation for shaping the base. The excavations yielded fifteen examples of base sherds showing mat impressions from the exterior base (Table 4.2). These were all coiled basketry (Chapter 10). Fragmented though they are, all examples appear to be flat bases. Using a mat as a foundation offered advantages during the shaping process. For instance, the vessel could be rotated during the subsequent stages of the shaping process, using the mat as a pragmatic, if simple, 'turntable' (Crowfoot 1938; Özdemir 2007). As

Table 4.2 Tell Sabi Abyad, Operation III. The frequencies of Standard Ware sherds with basketry impressions by level

Level	*Exterior*	*Interior*	*Total*
Mixed A	4	1	5
A1	1	1	1
A3	2	1	3
A4	3	1	4
A5	3	–	3
A6	1	–	1
A9	1	–	1
Total	15	4	19

well, the mat could be used to shuffle the pot away into some shaded corner to let it dry. Apparently, these benefits, such as they are, were not deemed to be very relevant, given the extreme paucity of basketry-impressed bases recovered from Operation III. About half of these come from levels A5 and A4, which appears to have been the time this strategy was the most commonly used at Tell Sabi Abyad. Apart from using a mat as an additional tool, these vessels seem to have had their lower parts shaped in exactly the same manner as with the regular kind of flat bases (Fig. 4.7: 6a–i).

Fascinatingly, Operation III yielded some examples of sherds with basketry impressions on the *interior* surface (Table 4.2). These include two flat base fragments. In these cases, the potters apparently began with putting a basket upside down, and used its turned-over exterior base surface as a foundation (Godon 2010, 701–702). Coils or slabs of clay were put on top of the basket and firmly pressed into shape. After they had finished creating a proper base, presumably after letting it briefly dry, the potters removed it from the basket, turned it upside down into the upright position, and continued with building-up the wall (Fig. 4.7: 7a–e). At Tell Sabi Abyad the evidence for this base-shaping strategy remains excruciatingly rare, but the few examples available show that at least some of the potters in the later A-levels were familiar with this possibility. In addition to the bases, the excavations yielded two examples of body sherds showing basketry imprints on the interior surface. In these two cases, presently unique in the ceramic record of the Upper Mesopotamian Late Neolithic, pottery vessels were apparently shaped around a basket as a support. The technological knowledge available to potters in reference to the production of white ware containers, which were often shaped in or around baskets, possibly provided a conceptual 'stepping stone' for these intriguing technical excursions.

Yet an entirely different approach to shaping the lower parts of the vessel is shown in a (small) number of large 'double-ogee' storage vessels. These have a carinated profile that separated a convex upper part from a concave lower part (Figs. 4.97:1, 4.99:1, 3, 4.100:1, 3, 4.101:2, 4.103:2, 4.105:2). Reinhard Bernbeck has argued (1994, 107, 1995, 32) that such vessels were shaped in two separate parts. First the lower part was constructed,

Table 4.3 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware base shape by level

Level	*Convex*	*Flat*	*Concave*	*Pedestal*	*Total*
D-Sequence	–	6	8	1	15
C-Sequence	–	4	4	–	8
Mixed B	1	48	19	–	68
B1	–	3	1	–	4
B2	–	4	1	–	5
B3	–	6	2	–	8
B4	2	4	5	–	11
B5	–	5	2	–	7
B6	–	3	–	–	3
B7	–	4	1	–	5
B8	3	26	9	–	38
Mixed A	3	237	37	1	278
A1	10	358	134	–	502
A2	2	137	49	2	190
A3	1	137	31	–	169
A4	6	259	41	–	306
A5	1	177	37	–	215
A6	6	217	17	–	240
A7	–	88	8	1	97
A8	–	54	10	–	64
A9	–	50	13	–	63
A10	–	4	1	–	5
Total	35	1831	430	5	2301

for which the potter most likely used a shallow pit as a supporting mould for the lower body. Clay was pressed into the pit, additional slabs or coils were added, and the resulting base was allowed to dry (Fig. 4.7:8a–d) before the potter shaped the lower body (Fig. 4.7: 8e). After the lower body had been allowed to dry for a sufficient time to increase its strength, the upper part was added (Fig. 4.7: 8f; cf. Bernbeck 1995, 32). This peculiar technology for shaping a base is so far attested only with large, very heavy vessels. The potters would have kept the vessel safely locked in its supporting pit while building the upper body to prevent sagging. As we observed at Tell Sabi Abyad, this did not always work out so well. The extreme weight of the upper part often pressed down the lower part, deforming it and contributing to its concavity.

Lastly, there were a few examples of low pedestal bases (Fig. 4.104: 19). The examples from Operation III were between 1.5 and 2.5 cm high, and they all had limited diameters. These were fashioned in an entirely different way, at the very end of the primary shaping process. After the potter had finished shaping the vessel itself, which in most cases would have been a convex-sided bowl, the vessel was placed upside down, and a single coil was used for shaping the pedestal.

To conclude, the Standard Ware potters knew how to create different types of bases, and various ways of shaping

Table 4.4 Tell Sabi Abyad, Operation III. Standard Ware base diameter (mm) and thickness (mm), distinguishing between base types

	Base diameter				*Thickness*			
	Mean	*Range*	*Std. Dev.*	*N*	*Mean*	*Range*	*Std. Dev.*	*N*
Convex	140.8	40–380	94.1	13	11.1	4–25	4.6	39
Flat	127.6	20–360	52.8	897	13.6	3–35	4.5	1.809
Concave	127.6	38–300	45.8	285	13.4	6–38	4.4	427
Pedestal	137.5	40–280	107.8	4	13.0	7–23	6.2	5
All bases	127.8	20–380	52.0	1199	14.6	3–38	4.5	2280

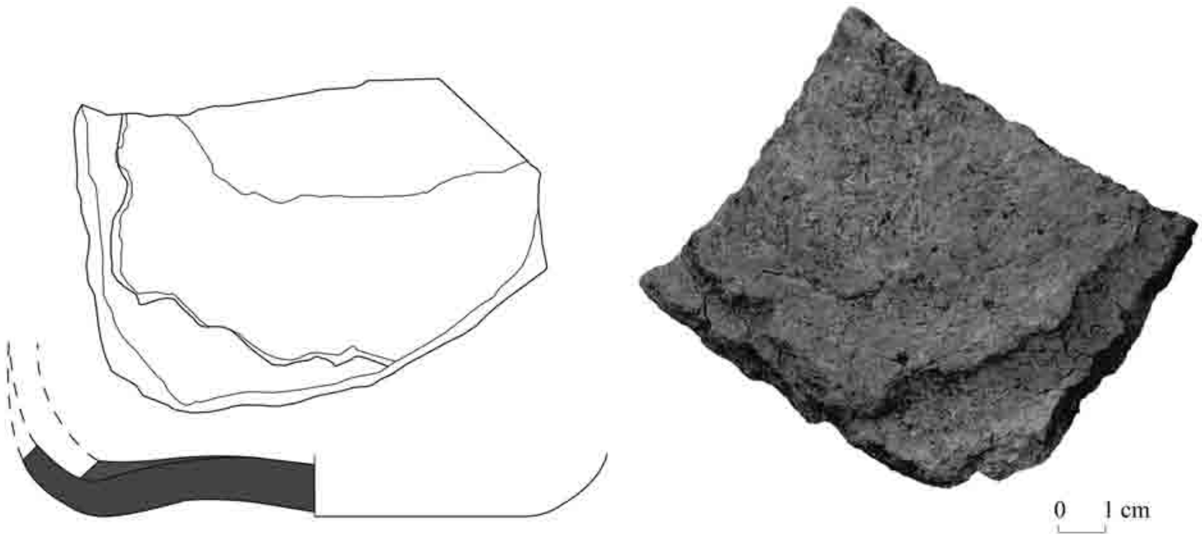


Fig. 4.8 Tell Sabi Abyad, Operation III. Traces of multiple slabs forming a concave Standard Ware base (F4-105-240-1; level A1).

them. Some base types may look formally the same in our typologies, but were shaped in different ways. Each base type would have offered its own set of advantages and performance characteristics, but presently we cannot relate base types to specific vessel types. Certainly, a number of vessel types are associated with particular types of bases. For instance, husking trays *always* have thick flat bases, carinated bowls *always* had a convex base, and the few pedestal bases *all* occur with convex-sided bowls of limited size. But on the whole, there was little standardisation. Standard Ware jars, for instance, were made with either a flat or concave base irrespective of their overall shape or size. We tested for differences in thickness and diameter between the various base types, and we found none: different base types cannot be shown to be associated with vessels of different size (Table 4.4). Intriguingly, given the changes in overall vessel typology in the later A-levels, traditions of shaping the base seem to have been fairly conservative. In contrast to the clear shifts in overall vessel size (see below, section 4.2.4), base size remained relatively constant: so far, we cannot detect changes in average base thickness or base diameter through time.

Once the base was ready, the vessel wall was build-up vertically. As we have already seen, a fair degree of technological choice existed in the way the lower parts were formed. The Standard Ware potters could shape the transition from the base to the body in different ways, depending on how they had formed the base. The base-body transition could be either sharp or gradual. They do not appear to have preferred one over the other; both possibilities occur about equally often. Apparently, the specific shape of the base-body transition was deemed to be less important than meeting the requirement of solid bonding and strength. Some 6% of all Standard Ware bases show a distinct 'disc' base (Fig. 4.9).[3] This type of base-body transition may have resulted from placing the lowest coil of the wall somewhat away from the base edge.

To the degree that we may reconstruct the primary shaping methods, by identifying their tell-tale traces on the sherds, the wall appears to have been made with coils. Coils are particularly suited for a household mode of production as they allow the potter to schedule the time allocated to shaping the vessel: the pot can be allowed to dry for a while when other urgent matters ask for attention (Arnold 1985; Sillar and Tite 2000, 7). As well, they offer extraordinary control over the shape of the final product (Blandino 2003). Visible ridges occasionally allow us to reconstruct the height. Standard Ware coils measured between 1.5 cm and 3.5 cm in height. Occasionally, however, taller stretches are observed, measuring up to 6.5 cm or 7 cm in height. These were not so much coils but rather slabs. The use of slab building is observed, for instance, with a thick-walled, plastered tray from level A1/A2. Four extant coils or slabs give a hint of the sequential order of the shaping process. First the base was made, by pressing-out several pieces of clay on a flat surface. The

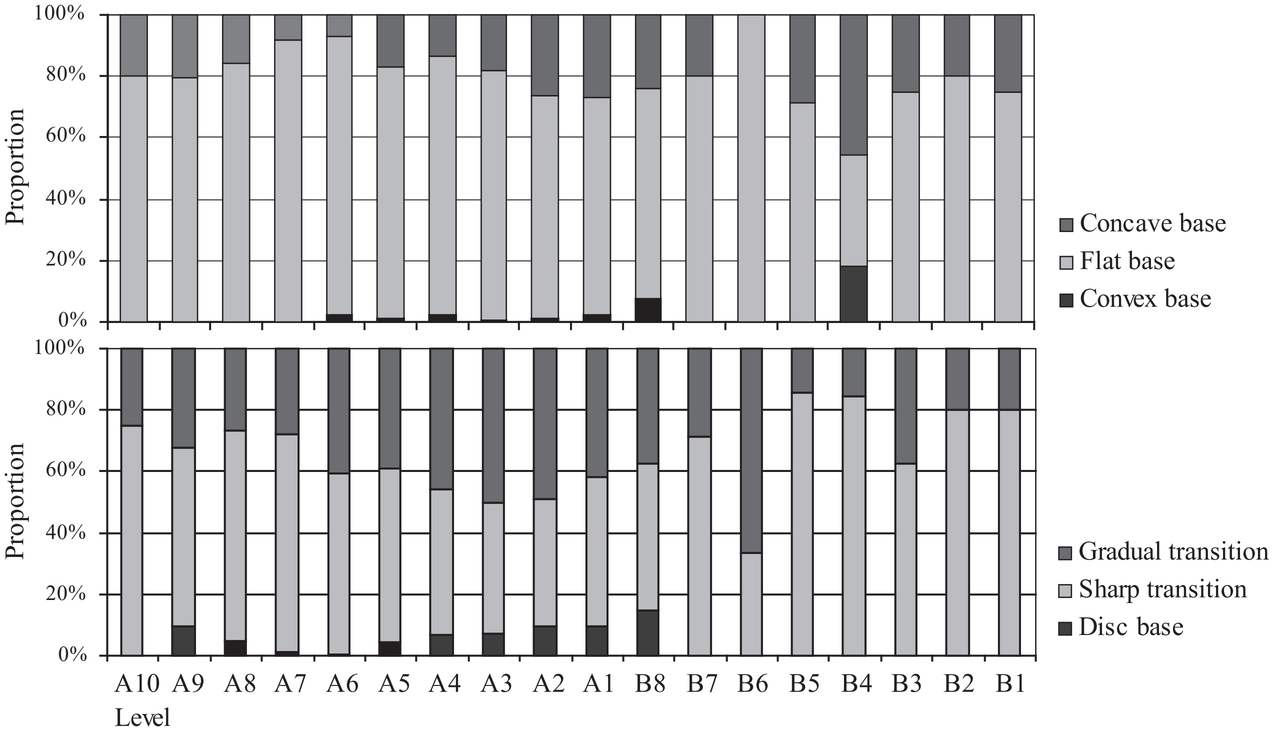


Fig. 4.9 Tell Sabi Abyad, Operation III. The proportions of different Standard Ware base types by level. Upper: shape of the base. Lower: shape of the base transition.

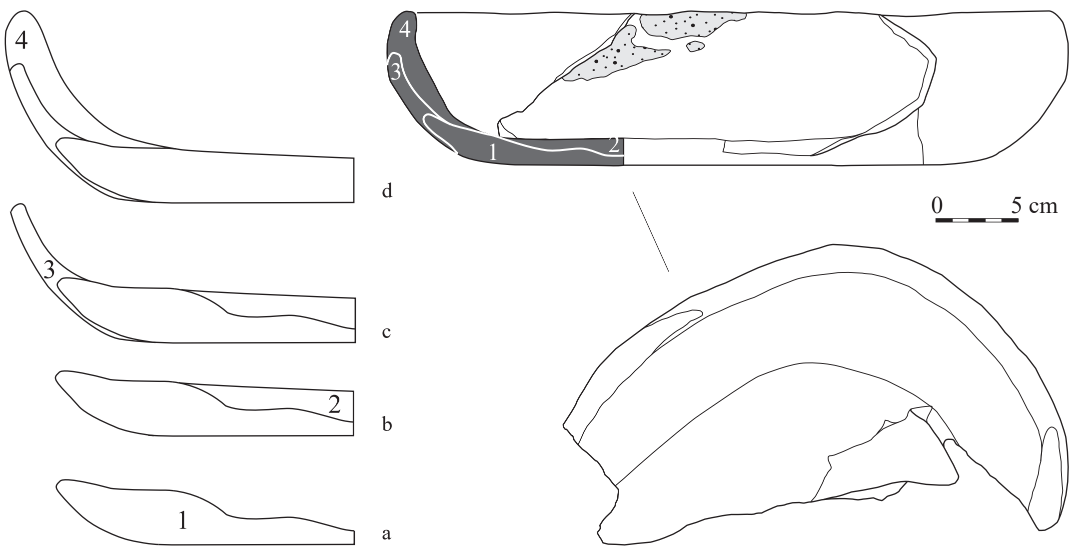


Fig. 4.10 Tell Sabi Abyad, Operation III. Standard Ware tray showing the sequence of shaping the base with slabs and the wall with coils (P08-34, level A1/A2) (image O. Nieuwenhuyse).

observed fissures suggest that in this case the potter began with shaping the central part of the base, subsequently adding more clay towards the edges. After completing the base, the potter then turned it upside-down before continuing with the wall. First the lower part of the wall was made, by adding a series of coils or slabs. Finally, the upper part of the wall was made by adding a few thick coils or, more likely in this case, slabs (Fig. 4.10). This sequence resulted in a low vessel with a smooth transition from the base to the body.

For taller vessels, the main primary shaping method for constructing the wall appears to have been coiling. The various surface treatments employed to improve the bonding between coils and to achieve a regular wall thickness left characteristic traces. Typical for Standard Ware from the A-levels are the horizontal, roughly-textured ridges and depressions resulting from adding one coil after another and kneading, pressing and smearing the still-soft vessel into shape (Fig. 4.11). In many cases we were able to count the number of coils. Coils resulted in

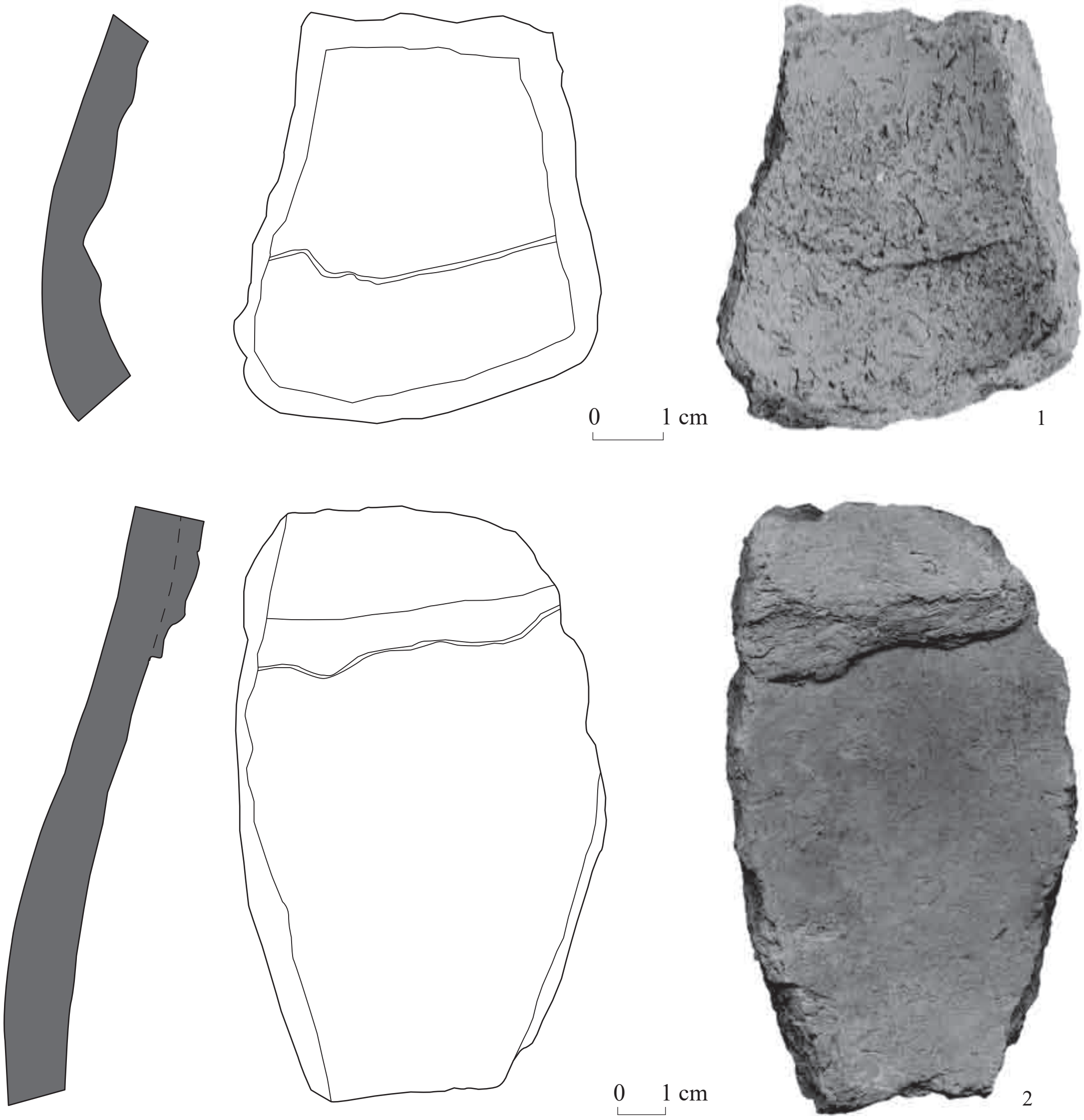


Fig. 4.11 Tell Sabi Abyad, Operation III. Standard Ware body sherds showing coil attachment ridges at the interior surface (1. F4-159-413-5, level A3; 2. G5-671-803-2, level A2) (image O. Nieuwenhuuyse).

a vertical build-up of the wall of between 2 cm and 3.5 cm for each coil (Figs. 4.13 and 4.14). Direct evidence for coiling was recognised in the field also in the frequent U-shaped breaks where the individual coils broke apart. Many sherds showed hollow wedges, which represent the lower part of a coil, whereas we also found examples of the convex protrusions that represent the upper part of a coil (Fig. 4.12). In addition, horizontal fractures and breakage lines across the body are frequent, showing that the coil attachments remained structurally weak parts of the vessel wall even after firing.

Apart from coiling, the main alternative method was pinching, which was probably how the smallest vessels were made (Van As and Jacobs 1989). For these the potter simply took a piece of well-prepared clay, and pressed and kneaded it into shape. As the low tray shown in Fig. 4.10 suggests, the slab building technique was known to the Late Neolithic potters from Tell Sabi Abyad. This technique has frequently been observed with plant-tempered coarse wares in the Zagros (Bernbeck 2010; Vandiver 1987). However, the extent to which the Tell Sabi Abyad potters adopted this technique for shaping taller vessels as well remains to be ascertained in future work.

Most interestingly, however, there is evidence that occasionally the potters used as *basket* as a support for shaping the vessel wall. We have already discussed base sherds carrying basketry impressions at the interior surface. Fascinatingly, a fragment of the upper body of a vertical straight-walled pot recovered from the fill of a level A3 pit carried clear impressions of basketry high up on the interior wall. The lower part of the interior surface was less clear, as this part was smeared over with some additional clay, erasing the traces of the primary shaping (Pl. 27.2). For making this vessel, clay was shaped around a reed basket, either with coiling or, perhaps more likely, with slabs. Made of flammable, organic materials, the basket was burnt away during the firing, leaving a pottery container.

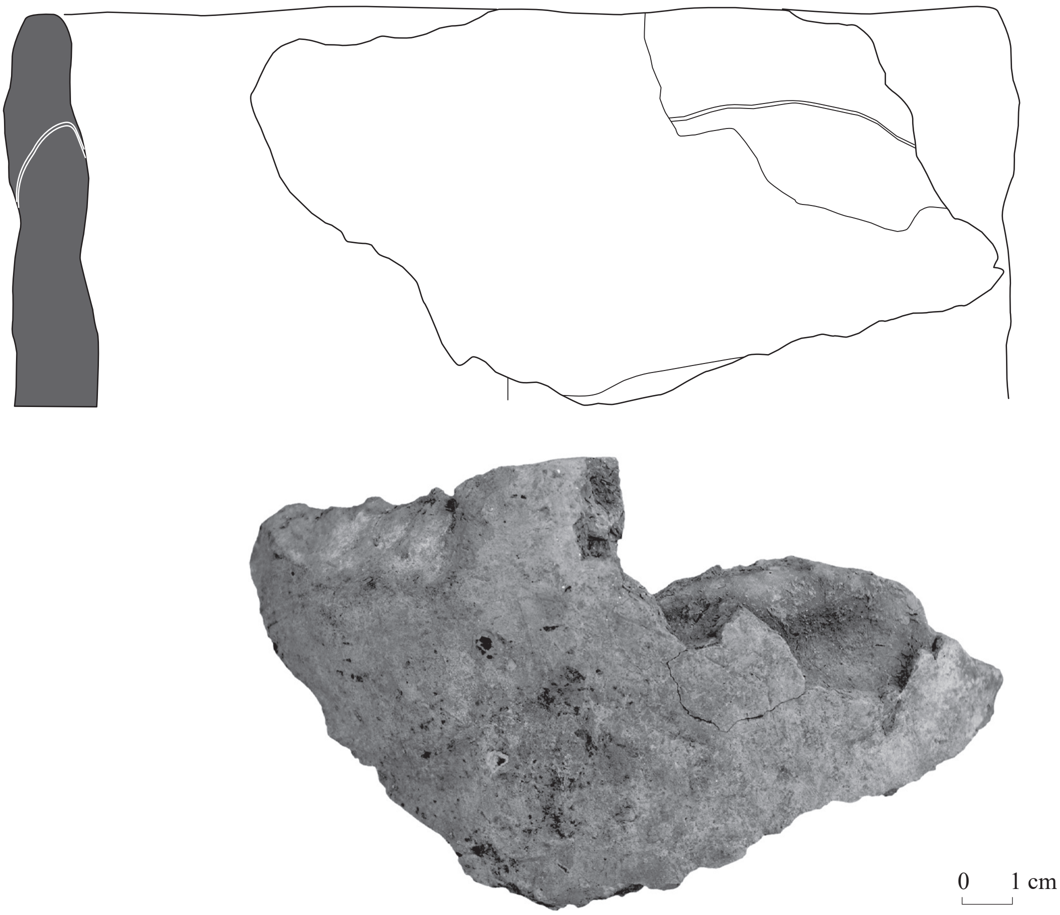


Fig. 4.12 Tell Sabi Abyad, Operation III. Standard Ware rim fragment showing superimposed coils broken at their attachment (D3-8-26-6, level A4).

It might be argued that in this case the container was never meant to be pottery, but a clay-lined basket instead; indeed, the firing might even have been accidental. The context would not immediately be supportive for this proposition, however, as the fragment was not found in a burnt context. The plant-tempered fabric, the vessel shape and size of the vessel and even the presence of a loop handle are perfectly in line with the regular ceramic production from level A3. It is more likely, then, that this was intended to be a fired-clay container – i.e. pottery – right from the start. This remarkable vessel remains the only unequivocal example of this technique so far. Even if we allow for the likely possibility that surface finishing obliterated traces from additional examples, it is clear that this curious shaping strategy remained exceptional at Tell Sabi Abyad. It forms an interesting technological cross-over with the abundant production of white ware in the same level, for which similar shaping methods were sometimes used (Nilhamn and Koek 2013).

After the primary shaping, the basic shape was prepared, and the vessel was further treated with a variety of finishing techniques. Various sorts of secondary shaping methods are evidenced in the Standard Ware by traces left at the surface. The potters treated their products with various types of tools, including the human hand. Many sherds display traces at the surface of treatment with a sharp-edged tool (Fig. 4.15). Broad shallow grooves on a number of sherds suggest that the potters treated them with their fingers while the clay was still sufficiently soft to allow modification. With these actions the potters compacted the vessel wall, and they evened-out irregularities in the wall thickness. Excess clay was removed where necessary. As a final stage in the shaping process, the exterior surface could be finished with various degrees of smoothing. However, Standard Ware vessels were not always carefully smoothed; many were left with remarkably coarse and irregular surfaces (Table 4.5). On the whole, the exterior was much more often made smooth than the interior (Table 4.6).

By lumping together evidence from different chronological phases, however, these general descriptions ignore important long-term shifts in surface treatment. Over the time represented by the sequence excavated in Operation III, a fluctuating emphasis on careful, time-consuming surface finishing techniques can be observed, in particular in the application of burnishing (Fig. 4.16). In the earliest stages of Standard Ware production, in levels A10 and A9, the large majority of the vessels were burnished. In this respect, at least, they still resembled the earlier mineral-tempered wares from levels A12–A10 (see below, section 4.3). From level A8 onwards, however, the proportion of Standard Ware finished with burnishing

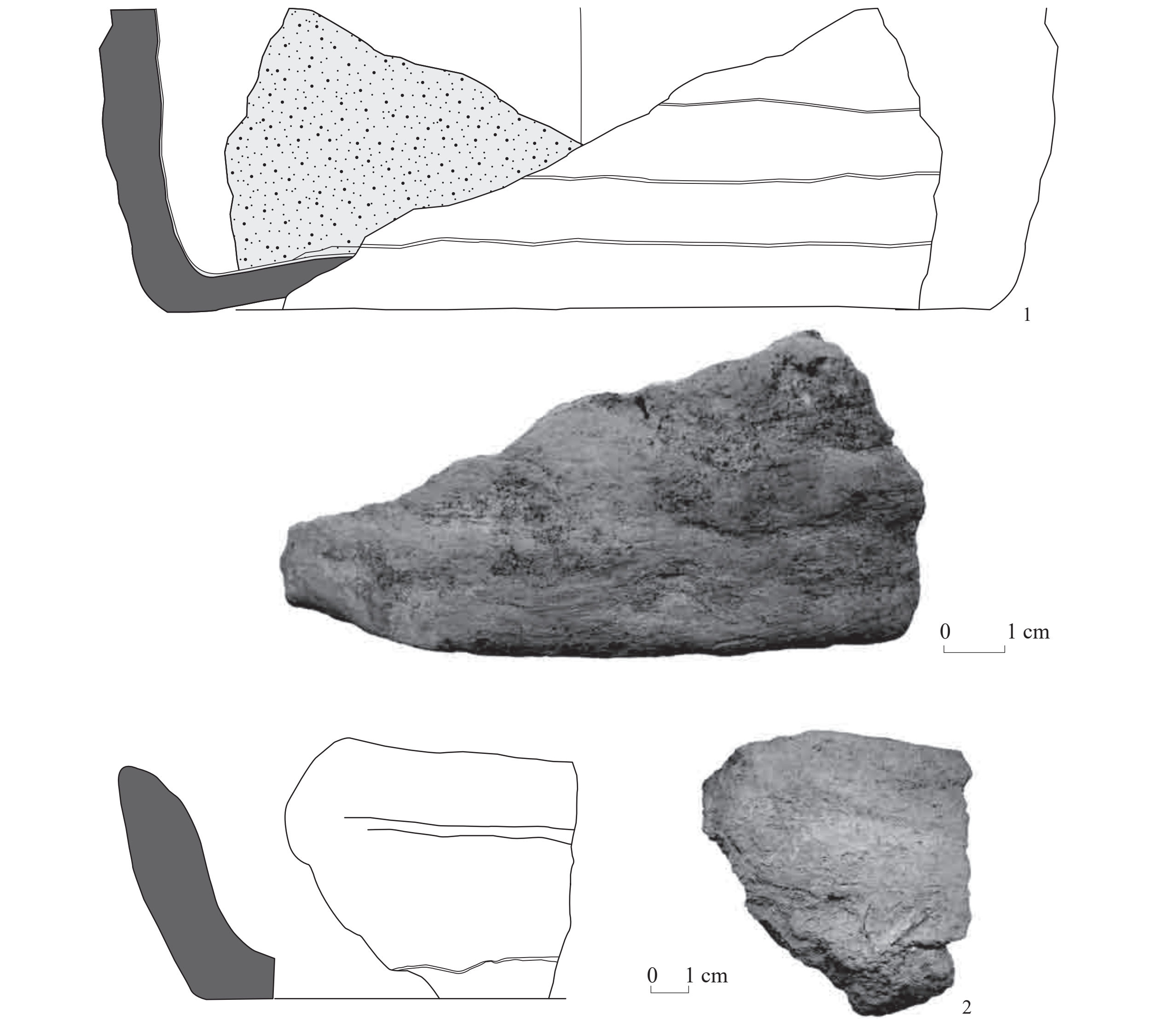


Fig. 4.13 Tell Sabi Abyad, Operation III. Standard Ware fragments showing coil attachment ridges at the surface (1.D4-50-134-1, level A5; 2. G5-678-812-1. Level A2) (image O. Nieuwenhuuyse).

began to dwindle. By level A3 and, particularly, level A2, burnishing had almost completely disappeared from the Standard Ware potter's technological tool kit. Standard Ware vessels from these levels are invariably coarsely textured, many of them having a distinctly rough 'feel' when they are handled. By level A-1, however, burnishing began to make a comeback. In time, more and more often Standard Ware vessels gained a burnish, until by the time represented by levels B7–B5, over one-third of all SW vessels were given a glossy, carefully burnished surface. Admittedly, the small sizes compromise the samples recovered from the B-levels, but these estimates fit very well with the statistics gained from the early Pre-Halaf levels in Operation I (Nieuwenhuyse 2007, 76).[4]

Intriguingly, however, the reintroduced burnishing was certainly not of the same *kind* as before. The earlier and later stages differ markedly in the specific characteristics of this particular surface finish, as well as in its contextual associations. As to the technology involved, the thoroughness of the treatment and the overall visual-aesthetic effects of the gloss were not the same. In the earlier levels, burnishing was often not so much an overall surface treatment, but instead it was done rather patchily, sometimes leaving large areas of the pot unburnished; the individual burnishing strokes can often still be seen. In contrast, in the later stages the burnish usually covered the entire vessel body, and it was applied so thoroughly that no individual strokes are visible any longer. A solid gloss and a smooth, sensual touch characterise the later burnishing. Another notable change is that in the earlier stages the *exterior bases* were frequently burnished. This meant that after shaping the vessel, and after the vessel had been allowed to gain some strength by letting it dry to a leather-hard stage, it was turned upside-down to allow the exterior base to gain a burnish. Most examples of these exterior-burnished bases come from levels A9–A5, after which this treatment disappeared entirely. When burnishing returned several centuries later, the potters did not resort to burnishing the exterior base, which in most cases was left without a burnish.

Table 4.5 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware traces of secondary shaping and finishing (exterior surface) by level

Level	*Pressing, smearing*	*Scraping with tool*	*Very coarse*	*Coarse smoothing*	*Fine smoothing*	*Burnish*	*Eroded*	*Total*
D-Sequence	3	–	1	60	38	18	7	127
C-Sequence	8	–	1	45	6	23	1	84
Mixed B	12	5	1	157	72	97	6	350
B1	–	1	–	9	2	9	3	24
B2	1	–	–	34	1	7	1	44
B3	–	–	–	16	10	10	1	37
B4	3	–	4	46	32	32	2	119
B5	–	–	1	13	7	22	2	45
B6	–	–	–	7	3	6	–	16
B7	1	–	–	13	2	9	–	25
B8	20	–	1	171	64	78	9	343
Mixed A	117	8	1	288	55	359	10	838
A1	151	8	32	1692	397	142	101	2523
A2	36	6	11	494	100	14	18	679
A3	65	5	5	444	103	32	19	673
A4	146	8	4	570	121	96	49	994
A5	113	8	–	265	53	218	14	671
A6	47	6	7	227	66	404	17	775
A7	18	–	1	103	38	179	12	351
A8	15	2	–	53	15	120	7	212
A9	2	3	–	27	12	165	8	217
A10	–	–	–	3	1	15	3	22
Total	755	60	69	4–677	1–160	2–037	283	9041

Perhaps the most important difference between the two stages, however, lies in the various associations between the burnishing and other aspects of the operational chain. In the later stages at Tell Sabi Abyad, as previous studies have made clear, burnishing formed part of a complex constellation of regularly co-occurring traits that resulted in a diffuse boundary between 'finer' and 'coarser' varieties of Standard Ware. Thus, in the Pre-Halaf levels of Operation I, a burnished surface was associated with particular decorative styles, specifically painting and slipping, and with relatively small-sized, thin-walled serving vessels (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007, 78; also Faura 1996; Le Mière 2001, 182ff). These distinctions also covered the selection of raw materials: the 'finer' segments more often were made of a 'fine' plant temper, whereas the 'coarser' parts tend to be made from more coarsely-tempered clays. The ceramic evidence from the B-levels in Operation III show precisely the same associations. In contrast, the earlier stages of the A-Sequence do not (yet) show such associations. Although many vessels in these early levels were burnished, vessels treated with different surface treatments do not differ so strongly in size or fabric.

We can gain some insight into the emergence of these associations by exploring the average wall thickness of Standard Ware sherds that employ different surface treatments (Fig. 4.17). This shows that from level A10 to about level A4, when burnishing was still common, vessels with burnished, smoothed or coarsely-smoothed surfaces did not differ much in terms of average wall thickness; their wall-thickness values were pretty much similar. From level A3 onwards, however, when burnishing had almost disappeared, a differentiation started to emerge between vessels having a coarsely-smoothed surface and vessels having carefully-smoothed or burnished surfaces. In these levels a careful surface finish began to become associated for the first time with vessels of limited wall thickness. This association continued to evolve within the B-levels, reaching their peak when burnishing made its forceful comeback.

We can see wall thickness as an indicator of vessel size. Other size indicators show similar associations, for instance the (preserved) height of Standard Ware vessels. Initially, through levels A10–A5, the data suggest little difference in either the average preserved height or the volume of Standard Ware vessels in either category of surface finish. Surface finish in these levels does not correlate significantly with vessel size. Starting with level A4, however, alongside its dwindling importance, burnishing as a surface finishing technique became more and more associated with vessels of limited height and volume. The association becomes more convincing if

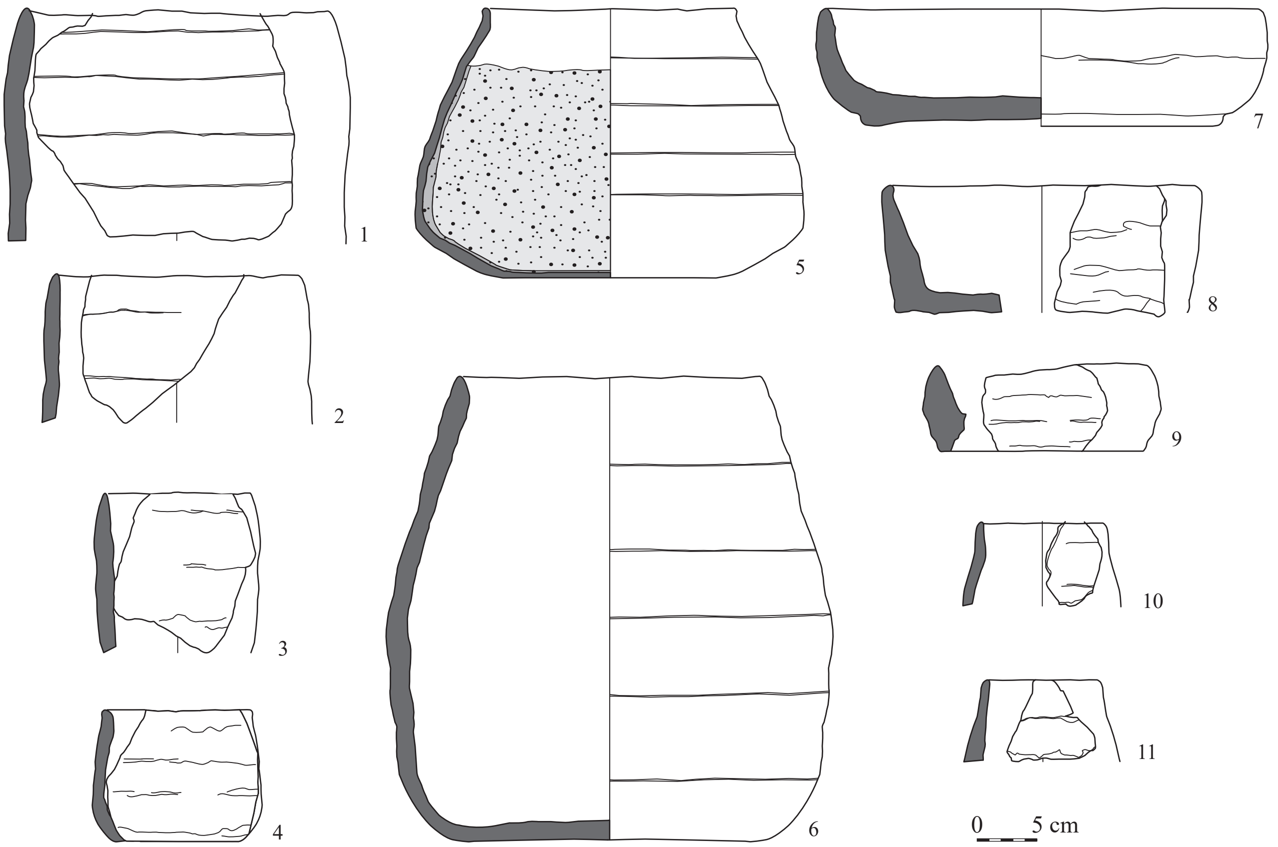


Fig. 4.14 Tell Sabi Abyad, Operation III. Standard Ware vessels showing horizontal traces of several coil attachments at the exterior surface.

Fig. 4.15 Tell Sabi Abyad, Operation III. Standard Ware. Traces of scraping the interior surface (level A5; Fig. 4.104: 8) (image O. Nieuwenhuuyse).

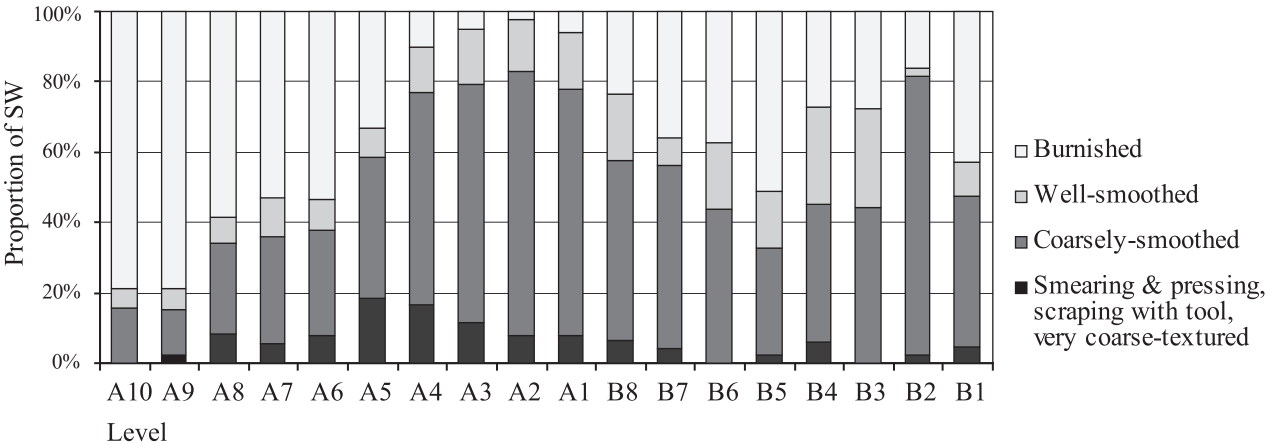


Fig. 4.16 Tell Sabi Abyad, Operation III. Proportions of Standard Ware finishing techniques (exterior surface).

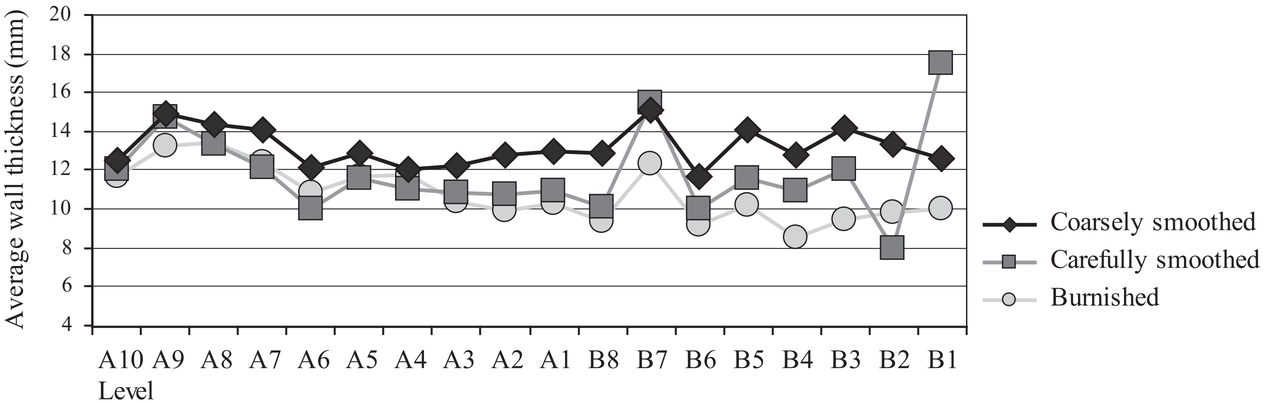


Fig. 4.17 Tell Sabi Abyad, Operation III. The relationship between Standard Ware surface finishing techniques and average wall thickness (mm) as an indicator for vessel size in the A–B Sequence.

we do not merely consider the average values, but bring the entire range of height and volume values into play (Fig. 4.18). In the earliest levels A10–A5, burnished vessels gained the greatest diversity as far as height and volume were concerned. Interestingly, burnishing in these levels was often applied to relatively tall, voluminous Standard Ware containers. This changed rather dramatically by level A4, when the ranges of height and volume values became significantly reduced for burnished vessels and these treatments were henceforward applied almost exclusively to vessels of limited height or volume. Coarsely-smoothed and roughly-textured vessels, in contrast, reach sky-high in these later levels. In sum, what these statistics suggest is that from about the time represented by level A4, the careful application of a time-consuming surface finishing in the form of burnishing first began to be associated with Standard Ware vessels of limited size.

Finally, in the final stages of the A-Sequence, surface treatment starts to correspond with types of fabric. We have already seen that Standard Ware varied in the size and the amounts of plant inclusions, both synchronically and diachronically, and we have also seen that this variation began to co-vary with vessel size in the later A-levels. Not unexpectedly, then, in these later levels the size and amounts of plant temper vary systematically with surface treatment as well. In this regard an interesting shift emerges if we compare different stages of the A-Sequence. In the earliest levels (levels A10–A5), when the strong majority of the pottery was still burnished, this surface finishing technique was associated with plant inclusions of small *size*, which may represent either the use of dung as tempering material or the selection of clays naturally containing some plant materials. Burnished vessels were more often made of a compact clay with little or no purposely added plant temper. But overall the differences in specific kinds of surface treatment found within different fabric types were not as large as in later stages.

By levels A4 to A3 this earlier pattern changed. While in these levels the overall proportion of burnished surfaces reached a deep low, this treatment began to be associated with different types of fabric. Instead, burnishing began to be associated with Standard Ware vessels made of clay containing reduced *amounts* of plant temper. In contrast, coarsely-tempered vessels, presumably reflecting the use of straw as temper, were more often given coarsely-textured, rough surfaces (Figs. 4.19 and 4.20). This emerging relationship continued to develop in the subsequent levels A2 and A1 when burnishing reached its minimum. In these

Table 4.6 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware traces of secondary shaping and finishing (interior surface) by level

Level	*Pressing, smearing*	*Scraping with tool*	*Very coarse*	*Coarse smoothing*	*Fine smoothing*	*Burnish*	*Eroded*	*Total*
D-Sequence	12	–	19	49	22	9	16	127
C-Sequence	17	1	2	37	4	19	4	84
Mixed B	36	11	12	138	61	68	24	350
B1	–	1	–	11	2	8	2	24
B2	7	2	–	25	–	6	4	44
B3	4	2	1	14	8	6	2	37
B4	6	1	13	50	24	21	4	119
B5	1	–	2	18	8	14	2	45
B6	4	1	–	4	3	2	2	16
B7	4	1	–	12	3	4	1	25
B8	56	4	13	157	44	54	15	343
Mixed A	253	12	16	268	47	180	65	841
A1	420	38	244	1368	198	64	191	2523
A2	142	11	45	385	43	7	46	679
A3	138	4	50	352	50	15	65	674
A4	314	20	17	429	54	39	123	996
A5	190	11	19	279	36	72	67	674
A6	201	10	25	253	66	168	52	775
A7	66	2	1	130	33	88	31	351
A8	56	10	–	55	13	61	17	212
A9	18	2	–	60	25	79	34	218
A10	4	–	–	4	3	7	4	22
Total	1937	144	460	4049	725	982	755	9052

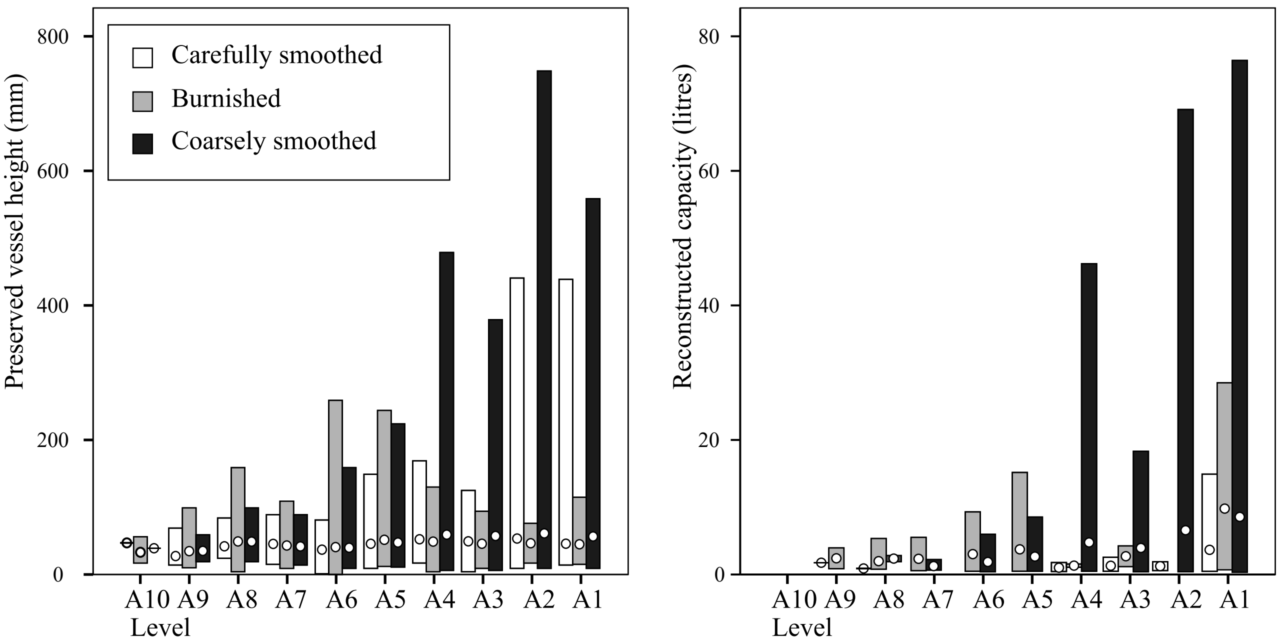


Fig. 4.18 Tell Sabi Abyad, Operation III. The relationship between main Standard Ware exterior surface finishing techniques – burnishing, careful smoothing, coarse smoothing – and vessel size in the A-Sequence (mean, minimum–maximum values). Left: preserved vessel height (mm); right: volume (litres).

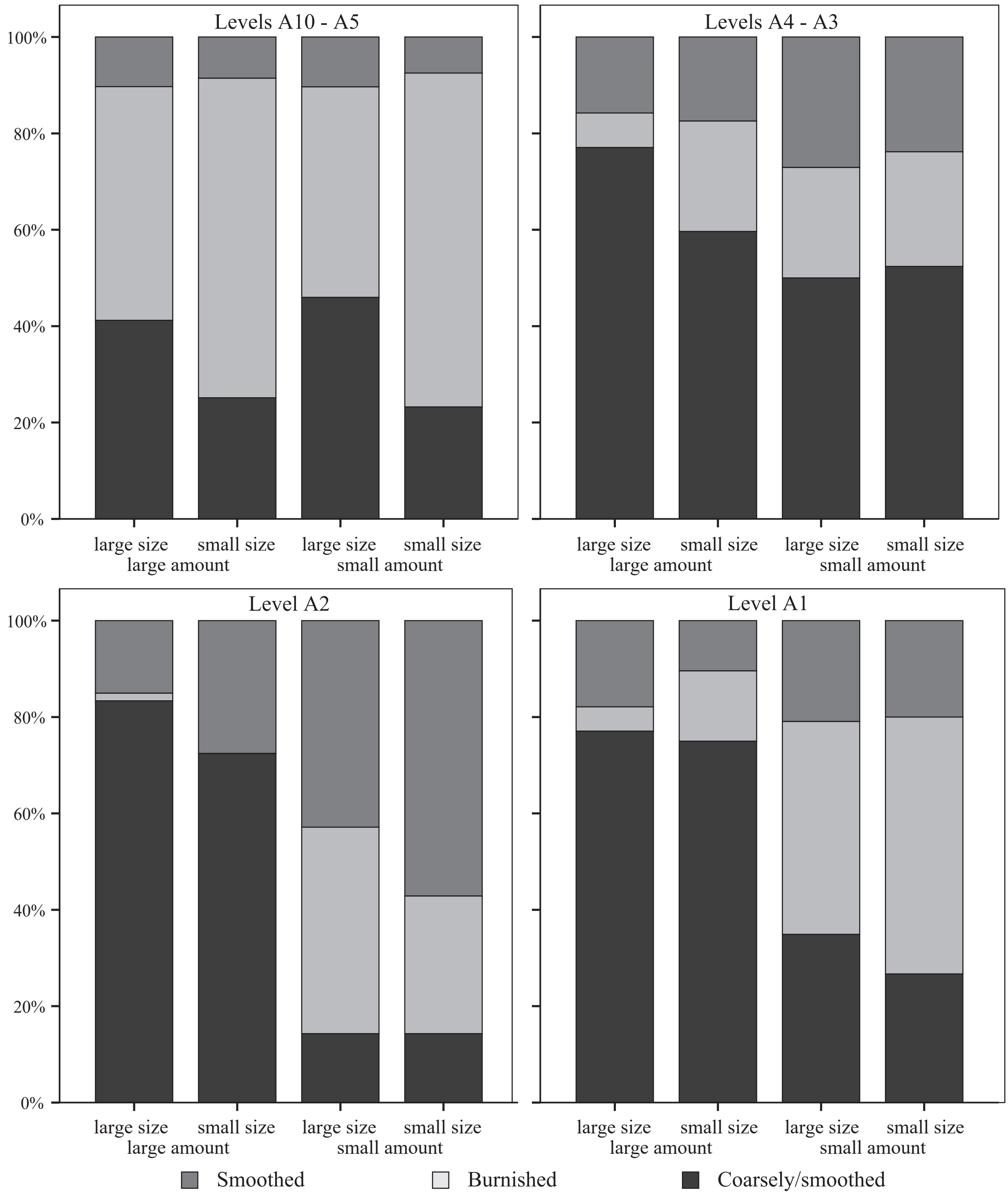


Fig. 4.19 Tell Sabi Abyad, Operation III. The relationship between Standard Ware surface finishing techniques and the macroscopically observed amounts and sizes of plant inclusions, distinguishing between grouped levels A10–A5, grouped levels A4–A3, level A2 and level A1.

levels, a burnished surface formed part of an established constellation of technological practices that created distinct varieties of Standard Ware differing in vessel size, shape, and outward appearance. When burnishing subsequently became more frequent again in the B-levels, this treatment remained consistently associated with finer plant-tempered fabrics. In short, in Operation III we may trace the first emergence of the relationships between fine-coarse fabrics and differential surface treatment to the time represented by level A4, when it reached its full maturity by level A2.

4.2.3.3. *Standard Ware firing circumstances*

Standard Ware vessels were fired at relatively low temperatures and for short periods of time. In combination with the characteristic coarse plant temper this very often

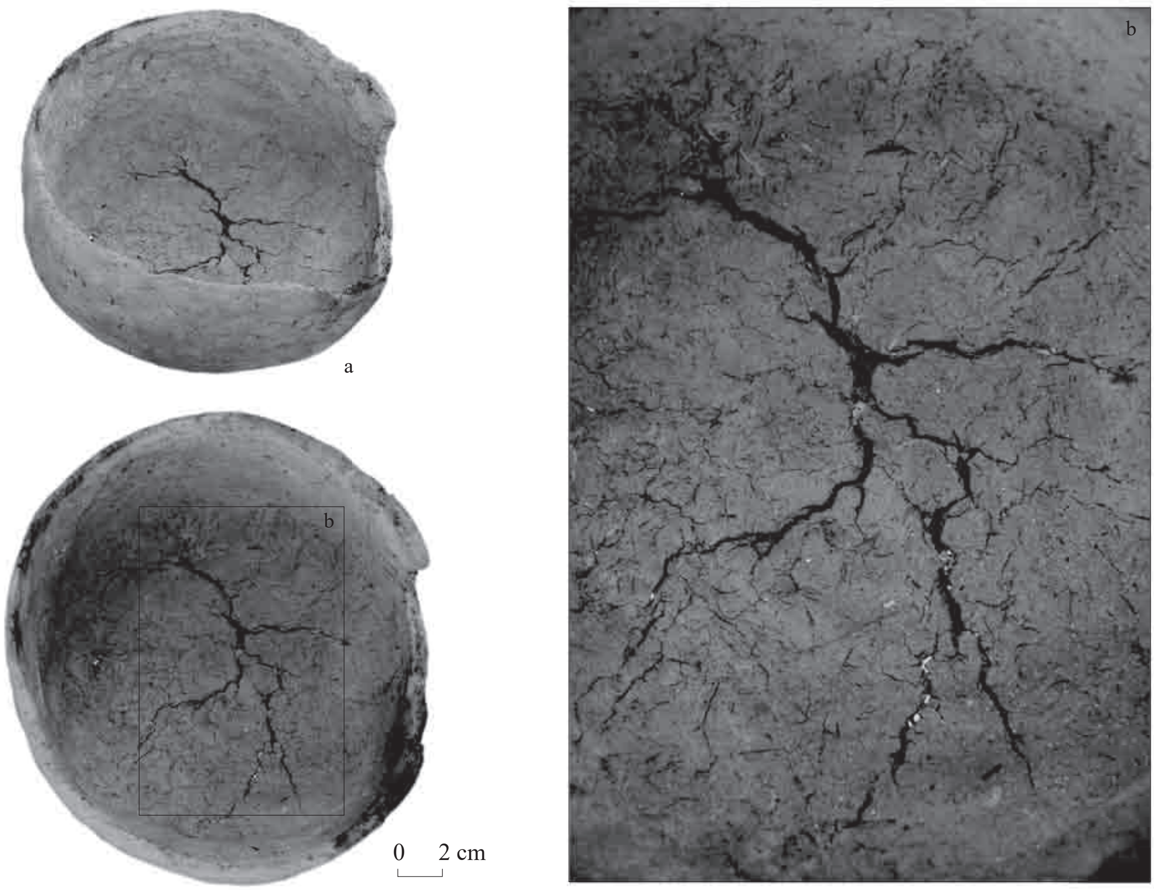


Fig. 4.20 Tell Sabi Abyad, Operation III. Standard Ware convex-sided bowl showing drying cracks at the interior base (P08-87; mixed B-levels) (image O. Nieuwenhuuyse).

resulted in an incomplete oxidation of the vessel wall. The greater majority of the material either has dark-grey to black cores or greyish cores signifying incomplete oxidation (Table 4.7). Sherds attesting to completely oxidising firing circumstances are a minority, constituting no more than about one-third of all Standard Ware. A few vessels came out of the firing so dark that they were described as 'completely reduced', while a handful of sherds suggested that oxygen conditions had become reducing at the end of the firing sequence ('end reduction'). These were exceptions, however, and we even doubt if their dark colour was deliberate. The consistent, systematic application of reducing firing circumstances was not part of the firing strategies for Standard Ware vessels. A few Standard Ware sherds would perhaps count as 'overfired' (Table 4.7).

As such, the frequent presence of a dark, incompletely-oxidised core represents an important part of the formal definition of Standard Ware. However, a closer inspection of firing behaviour through time suggests that firing strategies did not remain constant. Fig. 4.21 shows the proportions with which the three major modes of Standard Ware were fired in the A-B Sequences. The data from the earliest levels in which Standard Ware occurs should perhaps not be trusted because of the very limited sample sizes from these levels (e.g. Level A10); the same holds for some of the B-levels. Nonetheless, the graph suggests a gradual increase in thoroughly-oxidised Standard Ware during the A-Sequence, reaching a peak in levels A3–A2. Whereas in levels A8 to A6 the larger majority of the Standard Ware ended up with black or dark grey cores, by level A3 such pottery had become a minority. Significantly, a more complete oxidation was achieved in spite of the more abundant use of coarse plant temper and the increased wall thickness of Standard Ware in the later A-levels, two factors that would have mitigated against the chance of complete oxidation.

What this suggests is that over the longer term potters gradually increased their control over the firing process. They gradually learned to control the vagaries and risks of firing coarse plant-tempered ceramics. In the early stages they perhaps fired this pottery at the shortest intervals possible, simply aiming to reach the minimum firing needed to transform clay into ceramic. In the field we gained the impression that Standard Ware vessels in the earlier stages much more often gained variable, polytone surface colours, so-called fire clouding, because of this rapid firing. Later on, Standard Ware vessels gained more even surface colours. In these later levels the potters may have prolonged the duration of the firing to keep the vessels at a high temperature for a longer period. Possibly they found ways to raise somewhat the maximum temperatures reached during the firing, although overall firing temperatures remained low. In time, Standard

Table 4.7 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware firing circumstances by level

Level	*Completely Oxidised*	*Slightly incompletely oxidised*	*Strongly incompletely oxidised*	*Completely reduced*	*Overfired*	*End-reduction*	*Total*
D-Sequence	36	35	56	–	–	–	127
C-Sequence	32	13	36	3	–	–	84
B mixed	194	128	226	3	–	–	551
B1	8	8	7	–	1	–	24
B2	22	5	17	–	–	–	44
B3	20	2	15	–	–	–	37
B4	29	27	54	–	–	–	106
B5	10	15	19	1	–	–	45
B6	6	2	8	–	–	–	16
B7	5	4	16	–	–	–	25
B8	156	49	134	3	1	–	343
A mixed	171	127	537	6	1	–	842
A1	748	630	1141	2	3	–	2524
A2	348	121	199	6	4	1	679
A3	400	110	157	2	6	–	675
A4	497	142	350	5	3	–	997
A5	196	130	338	6	1	2	673
A6	188	125	458	1	3	–	775
A7	56	40	253	–	–	2	351
A8	9	8	195	–	–	–	212
A9	24	12	181	1	–	–	218
A10	7	–	15	–	–	–	22
Total	3158	1733	4412	39	23	5	9370

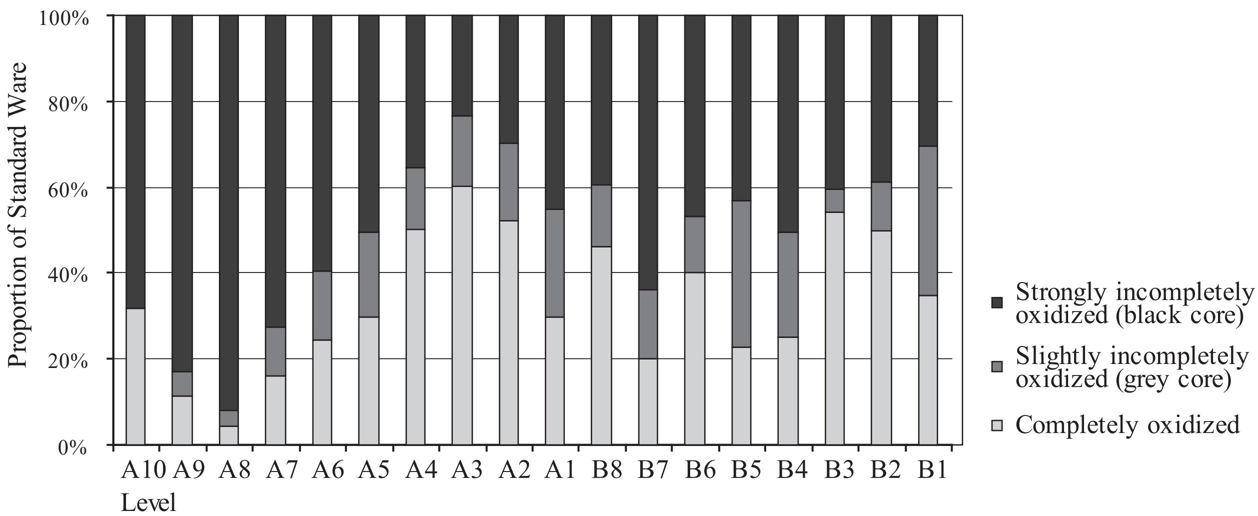


Fig. 4.21 Tell Sabi Abyad, Operation III. The fluctuating proportions of Standard Ware firing technology in the A–B Sequences.

Ware gained a stronger vessel wall and a more even, homogeneous colour of the surface.

An improved firing was more time-consuming and more fuel-intensive, but resulted in superior pottery. Presently we cannot say with any certainty what types of firing installations the potters used. In the early stages of Standard Ware production much, possibly all, of this pottery may have been fired in above-ground open fires (Rice 1987, 153–158; Rye 1981, 96–98). In the later stages potters probably employed specially-built kilns for firing Standard Ware ceramics, but we remain in the dark as to what types of kilns were available at Tell Sabi Abyad, or how we should interpret the many ovens that have been found. In Operation I, for instance, in levels overlapping

Table 4.8 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware exterior surface colour (Munsell) by grouped level (based on diagnostic sample)

	A10–A8	*A7–A5*	*A4–A3*	*A2*	*A1*	*Total*
Red (10R5/6)	–	–	1	–	–	1
Light red (2.5YR6/6. 10R6/6–7/6)	1	2	2	–	2	7
Yellowish red (2.5YR4/6–5/6–5/8. 5YR4/6–5/6–5/8)	2	13	17	6	19	57
Reddish yellow (2.5YR6/6–6/8–7/6–7/8. 5YR6/6–6/8–7/6. 7.5YR6/6–7/6)	8	34	49	25	72	188
Brown (10YR5/3. 7.5YR4/3–4/4–5/2–5/4)	11	13	11	3	8	46
Strong brown (7.5YR4/6–5/6)	2	3	1	–	5	11
Light brown (7.5YR6/3–4)	13	45	55	19	78	210
Pale brown (10YR6/3)	5	10	13	6	10	44
Very pale brown (10YR7/3–7/4–8/2–8/4)	2	38	69	33	62	204
Yellowish brown (10YR5/4)	–	–	2	–	1	3
Light yellowish brown (2.5Y6/3. 10YR6/4)	6	15	16	1	10	48
Brownish yellow (10YR6/6)	1	1	–	–	–	2
Reddish brown (2.5YR5/3–5/4. 5YR5/3–5/4–4/3–4/4)	2	1	12	8	6	29
Light reddish brown (2.5YR6/3–4. 5YR6/3–4)	4	11	26	11	51	103
Light brownish grey (2.5Y6/2. 10YR6/2)	–	1	1	1	1	4
Grayish brown (10YR5/2)	1	–	–	–	2	3
Dark greyish brown (10YR4/2)	–	–	1	–	–	1
Grey (5YR6/1)	–	–	1	–	–	1
Light grey (10YR7/2. 2.5Y7/2)	–	2	8	3	5	18
Dark grey (10YR4/1. 5YR4/1)	–	1	–	–	1	2
Very dark grey (10YR3/1)	–	–	1	–	–	1
Reddish grey (5YR5/2)	1	2	1	–	–	4
Dark reddish grey (2.5YR4/2. 5YR4/2)	–	2	1	–	–	3
Pinkish grey (2.5YR7/2. 5YR6/2. 7.5YR6/2–7/2)	–	1	7	2	3	13
Pink (7.5YR7/3–7/4–8/3–8/4. 2.5YR7/3–7/4. 5YR7/3–7/4–8/4)	2	26	68	51	121	270
Pinkish white (7.5YR8/2)	–	–	1	–	3	4
White (7.5YR8/1)	–	–	1	–	–	1
Pale yellow (2.5Y7/3–7/4–8/2–8/3–8/4. 5Y7/3–Y8/2)	–	1	11	5	2	19
Total	61	224	376	174	462	1297

in time with the dates of the B-C sequence of Operation III (Pre-Halaf–Early Halaf periods), a wide variety of ovens, kilns and fire places are attested, but their use in most cases remains obscure (Verhoeven 1999).

Intriguingly, the proportion of dark, incompletely-oxidised cores rose again somewhat during the B-Sequence. This trend appears to have begun already by level A1 (Fig. 4.21). The small sample sizes from the B-levels throw some doubt on the validity of the observations, but they fit with earlier observations with regard to the Standard Ware from Operation I (Nieuwenhuyse 2007, 77). However, this was not a return to earlier conditions. Rather than firing strategies becoming again more 'primitive', they became more *diverse*. As we have already seen, Standard Ware production as a whole diversified around the time represented by level A1; firing strategies became implicated in this diversification. The larger, coarser, undecorated pieces were fired with less care, and usually kept their dark, incompletely-oxidised cores. The smaller pieces were treated with more care and they were in most cases fired to a completely oxidising state. It is even possible that the potters employed different firing structures for different categories of Standard Ware from level A1 onwards, for instance kilns for the finer wares and open fires for the larger, coarser vessels.

Standard Ware surface colours were consequently quite variable and could fluctuate markedly even on a single vessel. In terms of the Munsell chart, surface colours most commonly range in the lighter, completely oxidised tones: reddish yellow, light brown, very pale brown, or pink (Table 4.8). The reddish to pink hues indicate the use of iron-rich clays, whereas the lighter hues (pale brown, very pale brown) reflect the calcareous character of the clays. There were subtle long-term changes in Standard Ware surface colour, however. Evidently, apart from the selection of raw materials, surface colour depended on the firing technique. The Standard ware from Operation

Table 4.9 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware rim shape by level (based on EVR)

Level	Plain	Pointed	Flat	Outwardly bevelled	Inwardly bevelled	Pinched	Thinned	Total
D-Sequence	68	19	3	–	–	1	–	91
C-Sequence	45	8	3	–	–	–	–	56
Mixed B	210	35	18	1	1	–	–	265
B1	11	1	5	–	–	–	–	17
B2	28	8	1	–	–	–	–	37
B3	19	5	1	–	–	–	–	25
B4	62	19	5	–	–	1	–	87
B5	27	5	–	–	–	–	–	32
B6	10	1	3	–	–	–	–	14
B7	13	2	1	–	–	–	–	16
B8	166	31	25	1	2	–	–	225
Mixed A	348	102	17	2	1	–	2	472
A1	1183	312	60	12	2	2	1	1572
A2	296	129	10	–	1	–	–	436
A3	330	129	7	–	–	–	–	466
A4	441	186	18	1	1	1	–	648
A5	260	117	16	1	–	2	2	398
A6	328	145	12	–	1	–	–	486
A7	145	49	10	3	–	–	–	207
A8	84	10	12	–	–	1	–	107
A9	91	7	5	–	–	–	–	103
A10	2	–	–	–	–	–	–	2
A12	1	–	–	–	–	–	–	1
Total	4168	1320	232	21	9	8	5	5763

III indeed shows that incompletely-oxidised sherds tend to have somewhat darker exterior surfaces, whereas completely oxidised sherds more often have somewhat lighter surfaces. Not surprisingly, then, surface colours show a diachronic trend that matches the long-term shifts observed in the firing processes. Summarising, in the early stages of the Early Pottery Neolithic (levels A10–A8), surface colours mostly fall in the Munsell categories of brown, light-brown or reddish yellow. In later stages somewhat lighter shades come to the foreground many vessels became very pale brown or pink (Table 4.8).

4.2.4. Standard Ware vessel typology

Here we shall present the formal vessel shape typology constructed for the Standard Ware from Operation III. Before moving on to a discussion of the various identified types, the analysis starts with aspects of the morphology that cut across the typological classification. The shape of the base has already been discussed (see above). This section starts with the shape of the uppermost part of the rim (the lip), followed by carinations and necks, the general orientation and shape of the rim, and vessel size. The appendages found with Standard Ware come next, followed by a general division in broad classes of vessel shape. Apart from the shape of the lip, these general morphological aspects all show clear chronological tends. Standard Ware bowls, trays, pots, jars and 'others' are discussed separately.

4.2.4.1. General morphological aspects

Ceramic specialists working on more recent periods in the archaeology of the ancient Near East sometimes perform typological miracles by exploring the shape of the rim. To those colleagues the 7th millennium may come as a disappointment. Rim shape is virtually irrelevant in this timer period for typological purposes; Standard Ware rims in Operation III were overwhelmingly kept plain and simple. This is not to say that they were very carefully finished. Characteristically, Standard Ware rims were often irregular in shape, in thickness and even in surface texture. It is typical for the rim to be wobbly and very irregular in height. For present purposes the adjective 'plain' simply means: not further elaborated. About a quarter of all Standard Ware vessels gained a pointed rim. Occasionally the rim was made flat (Table 4.9). This is about as far as the elaboration of Standard Ware rims would get. Very occasionally we came across rims that we classified as bevelled, pinched or thinned. We cannot detect any chronological changes in the shape of the Standard Ware rim.

As with the other wares in Operation III, Standard Ware vessels mostly had relatively simple shapes without carinated profiles. The very limited numbers of carinated profiles mostly come from the later parts of the sequence. No unequivocal examples of carinated profiles were recovered from levels A9–A5. Levels A4 and A3 each yielded but one example of a carinated Standard Ware body sherd; these perhaps constitute the earliest examples of carinated Standard Ware vessels at Tell Sabi Abyad. From level A2 onward carinated profiles became somewhat more common (Figs. 4.77: 1–15). These numbers are however almost certainly an underestimation. Carinated body sherds were sometimes difficult to identify with certainty in the field and we are quite sure that several were missed. As well, the large jars from the later A-levels sometimes had a sharp distinction between the lower and upper parts of the vessel wall – these, too, might be said to be 'carinated'. Nevertheless, we believe these statistics do reflect a genuine trend. Carinated Standard Ware shapes do not seem to appear at all in Operation III prior to level A4. By levels A3 and A2 such shapes emerged for the first time, but they were still rather exceptional. Only by level A1, and subsequently into the B-levels, carinated Standard Ware vessels formed a regular component of the ceramic repertoire.

Two morphological varieties of collars are distinguished for Standard Ware: distinct, sharply-articulated shoulders and indistinct shoulders leading to a gradual, S-shaped transition from the upper body to the rim. Both types are present in Operation III, although the latter, more gradual type was by far more common (Table 4.10). In addition, just a single example was recorded of a so-called 'grooved' shoulder, a type more at home with the Dark-Faced Burnished Ware. Whatever the specific shape of the shoulder, the chronological distribution of collars as a whole is almost entirely confined to the later stages documented in Operation III. In the early stages of the Operation III sequence collared Standard Ware vessels are conspicuously absent; there were virtually no collared Standard Ware vessels in levels A10–A5. To be sure, isolated examples do occur, but if measured as a proportion of EVR, collared vessels as a whole measure less than 0.5% of the repertoire (Fig. 4.22). Potters incidentally turned out the occasional S-shaped goblet or bowl, simply by bending the upper part of the vessel wall upward somewhat, but although these vessels formally count as 'collared' they are the exceptions that prove the rule; collared vessels did not (yet) form part of the typological repertoire.

This changed by level A4. In this level collared SW vessels appear in meaningful quantities for the first time. Their numbers rose in subsequent levels. If in level A4 collared vessels still constituted an unconvincing 2% of the Standard Ware repertoire, this figure doubled to over 4% in level A3 before skyrocketing to an astonishing 11% in

Table 4.10 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware sherds with a collar by level

Level	*Distinct collar*	*Indistinct collar*	*'Grooved' shoulder*	*Total*
D-Sequence	1	26	–	27
C-Sequence	3	10	–	13
Mixed B	13	74	–	87
B1	2	2	–	4
B2	–	7	–	7
B3	3	4	–	7
B4	2	15	–	17
B5	–	5	–	5
B6	–	5	–	5
B7	–	9	–	9
B8	1	36	–	37
Mixed A	–	7	–	8
A1	26	397	1	424
A2	–	50	–	50
A3	3	27	–	30
A4	2	13	–	15
A5	4	2	–	6
A6	2	3	–	5
A8	–	2	–	2
Total	62	694	1	757

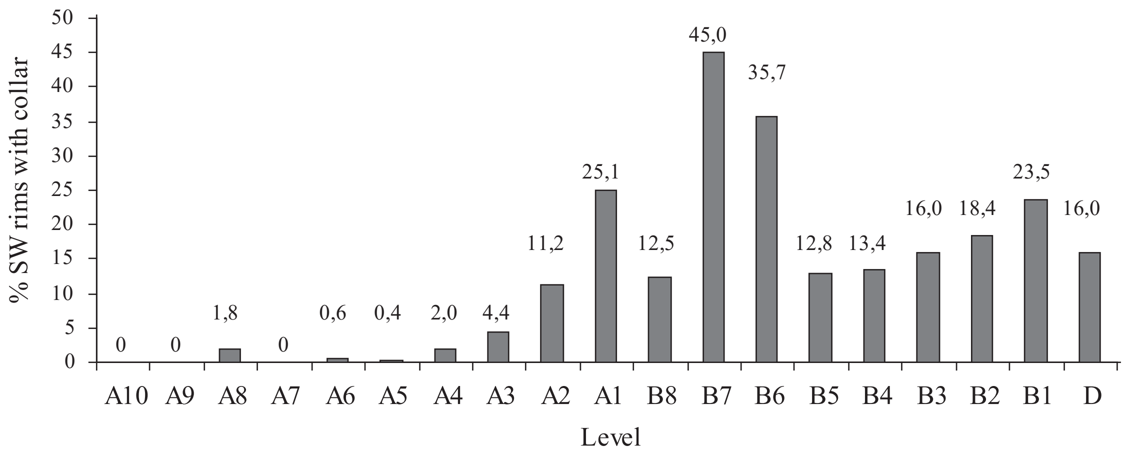


Fig. 4.22 Tell Sabi Abyad, Operation III. Collared Standard Ware vessels as a proportion of Estimated Vessels Represented.

level A2. The apogee was reached in level A1, when no less than one-quarter of all SW vessels from Operation III show a collared profile (Fig. 4.22). Typologically the emergence of collared vessels began with S-shaped bowls and goblets, but from about level A3 onwards closed vessels with a distinct neck (jars), firmly formed part of the Standard Ware typological tool kit (see below, section 4.2.4.3). Subsequently, collared Standard Ware vessels remained an important part of the ceramic assemblage during the B-levels, in which we find them represented with fluctuating proportions. Below we shall explore what specific Standard Ware vessel types collars are associated with.

If we consider the Standard Ware from Operation III as a whole, the general emphasis in the vessel morphology is overwhelmingly on a vertical orientation. Most of the Standard Ware vessels were shaped with their walls vertical. The average wall orientation is 91 degrees, a near-perfect vertical; most walls have an orientation falling between 80° and 100°. Occasionally we find a few rims that were either more closed or more open, but the spread around the average was remarkably low (Fig. 4.23).[5]

However, there was a subtle trend towards Standard Ware vessels becoming more open over time, with a clear shift in level A1. That is, from level A9–A2 the average wall orientation was always slightly closed; expressed in degrees it remained just below 90°. Synchronic fluctuations in average wall orientation in these early levels are hardly perceptible and statistically insignificant (Fig. 4.24). In level A1, however, Standard Ware vessels quite abruptly became more open, with an average wall orientation of over 90°. Evidently, these general statistics do not take into account the emergence of collared vessels in the later A-levels. Jars and other types of collared vessels are by definition closed, even if their collars may flare widely. Fig. 4.24 computes the average wall orientation of Standard Ware both with and without the inclusion of collared vessels. If rim fragments with a shoulder are excluded, the figures for average wall orientation drop somewhat for those levels in which jars are strongly represented. However, the general trend remains the same. Starting with level A1, Standard Ware vessel shape became, on average, more open.

Apart from the vertical orientation, another conspicuous morphological trait of the Standard Ware from Operation III is the strong emphasis on shaping a *straight* vessel wall. This trait is especially strong in the A-Sequence. Between levels A9 and A1, some 60% of all Standard Ware rims gained a straight profile. The main alternative was convex-walled shapes, which constitute the remaining 40% in levels A9–A2. Again, we see a shift in level A1. In this level for the first time concave walls appear in meaningful quantities. This is mainly due to the development of jars, which very often had concave, S-shaped necks. In addition, in the subsequent B-levels the potters for the first time developed open shapes (bowls) with a concave wall. Convex-sided

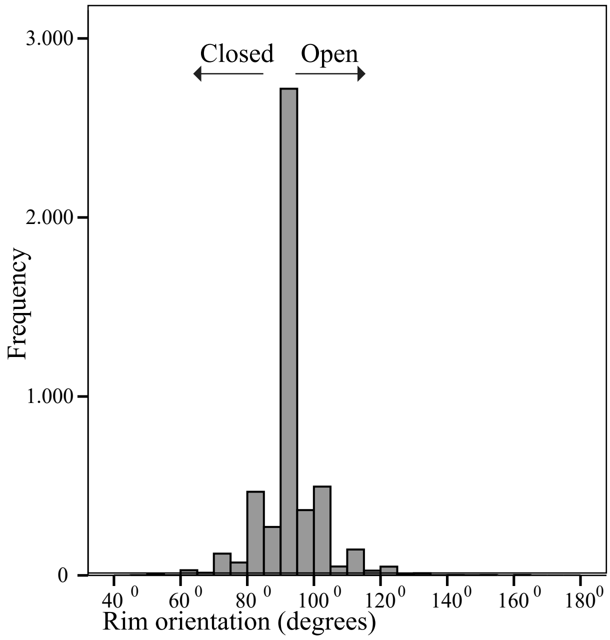


Fig. 4.23 Tell Sabi Abyad, Operation III. Histogram of wall orientation of Standard Ware vessels (measured in degrees). Closed: <85°. Open: >95°. Vertical: 85° to –95°.

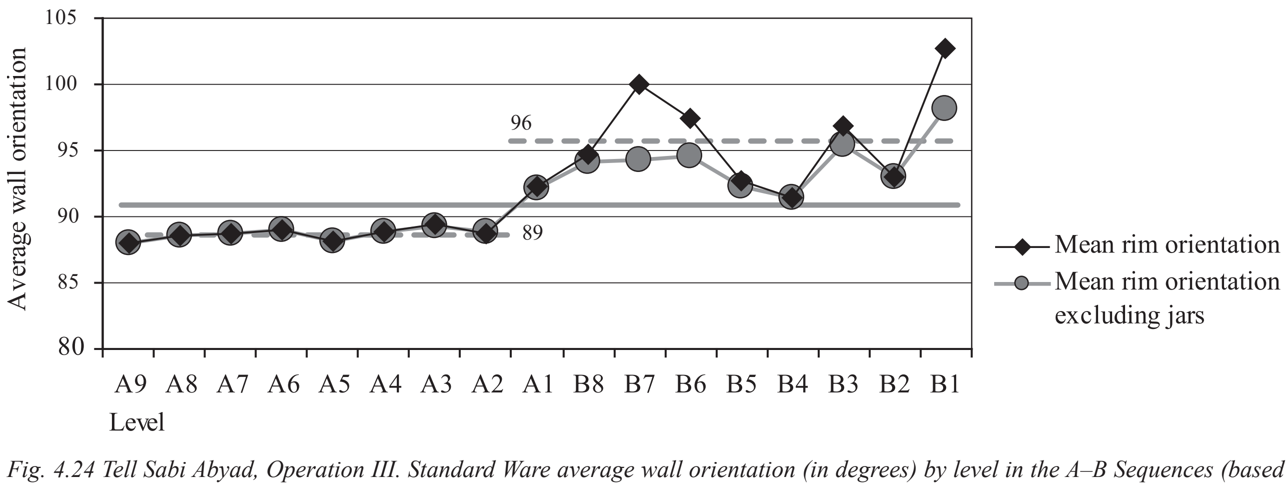


Fig. 4.24 Tell Sabi Abyad, Operation III. Standard Ware average wall orientation (in degrees) by level in the A–B Sequences (based on EVR). Grey solid line: average wall orientation for Standard Ware rims as a whole. Dotted lines: average wall orientation for levels A9–A2 and levels A1–B1.

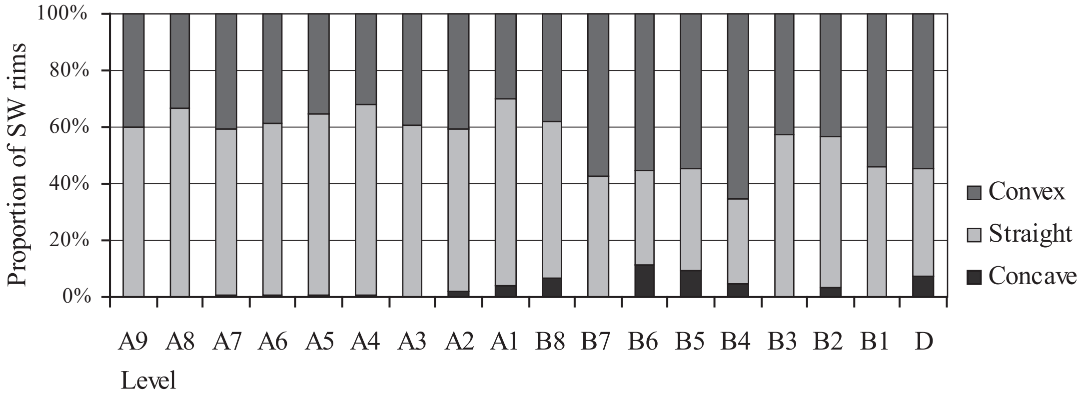


Fig. 4.25 Tell Sabi Abyad, Operation III. General Standard Ware shape in the A–B Sequences (based on EVR).

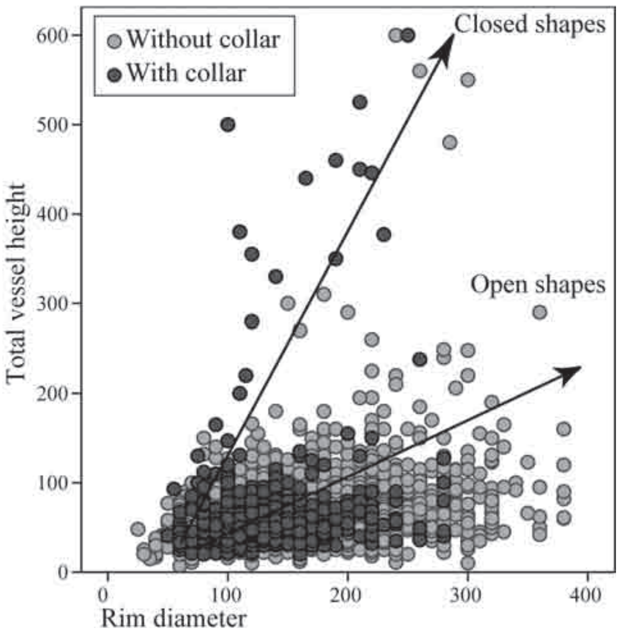


Fig. 4.26 Tell Sabi Abyad, Operation III. Plot of Standard Ware rim diameter versus total vessel height (both measured in mm), distinguishing between vessels with a collar and vessels without a collar (based on EVR).

shapes, too, became more common after level A1, to the demise of straight-walled shapes (Fig. 4.25).

Most generally, Standard Ware was relatively thick-walled, comparatively heavy pottery. If we ignore typological distinctions, average wall thickness is over 12 mm. Vessels ranged widely in size, occasionally reaching very large proportions (Table 4.11). On average, Standard Ware is much thicker, taller and larger than any other ware in Operation III. Plotting the rim diameter against the total preserved height shows the huge variability in size (Fig. 4.26). Many Standard Ware vessels were of near miniature size but others reached almost 40 cm in diameter. Most vessels were low and shallow, but markedly tall vessels are also found, some reaching over half a metre in height. A broad division emerges between closed vessels and open vessels, as expressed in the relative proportions of height and diameter. To a large measure this division corresponds to the presence or absence of a collar. Collared vessels

Table 4.11 Tell Sabi Abyad, Operation III. Three size-related properties of Standard Ware sherds: wall thickness (mm), total vessel height (mm), rim diameter (mm), weight (g) and volume (l); based on EVR

	Mean	*Min.*	*Max.*	*Std. Dev.*	*N*
Thickness	12.29	1	45	4.32	9208
Total vessel height	52.50	1	750	38.29	7696
Rim diameter	157.41	17	390	58.66	3108
Weight	127.37	1	25,635	1004.54	5953
Volume	4.89	0.01	114.50	13.23	335

show a much steeper relationship between rim diameter and vessel height: they tend to be much taller relative to their total height. These differences were certainly not absolute, however. Standard Ware overlapped significantly in size and proportions for both closed and open shapes.

Obviously, the sometimes large sizes and thick vessel walls bear on the weight of the pottery. Standard Ware vessels varied widely in size, but often were quite heavy. Given the highly fragmented state of the Standard Ware sample and the low numbers of complete vessels, it remains difficult to give reliable estimates for the original weight of the vessels.[6] If we simply investigate what has been preserved from the available rim fragments, sections and complete vessels (EVR), this shows that most of these weigh less than 100 grs (Fig. 4.27). We have already seen that the average body sherd weighed some 44 grs, more than any other ware. If we take into account only the complete vessels and those that have both the rim and the base preserved ('sections') the average weight, not very surprisingly, rises to some 2 kg. This offers a closer approximation of the average weight of the Standard Ware vessels in their intact condition, although it is still an underestimation. Many of the complete vessels were much heavier, some of them reaching a weight of over 20 kg.

The formal typology presented below shall give further insights in the huge synchronic variation in Standard Ware size (see below). However, there was important *diachronic* variation as well. We shall conclude this section with drawing attention to what perhaps emerges as the major long-term trend in Standard Ware production: the increase

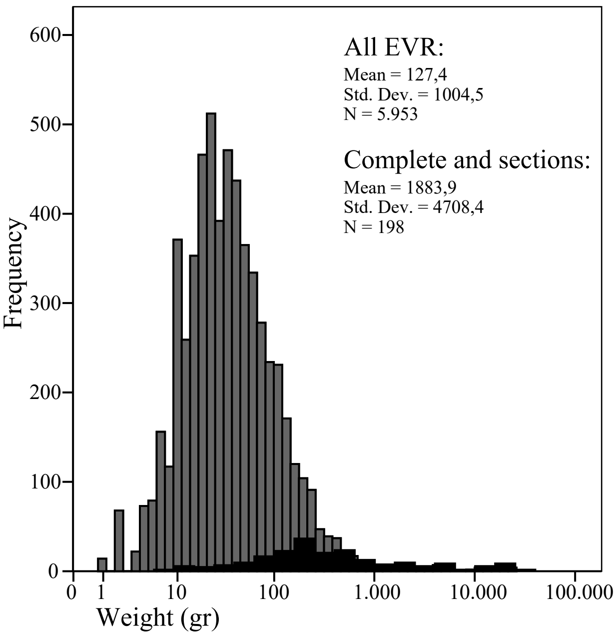


Fig. 4.27 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware weight (g) in Operation III (based on EVR; logarithmic scale). Grey shade: all fragments. Black shade: only complete shapes and sections

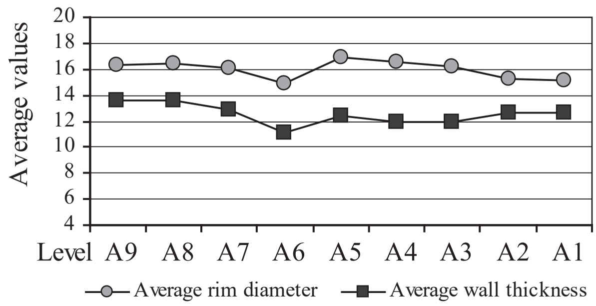


Fig. 4.28 Tell Sabi Abyad, Operation III. Average values for Standard Ware rim diameter (cm) and wall thickness (mm) in the A-Sequence (based on EVR).

in vessel size. This, too, is borne out by the vessel shape typology, in the introduction of *large* jars, *large* bowls, *tall* pots and so on in the later stages of the A-Sequence (see below). But it can also be demonstrated independently of typological subtleties. To explore changes in Standard Ware size through time, we may investigate five size-related properties: wall thickness, rim diameter, vessel height, weight and volume.

Most of these size-properties did not change *on average* dramatically over time. Especially average wall thickness and rim diameter do not show any clear trends at all, both fluctuating around their averages within certain narrow ranges (Fig. 4.28). However, the average values for vessel height and weight certainly increased somewhat. The average height rose from less than 4 cm in level A9 to about 6 cm by levels A2–A1. While technically this amounts to a 50% increase, it could be argued that in practice the ensuing effect was negligible. On the other hand, average weight rose perceptibly: from 20–30 g in levels A9–A6 to over 150 g by levels A3–A1. This corroborates the very similar increase in BMI already noted earlier (Fig. 4.1). Thus, while average wall thickness and rim diameter may not have changed much over time, vessel height and weight certainly did.

These long-term, but relatively minor shifts in average size values come more sharply into focus if we step away from averaged figures and take the *maximum* values into account (Fig. 4.29). These changed dramatically in the course of the A-Sequence, most spectacularly with regard to vessel height and weight. Maximum values for vessel height were all below 20 cm prior to level A6. From level A6 onwards, maximum values progressively increased, and they had more than tripled by level A2. As to weight, no vessels with a weight of over 1 kg were recorded prior to level A5. Maximum weight values sky-rocketed subsequently, with some vessels weighing over 20 kg by level A3. More extreme maximum values obviously resulted in an increased *variability*, as expressed in the progressively increasing deviation around the average. Variability for weight increased a hundredfold, that for height almost tripled in the course of the A-Sequence.

What may account for these developments is an increase in Standard Ware vessel volume through time. Throughout levels A9–A7, the variability in volume remained fairly limited. Standard Ware vessels were rather non-voluminous in these levels, with capacities not exceeding a few litres (Fig. 4.30). This began to change by level A6 and, especially, by level A5 when for the first time some Standard Ware pottery containers gained a volume of over ten litres. This trend accelerated in the succeeding levels. Average volume estimates increased somewhat from level A4 to A1, but this was because of the extraordinary increase in variability. Some Standard Ware vessels in the upper A-Sequence levels gained unprecedented volumes reaching to 75 litres or more (Fig. 4.30). Some of the larger Standard Ware pottery vessels from the B-Sequence reached even larger volumes, suggesting that the trend towards increased pottery vessel volume continued during the Pre-Halaf stage. To conclude, the main development in terms of vessel size was towards the production of progressively taller, or more precisely, more *voluminous*, Standard Ware vessels. In particular for the two properties of vessel height and weight, a major point of departure appears to have been by the approximate time represented by level A5, ca. 6495–6455 cal BC. More than any other factor, the increased height seems to explain the increasing weight of the vessels. As we shall see below, this development in size was strongly associated with changes in shape, in particular with the introduction of collars: the tallest shapes were those that formally classify as *jars* (see below, section 4.2.4.7).

4.2.4.2. Standard Ware appendages

Standard Ware vessels were frequently furnished with appendages. In total, nine different types of loop handles, cordons, lugs and other appendages were found (Table 4.12). Significantly, Standard Ware appendages are

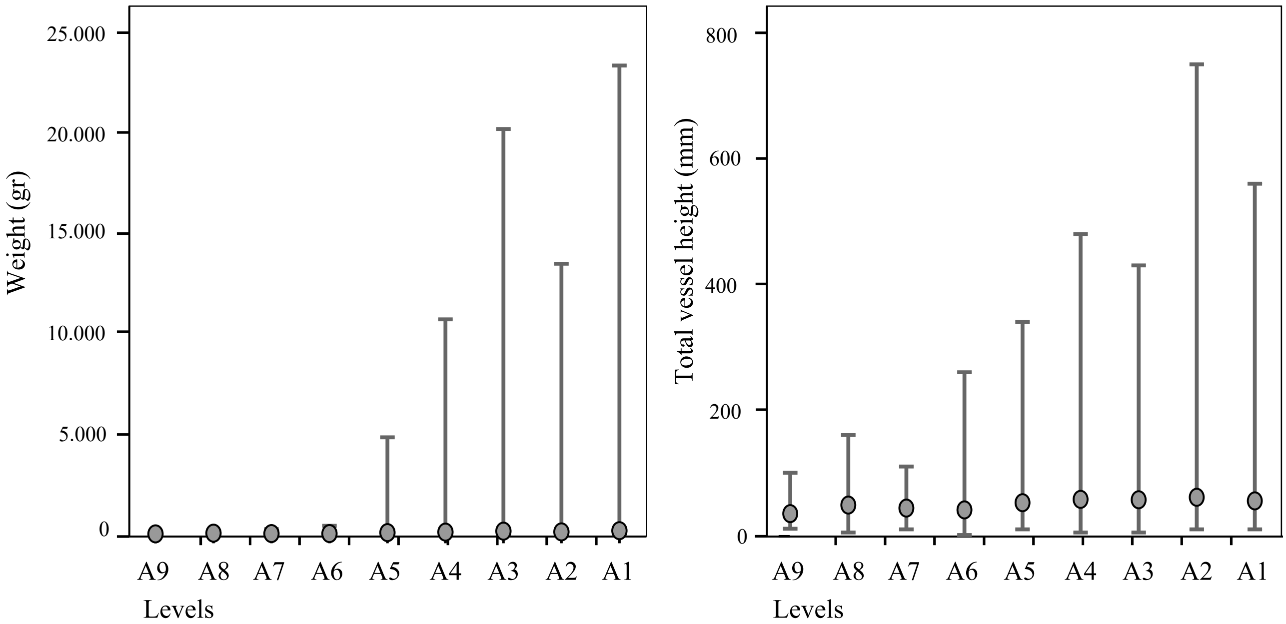


Fig. 4.29 Tell Sabi Abyad, Operation III. High-low plots showing the increasing Standard Ware size in the A-Sequence (based on EVR). Left: weight (g); right: total vessel height (mm).

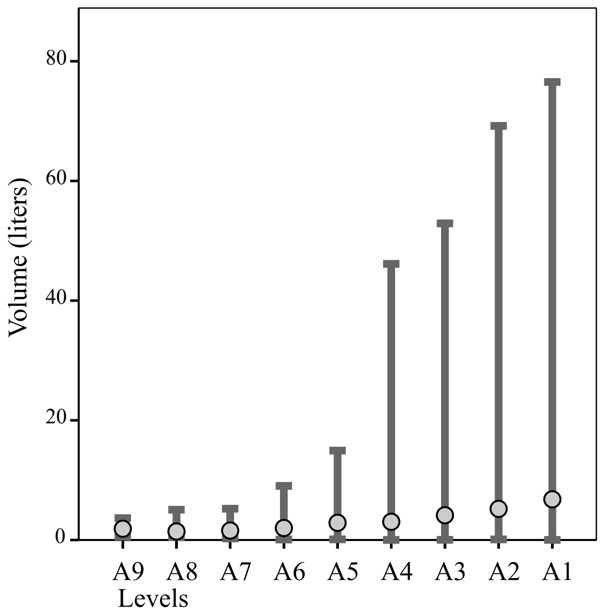


Fig. 4.30 Tell Sabi Abyad, Operation III. Increasing Standard Ware capacity in the A-Sequence (based on EVR).

virtually exclusively associated with *plain* vessels. We documented only two examples of an appendage occurring with a decorated vessel – two red-slipped Standard Ware vessels carrying a loop handle from level A1 and from level B7 (Fig. 4.107: 6). We should perhaps not make too much of this association, as the proportion of decorated Standard Ware was very low in the same levels in which appendages were frequent. By the time the proportion of decorated vessels began to increase, from level A1 onwards, Standard Ware appendages largely disappeared from the record (Table 4.12).

By far the most common type of Standard Ware appendage was the vertically-oriented loop handle (Pl. 2.1). This type of handle has so far not been attested with any of the other wares. Massive numbers of these handles are found either still attached to the vessel wall or as isolated specimens in Operation III (Table 4.12). They are vertically oriented, curved stretches of clay that were attached onto the vessel body while the clay was still relatively malleable, most likely directly after the primary shaping. An interesting, if rare, deviation is shown in three *horizontally*-oriented, vertically-perforated loop handles (Fig. 4.86: 2). The attachment areas were roughly smeared over to improve cohesion, in most cases leaving a wide, roughly circular area clearly visible at the surface. We found no evidence for the doweled joint technique for improving the adhesion of these handles (Nieuwenhuyse 2007, 80, fig. 5.6.1). Consequently, the bonding was not so strong in all cases, and often we found the loop handles dismembered from their vessels. Interestingly, traces running horizontally through the interior of the handle suggest that some of these loop handles may have been formed around some sort of support, perhaps a piece of wood that was subsequently removed. It is characteristic for many of the loop handles to be situated close to the rim, usually more or less on top of the rim, so that the top of the handle itself protruded above the rim. The sizes of the loop handles were quite variable, but mostly fell within the range of 4–5 cm in length and 2–3 cm in width.

These loop handles are overwhelmingly found with just one vessel type – the vertical pot (Figs. 4.84–4.89). Complete examples of such pots show that typically two loop handles were placed on either side of the vessel orifice (e.g. Fig. 12.4). This particular combination – a vertical pot with loop handles – is one of the most common pottery types in the A-Sequence, and it may be considered as iconic for the Early Pottery Neolithic in the Balikh valley (Akkermans 1988). However, it is emphasised

Table 4.12 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware appendages by level (based on Raw Counts)

Level	*Loop handle*	*Horizontal handle*	*Simple cordon*	*'Rope'-cordon*	*Conical lug*	*'Nose'-lug*	*'Ear'-lug*	*'Tongue'-lug*	*Sieve*	*Total*
D-Sequence	2	–	–	–	–	–	–	–	–	2
C-Sequence	1	–	–	–	–	–	–	–	–	1
Mixed B	5	–	–	–	–	–	–	–	–	5
B2	2	–	–	–	–	–	–	–	–	2
B3	–	–	–	–	–	–	–	–	1	1
B7	1	–	–	–	–	–	–	–	–	1
B8	2	–	–	–	–	–	–	–	–	2
Mixed A	117	–	4	–	3	–	1	–	–	125
A1	83	2	3	–	1	–	2	–	–	91
A2	52	–	–	1	–	1	–	–	–	54
A3	93	–	2	–	–	–	–	–	–	95
A4	163	–	20	3	2	–	2	1	–	191
A5	116	1	4	4	2	–	–	–	–	127
A6	95	–	–	–	–	–	3	–	–	98
A7	46	–	–	–	1	–	2	–	–	49
A8	26	–	–	–	1	–	–	–	–	27
A9	20	–	–	–	–	–	–	–	–	20
Total	824	3	33	8	10	1	10	1	1	891

Table 4.13 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware vessel types with loop handles by level (based on EVR)

	A9	*A8*	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*Mix A*	*B8*	*B7*	*B2*	*Mix B*	*C*	*D*	*Total*
Uncertain type	2	–	–	2	2	–	–	–	–	3	–	–	–	–	–	–	9
Everted convex-sided bowl	–	–	–	1	–	2	1	–	1	–	–	–	–	–	–	–	5
Vertical convex-sided bowl	–	3	1	1	4	4	3	1	2	4	–	–	–	–	–	–	23
Closed convex-sided bowl	–	2	3	1	4	6	1	1	1	4	–	–	–	–	–	–	23
Oval hole-mouth pot	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Everted straight-sided bowl	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	–	3
Closed S-shaped bowl	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Vertical pot	10	13	27	61	78	101	64	37	53	59	1	–	1	4	1	1	511
Oval vertical pot	–	–	–	–	–	2	2	–	–	–	–	–	–	–	–	–	4
Vertical pot with petalled rim	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Medium-sized jar	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1
Small jar	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Total	12	18	31	68	88	118	71	39	59	5	1	1	1	4	1	1	583

that this appendage also occurs occasionally with other shapes, in particular with closed or vertically-oriented convex-sided bowls. Especially in the earliest A-levels the use-ranges of these typological categories almost certainly overlapped. Other Standard Ware vessel types, too, occasionally were given a loop handle (Table 4.13).

The practical function of the loop handle remains to be elucidated, however. They may have been multifunctional, facilitating the use of the vessels for a wide range of activities. Evidently, they would have improved grip on the vessel. Especially in the early parts of the A-Sequence, vessel shapes largely consisted of vertical, straight-sided types; these may have slipped off the hands relatively easy and would have been much more firmly held with handles. The pot could be turned and shuffled around *by hand* or by pushing a stick through the opening of the loop handle, using this as a tool. However, if this was their primary function, the almost exclusive preference for this particular type of appendage remains to be explained. Alternative appendage types might have suited this usage equally well, unless the use of a stick was mandatory.

It seems less likely that the loop handles functioned to enable suspension, although this may certainly have been feasible with the smaller vessels. The larger vessels would be much too heavy when filled. Suspending them on the loop handles would quickly bring to light several

Table 4.14 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware vessel types with cordon and rope-style cordon appendages (between brackets) by level (based on EVR)

	A5	*A4*	*A3*	*A2*	*A1*	*Mix A*	*Total*
Vertical convex-sided bowl	–	–	1	–	–	–	1
Closed convex-sided bowl	2 (2)	9	–	–	1	2	16
Oval closed convex-sided bowl	1	1	–	–	–	–	2
Closed S-shaped bowl	–	1	–	–	–	–	1
Hole mouth pot	–	2 (1)	–	(1)	1	1	6
Oval hole mouth pot	1	–	–	–	–	–	1
Large hole mouth pot	–	1	–	–	1	1	3
Vertical pot	1	3 (1)	–	–	1	1	7
Total	7	19	1	1	4	5	37

structural weaknesses: the weak attachment of the handles themselves, and the generally poor bonding between the base and the vessel wall. Suspending a vertical pot by its handles would have involved the serious risk of the whole thing to fall apart, spilling its contents and making a general mess. Alternatively, the loop handles could have been a means, if a rather inefficient one, to facilitate the closure of the pots. In this case a cloth or piece of leather would be folded over the mouth and rim, after which it would be fastened and held in place with a rope through the two loop handles. If this were the purpose, however, one would expect the handles somewhat lower on the vessel wall.

We finish this discussion of the Standard Ware loop handles by drawing special attention to a number of loop handles that, curiously enough, show a deliberate perforation made through the vessel wall right *under* or behind the area covered by the loop handle (Pl. 2.2; Figs. 4.89: 17–19). All examples found thus far ($n = 5$) occur with vertical pots. Chronologically they are scattered through the A-Sequence.[7] These perforations were not pottery repairs like the neatly drilled Fine Ware repairs known after ca. 6200 cal BC (Chapter 8). Their purpose remains unknown. Given their location behind the handle it seems highly unlikely that they were used to pour liquid contents out of the pot. The opening would in any case have been too small for efficient pouring. The clear association with loop handles in any case suggests that these small perforations were employed for the same range of activities in which the presence of handles was relevant. Speculating, the perforations may have functioned to fasten a lid with a piece of rope. If so, such lids will have been made of perishable materials as no circular stone or pottery discs of corresponding sizes have thus far been reported from Tell Sabi Abyad. This would leave unanswered the question why the perforations were placed below the handle or why the lid was not simply fastened to the handles themselves.

Another characteristic type of appendage is the so-called cordon: an applied band running horizontally along the vessel perimeter, usually a few centimetres below the rim (Pl. 3). In the Balikh valley these were first excavated at Tell Assouad (Le Mière 1986), and they have for some time been a valuable typological key diagnostic for the early stages of the Pottery Neolithic. At Tell Sabi Abyad we can now be more precise. Not only can we date these much more precisely than before, but also we can explore with which vessel types they are associated. Two distinct types of cordon are found in Operation III: plain cordons (e.g. Figs. 4.70: 1–6, 4.71: 8, 4.77: 4, 4.84: 4, 4.90: 1, 4.93: 1, 4) and what we termed 'rope-style' cordons (e.g. Figs. 4.70: 9, 4.90: 2). These were all but identical in every aspect, save for the surface finishing. Whereas the former were constituted by simply a (single) band of clay with a coarsely-smoothed surface, the latter were incised with diagonal strokes at regular intervals. This made them resemble a horizontally-applied stretch of thick 'rope'. In Operation III cordons are found only in the upper part of the A-Sequence, in levels A5–A1 (Table 4.12). Their time span was limited to the period between ca. 6495 and 6225 cal BC. The approximately 100 years or so represented by levels A5 and A4 (ca. 6495–6390 cal BC), in particular, was 'cordon time'.

In terms of their practical use, Standard Ware cordons are strongly associated with *closed* vessels. Typologically, the most common vessel shapes bearing a cordon are closed convex-sided bowls, followed by vertical pots and hole mouth pots (Table 4.14). Cordons are associated with relatively thick vessel walls, suggesting that some of these vessels were relatively tall. These associations suggest that cordons were associated with storage, and with closure. Significantly, they occur in the sequence just prior to the development and break-through of real necks, and they disappeared for good thereafter. They may have constituted a precursor to the neck. To close a hole mouth pot with a cordon, one would cover the mouth with a piece of cloth or leather, making sure that the cover extended down the upper part of the vessel, well below the level of the cordon. To keep everything stay put, one would tighten the cover with a rope, fastening this securely with a knot below the cordon. It was no coincidence that some of these cordons actually emulated the shape of rope (Fig. 16.3).

In addition to loop handles and cordons, several distinct types of lugs occur with Standard Ware, albeit in very low numbers. After their shape they have been provisionally termed 'ear-shaped', 'nose-shaped', and 'tongue-shaped' lugs (Table 4.12). Most of these lugs are also found with Fine Mineral Tempered Ware and Grey Black Ware, for which they are perhaps more typical (see below). Furthermore, some conical-shaped lugs were attested in the Standard Ware (Fig. 4.91:2). As far as the limited sample indicates, Standard Ware lugs occur throughout the A-Sequence. Many of these lugs were recorded from isolated body sherds that did not reveal the original vessel

Table 4.15 Tell Sabi Abyad, Operation III. Relation between Standard Ware vessel type and lug type (based on EVR)

	Conical lug	*'Ear'-shaped lug*	*Total*
Uncertain	1	–	1
Closed convex-sided bowl	1	–	1
Closed S-shaped bowl	1	–	1
Hole mouth pot	1	–	1
Vertical pot	3	5	8
Miniature closed convex-sided bowl	1	–	1
Total	8	5	13

shape. Where the original shape could be reconstructed, Standard Ware lugs mostly figure with vertical pots, followed by closed convex-sided bowls or hole mouth pots (Table 4.15). Similar to the loop handles, the lugs were often placed either at the rim or close to it.

4.2.4.3. *Broad classes of Standard Ware vessel type*

At Tell Sabi Abyad we have constructed an elaborate formal typology of vessel shape based on the formal properties of size and shape (Table 4.17). As to size, we used both absolute and relative measurements of vessel height, collar height, and rim diameter. To allow comparisons with typologies established previously at Tell Sabi Abyad (Akkermans 1988; Nieuwenhuyse 2007) and other sites we adopted traditional terminology for these types: bowl, pot, jar, and 'other'. As commonly understood in archaeology these terms refer to open shapes (bowls), closed shapes without a collar (pots) and closed shapes with a collar (jars).[8]

However, if such terminology may seem relatively straight-forward for ceramics from later periods, or indeed for the pottery from the later parts of the ceramic sequence documented at Tell Sabi Abyad itself, it becomes problematic for much of the early material discussed here. Indeed, for the Standard Ware from the Pre-Halaf period and afterwards, most of the pottery shapes can readily be presented within this framework; Standard Ware shapes from these later stages are varieties of bowls, pots, or jars (Nieuwenhuyse 2007). Moving back in time, however, such neat distinctions break down. Collared vessels ('jars') are virtually non-existent prior to level A4 (Fig. 4.22). Many of the vessels in the earliest A-levels fall within a rather diffuse morphological category of straight or convex-walled, uncarinated vessels that display a strong continuity from 'rather closed' to 'very open' when viewed as a group. The properties of size in the early levels so far do not allow meaningful distinctions to be made between two discrete categories that we might unequivocally call 'bowls' or 'pots'.

Keeping this in mind, if we exclude the low number of 'other' sherds as well as the large numbers of fragments that could not be slotted into any of the main shape classes, a clear pattern emerges. In the early A-levels the Standard

Table 4.16 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware classes of vessel types by level (based on EVR)

Level	*Bowl*	*Pot*	*Jar*	*Tray*	*Other*	*Uncertain*	*Total*
D-Sequence	41	8	27	1	–	15	92
C-Sequence	29	6	11	2	–	8	56
Mixed B	164	27	64	10	–	30	295
B1	9	3	3	–	–	2	17
B2	17	4	8	2	–	6	37
B3	16	3	3	–	–	3	25
B4	33	6	16	1	–	21	77
B5	17	3	4	3	–	5	32
B6	6	1	6	–	–	1	14
B7	5	–	8	2	–	1	16
B8	113	29	43	14	2	24	225
Mixed A	172	196	4	3	2	95	472
A1	561	397	336	94	5	182	1575
A2	180	137	32	29	–	58	436
A3	182	203	12	13	3	53	466
A4	246	341	3	9	2	48	649
A5	149	189	–	4	1	55	398
A6	199	204	–	–	–	83	486
A7	90	73	–	2	–	42	207
A8	41	45	–	1	–	20	107
A9	36	44	–	–	–	23	103
A10	1	1	–	–	–	–	2
A12	–	–	–	–	–	1	1
Total	2307	1920	580	190	15	776	5788

Ware consists only of 'bowls' and 'pots', in roughly equal proportions. Trays and jars are entirely absent from these early levels (Fig. 4.31). Trays and jars are found in very low numbers for the first time in level A4. The importance of these two formal categories, in particular jars, rises in the subsequent levels, especially from level A2 onwards. By level A1 the repertoire shows a composition that compares quite well in terms of its composition with that of the Standard Ware recovered from the Pre-Halaf levels in Operation I (Nieuwenhuyse 2007, 111–112), consisting of various kinds of bowls, followed by jars, and with smaller but significant proportions of pots and trays.

Putting this into a different perspective, in the early levels (levels A9–A5) a differentiation of pottery containers into distinct shapes had yet to occur. The so-called bowls and pots in these levels, no matter how much we would wish to distinguish them formally, in practice resemble each other rather closely. As a whole they were certainly morphologically heterogeneous but they had not (yet) diversified into distinct categories of form. In these early levels, then, instead of a range of recognisably different vessel types, it would perhaps be more accurate to say that people basically had just one, variable, pottery type: the *vessel*. Subsequently, as documented in levels A4–A1, various elements of shape and size combined

Table 4.17 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware vessel types by level (based on EVR)

	A12	*A10*	*A9*	*A8*	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*Mix A*	*B8*	*B7*	*B6*	*B5*	*B4*	*B3*	*B2*	*B1*	*Mix B*	*C*	*D*	*Total*
Uncertain	1	–	23	20	42	83	55	48	53	58	182	95	24	1	1	5	21	3	6	2	30	8	15	776
Convex-sided Bowl – unspecified	–	–	4	3	22	42	17	20	16	21	33	22	8	–	–	1	2	1	–	1	13	3	4	233
Everted Convex-sided Bowl	–	–	2	5	11	19	11	23	17	17	64	12	22	2	2	2	5	3	8	2	38	–	3	268
Vertical Convex-sided bowl	–	1	16	13	25	62	36	81	75	52	124	53	19	2	2	10	15	5	1	1	49	9	17	667
Closed Convex-sided bowl	–	–	12	16	25	57	65	85	36	50	82	60	14	–	–	–	4	–	4	1	12	1	3	527
Very Everted Convex-sided Bowl	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	3
Large Convex-sided Bowl	–	–	–	–	–	–	2	1	4	–	7	1	2	–	–	–	–	–	–	–	1	–	1	19
Oval Everted Convex-sided Bowl	–	–	–	–	–	–	–	–	3	1	3	1	1	–	–	1	–	–	–	–	1	1	–	12
Oval Vertical Convex-sided Bowl	–	–	–	–	–	1	1	2	3	2	9	–	4	–	–	–	–	–	1	–	2	1	2	28
Oval Closed Convex-sided Bowl	–	–	2	–	–	–	2	4	7	3	11	1	1	–	–	–	–	–	–	–	2	–	1	34
Everted S-shaped Bowl	–	–	–	–	–	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	1	2	–	6
Vertical S-shaped bowl	–	–	–	–	–	–	–	–	–	–	7	–	2	–	–	–	–	–	–	–	1	1	–	11
Closed S-shaped Bowl	–	–	–	2	–	3	1	9	9	19	89	2	6	–	–	1	1	1	–	–	8	–	2	153
S-shaped Goblet	–	–	–	–	–	–	1	1	4	5	31	2	3	1	1	–	1	1	–	–	4	1	1	57
Straight-sided Bowl - unspecified	–	–	–	2	7	14	10	18	7	8	83	18	24	–	1	2	2	3	3	1	27	7	6	243
Straight-sided Flat-based Bowl	–	–	–	–	–	–	3	2	–	–	3	–	–	–	–	–	–	–	–	–	1	1	–	10
Large Straight-sided Bowl	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	1	–	3
Oval Straight-sided Bowl	–	–	–	–	–	–	–	–	–	–	8	–	–	–	–	–	–	–	–	–	–	1	1	10
Everted Straight-sided Carinated Bowl	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	1	–	–	1	1	–	–	5
Vertical Straight-sided Carinated Bowl	–	–	–	–	–	–	–	–	1	–	2	–	2	–	–	–	1	2	–	–	1	–	–	9
Closed Straight-sided Carinated Bowl	–	–	–	–	–	–	–	–	–	2	1	–	1	–	–	–	1	–	–	1	1	–	–	7
Low Carinated Bowl	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Tray - unspecified	–	–	–	–	1	–	–	–	–	–	3	–	–	–	–	1	–	–	–	–	–	–	–	5
Everted Tray	–	–	–	–	1	–	3	7	3	12	23	1	2	1	–	–	–	–	1	–	2	–	–	56
Vertical Tray	–	–	–	1	–	–	1	1	10	14	30	2	3	–	–	–	1	–	1	–	2	1	1	68
Tray Crenellated Rim	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Husking Tray	–	–	–	–	–	–	–	–	–	3	38	–	9	1	–	2	–	–	–	–	6	1	–	60
Vertical Pot	–	1	43	43	71	202	183	320	199	129	356	187	28	–	–	3	6	3	4	3	27	5	8	1821
Oval Vertical Pot	–	–	1	2	2	2	2	12	2	3	26	5	–	–	–	–	–	–	–	–	–	1	–	58
Vertical Pot Petalled Rim	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Hole Mouth Pot	–	–	–	–	–	–	1	5	–	2	11	3	1	–	–	–	–	–	–	–	–	–	–	23

Oval Hole Mouth Pot	–	–	–	–	–	–	3	2	1	3	3	1	–	–	–	–	–	–	–	–	–	–	–	13
Tall Hole Mouth Pot	–	–	–	–	–	–	–	1	1	–	1	–	–	–	1	–	–	–	–	–	–	–	–	4
Jar - unspecified	–	–	–	–	–	–	–	–	2	5	53	–	5	–	–	1	1	–	–	–	8	2	9	86
Small jar	–	–	–	–	–	–	–	1	–	7	117	–	19	2	4	1	11	1	5	1	27	5	7	208
Medium-sized Jar	–	–	–	–	–	–	–	1	9	18	126	4	18	5	–	2	4	2	2	2	26	2	8	229
Large Jar	–	–	–	–	–	–	–	–	1	2	34	–	1	1	2	–	–	–	1	–	2	1	2	47
Hole Mouth Jar	–	–	–	–	–	–	–	1	–	–	6	–	–	–	–	–	–	–	–	–	1	1	1	10
Low Oval Plate	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Re-used neck	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Miniature Bowl	–	–	–	–	–	–	1	2	3	–	3	2	2	–	–	–	–	–	–	–	–	–	–	13
Total	1	2	103	107	207	486	398	649	466	436	1575	472	225	16	14	32	77	25	37	17	295	56	92	5788

to diversify this type into conceptually distinct types of pottery containers. In terms of pottery shape these later levels are characterised by a progressive 'branching off' of new types and an increasing internal differentiation.

4.2.4.4. Standard Ware bowls

Standard Ware bowls come in three main morphological groups: convex-sided bowls, straight-sided bowls, S-shaped bowls, and a very small fourth category of bowls with a carinated profile. These main groups have been sub-divided on the basis of wall orientation (closed, vertical or open) and size. As to the size of these vessels, we did not employ elaborate statistical methods, but visually inspected distributions and plots of rim diameter and vessel height in order to distinguish sub-types. Bowls with an oval mouth were relatively common. For the sake of formal typology, we kept these, too, separate as distinct types. It should be pointed out, however, that apart from the oval shape of the orifice and (usually) the upper part of the vessel, oval-mouthed bowls do not distinguish themselves in any other way from their circular-mouthed relatives.

Convex-sized bowls by far constitute the most common type of Standard Ware bowl (Fig. 4.35). They dominate the collection of bowls throughout the Operation III sequence (Fig. 4.32). They are among the oldest Standard Ware type to appear. Present already in the very earliest stages of the Early Pottery Neolithic, they continue all the way through into the Early Halaf period. We distinguished several sub types on the basis of the overall openness of the shape: *Everted Convex-sided Bowls* (Figs. 4.64: 2–10), *Vertical Convex-sided Bowls* (Figs. 4.66: 1–9, 4.67: 1–16, 4.68: 1–20) and *Closed Convex-sided Bowls*. The latter category shades imperceptibly into that of the Hole Mouth Pots of which they perhaps represent a smaller variety (Figs. 4.69: 1–10, 4.70: 1–11). A few items with an extreme open orientation were classified as *Very Everted Convex-sided Bowls* (Fig. 4.64: 1) while a sub-category of convex-sided bowls of extreme size were put apart: *Large Convex-sided Bowls* (Figs. 4.72: 1–3). Oval-mouthed shapes (Figs. 4.71: 1–11) occur frequently with the convex-sided bowls, especially from the later part of the Early Pottery Neolithic to the early Pre-Halaf (i.e. between levels A5 to B8) (Tables 4.18 and 4.19).

Appendages, too, occur very frequently with the convex-sided Standard Ware bowls (Fig. 4.33). Most often these are the vertically-oriented loop handles, by far the most common type of Standard ware appendage. Other types of appendages attested include cordons and the occasional lug or vertically-pierced knob. Interestingly, appendages are mostly associated with convex-sided bowls that have either vertical or closed contours, much less often with bowls having a more open, everted contour. Moreover, different types of appendages can be related to different sizes ranges and, hence, will have been associated with different sorts of activities. Specifically, the loop handles are associated with relatively small convex-sided bowls (average rim diameter 15 cm). The

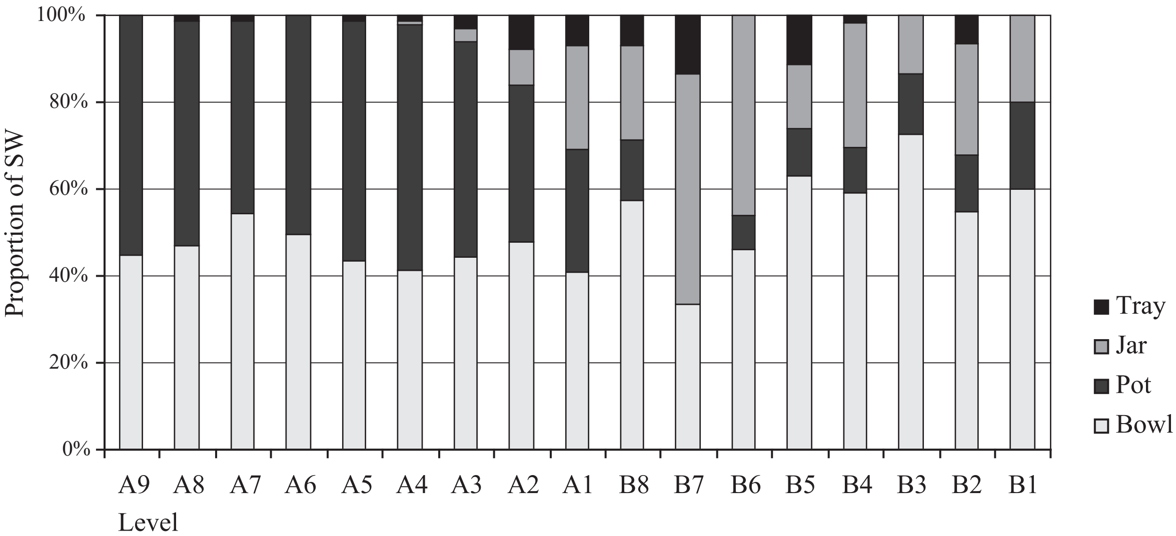


Fig. 4.31 Tell Sabi Abyad, Operation III. Proportions of four main Standard Ware shape classes in the A–B Sequences: bowls, pots, jars and trays (based on EVR).

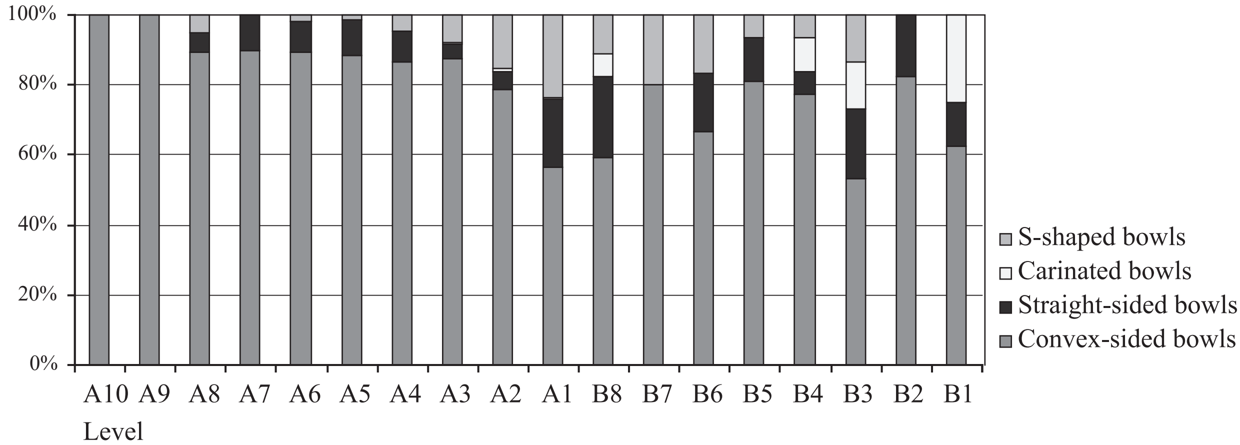


Fig. 4.32 Tell Sabi Abyad, Operation III. Broad Standard ware bowl classes by level in the A–B Sequences (based on EVR).

cordons, on the other hand, tend to have larger sizes (average rim diameter 24 cm).[9]

Straight-sided bowls form the second-largest group. They are open shapes without a collar, a vertical to open orientation (wall orientation >95°), and a straight shape of the wall. Straight-sided bowls appear quite early in the Operation III sequence, already by level A8. Most of these were found as fragments, so that we cannot say with certainty if they had a straight wall leading to a flat base or alternatively, a straight, carinated profile leading to a convex base. We classified these as *Straight-sided Bowls – unspecified* (Figs. 4.73: 2–17). Almost certainly most of them belonged to the former category, as carinated vessels do not occur in the early levels. A few examples of complete *Straight-sided, Flat-based Bowls* are found in the sequence (Figs. 4.74: 1–13). The visual inspection of their rim diameter shows a reasonably normal distribution between 7 cm and 32 cm. A few straight-sided vessels from levels A1 and B8 were put apart as *Large Straight-sided Bowls* on the basis of their extraordinary size, with rim diameters between 34 cm and 38 cm (Fig. 4.73: 1). These containers were all incomplete and preserved to a limited height; in pristine condition these bulky, heavy containers must have been impressive, resembling some of the white ware basins in size.

Interestingly, in stark contrast to the convex-sided bowls, virtually no appendages occur with the straight-sided bowls. This cannot be explained simply by the *shape* of these vessels: the straight wall would not have stopped the potters from applying appendages had they wanted to. Nor can it be explained by vessel *size*: convex-sided bowls and straight-sided bowls do not differ much in terms of their rim diameter distributions or height. What may have mattered in particular was the overall *orientation* of the wall, or the 'openness' of the vessel. With the convex-sided bowls, appendages are virtually limited to vessels with either a vertical or a closed orientation. Other Standard Ware shapes with frequent appendages include Vertical Pots and Hole Mouth Pots, which represent closed shapes too. In contrast the straight-walled bowls tend to

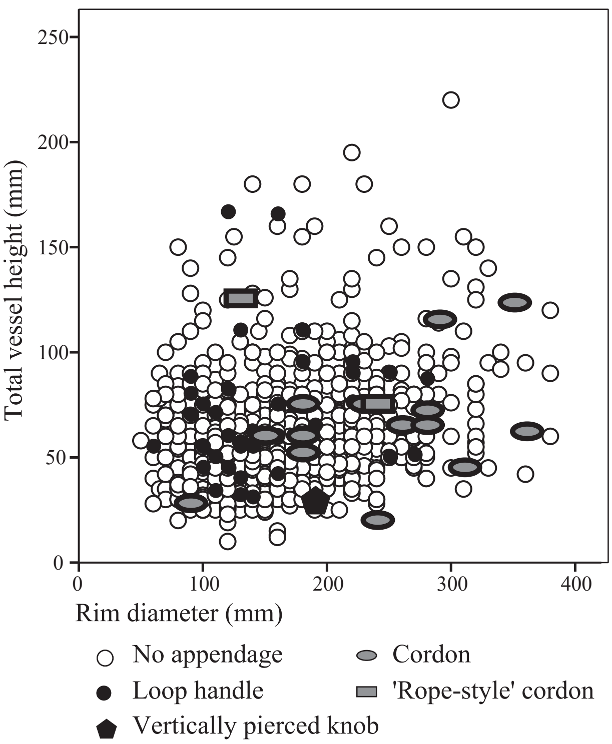


Fig. 4.33 Tell Sabi Abyad, Operation III. Plot of preserved height (mm) against rim diameter (mm) of Standard Ware convex-sided bowls, showing the distribution of appendages (based on EVR).

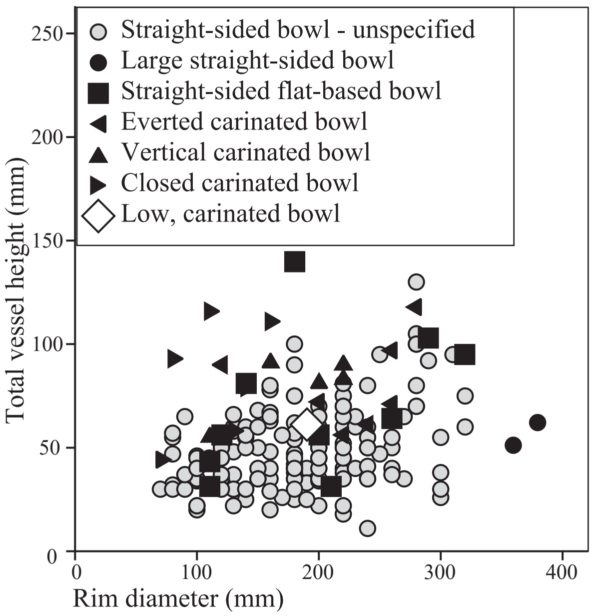


Fig. 4.34 Tell Sabi Abyad, Operation III. Plot of preserved vessel height (mm) against rim diameter (mm) of Standard Ware straight-sided and carinated bowls (based on EVR).

be more open. In general, then, Standard Ware appendages are associated with closed vessels.

S-shaped bowls represent the third main class of Standard Ware open shapes. Defined by the curvilinear shape of their body, they were sub-divided in *Everted S-shaped Bowls* (Figs. 4.75: 1–4), *Vertical S-shaped Bowls* (Figs. 4.75: 5–10) and *Closed S-shaped Bowls* (Figs. 4.74:

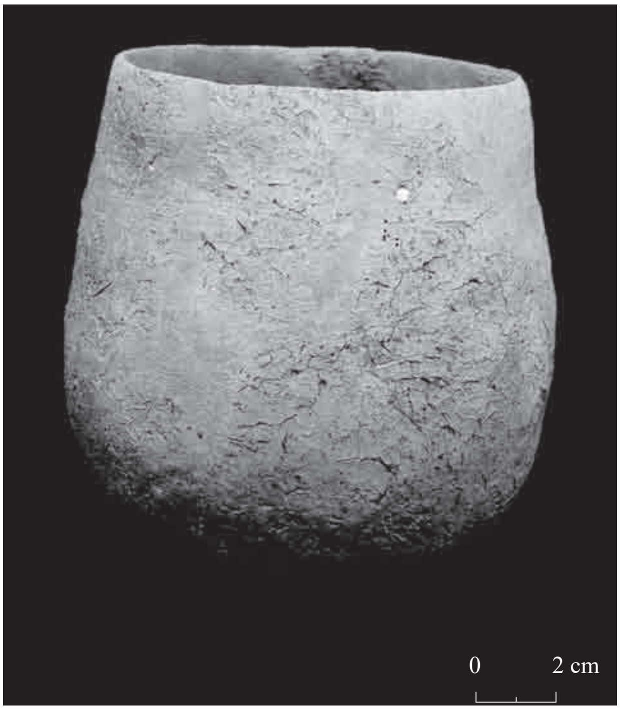


Fig. 4.35 Tell Sabi Abyad, Operation III. Standard Ware convex-sided bowl (P05-80; from a level A1 room fill). Height of the vessel 13 cm (image Tell Sabi Abyad Project)

19–22, 4.76: 1–15) Whereas the first sub-type formed part of the Standard Ware repertoire already by level A6 (with two exceptionally early examples coming from level A8), the latter two categories were only introduced by level A1. The small-sized *S-shaped Goblets* (Figs. 4.75: 9–18), here presented as a separate type, might equally well be seen as part of the broader, much larger category of closed S-shaped bowls. However, we separated them on the basis of their size: a closed S-shaped vessel qualified as a 'goblet' if it had a rim diameter less than 10 cm, and it was attributed to the group of closed S-shaped bowls if it had a rim diameter of 10 cm or more. Both categories were separated from the category of 'jars' by the low, indistinct shape of their collar.[10]

Carinated bowls, finally, are very uncommon for the Operation III Standard Ware, including no more than 1% of all Standard Ware bowls in general. This reflects the paucity of carinated Standard Ware profiles in general. The earliest examples appear in levels A3 and A2, but most examples come from level A1 where carinated shapes constitute about 0.3% of all Standard Ware bowls. This figure subsequently rose to some 4% of all Standard Ware bowls in the B-levels. On the basis of the wall shape they were sub-divided into *Everted Straight-sided Carinated Bowls* (Figs. 4.77: 1–5), *Vertical Straight-sided Carinated bowls* (Figs. 4.77: 6–9), *Closed Straight-sided Carinated bowls* (Figs. 4.77: 10–15), and a single, painted, example of a *Low Carinated Bowl* showing a concave upper part (Fig. 4.108: 6). The low numbers of carinated bowl shapes recovered from the B-levels are misleading, and simply reflect the small sizes of the pottery samples for these levels; earlier work on Pre-Halaf levels of

Table 4.18 Tell Sabi Abyad, Operation III. Rim diameter (mm) of Standard Ware bowl types

Rim diameter	*Mean*	*Min*	*Max*	*Std. Dev.*	*N*
Everted convex-sided bowl	179	70	300	52.6	196
Vertical convex-sided bowl	159	50	300	52.6	453
Closed convex-sided bowl	152	60	330	51.9	401
Very everted convex-sided bowl	166	110	230	60.3	3
Large convex-sided bowl	326	300	380	20.0	18
Everted straight-sided bowl – unspecified	182	70	320	61.0	154
Straight-sided flat-based bowl	194	110	320	76.3	10
Large straight-sided bowl	370	360	380	14.1	2
Closed S-shaped bowl	140	100	240	33.6	105
Vertical S-shaped bowl	103	50	160	39.5	7
Everted S-shaped bowl	172	60	230	68.2	6
S-shaped goblet	81	55	110	13.2	47
Everted straight-sided carinated bowl	226	120	280	53.8	7
Vertical straight-sided carinated bowl	195	110	260	52.8	6
Closed straight-sided carinated bowl	115	70	160	35.1	6
Low, carinated bowl		190		–	1
All bowls	163	50	380	60.4	1462

Operation I showed that carinated bowls were quite common (Nieuwenhuyse 2007). In terms of size, carinated bowls neatly fall within the size range indicated for the broader category of straight-sided bowls (Fig. 4.34).

Given the indications for the increasing size of Standard Ware as a whole during the Operation III sequence, we were curious to see if we could detect any changes in size of the category of Standard Ware bowls. Interestingly, no trends towards increased vessel size or even increasing diversity (deviation around the average) can be observed with regard to the properties of wall thickness and rim diameter. These measurements fluctuate within relatively narrow margins around their average values through the Operation III sequence, and they fall neatly within the ranges observed for Standard Ware as a whole (Fig. 4.28). This would suggest that Standard Ware bowls did not become wider or more thick-walled through time. Nor do the average values and standard deviations for vessel height show any clear trend – Standard Ware bowls apparently did not become significantly taller. Certainly, in terms of formal typology most of the *large* types are limited to the later part of the A-Sequence. These are few in number, however, and their presence apparently had no significant impact on the average thickness and diameter. Intriguingly, values for weight *do* show a trend, although a very minor one. The average weight of Standard Ware *bowls* increases a little after level A6, as does the deviation around the average.[11] Reflecting the general trend towards increasing diversity in Standard Ware weight, these shifts are not very strong, however, and perhaps reflect

Table 4.19 Tell Sabi Abyad, Operation III. Height (mm) of Standard Ware bowl types (only complete profiles)

Height	*Mean*	*Min*	*Max*	*Std. Dev.*	*N*
Everted convex-sided bowl	67	30	150	30.5	18
Vertical convex-sided bowl	74	29	180	33.3	49
Closed convex-sided bowl	110	41	195	42.1	21
Very everted convex-sided bowl			45		1
Large convex-sided bowl	133	85	220	63.8	4
Oval vertical convex-sided bowl	78	45	120	36.2	4
Oval everted convex-sided bowl	90	67	112	31.8	2
Oval closed convex-sided bowl	119	82	180	46.1	4
Everted straight-sided bowl – unspecified	none complete; varying between 11–130 mm tall				
Straight-sided flat-based bowl	63	30	139	36.5	9
Large straight-sided bowl	none complete; varying between 35–220 mm tall				
Oval straight-sided bowl	none complete; varying between 30–120 mm tall				
Closed S-shaped bowl	144	120	165	22.7	3
Vertical S-shaped bowl	78	55	100	31.8	2
Everted S-shaped bowl			50		1
S-shaped goblet	105	93	130	17.3	4
Everted straight-sided carinated bowl			117		1
Vertical straight-sided carinated bowl			85		1
Closed straight-sided carinated bowl	101	92	110	12.8	2
Low, carinated bowl	none complete; one example 60 mm tall				
All bowls	85	29	220	40.2	126

Table 4.20 Tell Sabi Abyad, Operation III. Volume (litres) of Standard Ware bowl types

	Mean	*Min*	*Max*	*Std. Dev.*	*N*
Very Everted Convex-sided Bowl	.63	.13	1.13	.71	2
Everted Convex-sided Bowl	1.39	.10	6.45	1.40	49
Vertical Convex-sided Bowl	1.22	.08	8.35	1.65	85
Closed Convex-sided Bowl	1.83	.19	6.22	1.74	29
Large Convex-sided Bowl	8.92	7.76	9.63	1.01	3
Oval Everted Convex-sided Bowl	2.41	2.26	2.57	.22	2
Everted S-shaped Bowl	1.31	.22	2.42	.99	5
Vertical S-shaped Bowl	.67	.04	1.54	.56	5
S-Shaped Goblet	.65	.28	1.07	.33	4
Closed S-shaped bowl	1.79	.70	4.27	1.67	4
Everted Straight-sided Bowl – unspecified	1.73	.15	4.94	1.61	19
Everted Straight-sided Carinated Bowl	2.76	1.32	3.79	1.29	3
Vertical Straight-sided carinated Bowl	2.38	.32	5.13	1.63	6
Closed Straight-sided Carinated Bowl	1.01	.17	1.86	.66	6
Low Carinated Bowl	1.14	1.14	1.14	–	1
Total	1.53	.04	9.63	1.76	223

the presence of larger bowl types in the later part of the sequence. Significantly, although the average values for vessel volume fluctuate from one level to the next, they, too, do so within relatively narrow margins (Table 4.20); no significant trend can be detected. To sum up, even if some larger Standard Ware bowl types appeared in the final A-levels, the trend towards increased vessel size observed with Standard Ware as a whole was not significantly caused by changes in the size of, specifically, Standard Ware *bowls*.

Table 4.21 Tell Sabi Abyad, Operation III. Total vessel height (mm) of Standard Ware trays (only complete sections).

Total vessel height	*Mean*	*Min*	*Max*	*Std. Dev.*	*N*
Everted tray	76	28	110	19.2	32
Vertical tray	86	29	146	19.9	32
Tray with crenellated rim		96			1
Husking tray	101	74	130	14.5	26
All trays	87	28	146	20.6	91

4.2.4.5. Standard Ware trays

Standard Ware trays are low, oval shapes without a collar (Pl. 4.1). They are not very tall: the maximum height observed is 15 cm, and many trays are much less tall (Table 4.21). On average, most of them ranged between 6 cm and 10 cm in height. Virtually no complete examples have so far been found, so we cannot always reconstruct the overall shape and size of the trays with much certainty. Some of them in any case reached a size of over half a meter in length, and a width of 40 cm or more were not uncommon. As these containers were also comparatively thick-walled (average wall thickness 19.6 mm), they would have been massive and heavy, and not very easy to move about.

The category of trays clearly falls into the 'coarse' to 'very coarse' ranges of Standard Ware production. They are strongly associated with the coarser varieties of plant-tempered fabric, characterised by a heavy presence of large plant inclusions. They were often given wobbly, irregularly-shaped rims, and the height in many cases varies strongly from one part of the vessel to another. The surfaces were as a rule left in a rather unfinished state, resulting in a relatively roughly-textured, very irregular surface. Traces of the primary shaping such as coiling ridges can very often be observed in this category. These objects were virtually never burnished: the excavations have so far yielded just one example. This specimen (from a level A9–A8 context) showed streaks of burnishing on its exterior base, a feature also seen with many of the vertical pots in the same level. As a rule, trays were always left entirely decorated. So far not a single example of a decorated tray has ever been found at Tell Sabi Abyad.

The trays display some variation in the shape of their wall, which could either be straight or convex. The orientation of the wall also varied, ranging between 90° and 120°. These two variables cannot be shown to be correlated: either rim shape displays similar wall orientations, while vertically-oriented and open trays do not differ in the shape of the wall (Fig. 4.36). We arbitrarily classified trays with an orientation less than 100° as '*Vertical Trays*' (Figs. 4.78: 1–9), while trays showing a more open orientation were termed '*Everted Tray*' (Figs. 4.79: 1–9). Almost none had been preserved sufficiently to allow the reconstruction of their capacity. Three complete trays held volumes of 0.33–6.30 litres.

We put apart one unique specimen, a tray with what appears to be a 'crenelated' rim. This *Tray with Crenelated*

Rim (Fig. 4.79: 10) can be reconstructed as a low, oval shape with a flat base and a straight, everted wall. What puts this example apart is the regular, curvilinear shape of the rim. Minimally, three very regular indentions can be reconstructed, each some two centimetres deep and spaced some two centimetres apart (Fig. 4.37). Due to the fragmented state we cannot say if this characterised the entire vessel or was perhaps restricted to a small part of it. No parallels for this strange shape are known so far, and its function remains a matter of speculation.

So-called *Husking trays* constitute a very distinct sub-category. In terms of their overall shape, wall orientation and size they fit perfectly well within the broader, heterogeneous group of trays.[12] We can detect no diachronic trends in the overall shape or orientation of the wall, or in vessel height of the husking trays. What distinguishes them is the deliberate corrugating of the interior surface, usually including both the interior base and vessel wall (Pl. 4.2). Eight varieties of husking trays were distinguished on the basis of the specific ways in which the interior was modified (Table 4.22). The interior base was most often impressed deeply, possibly with the fingers, but in some instances clearly with a sharp, blunt tool, resulting in a more angular impression. The interior impressions usually were distributed rather irregularly across the base, but in one instance the impressions were limited to the area where the base met the wall, in a circular fashion, leaving the rest of the base undisturbed (Fig. 4.80: 1). Alternatively, the base could be provided with very deep, wide grooves. The interior wall was either left plain or was given thick incised slits in vertical or somewhat diagonal direction. These incisions were in most cases not made with the fingers but with a sharp, rather large-sized instrument, as indicated by their angular shape. There is the unique case of a husking tray that had the interior wall punctuated by broad grooves that carried circular impressions in them (Fig. 4.80: 3).

As with the other types of trays, husking trays uniformly belong to the coarser varieties of Standard Ware. They were very consistently made of coarse, porous fabrics containing a large amount of large plant inclusions. They had roughly-textured, unfinished surfaces, and they were never burnished. They were remarkably thick walled, with the base often exceeding three centimetres in thickness. The exaggerated wall thickness made them relatively strong: husking trays dominate the collection of intact profiles, and consequently they are seriously overrepresented in the corpus of 'pottery objects' at the

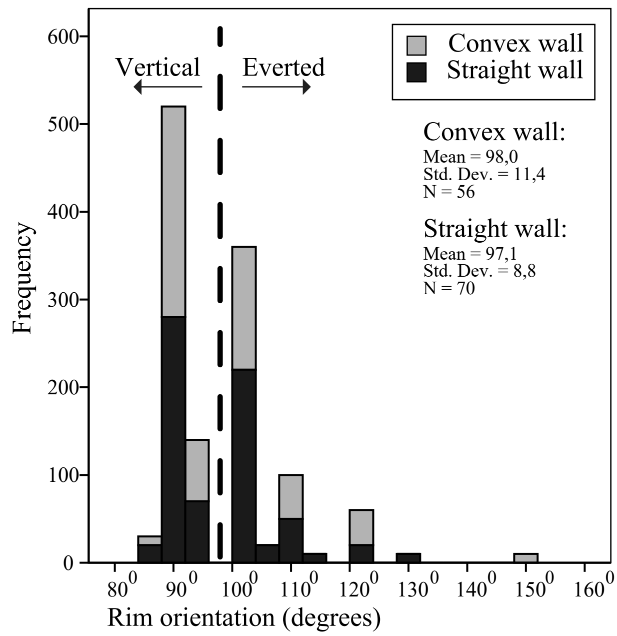


Fig. 4.36 Tell Sabi Abyad, Operation III. Wall orientation and shape of the wall of Standard Ware trays, distinguishing between Vertical Trays and Everted Trays (based on EVR).

Fig. 4.37 Tell Sabi Abyad, Operation III. Standard Ware Tray with Crenellated Rim (P04-96; from a level A4 open area). Both surfaces encrusted but not purposely plastered. Height of the vessel 9.6 cm (see Fig. 4.79: 10) (image Tell Sabi Abyad Project).

Table 4.22 Tell Sabi Abyad, Operation III. Frequencies of varieties of Standard Ware husking tray interior modification by level (based on all identified husking tray fragments).

Level	Grooved base	Impressed base	Incised wall	Grooved wall	Grooved base & incised wall	Impressed base & incised wall	Impressed base & grooved wall	Grooved & impressed wall	Too eroded	Total
C-Sequence	–	1	–	–	–	–	–	–	–	1
Mixed B	2	13	4	1	–	3	1	–	3	27
B1	–	1	–	–	–	–	–	–	–	1
B3	–	2	–	–	–	–	–	–	–	2
B4	2	4	–	–	–	–	–	–	–	6
B5	–	1	–	1	–	1	–	–	–	3
B7	1	–	1	–	–	–	1	–	–	3
B8	1	18	6	3	–	4	4	–	1	37
Mixed A	–	1	–	–	–	–	–	–	–	1
A1	1	59	19	8	3	8	11	1	1	111
A2	–	4	2	1	–	1	–	–	–	8
A3	–	2	–	–	–	–	–	–	–	2
Total	7	106	32	14	3	17	17	1	5	202

site (Chapter 3). Husking trays varied much in size and weight. Some of the larger examples reached over half a meter in length. Although no complete examples were found, some of the larger fragments allowed for a well-educated estimation of the original weight of the vessel when intact to be between ca. 7 and 15 kg.

Interestingly, a few of the husking trays were *plastered* (*n* = 11). These were recovered from the same levels that produced copious amounts of other plastered Standard Ware shapes. Most of the examples are from level A1. The plaster was quite substantial in all cases (thickness 1 to 7 mm), and it could be applied on either the interior or the exterior surface (Fig. 4.82:1-4). Perhaps the most remarkable example of a plastered husking tray was a vessel recovered from, unfortunately, a stratigraphically less secure context that carried a massive 1.5 cm thick plaster covering the entire interior and containing regularly distributed grey-brown pebbles (Fig. 6.6; Fig. 4.82:1). Did the pebbles function as an alternative to the now covered, corrugated interior? This most curious object so far remains unique.

As a group, trays were already present in very low numbers from level A8 on, but many of these early examples were so fragmented that their typological attribution remains questionable. Trays in any case became a regular, if very minor, component of the Standard Ware by level A4, increasing in frequency in subsequent levels (Fig. 4.31). Standard Ware trays as a category became quite common by level A1, and they remained a recurring Standard Ware shape throughout the B-Sequence. Intriguingly, the husking tray variety shows a much more chronologically restricted distribution. If we disregard a few isolated examples from levels A3 and A2, husking trays were conspicuously absent from the entire A-Sequence. They were abruptly introduced in level A1, in which level they were already relatively common. We may date the introduction of this characteristic vessel type at Tell Sabi Abyad with a fair degree of precision to ca. 6335–6225 cal BC.

4.2.4.6. *Standard Ware pots*

Pots were defined as closed shapes without a neck. Several distinct types of pots were distinguished on the basis of the shape of the wall (convex or straight), the shape of the orifice (circular or oval) and size.

In contrast to subsequent prehistoric periods, the most common type of Standard Ware pot in Operation III is not the convex-walled, hole mouth shape. Instead the archetypal pot shape for this period, indeed almost iconic for the Early Pottery Neolithic, is a kind of 'bucket' with vertically oriented, straight walls and a flat base. These *Vertical Pots* were often very irregularly shaped, so that the distinction between 'convex' or 'straight' is not as analytically straight-forward as one might wish, but the emphasis on the whole appears to have been on making these vessels straight and vertical (Figs. 4.84–4.88). We emphasize that we hesitated with designating these containers as 'pots', as this term implies a closed overall contour. A pot should be tall relative to its width or its orifice should be narrow. With the vertical pots the distinction between something akin to a 'pot' and something closer to a 'bowl' is not so sharply articulated. While many examples were indeed proportionally quite tall, others were similar to the category of convex-sided bowls in terms of their overall contour (Fig. 4.38, compare with Fig. 4.33). The lack of differentiation between distinct categories of shape is characteristic of the period. Instead of being either 'bowl' or 'pot', the vertically-oriented straight-walled pottery containers were simply 'vessels'.

Leaving such matters of artificial categorization aside, the excavations in Operation III yielded numerous

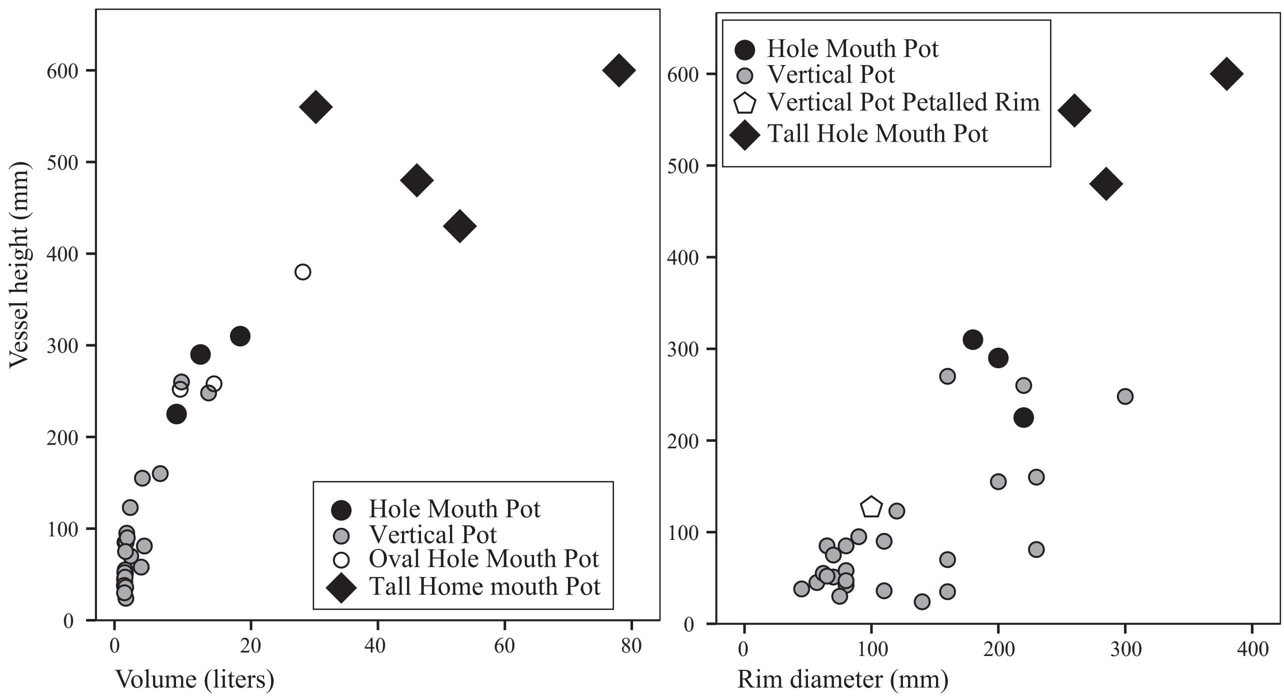


Fig. 4.38 Tell Sabi Abyad, Operation III. Vessel height plotted against vessel volume (left) and rim diameter (right) of Standard Ware pots from Operation III showing typological distinctions (based on EVR).

complete examples of such vertical, straight-walled vessels. They were very characteristic for the A-Sequence, especially for the earliest stages of the Early Pottery Neolithic. Prior to level A5 (levels A10–A6), Standard Ware effectively consisted almost exclusively of convex sided bowls and vertical pots. Vertical pots continued to be made and used in numbers in the very early stages of the Pre-Halaf period (levels A1 and B8), but subsequently they rapidly went out of production. A few examples were recovered from the various B-levels in Operation III and a few examples were recovered from the Pre-Halaf strata in Operation I (Nieuwenhuyse 2007, 118, table 6.4.12). In these later stages, this shape may already have been an anachronism.

The vertical pots display an extraordinary variation in size. The basic shape ranges from pretty much miniature to huge, from very shallow to tall, from proportionally closed to open. Vertical pots fall within a continuum that goes from remarkably light weight and mobile to very heavy and difficult to relocate, from containing almost nothing to bulky and voluminous (Fig. 4.40). We inspected visually the distributions of vessel height and rim diameter. The rim and base diameters both show perfectly normal distributions. Most of the rims fall in the range of between 5 cm and 25 cm; none is much larger than 30 cm. The height on the other hand shows a bi-modal distribution. Most of the vertical pots were well below 20 cm in height, with an average height of 7 cm, but a few reached a height of over 20 cm with an approximate average height of 24 cm. In terms of their size the latter overlap neatly with the category of hole mouth pots (Fig. 4.38), and perhaps they should be considered a straight walled variety of these. The preserved height measurements are problematic, however, as our vertical pots are mostly broken. In many cases they appear to have been broken at the junction of the wall and the base – hence allowing us to estimate their original height - but frequently they broke at some point midway the vessel wall. If we include only complete profiles the distribution of vessel height shows the same bi-modality, but the sample becomes quite small. We decided not to sub-divide the vertical pots in categories of size. If we put all the Standard Ware pot types together (as in Fig. 4.38), it appears that the lower varieties were generally given a straight wall – the vertical pots - whereas the taller varieties (over 20 cm in height) more often gained a convex wall – the hole mouth pots.

We draw special attention to a unique example of a small Standard Ware *Vertical Pot with a Petalled Mouth* (Fig. 4.89: 20). No other examples of this shape were found in the entire Operation III (or for that matter, at Tell Sabi Abyad as a whole), but the curvilinear shape of the mouth definitely appears to have been deliberate. The vessel was not complete, with approximately half of the vessel intact, which is above-average preservation for Standard Ware. The function of the vessel remains enigmatic. The vessel was found in the fill of a level A4 building but the use context of this space remains unclear.

True *Hole Mouth Pots*, then, constitute a minority (Figs. 4.90 and 4.91).[13] Their chronological distribution, moreover, is much more limited than the vertical pots. The various sub varieties of this type are found only from level A5 onward. They occur in very low frequencies in levels A5–A1, and continued afterwards. While they were not documented in the B-levels of Operation III, we know that small numbers of hole mouth pots were still in use in Operation I during the Pre-Halaf period

Table 4.23 Tell Sabi Abyad, Operation III. Frequencies of appendages with Standard Ware vertical pots by level (based on EVR)

Level	*None*	*Loop handle*	*Lug*	*Vertically pierced knob*	*"Ear"-shaped lug*	*Plain cordon*	*"Rope"-style cordon*	*Appendage eroded*	*Total*
D-Sequence	7	1	–	–	–	–	–	–	8
C-Sequence	4	1	–	–	–	–	–	–	5
Mixed B	40	3	–	–	–	–	–	–	43
B1	3	–	–	–	–	–	–	–	3
B2	3	1	–	–	–	–	–	–	4
B3	3	–	–	–	–	–	–	–	3
B4	6	–	–	–	–	–	–	–	6
B5	3	–	–	–	–	–	–	–	3
B8	27	1	–	–	–	–	–	–	28
Mixed A	125	59	1	–	1	1	–	–	187
A1	300	53	–	1	1	1	–	–	356
A2	89	37	–	–	–	–	–	3	129
A3	133	64	–	–	–	–	–	2	199
A4	214	101	1	–	–	3	1	–	320
A5	103	78	1	–	–	1	–	–	183
A6	139	61	–	–	2	–	–	–	202
A7	43	27	–	–	1	–	–	–	71
A8	30	13	–	–	–	–	–	–	43
A9	33	10	–	–	–	–	–	–	43
A10	1	–	–	–	–	–	–	–	1
Total	1306	510	3	1	5	6	1	5	1837

(Nieuwenhuyse 2007, 118). We distinguished as a separate category the *Oval Hole Mouth Pots* (Pl. 6; Figs. 4.92: 1–3, Figs. 4.93: 1–2, 4). A special category of hole mouth pots of extraordinary size was termed *Tall Hole Mouth Pots* (Figs. 4.81: 3, 4.82: 1–2). These sometimes reached a height of over 60 cm (Fig. 4.38).

One magnificent Tall Hole Mouth Pot was found *in situ* (Pl. 7; Fig. 4.81: 3). This truly remarkable container with a capacity of somewhat over 30 litres still carried a flat, circular block of limestone as a lid. This container had been extremely heavily plastered on the interior. The plaster was especially thick near the rim, forming an interior ledge of sorts that held the stone lid. When the vessel was discovered the lid was still in place. The vessel was removed to the dig house where, in great suspense for the assembled team, the lid was carefully removed and the pot opened. Somewhat to everyone's disappointment the vessel was found to be empty, containing a very loose fill of almost dust-size particles. Possibly the container had been closed and abandoned without any contents at all or, perhaps, its contents were in liquid form, now evaporated after eight millennia.

Appendages were relatively common with pot shapes. The hole mouth pots frequently carried a cordon, either the plain type or the 'rope'-style type of cordon (Table 4.14). The vertical pots on the other hand were virtually exclusively associated with vertical loop handles (Pl. 5). Occasionally, other types of appendages were placed onto these vessels, such as the occasional lug or a cordon (Table 4.23). Interestingly, for reasons still unknown, the frequency of loop handles and other appendage types fluctuated strongly through time. Appendages were common already in the earliest A-levels. In level A9 over 20% of all vertical pots carried an appendage (Fig. 4.39). This proportion rose to between 30% and 40% by levels A-7–A-5. Subsequently it gradually decreased again. By level B8 most vertical pots no longer held any appendages. The presence of a loop handle cannot be related to the *size* of the vertical pots. They are distributed quite evenly across their diameter-height spectre (Fig. 4.40). It can be related to the *shape* of the mouth. Vessels with a circular orifice much more often have an appendage (28%) than when they had an oval orifice (only 7%). Technically nothing would have prevented people from attaching an appendage to an oval shaped pot, as indeed they occasionally did. Functional differences between circular and oval mouthed vessels perhaps guided the preference for attaching appendages.

Given the general increase in Standard Ware vessel size through time in the A-Sequence, did Standard Ware pots increase in size and volume? Intriguingly, they may have – depending on what proxy for size one prefers. If we consider the individual types of pots separately, none of them show any shifts at all. Both the rim diameters and the (preserved) heights of the vessel fragments fluctuate within narrow margins around their respective average

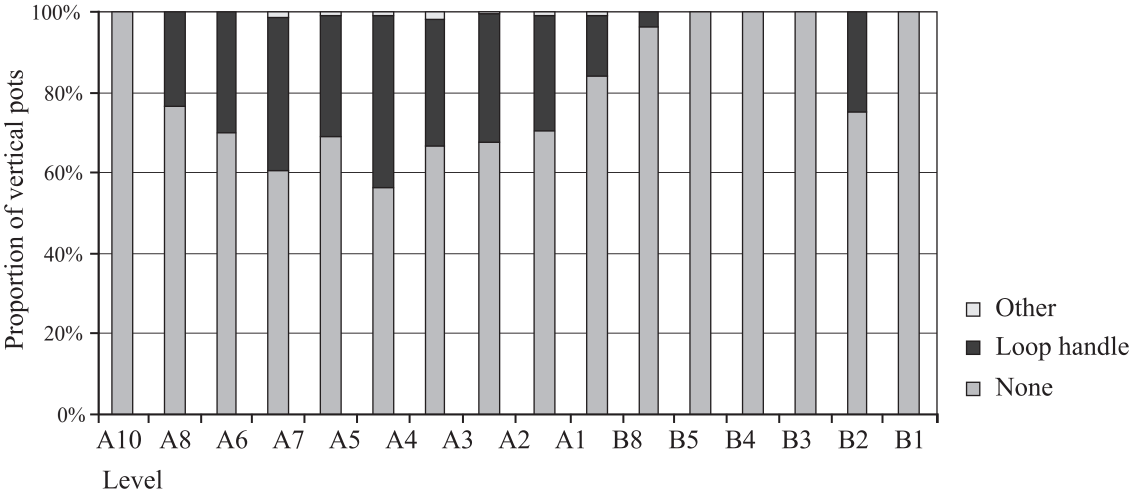


Fig. 4.39 Tell Sabi Abyad, Operation III. The proportion of vertical pots carrying an appendage in the A–B-Sequences (based on EVR).

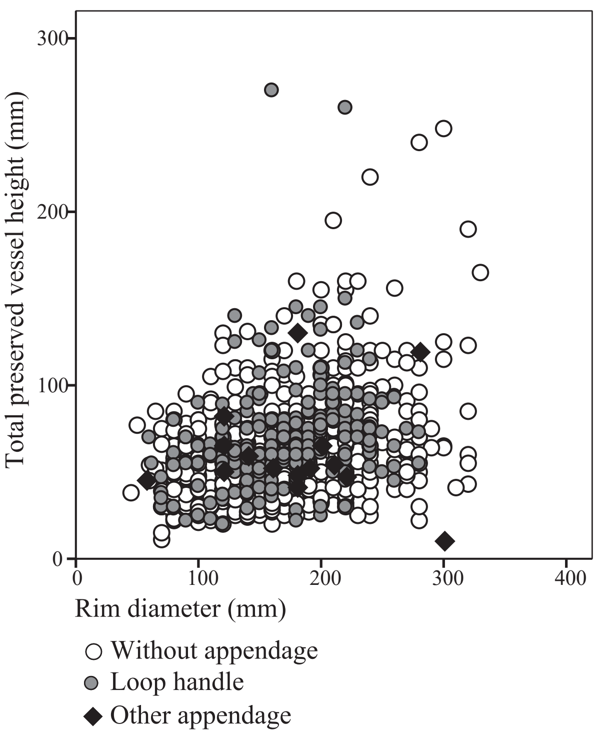


Fig. 4.40 Tell Sabi Abyad, Operation III. Plot of rim diameter (mm) against preserved vessel height (mm) of Standard Ware vertical pots from Operation III, showing the distributions of different types of appendages (based on EVR).

values, which remained rather similar from one level to the next. The average rim diameter of the vertical pots is about 17 cm in most levels, while their average height fluctuated around 6 cm (Tables 4.24–4.26). Even if we put all pot types together to enlarge the sample size we find no significant changes in average vessel size, nor does the spread around the average change dramatically through time. Nor does the thickness of the vessel wall, a useful proxy of vessel size, show any significant shift. Certainly, the *larger* pot types – the tall hole mouth pots and the large oval hole mouth pots – appeared late in the A-Sequence. However, these large types always remained limited in number, and apparently did not affect the average size values significantly. It is only when vessel *volume* is brought into the equation that the record suggests increasing volume through time (Fig. 4.45). The few volume estimates available for the earliest A-levels

Table 4.24 Tell Sabi Abyad, Operation III. Rim diameter (mm) of Standard Ware pot types

	Mean	*Min*	*Max*	*Std. Dev.*	*N*
Vertical pot	166	45	330	53.95	947
Vertical pot with petalled rim	100	100	100	–	1
Hole mouth pot	287	150	380	68.93	21
Tall hole mouth pot	308	260	380	63.31	3
All pots	169	45	380	57.62	972

Table 4.25 Tell Sabi Abyad, Operation III. Height (mm) of Standard Ware pot types (based on complete profiles only)

	Mean	*Min*	*Max*	*Std. Dev.*	*N*
Vertical pot	92	24	270	70.814	26
Oval vertical pot	60	60	60	–	1
Vertical pot petalled rim	127	127	127	–	1
Hole mouth pot	275	225	310	44.441	3
Oval hole mouth pot	308	252	380	62.830	4
Tall hole mouth pot	518	430	600	76.76	4
All pots	172	24	600	155.894	39

Table 4.26 Tell Sabi Abyad, Operation III. Volume (litres) of Standard Ware pot types

	Mean	*Min*	*Max*	*Std. Dev.*	*N*
Vertical pot	2.67	.03	13.31	3.26	64
Home mouth pot	12.87	8.27	18.30	5.07	3
Oval hole mouth pot	16.28	8.84	28.17	6.55	6
Tall hole mouth pot	51.82	30.22	78.00	19.88	4
All pots	6.69	.032	78.00	12.55	77

(levels A8 and A7) do not surpass a capacity of two litres. By levels A6 to A4, however, pot types gained an average volume of about five litres, whereas by level A3 they held an average ten litres. This drops to between five and six litres during levels A2 and A1, but it rises to an astonishing 78 litres by level B8. Underlying this emerging trend are quite low numbers of pot for which the volume could be calculated and rather high margins around the average, however, and the patterns are statistically not significant.

4.2.4.7. Standard Ware jars

According to text-book archaeology, jars are defined as closed vessels with a distinct collar. In the case of the Late Neolithic Standard Ware, things are not so simple. The shape of the shoulder – the point of transition between the body and the neck – was rarely very distinct. The far majority of all collars (92%) were indistinct, showing a concave transition with no angularity between the upper body and the collar. Complicating matters, the majority of the necks were not straight but concave, contributing to their indistinctiveness. This leaves precious little formal morphological difference between S-shaped 'bowls' and S-shaped 'jars'. Collared Standard Ware shapes were effectively all S-shaped; sensuous curves and a lack of sharp angularities characterise them. Finally, most Standard Ware collars were not very tall. If the case of a tall, concave collar can be easily identified as such (even with a very indistinct shoulder), then the low, vertically oriented uppermost part of an S-shaped curve would hardly qualify as a neck. Measuring the height of such vertically S-shaped upper parts becomes a challenge – where does the shoulder end and the collar start? This ambivalence is hardly unique to Tell Sabi Abyad: Braidwood's team already encountered the issue many years ago in the Zagros, describing similar pottery with the term 'shouldered jars' (Adams 1983, 218–219; Caldwell 1983, 652).

If we simply accept our collar-height measurements as valid, the height of the neck shows a bi-modal distribution, presenting an initial peak at 2 cm and a second one at 4.5 cm tall. We therefore took a collar height of 2 cm as the criterion to distinguish formally between on the one hand, S-shaped bowls and goblets and, on the other hand, jars. Following this distinction vessels qualifying as 'jars' first appeared by level A3, constituting some 3% of all Standard Ware in that level. The proportion rose rapidly to about 9% by level A2, moving on to an astonishing 24% in level A1. Jars remained part of the Standard Ware through the B-Sequence and in subsequent levels (Table 4.16, Fig. 4.31).

Collared vessels are not associated with appendages. Altogether, of all collared vessel types documented (n = 591) only five carried an appendage. This includes three examples of S-shaped bowls and just two jars. A small jar and a medium-sized jar both carried a vertical loop handle close to the rim. Of course, we should take into account that most of the appendages are found in very fragmented condition, so that often not much of the shape can be reconstructed. Theoretically, additional appendages may have been applied to jar bodies. We believe this is unlikely, however, given the conspicuous lack of appendages with the complete shapes and larger fragments.

We sub-divided the large, heterogeneous category of jars on the basis of the relative proportions of the neck, using the properties of rim diameter and collar height from the available rim fragments. We used the neck of the jar rather than the overall shape and size of the entire vessel simply because complete Standard Jars were so few (n = 32). Visual inspection of the rim diameter distribution suggests several diffuse sub-groups (Fig. 4.41; Tables 4.27 and 4.28). This led us to distinguish between *Small Jars*, with rim diameters less than 12 cm (Figs. 4.95: 1–17), *Medium-sized Jars*, showing rim diameters between 12 cm and 20 cm (Figs. 4.96: 1–2, 4.97: 1–6, 4.98: 1–12), and *Large Jars*, boasting rim diameters from 20 cm up to 30 cm (Figs. 4.99–4.102, 4.103: 1). The 'large' jars were relatively uncommon; most Standard Ware jars belonged to the 'small' or 'medium-sized' varieties. Perhaps splitting hairs, we took apart two sub-categories of jars with oval mouths. These were termed *Medium-sized Oval Jars* and *Large Oval Jars*. We emphasise that they were not in any way different from circular-mouthed jars, apart from their oval mouth. As a final formal category, finally, we distinguished the so-called *Hole Mouth jars*. First singled out as a separate vessel type by Peter Akkermans (1989b, 92), hole mouth jars are characterised by low, straight to somewhat concave inwardly-oriented necks (Figs. 4.103: 2–3).

We wish to draw special attention to a small number of jars that deviate conspicuously from the general pattern of smooth, curvilinear Standard Ware profiles. These have a carinated break in the orientation of their wall, not too high above the base, separating the lower body from the upper parts. The lower body tends to be straight to slightly concave (e.g. Figs. 4.97: 1, 4.99: 1, 3, 4.100: 1, 3, 4.101: 2, 4.103: 2, 4.105: 2). The upper body is convex, but the uppermost part that leads towards the S-shaped rim is again concave. Invariably these carinated jars are of a rather large size. In terms of our formal typology, almost all of them fall within the category of large jars (one is a medium-sized jar). It is difficult to assess exactly how many Standard Ware jars had such a carinated profile. The examples we could identify as such were all complete shapes; a number of carinated body sherds suggest that an additional number of jars had a similar profile. If the corpus of complete shapes might be seen as statistically representative, the proportion of Standard Ware jars with a carinated profile would be about 18%; the proportion of, specifically, *large* carinated jars was certainly higher.

These intriguing vessels closely resemble the famous 'double ogee' pots known from northeastern Syria and northern Iraq. In these parts, such vessels have been taken as one of the key indicators for identifying the Proto-Hassuna ceramic assemblage (Bader 1993a; Lloyd and Safar 1945). Admittedly, the 'Tell Sabi Abyad variety'

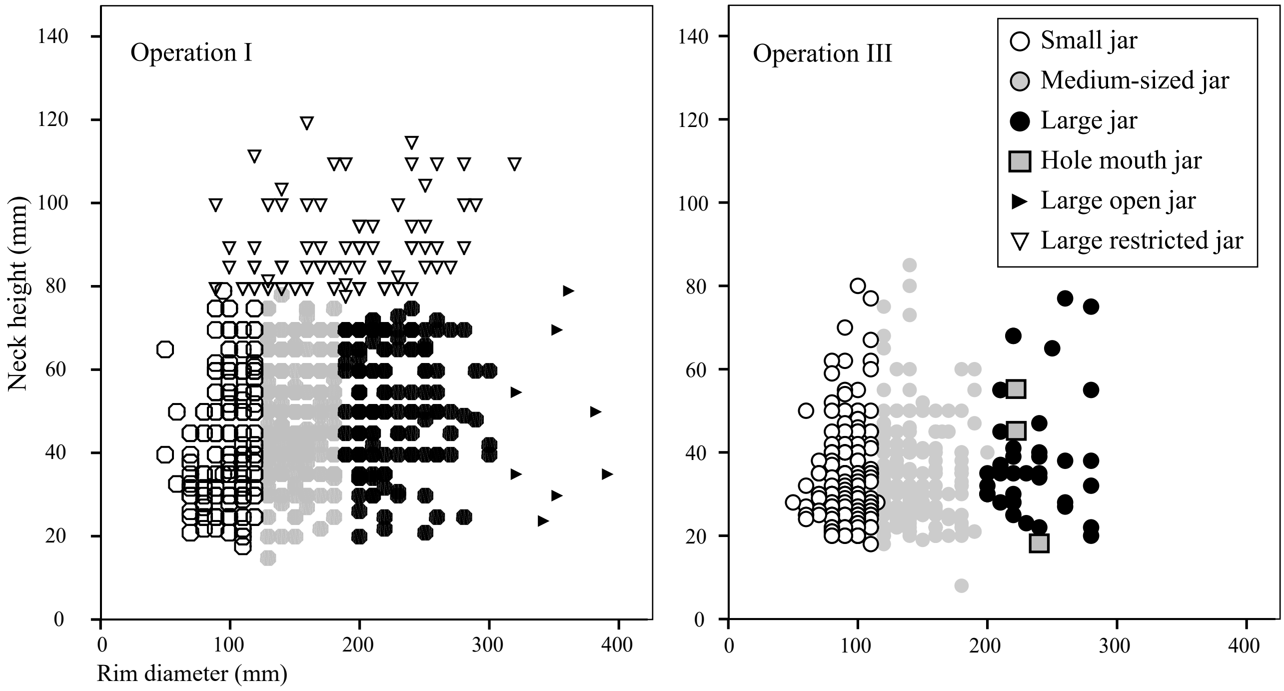


Fig. 4.41 Tell Sabi Abyad, Operation III. Plots of rim diameter (mm) against height of the neck (mm) of Standard Ware jars, distinguishing between jar types, and comparing jars from Operation III (right) with those from Operation I (left) (based on EVR; after Nieuwenhuyse 2007: 119, fig. 6.4.7).

Table 4.27 Tell Sabi Abyad, Operation III. Rim diameter (mm) of Standard Ware jar types

	Mean	*Min*	*Max*	*Std. Dev.*	*N*
Small jar	93	50	115	13.84	208
Medium-sized jar	142	110	200	20.41	227
Large jar	235	190	310	30.39	44
Hole mouth jar	154	90	240	54.41	10
All jars	130	50	310	45.40	489

Table 4.28 Tell Sabi Abyad, Operation III. Vessel height (mm) of Standard Ware jar types (based on complete profiles only)

	Mean	*Min*	*Max*	*Std. Dev.*	*N*
Small jar	172	131	220	44.91	3
Medium-sized Jar	346	280	440	51.69	7
Large Jar	514	377	640	79.63	10
Hole Mouth Jar	480	480	480	–	1
All complete jars	408	131	640	139.26	21

is not identical to the classic double ogees. These tend to have a much more pronounced concavity in their lower parts. But the resemblances are unmistakable. The examples from Tell Sabi Abyad perhaps represent the 'northern Syrian' variety of the same general principle: a large jar with a carinated body, a (somewhat) concave lower body and a convex-to-S-shaped upper part. Given their great size and weight, they would not have been around very frequently and were likely used as 'fixtures' (Cribb 2001). Most of the examples from Tell Sabi Abyad came from room fills where they may have been used in a stationary position.

Interestingly, all examples are either from level A1 or from a stratigraphic mixture of levels A2 and A1. One should perhaps not expect many earlier examples to be found, as large jars simply did not exist at Tell Sabi Abyad in significant numbers before level A1. The specific shaping technique needed to produce these vessels – shaping them in two stages and using a shallow pit as a support (Fig. 4.7: 8a–f) – may have been introduced into the Tell Sabi Abyad community from neighbouring groups to the east, or it may have been discovered by them independently. In either case, they hit upon the idea relatively late, as such shapes apparently began earlier in the neighbouring regions to the east. At Tell Sabi Abyad, no examples have so far been recovered from levels younger than level A1 (Nieuwenhuyse 2007). At Tell Sabi Abyad this shape was apparently limited to the very start of the Pre-Halaf phase. It was not only the vessel type as such that was abandoned so quickly, but also the specific technique needed to produce this it. Apparently the Tell Sabi Abyad potters soon found ways of producing large coarse storage jars through other techniques.

Plotting the values for neck height and rim diameter we used similar scales as in earlier work on the Standard Ware from Operation I (Nieuwenhuyse 2007, 119–121). This brings to light two interesting discrepancies between the two sets (Fig. 4.41). First, the Operation I jars included many necks taller than 8 cm, which were termed 'Large Restricted Jars' (Nieuwenhuyse 2007, 120). These do (virtually) not appear in Operation III. Second, Operation I yielded quite a number of very large jars with a rim diameter over 30 cm, the so-called 'Large Open Jars' (Nieuwenhuyse 2007, 120). These do not appear in Operation III. In comparison, the Operation III jars show a much more restricted size range. On the whole this suggests that the Standard Ware jars from Operation III were smaller than those from Operation I and/or less diverse in terms of their size (Fig. 4.41).

In constructing a formal typology of jars, we subjected the limited numbers of complete Standard Ware jars (n = 32) to the same typological distinction as the great mass of rim fragments. We simply began with the assumption that the size of the neck is proportionally related to the overall size of the vessel: larger, more voluminous jars should have larger necks (Table 4.29). While keeping the small sample size firmly in mind, we may use the available complete jars to put this assumption to the test. How do they behave *vis-a-vis* our rim-based typology? Useful proxies of vessel size are the total height, volume and the wall thickness. These measures are related because of the underlying ceramic technology: the potters needed a thicker wall for building a taller, more voluminous, hence heavier shape. Indeed, the measurements of wall thickness and vessel height of the complete profiles of Standard Ware collared vessels from Operation III show a strong linear correlation (Fig. 4.42: left). So, too, do vessel volume and wall thickness (Fig. 4.42: right). Thicker Standard Ware collared vessels, then, tend to be taller and more voluminous, and *vice versa*.[14]

Table 4.29 Tell Sabi Abyad, Operation III. Volume (litres) of Standard Ware jar types

	Mean	*Min*	*Max*	*Std. Dev.*	*N*
Small jar	.82	.77	.88	.083	2
Medium-sized Jar	11.94	7.75	20.22	4.53	7
Large jar	61.82	32.10	114.50	29.35	10
Hole mouth jar	36.02	28.33	43.725	10.8	2
All jars	36.93	.76	114.50	32.54	21

The complete jars highlight the complexity and to some extent the artificiality of our formal classification. The jar types, formally distinguished on the basis of the size of their neck, separate quite well when their overall size is taken into account but certainly not perfectly (Figs. 4.42 and 4.43). The S-shaped bowls and goblets would seem to form a relatively distinct category of vessels of small size, characterised by a limited vessel height and a low wall thickness, but they overlap with the smallest examples of the small jars. The two formal categories of large jars and small jars show some overlap in vessel size but still separate reasonably well. The intermediate category of medium-sized jars overlaps with both of them, however. The complete Standard Ware collared vessels are situated on a continuum from very low to quite tall, with the taller vessels showing a corresponding increasing wall thickness (Fig. 4.42). The recovery of larger data sets of complete Standard Ware jars may allow such size-based distinctions to be further explored.

So, when applied to intact vessels, our neat formal categorizations constructed on the basis of the size of the neck translate in overlapping categories with diffuse boundaries. The rim diameter correlates quite well with overall vessel size, as expressed in vessel height and wall thickness (Fig. 4.43). As to the relationship between rim diameter and vessel height, a plot shows two potential

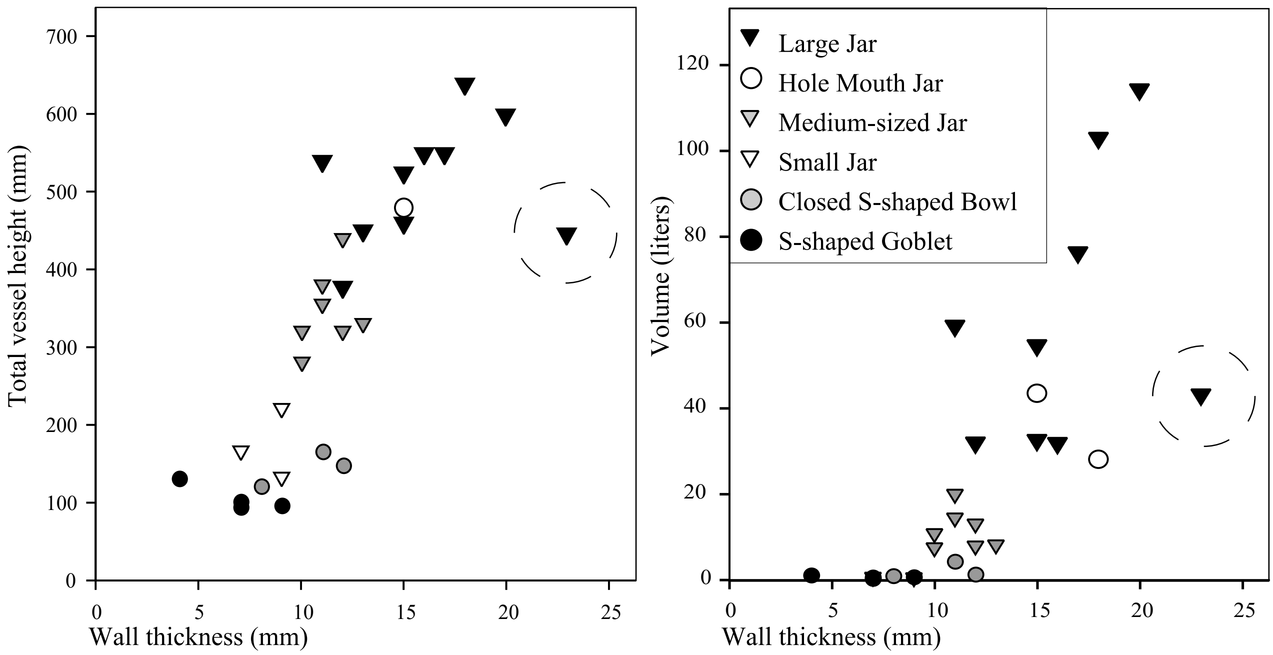


Fig. 4.42 Tell Sabi Abyad, Operation III. Complete Standard Ware collared vessel types. Plots of wall thickness against vessel height (left) and wall thickness against volume (right), distinguishing between formal types distinguished on the basis of collar size. Circle: possible outlier.

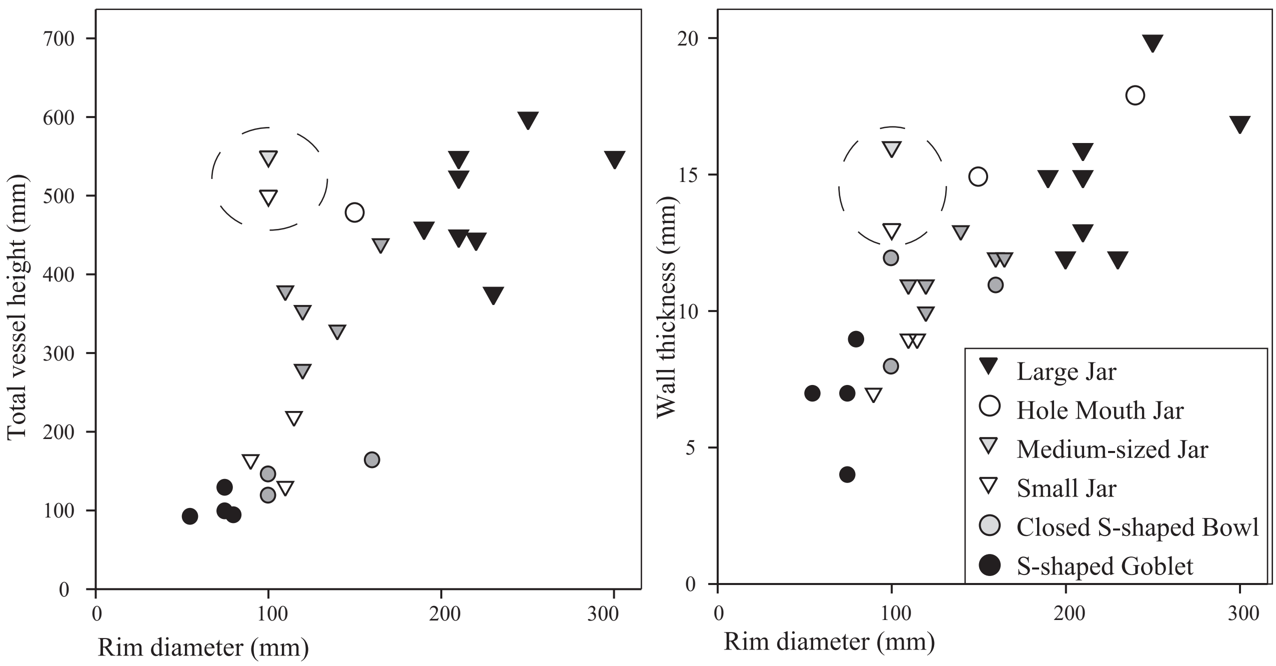


Fig. 4.43 Tell Sabi Abyad, Operation III. Complete Standard Ware collared vessel types. Plots of rim diameter against vessel height (left) and rim diameter against wall thickness (right), distinguishing between formal types distinguished on the basis of collar size. Circle: possible outliers.

outliers, both relatively tall vessels with apparently small rim diameters. Both are somewhat suspect. One is a very fragmented tall vessel, the rim diameter of which could be reconstructed only with difficulty. The other is a jar with a plaster repair on the neck. The resulting new rim may not accurately reflect the original diameter of the jar, while it artificially increased the thickness of the wall. If these two examples are omitted, the linear correlation becomes even more prominent.[15] We tentatively conclude, then, that for the category of Standard Ware collared vessels, there is a correlation between the size of the neck and total vessel size. Taller, thick walled vessels have larger rim diameters and, to a lesser extent, higher necks. *Vice versa*, the diameter of the rim may be taken as a rough but reliable proxy for the original size of the intact vessel.

We have seen that Standard Ware as a whole shows a significant increase in vessel size through time (Figs. 4.29 and 4.30). We have also seen that these temporal trends do not show up in the classes of bowls and trays, and only to some extent in the class of pots. What about the jars? The typology frequency table already showed that the later part of the A-Sequence was characterised by the introduction of *large* jars (Table 4.17). This suggests that it was specifically the class of jars that was mostly responsible for the overall increases in Standard Ware vessel size. Indeed, we find significant diachronic variation among jars. They became more diverse in terms of their size: taller, heavier, and more voluminous.

To explore these trends, we may take into account both the available complete jars and the larger set of rim fragments. We have seen that the size of the neck of the collared vessels is a reasonable indicator of overall vessel size. Through time, the size of the neck of jars increased somewhat. Jars by definition were identified on the basis of a more pronounced collar, measuring over 2 cm tall. After their first introduction in level A4, Standard Ware jar necks progressively became somewhat taller. They also became much more variable in terms of their neck height.[16] If we move on to a consideration of the preserved overall height, it becomes clear that Standard Ware jars included some of the tallest, bulkiest and heaviest pottery types available at Tell Sabi Abyad. Collared vessels, moreover, increased dramatically in height through time. Prior to level A3 no collared vessel was more than 20 cm tall. In level A3, when the first true jars were introduced, the maximum height reached by collared vessels more than doubled. Jars with a height over 50 cm are present in every level from level A2 on. The tallest collared Standard Ware vessels from Operation III were recovered from level A2, with some vessels reaching up to over 70 cm high (Fig. 4.44). This vast increase in height is reflected in a huge increase in average volumes of jar types (Fig. 4.45).

4.2.4.8. *Other Standard Ware types*

Finally, we come to the small remaining category of 'other shapes'. These include an *oval plate*, a single *re-used jar neck*, and a few miniature vessels. The *Oval plate* was a 4 cm tall, almost flat, oval shape with a simple rim (Fig. 4.71: 1). The very limited height and the low, very open contour distinguished the object from the bulk of the oval-mouthed trays. Recovered from level A1, the *Re-Used Jar Neck* is the earliest example of its kind so far recovered from Tell Sabi Abyad (Fig. 4.112: 4). Additional examples made from Standard Ware are known from the later Pre-Halaf and Transitional levels in Operation I (Nieuwenhuyse 2007) and from Halaf Fine Ware during the Halaf period (Campbell 2012, 308). It originally belonged to a small or medium-sized jar with a white gypsum plaster on which fugitive traces of reddish-brown paint or slip can still be observed. Horizontal traces of cutting or sawing with a sharp tool are clearly visible at the location where the shoulder started. The group of *Miniatures*, finally, includes a small number of pottery containers that were put apart because of their very limited size (Figs. 4.72: 4–17). They are less than 5 cm in height, and just a few centimetres in diameter. They are mostly shaped with convex walls and a sometimes irregularly flat or gently rounded base. One nice miniature hole mouth pot carried a miniature lug. Miniatures first appeared in level A5.

Special attention is drawn to a single example of a sieve. Recovered from a level B3 context it was severely fragmented, yet it resembles similar Standard Ware sieves previously recovered from the Transitional Period levels in Operation I (Nieuwenhuyse 2007, 111, pl. 30: 21–22). The body sherd was relatively thick, probably originally circular, and shows the remains of two perforations of about 1.5 cm in diameter (Fig. 4.46). As far as we are able to reconstruct this piece, it was not meant to be used as an independent artefact but always in combination with a closed vessel with a narrow orifice, specifically by placing it inside the neck of a jar. In other words, it was an appendage of sorts. What we cannot say is whether it was fixed to the vessel during the shaping and was an inseparable part of it, or was made as a separate gadget that could be removed, cleaned and reinserted.

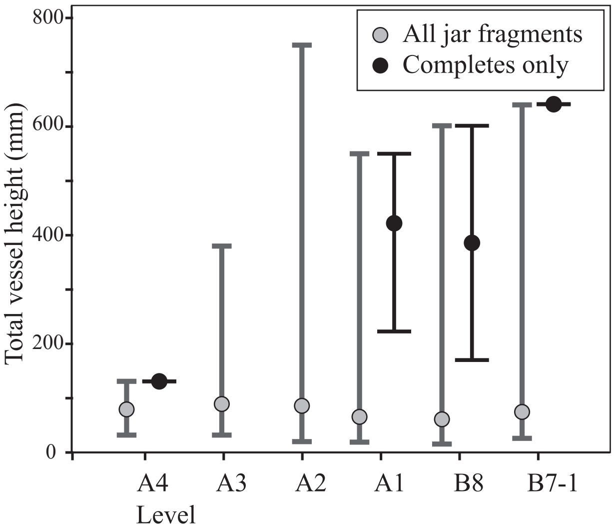


Fig. 4.44 Tell Sabi Abyad, Operation III. Standard Ware jar types. High-low plots of total vessel height by level distinguishing by fragmentation. Grey close: all jar types (EVR). Black close: only complete vessels. Levels A5–A8 and levels B1–B7 grouped to increase sample size.

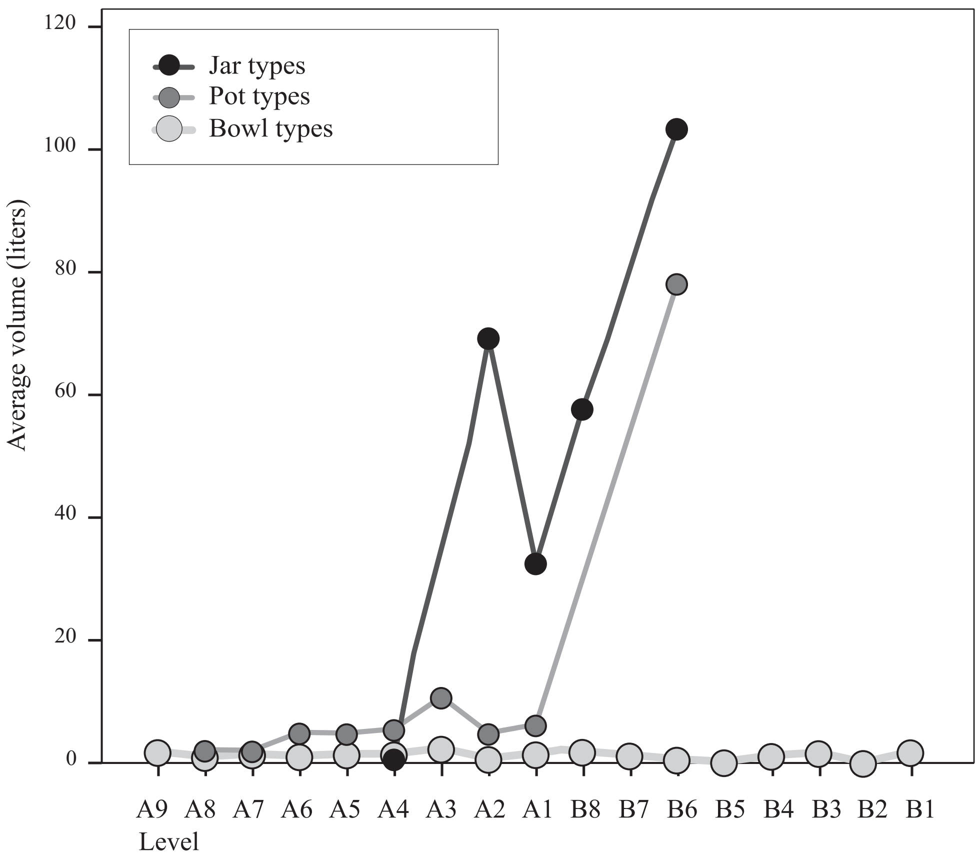


Fig. 4.45 Tell Sabi Abyad, Operation III. Average volumes of Standard Ware vessel types, distinguishing between jars, pots and bowls.

4.2.5. *Standard Ware decoration*

4.2.5.1. Decorated Standard Ware in Operation III

In this section, the 7th millennium plant-tempered pottery discussed is often described as a *plain* ware, and for very pertinent reasons. The relentlessly plain and undecorated nature of the Standard Ware from Operation III is reflected by the title of this book: by far most of this pottery was entirely plain and undecorated**.** However, the subtle, fine-tuned stratigraphy now available for Tell Sabi Abyad allows us to be more precise. It would be more correct to say that Standard Ware remained a plain ware for *almost* the entire 7th millennium. The term would be a misnomer for its *final* stages, as part of the pottery was in fact decorated. More importantly, the later 7th millennium decorated Standard Ware merits attention in its role as the direct forerunner of the Halaf painted pottery in the early 6th millennium. Operation III allows us to follow the roles of decorated Standard Ware at Tell Sabi Abyad in detail.

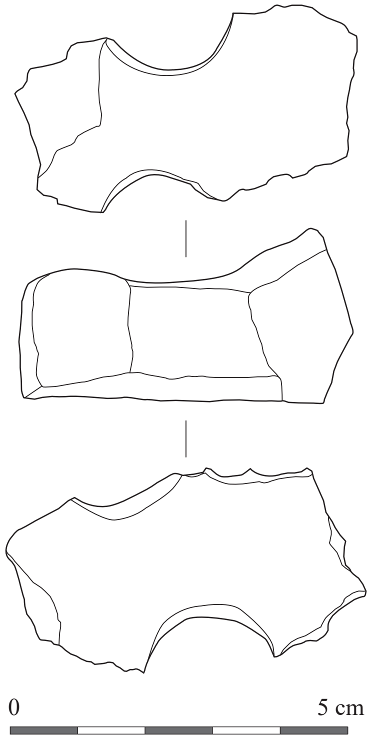


Fig. 4.46 Tell Sabi Abyad, Operation III. Body fragment of a Standard Ware sieve.

Throughout the A-Sequence of Operation III, the proportions of decorated Standard Ware are very low. The proportions of decorated Standard Ware throughout levels A10–A3 are only slightly above nil; very small numbers of decorated Standard Ware are found scattered through these levels. It cannot be entirely excluded that they were intrusive from the upper levels, but in terms of their shape, surface treatment and fabric, most examples appear very similar to the undecorated items from the same levels. This suggests that decorated Standard Ware was not entirely unknown during the time represented by levels A10–A3. The production and elaboration of decorated pottery was kept at a bare minimum, however.

This situation changed around 6300 cal BC. Decorated Standard Ware made its first appearance in significant numbers in level A2, and became a regular component of the Standard Ware by level A1 (Fig. 4.47). A suite of innovative decorative styles was introduced; a red slip was the most common, while painting, impressing, incising, and appliqué were practised. A large number of vessels carried red-painted motifs on a white slip. Precise estimates of the proportions of decorated Standard Ware depend on the type of statistic utilised. Estimates based on Raw Counts present lower proportions of decorated Standard Ware, given their inclusion of large piles of plain body sherds from the undecorated parts of the vessels (Fig. 4.47). These proportions of decorated Standard Ware are inversely higher using the minimum numbers

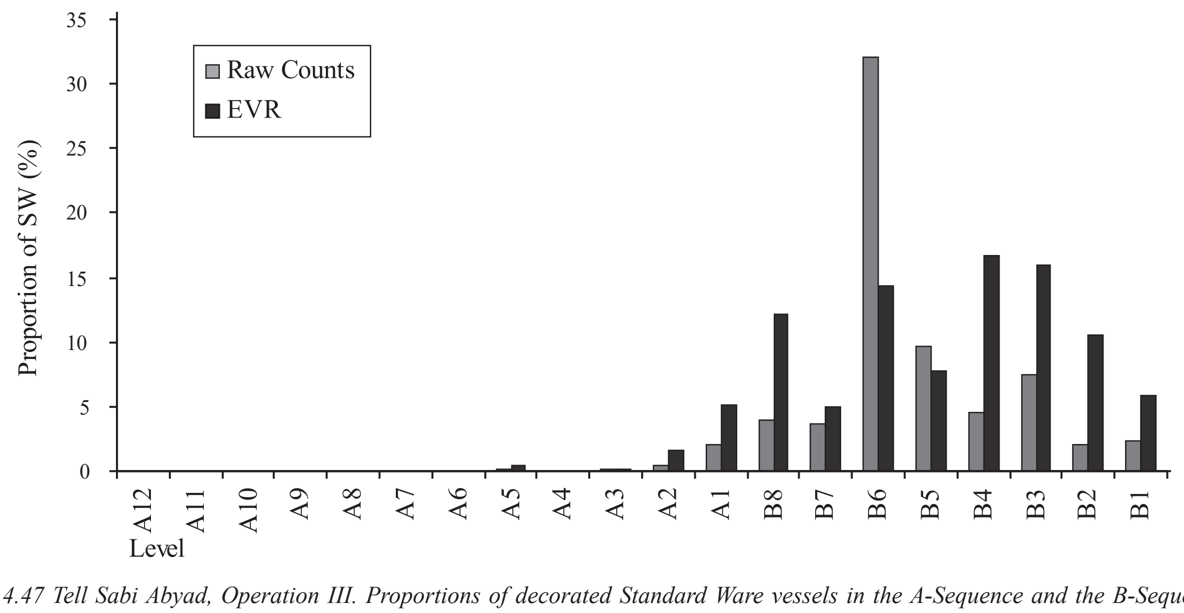


Fig. 4.47 Tell Sabi Abyad, Operation III. Proportions of decorated Standard Ware vessels in the A-Sequence and the B-Sequence, distinguishing between Raw Counts and Estimated Vessels Represented (EVR)

of vessels represented (EVR), however, certain decorative styles become underrepresented or are altogether absent. In particular, incised, impressed and appliqué-decorated Standard Ware (and combinations thereof) largely disappear (compare Tables 4.30 and 4.31). These styles emphasised the body of closed vessels; upon breakage they are much less often, or never, found with a piece of the rim still attached. In terms of Raw Counts, between 2% and 15% of all Standard Ware vessels in levels A1 to B3 were decorated. These statistics rise to between 5% and 16% when the EVR's are considered (Fig. 4.58). Note that the figure for level B6 is erratic, which almost certainly must be attributed to the very small sample size for this level (n = 25).

Significantly, the statistics from Operation III attest to a decrease of decorated Standard Ware in the final B-levels B2 and B1 (Fig. 4.47). The proportion of decorated Standard Ware in Operation III reaches a peak by levels B8–B3, after which potters gradually returned to the production of plain, undecorated Standard Ware. This corresponds very well with data gained from earlier work in Operation I (Nieuwenhuyse 2007). Levels B2 and B1 are dated to the Transitional Period, which saw the introduction of painted Fine Ware pottery; at this stage the role of decorated vessels largely shifted to Fine Ware, and Standard Ware gradually became a plain ware again (Nieuwenhuyse 2007, 159). Standard Ware was no longer decorated in any way by the Early Halaf period (Akkermans 1988; Nieuwenhuyse 2007, 159–160). Combining the data from Operation I with those from Operation III, we may now date the era of decorated Standard Ware at Tell Sabi Abyad from about 6300 cal BC (Operation III, level A1) to about 5900 cal BC (Operation I, level 4), a period of about four centuries.

The Standard Ware recovered from the C-Sequence and the D-Sequence also yielded decorated items (Table 4.30). However, these figures should not be accepted uncritically. While the C–D levels are attributed to the Halaf period on stratigraphic arguments (Chapter 2), the ceramic assemblages recovered from these contexts comprise a mixture of Halaf sherds with older material (Chapter 11). The earlier work in Operation I provides a more reliable figure for the proportion of decorated Standard Ware in the Halaf period: as already mentioned, the Standard Ware from the Early Halaf levels was completely plain (Nieuwenhuyse 2007, 160).

Most interestingly, right from the start, the application of Standard Ware pottery decoration was *structured*, in the sense that it was not randomly applied to just any type of Standard Ware vessel. To begin with, pottery decoration mainly focussed on just two classes of vessel shape: bowls and jars. Standard Ware pots were hardly ever decorated and trays never at all (Fig. 4.48). Moreover, the various decorative styles are far from equally distributed across these main classes (Table 4.32). Bowls were most often red-slipped or painted; they were very infrequently treated with any other type of decoration. Jars, on the other hand, were much more diverse stylistically. Most often they

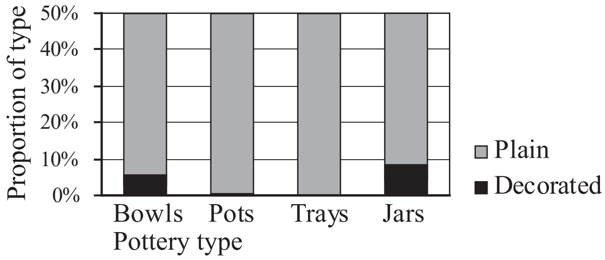


Fig. 4.48 Tell Sabi Abyad, Operation III. Proportions of decorated Standard Ware for the four main classes of vessel shape (based on EVR).

were plastered or plastered-and-painted. Jars could also be red-slipped or painted, similar to bowls. But incising, impressing, appliqué, and so-called RPB were exclusively associated with jars.

This broad dichotomy is to some degree reflected in average wall thickness of vessels carrying different decorative styles. As we have seen in previous sections, wall thickness may be taken as a proxy for vessel size. Certainly, the size-measurements do not yield discrete categories of vessel types differing in size and decoration. Nonetheless, a diffuse continuum of techniques can be suggested. A *larger* size range is associated with plastering, appliqué, and incising. In contrast, a *smaller* size range is associated with painting and impressing, with most of the red-slipped repertoire, and with vessels that show these styles in combination (Fig. 4.49: lower).

We have already seen that Standard Ware *size* correlates with *fabric*, specifically with the amounts and sizes of the plant inclusions observed macroscopically. The smaller size ranges are associated with less coarse plant temper. Not surprisingly, then, different decorative styles associate with different fabric types. Again, we find no clear groups or distinct 'wares', but trends and correlations (Fig. 4.49: upper). Thus, plastered, plastered-and-painted, appliqué, incised and bitumen-painted Standard Ware fall into the coarser ranges of Standard Ware production. These tend to be made of clays strongly tempered with sizable amounts of large plant particles. In contrast, painted, red-slipped, impressed and so-called RPB-decorated Standard Ware were more often made of clays containing minor amounts of plant particles or particles of smaller size. Apparently, the potters purposely manipulated the clays they intended to use in order to produce vessels decorated in a particular style.

Thus, the potters' decision to decorate a Standard Ware vessel in a specific manner enters into the complex set of associations and correlations that we have already met with regard to clay preparation, surface treatment and vessel size. Earlier work in Operation I had already shown the validity of these associations during the Pre-Halaf and Transitional stages (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007). Operation III now allows us to pin point the origins of these connections. With regard to decorative style, these associations were part of the Standard Ware category from the very moment this pottery was conceived of as a medium for stylistic

Table 4.30 Tell Sabi Abyad, Operation III. Frequencies of plain and decorated Standard Ware by level (Raw frequency counts)

	Plain	*Red-slipped*	*Painted*	*Incised*	*Impressed*	*Impressed & red-slipped*	*Applique*	*Applique & red-slipped*	*Painted & incised*	*Painted & impressed*	*RPB*	*Bitumen-painted*	*Red-slipped & bitumen*	*White-slipped*	*White-slipped & painted*	*Total*
D-Sequence	2632	36	6	1	8	–	3	–	1	1	4	–	–	1	1	2695
C-Sequence	772	24	1	2	1	–	–	–	–	–	1	–	–	–	1	802
B-Mixed	6115	195	25	11	13	2	11	–	4	–	5	–	1	13	18	6413
B1	173	3	–	–	–	–	–	–	–	–	1	–	–	–	–	177
B2	293	2	–	–	–	–	–	–	–	–	2	1	–	1	–	299
B3	186	6	4	3	1	–	–	–	–	–	1	–	–	–	–	201
B4	1107	30	10	4	5	–	1	–	1	–	2	–	–	–	–	1160
B5	328	28	5	–	–	–	1	–	–	–	–	–	–	1	–	363
B6	17	6	1	–	–	–	1	–	–	–	–	–	–	–	–	25
B7	185	4	–	–	1	–	–	–	–	–	–	–	–	2	–	192
B8	3324	73	19	7	1	1	4	–	2	–	–	–	–	22	8	3461
A-mixed	3583	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3583
A1	23,697	238	25	4	3	–	4	1	–	–	–	–	–	103	135	24,210
A2	5325	12	2	1	1	–	3	–	–	–	–	–	–	7	1	5352
A3	4881	5	–	–	–	–	–	–	–	–	–	–	–	5	1	4892
A4	5207	–	–	–	–	–	1	–	–	–	–	–	–	1	–	5209
A5	3679	2	–	–	–	–	1	–	–	–	–	–	–	–	–	3682
A6	3881	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3883
A7	1483	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1483
A8	681	–	–	–	–	–	–	–	–	–	–	–	–	–	–	681
A9	693	–	1	–	–	–	–	–	–	–	–	–	–	–	–	694
A10	22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	22
A11	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
A12	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Total	68,606	664	99	33	34	3	30	1	8	1	16	1	1	156	167	69,820

Table 4.31 Tell Sabi Abyad, Operation III. Frequencies of plain and decorated Standard Ware by level (Estimated numbers of vessels represented, EVR)

	Plain	*Red-slipped*	*Painted*	*Incised*	*Impressed*	*Impressed & red-slipped*	*Applique*	*Applique & red-slipped*	*Painted & incised*	*Painted & impressed*	*RPB*	*Bitumen-painted*	*Red-slipped & bitumen*	*White-slipped*	*White-slipped & painted*	*Total*
D-Sequence	137	8	4	–	1	–	–	–	–	–	–	–	–	–	–	150
C-Sequence	47	11	–	–	–	–	–	–	–	–	–	–	–	–	–	58
B-Mixed	607	64	12	–	1	–	2	–	–	–	2	–	–	7	1	696
B1	16	1	–	–	–	–	–	–	–	–	–	–	–	–	–	17
B2	34	2	–	–	–	–	–	–	–	–	1	1	–	–	–	38
B3	21	1	2	–	–	–	–	–	–	–	1	–	–	–	–	25
B4	85	12	5	–	–	–	–	–	–	–	–	–	–	–	–	102
B5	36	3	–	–	–	–	–	–	–	–	–	–	–	–	–	39
B6	12	2	–	–	–	–	–	–	–	–	–	–	–	–	–	14
B7	19	1	–	–	–	–	–	–	–	–	–	–	–	–	–	20
B8	253	32	2	–	–	–	–	–	–	–	–	–	–	1	–	288
A-Mixed	475	–	–	–	–	–	–	–	–	–	–	–	–	–	–	475
A1	1567	45	2	–	2	–	–	–	–	–	–	–	–	19	15	1650
A2	439	4	–	–	–	–	2	–	–	–	–	–	–	1	–	446
A3	572	1	–	–	–	–	–	–	–	–	–	–	–	–	–	573
A4	649	–	–	–	–	–	–	–	–	–	–	–	–	–	–	649
A5	405	1	–	–	–	–	1	–	–	–	–	–	–	–	–	407
A6	525	–	–	–	–	–	–	–	–	–	–	–	–	–	–	525
A7	207	–	–	–	–	–	–	–	–	–	–	–	–	–	–	207
A8	108	–	–	–	–	–	–	–	–	–	–	–	–	–	–	108
A9	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	100
A10	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
A12	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Total	6317	188	27	0	4	0	5	0	0	0	4	1	0	28	16	6590

Table 4.32 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware vessel class for each decorative style (based on all coded sherds)

	Bowl	*Jar*	*Other*	*Pot*	*Uncertain*	*Total*
Red-slipped	118	96	–	2	113	329
Painted	25	22	–	–	22	69
Incised	–	23	–	–	2	25
Impressed	–	15	–	–	3	18
Impressed and red-slipped	–	3	–	–	–	3
Applique	1	12	–	2	1	16
Applique and red-slipped	–	1	–	–	–	1
Painted and incised	–	4	–	–	1	5
Painted and impressed	–	1	–	–	–	1
Red-painted-bands (RPB)	2	10	–	–	–	12
Bitumen-painted	–	1	–	–	–	1
Red-slipped and bitumen-painted	–	1	–	–	–	1
Plastered	2	66	1	–	23	92
Plastered and painted	8	39	–	3	67	117
Total	156	294	1	7	232	690

expression. At Tell Sabi Abyad this occurred by level A2, and it was certainly fully established by level A1, around 6335–6225 cal BC. Below we shall briefly discuss each of the decorative styles associated with Standard Ware in Operation III.

4.2.5.2. Red-slipped Standard Ware

Covering the vessel surface with a red slip constituted the most common way of decorating a Standard Ware vessel (Figs. 4.106 and 4.107). With the exception of two somewhat suspiciously early examples from level A5, red-slipped decoration with Standard Ware originated in very small numbers by level A3 (Table 4.30).[17] The idea of applying a red slip to Standard Ware pottery may have been borrowed from Fine Mineral Tempered Ware, which first began to be red slipped already in level A4 (see below, section 4.3). The proportions of red-slipped Standard Ware significantly increased in the next level A2, at the same time when many other decorative techniques were introduced. Applying a red slip became even more common in level A1 and remained common throughout the B-Sequence, including 3–14% of all Standard Ware (in terms of EVR). Following earlier work in Operation I, we know that red-slipped Standard Ware eventually disappeared at the end of the Transitional period (Operation I, level 4) (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007). Thus, the time-span of red-slipped Standard Ware at Tell Sabi Abyad can now be given with a fair degree of accuracy. It started around 6395–6375 cal BC (level A3), reached a peak in the few centuries between ca. 6300–6000 cal BC, and eventually disappeared entirely around 5900 cal BC.

That is not to say that the method of production of red-slipped Standard Ware was static through time. Subtle but clear differences can be observed between the red-slipped ceramics from the A-Sequence and those from the subsequent B-Sequence. Specifically, more than for Standard Ware as a whole, red-slipped Standard Ware became *finer* in terms of the fabrics prepared for its production. We have already seen that for the entire Standard Ware category there was significant variation in fabric and size for the various decorative categories: the red-slipped sub-category belongs to the 'finer', 'smaller' ranges of Standard Ware (Fig. 4.49). If we focus on this particular sub-category it becomes clear that these two properties largely arose after level A1.

A clear change is apparent, for instance, with regard to the choice of tempering materials (Fig. 4.50). Standard Ware, by definition was tempered with plant inclusions, but the amounts and types of these inclusions varied over time. In the A-Sequence, the large majority of the red-slipped Standard Ware was made of clay tempered with dense amounts of large plant inclusions. In contrast, the B-levels demonstrated a reduced proportion of coarsely plant-tempered red-slipped pottery. Typical for red-slipped Standard Ware in the B-levels became a dense amount of *small* plant inclusions. For many red-slipped Standard Ware vessels from the B-levels the potters used clays prepared with very low densities of plant inclusions. The potters perhaps moved from almost exclusively using copious amounts of chopped straw as a tempering material towards a more diverse range of tempering strategies, which perhaps included dung in addition to straw. Often, they kept the amounts of non-plastic additions to a minimum. They also reduced the wall thickness for red-slipped vessels somewhat. This may have been a form of stylistic elaboration, leading to more clearly defined vessel types in the later B-levels, but it may also have had a technological rationale as it reduced the risk of breakage during drying and firing.[18]

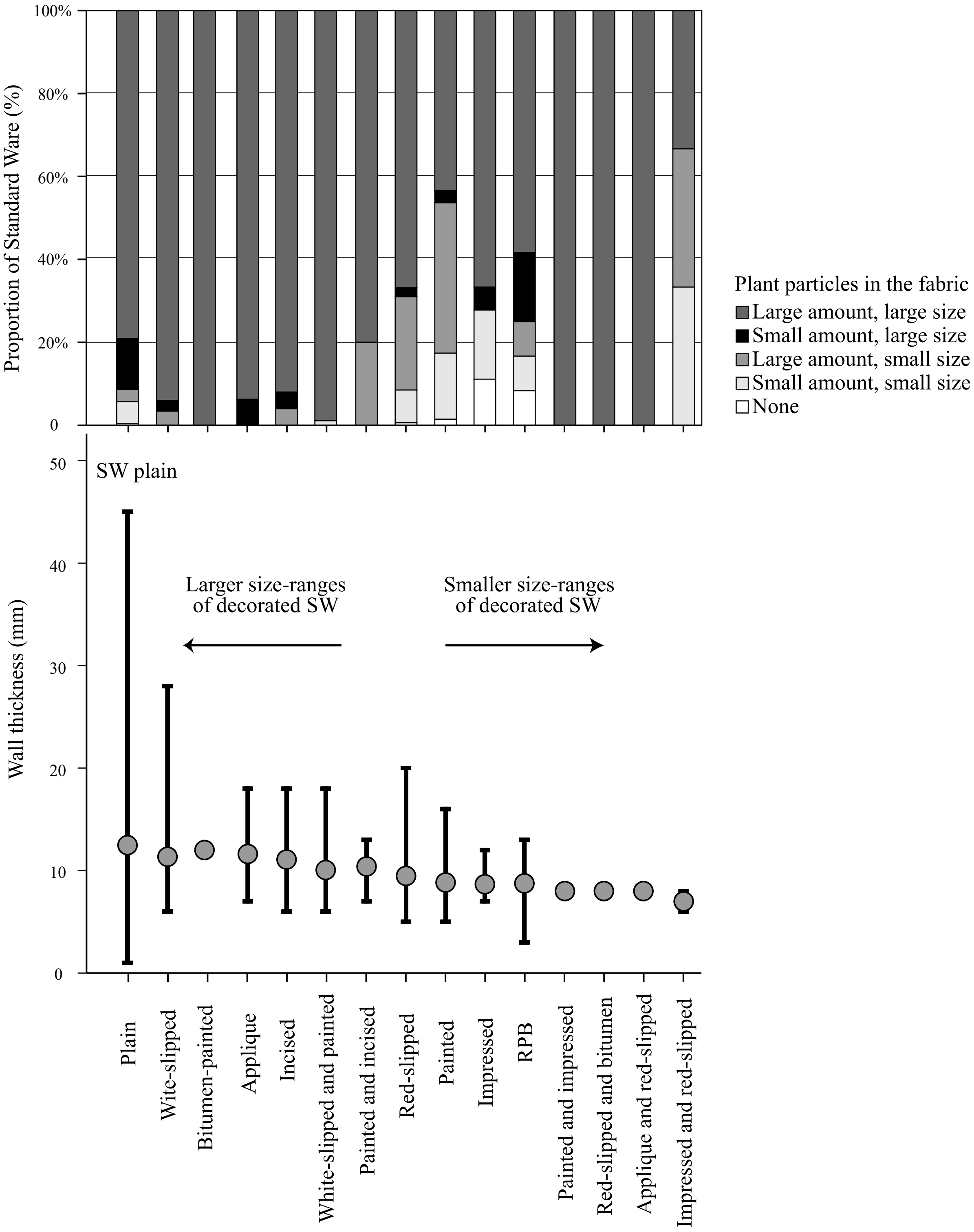


Fig. 4.49 Tell Sabi Abyad, Operation III. Relationships between Standard Ware decorative style, fabric and vessel size. Upper: fabric types of plain and decorated Standard Ware. Lower: high–low plot (minimum, maximum mean) of wall thickness of plain and decorated Standard Ware (based on all coded sherds).

These shifts developed along with an increasingly elaborated surface finishing. In the initial stages, in levels A3 to A1, most of the red-slipped Standard Ware was smoothed, but not usually burnished (Fig. 4.51). Occasionally the smoothing was quite roughly done, leaving faint traces of the process clearly visible. Initially the potters did not find it necessary to create an even, glossy surface texture. This changed after level A1. In the B-levels smoothing was no longer sufficient and the far majority of the red-slipped vessels were thoroughly

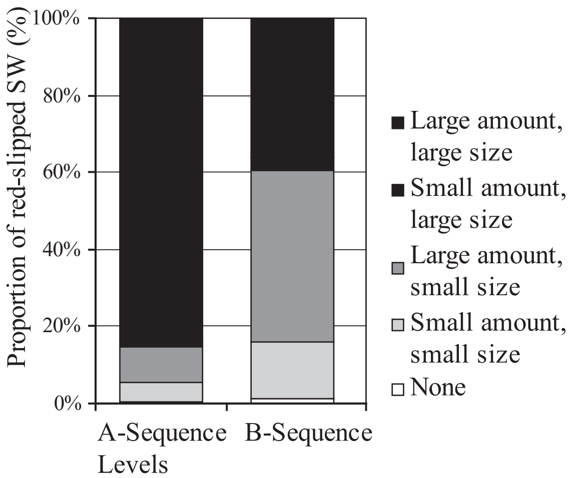


Fig. 4.50 Tell Sabi Abyad, Operation III. Tempering strategies for red-slipped Standard Ware in the A-Sequence and the B-Sequence (based on all coded sherds).

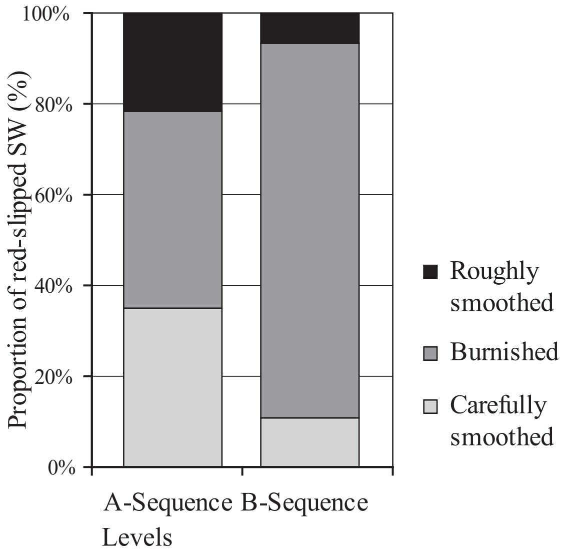


Fig. 4.51 Tell Sabi Abyad, Operation III. Surface treatment for red-slipped Standard Ware in the A-Sequence and the B-Sequence (based on all coded sherds).

burnished on both the inner and outer surfaces. This burnishing was usually done with great care to the extent that the individual strokes applied during the burnishing process usually are no longer visible.

The pigment used for the slip usually produced shades of red (10R4/6–4/8–5/6–5/8, 2,5YR4/6–5/6–5/8) or weak red (10R4/3–4/4–5/4). Less commonly we find dusky red (10R3/3–3/4), dark red (10R3/6), dark reddish brown (2,5YR3/3–3/4) or other shades or reddish brown. In the A-levels, however, some of the red-slipped pottery shows a curiously light surface colour, which disappears entirely in the B-levels. Changes in the selection and preparation of the raw materials may have caused such variability. Might some of the early slips have been made with calcareous pigments? Subtle shifts in the firing may also have played a role. The earliest red-slipped Standard Ware (in levels A3 and A2) usually had dark and incompletely oxidised cores. In contrast, the majority of examples from the B-levels show completely oxidised cores. This may be explained by the reduced wall thickness of red-slipped vessels in the B-Sequence, which facilitated complete oxidation during firing. But it is also possible that the potters changed their firing methods. The later part of the B-Sequence after all saw the introduction of Standard Fine Ware, which was fired in more advanced updraught kilns. Possibly red-slipped Standard Ware may have become better fired in the B-sequence.

We have already seen that red-slipped Standard Ware vessels were of a relatively small size in comparison to the larger family of Standard Ware (Fig. 4.49). The typological repertoire consists mostly of open vessels, or bowls of various types and sizes (Table 4.33). Closed vessels with a neck are present as well but these clearly represent a minority. No red-slipped pots have so far been attested. The red-slipped Standard Ware was fairly constant over time in terms of its vessel typology. The most common vessel shape by far was the convex-sided bowl, which came in different typological varieties (Table 4.33). A few vertical pots were found in the A-Sequence, a shape fairly common for undecorated Standard Ware in these levels; this type no longer occurs in the B-Sequence. A (single) carinated vessel was recovered from the B-Sequence, but we know from previous work in Operation I that carinated red-slipped shapes became somewhat more common by the later Pre-Halaf and Transitional stages (Nieuwenhuyse 2007, 163). Their virtual absence from the B-Sequence in Operation III is likely due to the limited sample size.

4.2.5.3. *Painted Standard Ware*

Painted Standard Ware was relatively uncommon in Operation III (Figs. 4.108: 1–15). Moreover, painting began relatively late in the sequence. With the exception of a single, somewhat dubious, example from level A9, and ignoring two isolated examples from level A2, painted Standard Ware quite abruptly appeared in level A1 (Table 4.30).[19] Painting continued through the B-Sequence until level B3. This corresponds with what we know from the excavations in Operation I, which showed that red-painted decoration occurred with Standard Ware until the early stages of the Transitional Period, after which it disappeared for good (Nieuwenhuyse 2007, 161, 163-166). Operation III also yielded limited numbers of painted Standard ware from the C and D Sequences, but these should be considered to be intrusive from older, Pre-Halaf levels. In levels A1 to B3, red-painted Standard Ware always constituted a very small proportion of the Standard Ware, never comprising more than a few percent.

The red-painted Standard Ware resembles the red-slipped variety in many ways. We find a comparable range of vessel shapes and sizes, and a closely comparable manufacturing method. We also find the same developments in ceramic technology. For instance, over time the red-painted pottery became ‘finer’ in terms of fabric. In levels A2 and A1 the red-painted variety still belongs to the comparatively ‘coarse’ range, as indicated by the

Table 4.33 Tell Sabi Abyad, Operation III. Frequencies of red-slipped Standard Ware vessel types by level (based on EVR)

	A5	*A3*	*A2*	*A1*	*B8*	*B7*	*B6*	*B5*	*B4*	*B3*	*B2*	*B1*	*Mix-B*	*C-Seq.*	*D-Seq.*	*Total*
Uncertain	–	–	–	2	3	–	–	1	3	–	–	1	1	1	2	14
Everted convex-sided bowl	–	1	–	10	3	–	–	–	–	–	1	–	11	–	–	26
Vertical convex-sided bowl	1	–	–	3	5	–	–	1	5	–	–	–	12	5	1	33
Closed convex-sided bowl	–	–	–	4	4	–	–	–	–	–	–	–	4	–	1	13
Large convex-sided bowl	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
Oval convex-sided bowl – vertical	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–	2
Oval convex-sided bowl – everted	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Straight-sided flat-based bowl	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
Straight-sided bowl – unspecified	–	–	–	5	3	–	–	–	–	1	1	–	4	2	–	16
Everted straight-sided carinated bowl	–	–	–	–	1	–	–	–	–	–	–	–	2	–	–	3
Vertical S-shaped bowl	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Closed S-shaped bowl	–	–	1	2	–	–	–	–	–	–	–	–	–	–	–	3
S-shaped goblet	–	–	1	1	1	–	–	–	–	–	–	–	1	–	–	4
Vertical pot	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	2
Jar – unspecified	–	–	–	3	–	–	–	–	–	–	–	–	2	–	–	5
Small jar	–	–	–	4	3	–	2	–	2	–	–	–	4	–	1	16
Medium-sized jar	–	–	–	3	1	1	–	–	–	–	–	–	1	1	–	7
Large jar	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Total	1	1	3	42	25	1	2	2	10	1	2	1	43	10	5	149

predominant use of clays tempered with a dense amount of large plant inclusions. In the B-Sequence, in stark contrast, painting became strongly associated with finer plant-tempered fabrics, as indicated by the presence of mainly small-sized plant inclusions (Fig. 4.52). As to surface treatment, in levels A2 and A1 painting was associated mostly with smoothed, even roughly smoothed surfaces, resulting in a dull appearance of the painted designs. In contrast, the pigments in the B-Sequence were invariably burnished to a glossy, shining texture (Fig. 4.53). The colours of the painted designs are exactly those of the red slip; almost certainly the same pigments were used. As regards the slipped Standard Ware, finally, the firing process indicates a shift in the B-Sequence towards a more completely oxidised firing practice.

The most common painted Standard Ware vessel shape consists of convex-sided bowls (Figs. 4.108: 2–4). They are followed by bowls with straight walls and those with a carinated profile (Fig. 4.108: 6). Interestingly, jars, too, were relatively common, especially in the earliest levels in which painted Standard ware occurs. Note that since most of the painted Standard Ware jar fragments were body sherds, they do not figure in the EVR estimates (Table 4.34). As with painted Standard Ware from Operation I (Nieuwenhuyse 2007, 164), which overlaps in time with the B-levels from Operation III, jars constituted a minority and most of the painted vessels were bowls. We gain the impression that painted Standard Ware began with the

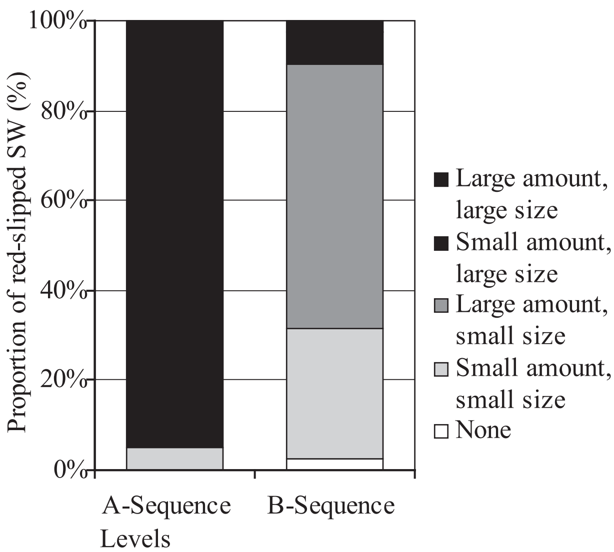


Fig. 4.52 Tell Sabi Abyad, Operation III. Tempering strategies for red-painted Standard Ware in the A-Sequence and the B-Sequence (based on all coded sherds).

production of (mostly) jars (level A1) and subsequently (B-Sequence) largely shifted to bowls.

The red-painted Standard Ware style qualifies as a ‘bounded’ style (Pl. 10.1). This term derives from the analysis of the decorative styles associated with the Fine Wares that emerged during the Transitional Period (Akkermans 1993; Nieuwenhuyse 2007). With these later styles, motifs were invariably attached ('bounded') to horizontal or, very occasionally, vertical structural lines. As to the painted Standard Ware, we have so far not uncovered a single example of an isolated, unbounded, 'free-floating' motif. Motifs were always placed *against* something. Horizontal lines in most cases demarcated the (top of the) rim, although they tended not to extend much below the rim. Collared vessels (jars) always seem to have had a painted band on the shoulder. The neck of the jar was in fact often completely slipped, forming a structural boundary for the motif painted on the body (e.g. Fig. 4.108: 10). With bowls, often the interior surface was slipped and the exterior motif reached up to the rim. In its emphasis on bounded motifs the red-painted Standard Ware acts as a direct precursor of the later Fine Ware styles (Nieuwenhuyse 2007).

Yet, even if the overall design effect leaves the strong impression of 'boundedness', this may not in all cases have been intended as such. Interestingly, in some cases the potters reached the effect without painting lines. This appears to have been the case when they painted the solid triangles motif in two or sometimes three zones on the same vessel. In such cases they often did not use painted lines to define these zones horizontally. Rather, they placed the motifs on the vessel such that they overlapped somewhat; the parts that overlapped then gave the impression of horizontal 'lines' (e.g. Fig. 4.108: 1).

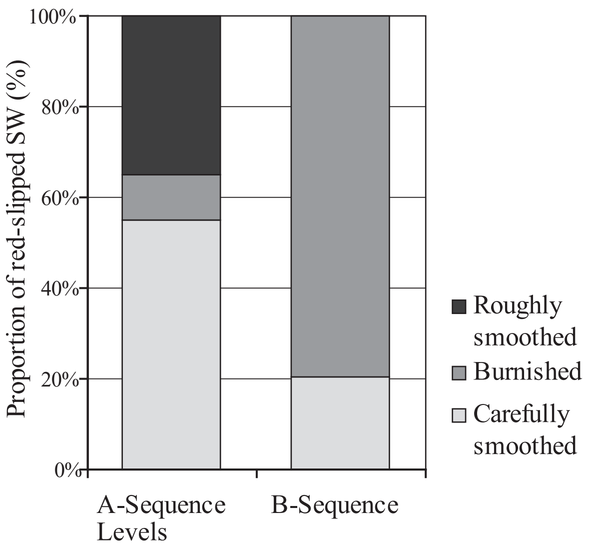


Fig. 4.53 Tell Sabi Abyad, Operation III. Surface treatment for red-painted Standard Ware in the A-Sequence and the B-Sequence (based on all coded sherds).

Multiple decorated divisions upon the same vessel were in any case exceptional for this pottery. Operation III yielded less than a handful of examples of painted Standard Ware that showed more than a single motif on the same pot ($n = 4$). These all came from relatively late in the sequence. The earliest painted Standard Ware (levels A2–B5) displays exclusively a single decoration zone. It was not before level B4 that for the first time we find examples showing two vertically arranged zones. From level B3 came a few vessels that displayed three such zones (Figs. 4.108: 1, 3). In this regard, too, the painted Standard Ware foreshadows subsequent developments evinced with the painted Fine Wares, which furthermore would show a trend towards increasing design complexity through time (Nieuwenhuyse 2007, 191–192).

The range of painted motifs, finally, was not very large. Six motifs have been identified so far from Operation III (Table 4.35). The motif most often used was a horizontal row of solid triangles. Second in frequency are the same triangles but with the empty triangular spaces between them filled with diagonal lines. Other characteristic motifs include diagonal stripes, diagonal crosshatching, diagonal lines in alternating direction and zigzags alternating with concentric triangles.

4.2.5.4. Incised Standard Ware

Incised decoration is not very common in Operation III (Pl. 10.2: 1, 3, 7). The excavations yielded just over thirty examples ($n = 33$). Most of these were recovered from the B-Sequence; Incised Standard Ware began relatively late in this sequence. If we disregard a single incised sherd from level A2, incised Standard Ware was introduced only by level A1. No examples were recovered from the uppermost B-levels, and this corroborates the existing data from Operation I (Nieuwenhuyse 2007, 166–169). At Tell Sabi Abyad the Incised Standard Ware as a decorative style belongs to the Pre-Halaf period and the early stages of the Transitional Period (Figs. 4.109:8-16).

Table 4.34 Tell Sabi Abyad, Operation III. Frequencies of painted Standard Ware vessel types by level (based on EVR)

	A1	*B8*	*B4*	*B3*	*Mix-B*	*C-Seq.*	*D-Seq.*	*Total*
Uncertain	–	–	1	–	–	1	–	2
Everted convex-sided bowl	–	–	1	–	–	–	–	1
Vertical convex-sided bowl	–	–	1	–	5	–	2	8
Closed convex-sided bowl	–	1	1	–	–	–	–	2
Everted straight-sided bowl – unspecified	1	1	–	–	1	–	2	5
Vertical straight-sided carinated bowl	–	–	–	1	–	–	–	1
Low carinated bowl	–	–	–	–	1	–	–	1
Closed S-shaped bowl	–	–	–	–	1	–	–	1
Medium-sized jar	–	–	–	1	–	–	–	1
Total	1	2	4	2	8	1	4	22

Table 4.35 Tell Sabi Abyad, Operation III. Frequencies of painted Standard Ware vessel painted motifs by level (based on all coded sherds)

		A9	*A2*	*A1*	*B8*	*B6*	*B5*	*B4*	*B3*	*Mix-B*	*D-Seq.*	*Total*
	Diagonal lines	–	–	2	2	–	1	1	–	1	1	8
	Diagonal crosshatching	–	–	5	1	–	–	–	–	1	–	7
	Solid triangles pointing up	–	–	5	1	–	1	3	5	–	2	17
	Solid triangles pointing up with diagonal lines	–	–	–	–	–	–	2	–	3	2	7
	Alternating diagonal lines	–	–	–	–	–	–	1	1	1	1	4
	Horizontal zigzags alternating with concentric triangles	–	–	–	–	–	–	–	–	1	–	1
Eroded		1	2	4	11	1	2	–	–	7	–	28
Total		1	2	16	15	1	4	7	6	14	6	72

Incised Standard Ware is rather homogeneous in terms of ceramic technology and vessel shape. The vessels fall into the 'coarser' ranges of Standard Ware production. This comes forward from the clay used to shape the vessels, which was mostly tempered with coarse plant inclusions (Fig. 4.49). It is also apparent in the coarse surface finishing of the vessels. The potters almost never took the effort to burnish the surface of an incised vessel, and they usually stopped at giving it a rough smoothing. The incised decoration, furthermore, shows a strong association with a specific vessel class, the jar. It remains hazardous to reconstruct vessel types for this category, as all examples from Operation III are body sherds. Taking their curvature into account, as well as the characteristically coarse finishing of the interior surface, most of these must have belonged to closed vessels. Some of these sherds show the beginning of a shoulder leading to the neck. What is more, the relative thickness of these sherds clearly suggests that these vessels were comparatively large (Fig. 4.49). Their cores are more often dark resulting from incomplete reduction in the firing than, for instance, red-slipped or painted Standard Ware. This also fits with the characteristics of the incised Standard Ware from Operation I (Nieuwenhuyse 2007, 167).

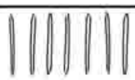
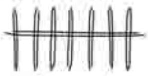
In all respects then, the incised Standard Ware from Operation III resembles the earlier material from Operation I. What the new excavations have made clear is that these properties and associations were part of this category from its very beginning in level A1. In the range of design configurations, too, the incised pottery from the two excavated areas closely resemble each other. The incised style is straight-forward and simple: a singular motif was scratched into the clay. The range of incised design configurations was very limited, with only seven different motifs attested (Table 4.36). Many of these are variations on the same theme, parallel lines. There is little evidence to suggest that the potters attempted more elaborate design structures, although we stress that the fragmented nature of the material may obscure latent design complexity. With few exceptions the motifs all seem to have been unbounded and 'free-floating', unlike the red painted Standard Ware. Operation III yielded just a single exception, coming from level B3. This vessel shows two vertically arranged and bounded decoration zones containing triangular design configurations. Interestingly, this unique vessel resembles the painted Standard Ware from this level in the choice of motif and the use of bounded structure (Fig. 4.109: 8).

4.2.5.5. Impressed Standard Ware

Impressed Standard Ware was relatively uncommon (n = 34). Its distribution in the Operation III sequence mirrors that of the incised Standard Ware (Figs. 4.109: 1–7). With the exception of a single impressed sherd from level A2, this decorative category also began by level A1 and continued through the early stages of the B-Sequence (Table 4.30). This fits well with the evidence from Operation I (Nieuwenhuyse 2007, 169–172). The chronological distribution of incised Standard Ware was limited to the Pre-Halaf period and to the early stages of the Transitional Period.

In contrast to the incised group, however, the impressed variety of Standard Ware is less homogeneous in terms of its manufacturing method. First, the potters used different tempering strategies for making impressed Standard Ware

Table 4.36 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware incised design configurations by level (all sherds coded).

		A2	A1	B8	B4	B3	Mix-B	C-Seq.	D-Seq.	Total
	Horizontal row of vertical lines	–	–	–	–	–	1	–	–	1
	Horizontal row of diagonal lines	–	2	3	1	–	1	–	–	7
	Irregular wavy lines	–	–	–	–	1	1	–	–	2
	Single horizontal line crossed with vertical or diagonal lines	–	2	–	–	–	–	–	–	2
	Horizontal row of triangles filled with diagonal lines	–	–	–	–	2	–	–	–	2
	Singular triangle of converging lines pointing down	–	1	–	–	–	–	–	–	1
	Horizontal row of triangles of converging lines pointing down	–	–	1	–	–	1	–	–	2
Eroded		1	–	3	3	–	7	2	1	17
Total		1	5	7	4	3	11	2	1	34

(Fig. 4.49). Most of the impressed pottery was quite coarse, but finer, more compact plant-tempered fabrics are also seen, and some impressed Standard Ware shows no macroscopically visible plant inclusions whatsoever. The surfaces were on the whole never burnished, but the surface finishing was done with more care than seen with the incised pottery. As with the incised pottery, impressed decoration is found exclusively on a single vessel shape, the jar. However, the impressed sub-category may be associated with jars of smaller size, as indicated by a somewhat reduced wall thickness (Fig. 4.49).

The diversity seen in the clay fabrics is also relevant to the way the impressions were made (Pl. 10.2: 4, 5, 8). It is emphasised that the pottery presented here as a single category – 'impressed' – was in fact quite variable in its technological aspects. The term covers a diversity of tools and micro-styles, and future work may well reveal convincing sub-categories. Most commonly uncovered was a type of impressions that we have provisionally termed 'comb-impressed', although the precise tool used remains to be identified. These typically show horizontal bands of diagonally oriented or, rarely, vertically oriented strokes (Figs. 4.109: 5–6). Decorative elements are often vertically arranged in multiple horizontal bands in alternating diagonal orientation, so that the impressed strokes form zigzags. Other varieties documented in Operation III show impressions made with a flat-topped, circular stick (ca. 0.6 cm in diameter) (Fig. 4.109: 2), impressions with a sharp triangular tool, and impressions with a pointed circular tool. The latter was used to stab tiny dots into a regular zigzag-like pattern (unfortunately not entirely preserved) (Fig. 4.109: 1).

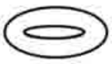
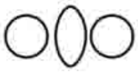
4.2.5.6. Appliqué Standard Ware

Appliqué decoration, too, was not very common with Standard Ware; Operation III yielded some 30 examples (Table 4.30; Figs. 4.110: 1–10). The exact proportion is difficult to estimate, but it will have been less than 1% of all Standard Ware. As with the incised and impressed pottery, appliqué decoration starts more or less by level A1. Operation III yielded two very early examples, from levels A5 and A4 (Figs. 4.110: 2, 6, resp.). It would be easy to dismiss these as intrusive from a later context, but in terms of shape, surface treatment and fabric type they would not be out of place in the levels in which they were found. On the whole, however, appliqué decorated Standard Ware is characteristic for the Pre-Halaf phase and the early part of the Transitional Period (Nieuwenhuyse 2007, 174–177).

Appliqué at Tell Sabi Abyad was clearly associated with the coarser varieties of Standard Ware. This is attested by the prevalence of using a coarse plant-tempered fabric (Fig. 4.49), the dark, incompletely oxidised cores, and a roughly textured, irregularly finished exterior surface. The appliqué decorated Standard Ware was never meticulously smoothed or even burnished. Vessel shapes invariably were closed shapes, and largely included just one vessel type, the jar. In addition, some examples of vertical pots with an appliqué were recovered. To the degree that their sizes can be estimated, these vessels tend to be large and thick-walled.

The design structure was straight forward (Pl. 10.2:2, 6). Appliqué motifs were either placed on the shoulder (jars) or close to the rim (vertical pots). They were never bounded and always appeared as isolated, 'free-floating' design configurations. Some ten different design configurations or motifs were documented in Operation III (Table 4.37). Most of these consist of singular, geometrical elements, but combinations are occasionally found of circular and ovoid blobs, or of several circular blobs arranged in rows. Circular blobs and crescents

Table 4.37 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware appliqué design configurations by level (all sherds coded)

		A5	*A4*	*A2*	*A1*	*B8*	*B6*	*B5*	*B4*	*Mix-B*	*D-Seq.*	*Total*
	Single circular blob	–	–	–	–	–	–	–	–	2	–	2
	Horizontal coffee bean	–	–	–	1	–	–	–	–	–	–	1
	Single crescent pointing down	–	–	–	–	–	–	–	1	1	–	2
	Single crescent pointing up	–	–	–	–	–	–	–	–	4	–	4
	Vertical ovoid and two circular blobs	–	–	–	1	–	–	–	–	–	–	1
	Two horizontally-arranged horizontal blobs	–	–	1	–	–	–	–	–	–	–	1
	Three diagonally arranged horizontal blobs	–	–	1	–	–	–	–	–	–	–	1
	Double row of six circular blobs	–	1	–	–	–	–	–	–	–	–	1
	Singular vertical Z	1	–	–	–	–	–	–	–	–	–	1
Eroded		.	.	1	2	4	1	1		4	3	16
Total		1	1	3	4	4	1	1	1	11	3	30

form the most common appliqué motifs. Operation III yielded no examples of figurative appliqué motifs as known from other Upper Mesopotamian sites such as Umm Dabaghiyah (Kirkbride 1972) or Shir (Bartl and Nieuwenhuyse 2008; Nieuwenhuyse 2009a).

4.2.5.7. Bitumen-painted Standard Ware

Operation III yielded a single example of a bitumen-painted Standard Ware sherd (Fig. 4.109: 24). This was a neck fragment of a small jar from level B2. The somewhat eroded surface shows traces of a single, diagonal line extending from the rim to the shoulder. A second example came from the fill of a Late Bronze Age burial (because of its mixed context it was not included in Table 4.30). The burial was dug through deposits attributed to level B1, and quite possibly the fragment came from that level. This fragment was a base fragment and most likely belonged to a bowl or small goblet, showing vertical bands on the body. Both items closely resemble the bitumen-painted Standard Ware recovered earlier from Operation I (Nieuwenhuyse 2007, 177–179). A provenance study has suggested that the bitumen originally came from northern Iraq (Connan *et al.* 2004). Used as a pigment for painting pottery, the bitumen may have been applied when the vessels were still lukewarm from the oven, melting the bituminous lumps used as a crayon. This reconstruction is based on the ethno-archaeological observations of Matson (Matson 1983, 623) in northern Iraq in the 1950's. In the village of Diyana he saw potters using this technique to create a style that closely resembled the Late Neolithic bitumen-painted Standard ware.

4.2.5.8. Standard Ware decorated with combined techniques

Characteristic for decorated Standard Ware vessel was the use of just one technique for a particular vessel or group of vessels. Combinations of different decorative techniques on the same vessel were usually avoided. But we do have a few examples of different techniques used in combination on the same vessel (Figs. 4.109: 17–23, 25; 4.110: 11–13). Most of these come from the red-slipped or red-painted part of a vessel in combination with impressing, incising, appliqué, or bitumen-painting (Fig. 4.54). The slips and paints were usually burnished, yielding a regular surface and a glossy texture. Combinations of incisions, impressions and appliqué motifs have so far not been observed in Operation III, but these are known (in very small numbers) from Operation I (Nieuwenhuyse 2007, 159–160); their absence from Operation III is likely due to the small sample size. With the single exception of an appliqué-and-slipped vessel from level A1, all examples of combined technologies come from the B-Sequence. The Pre-Halaf and, in particular, the early part of the Transitional Period were when combined techniques were the most popular (Nieuwenhuyse 2007, 160).

Five examples of a red slip in combination with several other techniques were counted (Table 4.30): with impressions, with appliqué, and with a bitumen-painted motif. All examples were body sherds that likely belonged to small jars or goblets. This included three examples of red-slipped and impressed sherds. It is not always clear if the slip was applied before or after the impressions. In one instance, the slip covered the impressions and

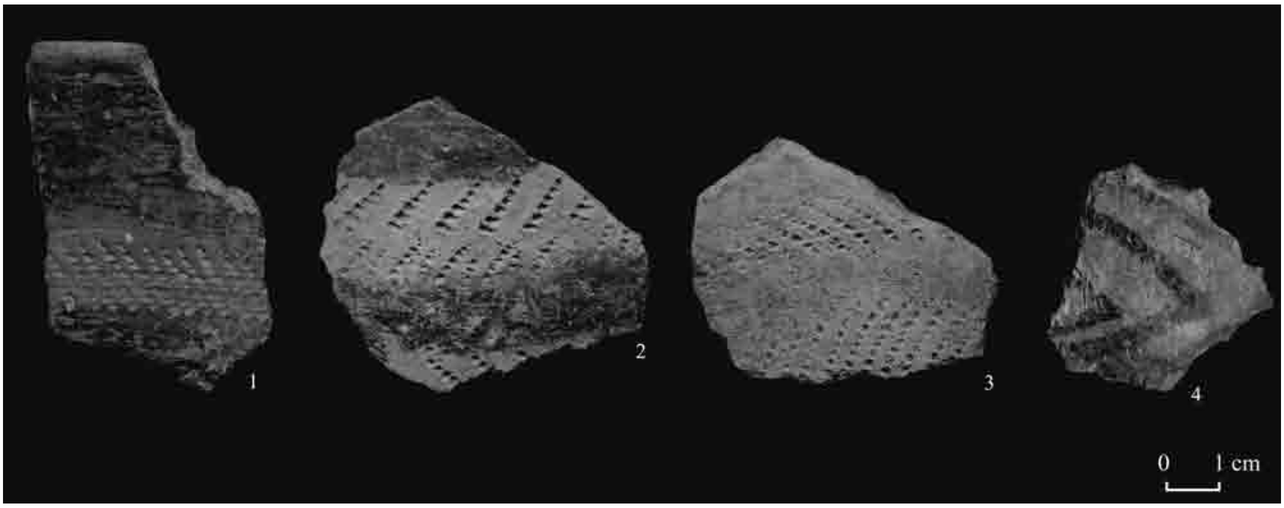


Fig. 4.54 Tell Sabi Abyad, Operation III. Examples of Standard Ware decorated with combined techniques. 1–3: Red-painted and impressed in alternating bands ('RPB'). 4: Red-slipped and bitumen-painted (no. 1: Fig. 4.109: 21; no. 2 K5 40-88:1, body sherd of a jar, from a level B1 generall fill layer; no. 3: Fig. 4.109: 19; no. 4: Fig. 4.109: 25).

consequently can only have been applied after the impressing; in another case the impressions were not slipped, and were made only after the slip.

Special attention is drawn to a short-lived decorative combination characteristic for the later stages of the Pre-Halaf and the early part of the Transitional Period. This is the so-called 'red-painted and impressed in alternating bands', or simply RPB (Nieuwenhuyse 2007, 172–174). In Operation III the RPB examples were limited to the uppermost B-levels B4 to B1. These show horizontal bands of burnished red paint stacked above each other with diagonal comb-impressed strokes between each band (Figs. 4.54: 1–3). The impressions are the same as those seen with the comb-impressed Standard Ware; the difference lies in their arrangement in bounded horizontal zones. Vessel shapes associated with the RPB style include straight-sided bowls and small types of jars.

4.2.5.9. White-slipped and white-slipped-and-painted Standard Ware

An intriguing Standard Ware group was set apart because of what appeared to be a deliberate, purposeful application of a thin, white coating. In some instances, this coating functioned as a background for red-painted motifs (Figs. 4.111: 1–21, 4.112: 1–4). Similar looking pottery had in fact already been observed in the Pre-Halaf levels of Operation I (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007, 159), but at the time the small sample was not wholly convincing. A preliminary archaeometric analysis of the raw materials and technologies involved suggests that this single group exhibits some technological diversity. While some sherds appear to have received a self-slip, others were given a thin calcareous coating or a sulphurous, gypsum coating (Chapter 7). In the field we did not attempt to make such sub-distinctions on visual inspection alone and we kept them in the categories of 'white-slipped' or 'white-slipped-and-painted' Standard Ware.

Admittedly, distinguishing between a white plaster 'slip' and (the remains of) a white plastered surface presented difficulties. Well-preserved slips and plasters may be distinguished by taking the properties of thickness, distribution and surface coarseness into consideration. Thus, sherds were counted as 'slipped' in the case of a thin, regular, and evenly distributed surface coating; they counted as 'plastered' in the case of a more uneven distribution of irregular thickness. Gypsum plasters in Operation III generally were thick and coarse (Chapter 6). Complicating matters, gypsum plasters have the tendency to flake off, leaving a fugitive whitish ghost layer easily interpreted as a 'slip'. In addition, sherds may have accumulated a post-depositional calcareous crust that may appear surprisingly similar. Statistics for the frequencies of white-slipped Standard Ware should be treated with a healthy measure of scepticism.

This issue is more than a matter of semantics. Counts for plastering and white-slipping show a markedly different chronological distribution. While a rough plaster coating occurs already quite early in the Operation III sequence (Chapter 6), a thin plaster employed as a slip was introduced only much later. With the exception of a single possible example from level A4, white-slipped Standard Ware does not occur before levels A3 and A2. In these two levels, white-slipped sherds occur in limited numbers. The real breakthrough of white-slipped Standard Ware was in level A1 (Table 4.30). In these levels between 1% and 2% of all Standard Ware gained a white slip (including white-slipped-and-painted items). Intriguingly, the practice largely disappeared very soon thereafter. A few examples were recovered from level B8 but only a minimal fraction came from any of the younger levels. Given the steady increase in decorated ceramics in these levels, the desirability of a white slip as a contrasting surface background for painted designs might seem to be self-evident. A drawback of a white plaster slip that was applied after the firing, may have been its higher susceptibility to wear and tear in comparison with the pre-firing strategies which the potters subsequently preferred for their slips and paints.

This category falls within the 'coarser' ranges of Standard Ware production. The white-slipped Standard ware is associated with a fabric heavily tempered with coarse plant inclusions (Fig. 4.49). However, vessels selected for white slipping seem to have been more carefully finished than the average Standard Ware in level A1, often resulting in a regular, evenly smoothed surface. The thin plaster coating resulted in surface colours ranging from white (2.5YR8/1, 10YR8/1) or very pale brown (10YR7/4–8/3) to pinkish white (5YR8/2, 7.5YR8/2) or pink (7.5YR7/3–8/4). Seen from a distance these containers must have stood out for their clear, light-coloured appearance.

Associations with specific vessel shapes should be treated with caution, as most of the recovered examples were body sherds. On the basis of their curvature, wall thickness and poorly finished interior surface, most of these sherds would have belonged to closed shapes, either hole mouth pots or jars. If we take only the EVR into account, jars and bowls were equally often white slipped (each ca. 40% of all white-slipped Standard Ware) while some 20% were vertical pots. The pottery was relatively thick-walled in comparison to other categories of decorated Standard Ware (Fig. 4.49). Vessels in this category were relatively tall and voluminous.

The chronologically restricted distribution of white-plastered Standard Ware to levels A1 and B8 must be seen in the context of another distinctive decorative technology in the same levels, white-slipped-and-painted Standard Ware. Given the fragmented state of the material, it is likely that at least some of the white-slipped pottery, too, originally held red-painted designs. White-slipped-and-painted decoration was also associated with the 'coarser' ranges of Standard Ware production, as seen in the predominant use of a coarse plant-tempered fabric, dark, incompletely oxidised cores, and a somewhat increased wall thickness. The chronological restriction of white-slipped-and-painted Standard Ware makes this pottery a sensitive chronological marker for the very early stage of the Pre-Halaf period at Tell Sabi Abyad.

Interestingly, the painted designs were often applied *after* the firing (Chapter 7). The paints were often used in a rather viscous condition: we have quite a few examples that show extensive dripping (e.g. Fig. 4.112: 1). After drying, this left a characteristic matte painted surface, in shades of red (10R4/6–8, 5/6–8) to weak red (10R4/3–4, 5–4) or reddish brown (2.5YR4/4, 5YR5/4). As both the unfired pigment and the underlying plaster slip were quite susceptible to erosion, the designs are often greatly worn. In many instances it is difficult to 'read' the design configurations, and occasionally it is even difficult to ascertain unequivocally if a painted design was originally present at all.

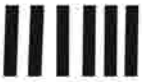
Table 4.38 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware vessel types associated with white-slipped and white-slipped and painted decoration (based on EVR)

Type	*White slipped*	*White slipped & painted*	*Total*
Uncertain	6	–	6
Everted convex-sided bowl	1	1	2
Vertical convex-sided bowl	3	–	3
Closed convex-sided bowl	1	–	1
Everted straight-sided bowl – unspecified	1	1	2
Closed S-shaped bowl	1	–	1
S-shaped goblet	1	–	1
211 Vertical pot	3	–	3
Jar – unspecified	1	1	2
Small jar	4	4	8
Medium-sized jar	3	4	7
Re-used jar neck	–	1	1
Total	25	12	37

The range of vessel shapes is fairly limited. By far the largest category of sherds represent body sherds from closed vessel types, most likely jars. Jars constitute the largest class of both white-slipped and white-slipped and red-painted Standard Ware vessels if terms of EVR (Table 4.38). The excavations yielded one example of a re-used jar neck (Fig. 4.112:4). There were no examples of any appendage such as lugs or handles. In terms of vessel size the white-slipped-and-painted vessels were intermediate between other decorated categories. Their rim diameters are not particularly large, and range between 8 and 18 cm. The jars in this group are either small jars or medium-sized jars.

The lack of complete vessels makes it hazardous to generalise regarding to the overall design structure and design configurations. What appears to be clear in any case is that both were kept to a basic level (Pl. 20.2). Not a single example was found demonstrating more than just a single design motif. The emphasis was on painting large, singular fields that occupied the entire upper body of the vessel and often extended a good part onto the lower body. There was virtually no attempt to differentiate the vessel surface in distinct decoration zones, even if the potters did emphasize specific points of the vessel contour. Occasionally, the lip of the rim was the only vessel part that was painted (e.g. Figs. 4.111: 8–12), and some examples may have had only the shoulder painted. In most cases the shoulder was left unmarked (Figs. 4.112: 1–3). We counted just one or two examples where the potters appear to have purposely demarcated the point of maximum vessel diameter. The range of design configurations was very limited (Table 4.39). Just three or four motifs are observed: diagonal crosshatching, solid triangles pointing upwards, and parallel lines in either a vertical or a diagonal position.

Table 4.39 Tell Sabi Abyad, Operation III. Frequencies of Standard Ware white-slipped and painted design configurations by level (all sherds coded)

		A3	A2	A1	A-mix	B8	B5	B2	B-mix	C-Seq.	D-Seq.	Total
	Diagonal crosshatching	–	–	8	1	1	–	–	3	–	1	14
	Parallel diagonal lines	1	–	1	–	–	–	–	–	–	–	2
	Parallel vertical lines	–	–	5	–	2	–	–	–	–	–	7
	Solid triangles pointing up	–	–	–	11	–	–	–	–	–	–	11
Eroded		–	1	34	–	6	1	1	9	1	–	53
Total		1	1	48	12	9	1	1	12	1	1	87

4.3. Early Mineral Ware

4.3.1. The field definition of Early Mineral Ware

In the field, sherds were attributed to the *Early Mineral Ware* category if they shared the following characteristics: a) a strongly mineral-tempered fabric, b) the absence of plant inclusions in the fabric, c) a regular wall thickness, and d) a well-finished, smoothed or burnished vessel surface. Complicating this definition, the same rather general characteristics define a suite of other mineral-tempered categories at Tell Sabi Abyad, such as Fine Mineral Tempered Ware, Grey-Black Ware, Dark-Faced Burnished Ware and Mineral Coarse Ware. However, the much higher volume proportions of the mineral inclusions, the simple vessel shapes, the characteristic decoration and the texture of the sherds allow a fairly safe distinction to be made. A further characteristic emerged in the course of the analysis: the distinctive nature of the mostly dark (basalt) inclusions (Chapter 5).

As reflected in the name we eventually adopted for this category, the mineral-tempered category characterises the very earliest stages of ceramic production at Tell Sabi Abyad currently known. We adopted the term *Early Mineral Ware* simply as a generic field category to cover this group as a whole. Already in the field it was clear that this category incorporated variation in colour of both surface and fabric, as well as in the densities and sizes of the mineral inclusions. Future work may show that this general category merits subdivision.

The pottery from Operation III presented here with the term *Early Mineral Ware* was in fact previously excavated some years before the work in Operation III began. At the nearby site of Tell Sabi Abyad II the uppermost level at this site (level 1) consisted of an ash-filled pit yielding coarse ceramics characteristic of the Early Pottery Neolithic (Van As *et al.* 2005; Verhoeven and Akkermans, eds., 2000). The level immediately below, level 2, was attributed to the Late PPNB (Akkermans and Verhoeven 2000, 1). However, very small numbers of sherds were in fact recovered from level 2. With the benefit of hindsight, we would now classify these as Early Mineral Ware; at the time they were not recognised for what they were. As they were found in very limited quantities, and because they deviated so strongly from everything we had seen thus far, they were duly explained away and put apart as 'post-Neolithic intrusions'. As a consequence, they were simply omitted from the report (Nieuwenhuyse 2000b). The excavations in Operation III at Tell Sabi Abyad I and the soundings at Tell Sabi Abyad III then brought home the point that this 'intrusive' material in fact represented a genuine, distinct Late Neolithic ceramic category (Nieuwenhuyse *et al.* 2010).

4.3.2. The Early Mineral Ware sample

The Early Mineral Ware in Operation III was limited to the levels constituting the A-sequence. The total extant sample remains quite limited (n = 190). Most early mineral-tempered sherds identified at Operation III, some 64%, come from levels A12 to A10 (Table 4.40). Within these levels this pottery represents the main ceramic category (Nieuwenhuyse *et al.* 2010). Another 13% come from mixed contexts at the interface between levels A12 to A10 and the immediate levels above (mostly level A9). Thus, some 80% of the material either was recovered from the earliest levels excavated at Operation III or can be associated with these levels.[20] Additional examples were recovered from much later contexts as well, scattered through levels A8–A1. In these later levels, however, they comprise a minute faction of the overall ceramic assemblage, and they may very well be intrusive from the older levels.[21]

The Early Mineral Ware on the whole is severely fragmented. Not a single complete vessel was found, and the excavations yielded only a single complete profile (Table 4.40). The average radius of the Early Mineral rim sherds is 25°: on average less than 10% of the rim is preserved. The largest radius surviving from the Early Mineral Ware rim fragments studied so far measures just

Table 4.40 Tell Sabi abyad, Operation III. Frequencies of Early Mineral Ware by level (based on Raw Counts)

Level	Section	Rim sherd	Body sherd	Base sherd	Other	Total
A1	–	2	–	1	–	3
A4	–	1	1	–	–	2
A5	–	–	1	–	–	1
A6	–	–	2	–	–	2
A7	–	2	8	–	–	10
A8	–	1	1	–	–	2
Mixed A7–A9	–	–	2	–	1	3
Mixed A9–A11	–	2	18	1	–	21
A9	–	1	23	–	–	24
A10	1	18	68	2	1	90
A11	–	5	6	–	–	11
A12	–	3	17	1	–	21
Total	1	35	147	5	2	190

50°; this specimen has no more than 14% of the original orifice preserved. This category displays a rather low BMI spectre (Chapter 3): in the three Initial Pottery Neolithic levels the average Early Mineral Ware body sherd weighs a mere 21 grams. These low measurements may reflect the find contexts of EMW from Operation III, which were recovered mostly from out-doors, frequently trampled open areas or from the fill of architectural platforms. In addition, the severe fragility of this low-fired, heavily mineral-tempered ware certainly contributed to its high degree of fragmentation.[22]

4.3.3. *The Early Mineral Ware* chaîne opératoire

For the production of Early Mineral Ware, the potters prepared a clay fabric strongly tempered with mineral inclusions. Plant temper, in contrast, is virtually absent.[23] In the field most sherds were described as having a large amount of mineral inclusions of large sizes. The macroscopic observations in the field suggest two major types of mineral inclusions, *viz*, dark-grey to black angular inclusions and large greyish-white lumps of limestone. Petrographic studies suggest that the former constitute crushed basalt (Chapter 5). These two types of mineral non-plastic occur in various proportions but always in huge densities, occasionally reaching over 45% by volume.

It is perhaps likely that the potters used coils to shape the vessels, but pinching the vessel from a lump of clay may also have been employed, especially for the smaller vessels. EMW vessels were relatively thick-walled (Table 4.45). Traces of the primary shaping techniques are difficult to identify, as secondary shaping stages obliterated all earlier traces. Early Mineral Ware was very carefully finished, in particular on the exterior surface. The interiors were much less often burnished, although in most cases they were at least carefully smoothed. The interiors more often were left roughly smoothed, and in some cases traces of finger pressing can still be observed.

Table 4.41 Tell Sabi Abyad, Operation III. Early Mineral Ware firing circumstances (based on all coded sherds)

	Frequency	%
Completely oxidised	73	42.7
Strongly reduced dark core	34	19.9
Completely reduced throughout	36	21.1
End-reduction	28	16.4
Total	171	100.0

Table 4.42 Tell Sabi Abyad, Operation III. Frequencies and percentages of Early Mineral Ware exterior surface colour (Munsell; based on diagnostic sample)

	N	%
Very dark grey (10YR3/1)	2	5.4
Dark grey (10YR4/1)	1	2.7
Grey (10YR5/1–6/1)	2	5.4
Greyish brown (10YR5/2)	2	5.4
Light greyish brown (10YR6/2)	4	10.8
Pale brown (10YR6/3)	3	8.1
Light yellowish brown (10YR6/4)	3	8.1
Light grey (10YR7/2)	2	5.4
Very pale brown (10YR7/3–8/3)	6	16.2
Light brownish grey (2.5Y6/2)	1	2.7
Pale yellow (2.5Y7/3)	1	2.7
Dark reddish brown (5YR4/2)	1	2.7
Brown (7.5YR4/2–5/4)	4	10.8
Light brown (7.5YR6/3–6/4)	3	8.1
Reddish yellow (7.5YR6/6)	1	2.7
Pink (7.5YR7/3)	1	2.7
Total	37	100

This category displays a surprisingly broad range of surface colours (Table 4.42); the colours of the sections are also variable. To a large degree this is attributable to variations in the condition of firing. On the one hand, many vessels were completely oxidised during the firing, or minimally gained thoroughly oxidised surfaces while keeping a dark core. This category shows surface colours that range from buff or cream (10YR6/2–6/4, 7/2–7/4) to, occasionally, brown or reddish-brown (7.5YR5/4–6/6). On the other hand, many sherds were completely dark throughout, suggestive of a reduced firing or firing at rather low temperatures. Some had surface colours darker than the section, suggesting a reduction stage at the end of the firing process (Table 4.42). This resulted in surface colours ranging from greyish-brown to dark-grey or black (10YR3/1–5/2).[24]

The degree to which the potters purposefully manipulated oxygen levels during the firing remains to be studied in further detail. In subsequent periods potters skilfully and systematically employed a purposely-reduced firing to produce very regular hues of dark-grey to black surface colours (Le Mière *et al.* 2017; Le Mière and Nieuwenhuyse 1996). In the case of the EMW, in contrast, the output was much more variable: in many cases the colour shades from light to dark on a single sherd. In many instances the final surface appearance of the EMW vessel may have been the result of chance, an unintended by-product of the firing. Alternatively, some of this pottery was decorated with red paints or slips, and these are invariably associated with the lighter, oxidised surface colours. For these varieties, at least, the potters apparently purposefully aimed to achieve a light tone of the vessel surface by allowing sufficient oxygen to reach the vessel during the firing.

It remains uncertain what types of firing installations were used for firing EMW. No kilns or other types of special-purpose firing installation have so far been recovered from any of the Initial Pottery Neolithic levels. Certainly, the excavations brought to light abundant numbers of small ashy pits and fire places within the open areas. In principle some of these might have been employed to fire ceramics, but so far none of them has yielded the unequivocal remains of a pottery firing, such as warped wasters or stashed unfired pots left *in situ*. A pit firing would corroborate the observations of a low firing temperature and the variable surface colours for many of the vessels.

4.3.4. Early Mineral Ware vessel typology

The Early Mineral Ware present a rather limited morphological variability (Figs. 4.113: 1–17, 4.114: 1–3). As Akira Tsuneki describes it (Tsuneki 2017, 4), they are all 'bowls'. Characteristic aspects of the EMW shapes are the absence of carinated shapes and the lack of collars. To be sure, a low S-shaped upper part does occasionally occur, but sharply articulated necks have so far not been attested. Characteristic, too, is a somewhat flattened rim. More than half of all vessels were given a flattened rim, while we observed even one example of a flattened-and-thickened rim. The restricted size of these containers, finally, represents another distinctive aspect. We may safely say that Early Mineral Vessels were *small*. No vessels with a rim diameter larger than 20 cm were attested (Table 4.45). The maximum preserved height was 10 cm, although this statistic should be treated with caution given the strong degree of fragmentation (Fig. 4.55). These small measurements are also reflected in the low volume of these containers. Only two items permitted an estimate of volume capacity. One everted convex-sided bowl, incompletely preserved, minimally contained 0.4 litres, while a complete closed convex-sided bowl held 1.7 litres. As these two examples fall neatly within the size ranges for Early Mineral Ware as a whole (Fig. 4.55), these values may be fairly representative.

Perhaps importantly, the absence of necks does not mean that the vessel shapes were all *open* bowls. On the contrary, EMW vessel shapes tend to be somewhat closed in terms of the overall orientation of their profile. The closed convex-sided bowl constituted the main vessel type, comprising about half of all EMW vessels (Tables 4.43 and 4.44). Vertically-oriented convex-sided bowls rank second in quantity. S-shaped goblets and vertical pots are found occasionally. Only a single example was found of an everted convex-sided bowl.

Appendages were not uncommon with the EMW. Three different types of appendages are attested: loop handles, so-called ear-shaped lugs and solid conical lugs. The latter two types are the earliest; they are found already by levels A11 and A12 and disappear after level A10. Loop handles on the other hand are found from level A10 onwards,

Table 4.43 Tell Sabi Abyad, Operation III. Frequencies of Early Mineral Ware vessel types by level (based on EVR)

	A12	*A11*	*A10/11*	*A10*	*A9*	*A8*	*A7*	*A4*	*A1*	*Total*
Everted convex-sided bowl	–	–	–	–	–	–	–	1	–	1
Vertical convex-sided bowl	–	–	1	3	–	–	–	–	–	4
Closed convex-sided bowl	3	4	1	9	–	–	–	–	1	18
Convex-sided bowl with in-turned rim	–	–	–	–	1	–	–	–	–	1
Everted straight-sided bowl	–	–	–	–	–	–	–	–	1	1
S-shaped goblet	–	–	–	2	–	–	–	–	–	2
Vertical pot	–	–	–	1	–	1	1	–	–	3
Uncertain	–	1	–	4	–	–	1	–	–	6
Total	3	5	2	19	1	1	2	1	2	36

Table 4.44 Tell Sabi Abyad, Operation III. Frequencies of Early Mineral Ware appendages by level (based on all coded sherds)

	A12	*A11*	*A10*	*A9/10*	*A9*	*A8*	*A9/8/7*	*A7*	*Total*
Loop handle	–	–	1	1	1	1	1	1	6
Conical lug	–	1	–	–	–	–	–	–	1
Ear-shaped lug	1	–	3	–	–	–	–	–	4
Total	1	1	4	1	1	1	1	1	11

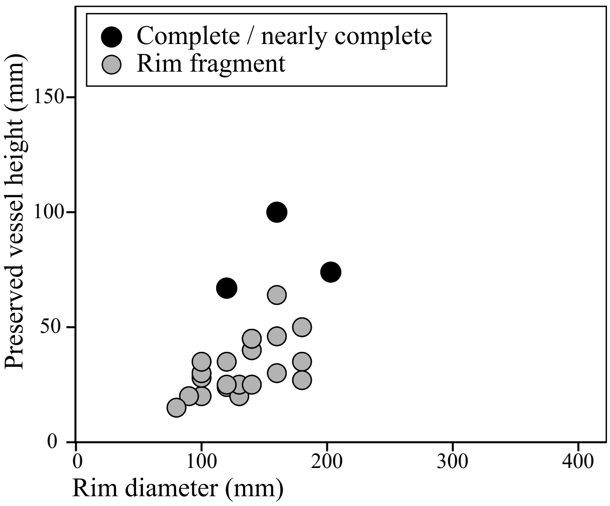


Fig. 4.55 Tell Sabi Abyad, Operation III. Plot of Early Mineral Ware total preserved height (mm) versus rim diameter (mm). Black: complete or nearly complete shapes allowing a volume estimate.

Table 4.45 Tell Sabi Abyad, Operation III. Early Mineral Ware preserved height, wall thickness, rim diameter (all in mm) and volume (l); based on EVR

	Preserved height	*Wall thickness*	*Rim diameter*	*Volume*
Mean	38	9	134	1.1
Minimum	10	6	80	0.4
Maximum	100	15	180	1.7
Standard Deviation	19.3	2.0	29.6	–
Total	30	30	22	2

but do no longer occur after level A7. Very similar types of loop handles occur with the plant-tempered Standard Ware pottery in these levels. We have suggested above that the EMW in these later levels was intrusive from levels A12–A10, but the shape of the loop handles in the later levels suggests a linkage with the contemporaneous Standard Ware that very frequently had such handles.

4.3.5. Early Mineral Ware decoration

Already during the excavations, it became clear that some of the Early Mineral Ware was decorated (Nieuwenhuyse *et al.* 2010). However, only after the site-stratigraphy had become available, it became apparent that decorated Early Mineral Ware vessels were not present during the very *earliest* levels excavated in the A-sequence. In levels A12 and A11, the small amount of pottery recovered from the sounding is entirely plain. Decorated vessels occur for the first time in level A10. They are also found in 'transitional' level A9, and thereafter largely disappear. To be sure, decorated examples also occur in subsequent levels A8–A1, but as already mentioned, it remains uncertain whether these examples are part of those assemblages. The small size of the sample precludes firm statements as to the proportions of plain versus decorated vessels in these levels. Taking all sherds into account, some 7% of the EMW from level A10 was decorated, rising to 33% in level A9 (Table 4.46). If only EVR were to be considered, however, the proportions are, respectively, 16% in level A10 versus a complete lack in level A9. Perhaps the safest conclusion to be drawn at this stage is that by the end of the Initial Pottery Neolithic a small portion of the EMW became decorated, and that decoration disappeared again fairly rapidly thereafter.

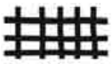
Table 4.46 Tell Sabi Abyad, Operation III. Frequencies of Early Mineral Ware decoration by level (Raw Counts)

Level	*Plain*	*Red-slipped*	*Painted*	*Total*
A1	2	–	1	3
A4	–	–	2	2
A5	1	–	–	1
A6	1	1	–	2
A7	6	1	3	10
A8	1	1	–	2
Mixed A7–A9	2	1	–	3
Mixed A9–A11	20	–	1	21
A9	15	1	8	24
A10	84	–	6	90
A11	11	–	–	11
A12	21	–	–	21
Total	164	5	21	190

Two decorative technologies are associated with this pottery: red slipping and painting (Pl. 11). As the colours and textures are virtually identical in both categories, the same pigment was probably used. This is supported by the similarities in appearance of these two techniques. In the case of the EMW the difference between a slip and a painted composition is often difficult to identify, and the boundary between an imperfectly-executed slip or a sloppily-painted motif is often far from clear. The slips are often fugitive, watery, and uneven in thickness, whereas the painted lines are usually very uneven in width and lacking in sharp contours. The texture of both slips and paints is in most cases slightly glossy, but very often the pigment was not applied thickly, nor was it done very uniformly. The painted motifs, if the term may be used, were often not sharply articulated at all. Potters may have used similar tools for applying the slips and paints. This may have been a brush, but the lack of clear articulation suggests that they may also have used less specialised tools, for instance simply a twig. Pigment colours vary in the range of red (10R4/6–5/8, 2.5YR4/6–5/8), to dusky red (10R3/3).

The existing evidence from painted vessels does not suggest any particular design structure. With such a limited sample not much can be said with regard to the way the potters conceptualised the empty vessel as a surface to be decorated. In some instances, they emphasised the rim, and one fragmented S-shaped goblet may have had a painted band emphasising the shoulder (Fig. 4.114:3).

Table 4.47 Tell Sabi Abyad, Operation III. Frequencies of Early Mineral Ware painted motif frequencies.

		Frequency
	Single horizontal line	1
	Horizontal lines	4
	Vertical lines	2
	Diagonal lines	6
	Cross-hatched diagonal lines	1
	Parallel diagonal wavy lines	1
	Alternating diagonal lines (zigzag?)	1
	Alternating diagonal lines	1
Total		17

Occasionally, a band of horizontally-painted strokes seems to mark the point of maximum vessel diameter (e.g. Fig. 4.113: 8). But these structural boundaries on the vessel body were certainly not always marked. We do not have any examples of sherds showing more than a single painted motif.

The motifs, if this term may be used, were on the whole quite simple. Usually the potters were satisfied with applying parallel lines in vertical, horizontal or, most often, diagonal directions. Occasionally, however, they concocted more complex motifs. These are so far all known from a single respective example: cross-hatching (Fig. 4.114: 9), parallel wavy lines (Fig. 4.114: 3), or alternating diagonal lines in, perhaps, a zigzag (Fig. 4.113: 8). One intriguing vessel, finally, recovered from level A4, displays what a biologist attached to the Tell Sabi Abyad team– she prefers anonymity – somewhat approvingly dubbed the 'blood-spatter' style (Fig. 4.113: 1).

4.4. Fine Mineral Tempered Ware

*4.4.1. The **field** definition of Fine Mineral Tempered Ware*

We provisionally adopted the term *Fine Mineral Tempered Ware* to refer to a distinct ceramic category that showed up consistently in the Early Pottery Neolithic levels as a minority component alongside the ubiquitous coarse pottery. In stark contrast to the coarsely-finished, thick-walled, plant-tempered bulk this category was characterised by the regular association of the following characteristics: a) a fine mineral-tempered fabric without plant inclusions, b) relatively thin-walled, regular vessel shapes, c) the thoroughly burnished surfaces, and d) generally oxidising firing circumstances.

Initially we considered the term 'Early Fine Ware' (Akkermans *et al.* 2006; Nieuwenhuyse *et al.* 2015). The adjective 'fine' referred to the observation that the first two characteristics are among the defining elements of the Fine Wares that emerged at Tell Sabi Abyad in the Transitional (Proto-Halaf) stage (Le Mière and Nieuwenhuyse 1996); 'early' simply pointed to its occurrence already in the *Early* Pottery Neolithic phase, well before the Transitional stage began. Both adjectives are problematic. The main difficulty lies with the various implicit connotations. There are no substantial arguments to claim that this ware functioned as a 'fine ware', or that it encompassed all the social and symbolic aspects associated with the lavishly elaborated Fine Wares of the Transitional and Early Halaf stages. As to the 'early' aspect – this of course is relative. From the perspective of the well-made Early Mineral Ware of the Initial Pottery Neolithic, this category could equally well be termed a 'Late Mineral Ware'. We settled on Fine Mineral Tempered Ware.

The fourth criterion complicates matters even more. If we ignore the firing, the first three criteria together define a recognisable ceramic category in the Early Pottery Neolithic levels. However, ceramics showing a very similar clay fabric consistently display purposely-reduced, dark surfaces (Chapter 5). These have been put apart as a distinct category termed Grey-Black Ware (see below, section 4.5). Making use of the same types of clay potters attempted to establish two visually distinct categories by manipulating the oxygen fluctuations in the kiln. We reserved the term Fine Mineral Tempered Ware exclusively for the oxidised variety. Apart from the firing these two categories are very much alike in terms of their *Chaîne opératoire*, vessel shape, size and volume.

4.4.2. The Fine Mineral Tempered Ware sample

On the basis of the above definition slightly less than seven hundred sherds from Operation III were attributed to Fine Mineral Tempered Ware (Table 4.48). The great majority are from the A-Sequence, more specifically from levels A6–A1. Intriguingly, almost no FMTW was recovered from the earliest Early Pottery Neolithic levels A9–A7. This hints at the possibility that after the disappearance of the Early Mineral Ware typical for levels A12–A10, during the time represented by level A9–A7 (ca. 6650-6500, cf. Table 2.1), there was hardly any mineral-tempered pottery available at Tell Sabi Abyad. On the opposite side of the chronological spectrum, FMTW also occurred in the earliest stages of the B-Sequence, level B8, and even continued in small quantities thereafter.

Most of the material is rather fragmented, but a few complete shapes were found. The average radius of the rim is 44^{o}, meaning that on average no more than 12% of the rim was preserved. Excluding the three completely preserved vessels, the largest radius measured on rim fragments is 120^{o} – this vessel has no more than about

Table 4.48 Tell Sabi Abyad, Operation III. Frequencies of Fine Mineral Tempered Ware by level (Raw Counts)

Level	*Complete*	*Section*	*Rim sherd*	*Body sherd*	*Base sherd*	*Other*	*Total*
D-Sequence	–	–	2	1	–	–	3
C-Sequence	–	–	–	1	–	–	1
Mixed B	–	–	10	13	–	–	23
B4	–	–	3	–	–	–	3
B6	–	–	–	1	–	–	1
B8	–	–	5	7	–	–	12
Mixed A			8	36	1	1	46
A1	–	–	55	125	13	6	199
A2	1	1	27	25	5	–	59
A3	–	1	26	91	15	8	141
A4	1	2	21	73	11	7	115
A5	–	–	8	20	4	1	33
A6	–	–	6	19	2	2	29
A7	–	–	–	1	–	–	1
A8	–	–	–	1	–	–	1
A9	–	–	1	–	–	–	1
Total	2	4	172	414	51	25	668

Table 4.49 Tell Sabi Abyad, Operation III. Frequencies of Fine Mineral Tempered Ware firing circumstances by level (based on all coded sherds)

	A9	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*A Mix*	*B8*	*B4*	*B Mix*	*Total*
Completely oxidised	–	1	16	8	52	44	34	76	12	5	1	1	250
Slight incomplete oxidation	–	–	3	2	1	8	5	19	3	3	1	3	48
Strong incomplete oxidation	1	–	1	4	9	2	8	31	3	2	1	2	64
Total	1	1	20	14	62	54	47	126	18	10	3	6	362

one-third of its original orifice preserved.[25] The BMI for this pottery is small: on average an FMTW sherd measures a mere 16 g, although these statistics fluctuate through time. They reach their highest values between levels A5–A2, reflecting the somewhat less fragmented depositions of FMTW in these levels. Possibly this suggests that FMTW was most commonly produced in levels A5–A2, and that samples from earlier and later levels include a higher proportion of intrusive material.

4.4.3. *The Fine Mineral Tempered Ware* chaîne opératoire

Neolithic potters prepared a mineral-tempered fabric for making Fine Mineral Tempered Ware. Macroscopically, most of the sherds attributed to this category show small mineral inclusions in the fabric, which occur in various densities but on the whole are mostly small (<1 mm). The inclusions are a heterogeneous mixture of finely ground calcite or occasionally basalt, and naturally occurring limestone (Chapter 5). This heterogeneity so far does not suggest any clear sub-categories within the Fine Mineral Tempered Ware, nor can we observe any temporal shifts in the types of mineral tempering. In addition to mineral inclusions, some 6% of the sherds have small plant particles as well, always in small quantities. Mostly these may have been naturally present in the clay, in which case they would not constitute a deliberate 'temper'. Interestingly, their chronological distribution is largely confined to level A1. Potters in level A1 possibly selected different clay beds or adopted different clay preparation strategies for making FMTW.

The very careful surface finish typical of the FMTW obscured most of the traces for reconstructing the primary shaping techniques. Flat bases are typical for this group, created by pressing a piece of clay onto a flat surface. We presume that the potters employed coiling as the primary shaping technique for building up the vessel wall, as they did with the Standard Ware from the same levels. Traces of secondary shaping can occasionally be identified at the interior: scraping with a sharp tool or with the fingers to remove excess clay, reduce wall thickness, and push and pull the vessel into shape. After the primary and secondary shaping, the vessels were thoroughly burnished on both surfaces. On the interior, potters sometimes limited the burnishing to the upper part of the wall, the area below the rim. When not burnished, the surfaces were minimally carefully smoothed. The operational chain for shaping FMTW appears to have been remarkably consistent through time; we can observe no shifts in the application of surface finishing techniques.

The Fine Mineral Tempered Ware was fired at low temperatures and for short intervals, and firing conditions generally were oxidising. Most of the sherds in this category show light-coloured, thoroughly oxidised sections throughout. Others have light-coloured, oxidised surfaces with a light-grey, incompletely reduced core. Strongly incomplete oxidation occurs rarely; dark-grey or black cores constitute a minority (Table 4.49). As a result, the exterior surface ranges in colour from light reddish brown (5YR6/3–6/4, 2.5YR6/4) or light brown (7.5YR6/3–6/4), to reddish brown (2.5YR5/3–5/4, 5YR5/3–5/4) or light red (2,5YR6/6–6/8) (Table 4.50). Most vessels are similar in surface colours on both inner and outer faces; occasionally the interiors are darker than the exteriors.

Table 4.50 Tell Sabi Abyad, Operation III. Frequencies and percentages of Fine Mineral Tempered Ware exterior surface colour (Munsell; based on diagnostic sample)

	n	*%*
Red (10R5/6. 2.5YR5/6)	10	9.4
Pale red (10R6/4)	1	1.0
Pale brown (10YR6/3)	2	1.9
Very pale brown (10YR7/3)	1	1.0
Brown (7.5YR4/4)	2	1.8
Reddish brown (2.5YR5/3–5/4. 5YR5/3–5/4 7.5YR4/3. 5/3–5/4)	15	14.4
Light reddish brown (2.5YR6/4. 5YR6/3–6/4)	21	20.0
Light yellowish brown (10YR6/4)	2	1.8
Light red (2.5YR6/6–6/8)	10	9.4
Light brown (7.5YR6/3–6/4)	10	9.4
Yellowish red (5YR5/6)	9	8.6
Reddish yellow (5YR6/6–7/6)	7	6.7
Reddish grey (5YR5/2)	1	1.0
Dark reddish grey (7.5YR4/2)	1	1.0
Grey (7.5YR5/1)	1	1.0
Dark grey (7.5YR4/1)	1	1.0
Very dark grey (5YR3/1)	1	1.0
Pinkish grey (7.5YR7/2)	1	1.0
Pink (7.5YR7/3–7/4)	9	8.6
Total	105	100.0

4.4.4. Fine Mineral Tempered Ware vessel typology

The morphological repertoire for the Fine Mineral Tempered Ware is fairly limited. Fine Mineral Tempered Ware morphology emphasised relatively small, comparatively closed shapes, most of which can be classified as 'bowls' (Table 4.51). Fine Mineral Tempered Ware vessels mostly display plain rims, but a fair number were given pointed or flat rims. Bevelled or beaded rims occur with FMTW in very low numbers from level A3 onwards (Table 4.52). Fine Mineral Tempered Ware vessels were usually made with a flat base. Concave bases certainly also occur together with convex bases, yet these two categories are represented with minimal respective examples. Moreover, the curvature of the latter two base types was less than with the Standard ware. A flat shape was the norm when it came to shaping the FMTW base. The transition from the base to the body was usually quite sharp, but certainly not always so. About a third of the FMTW bases show a gradual, indistinct transition to the lower body. So-called disc bases have not been attested for this ware.

In terms of vessel shape typology, most common by far are the convex-sided bowls. These include just over half of all FMTW vessels (54%, based on EVR). They have been ordered into three sub-categories on the basis of the wall orientation: *Everted Convex-sided Bowls* (Figs. 4.115: 1–7), *Vertical Convex-sided Bowls* (Figs. 4.115: 8–17), and *Closed Convex-sided Bowls* (Figs. 4.116: 1–16).[26] Of these three varieties, closed convex-sided bowls represent the most common type by far, representing some 25% of all FMTW vessels. Less common are bowls with straight sides. These come in (only) two varieties: bowls with

Table 4.51 Tell Sabi Abyad, Operation III. Frequencies of Fine Mineral Tempered Ware vessel types by level (based on EVR)

	A9	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*Mixed A*	*B8*	*B4*	*Mixed B*	*D-Sequence*	*Total*
Uncertain	–	–	1	1	2	1	2	–	1	–	7	2	17
Convex-sided bowl – uncertain orientation	–	–	–	1	–	1	5	–	–	–	–	–	7
Everted convex-sided bowl	–	–	1	1	1	–	5	1	1	1	–	–	11
Vertical convex-sided bowl	–	1	3	3	4	5	12	–	–	1	–	–	29
Closed convex-sided bowl	–	3	1	10	8	10	10	5	–	1	1	–	49
Vertical straight-walled pot	–	–	1	–	4	2		–	–	–	–	–	9
Everted straight-sided bowl unspecified	1	1	–	–	1	–	5	–	1	–	–	–	9
Carinated everted straight-sided bowl	–	–	–	1	–	2		1	–	–	–	–	6
Low carinated bowl	–	–	–	1	–	–		–	–	–	–	–	1
Vertical S-shaped bowl	–	–	–	–	2	–		–	–	–	–	–	3
Closed S-shaped bowl	–	1	–	3	2	5		1	2	–	1	–	21
S-shaped goblet	–	–	1	3	3	3		–	–	–	1	–	16
Total	1	6	8	24	27	29	55	8	5	3	10	2	178

Table 4.52 Tell Sabi Abyad, Operation III. Frequencies of Fine Mineral Tempered Ware rim shape by level (based on EVR)

Level	*Plain*	*Pointed*	*Flat*	*Outwardly bevelled*	*Inwardly bevelled*	*Beaded*	*Pinched*	*Total*
D-Sequence	2							2
Mixed B	8	1	1	–	–	–	–	10
B4	–	1	2	–	–	–	–	3
B8	4	–	1	–	–	–	–	5
Mixed A	2	3	3	–	–	–	–	8
A1	36	8	7	–	3	–	1	55
A2	17	4	3	–	3	–	2	29
A3	13	3	8	2	–	–	1	27
A4	14	6	3	–	–	1	–	24
A5	6	2	–	–	–	–	–	8
A6	1	2	3	–	–	–	–	6
A9	1	–	–	–	–	–	–	1
Total	104	30	31	2	6	1	4	178

a straight, everted wall and a carinated contour – the *Carinated Everted Straight-sided Bowl* (Figs. 4.117: 18–20) – and fragments of straight-sided bowls without an extant transitional point – the so-called *Everted Straight-sided Bowl unspecified* (Figs. 4.117: 16–17). The latter may constitute the upper part of carinated vessels, or of everted straight-sided bowls with a flat base. Put together they comprise less than 10% of all FMTW vessels. Also, a few rims with a vertical straight wall were put apart (Fig. 4.117: 15). Their complete shape, too, remains unknown. In principle some of these could originally have had a carinated profile, but more likely they represent either the upper parts of vertical convex-sided bowls, or of vertical straight-walled pots similar to the characteristic Standard Ware type. Two examples occurred of carinated bowls with a concave upper body, so-called *Low, Carinated Bowls* (Figs. 4.117: 14).

Shapes with a neck are absent from the Fine Mineral Tempered Ware repertoire. But S-shaped profiles do occur, albeit in low quantities. Apart from a few *Vertical S-shaped Bowls* (Figs. 4.117: 1–2), their overall orientation tends to be closed; everted S-shaped bowls have so far not been attested. Two categories of closed S-shaped profiles were distinguished on the basis of rim diameter. A bi-modal distribution of the rim diameter frequencies was observed, with peaks at 8 cm and at 12 cm. We selected this as a criterion to distinguish between *S-shaped Goblets*, with a rim diameter less than 10 cm (Figs. 4.117: 9–13), and *Closed S-shaped Bowls*, with a rim diameter wider than 10 cm (Figs. 4.117: 3–8). The latter have somewhat more pronounced collars, and they were taller and more voluminous.

Perhaps due to the small sample sizes it is difficult to observe any clear trends in FMTW morphology. Most types occur throughout the A-Sequence and into level B8. Perhaps the only noticeable shift is a somewhat rising proportion of vertical convex-sided bowls in level A1. Another chronological observation concerns the carinated vessels, which do not occur at all prior to level A4. Most examples are from levels A2 and A1. Carinated FMTW shapes seem to be limited to the upper levels of the A-sequence.

Table 4.53 Tell Sabi Abyad, Operation III. Fine Mineral Tempered Ware preserved height, wall thickness and rim diameter (all in mm) and volume (l); based on EVR

	Preserved height	*Wall thickness*	*Rim diameter*	*Volume*
Mean	48.65	7.01	128.15	0.8
Minimum	11	2	60	0.1
Maximum	120	14	240	2.4
Standard Deviation	20.485	1.976	34.837	0.62
Sample size	165	167	130	36

On the whole, the various FMTW types are comparatively small, and the variability in size is not extreme. So far, no vessel could be reconstructed having a height over 20 cm – the tallest examples are a few closed S-shaped bowls. Rim diameters range between 6 cm and 25 cm. The largest orifices are found, not surprisingly, with bowls having an open wall orientation. But overall, rim diameters tend to be very similar across vessel types, mostly clustering between 10 cm and 17 cm (Table 4.53). The average capacity of these vessels is somewhat less than one litre (Table 4.53). Interestingly enough, however, the volume estimates perhaps suggest a bi-model distribution. While the sample of complete or nearly intact vessels allowing an estimate of volume remains small (n = 36), it suggests two sub-groups. About half of the vessels fall into a smaller volume-category ranging from 0.1 litres to 1 litre, averaging at about 0.5 litres, whereas the others range between 1.4 litres and 2.5 litres, with an average around 1.8 litres. The formal vessel types distinguished within these two sub-categories are the same, however.

Appendages were not frequently found with Fine Mineral Tempered Ware. If we only consider the EVR, only 10% of all FMTW vessels carried an appendage.

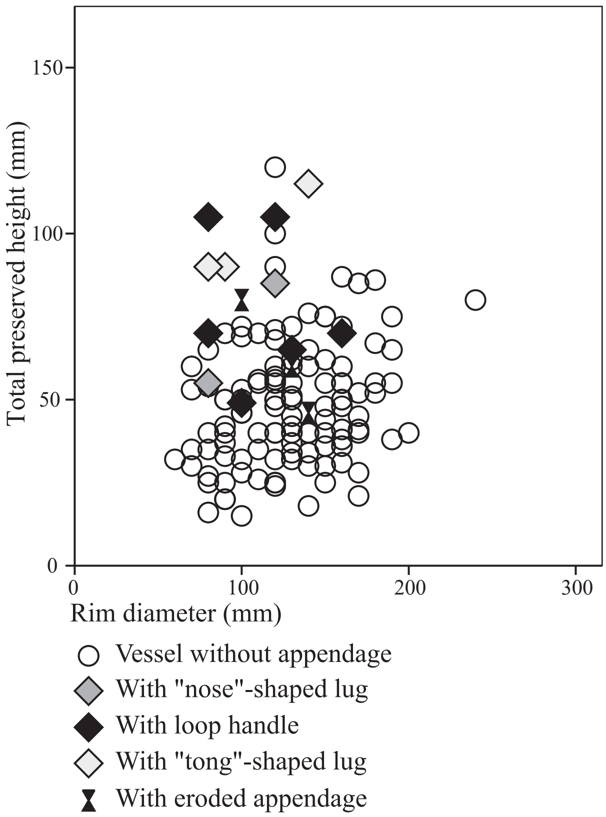


Fig. 4.56 Tell Sabi Abyad, Operation III. Plot of Fine Mineral Tempered Ware total preserved height (mm) versus rim diameter (mm) and the distribution of various types of appendages (based on EVR).

Table 4.54 Tell Sabi Abyad, Operation III. Frequencies of Fine Mineral Tempered Ware appendages by level

Level	*Loop handle*	*'Nose'-lug*	*'Ear'-lug*	*'Tongue'-lug*	*Uncertain type*	*Total*
Mixed B	–	–	–	1	–	1
Mixed A	1	1	–	–	1	3
A1	2	–	3	1	3	9
A2	–	–	–	1	–	1
A3	2	8	4	–	1	15
A4	2	1	3	2	3	11
A5	1	–	1	–	–	2
A6	–	–	2	–	–	2
Total	8	10	13	5	8	44

Of course, the fragmented state of the sample must be taken into account: several more intact vessels could have had an appendage. But not many body sherds carrying appendages were found; in general, the number of FMTW appendages recovered from Operation III is not large (*n* = 44). It would seem then, that the far majority of the FMTW vessels did not carry any sort of appendage. The earliest examples appeared already by level A6 (Table 4.54). They remained quite exceptional in levels A6 and A5, but definitely became somewhat more common by level A4. No FMTW appendages were recovered from any of the B-levels. The most common appendages were 'ear'-shaped lugs, 'nose'-shaped lugs and loop handles. 'Tongue'-shaped lugs occur as well. Associations with any specific vessel type or with vessel size cannot be demonstrated with certainty. When we plot the distribution of appendages against rim diameter and vessel height (Fig. 4.56), lugs and handles tend to be cluster with comparatively tall vessels. Interestingly, in contrast to the Standard Ware, the few loop handles in this category are associated with S-shaped goblets, and not with vertical pots.

The Fine Mineral Tempered Ware, finally, so far yielded virtually no examples of curating vessels by reshaping them into some other form. One possible example was attested of a base fragment from level A4 of what seems to have been originally a bowl. It was cut down in size and turned into a small everted convex-sided bowl (Fig. 4.115: 7). This constitutes one of the earliest manifestations at Tell Sabi Abyad of a purposely reshaped pottery container (Chapter 8). It may have constituted a drastic instance of repair, or an attempt to curate a broken vessel and extend its use life, but this suggestion remains entirely conjectural.

4.4.5. Fine Mineral Tempered Ware decoration

The Fine Mineral Tempered Ware was mostly a 'plain' ware. During the time represented by levels A9–A5 (ca. 6650–6450 cal BC), this pottery was not decorated at all. Then, by the time of level A4, a major innovation occurred with the introduction of red-slipped FMTW (Figs. 4.118: 1–10, 12, 14–17). Significantly, excluding the enigmatic EMW from levels A10–A9, the red-slipped FMTW represents the *earliest* sustained decoration applied to *any* category of pottery containers at Tell Sabi Abyad (Table 4.55). The slips range in colour from red to weak red or dusky red (10R3/–5/8. As the surfaces were also burnished, the net result was a glossy, red-orange surface. The proportion of red-slipped FMTW fluctuated wildly between levels A4–A3, but it apparently reached a peak in levels A1 and B8, when between one-quarter and one-third of all FMTW was given a slip (Fig. 4.57). After level B8 Fine Mineral Tempered Ware as a whole gradually disappeared again along with its red-slipped variety.

In addition to slipping, three other decorative methods are found, each attested with just one or two examples each, *viz*. painting, plastered-and-painted, and red-slipped-and-impressed. With the exception of a magnificent and unique S-shaped goblet painted with nested chevrons from level A4 (Pl. 12.1.2; Fig. 4.118: 13), most of these decorated items come from level A1, demonstrating the same decorative styles emerging with the Standard Ware (Pl. 12.1). The slipped-and-impressed vessel is a small, delicate thin-walled S-shaped goblet encircled with two horizontal rows of tiny circular impressions on the shoulder, covered with red slip (Pl. 12.1.4; Fig. 4.118: 18).

Table 4.55 Tell Sabi Abyad, Operation III. Frequencies of Fine Mineral Tempered Ware decoration by level (based on Raw Counts)

Level	*Plain*	*Red- slipped*	*Painted*	*Plastered & painted*	*Red-slipped & impressed*	*Total*
D-Sequence	3	–	–	–	–	3
Mixed B	13	9	–	–	1	23
B4	2	1	–	–	–	3
B6	1	–	–	–	–	1
B8	8	4	–	–	–	12
Mixed A	45	1				46
A1	143	54	1	1	–	199
A2	49	10	–	–	–	59
A3	136	5	–	–	–	141
A4	96	18	1	–	–	115
A5	33	–	–	–	–	33
A6	29	–	–	–	–	29
A7	1	–	–	–	–	1
A8	1	–	–	–	–	1
A9	1	–	–	–	–	1
Total	561	102	2	1	1	667

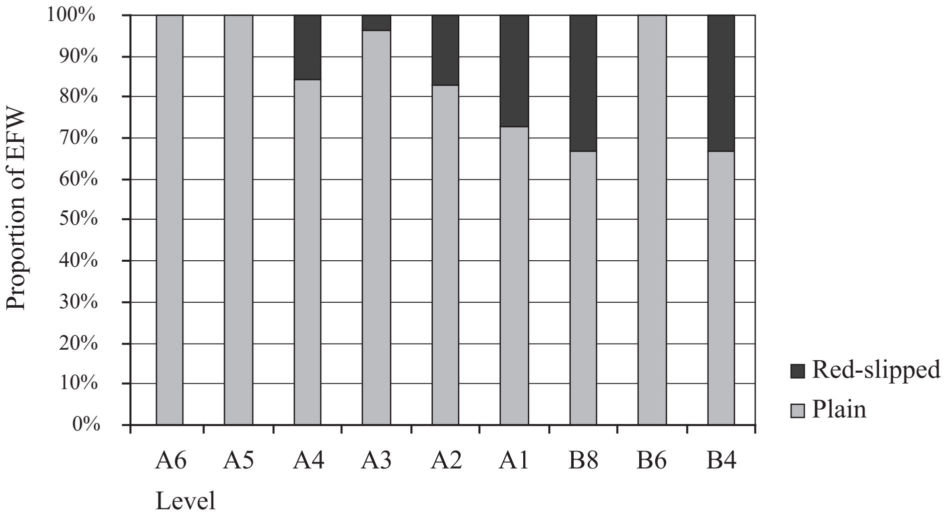


Fig. 4.57 Tell Sabi Abyad, Operation III. The proportion of red-slipped Fine Mineral Tempered Ware in Operation III (based on EVR). Note that the samples for levels A9–A7 and levels B6 and B4 are too small to be meaningful.

Interestingly, these decorative styles were not randomly applied to just any type of FMTW vessel. In contrast to the Standard Ware, the presence/absence of decoration cannot so far be associated with differences in vessel size. However, a red slip seems to have been instrumental in differentiating a subset of, specifically, *serving* vessels from the bulk. Decorated vessels predominantly were vertical convex-sided bowls. A slip was also applied, less often, to bowls with a carinated profile or with an S-shaped profile. Closed convex-sided bowls, on the other hand, were mostly left plain (Table 4.56). These associations between vessel type and decorative style emerged already by level A4, thus preceding, and perhaps anticipating, similar associations subsequently developing within the plant-tempered Standard Ware.

4.5. Grey-Black Ware

4.5.1. The field definition of Grey-Black Ware

The term *Grey-Black Ware* derives from previous work at Operation I, as does much of the ceramic terminology at Tell Sabi Abyad. Marie Le Mière first coined the term to refer to a category of dark-coloured pottery with burnished surfaces (Le Mière and Nieuwenhuyse 1996, 132). Le Mière found that whereas some of the other wares sometimes gained a dark surface appearance because of the raw materials or the way the pottery was used, a purposefully reduced firing was employed to create a series distinctive in vessel shape, size, and decoration, which she dubbed Grey-Black Ware. Some of the Dark-Faced Burnished Ware was also purposely fired in

Table 4.56 Tell Sabi Abyad, Operation III. Fine Mineral Tempered Ware The relationship between decorative style and vessel type (based on EVR)

	Plain	*Painted*	*Red-slipped*	*Painted & impressed*	*Total*
Uncertain	14	–	3	–	17
Convex-sided bowl – uncertain orientation	6	–	1	–	7
Everted convex-sided bowl	9	–	2	–	11
Vertical convex-sided bowl	19	–	10	–	29
Closed convex-sided bowl	45	–	4	–	49
Everted straight-sided bowl – unspecified	5	1	3	–	9
Everted carinated straight-sided bowl	4	–	2	–	6
Low, carinated bowl	–	–	1	–	1
Vertical S-shaped bowl	3	–	–	–	3
Closed S-shaped bowl	14	1	6	–	21
S-shaped goblet	12	–	3	1	16
Vertical straight-walled pot	9	–	–	–	9
Total	140	2	35	1	178

reducing circumstances (Nieuwenhuyse 2007, 82–83) but the reduced variety of DFBW may easily be kept apart by its characteristic mineral-tempered fabric (Le Mière 2000, 129, 2001, 181; Le Mière and Nieuwenhuyse 1996, 128).

The current study at Operation III has complicated the definition. When the excavations of the 7th millennium levels began, it quickly became clear that the ceramic assemblage included Grey-Black Ware as previously defined for the Pre-Halaf to Early Halaf levels of Operation I (Akkermans *et al.* 2006). Subsequent analysis made it clear that there was a significant variability in terms of fabric composition *within* this category. Whereas most of the Grey-Black Ware sherds recovered from the B-Sequence and the uppermost A-levels resembled that of Operation I closely, most of the pottery recovered from earlier levels in the A-sequence was characterised by a fabric that closely resembled that of the Fine Mineral Tempered Ware from the same levels (cf. Chapter 5). The main distinction between the FMTW and the GBW lay in the purposely reduced firing induced for the latter. We considered the possibility of coining a distinct term for the earlier variety of reduced pottery ('Early GBW'?) but in the end they were all counted as part of the singular, if heterogeneous category termed Grey-Black Ware. Further studies should scrutinize this field definition.

4.5.2. The Grey-Black Ware sample

Using the above criteria, over four hundred sherds from Operation III were attributed to Grey-Black Ware. GBW occurs as a minor component of the ceramic assemblage throughout the A-Sequence and the B-Sequence (Table 4.57). GBW is also present in the Halaf levels of the C-Sequence and in the confusion that is the D-Sequence (see Chapter 2). The earliest examples come from level A9, ca. 6675–6620 cal BC. No GBW at all was recovered from level A8, however, while levels A7–A5 each yielded just a handful of sherds. This throws some suspicion onto these early attributions, calling for further specialist study. Upon closer inspection the very few examples we have from level A9 deviate from the later GBW in terms of fabric: they are much coarser. Possibly these represent examples of EMW instead. The real start of GBW in Operation III, then, seems to have been by level A4, ca. 6455–6390 cal BC. Awaiting further work, it is probably safest to take this later time slot as a secure start for the development of purposely-reduced firing strategies.

Table 4.57 Tell Sabi Abyad, Operation III. Frequencies of Grey-Black Ware by level (Raw Counts)

Level	*Section*	*Rim sherd*	*Body sherd*	*Base sherd*	*Total*
D-Sequence	1	8	17	–	26
C-Sequence	–	4	11	–	15
Mixed B	–	23	30	1	54
B1	–	–	2	1	3
B2	–	1	4	–	5
B4	–	6	2	1	9
B5	–	1	3	–	4
B6	1	–	–	–	1
B7	1	–	1	–	2
B8	1	12	24	–	37
Mixed A	–	2	10	–	12
A1	1	43	109	15	168
A2	1	9	19	2	31
A3	–	6	9	5	20
A4	1	2	13	–	16
A5	–	–	7	–	7
A6	–	1	5	–	6
A7	–	–	1	–	1
A9	–	1	3	1	5
Total	7	119	270	26	422

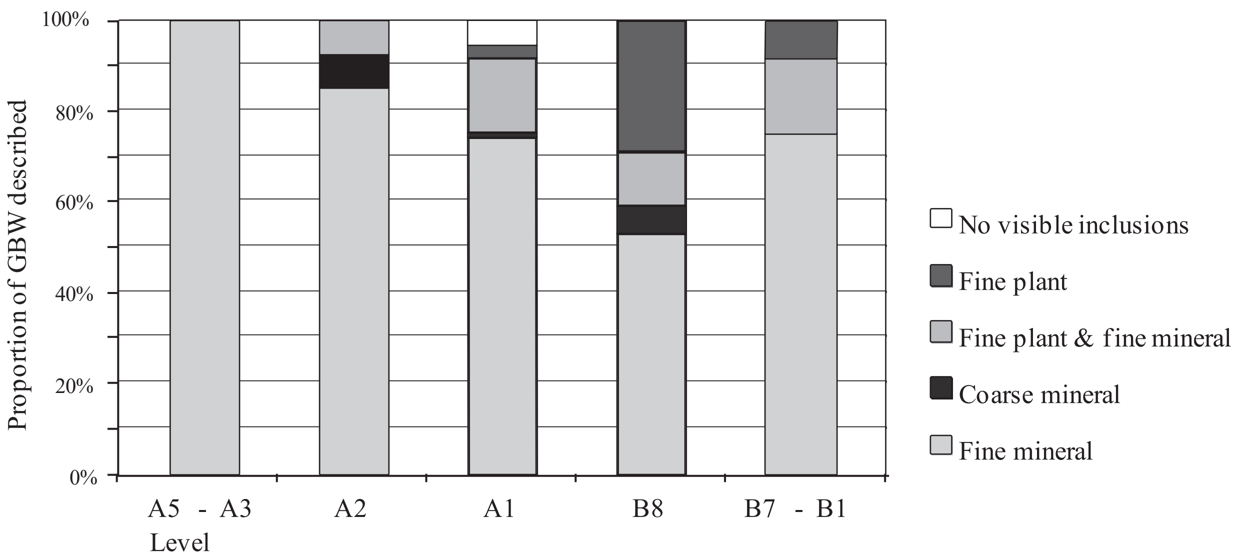


Fig. 4.58 Tell Sabi Abyad, Operation III. The proportions of macroscopically-observed non-plastic inclusions for Grey-Black Ware by grouped level (based on diagnostic sample). We distinguish between five 'fabric types'. Levels A9–A6 are omitted because of the small sample sizes and uncertain attributions.

The sample mostly consists of small and fragmented body sherds and includes few complete profiles. Not a single really complete GBW vessel was found (Table 4.57). The average radius of the rim fragments is 43^{o}, meaning that on average no more than 12% of the rim was preserved. The largest rim radius we measured was 240^{o}; this vessel has only two-thirds of its original orifice preserved. We can observe no chronological shifts in the fragmentation estimates.[27] Nor do we detect significant shifts in the Grey-Black Ware BMI. The average BMI is quite low in all levels, fluctuating between 8 g and 13 g. In sum, the GBW pottery retrieved from Operation III is all broken and appears to be severely fractured.

4.5.3. The Grey-Black Ware chaîne opératoire

As already discussed, what is currently termed Grey-Black Ware varies in terms of raw materials and clay preparation. We distinguished five fabric types on the basis of our macroscopic observations (Fig. 4.58). In general, Grey-Black Ware was produced from clay containing fine mineral inclusions that can be observed even without the assistance of a microscope. Coarse mineral grains are largely absent from this group; some of the very early GBW from level A9 fall into this category. Plant inclusions are entirely absent from most of the sherds; if these occur, they are always of small size and in most cases occur in addition to the mineral grains. As with the Fine Mineral Tempered Ware, these may have been natural impurities in the clay rather than a purposely-added 'temper'. A small minority (some 3%) of the GBW sherds show a compact fabric without any macroscopically visible non-plastic inclusions.

It appears that Grey-Black Ware production was remarkably consistent during the time represented by the A-Sequence. If we ignore the somewhat questionable material from levels A9 to A6, only a single fabric type is attested throughout levels A5–A3: the 'fine mineral' variety (Fig. 4.58). Petrographic analyses show that the potters used a calcareous clay which they tempered with finely-grounded calcite or, occasionally, basalt (Chapter 5). The fabric composition of the fine-mineral-tempered sherds from the A-levels most closely resembles that of the FMTW from the same levels. Interestingly, however, a clear change in Grey-Black Ware production started by level A2. In terms of clay composition, a diversification in fabric types is observed (Fig. 4.58). In level A2 the potters for the first time began to adopt a clay that included fine plant particles in addition to the minerals. In level A1 and in the B-Sequence, Grey-Black Ware was increasingly made of clay containing plant particles. Some of the GBW from these levels shows fine plant inclusions exclusively. A small portion was made of a compact clay exhibiting a complete lack of non-plastic inclusions (Fig. 4.58). A very similar variability in clay composition has also been observed for the Grey-Black Ware from Operation I (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007, 78), and it forms a major difference between the purposely-reduced pottery from the Early Pottery Neolithic and the Pre-Halaf to Transitional phases at Tell Sabi Abyad.

As with the FMTW, relatively few traces of the shaping process were observed, due to the thorough surface finishing techniques that characterizes this pottery and obscure most traces of earlier stages. Few unequivocal instances of the use of coils were observed, but it is likely that coiling was the major shaping technique employed as this technique is so strongly attested with the Standard Ware. Traces of the secondary shaping most often remain visible on the interior surfaces of closed shapes. These include scraping with tools and scraping-pressing with the fingers to reduce the thickness of the wall and work the vessel into the desired shape. Afterwards the vessels were carefully finished by smoothing both surfaces or, in most cases, burnishing them. Grey-Black Ware and Fine Mineral Tempered Ware were very similar in terms of the way potters shaped the vessels. Both surfaces were usually burnished, but on the interior this treatment was sometimes restricted to the area immediately below the rim.

Grey-Black Ware pottery is essentially defined by its dark surface colours, which are evenly and consistently dark across the vessel surface. This suggests that the potters purposely manipulated the oxygen fluctuations during the firing. Surface colours range mostly from very dark grey (5YR3/1, 7.5YR3/1), to dark grey (7.5YR4/1) or black, often with reddish hues shining through (Table 4.58). Firing temperatures were quite low, and the duration of the firing was relatively short (Chapter 5). Often the cores are even darker than the surface, attesting to incomplete oxidation. About a quarter of all GBW sherds show an alternating 'zebra pattern' of darker and lighter shades in the sections: a dark surface, a lighter colour of the sub-surface, and again a dark colour of the core. This attests to incomplete oxidation in combination with a short reduction stage at the end of the firing stage – so-called end reduction. A few sherds, interestingly, perhaps were a little overfired, as suggested by a somewhat sintered and discoloured surface, although no unequivocally warped or misfired items were found.

Table 4.58 Tell Sabi Abyad, Operation III. Frequencies and percentages of Grey-Black Ware exterior surface colour (Munsell; based on diagnostic sample)

	n	*%*
Black (2.5Y2.5/1. 5YR2.5/1. 10YR2/1)	19	28.8
Reddish black (2.5YR2.5/1)	1	1.5
Dark Grey (7.5YR4/1)	8	12.1
Very dark grey (5YR3/1. 7.5YR3/1. 10YR3/1)	18	27.3
Dark grey (5YR4/1. 10YR4/1)	4	6.1
Dark reddish grey (2.5YR3/1–4/1. 5YR4/2. 10R3/1)	5	7.6
Reddish grey (2.5YR2.5/1)	2	3.0
Light brownish grey (10YR6/2)	2	3.0
Very dusky red (2.5YR2.5/2)	1	1.5
Dark reddish brown (5YR3/2)	2	3.0
Grey (5YR5/1. 7.5YR2.5/1–5/1)	4	6.1
Total	66	100.0

4.5.4. Grey-Black Ware Vessel typology

The Grey-Black Ware morphological repertoire closely mirrors that of the Fine Mineral Tempered Ware. The range of shapes is fairly limited. Apart from a number of small jars and some S-shaped goblets, dedicated lumpers would merge our neat typological distinctions within a more general class of 'bowls' without much difficulty. A purposely-reduced firing was rather consistently applied to a narrow range of vessel shapes. It remains difficult at this stage to observe any long-term trends in Grey-Black Ware morphology. Most types occur throughout the A-Sequence and into level B-8. Perhaps the only major exception is that carinated profiles do not occur at all prior to level A3, and would seem to be limited to the upper-most A-levels and the B-Sequence.[28] The vessels were shaped mostly with plain rims, but many of them were given a pointed rim or a flat rim. Other rim shapes that occur now and then include pinched, thickened and thickened-beaded rims (Table 4.59). The large majority of Grey-Black Ware vessels had solid, flat bases (81% of all bases; Figs. 4.121: 15–23). Somewhat concave bases are rare, but occur as well. As well, a single fragment of a Grey-Black Ware pedestal base was recovered from a

Table 4.59 Tell Sabi Abyad, Operation III. Frequencies of Grey-Black Ware rim shape by level (based on EVR)

Level	*Plain*	*Pointed*	*Flat*	*Pinched*	*Thickened*	*Thickened, beaded*	*Thickened, inwardly bevelled*	*Total*
D-Sequence	5	1	–	–	–	1	–	7
C-Sequence	1	2	–	–	–	–	–	3
Mixed B	6	1	3	–	–	–	–	10
B2	1	–	–	–	–	–	–	1
B4	1	5	–	–	–	–	–	6
B5	1	–	–	–	–	–	–	1
B6	–	1	–	–	–	–	–	1
B7	1	–	–	–	–	–	–	1
B8	7	–	2	–	–	–	1	10
Mixed A	1	–	1	–	–	–	–	2
A1	27	12	1	2	–	–	–	42
A2	6	1	–	1	–	–	–	8
A3	3	2	–	1	–	–	–	6
A4	1	–	–	–	1	–	–	2
A6	–	–	1	–	–	–	–	1
A9	–	–	1	–	–	–	–	1
Total	61	25	9	4	1	1	1	102

level B4 context. Most of the bases show a very regular thickness and a gentle transition from the base to the lower body.

Grey-Black Ware vessel types were relatively small, lightweight and did not hold a lot of volume. Rim diameters range between 4 cm and 16 cm. Evidently, the fragmented state of the sample must be kept in mind but the largest GBW vessel recovered from Tell Sabi Abyad (from Operation IV) measured less than 20 cm tall (Chapter 12). In terms of vessel size, too, GBW is virtually identical to the FMTW (Table 4.62). The average volume capacity was slightly over one litre. Interestingly, as with the FMTW, a weak bi-modal distribution of volume can be suggested, with peaks at about 0.8 litres and at about 1.8 litres. No long-term changes in vessel size can be detected in Operation III, but of course the samples for the B-Sequence and for the Early Halaf (C-Sequence) are so small as to be practically meaningless in this regard.

The most common category of vessel shapes is the convex-sided bowls, which include some 40% of all GBW vessels from Operation III (based on EVR) (Table 4.60). They have been formally classified into three separate typological groups on the basis of the wall orientation: *Everted Convex-sided Bowls* (Figs. 4.109: 11–20) *Vertical Convex-sided Bowls* (Figs. 4.119: 1–10) and *Closed Convex-sided Bowls* (Figs. 4.120: 1–7).[29] Open and vertical bowls represent by far the most common type of convex-sided bowl. As with GBW in general, the convex-sided bowls all had flat bases.

Bowls with straight walls were much less common. These come in two main varieties, either having a carinated contour – so-called *Everted Straight-sided Carinated bowls* (Figs. 4.121:9-11) – or a straight-sided wall without either a carination or a base preserved. The latter were classified as *Straight-Sided Bowl 'unspecified'* (Figs. 4.121:1-8). As a typological group they occur from level A1 onwards, at about the time when carinated profiles were becoming widespread. It is therefore likely that at least some of them originally had a carination. The only other example of a Grey-Black Ware bowl with an unequivocal carinated profile in Operation III is a *Low Carinated bowl* from level A1, characterised by the concave shape of its upper body (Fig. 4.121:12). A third category of straight-sided bowls is represented by a single fragment only. This vessel, which carried a thickened, beaded rim, most likely represents a *Straight-sided, Flat-based Bowl* as known from the Pre-Halaf and Transitional Period at Operation I (Nieuwenhuyse 2007, 124, pl. 69: 7–12).

Real necks are almost entirely absent from the Operation III Grey-Black Ware. *Small Jars* start to appear in very limited numbers in level A1 (Figs. 4.121: 13–14). None of these were completely preserved, but they all had low necks less than 4 cm tall and a very narrow rim diameter (Fig. 4.59). But closed S-shaped profiles do occur, albeit in very low quantities. Characterised by a low, indistinct collar, the rim diameters of these closed S-shapes show a bi-modal distribution with peaks at 8 cm and at 17 cm,

Table 4.60 Tell Sabi Abyad, Operation III. Frequencies of Grey-Black Ware vessel types by level (based on EVR)

	A9	*A6*	*A4*	*A3*	*A2*	*A1*	*Mixed A*	*B8*	*B7*	*B6*	*B5*	*B4*	*B2*	*Mixed B*	*C-Sequence*	*D-Sequence*	*Total*
Uncertain	–	–	1	–	3	5	–	5	–	–	–	–	–	13	1	2	30
Everted convex-sided bowl	1	–	1	–	–	9	–	–	1	–	–	1	–	1	1	–	15
Vertical convex-sided bowl	–	–	–	–	–	9	–	2	–	–	1	–	–	3	1	1	17
Closed convex-sided bowl	–	1	–	1	1		2	2	–	–	–	–	–	1	–	–	8
Everted straight-sided bowl unspecified	–	–	–	–	–	5	–	1	–	–	–	2	1	5	–	3	17
Straight-sided bowl	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Everted straight-sided carinated bowl	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	1	3
Low carinated bowl	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Everted S-shaped bowl	–	–	–	–	–	–	–	–	–	–	–	2	–	–	1	–	3
Vertical S-shaped bowl	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Closed S-shaped bowl	–	–	1	3	1	4	–	2	–	–	–	1	–	–	–	–	12
S-shaped goblet	–	–	–	2	4	4	–	1	–	–	–	–	–	–	–	1	12
Vertical straight-walled pot	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	3
Small jar	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	3
Total	1	1	3	6	10	44	2	13	1	1	1	6	1	23	4	9	126

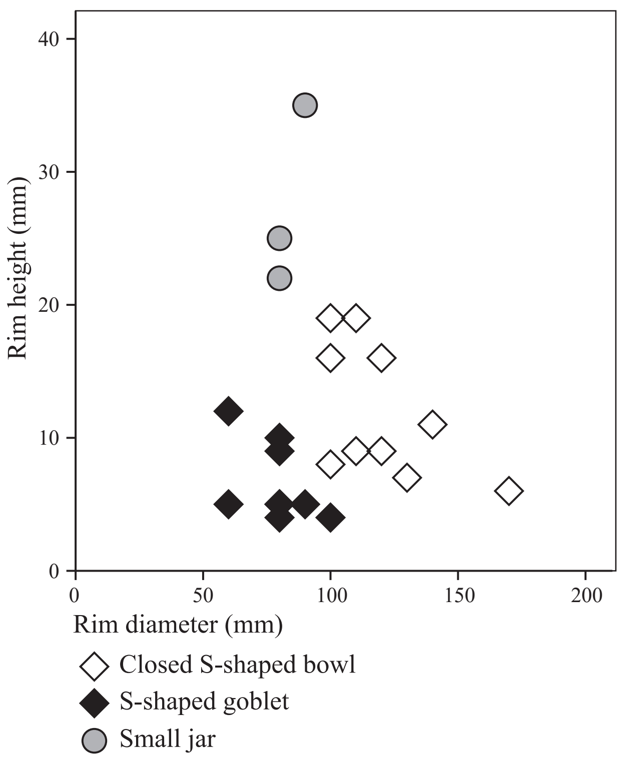


Fig. 4.59 Tell Sabi Abyad, Operation III. The rim diameter versus height of Grey-Black Ware collars (mm), distinguishing between small jars, S-shaped goblets and closed S-shaped bowls (based on EVR).

Table 4.61 Tell Sabi Abyad, Operation III. Frequencies of Grey-Black Ware appendages by level (based on all coded sherds)

Level	*Loop handle*	*Knob handle*	*'Nose' lug*	*'Nipple' lug*	*Double flattened knobs*	*Total*
Mixed A	1	–	–	–	–	1
A3	–	–	1	1	1	3
A4	–	1	–	–	–	1
A9	1	–	–	–	–	1
Total	2	1	1	1	1	6

which we took as a criterion to differentiate between *Closed S-shaped Bowls* (a rim diameter over 10 cm; Figs. 4.120:14-17) and *S-shaped Goblets* (rim diameter less than 10 cm; Figs. 4.120:10-13) (Fig. 4.59).

In contrast to the Fine Mineral Tempered Ware, appendages were not very common with Grey-Black Ware. Five types of appendages are attested: loop handles, knob handles, 'nose'-shaped lugs, 'nipple'-shaped lugs and double-flattened knobs (Table 4.61). GBW appendages are limited to the earlier stages in the A-sequence (levels A9–A3). The Grey-Black Ware from the B-Sequence no longer carried any appendages. With so few examples it remains impossible to see any specific correlations between the presence/absence of appendages and vessel type. Nor do we observe strong differences in size between vessels with or without appendages, or between vessels bearing different types of appendages. All we can say is that appendages do not occur with the smallest GBW vessels, and that by and large the size-distribution of GBW vessels carrying an appendage closely resembles that of the FMTW (Fig. 4.60).

Table 4.62 Tell Sabi Abyad, Operation III. Size properties of Grey-Black Ware vessels (all estimates in mm; volume in litres)

	Total height	*Wall thickness*	*Rim diameter*	*Base diameter*	*Volume*
Mean	38.51	6.65	131.15	66.52	1.1
Minimum	11	2	60	40	0.3
Maximum	180	15	250	160	2.3
Std. Dev.	21.815	2.255	46.527	29.015	0.65
Sample size	127	213	74	23	14

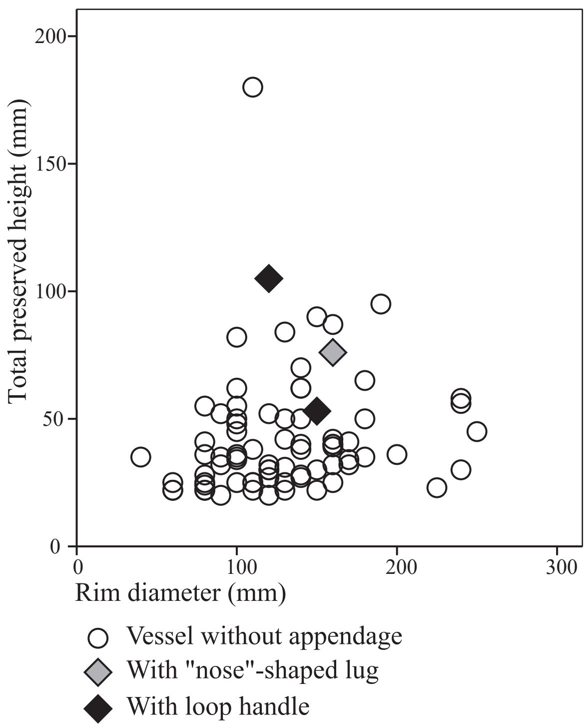


Fig. 4.60 Tell Sabi Abyad, Operation III. Plot of Grey-Black Ware total preserved height (mm) versus rim diameter (mm) and the distribution of various types of appendages (based on EVR).

4.5.5. Grey-Black Ware decoration

In practice, Grey-Black Ware was virtually a 'plain ware'. Decorated examples are rare (in the present sample: *n* = 7). The decoration focused exclusively on the exterior surface. The collection includes a single pattern-burnished sherd from level A1. Neither the motif nor the original shape of the vessel can be reconstructed. The excavations yielded a handful of incised sherds, one from a level B2 context, one from a mixed B-levels context, and the rest from strata attributed to the D-Sequence. The incisions were made with a fine, sharp tool when the clay had dried to a leather hard condition. Most of the incised vessels were probably small jars or S-shaped goblets. The incised style closely resembles what we know from Operation

I, where similar incised GBW occurs in the Pre-Halaf period and the early stages of the Transitional Period (Nieuwenhuyse 2007, 181). Characteristic GBW incised motifs, attested in Operation III as well, include diagonal crosshatching, a horizontal row of triangles filled with alternating diagonal lines, and a 'stand-alone', singular triangle of converging lines.

4.6. Mineral Coarse Ware

Mineral Coarse Ware is identified by a large quantity (20–35 volume %) of large (>1 mm), angular mineral inclusions, which mostly consist of crushed, crystalline calcite (Le Mière 2001, 181; Le Mière and Nieuwenhuyse 1996, 128; Nieuwenhuyse 2007, 80). There can be no doubt that these minerals constitute a deliberately added temper. In addition to the coarse mineral temper, the burnished, dark-coloured surfaces (2.5YR 3/2, dusky red, to 7.5YR 4/1, dark grey) permit their identification (Le Mière 2001, 181; Le Mière and Nieuwenhuyse 1996, 128, 147, 187).

Small quantities of MCW were retrieved from Operation III. With the exception of a few sherds from level A1, MCW does not occur at all in the A-levels; most examples come from the B-Sequence (Table 4.63). The strata attributed to the D-Sequence yielded some examples, too. The low-fired pottery is rather friable. Firing temperatures probably did not exceed 700°C for an extended period of time, as this would have affected the calcite crystalline matrix negatively (Schneider 1991, 106); refiring tests in the laboratory showed most samples falling apart at temperatures above 750°C (Nieuwenhuyse 2007, 80–81). The average rim radius is a mere 36°, much less than Standard Ware and even slightly below that of the Fine Mineral Tempered Ware. The radius furthermore shows a very low deviation from the average. This suggests that MCW is relatively susceptible to fragmentation, and is even less likely than the other wares to survive intact.

The most common MCW vessel type is the *Hole Mouth Pot*, with a rim diameter ranging between 11 cm and 26 cm (Figs. 4.122: 1–5). Occasionally these pots have an inwardly bevelled rim (*n* = 2). Two relatively shallow examples were classified as *Closed Convex-sided Bowls* rather than pots (Table 4.64). It would seem that most of the hole mouth pots carried at least one lug. MCW lugs are all of the same type: a solid conical lug that was attached onto the upper body close to the rim. The lugs are frequently found dissociated from their vessels. Often such isolated lugs show a protruding part on the distal surface. As many vessels show a corresponding perforation exactly on the spot where a lug was originally present, this suggests that lugs were attached to the vessel by way of a dowelled joint (Nieuwenhuyse 2007, 80). Interestingly, Operation III also yielded two examples of Mineral Coarse Ware *Jars* (Fig. 4.122: 6). This shape has so far not been attested previously with the MCW from Operation I, but one example was retrieved from the Middle Halaf levels of Operation II (Nieuwenhuyse 1997, 241, fig. 8.3). One of the two examples from Operation III came from the D-Sequence, dated to the Middle Halaf period.

Table 4.63 Tell Sabi Abyad, Operation III. Frequencies of Mineral Coarse Ware by level (Raw Counts)

Level	*Rim sherd*	*Body sherd*	*Base sherd*	*Other*	*Total*
D-Sequence	9	14	1	1	25
C-Sequence	1	3	–	–	4
B mixed	5	19	–	–	24
B1	1	7	–	1	9
B4	2	8	2	–	12
B5	1	–	–	–	1
B6	1	–	–	–	1
B8	2	5	–	–	7
A1	1	1	1	–	3
Total	23	57	4	2	86

4.7. Dark-Faced Burnished Ware

So-called *Dark-Faced Burnished Ware* represents an intriguing element of the ceramic assemblage at Tell Sabi Abyad and many other Late Neolithic sites in Upper Mesopotamia (Figs. 4.123: 1–20). On the northern Syrian plains this category represents an unequivocal candidate of a non-local, imported ware, even if the precise region of origin remains to be established. First coined by the Braidwoods in the Amuq (Braidwood and Braidwood, eds., 1960), the term DFBW was adopted by Le Mière to draw attention to a category of mineral-tempered ceramics that clearly was of non-local origin at sites spread across northern Iraq, northeastern Syria and southeastern Anatolia (Bader *et al.* 1994; Le Mière 1989, 2000, 129, 2001, 180; Le Mière and Nieuwenhuyse 1996, 126–127; Le Mière and Picon 1987, 1998). The geological and chemical

Table 4.64 Tell Sabi Abyad, Operation III. Frequencies of Dark-Faced Burnished Ware types by level (based on EVR)

	A1	*B8*	*B6*	*B5*	*B4*	*B1*	*Mixed B*	*C-Sequence*	*D-Sequence*	*Total*
Uncertain	–	1	–	1	–	–	3	–	1	6
Closed convex-sided bowl	1	–	–		–	–	–	–	1	2
Hole mouth pot	–	1	1		1	1	2	1	6	13
Jar	–	–	–		1	–	–	–	1	2
Total	1	2	1	1	2	1	5	1	9	23

properties of the clay made it clear that the pottery must have derived from ophiolite-bearing formations, as indeed does the DFBW from the Amuq valley.

However, renewed work in the Northern Levant and in the Amuq itself has highlighted stylistic differences as well as differences in chemical composition between the Northern Levantine DFBW and the eponymous Upper Mesopotamian group (Balossi 2004; Nieuwenhuyse 2009a; Tsuneki *et al.* 1997, 1998, 1999, 2000). The use of a singular term is therefore positively misleading, as by now it covers a very heterogeneous group of mineral-tempered ceramics with 'dark' and burnished surfaces. We shall nonetheless retain the term for the sake of consistency with previous work but it is stressed that the Upper Mesopotamian variety of DFBW is not the same pottery as known by the same term in the Northern Levant. Previously it has been tentatively suggested that the Upper Mesopotamian variety originated from the area to the north and northwest of the Balikh basin, between the upper courses of the Euphrates and Tigris rivers (Nieuwenhuyse 2007, 84–85).

Leaving the issue of terminology and origins aside, in the field we attributed sherds to the category of DFBW on the basis of the definition provided by Le Mière (Le Mière 2000, 129, 2001, 180; Le Mière and Nieuwenhuyse 1996, 126–127). The main criterion was the combination of: 1) large (>1 mm) and often very large (>2 mm), mainly black mineral inclusions; 2) the absence of plant temper; 3) the colour of the vessel surface and fabric, which varies from red to black but which is mainly chocolate-brown or dark grey. Importantly, this definition conflates two distinct modes of firing, *viz*. oxidising and purposely reducing. Most of the DFBW was fired in oxidising circumstances, resulting in a characteristically dark and chocolate brown surface (10R 3/4, dusky red, 2.5YR 5/4, reddish brown, 5YR 4/4, reddish brown). Some of the sherds shade into grey or dark-grey, but in these cases the dark colour resulted either from the raw materials used or from the use of the vessels over a fire. These vessels were often red-slipped or painted (10R 3/6, dark red, 10R 4/8, red). In contrast, a purposely-reduced firing was found with a restricted proportion of the Dark-Faced Burnished Ware (some 10% of all sherds counted). This firing led to a homogeneous dark-grey to black surface (5YR 2.5/1, black, 2.5YR 2.5/1–10R 2.5/1, reddish black). Both firing modes are associated with a similar fabric, but they differ in vessel shape and decoration. Pattern-burnished decoration and bowls with ridged walls, for instance, are associated mainly with a reduced firing.

Following this definition, Dark-Faced Burnished Ware does not appear to be present at Tell Sabi Abyad before ca. 6300 cal BC. If we exclude a single sherd from level A2, this pottery exists in very small quantities in level A1. In meaningful quantities it forms part of the ceramic assemblage throughout the B-Sequence and beyond into the Early Halaf (Table 4.65). Our raw counts yielded several examples from the D-Sequence; however, as shall be argued below, these specimens are almost certainly unrelated to the Middle Halaf building remains associated with the D-Sequence and instead must belong to the underlying Pre-Halaf strata (Chapter 11).

Table 4.65 Tell Sabi Abyad, Operation III. Frequencies of Dark-Faced Burnished Ware by level (Raw Counts)

Level	*Section*	*Rim sherd*	*Body sherd*	*Base sherd*	*Other*	*Total*
D-Sequence	–	4	74	–	–	78
C-Sequence	1	5	14	–	–	20
Mixed B	–	14	140	4	1	159
B1	–	2	5	–	–	7
B2	–	–	20	–	–	20
B3	–	1	3	–	–	4
B4	–	2	38	–	–	40
B5	–	–	8	–	–	8
B6	–	–	4	–	–	4
B7	–	1	–	–	–	1
B8	–	7	24	–	–	31
A1	–	5	5	1	–	11
A2	–	–	1	–	–	1
Total	1	41	336	5	1	384

The Dark-Faced Burnished Ware from Operation III is very fragmented. The sample yields not a single complete vessel and just one complete profile (Table 4.65). The average radius of the extant rim fragments measures 47°. This comes close to that of the Standard Ware, but it is much larger than the earlier mineral-tempered categories and also much more than Mineral Coarse Ware. The compact fabric and superior strength of the DFBW made this pottery relatively resistant to mechanical-stresses and to (post-) depositional processes.

The DFBW vessel shapes retrieved from Operation III closely mirror the repertoire found earlier in Operation I (Nieuwenhuyse 2007, 127–132). As in Operation I, the majority of all DFBW vessels are bowls (Table 4.66). This includes one *Straight-sided Bowl with a multiple ridged wall*. The *Hole Mouth Pots* (Figs. 4.123: 8–9) were, in fact, re-used jars; after the neck of these jars was removed the resulting break was grinded into a new rim, after which the vessel continued its use life as a closed, hole mouth shape (Nieuwenhuyse 2007, 128–129). Another example of pottery reuse is seen in a few examples of *Re-used necks* (Figs. 4.123: 10–12). It remains uncertain what these isolated necks were used for. The excavations in Operation I yielded several instances of curated DFBW necks deposited *in situ* on room floors (Verhoeven and Kranendonk 1996, 53). They may have been used as pot stands. The few DFBW jars from Operation III have necks varying between 11 cm and 15 cm in diameter, with a neck height of between 2 and 8 cm. With such examples any attempt at sub-dividing them on the basis of size would be meaningless. If we simply adopt the criteria previously established

Table 4.66 Tell Sabi Abyad, Operation III. Frequencies of Dark-Faced Burnished Ware vessel types by level (based on EVR)

	A1	*B8*	*B7*	*B4*	*B3*	*B1*	*Mixed B*	*C-Sequence*	*D-Sequence*	*Total*
Uncertain	–	4	1	–	–	1	6	–	–	12
Everted convex-sided bowl	1	–	–	–	–	–	–	–	–	1
Bowl with multiple ridged wall	–	–	–	–	–	–	–	–	1	1
Straight-sided bowl	1	–	–	–	–	–	1	–	–	2
Everted S-shaped bowl	1	–	–	–	–	–	–	–	–	1
Closed S-shaped bowl	–	1	–	–	–	–	2	1	1	5
Hole mouth pot	–	–	–	–	–	–	1	3	–	4
Jar	2	2	–	2	1	–	4	–	1	12
Reused jar neck	–	–	–	–	–	1	–	1	1	3
Total	5	7	1	2	1	2	14	5	4	41

Table 4.67 Tell Sabi Abyad, Operation III. Frequencies of Dark-Faced Burnished Ware decoration by level (Raw Counts)

Level	*Plain*	*Slipped*	*Painted*	*Incised*	*Painted & Incised*	*Pattern-burnished*	*Total*
D-Sequence	64	11	1	–	1	3	80
C-Sequence	9	11	–	–	–	–	20
Mixed B	116	30	2	5	5	1	159
B1	5	2	–	–	–	–	7
B2	15	5	–	–	–	–	20
B3	4	–	–	–	–	–	4
B4	27	5	2	1	2	3	40
B5	4	4	–	–	–	–	8
B6	3	1	–	–	–	–	4
B7	–	1	–	–	–	–	1
B8	15	7	1	4	4	–	31
A1	6	2	–	–	2	1	11
A2	1	–	–	–	–	–	1
Total	269	79	6	10	14	8	386

(Nieuwenhuyse 2007, 130), most of them would counts as '*Small Jars*' (Figs. 4.123: 13–14). No 'large restricted jars' with tall necks were attested in the Operation III sample.

Finally, the decorative styles found with the Dark-Faced Burnished Ware are very distinctive, and differ strongly from those seen with the other groups. Often this makes identifying this pottery in the field relatively easy. The exact proportion of decorated DFBW, of course, varies with the quantification method preferred. In terms of Raw Counts, about one-third of all Dark-Faced Burnished Ware sherds were decorated (Table 4.67); in terms of EVR this proportion rises to about 60%. The decoration concentrated upon the exterior; the interior was either left plain or simply painted along the rim. Decorative techniques include slipping, painting, incising, and pattern-burnishing. Pattern-burnishing was not common. This technique was employed mostly, though not exclusively, on bowls (e.g. Fig. 4.123: 15). Incised decoration was much more characteristic. This is usually found in combination with slipping or painting (Figs. 4.123: 18–20). Characteristic for Dark-Faced Burnished Ware are large semi-circular painted 'rainbows' covering the entire upper body (e.g. Pl. 12.2). The curvilinear spaces between the painted parts were filled with thin, curvilinear incised lines.

4.8. Fine Painted Ware

What has been termed *Fine-Painted Ware* is identified by a combination of: 1) a fine, compact clay matrix showing no plant inclusions but showing small particles of quartz or quartz sandstone, and 2) an intricately executed decorative style, using red pigments occasionally together with fine impressions (Le Mière and Nieuwenhuyse 1996, 169–170; Nieuwenhuyse 2007, 88). In addition, the small size of the vessels and their carefully finished surfaces are typical. This pottery was fired in oxidising circumstances, resulting in a pale surface and core (10YR 7/3, very pale brown), and a red to reddish-brown paint (2.5YR 3/4–6/6, red to dark reddish-brown). Operation III yielded only four examples, all from the later B-levels (B1–B3). They all represent *Small Jars* or goblets (Fig. 4.124: 4).

Table 4.68 Tell Sabi Abyad, Operation III. Frequencies of Orange Fine Ware by level (Raw Counts)

Level	*Rim sherd*	*Body sherd*	*Total*
D-Sequence	1	4	5
Mixed B	1	2	3
B1	–	1	1
B2	–	2	2
B4	1	1	2
A1	–	2	2
Total	3	12	15

Table 4.69 Tell Sabi Abyad, Operation III. Frequencies of Standard Fine Ware by level (Raw Counts)

Level	*Rim sherd*	*Body sherd*	*Base sherd*	*Total*
D-Sequence	42	275	8	325
C-Sequence	1	33	4	38
Mixed B	8	55	3	66
B1	3	32	2	37
B2	1	8	2	11
B4	2	–	–	2
B5	–	6	2	8
A4	–	1	–	1
Total	57	410	21	488

4.9. Orange Fine Ware

The so-called *Orange Fine Ware* was identified by the combined occurrence of: 1) the orange-pinkish surface colour (generally 5 YR 7/3, pink) combined with an orange-pinkish paint colour of the painted decoration and slips (2.5 YR 5/4, weak red); 2) a relatively coarse, largely mineral fabric predominantly of large pieces of calcium carbonate and mud rock. Occasionally sherds show plant inclusions in addition to minerals (Le Mière 2000, 132–134; Le Mière and Nieuwenhuyse 1996, 168; Nieuwenhuyse *et al.* 2001, 2002; Van As *et al.* 1998). In contrast to what its name suggests, then, OFW is not at all 'fine' but relatively coarse pottery. The coarse white calcium-carbonate particles in the clay often resulted in lime spalling and a pitted surface. The vessels are comparatively thick-walled, and the painted decoration did not reach the levels of stylistic complexity seen with the Standard Fine Ware (Pl. 12.3). The OFW was generally fired in oxidising circumstances, although incompletely oxidised, dark-grey cores are frequently seen with the thicker sherds.

OFW occurs in very low quantities in Operation III (n = 15). Two sherds recovered from level A1 are probably intrusive. With these two excluded, the OFW evidence in Operation III is largely limited to the upper B-levels (Table 4.68). From the few extant shapes we were able to reconstruct some convex-sided bowls, S-shaped bowls, and a few examples of straight-sided bowls (Figs. 4.124: 1–3).

4.10. Standard Fine Ware

The term *Standard Fine Ware* was adopted at Tell Sabi Abyad in Operation I for the light-coloured, generally dark-painted, fine mineral-tempered pottery that first appeared during the Transitional period (Le Mière and Nieuwenhuyse 1996, 160–161). Standard Fine Ware was identified in the field by a combination of the following criteria: 1) a finely-textured clay fabric with macroscopically visible fine mineral inclusions; 2) a light-coloured surface (2.5Y 8/1–8/2, pale yellow, to 10 YR 8/2–8/4, very pale brown); 3) an exterior surface that was carefully finished by smoothing, not by burnishing; 4) if painted, a mostly dark-brown or dark-grey paint colour (10YR 3/2, dark-greyish brown to 5YR 3/1, very dark grey) (Akkermans 1989b; Le Mière and Nieuwenhuyse 1996, 161–163, 178; Nieuwenhuyse 1999; Nieuwenhuyse 2007, 89–92).

As with most of the ceramic categories distinguished at Tell Sabi Abyad, SFW is not a homogeneous category. It covers considerable variation in ceramic technology both diachronically and synchronically. This may reflect a situation of multiple potters at work at the site or complex provenances – we know that some of the Standard Fine Ware reached the site from elsewhere (Le Mière and Picon 2008). It also reflects considerable technological and stylistic change taking place during the Transitional period (Nieuwenhuyse 2007). Whereas in the earliest Transitional period levels some of this pottery resembled the 'finer' ranges of the plant-tempered Standard Ware from the Pre-Halaf period, at the end of the Transitional period it had become hardly distinguishable from the Fine Ware of the succeeding Early Halaf. Standard Fine Ware can therefore be considered as the direct forerunner of Halaf Fine Ware. The use of a singular term suggests a spurious homogeneity, yet the limited excavations of Transitional period strata in Operation III do not allow to identify such changes (Nieuwenhuyse 2007).

Some five hundred sherds from Operation III were attributed to SFW. As Murphy's Law would have it, unhelpfully, their stratigraphic distribution is problematic (Table 4.69). The large majority come from the enigmatic D-Sequence and a few come from the C-Sequence. As both stratigraphic deposits are dated to the Halaf period based on contextual evidence, the SFW in these levels must be considered intrusive. A single sherd from level A4, too, can only be considered as anachronistic. In all likelihood the few SFW sherds from level B5 and, perhaps, B4 are intrusive as well. In sum, the only reliable stratigraphic contexts for the SFW from Operation III may be levels B1 and B2, both dated to the Transitional period.[30] This material is fairly well fragmented. No complete shapes were found, and the average radius of the extant rim fragments was 47°.

The clay composition predominantly displays fine mineral inclusions when viewed macroscopically. However, microscopic analysis has revealed these to be mostly light-coloured calcium carbonate particles and quartz, although occasionally other types of minerals are found (Nieuwenhuyse 2007, 89). Plant inclusions are virtually absent from this category, but periodically occur in addition to fine mineral inclusions in the earliest stages of the Transitional period (Nieuwenhuyse 2007, 92). In the sample from Operation III no more than 6% of all SFW sherds showed a low density of fine plant inclusions. On the whole, some 10% of the SFW from Operation III has no macroscopically visible inclusions whatsoever. At Operation I this fabric type became more common towards the final stages of the Transitional period (Nieuwenhuyse 2007, 92). Through time Transitional potters developed cleaner, more compact clays from which both organic and mineral impurities were carefully removed.

Apart from the clay fabric, perhaps the most conspicuous aspect of the Standard Fine Ware in terms of its ceramic technology was the dark-on-light effect of the painted decoration. This must be attributed to the development of technologies to control alternating oxidising-reducing-reoxidising cycles during the firing when applied to iron-rich pigments (Nieuwenhuyse *et al.* 2001; Noll 1976, 1977, 1991; Robert 2010; Steinberg and Kamili 1984; Van As *et al.* 1998; Všiansky and Mateiciucová 2017). Even if pigment colours were in fact quite variable and we should certainly not over-estimate the 'blackness' of the SFW painted decoration, it appears safe to suggest that the potters deliberately aimed at producing dark-on-light vessels. While vessels painted in red (2.5YR4/6, 10R4/6), yellowish red (5YR5/6), brown (7.5YR4/2–5/4), or reddish brown (2.5YR4/4, 5YR4/3) occur frequently, pigments in black (2.5Y2.5/1, 10YR2/1), dark-grey (5Y4/1) or very dark grey (5Y3/1, 10YR3/1) were the most common. Often the paint colour varied from reddish to black on the same vessel, a clear sign of fluctuating oxygen levels during the firing and attempts by the potters to keep these fluctuations under control (Noll 1991). These paints contrast sharply against the characteristic pale brown to pale yellow surface (Table 4.70). A few greenish sherds suggest they were fired at temperatures somewhat too high for the very calcareous clays available to the potters, but no misfired or warped items were recovered from Operation III.

Table 4.70 Tell Sabi Abyad, Operation III. Frequencies and percentages of Standard Fine Ware exterior surface colour (Munsell; based on diagnostic sample)

	N	*%*
Light grey (2.5Y7/2. 10YR7/2)	2	5.0
Very pale brown (10YR7/3–8/4)	28	54.0
Pale yellow (2.5Y7/3. 8/2–8/3. 5Y7/4)	11	21.0
White (2.5Y8/1)	2	5.0
Pink (7.5YR7/3–8/3)	12	15.0
Total	55	100.0

In terms of vessel shape, the Standard Fine Ware from Operation III corresponds very closely to the typology established already for Operation I (Nieuwenhuyse 2007). We simply listed the typological classification according to the previously established framework (Table 4.71). Especially characteristic are various types of bowls with a carinated profile (Figs. 4.124: 7–8), and the so-called *Low-collared Bowls* (Figs. 4.124: 13–16). The latter represent the earliest examples of carinated vessels with a collar and hence are the immediate precursors of the cream bowls of the Early Halaf. The jars were sub-divided on the basis of the size of their neck (Nieuwenhuyse 2007: 138). Most common are *Small Jars*, with a low neck and a rim diameter less than 12 cm (Figs. 4.125: 4–6), and *Medium-sized Jars* with a rim diameter between 12 cm and 20 cm (Figs. 4.125: 2–3). In addition, a single example was found of a so-called *Tall-necked Jar*, a vessel shape characterised by a long, narrow neck with a height of about 14 cm and a restricted diameter of 13 cm (Fig. 4.125: 1).

Only very few SFW shapes were sufficiently complete to facilitate computing their volume content (n = 10). These produced an average volume of about one litre.

Table 4.71 Tell Sabi Abyad, Operation III. Frequencies of Standard Fine Ware vessel types by level (based on EVR)

	B4	*B2*	*B1*	*Mixed B*	*C-Sequence*	*D-Sequence*	*Total*
Uncertain	–	–	1	1	1	15	18
Everted convex-sided bowl	–	–	–	–	–	1	1
Vertical convex-sided bowl	–	–	–	1	–	–	1
Straight-sided bowl	–	–	–	2	–	6	8
Everted straight-sided carinated bowl	–	–	–	2	–	–	2
Low, carinated bowl	–	–	–	–	–	3	3
Vertical S-shaped bowl	–	–	–	–	–	1	1
Everted S-shaped bowl	–	–	–	–	–	3	3
Closed S-shaped bowl	–	1	–	–	–	3	4
Short-collared bowl	–	–	1	–	–	3	4
Small jar	–	–	–	2	–	4	6
Medium-sized jar	1	–	1		–	3	5
Tall-necked jar	1	–	–		–		1
Total	2	1	3	8	1	42	57

Table 4.72 Tell Sabi Abyad, Operation III. Frequencies of Standard Fine Ware exterior surface decoration (Raw Counts)

	Rim sherd	*Body sherd*	*Base sherd*	*Total*
Plain	8	230	18	256
Painted	47	174	3	224
Painted and incised	1	3	–	4
Incised or impressed	1	3	–	4
Total	57	410	21	488

The small sample is certainly not representative, though, as it includes only bowl types and a few Small Jars; the larger jars must have been considerably more capacious. As such, the sample perhaps says something on the generally limited volume content of Standard Fine Ware bowls, which range from 0.2 litres to 2 litres. That is, they would be of about similar size as Fine Mineral Tempered Ware and Grey-Black Ware shapes.

The Standard Fine Ware from Operation III was frequently decorated. In terms of basic sherd counts, some 48% of all SFW sherds were painted (Pl. 13.1). However, this statistic ignores the contextual complexities, mixing the few contexts considered to be stratigraphically secure - levels B1 and B2 – with the mess that is the D-Sequence. If we look at these two secure levels alone, the proportions of decorated SFW are respectively 51% and 64% (Raw Counts). In terms of EVR the overall proportion of decorated SFW is 86%, which closely matches estimates from Operation I (Nieuwenhuyse 2007, 189).

The decoration consists almost exclusively of painting. In addition, a few examples were found of painted-and-impressed sherds, as well as sherds with incised or impressed decoration without painting (Table 4.72). These probably originate from vessels that originally were painted in combination with incising or impressing. One intriguing small bowl, however, clearly was incised without being painted (Fig. 4.124: 10). This rare example may be the only example so far from Tell Sabi Abyad that perhaps compares to what is known in northern Iraq as 'Standard Hassuna Incised' pottery (Lloyd and Safar 1945).

Characteristic for the Standard Fine Ware painted decoration is the emphasis on band patterns: motifs that were repeated in a horizontal direction by translation symmetry. These motifs were usually 'bounded', in the sense that they were firmly attached to structural lines. Free-floating motifs do occur now and then, but overall, they were exceptionally rare. The potters followed 'grammar rules' when dividing the empty vessel surface into zones suitable for decoration. They usually placed horizontal bands on the lip, the shoulder, and the point of maximum body diameter. However, potters at Tell Sabi Abyad were flexible in deciding at what stage in the operational sequence these structural bands should be painted. They often began with the structural lines, followed by filling-in the motifs, but in many cases they painted the motifs first and finished with the structural bands (Castro-Gessner 2013). Additionally, 'optional' lines were frequent (e.g. Pl. 13.1: 3, 4, 11); at the end of the Transitional period potters increasingly applied such optional lines (Nieuwenhuyse 2007, 191–192). The frequent presence of optional lines seen with the SFW sherds from Operation III suggest a date in the later stages of the Transitional period for most of the material.

Standard Fine Ware painted decoration prioritised the exterior surface: the interiors were often left plain, or they gained a simple band along the rim. Less often they show wavy bands or so-called 'dancing ladies' (Fig. 4.124: 16). Most of the motifs observed in Operation III have already been attested elsewhere at Tell Sabi Abyad, for instance in Operation I (Akkermans 1988; Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007, appendix II), but a few have not been seen before at the site. The motifs suggest a date in the later stages of the Transitional period for the Operation III material, for instance the 'church windows'-like vertical bars, always placed as the uppermost motif immediately below the rim (Fig. 4.125: 3; Pl. 13.1: 11), the 'birds on telegraph wire' dots on horizontal lines (Fig. 4.124: 13, also Figs. 12.15: 10, 12), or the frequent horizontal and diagonal crosshatchings.

4.11. Halaf Fine Ware

The excavations in Operation III yielded a large number of *Halaf Fine Ware* sherds (n = 2033). Halaf Fine Ware at Tell Sabi Abyad is identified in the field by a combination of: a) a compact fabric lacking macroscopically visible plant or mineral inclusions except the occasional calcium carbonate particle, b) a light surface colour indicating oxidising or neutral firing conditions, c) vessel shapes and painted decoration typical for the Halaf period (for discussions, see Akkermans 1988, 1993, Le Mière and Nieuwenhuyse 1996, 178-184).

If identifying Halaf Fine Ware by itself may seem fairly straight forward, its stratigraphic context within Operation III is complicated, to put it mildly. The excavations led to the identification of two distinct stratigraphical deposits that can be dated to the Early Halaf and the Middle to Late Halaf periods on the basis of the ceramics, *viz*. the C-Sequence and the D-Sequence, respectively (Chapter 2). Complications arise because not all the pottery excavated from these stratigraphic units dates to the Halaf period. The D-levels are especially very mixed (Chapter 11). Further, much of the Halaf Fine Ware retrieved from Operation III does not derive from either of these two deposits at all. Instead it comes from much older A-levels or B-levels, or from strata attributed to the Late Bronze Age or even later periods (Table 4.73). The Early Halaf and a Middle-Late Halaf phase can clearly be identified within the Halaf Fine Ware on stylistic and typological grounds, but these two phases do not neatly separate stratigraphically: The D-levels contain both Early Halaf and Middle Halaf Fine Ware.

A somewhat pessimistic conjecture would be that building activities during the Halaf period itself together with the massive construction activities in the Late

Table 4.73 Tell Sabi Abyad, Operation III. Frequencies of Halaf Fine Ware by level, including Late Bronze Age, Islamic period and top soil levels (Raw Counts)

Level	*Complete*	*Section*	*Rim sherd*	*Body sherd*	*Base sherd*	*Other*	*Total*
Top soil	2	7	11	250	4	–	274
Islamic	–	–	1	36	2	–	39
Late Bronze Age	–	–	85	839	5	1	930
D-Sequence	–	1	44	309	12	–	366
C-Sequence	–	3	3	7	–	–	13
Mixed B	–	5	32	–	–	–	37
B4	1	1	24	227	3	–	256
B5	–	–	–	2	–	–	2
B7	–	–	–	1	–	–	1
B8	–	–	5	13	–	–	18
Mixed A	–	–	–	4	–	–	4
A1	–	–	6	70	–	–	76
A3	–	–	2	3	–	–	5
A4	–	–	1	7	–	–	8
A5	–	–	–	3	–	–	3
A12	–	–	–	1	–	–	1
Total	3	17	214	1772	26	1	2033

Table 4.74 Tell Sabi Abyad, Operation III. Frequencies of Halaf Fine Ware sherds by trench, distinguishing between Early Halaf and Middle–Late Halaf periods on typological grounds (Raw Counts)

Period	*D4*	*E3*	*E4*	*F4*	*G3*	*G5*	*H4*	*H5*	*I2*	*I3*	*J3*	*J4*	*J5*	*K5*	*Total*
Early Halaf	–	–	–	–	–	–	–	–	3	35	11	3	76	–	128
Middle–Late Halaf	–	–	–	–	–	–	–	–	–	–	–	–	553	–	553
Stylistically unclear	1	5	10	1	4	27	24	41	–	–	–	–	–	7	120
Total	1	5	10	1	4	27	24	41	3	35	11	3	629	7	801

Bronze Age and subsequent periods severely damaged the deposits in Operation III. Following this theory, later material would be significantly intermingled into the Early Pottery Neolithic strata. We know that Halaf sherds were included in Late Bronze Age mud bricks as building material (Nieuwenhuyse 1997; see Chapter 13.2 for a discussion of LBA depositional practices in Operation III). As a result, we have found a strong correlation between the presence of Late Bronze Age and Halaf period pottery. The Halaf sherds recovered from the A-levels and B-levels are somewhat more fragmented than those from the C-levels and the D-levels. This would support their interpretation as intrusive material. Thus, apart from the C-Sequence, none of the Halaf material should be trusted at face value. *Vice versa*, those earlier levels that contain a significant proportion of intrusive Halaf material should be treated with healthy suspicion as well. In this scenario the Halaf pottery from Operation III would largely reflect post-Halafian disturbances.

On closer inspection we may arrive at a less grim verdict. If we examine the spatial distribution of the Halaf material in Operation III, it appears that if the topsoil, Islamic burial pits and Late Bronze Age contexts are excluded, most of the remaining Halaf Fine Ware clusters in two spatially distinct parts of the site. Moreover, these two spatial clusters *do* separate according to phase (Table 4.74). Material typologically attributed to the Early Halaf predominantly stems from the northwestern corner of Operation III (trenches I2, I3, J3, and J4). The material from trench J5 on the other hand all fits nicely with the later Halaf. The major exception in this trench is a somewhat mysterious silo-like construction (silo AR), dug into the Pre-Halaf levels of the B-Sequence. The fill of this feature yielded, among others, Halaf Fine Ware pottery that dates to the Early Halaf. Guided by these attributions, we present the Halaf Fine Ware in two semi-chronological groups, *viz*. Early Halaf (trenches I2–3, J3–4, and silo AR) and Middle Halaf (trench J5 minus silo AR) (Table 4.75). The Halaf Fine Ware sherds scattered across the other trenches represent a much more diffuse pattern, and shall henceforward simply be ignored.

In terms of raw materials and clay preparation, the Halaf Fine Ware from Operation III corresponds quite well to the picture of Halaf pottery established elsewhere at Tell Sabi Abyad (Akkermans 1988, 1993; Nieuwenhuyse 1997, 2007); indeed, this aligns well with evidence from Halafian sites across Upper Mesopotamia. We detected no macroscopic differences in clay fabric between the earlier

Table 4.75 Tell Sabi Abyad, Operation III, trenches I2–3, J3–4, and J5. Frequencies of Halaf Fine Ware by typological phase (Raw Counts)

Period	*Complete*	*Section*	*Rim sherd*	*Body sherd*	*Base sherd*	*Total*
Early Halaf	3	11	13	101	–	128
Middle–Late Halaf	–	1	63	474	15	553
Total	3	12	76	575	15	681

Table 4.76 Tell Sabi Abyad, Operation III. Frequencies and percentages of Halaf Fine Ware exterior surface colour (Munsell), distinguishing between typological phase (based on diagnostic sample)

	Early Halaf		*Middle Halaf*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*
White (2.5Y8/1)	1	3.7	1	1.5	2	1.9
Light grey (2.5Y7/2. 10YR7/2	2	7.4	1	1.5	3	2.9
Pale brown (10YR6/3)	1	3.7	–	–	1	1.0
Very pale brown (10YR7/3–8/4)	18	66.7	32	41.8	50	48.1
Pale yellow (2.5Y7/3. 8/2–3)	4	14.8	6	7.8	10	9.6
Yellow (10R7/8)	–	–	1	1.5	1	1.0
Reddish yellow (7.5YR8/6)	1	3.7	–	–	1	1.0
Light reddish brown (2.5YR7/4)	–	–	3	3.9	3	2.9
Reddish brown (2.5YR5/4)	–	–	1	1.5	1	1.0
Brown (7.5YR5/4)	–	–	1	1.5	1	1.0
Light brown (7.5YR6/3–7/2)	–	–	3	3.9	3	2.9
Pinkish white (7.5YR8/2)	–	–	1	1.5	1	1.0
Pink (7.5YR7/3–8/3)	–	–	23	29.9	23	22.1
Light red (2.5YR6/6–6/8)	–	–	2	2.7	2	1.9
Total	27	100	75	100	104	100

and later Halaf sherds from Operation III. However, subtle differences in firing strategies may perhaps be observed which affected both the surface colour and pigment colours. In general, the Halaf sherds mostly have an even, light-coloured, 'oxidised' section throughout. A light grey, slightly incompletely oxidised core is uncommon (ca. 13% of all sherds), whereas dark grey and reduced cores are virtually absent. However, the two main stages seem to differ in the preference for particular firing strategies. As to the Early Halaf, the characteristic creamy-white surface colour (10YR7/3–8/4, very pale brown) together with the characteristic dark-coloured paint (10YR2/1, black, to 5YR3/1, very dark grey) indicates neutral firing circumstances in the kilns. The Early Halaf potters had extraordinary control over alternating oxygen levels during the firing (Nieuwenhuyse 2007, 94–96). This strategy for firing iron-rich pigments aimed at producing a dark-on-light contrast between the surface background and painted decoration. These skilled craft persons continued practices initially developed during the Transitional period for the Standard Fine Ware.

A good part of the Middle-Late Halaf from Operation III, on the other hand, displays a bright orange or pinkish surface and section (7,5YR7/3, pink), together with orange-reddish pigments (2,5YR4/6–4/8 to 10R4/6, red) indicating oxidising circumstances (Table 4.76). Dark paints on oxidised backgrounds certainly remained part of the later Halaf technological repertoire but they no longer represented the previously-exclusive majority. In the Operation III material, incompletely oxidised, light-greyish cores are much more common with the later Halaf material than with the Early Halaf sherds.[31] After the Early Halaf phase potters moved away from the strong emphasis on producing dark-on-light ceramics, developing instead a wider range of surface colours and paints. The later Halaf sample even includes one attempt at producing a bichrome paint (Pl. 14.1: 3).

The Early Halaf shape typology closely mirrors the framework established in earlier work (Akkermans 1988; Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007, 141–143) (Table 4.77). Characteristic open shapes include *Everted Straight-sided Bowls* (Figs. 4.126:1-6), *Low Carinated Bowls* (Fig. 4.126: 13) and *Small Cream Bowls* (Figs. 4.126: 8–12). The latter were invariably painted with horizontal crosshatches. The later Halaf yielded a range of shapes known quite well from Middle to Late Halafian sites in the Balikh Valley not far from Tell Sabi Abyad, including Tell Damishliyah (Akkermans 1988) and Khirbet es-Shenef (Akkermans 1993; Akkermans and Wittmann 1993). At Tell Sabi Abyad itself, similar material was excavated in the late 1980's in limited quantities on the northeastern mound (Nieuwenhuyse 1997). These included a series of bowls with a convex or an S-shaped contour

Table 4.77 Tell Sabi Abyad, Operation III. Frequencies of Halaf Fine Ware vessel type, distinguishing between typological phase (based on EVR)

	Early Halaf	*Middle Halaf*	*Total*
Uncertain	1	14	15
Bowl – unspecified	–	10	10
Everted CVS bowl	–	7	7
Vertical CVS bowl	–	2	2
Closed CVS bowl	–	1	1
Everted Straight-sided bowl	7	–	7
Miniature everted straight-sided bowl	2	–	2
Straight-sided bowl 'unspecified'	–	4	4
Carinated everted straight-sided bowl	1	–	1
Low, carinated bowl	2	–	2
Vertical S-shaped bowl	–	1	1
Everted S-shaped bowl	–	1	1
Small cream bowl	5	1	6
Large cream bowl	1	1	2
Wide, globular bowl with low collar	–	4	4
Large, steep cream bowl ('*Trichterrandbecher*')	–	9	9
Large cream bowl with curved mouth	–	1	1
Small jar	3	3	6
Large restricted jar	2	2	4
Total	24	61	85

(Figs. 4.128: 1–9), *Large Cream Bowls* (Fig. 4.129: 1), *Wide Globular Bowls with a low collar* (Figs. 4.129: 2–4), and a large, steep variety of the cream bowl known as '*Trichterrandbecher*' (Table 4.77). The latter display a degree of standardisation in the way they were decorated, often showing stylised bucrania captured between vertically arranged dots (Figs. 4.130: 1–6). The collection includes a heterogeneous group of rim fragments classified as '*bowls – unspecified*', many of which were probably *Trichterrandbecher*, of which the carination and lower parts had not been preserved (Figs. 4.128: 11–16). One vessel carried a small pierced knob, a feature characteristic for Middle-Late Halaf pottery in the Balikh (Akkermans 1993).

Closed shapes with a neck constitute a minority of the Halaf Fine Ware from Operation III. Jars constitute some 21% of the Early Halaf sample (in terms of EVR), a proportion which ranks significantly below estimates for the Early Halaf in Operation III (Nieuwenhuyse 2007, 141). The Middle Halaf subset contains even less jars (some 8% in terms of EVR). Following earlier work (Nieuwenhuyse 2007, 138–139, 142) we distinguished different types of jars on the basis of the size of their neck, taking neck size as an indicator for overall vessel size. This resulted in only two types of Halaf Fine Ware jars among the Operation III material: *Small Jars* (rim diameter less than 10 cm; Figs. 4.127: 4–6, 4.129: 7–8) and *Large restricted jars* (with a neck height over 7 cm and a rim diameter up to 18 cm; Figs. 4.127: 1, 4.129: 5–6).

We draw special attention to one unique vessel from the later Halaf context: A *Large Cream Bowl with a Curved Mouth* (Fig. 4.130: 7; Pl. 14.2.5). Although only part of the vessel had been preserved, the curving, petalled mouth clearly was intentional; it did not result from faulty shaping or some unfortunate firing. This fascinating vessel is quite large – in effect it represents the largest cream bowl so far found at Tell Sabi Abyad. The painted decoration of this cream bowl is reminiscent of the two-dimensional chequer board patterns found with the Large cream bowls from the Early Halaf period (Nieuwenhuyse 2007, 143). An important difference lies with the design structure. The later Halaf potter ignored the structural boundary between the neck and the upper body; the painted motif went down from the rim onto the body with no disruption. Parallels for this intriguing vessel come from Kerküşti Höyük (Sarıaltun 2013, fig. 45.10: a) and from Tell Halaf itself (Von Oppenheim and Schmidt 1943).[32] Interestingly, apart from the similarity in shape the Tell Halaf bowl shows resemblances in the design structure as well. The motifs identified at the two sites are not the same but on the Tell Halaf bowl, too, the painted decoration crosses the transition from neck to body without disruption.

It is possible that cream bowls became larger by the later Halaf period at Tell Sabi Abyad. Plotting rim diameters versus vessel height for the various types of cream bowls from Operation III shows that the earliest types are fairly small, whereas later varieties, including the *Trichterrandbecher*, all became wider and taller (Fig. 4.61: left). Only few Halaf Fine Ware vessels were sufficiently complete as to permit the reconstruction of their volume content (n = 29). Given these low numbers plus the stratigraphic-chronological issues we shall refrain from listing detailed volume statistics for each type separately. In general, the average volume measured for Halaf Fine Ware items was 2.2 litres, but this statistic cannot be seen as representative for Halaf Fine Ware vessel shapes as a whole. The sample includes just a single relatively voluminous vessel, a Large Restricted Jar containing 12.7 litres. Interestingly enough, however, these estimates corroborate the impression that the 'earlier' types were (much) less voluminous (Fig. 4.61: right). The small cream bowls, for instance range from as little as 0.4 litres to maximally 1.2 litres, with an average capacity of 0.8 litres; an Early Halaf low, carinated bowl held only 0.3 litres. The Early Halaf everted straight-sided bowls, distinctly larger, never went beyond three litres, with an average capacity of 2.2 litres. However, the Everted convex-sided bowls, typologically dated to the later Halaf, held 1.7 litres on average with some examples holding over three litres. The *Trichterrandbecher* ranged from three to nine litres with an average of 5.1 litres, while the large cream bowl with a curved mouth carried up to 6.6 litres (Fig. 4.61: right).

Table 4.78 Tell Sabi Abyad, Operation III. Rim diameter (mm) of Halaf Fine Ware types

Rim diameter	*Mean*	*Min*	*Max*	*Std. Dev.*	*N*
Everted CVS bowl	200	120	260	54.5	7
Vertical CVS bowl	90	60	120	42.5	2
Closed CVS bowl	80	80	80	–	1
Everted Straight-sided bowl	206	190	220	11.3	7
Miniature everted straight-sided bowl	73	70	75	3.5	2
Straight-sided bowl 'unspecified'	185	140	280	64.0	4
Carinated everted straight-sided bowl	200	200	200	–	1
Low, carinated bowl	130	120	140	14.1	2
Vertical S-shaped bowl	170	170	170	–	1
Everted S-shaped bowl	120	120	120	–	1
Small cream bowl	140	100	200	34.1	6
Large cream bowl	180	160	200	28.3	2
Wide, globular bowl with low collar	278	250	320	30.9	4
Large, steep cream bowl ('*Trichterrandbecher*')	251	150	380	65.6	8
Large cream bowl with curved mouth	270	270	270	–	1
Small jar	73	45	90	20.9	6
Large restricted jar	140	100	180	36.5	4
All Halaf Fine Ware types	170	45	380	78.5	59

Halaf Fine Ware was very often decorated; painting was the only technique employed. The extraordinary versatility of the Halaf potters in creating complex geometric painted designs has made their works rightly famous. Interestingly, if the chronological attributions are to be trusted, the Halaf Fine Ware from Operation III points to a decrease in the proportion of painted Fine Ware vessels by the later Halaf. In terms of Raw Counts, some 67% of all Early Halaf Fine Ware sherds were decorated, as opposed to 50% in the later Halaf strata. When we consider the EVR estimates for the same material, some 90% of all Early Halaf Fine Ware vessels were painted, a figure that sank to about two-thirds of all vessels during the later Halaf. This trend also holds for the interior decoration. No more than some 8% of all Early Halaf Fine Were vessels had an unpainted interior surface. This proportion rose to 25% during the Middle-Late Halaf phase. Unpainted Halaf Fine Ware vessels largely were bowls, with most of them belonging to the category of *Everted straight-sided bowl* (Figs. 4.128: 15–16).

The Early Halaf Fine Ware from Operation III corresponds closely to the painted style already described for Early Halaf ceramics from Operation I and Operation II (Akkermans 1993; Nieuwenhuyse 1997, 2007). The potters followed in the footsteps of their predecessors during the Transitional period, continuing the emphasis on bounded band-pattern motifs arranged in horizontal zones. Various types of crosshatching became popular during the Early Halaf, as well as diagonally-crosshatched lozenges (Figs. 4.126: 1, 5, 4.127: 1, 4), diagonally crosshatched triangles (Fig. 4.127: 1) and crosshatched triangles separated by zigzags (Fig. 4.127: 2). Early Halaf potters also developed a range of more complicated

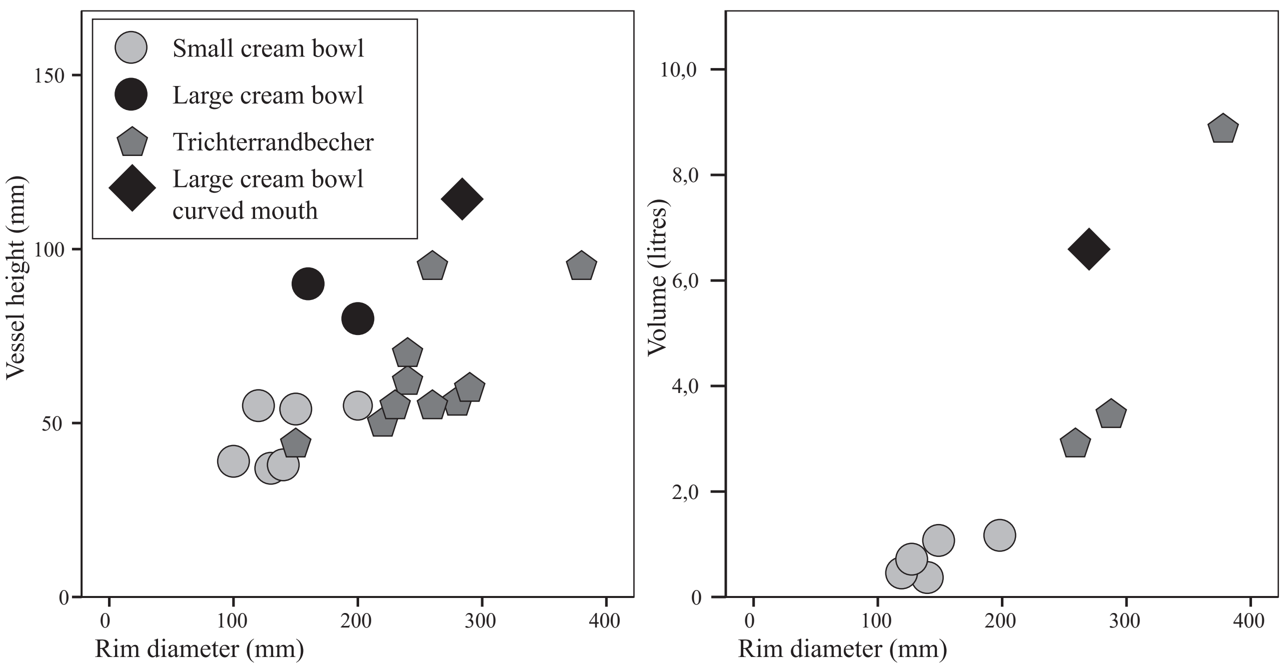


Fig. 4.61 Tell Sabi Abyad, Operation III. Plots of size estimates of Halaf Fine Ware cream bowl varieties. Left: rim diameter (mm) versus preserved height (mm). Right: rim diameter versus volume (litres).

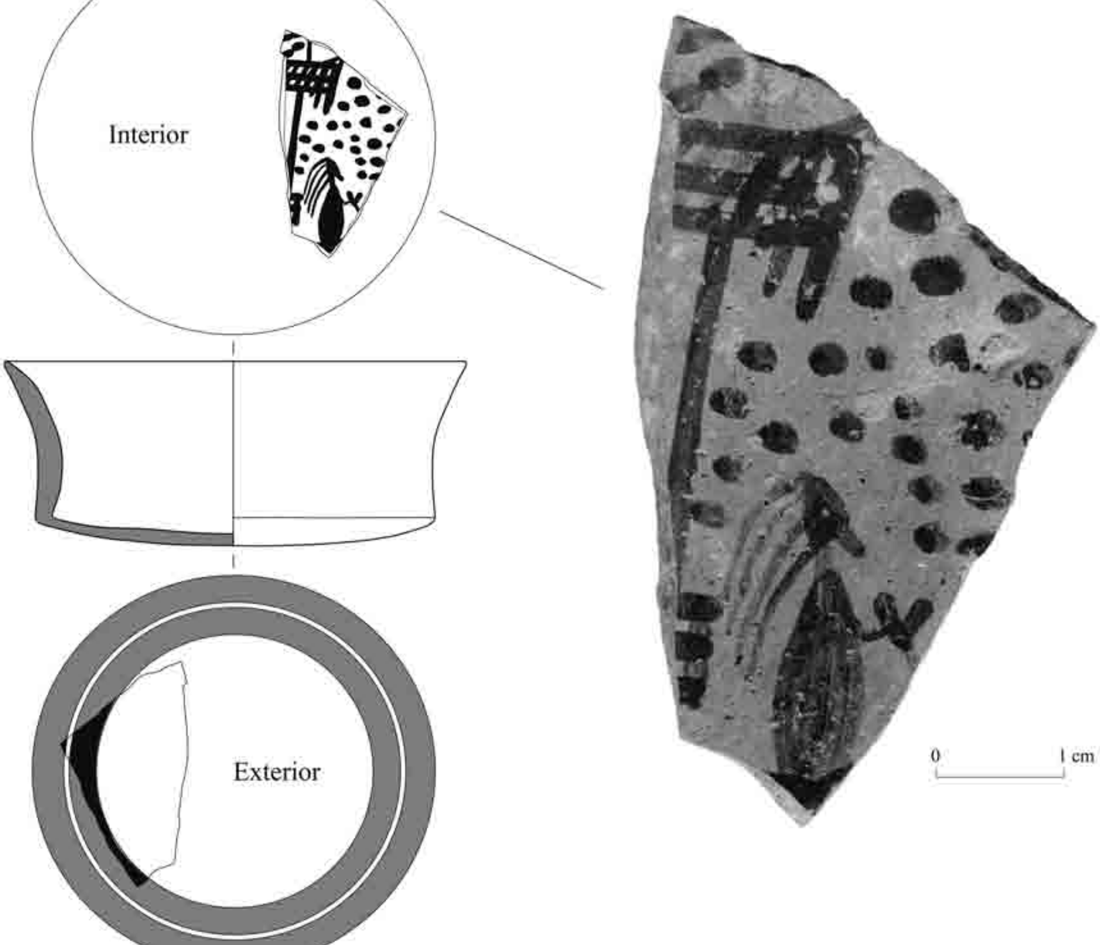


Fig. 4.62 Tell Sabi Abyad, Operation III. A painted Halaf Fine Ware base fragment showing a figurative composition. From a C-Sequence unspecified context. Shape reconstructed (Fig. 4.126: 14).

designs covering the larger part of the vessel body which sometimes border on the psychedelic (e.g. Pl. 13.2).

Early Halaf potters usually avoided non-geometric, figurative motifs. A fascinating exception is a small base fragment that in all likelihood belonged to a low carinated bowl or perhaps a small cream bowl (Fig. 4.62; Fig. 4.126: 14). The interior surface, fragmentarily preserved, shows a composition that combines three familiar elements of Early Halaf representational iconography: a built construction, a human figure, and dots. This specific composition currently remains without parallel, however. A tall construction stands centrally situated made of what appear to be light-weight construction materials. Following the reconstruction of a painted Halafian vase from Domuztepe (Campbell and Fletcher 2013, fig. 2.5), this construction almost certainly represents a building. Similar to the buildings shown on the Domuztepe vase, it appears to have had a protruding upper storey, or perhaps a gabled roof. In front of the building a human-shaped figure is standing. It faces outward away from the building, its back toward the entrance. The figure appears to be dressed in a long, flowering dress, and may hold something in its hands (this part, alas, has not been preserved). The figure carries an oval-shaped head or mask from which long, expressive extensions fall over its back, possibly representing dreadlock-style hair. Finally, the figure finds itself fully surrounded with free-floating ‘dots’ (Nieuwenhuyse 2017d).

The later Halaf painted Fine Ware departs from the earlier patterns in a number of ways. We have already seen that the proportion of painted vessels may have diminished somewhat. We find clear changes, too, in the approach to the design structure (Pl. 14.1). Interestingly, there was a return of vessels with completely painted surfaces – technically these should be termed ‘slipped’ (e.g. Fig. 4.128: 3). Some vessels were almost entirely covered by applying broad bands of paint that left almost no empty surface between them – this approach is often seen with the wide globular bowls with low collar (Figs. 4.129: 2–3). In stark contrast to the prescriptions during the Transitional and Early Halaf periods, motifs were frequently painted in an unbounded, free-floating fashion (Akkermans 1993). Some of the geometric compositions betray superb mastery of the overall *gestalt*. For instance, take a rim fragment showing on its interior neat rows of impaled circles arranged at virtually identical intervals

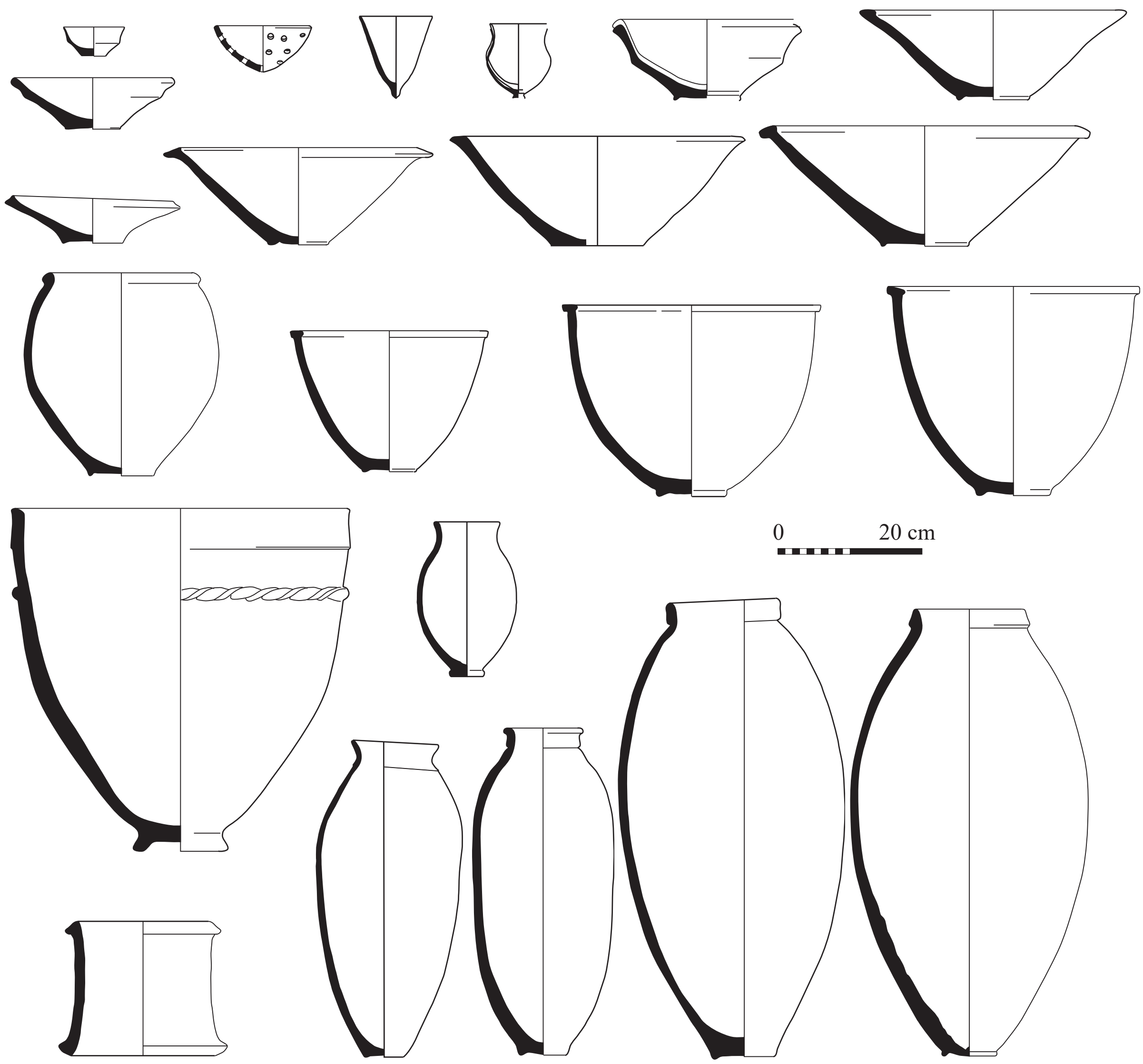


Fig. 4.63 Tell Sabi Abyad, Operation III. Characteristic Late Bronze Age pottery types (after Duistermaat 2008).

(Pl. 14.2.4; Fig. 4.128: 14), or a bowl painted with horizontal lines of virtually identical width and very accurately spaced at regular intervals (Fig. 4.128: 1). These without a doubt deserve the qualification 'standards of excellence … difficult to parallel elsewhere' (Campbell 1992, 184).

The role of dots changed as well from the early to later Halaf. Painted dots had been used with great reservation during the Transitional and Early Halaf stages. They hardly ever figured in geometric motifs and their use was conspicuously confined to a role in figurative compositions (e.g. Fig. 4.62). In the later Halaf dots frequently figured as part of geometric motifs, including cables (Pl. 14.1: 8; Figs. 4.131: 7–8), rows of dots alternating with solid lines (Fig. 4.131: 18) or two-dimensional fields filled with dots. The so-called 'eggs-and-dots' are a well-known Middle to Late Halaf motif (Fig. 4.131: 16). Figurative motifs may have become more important. However, they became more stylised and standardised (Mallowan 1936) and they gained a different relation with dots. Abstracted bulls' heads or *bucrania* were a very regular component of the later Halaf palette. *Bucrania* framed between vertically arranged dots commonly were placed together with the tall *Trichterrandbecher* (Figs. 4.130: 1–6).

Special attention, finally, is drawn to a (single) example of what may be a deliberate attempt to create a bichrome design (Fig. 4.128: 10). This represents the *only* possible bichrome painted Halaf sherd attested so far at Tell Sabi Abyad. The fragment most likely belonged to an open vessel, of which the original shape can no longer be reconstructed. It was fired in oxidising conditions, leading to an orange-reddish brown hue of both surface and paints. The exterior shows a cable motif in reddish brown (Pl. 14.1.3). The interior shows parts of two branch-like motifs running parallel. The central stem was made dark brown (5YR3/2), whereas the diagonal 'leaves' were orange (5YR5/8). The differences in hue are not very dramatic, and quite possibly the potter simply applied pigments differing in solution or thickness. Halaf painted designs often show instances where the paint was petering out, becoming more lightly coloured in the process (Castro-Gessner 2013). In this case, however, the effect is remarkably regular and almost certainly was achieved deliberately.

4.12. Late Bronze Age pottery

In addition to the prehistoric wares the excavations of the prehistoric parts of Operations III, IV and V yielded large amounts of material from the Late Bronze Age settlement at Tell Sabi Abyad. The identification of this material was made possible by the detailed analysis of the Middle Assyrian pottery by Kim Duistermaat (Duistermaat 2008). The great majority of the Late Bronze Age sherds had organic inclusions, light-coloured surfaces, and displayed a range of carinated bowls, goblets, pots and jars typical for the Middle Assyrian *dunnu* at Tell Sabi Abyad (Duistermaat 2008). Duistermaat distinguished between various categories among this pottery; as this is not a book about Late Bronze Age ceramics these distinctions were not acknowledged in the prehistoric ceramic analysis. Instead we simply counted all Late Bronze Age sherds as a single category (Fig. 4.63).

Notes

1 In Operation I, convex Standard Ware bases occur in low numbers in the Pre-Halaf and Transitional-period levels (Nieuwenhuyse 2007, 122).

2 Martin Godon (2010) alerted me to this possibility.

3 These figures are approximately the same as those of the Standard Ware bases studied previously in Operation I (Nieuwenhuyse 2007, 122). Somewhat curiously, no disc bases at all were recovered from any of the B-levels in Operation III. As disc bases occur throughout the Pre-Halaf and Transitional levels in Operation I, if in small numbers, the discrepancy is attributed to the limited sample sizes from the B-levels. Perhaps interestingly, while disc bases occur in low numbers throughout the A-levels, their quantity fluctuated. In levels A10 and A9, some 10% of all SW bases gained a disc base. This figure sank to almost zero by the time of level A7. From level A6 onwards its presence began to increase again, reaching its earlier extent by level A2.

4 Interestingly, the work in Operation I also made it clear that burnishing would almost entirely disappear again from Standard Ware at the end of the Transitional Period (Nieuwenhuyse 2007, 76).

5 These statistics include the category of collared vessels, which by definition were 'closed'. If jars are excluded, however, the statistics do not change significantly. Without jars, the average wall orientation is 90.4° and the spread is still very low (standard deviation 9.5).

6 We have not attempted to reconstruct weight distributions for hypothetical complete vessels. Delineating the complex statistical relationships between preserved radius, wall thickness, vessel height and weight would extend beyond the scope of this report.

7 They were recovered from levels A4, A3, A2, and A1, and from a mixed levels A9/A8/A7 context.

8 The present grouping of individual types in broader morphological classes differs somewhat from an earlier grouping made for material from Operation I (Nieuwenhuyse 2007, 111–112). For Operation III we did not distinguish a separate category 'goblets'. Instead, we put the smaller varieties of bowls put together with 'bowls'. In the previous classifications, moreover, miniature vessels were grouped with 'goblets'. In the present analysis they were classified with 'other'.

9 The difference in average rim diameter between convex-sided bowls with loop handles and with cordons is statistically significant at the .01 level.

10 S-shaped goblets and closed S-shaped bowls have a vertically-oriented upper part or collar that is relatively indistinct and less than 2 cm in height. In contrast, S-shaped profiles classified as 'jars' have a more pronounced collar that is over 2 cm tall. These distinctions, however, are not as black-and-white as the neat typology suggests and the classifications certainly show some overlap.

11 The average weight of Standard Ware bowls from levels A9–A6 is less than 50 g. This rises to between 50 g and 100 g in the subsequent levels.

12 As a sub-category of trays, we should perhaps have made a typological distinction between 'open' husking trays and 'vertical' husking trays. We refrained from making this distinction and instead took the interior modification as the primary classificatory criterion.

13 Considering the characteristic irregularity with which the vessels were shaped, the boundary between hole mouths and vertical pots is diffuse. The boundary between a hole mouth pot and a closed convex-sided bowl was decided on the basis of height. Individual fragments were classified as a 'pot' rather than a 'bowl' if their preserved height was about 15 cm or more, or if the orientation and thickness of the wall suggested that the original shape was deep and closed rather than open.

14 Pearson's R Square between thickness and height is .63. Pearson's R Square between thickness and volume is .56. This statistic incorporates one possible outlier of a jar with a relatively extreme wall thickness (encircled in Fig. 4.42); if this item is left out, Pearson's R Square between thickness and height and between thickness and volume rise to .74 and .64, respectively.

15 The Pearson's R Square between rim diameter and vessel height is .52; between rim diameter and wall thickness it is .60. If the two outliers are omitted (encircled in Fig. 4.43) these measurements jump to .77 and .76, respectively.

16 Interestingly enough, Standard Ware jars do not appear to have gained larger rim diameters. On the contrary, the average rim diameter of Standard Ware collared vessels even diminished somewhat. The diversity in rim diameters for jars may have increased, but on average Standard Ware jars became proportionally more closed.

17 The two red-slipped Standard Ware sherds from level A5 are not typical for this category as a whole. Instead of the characteristic solid, glossy, reddish-brown surface coating that characterised red-slipped items from level A1, they have a matte, distinctively fugitive, pinkish slip (2.5YR6/6, light red). This pigment more accurately resembles the plastered-and-painted Standard Ware from level A1. It is therefore possible that the two examples of red-slipped Standard Ware from level A5 belong to a different category, plastered-and-painted.

18 Red-slipped Standard Ware from the A-Sequence and the B-Sequence has an average wall thickness of, respectively,

10 mm and 9 mm. This very small difference is statistically significant at the .01 percentage of statistical variation level.

19 The painted Standard Ware sherd from level A9 is a body sherd with a poorly preserved diagonal band. Stylistically it does not closely resemble the examples from later levels.

20 The final field campaign in 2009 yielded four earlier levels in Operation III, levels A16–A13. According to the excavators these levels yielded very small quantities of EMW (Akkermans, pers. comm. September 2009). This material has not been analysed.

21 Early Mineral Ware sherds in levels A8–A1 mostly were recovered from the sloping 'open area' debris layers that are susceptible to post-depositional mixing.

22 The MCW recovered from various levels in the A-Sequence shows no significant differences in fragmentation through time.

23 Only three examples show small quantities of small plant particles in addition to the minerals (levels A-10, A-11 and A-12).

24 In the field the variation in dark-light shades led to a tentative distinction between 'light' and 'dark' varieties of Early Mineral Ware. Subsequent work in the lab has so far not corroborated this field distinction.

25 FMTW bases have preserved much better. The radius of the base measures an average of 89^{o} if complete shapes are excluded.

26 The wall orientation of convex-sided bowls as a group shows a normal distribution from 50^{o} (very closed) to 140^{o} (rather open), with a modus at 85^{o}.

27 On average, the A-Sequence shows a higher GBW rim radius than the B-Sequence. However, this is due to a single well-preserved fragment (outlier). If this is omitted, there are no statistically significant differences in rim radius between the A-levels and the B-levels.

28 A total of 11 carinated GBW contours were counted from Operation III. Their distribution is: level A3 (n = 1), level A2 (n = 6), level A1 (n = 3), B-levels (n = 2).

29 The wall orientation of GBW convex-sided bowls shows a reasonably normal distribution that ranges from 50° (very closed) to 140° (rather open), with a modus at 85°.

30 The spatial distribution of SFW from Operation III shows this pottery to be limited to just a handful of trenches mostly situated at the eastern limits of the Operation III exposures. SFW was recovered from trenches K5 (n = 445), I3 (n = 51), J5 (n = 3), H5 (n = 2) and E3 (n = 1).

31 The proportions of incompletely oxidisedd sherds are 21% for the Middle Halaf Fine Ware versus 3% for the Early Halaf Fine Ware.

32 At Tell Halaf, Schmidt mentions the shape on two occasions although it is not entirely clear if these were two different vessels (Von Oppenheim and Schmidt 1943, T.VII: 14, T.LXIV: 3).

Catalogue

Fig. 4.64. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.64.1. F4 29-66-1. Standard Ware. Rim fragm. Very Everted Convex-sided Bowl. R. diam. 230 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 1.13 l. Level A1. Room fill.

Fig. 4.64.2. F4 178-400-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 280 mm. Ext. burnished. Int. very rough. Ext. 2.5YR6/4. Vol. 3.95 l. Level A3. Pit.

Fig. 4.64.3. F4 29-89-2. Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 290 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 4.66 l. Level A1. Open area.

Fig. 4.64.4. K5 45-101-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 280 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Vol. 2.85 l. Level B4. Open area.

Fig. 4.64.5. E3 168-381-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 260 mm. Ext. burnished. Int. burnished. Ext. 2.5YR6/4. Vol. 3.65 l. Level A9. Pit.

Fig. 4.64.6. F4 170-386-1. Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 260 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/4. Vol. 6.45 l. Level A4. Open area.

Fig. 4.64.7. J4 300-682-101 (P08-45). Standard Ware. Complete. Everted Convex-sided Bowl; height very uneven. R. diam. 200 mm. Ext. burnished. Int. well smoothed. Ext. 5YR6/6. Vol. 1.33 l. Level B7. Open area.

Fig. 4.64.8. J3 587-789-101 (P09-55). Standard Ware. Complete. Everted Convex-sided Bowl. R. diam. 165 mm. Ext. eroded. Int. eroded. Ext. 'buff'. Vol. 1.24 l. Mixed levels B4/B6. Burial BN09-31.

Fig. 4.64.9. H3 61-124-100 (P05-33). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 240 mm. Ext. well smoothed. Int. well smoothed. Ext. 'brown'. Vol. 1.39 l. Level A1. Room fill.

Fig. 4.64.10. L5 54-108-102 (P07-58). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 220 mm. Ext. well smoothed. Int. well smoothed. Ext. 2.5YR6/6. Vol. 1.92 l. Level B3. Room fill.

Fig. 4.65. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.65.1. J5 70-137-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 240 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Vol. 2.07 l. Level B8. Open area.

Fig. 4.65.2. E3 105-273-2. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 220 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR6/4. Vol. 0.92 l. Level A6. Open area.

Fig. 4.65.3. G5 23-93-4. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/3. Vol. 1.78 l. Level B8. Pit.

Fig. 4.65.4. G5 10-39-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 1.25 l. Level A1. Room fill.

Fig. 4.65.5. G4N 29-106-200 (P07-91). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. finger pressed. Ext. 'brown'. Vol. 0.87 l. Level A3. Open area.

Fig. 4.65.6. K5 31-68-101 (P07-42). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/2. Vol. 0.11 l. Level B2. Room fill.

Fig. 4.65.7. G3 13-55-2. Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/3. Vol. 0.10 l. Level A2. Pit.

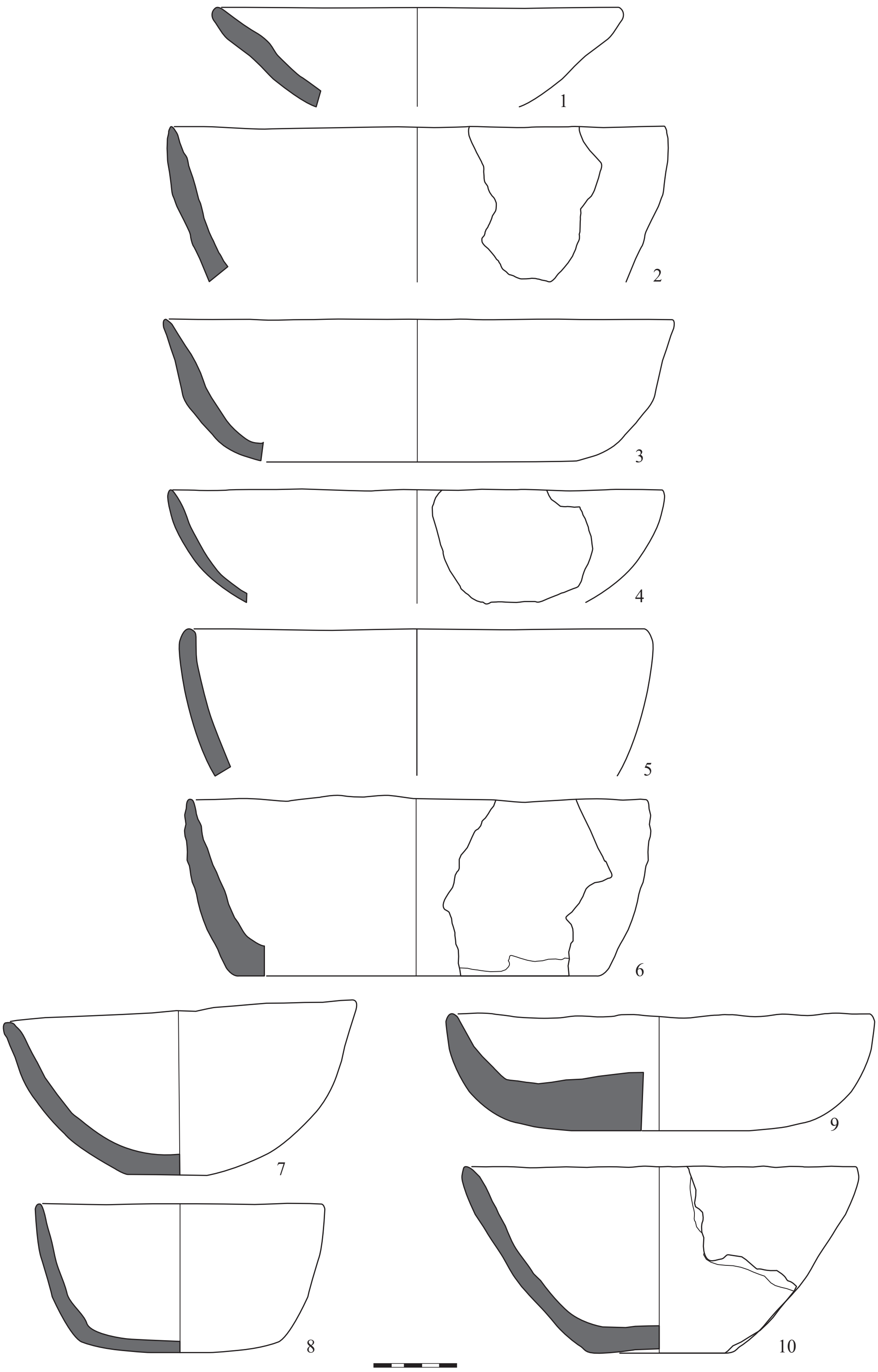


Fig. 4.64 Tell Sabi Abyad. Operation III. Standard Ware Very Everted Convex-sided Bowl (no. 1); Everted Convex-sided Bowls (nos. 2–10) (scale 1:3).

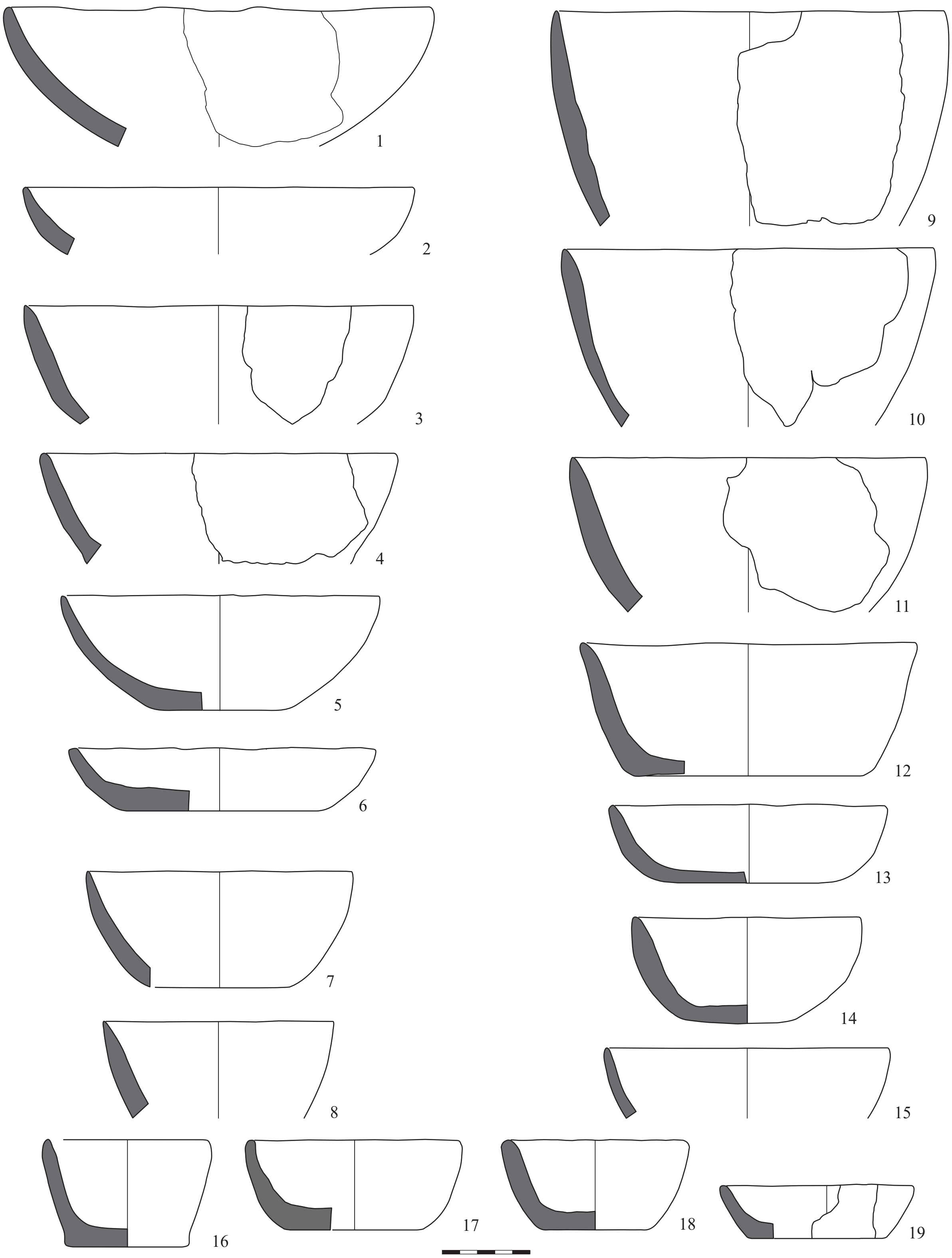


Fig. 4.65 Tell Sabi Abyad. Operation III. Standard Ware Everted Convex-sided Bowls (scale 1:3).

Fig. 4.65.8. F4 38-121-8. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 130 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/4. Vol. 0.41 l. Level A1. Open area.

Fig. 4.65.9. F4 92-217-4. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR8/3. Vol. 3.44 l. Level A1. Open area.

Fig. 4.65.10. F4 19-38-2. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 210 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/4. Vol. 2.39 l. Level A1. Hearth.

Fig. 4.65.11. J5 70-137-2. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Vol. 1.70 l. Level B8. Open area.

Fig. 4.65.12. G5 78-148-100 (P05-89). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 190 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Vol. 1.28 l. Level uncertain. General fill layer.

Fig. 4.65.13. J4 223-666-101 (P08-44). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR7/4. Vol. 0.23 l. Level B5. Pit.

Fig. 4.65.14. F5 38-95-100 (P04-52). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 130 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR8/4. Vol. 0.41 l. Level A3. Open area.

Fig. 4.65.15. E3 114-294-3. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 160 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Vol. 0.61 l. Level A7. Open area.

Fig. 4.65.16. G3 14-29-1. Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 90 mm. Ext. finger pressing. Int. finger pressed. Ext. 2.5YR6/8. Vol. 0.21 l. Level A2. Open area.

Fig. 4.65.17. G3 30-101-1 (P02-213). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 120 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/4. Vol. 0.34 l. Level A4. Oven.

Fig. 4.65.18. I3 115-133-100 (P05-53). Standard Ware. Complete. Everted Convex-sided Bowl. R. diam. 95 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR5/6. Vol. 0.17 l. Mixed levels B7/B8/A1. Open area.

Fig. 4.65.19. G5 46-92-2. Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 0.14 l. Level A1. Open area.

Fig. 4.66. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.66.1. E4 61-169-2. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 290 mm. Ext. finger pressing. Int. eroded. Ext. 10R6/6. Vol. 7.53 l. Level A5. Room fill.

Fig. 4.66.2. G4 529-536-101 (P08-16). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 300 mm. Ext. roughly smoothed. Int. very rough. Ext. 7.5YR6/4. Vol. 8.35 l. Level A3. Construction.

Fig. 4.66.3. D4 41-57-6. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 250 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/4. Vol. 4.49 l. Level A4. Room fill.

Fig. 4.66.4. I2 41-127-101 (P09-22). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. eroded. Int. eroded. Ext. 'buff'. Vol. 1.52 l. C-Sequence. Burial BN09-06.

Fig. 4.66.5. J3 158-314-101 (P08-87). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 190 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/3. Vol. 1.87 l. Mixed levels A1/A2. Burial BN08-63.

Fig. 4.66.6. H3 67-127-100 (P05-32). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 290 mm. Ext. finger pressing. Int. finger pressed. Ext. 'brown'. Vol. 6.65 l. D-Sequence. Pit.

Fig. 4.66.7. E4 19-139-106 (P03-227). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Vol. 3.87 l. Level A4. Room fill.

Fig. 4.66.8. H5 513-610-101 (P08-31). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. roughly smoothed. Int. very rough. Ext. 7.5YR6/4. Vol. 1.41 l. Level A1. Room fill.

Fig. 4.66.9. J4 124-186-101 (P07-55). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 145 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/6. Vol. 0.92 l. Perhaps thin plaster on interior. Level B4. Open area.

Fig. 4.67. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.67.1. G5 32-65-3. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10R6/6. Vol. 2.78 l. Level A1. Open area.

Fig. 4.67.2. H4 148-345-102 (P08-29). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 90 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Vol. 0.08 l. Level A3. Room fill.

Fig. 4.67.3. G5 550-568-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 210 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 2.85 l. Level A1. Room fill.

Fig. 4.67.4. J5 87-169-5. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 230 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR7/3. Vol. 2.27 l. Level B8. Open area.

Fig. 4.67.5. D3 8-26-208. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. 5YR5/6. Vol. 1.25 l. Level A4. Pit.

Fig. 4.67.6. K4 55-142-102 (P09-58). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 135 mm. Ext. eroded. Int. eroded. Ext. 'brown'. Vol. 1.59 l. Mixed levels B4/B6. Burial BN09-32.

Fig. 4.67.7. J3 277-528-101 (P09-117). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 150 mm. Ext. eroded. Int. eroded. Ext. 'brown'. Vol. 1.65 l. Mixed levels B8/B9. Burial BN09-51.

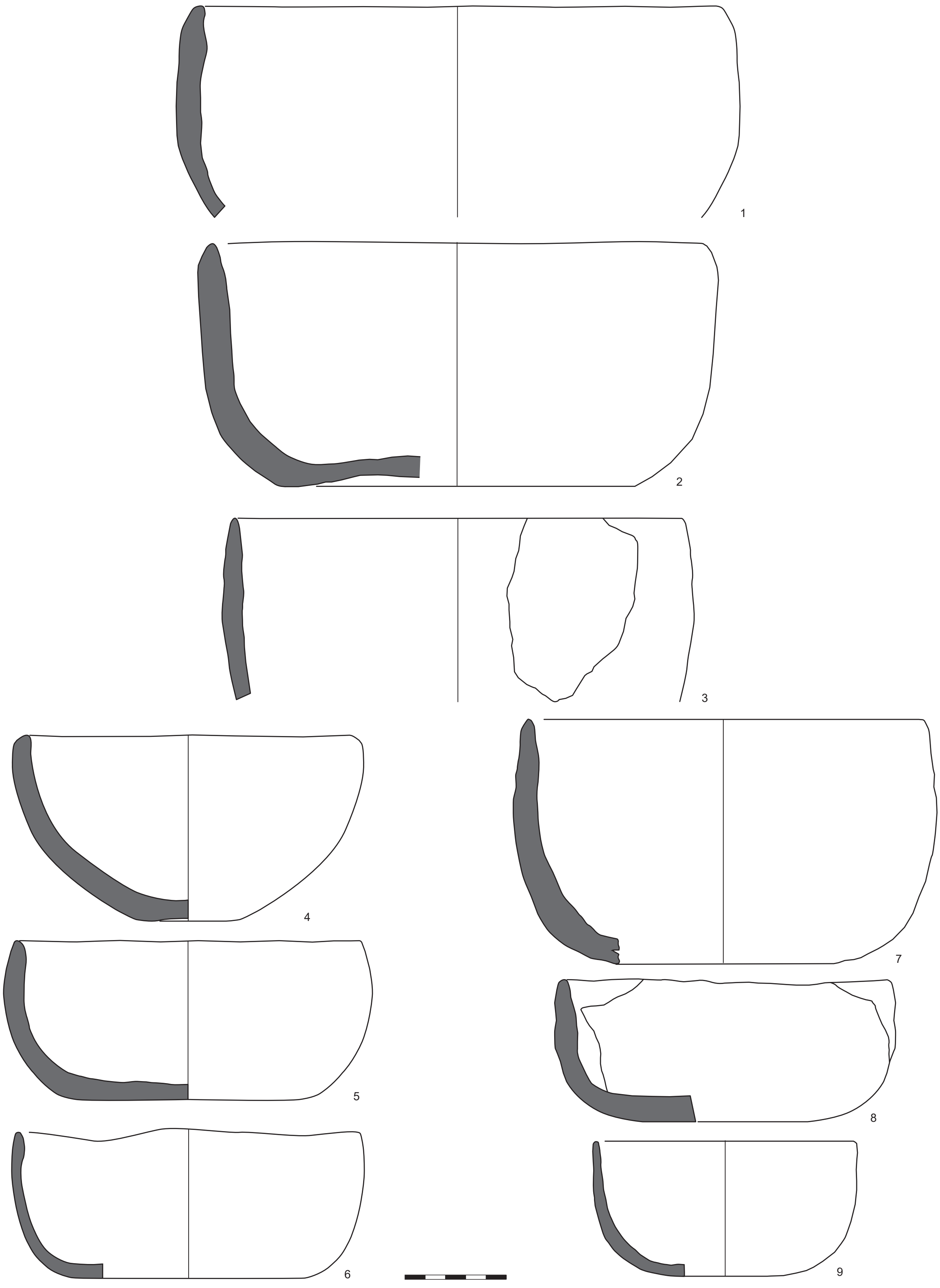


Fig. 4.66 Tell Sabi Abyad. Operation III. Standard Ware Vertical Convex-sided Bowls (scale 1:3).

Fig. 4.67.8. E3 131-321-5. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5YR6/4. Vol. 1.92 l. Level A7. Open area.

Fig. 4.67.9. G3 167-529-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl with vertical loop handle. R. diam. 160 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Vol. 1.43 l. Level A2. Pit.

Fig. 4.67.10. F4 177-411-4. Standard Ware. Rim fragm. Vertical Convex-sided Bowl with vertical loop handle. R. diam. 140 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 5YR6/4. Vol. 0.80 l. Level A4. Open area.

Fig. 4.67.11. D4 89-173-10. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 80 mm. Ext. burnished. Int. burnished. Ext. 7.5YR7/4. Vol. 0.10 l. Mixed levels A7/A8. Open area.

Fig. 4.67.12. E3 167-374-2. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 1.44 l. Level A9. Open area.

Fig. 4.67.13. E4 83-233-3. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 160 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/6. Vol. 1.61 l. Thin traces plaster exterior. Level A8. Pit.

Fig. 4.67.14. E3 168-397-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. finger pressed. Ext. 7.5YR5/6. Vol. 0.56 l. Level A9. Pit.

Fig. 4.67.15. K5 34-83-101 (P07-51). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. 10YR7/3. Vol. 0.47 l. Mixed levels B2/B4. Open area.

Fig. 4.67.16. H4 148-345-101 (P08-30). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 130 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR8/2. Vol. 0.64 l. Level A3. Room fill.

Fig. 4.68. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.68.1. D3 380-445-3. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 150 mm. Ext. burnished. Int. well smoothed. Ext. 10YR7/4. Vol. 1.07 l. Level A6. Platform.

Fig. 4.68.2. F4 85-202-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR5/6. Vol. 1.15 l. Plastered exterior. Level A1. Construction.

Fig. 4.68.3. H3 166-367-100 (P07-99). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 105 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 'orange'. Vol. 0.30 l. Level A4. Construction.

Fig. 4.68.4. F3 4-13-100 (P03-96). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10R6/6. Vol. 0.32 l. Top soil.

Fig. 4.68.5. G3 39-151-1. Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 110 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/6. Vol. 0.51 l. Level A4. Room fill.

Fig. 4.68.6. G5 770-412-101 (P08-63). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 100 mm. Ext. well smoothed. Int. finger pressed. Ext. 10YR6/3. Vol. 0.40 l. Level A4. Room fill.

Fig. 4.68.7. J3S 209-425-101 (P09-42). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 145 mm. Ext. eroded. Int. eroded. Ext. 'brown'. Vol. 1.14 l. Mixed levels B8/B9. Burial BN09-26.

Fig. 4.68.8. F4 20-55-1 (P03-502). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Vol. 0.62 l. Level A3. Pit.

Fig. 4.68.9. I4 235-349-102 (P08-23). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 100 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR7/4. Vol. 0.27 l. Level A2. Room fill.

Fig. 4.68.10. E3N 14-28-12. Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. finger pressing. Int. finger pressed. Ext. 2.5YR6/4. Vol. 1.16 l. Mixed levels A5/A6. Open area.

Fig. 4.68.11. E3 98-247-4. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. 7.5YR6/4. Vol. 0.41 l. Level A5. Open area.

Fig. 4.68.12. F4 158-355-200 (P04-68). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 90 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 0.58 l. Level A1. Construction.

Fig. 4.68.13. G4 38-132-200 (P04-65). Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 90 mm. Ext. finger pressing. Int. finger pressed. Ext. 2.5YR6/6. Vol. 0.51 l. Level A3. Room fill.

Fig. 4.68.14. D4 38-53-1. Standard Ware. Complete. Vertical Convex-sided Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. very rough. Ext. 5YR6/6. Vol. 0.19 l. Level A4. Pit.

Fig. 4.68.15. F5 54-154-100 (P04-78). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 70 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Vol. 0.16 l. Level A4. Open area.

Fig. 4.68.16. G4N 33-88-101 (P07-52). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 85 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR4/1. Vol. 0.15 l. Level A1. Room fill.

Fig. 4.68.17. E3 114-294-1 (P04-139). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. finger pressed. Ext. 10YR6/4. Vol. 5.23 l. Level A7. Open area.

Fig. 4.68.18. E3 111-277-3 (P04-135). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 65 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 0.08 l. Level A6. Platform.

Fig. 4.68.19. G4N 29-81-100. Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Vol. 0.32 l. Level A2. Room fill.

Fig. 4.68.20. E3N 6-1-100 (P05-1). Standard Ware. Section. Vertical Convex-sided Bowl. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'buff'. Vol. 0.16 l. Level A5. Room fill.

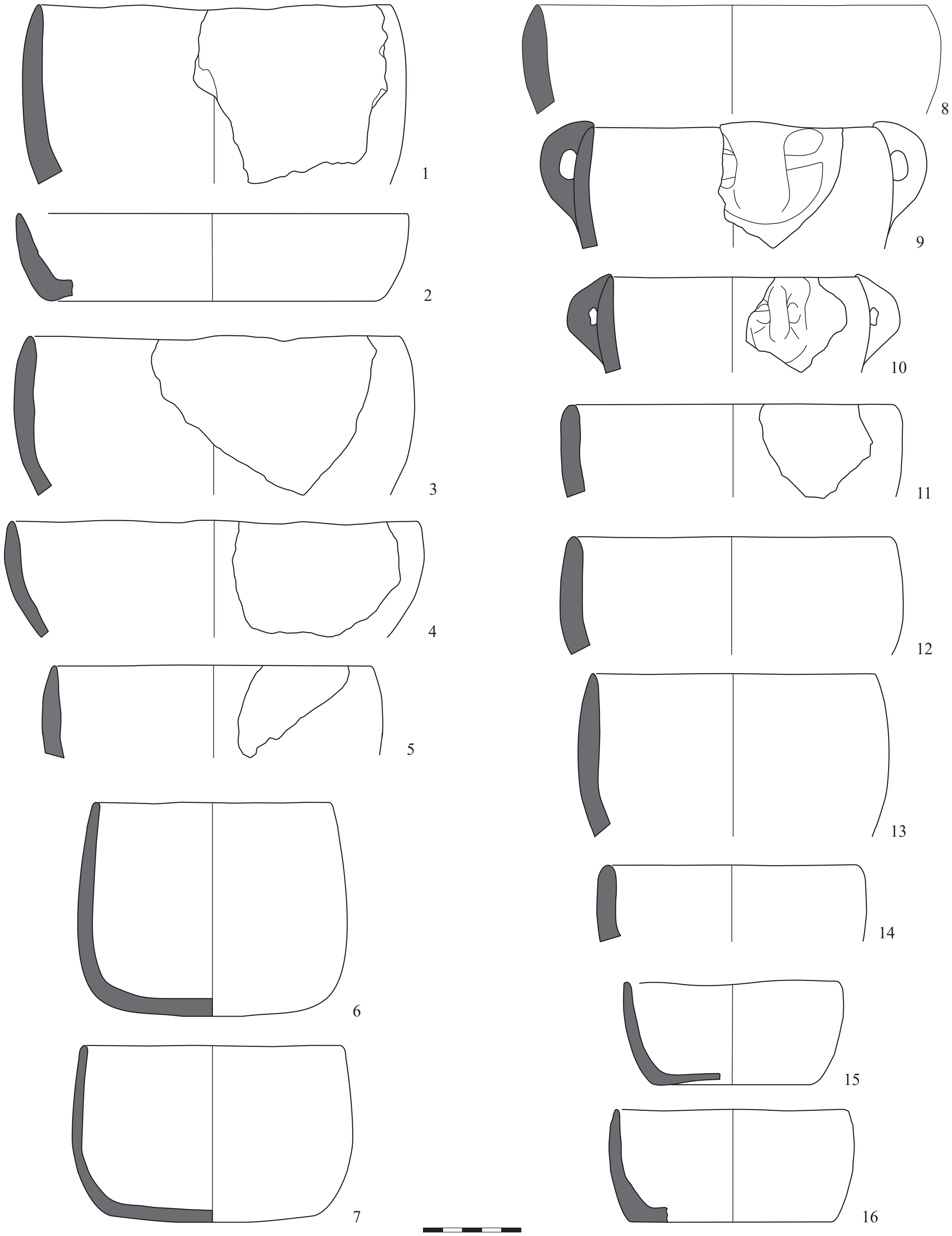


Fig. 4.67 Tell Sabi Abyad. Operation III. Standard Ware Vertical Convex-sided Bowls (scale 1:3).

Fig. 4.69. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.69.1. E4 19-139-100 (P03-228). Standard Ware. Section. Closed Convex-sided Bowl. R. diam. 180 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR5/3. Vol. 6.20 l. Level A4. Room fill.

Fig. 4.69.2. D3 8-26-100 (P04-100). Standard Ware. Section. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. finger pressing. Int. roughly smoothed. Ext. 2.5YR6/6. Vol. 2.51 l. Level A4. Pit.

Fig. 4.69.3. F4 150-327-100 (P04-47). Standard Ware. Section. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5YR6/6. Vol. 1.69 l. Level A1. Hearth.

Fig. 4.69.4. G5 584-691-15. Standard Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 130 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/4. Vol. 1.33 l. Thin plaster interior. Level A2. Pit.

Fig. 4.69.5. G4N 29-106-2 (P07-92). Standard Ware. Section. Closed Convex-sided Bowl. R. diam. 70 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/4. Vol. 0.60 l. Level A3. Open area.

Fig. 4.69.6. G5 760-391-101 (P08-50). Standard Ware. Complete. Closed Convex-sided Bowl. R. diam. 90 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 5YR7/4. Vol. 0.83 l. Level A4. Room fill.

Fig. 4.69.7. F4 150-326-1. Standard Ware. Section. Closed Convex-sided Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR7/4. Vol. 0.88 l. Level A1. Hearth.

Fig. 4.69.8. G5 734-478-103 (P08-52). Standard Ware. Complete. Closed Convex-sided Bowl carrying a plaster repair. R. diam. 80 mm. Ext. well smoothed. Int. finger pressed. Ext. 5YR7/3. Vol. 0.45 l. Level A4. Room fill.

Fig. 4.69.9. I5 182-246-100 (P07-75). Standard Ware. Complete. Closed Convex-sided Bowl. R. diam. 65 mm. Ext. finger pressing. Int. finger pressed. Ext. ‘orange’. Vol. 0.64 l. Level A1. Open area.

Fig. 4.69.10. E4 49-172-1 (P04-114). Standard Ware. Section. Closed Convex-sided Bowl. R. diam. 60 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR6/4. Vol. 0.24 l. Level A5. Room fill.

Fig. 4.70. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.70.1. E3 32-83-6. Standard Ware. Rim fragm. Closed Convex-sided Bowl with cordon. R. diam. 150 mm. Ext. well smoothed. Int. eroded. Ext. 10YR7/4. Level A4. Open area.

Fig. 4.70.2. G3 14-29-3. Standard Ware. Rim fragm. Closed Convex-sided Bowl with cordon. R. diam. 150 mm. Ext. well smoothed. Int. finger pressed. Ext. 10YR8/4. Vol. 1.59 l. Level A2. Open area.

Fig. 4.70.3. E3 29-57-3. Standard Ware. Rim fragm. Closed Convex-sided Bowl with cordon. R. diam. 230 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/4. Level A4. Open area.

Fig. 4.70.4. F4 182-407-6. Standard Ware. Rim fragm. Closed Convex-sided Bowl with cordon. R. diam. 280 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A4. Oven.

Fig. 4.70.5. D4 14-43-1. Standard Ware. Rim fragm. Closed Convex-sided Bowl with cordon. R. diam. 180 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 10YR7/4. Level A4. Pit.

Fig. 4.70.6. F4 112-246-1. Standard Ware. Rim fragm. Closed Convex-sided Bowl with cordon. R. diam. 180 mm. Ext. roughly smoothed. Int. eroded. Ext. 10YR8/3. Level A1. Room fill.

Fig. 4.70.7. E4 83-237-16. Standard Ware. Rim fragm. Closed Convex-sided Bowl with vertical loop handle. R. diam. 180 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10R7/6. Vol. 2.51 l. Level A8. Pit.

Fig. 4.70.8. D3 8-26-10. Standard Ware. Rim fragm. Closed Convex-sided Bowl with vertical loop handle. R. diam. 130 mm. Ext. scraped. Int. finger pressed. Ext. 10YR7/4. Vol. 0.79 l. Level A4. Pit.

Fig. 4.70.9. D4 51-110-1. Standard Ware. Rim fragm. Closed Convex-sided Bowl with ‘rope’ cordon. R. diam. 130 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Vol. 1.96 l. Level A5. Floor.

Fig. 4.70.10. D4 49-87-1. Standard Ware. Rim fragm. Closed Convex-sided Bowl with vertical loop handle. R. diam. 120 mm. Ext. burnished. Int. finger pressed. Ext. 7.5YR7/3. Vol. 2.42 l. Level A5. Floor.

Fig. 4.70.11. D4 30-71-1. Standard Ware. Rim fragm. Closed Convex-sided Bowl with vertical loop handle. R. diam. 140 mm. Ext. well smoothed. Int. well smoothed. Ext. 7.5YR6/6. Level A5. Room fill.

Fig. 4.71. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.71.1. F4 7-36-1 (P03-500). Standard Ware. Section. Oval Fig. R. diam. oval mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Level A1. Room fill.

Fig. 4.71.2. H4 147-390-101 (P08-64). Standard Ware. Section. Oval Everted Convex-sided Bowl. R. diam. oval mm. Ext. roughly smoothed. Int. very rough. Ext. 5YR6/6. Level A3. Room fill.

Fig. 4.71.3. I3 110-116-100 (P05-42). Standard Ware. Complete. Oval Everted Convex-sided Bowl. R. diam. oval. Ext. burnished. Int. burnished. Ext. 2.5YR5/6. Mixed levels B4/B6. Burial BN05-10.

Fig. 4.71.4. F3 160-326-100 (P04-20). Standard Ware. Section. Oval Vertical Convex-sided Bowl. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Level A5. Room fill.

Fig. 4.71.5. J5 97-206-1. Standard Ware. Section. Oval Vertical Convex-sided Bowl. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Three thin layers of plaster (together 2mm) interior lower body. Level B8. Hearth.

Fig. 4.71.6. G4 547-583-101 (P08-59). Standard Ware. Section. Oval Vertical Convex-sided Bowl. R. diam. oval. Ext. well smoothed. Int. well smoothed. Ext. 7.5YR6/3. Vol.

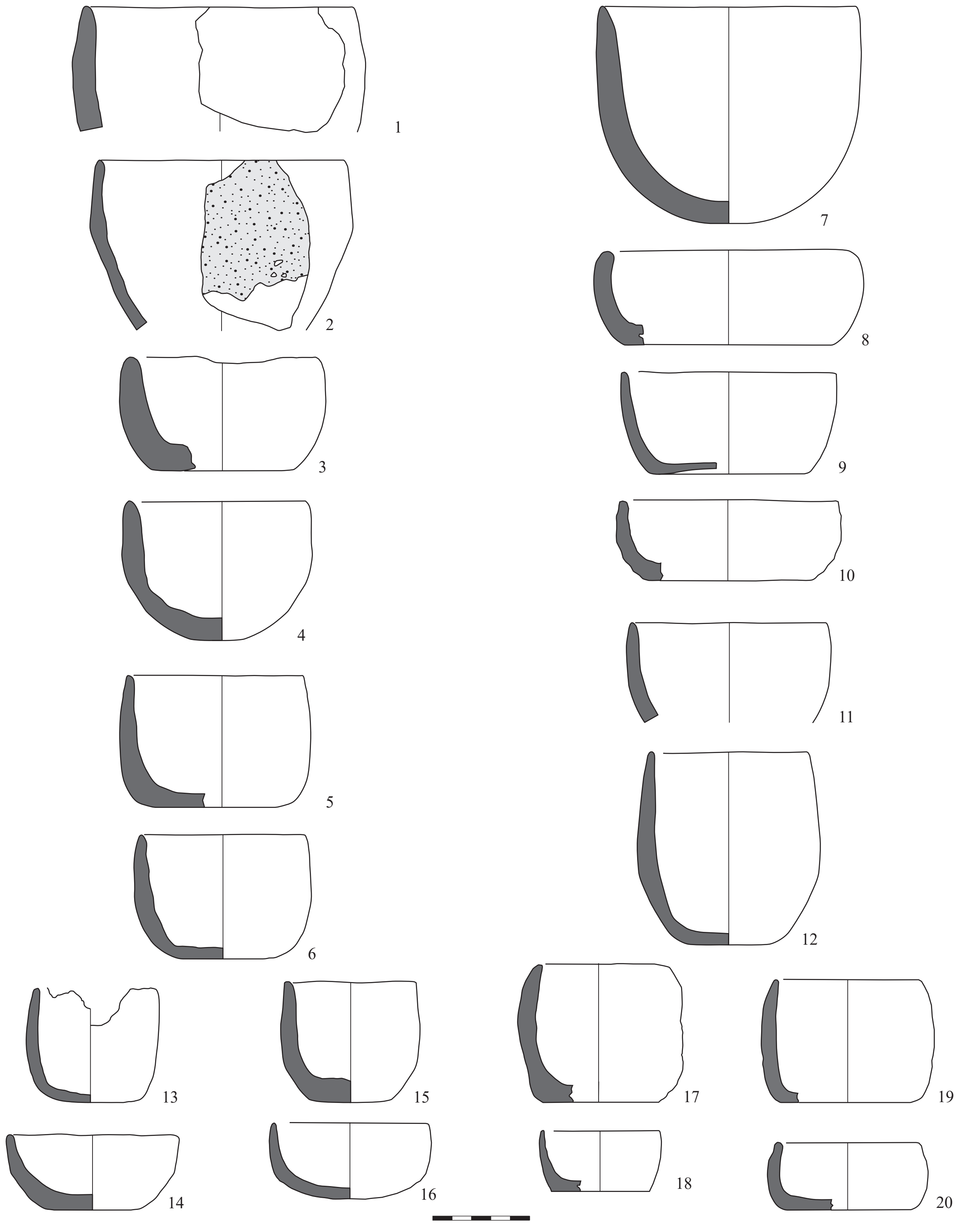


Fig. 4.68 Tell Sabi Abyad. Operation III. Standard Ware Vertical Convex-sided Bowls (scale 1:3).

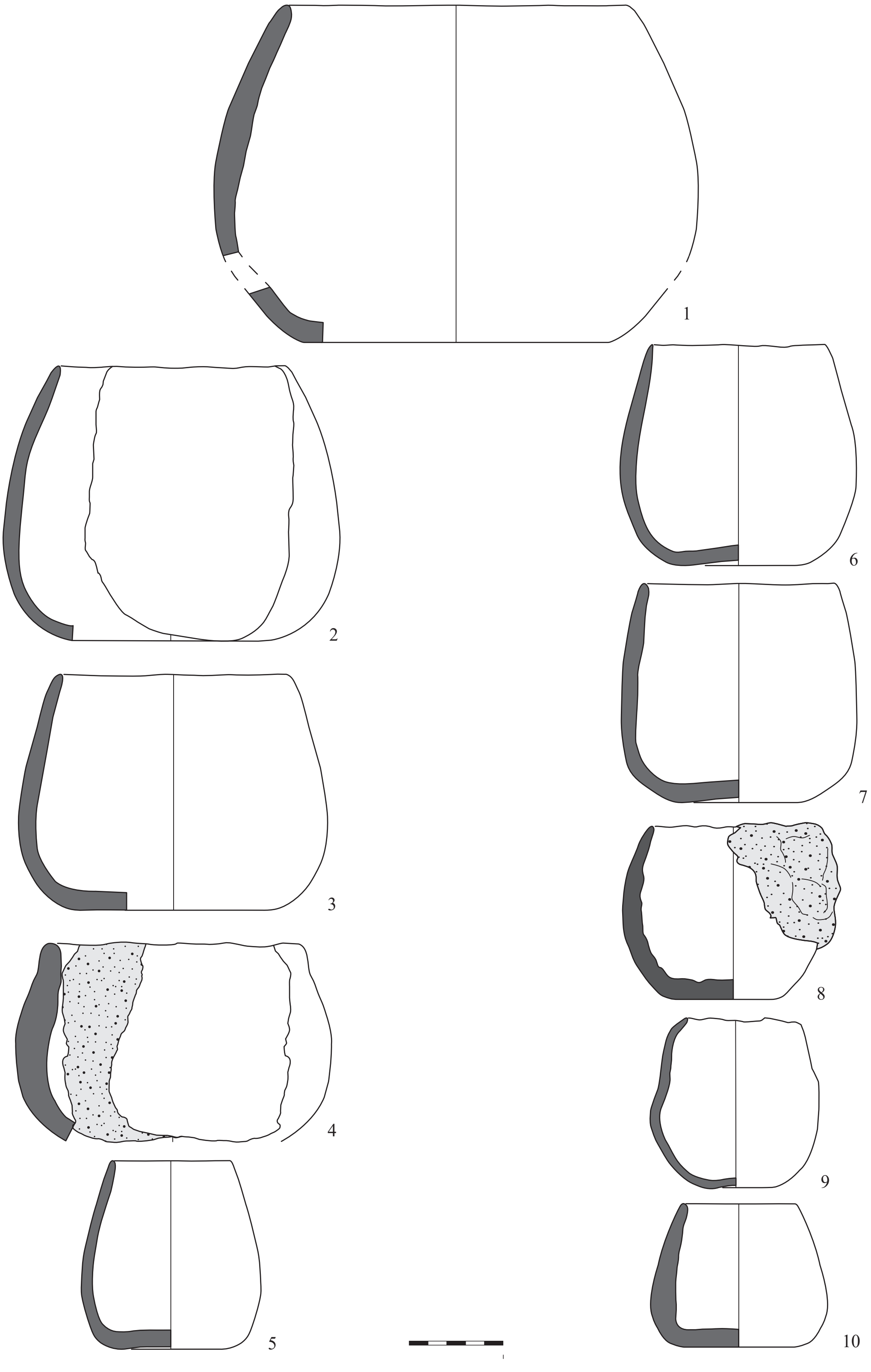


Fig. 4.69 Tell Sabi Abyad. Operation III. Standard Ware Closed Convex-sided Bowls (scale 1:3).

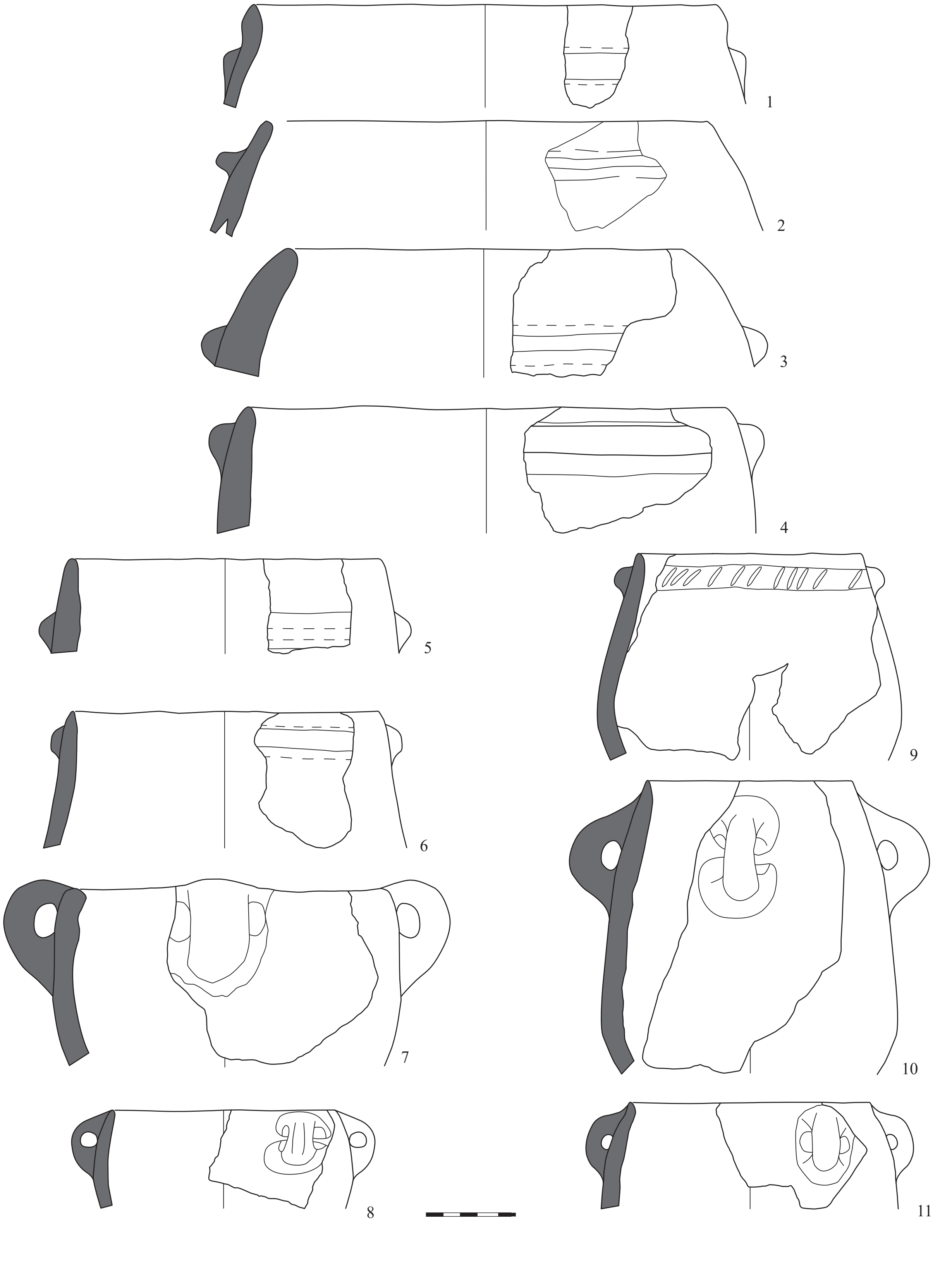


Fig. 4.70 Tell Sabi Abyad. Operation III. Standard Ware Closed Convex-sided Bowls (scale 1:3).

2.26 l. Thin plaster interior base and lower body. Level A3. Construction.

Fig. 4.71.7. G4N 29-106-3 (P07-90). Standard Ware. Section. Oval Vertical Convex-sided Bowl. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 2.57 l. Level A3. Open area.

Fig. 4.71.8. D4 79-150-2. Standard Ware. Rim fragm. Oval Closed Convex-sided Bowl with cordon. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Level A5. Open area.

Fig. 4.71.9. D4 51-69-1. Standard Ware. Section. Oval Closed Convex-sided Bowl. R. diam. oval. Ext. burnished. Int. finger pressed. Ext. 10YR8/3. Level A5. Floor.

Fig. 4.71.10. G4N 30-109-100 (P07-65). Standard Ware. Section. Oval Closed Convex-sided Bowl. R. diam. oval. Ext. finger pressing. Int. finger pressed. Ext. 'buff'. Level A2. Open area.

Fig. 4.71.11. F4 204-444-101 (P08-10). Standard Ware. Section. Oval Closed Convex-sided Bowl. R. diam. oval. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/2. Thin plaster on interior. Level A4. Room fill.

Fig. 4.72. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.72.1. H5 26-89-1. Standard Ware. Rim fragm. Large Convex-sided Bowl. R. diam. 360 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/6. Vol. 9.63 l. Level A1. Room fill.

Fig. 4.72.2. G5 668-799-1. Standard Ware. Rim fragm. Large Convex-sided Bowl. R. diam. 320 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR8/3. Vol. 9.38 l. Level A3. Room fill.

Fig. 4.72.3. G4 529-536-102 (P08-17). Standard Ware. Section. Large Convex-sided Bowl. R. diam. 300 mm. Ext. roughly smoothed. Int. very rough. Ext. 7.5YR6/4. Vol. 7.76 l. Level A3. Construction.

Fig. 4.72.4. E3 96-223-2 (P04-133). Standard Ware. Section. Miniature Bowl. R. diam. oval. Ext. finger pressing. Int. finger pressed. Ext. 10YR7/3. Vol. 0.11 l. Level A5. Open area.

Fig. 4.72.5. H4 78-134-101 (P07-54). Standard Ware. Complete. Miniature Bowl. R. diam. 55 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 0.04 l. Level A1. Open area.

Fig. 4.72.6. I3 122-196-100 (P07-80). Standard Ware. Complete. Miniature Bowl. R. diam. 40 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 'orange'. Vol. 0.02 l. Mixed levels A1/A2. Open area.

Fig. 4.72.7. J3 600-860-101 (P09-122). Standard Ware. Complete. Miniature Bowl. R. diam. 40 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'brown'. Vol. 0.04 l. Mixed levels A1/A2. Burial BN09-60.

Fig. 4.72.8. K4 55-142-101 (P09-57). Standard Ware. Complete. Miniature Bowl. R. diam. 40 mm. Ext. eroded. Int. eroded. Ext. 'brown'. Vol. 0.01 l. Mixed levels B4/B6. Burial BN09-32.

Fig. 4.72.9. H5 232-495-101 (P08-78). Standard Ware. Complete. Miniature Bowl. R. diam. 40 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR7/3. Vol. 0.02 l. Level A4. Hearth.

Fig. 4.72.10. J5 74-177-11. Standard Ware. Section. Miniature Bowl. R. diam. 35 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR3/1. Vol. 0.01 l. Level B8. Open area.

Fig. 4.72.11. G4 51-178-100 (P04-107). Standard Ware. Complete. Miniature Bowl. R. diam. 45 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR7/6. Vol. 0.06 l. Level A3. Floor.

Fig. 4.72.12. H5 30-59-100 (P05-29). Standard Ware. Section. Miniature Bowl. R. diam. 25 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/4. Vol. 0.02 l. Level A1. Open area.

Fig. 4.72.13. E3N 14-26-8. Standard Ware. Rim fragm. Miniature Bowl with conical lug. R. diam. 30 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/4. Vol. 0.02 l. Mixed levels A5/A6. Open area.

Fig. 4.72.14. J5 74-163-4. Standard Ware. Rim fragm. Miniature Bowl. R. diam. 40 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR7/3. Vol. 0.01 l. Level B8. Open area.

Fig. 4.72.15. F4 126-270-100 (P04-19). Standard Ware. Section. Miniature Bowl. R. diam. 50 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR7/3. Vol. 0.04 l. Level A3. Open area.

Fig. 4.72.16. F5 69-165-100 (P04-83). Standard Ware. Section. Miniature Bowl. R. diam. 45 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR6/3. Vol. 0.03 l. Level A3. Oven.

Fig. 4.72.17. I3 230-598-102 (P08-71). Standard Ware. Complete. Miniature Bowl. R. diam. 45 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR6/6. Vol. 0.06 l. C-Sequence. Burial BN08-43.

Fig. 4.73. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.73.1. G5 86-156-3. Standard Ware. Rim fragm. Large Straight-sided Bowl. R. diam. 380 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 10YR6/3. Level B8. Pit.

Fig. 4.73.2. F4 177-401-4. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 310 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 4.94 l. Level A4. Open area.

Fig. 4.73.3. G5 62-128-2. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 280 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/3. Vol. 3.71 l. Level A1. Open area.

Fig. 4.73.4. H5 68-126-1. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/8. Vol. 0.57 l. Level A1. Room fill.

Fig. 4.73.5. D3 352-404-4. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 140 mm. Ext. finger pressing. Int. very rough. Ext. 'brown'. Vol. 0.69 l. Mixed levels A6/A7. Open area.

Fig. 4.73.6. J5 74-177-5. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 220 mm. Ext. roughly smoothed. Int. well smoothed. Ext. 5YR7/4. Vol. 0.92 l. Level B8. Open area.

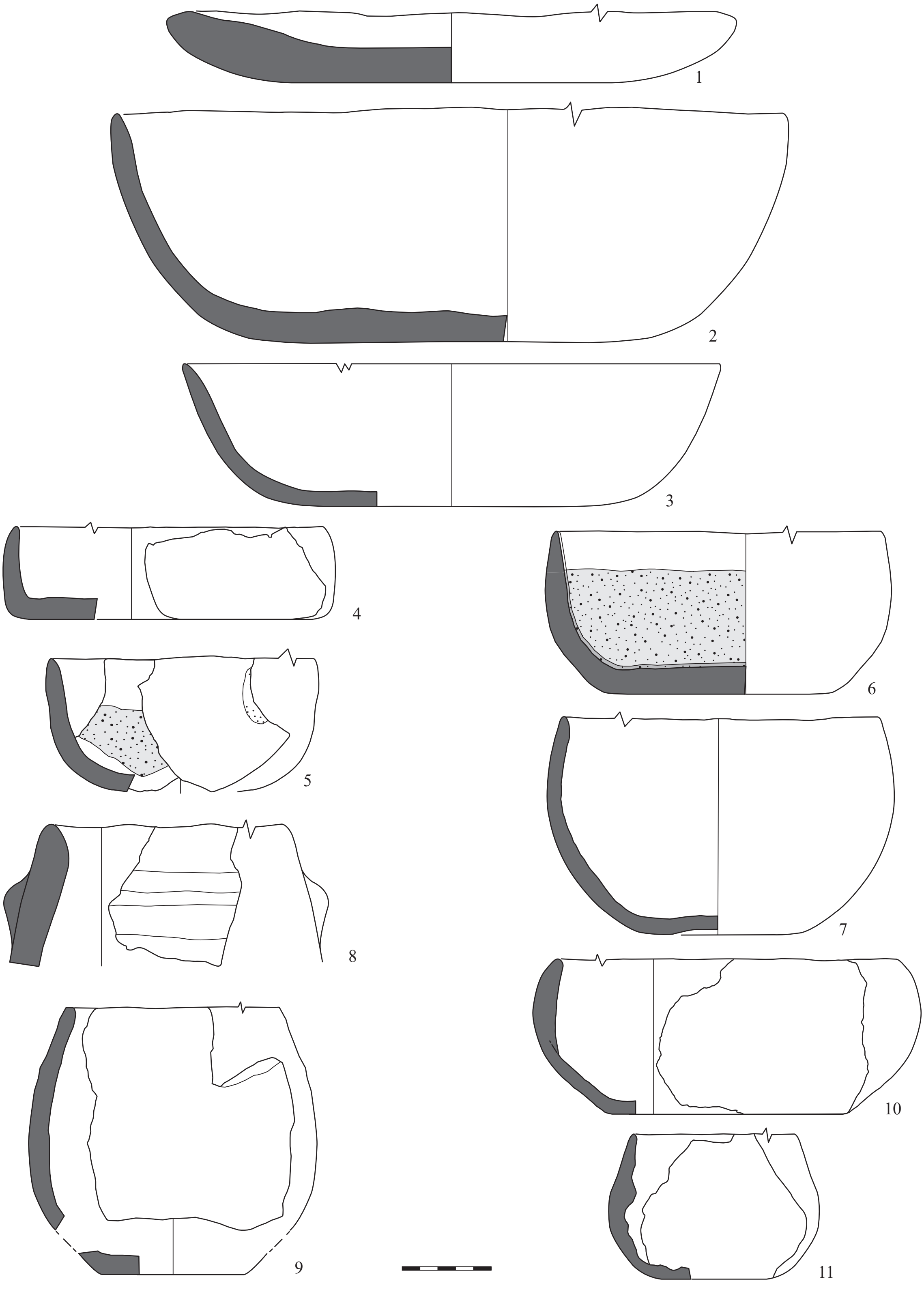


Fig. 4.71 Tell Sabi Abyad. Operation III. Standard Ware oval Convex-sided Bowls (scale 1:3).

Fig. 4.72 Tell Sabi Abyad. Operation III. Standard Ware Large Convex-sided Bowls (nos. 1–3); miniature bowls (nos. 4-17) (scale 1:3).

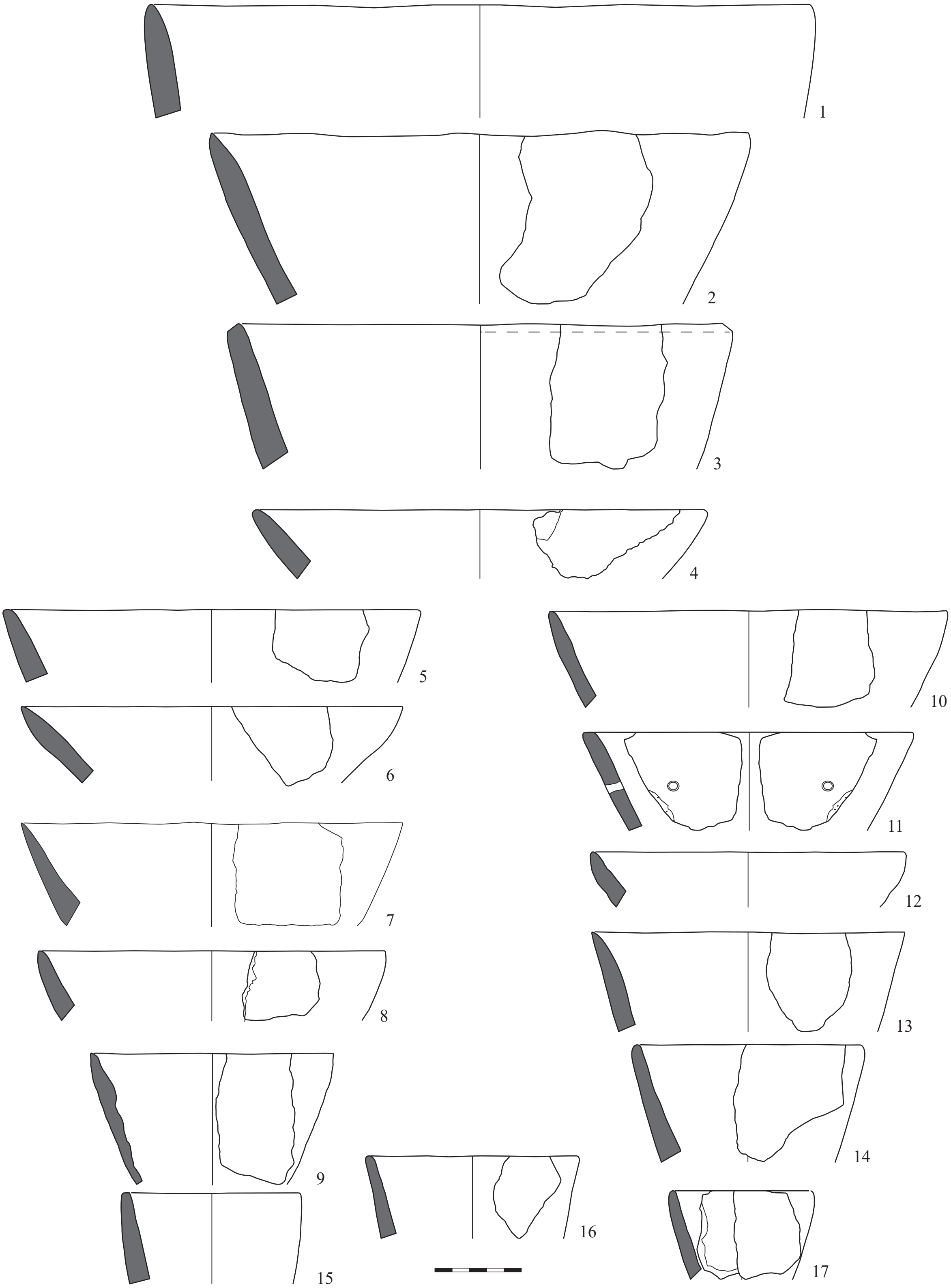


Fig. 4.73 Tell Sabi Abyad. Operation III. Standard Ware Straight-sided Bowls – Unspecified (scale 1:3).

Fig. 4.73.7. G5 585-663-1. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/3. Vol. 1.27 l. Level A2. Open area.

Fig. 4.73.8. J5 74-177-7. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 240 mm. Ext. burnished. Int. burnished. Ext. 5YR7/3. Vol. 1.37 l. Level B8. Open area.

Fig. 4.73.9. D3 394-466-4. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 200 mm. Ext. burnished. Int. very rough. Ext. 5YR5/6. Vol. 0.81 l. Level A6. Platform.

Fig. 4.73.10. E3 99-233-8. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 230 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Vol. 1.61 l. Mixed levels A4/A5. Open area.

Fig. 4.73.11. J5 31-74-5. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified; perforation as repair. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. 10YR8/4. Vol. 0.95 l. Mixed levels B5/B8. Open area.

Fig. 4.73.12. E3 139-332-11. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 180 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR6/3. Vol. 0.48 l. Level A8. Room fill.

Fig. 4.73.13. H4 78-134-4. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 180 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR7/4. Vol. 0.93 l. Level A1. Open area.

Fig. 4.73.14. I3 5-6-4. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. 10YR8/3. Vol. 2.05 l. Mixed levels B4/B8. Open area.

Fig. 4.73.15. E4 78-223-6. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 100 mm. Ext. burnished. Int. burnished. Ext. 5YR5/3. Vol. 0.31 l. Mixed levels A7/A8. Open area.

Fig. 4.73.16. H5 14-25-4. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. 5YR6/4. Vol. 0.38 l. Level A1. Open area.

Fig. 4.73.17. G5 33-80-2. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Vol. 0.15 l. Level A1. Room fill.

Fig. 4.74. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.74.1. E3 97-220-4. Standard Ware. Rim fragm. Straight-sided Flat-based Bowl. R. diam. 290 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR5/3. Level A5. Open area.

Fig. 4.74.2. E3 60-140-100 (P03-443). Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 320 mm. Ext. burnished. Int. burnished. Ext. 2.5YR6/4. Level A4. Floor.

Fig. 4.74.3. I3 142-226-100 (P07-94). Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 260 mm. Ext. finger pressing. Int. roughly smoothed. Ext. 'buff'. Mixed levels B8/A1/A2. Open area.

Fig. 4.74.4. H3 200-470-101 (P08-9). Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 180 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/4. Thin plaster on interior. Level A4. Room fill.

Fig. 4.74.5. J4N 931-404-101 (P09-34). Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 150 mm. Ext. eroded. Int. eroded. Ext. 'brown'. Vol. 1.23 l. Level uncertain.

Fig. 4.74.6. I3 191-462-101 (P08-24). Standard Ware. Complete. Straight-sided Flat-based Bowl. R. diam. 130 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR5/6. Vol. 0.59 l. C-Sequence. Burial BN08-11.

Fig. 4.74.7. H3 25-32-100 (P05-14). Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/4. Top soil.

Fig. 4.74.8. E3N 0-9-1. Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 210 mm. Ext. well smoothed. Int. very rough. Ext. 7.5YR4/3. Level A5. Open area.

Fig. 4.74.9. I3 100-115-100 (P05-40). Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 120 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR5/8. Level A1. Open area.

Fig. 4.74.10. D4 85-161-11. Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 110 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR7/4. Level A5. Open area.

Fig. 4.74.11. I3 12-21-11. Standard Ware. Section. Straight-sided Flat-based Bowl; uneven height. R. diam. 110 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR6/4. Mixed levels B4/A1. Open area.

Fig. 4.74.12. I3 102-101-1. Standard Ware. Section. Straight-sided Flat-based Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Mixed levels C-Sequence/B5. Open area.

Fig. 4.74.13. H5 19-43-1. Standard Ware. Section. Straight-sided Flat-based Bowl; uneven height. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/3. Level A1. Room fill.

Fig. 4.75. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.75.1. J4 176-323-1. Standard Ware. Rim fragm. Everted S-shaped Bowl. R. diam. 230 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Vol. 1.51 l. Mixed levels B4/B5. Open area.

Fig. 4.75.2. G5 67-131-1. Standard Ware. Rim fragm. Everted S-shaped Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Vol. 2.42 l. Level A1. Open area.

Fig. 4.75.3. I3 126-164-1. Standard Ware. Rim fragm. Everted S-shaped Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/4. Vol. 2.07 l. Level A1. Room fill.

Fig. 4.75.4. J5 92-229-100 (P07-82). Standard Ware. Section. Everted S-shaped Bowl. R. diam. 110 mm. Ext. finger pressing. Int. roughly smoothed. Ext. 'orange'. Vol. 0.22 l. Mixed levels C-Sequence/B4. Oven.

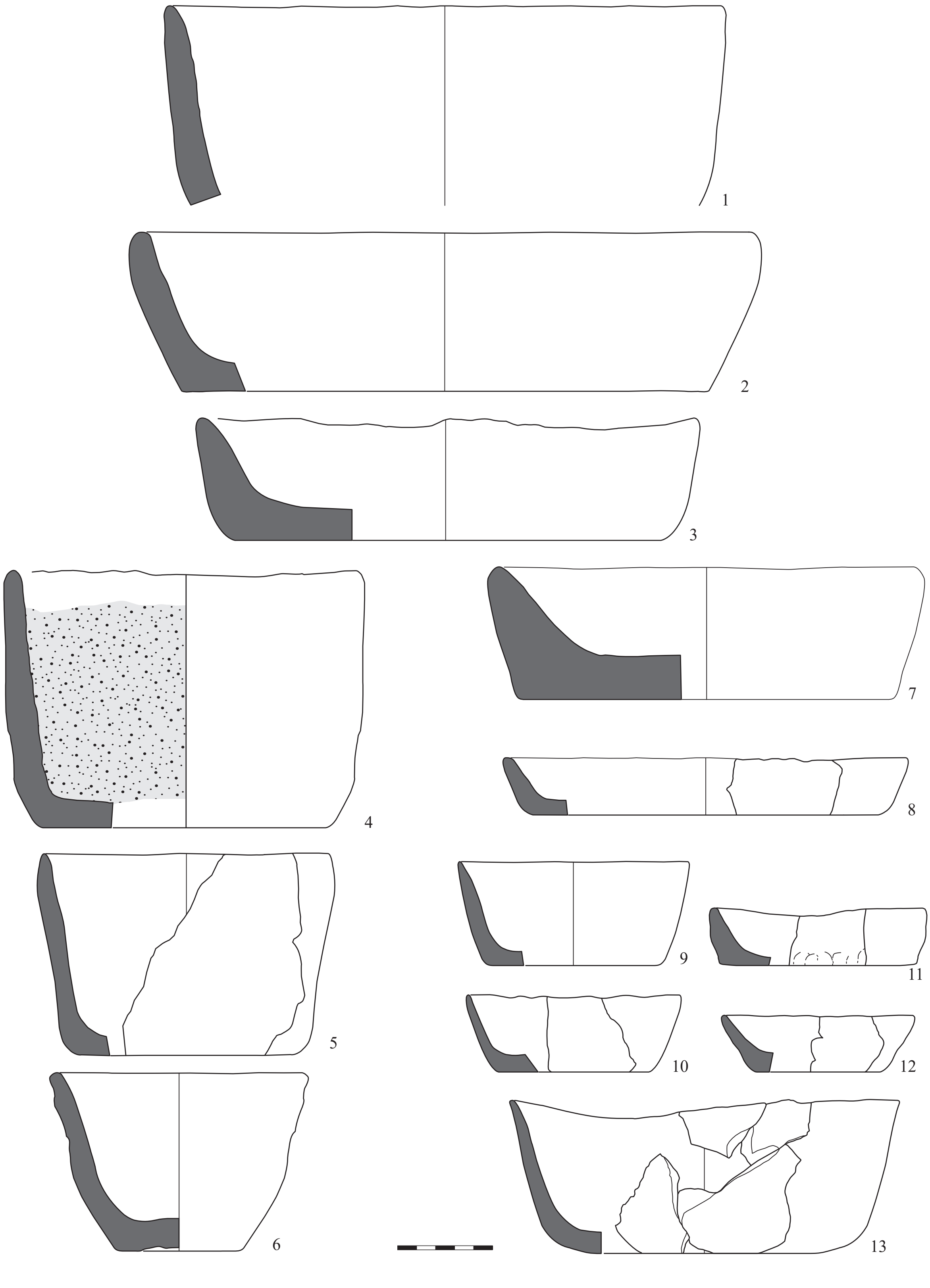


Fig. 4.74 Tell Sabi Abyad. Operation III. Standard Ware Straight-sided Flat-based Bowls (scale 1:3).

Fig. 4.75.5. J3S 202-365-102 (P09-28). Standard Ware. Complete. Vertical S-shaped Bowl. R. diam. 125 mm. Ext. eroded. Int. eroded. Ext. 'orange'. Vol. 0.87 l. C-Sequence. Biurial BN09-12.

Fig. 4.75.6. G4 8-35-100 (P04-12). Standard Ware. Section. Vertical S-shaped Bowl. R. diam. 50 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR6/3. Vol. 0.04 l. Level A1. Open area.

Fig. 4.75.7. H4 124-209-102. Standard Ware. Rim fragm. Vertical S-shaped Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 0.52 l. Level A1. Open area.

Fig. 4.75.8. I5 203-307-100 (P07-111). Standard Ware. Section. Vertical S-shaped Bowl. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'buff'. Vol. 0.47 l. Level A1. Room fill.

Fig. 4.75.9. J4 220-582-101 (P08-28). Standard Ware. Complete. S-shaped Goblet with vertical loop handle. R. diam. 80 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Vol. 0.65 l. Level B6. Bin.

Fig. 4.75.10. L5 45-116-101 (P07-57). Standard Ware. Complete. S-shaped Goblet. R. diam. 55 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Vol. 0.28 l. Level B3. Room fill.

Fig. 4.75.11. I3 5-6-8. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 70 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/4. Mixed levels B4/B8. Open area.

Fig. 4.75.12. H5 43-80-1. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 60 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR8/2. Level A1. Open area.

Fig. 4.75.13. G5 517-519-2. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 80 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5YR6/4. Level A1. General.

Fig. 4.75.14. J3N 595-821-101 (P09-90). Standard Ware. Complete. S-shaped Goblet. R. diam. 50 mm. Ext. Int. Ext. 'buff'. Vol. 0.16 l. Mixed levels B8/B9. Burial BN09-46.

Fig. 4.75.15. J4 176-323-100 (P07-97). Standard Ware. Section. S-shaped Goblet. R. diam. 75 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'buff'. Vol. 0.59 l. Mixed levels B4/B5. Open area.

Fig. 4.75.16. D4 80-151-2. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 80 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR6/6. Level A5. Open area.

Fig. 4.75.17. H5 1-3-1. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 80 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR7/4. Vol. 0.47 l. Top soil.

Fig. 4.75.18. G5 91-161-6. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 60 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/4. Level A1. Open area.

Fig. 4.75.19. F4 29-70-2. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 170 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/4. Level A1. Room fill.

Fig. 4.75.20. F4 184-410-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Level A1. General fill layer.

Fig. 4.75.21. F4 111-252-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 160 mm. Ext. roughly smoothed. Int. very rough. Ext. 5YR6/2. Level A3. Open area.

Fig. 4.75.22. D4 5-8-10. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 150 mm. Ext. burnished. Int. finger pressed. Ext. 5YR7/4. Level A4. Open area.

Fig. 4.76. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.76.1. G5 86-156-2. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 200 mm. Ext. roughly smoothed. Int. scraped. Ext. 10YR7/3. Level B8. Pit.

Fig. 4.76.2. D4 23-28-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Level A4. Room fill.

Fig. 4.76.3. D3 15-30-2. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 160 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/4. Level A6. Floor.

Fig. 4.76.4. E4 17-52-3. Standard Ware. Rim fragm. Closed S-shaped Bowl with cordon. R. diam. 160 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR5/6. Level A4. Open area.

Fig. 4.76.5. E3 146-348-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 140 mm. Ext. burnished. Int. finger pressed. Ext. 5YR5/6. Mixed levels A8/A9. Open area.

Fig. 4.76.6. D4 109-212-1. Standard Ware. Rim fragm. Closed S-shaped Bowl with conical lug. R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. 5YR6/6. Level A5. Platform.

Fig. 4.76.7. H4 71-111-10. Standard Ware. Rim fragm. Closed S-shaped Bowl with vertical loop handle. R. diam. 100 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR7/4. Level A1. Open area.

Fig. 4.76.8. G5 558-590-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/6. Level A2. Open area.

Fig. 4.76.9. G5 522-529-3. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5YR7/4. Level A1. Bin.

Fig. 4.76.10. G5 21-59-100 (P05-22). Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 100 mm. Ext. scraped. Int. finger pressed. Ext. 10YR6/3. Vol. 0.70 l. Level A1. Oven.

Fig. 4.76.11. F4 184-410-7. Standard Ware. Section. Closed S-shaped Bowl. R. diam. 160 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Vol. 4.27 l. Traces of thin plaster interior lower body. Level A1. General fill layer.

Fig. 4.76.12. G5 610-660-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/6. Level A2. Open area.

Fig. 4.76.13. F4 93-218-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Level A3. Open area.

Fig. 4.76.14. I4 184-233-101 (P07-67). Standard Ware. Complete. Closed S-shaped Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR7/4. Vol. 0.91 l. Level A1. Room fill.

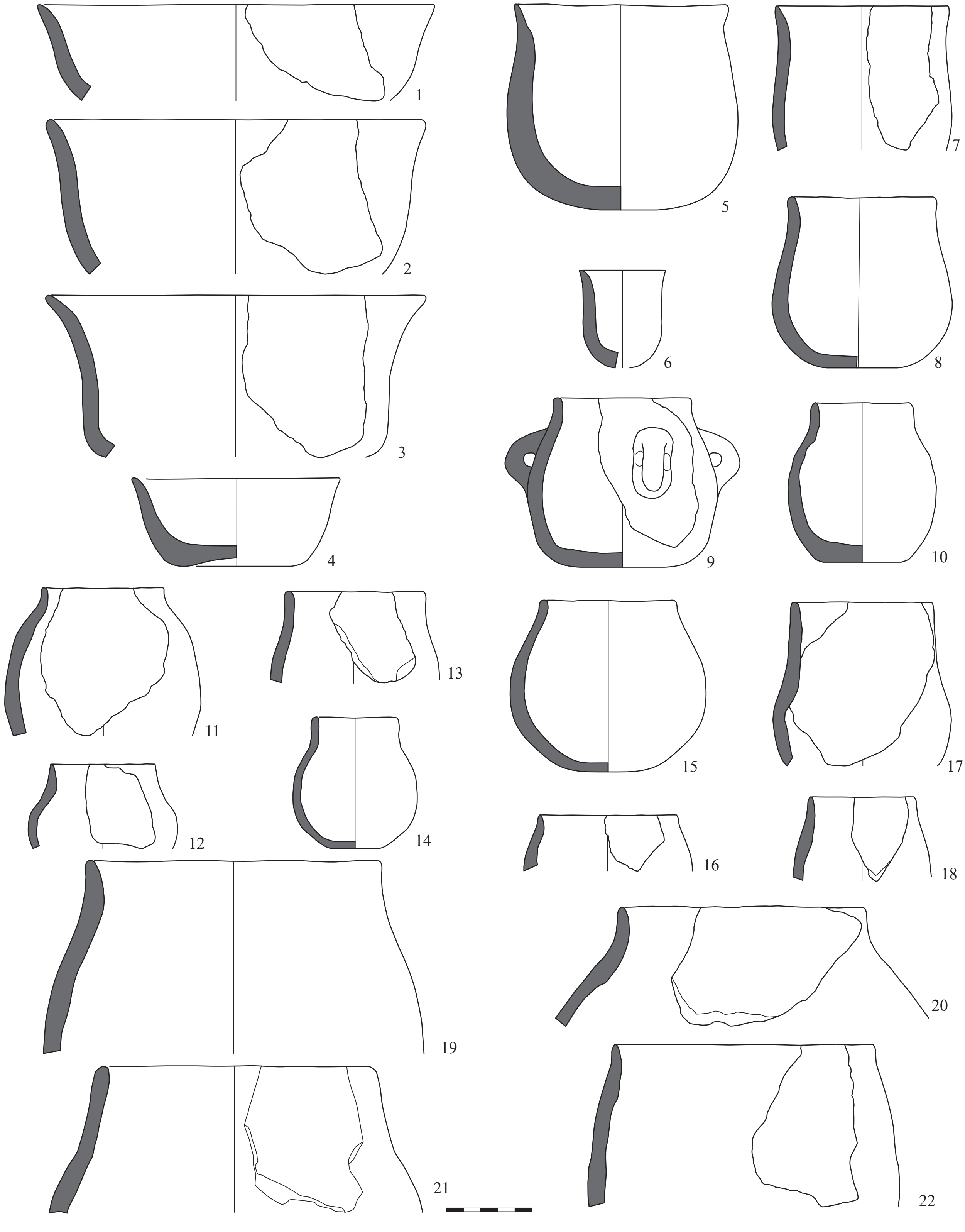


Fig. 4.75 Tell Sabi Abyad. Operation III. Standard Ware Everted S-shaped Bowls (nos. 1–4); Vertical S-shaped Bowls (nos. 5–8); S-shaped Goblets (nos. 9–18); Closed S-shaped Bowls (nos. 19–22) (scale 1:3).

Fig. 4.76.15. K5 34-81-101 (P07-45). Standard Ware. Section. Closed S-shaped Bowl. R. diam. 100 mm. Ext. well smoothed. Int. finger pressed. Ext. 10YR8/2. Vol. 1.27 l. Mixed levels B2/B4. Open area.

Fig. 4.77. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.77.1. J5 93-186-1. Standard Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 260 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/3. Vol. 3.18 l. Level B8. Oven.

Fig. 4.77.2. J5 67-133-3. Standard Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 220 mm. Ext. burnished. Int. burnished. Ext. 7.5YR6/4. Vol. 1.32 l. Level B4. Open area.

Fig. 4.77.3. I3 10-22-1. Standard Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/2. Vol. 1.19 l. Level A1. Room fill.

Fig. 4.77.4. I3 115-133-15. Standard Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Vol. 1.74 l. Mixed levels B7/B8/A1. Open area.

Fig. 4.77.5. G5 9-25-2. Standard Ware. Rim fragm. Vertical Straight-sided Carinated Bowl. R. diam. 160 mm. Ext. roughly smoothed. Int. eroded. Ext. 7.5YR7/3. Vol. 1.27 l. Level A1. Room fill.

Fig. 4.77.6. G5 667-798-4. Standard Ware. Rim fragm. Vertical Straight-sided Carinated Bowl. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 2.46 l. Plastered interior base. Level A3. Room fill.

Fig. 4.77.7. H5 8-54-1. Standard Ware. Rim fragm. Vertical Straight-sided Carinated Bowl. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. 7.5YR6/4. Vol. 2.27 l. Level B8. Open area.

Fig. 4.77.8. J5 56-106-6. Standard Ware. Rim fragm. Vertical Straight-sided Carinated Bowl. R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. 7.5YR7/3. Vol. 0.32 l. Mixed levels B5/B7/B8. Open area.

Fig. 4.77.9. G5 66-135-3. Standard Ware. Rim fragm. Vertical Straight-sided Carinated Bowl. R. diam. 260 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/6. Vol. 5.13 l. Level A1. Pit.

Fig. 4.77.10. G3 8-14-1. Standard Ware. Rim fragm. Closed Straight-sided Carinated Bowl. R. diam. 130 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/4. Vol. 1.10 l. Top soil.

Fig. 4.77.11. J5 31-74-101 (P07-36). Standard Ware. Rim fragm. Closed Straight-sided Carinated Bowl. R. diam. 130 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR6/3. Vol. 0.78 l. Mixed levels B5/B8. Open area.

Fig. 4.77.12. K5 21-46-101 (P07-32). Standard Ware. Section. Closed Straight-sided Carinated Bowl. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. 7.5YR6/3. Vol. 1.86 l. Level B1. Hearth.

Fig. 4.77.13. G5 42-90-1. Standard Ware. Rim fragm. Closed Straight-sided Carinated Bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/6. Vol. 1.35 l. Level A1. Room fill.

Fig. 4.77.14. G3 11-34-1. Standard Ware. Rim fragm. Closed Straight-sided Carinated Bowl. R. diam. 110 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5Y7/2. Vol. 1.49 l. Level A2. Pit.

Fig. 4.77.15. J5 81-155-2. Standard Ware. Rim fragm. Closed Straight-sided Carinated Bowl. R. diam. 70 mm. Ext. well smoothed. Int. well smoothed. Ext. 7.5YR6/3. Vol. 0.17 l. Level B4. Pit.

Fig. 4.78. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.78.1. G4 22-120-200 (P04-60). Standard Ware. Section. Vertical Tray; notable thickening of the centre base. R. diam. oval. Ext. finger pressing. Int. finger pressed. Ext. ‘buff’. Level A2. Room fill.

Fig. 4.78.2. I5 283-485-101 (P08-49). Standard Ware. Section. Vertical Tray; notable thickening of the centre base. R. diam. oval. Ext. finger pressing. Int. roughly smoothed. Ext. 2.5YR6/6. Vol. 6.27 l. Mixed levels A1/A2. Open area.

Fig. 4.78.3. I5 255-490-101 (P08-46). Standard Ware. Section. Vertical Tray. R. diam. oval. Ext. roughly smoothed. Int. very rough. Ext. 2.5YR6/8. Level A2. Room fill.

Fig. 4.78.4. F4 9-40-1. Standard Ware. Section. Vertical Tray. R. diam. oval. Ext. finger pressing. Int. finger pressed. Ext. 10YR7/4. Patches plaster exterior base. Level A1. Room fill.

Fig. 4.78.5. F4 29-102-1 (P03-496). Standard Ware. Section. Vertical Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Level A1. Open area.

Fig. 4.78.6. G4 22-120-100 (P04-59). Standard Ware. Section. Vertical Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Level A2. Room fill.

Fig. 4.78.7. F3 8-25-100 (P03-23). Standard Ware. Section. Vertical Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A1. Open area.

Fig. 4.78.8. G4N 29-106-107. Standard Ware. Section. Vertical Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. ‘brown’. Level A3. Open area.

Fig. 4.78.9. H5 236-707-101 (P08-93). Standard Ware. Complete. Vertical Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Vol. 0.33 l. Level A4. Bin.

Fig. 4.79. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.79.1. J5 75-145-1. Standard Ware. Section. Everted Tray. R. diam. oval. Ext. finger pressing. Int. roughly smoothed. Ext. 2.5YR6/4. Level B7. Oven.

Fig. 4.79.2. H4 58-84-101 (P07-37). Standard Ware. Section. Everted Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/4. Level A1. Open area.

Fig. 4.79.3. F4 9-40-2 (P04-34). Standard Ware. Section. Everted Tray. R. diam. oval. Ext. finger pressing. Int. roughly smoothed. Ext. 5YR6/4. Level A1. Room fill.

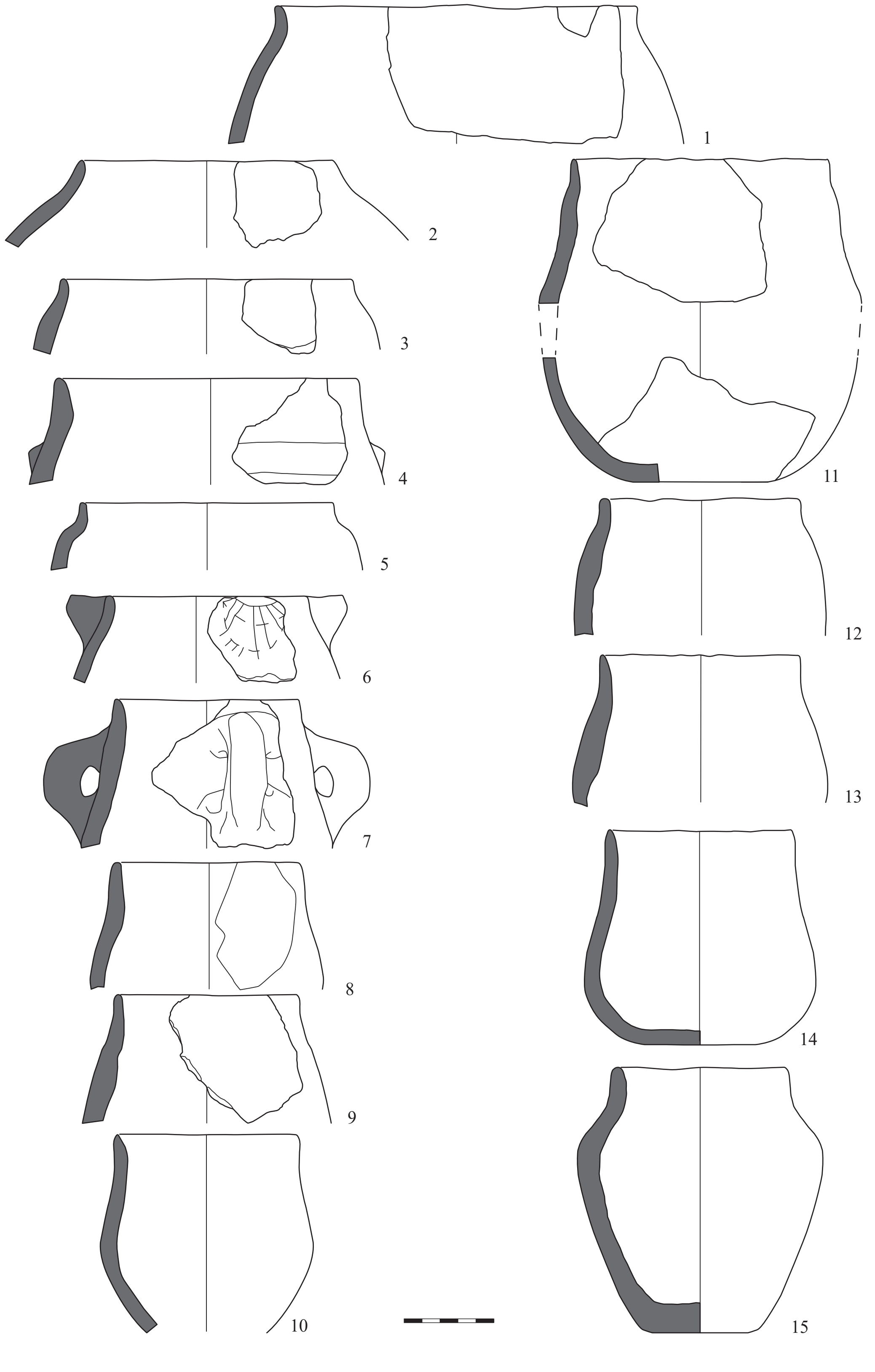


Fig. 4.76 Tell Sabi Abyad. Operation III. Standard Ware Closed S-shaped Bowls (scale 1:3).

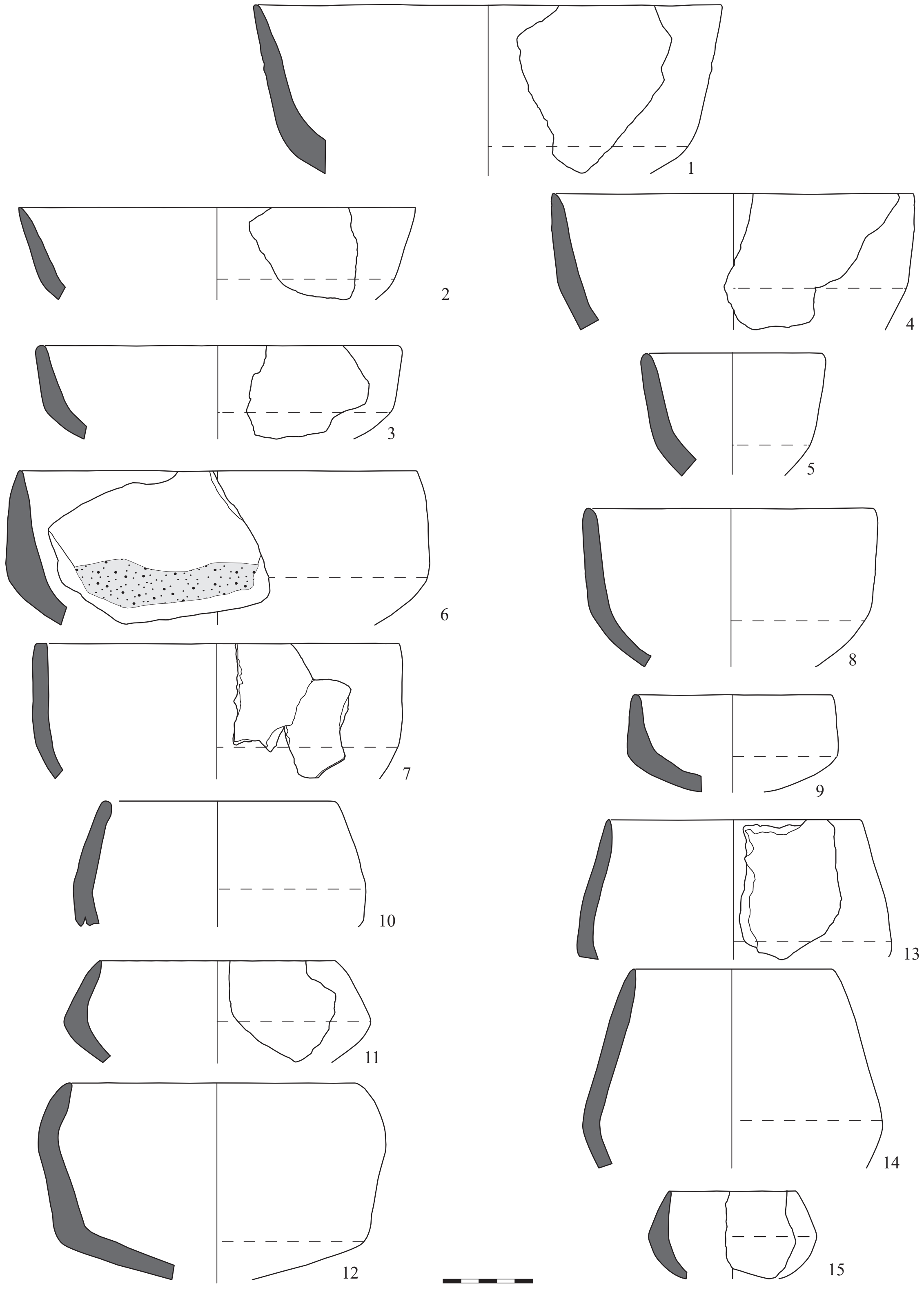


Fig. 4.77 Tell Sabi Abyad. Operation III. Standard Ware Everted Straight-sided Carinated Bowls (nos. 1–4); Vertical Straight-sided Carinated Bowls (nos. 5–9); Closed Straight-sided Carinated Bowls (nos. 10–15) (scale 1:3).

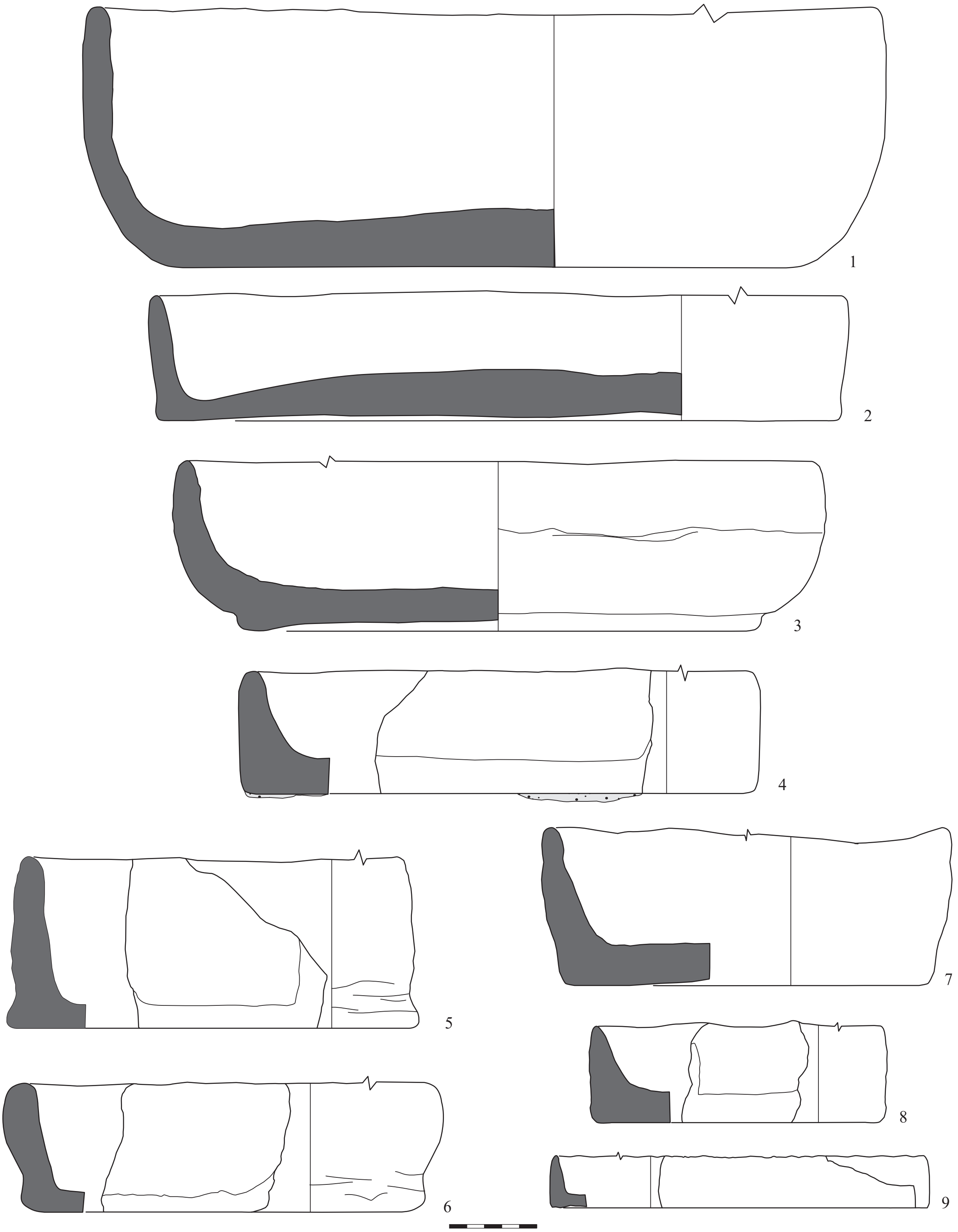


Fig. 4.78 Tell Sabi Abyad. Operation III. Standard Ware Vertical Trays (scale 1:3).

Fig. 4.79.4. H3 71-139-100 (P05-38). Standard Ware. Section. Everted Tray. R. diam. 380 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/4. Level A1. Room fill.

Fig. 4.79.5. E3N 11-11-1. Standard Ware. Section. Everted Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A5. Room fill.

Fig. 4.79.6. D4 1-1-1. Standard Ware. Section. Everted Tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/4. Level A4. Open area.

Fig. 4.79.7. E3 97-220-1 (P04-XX). Standard Ware. Section. Everted Tray. R. diam. oval. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR6/4. Level A5. Open area.

Fig. 4.79.8. G3 34-126-1 (P02-215). Standard Ware. Section. Everted Tray; height very uneven. R. diam. oval. Ext. scraped. Int. scraped. Ext. 7.5YR6/3. Level A4. Room fill.

Fig. 4.79.9. G5 624-690-1. Standard Ware. Section. Everted Tray. R. diam. oval. Ext. roughly smoothed. Int. eroded. Ext. 5YR7/4. Thin plaster interior. Level A2. Open area.

Fig. 4.79.10. E5 16-30-100 (P04-96). Standard Ware. Section. Tray with Crenellated rim. R. diam. oval. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR6/4. Level A4. Open area.

Fig. 4.80. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.80.1. J4 346-735-101 (P08-77). Standard Ware. Section. Husking Tray; grooved wall, impressed base; about one-fourth preserved: original weight 7-8 kg? R. diam. oval. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/4. Mixed levels B8/A1. Open area.

Fig. 4.80.2. G4N 30-77-101 (P07-47). Standard Ware. Section. Husking Tray; impressed base. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A1. Room fill.

Fig. 4.80.3. I3 100-124-102 (P05-46). Standard Ware. Section. Husking Tray; grooved-and-impressed wall. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A1. Open area.

Fig. 4.81. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.81.1. I6 108-339-101 (P08-66). Standard Ware. Section. Husking Tray; grooved wall, impressed base. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/6. Level A1. Room fill.

Fig. 4.81.2. H4 19-101-1. Standard Ware. Section. Husking Tray; grooved wall, impressed base. R. diam. oval. Ext. roughly smoothed. Int. very rough. Ext. 'brown'. Level A1. Open area.

Fig. 4.81.3. H4 28-79-101 (P07-34). Standard Ware. Section. Husking Tray; cross-incised wall, impressed base. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'brown'. Level B8. Open area.

Fig. 4.82. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.82.1. H4 9-13-100 (P07-10). Standard Ware. Section. Husking Tray; grooved wall, impressed base. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR5/6. Three mm thick plaster interior wall; 1-1,5 cn thick plaster interopr base; rounded grey-brown pebbles (0,5-2.5cm) pressed into interior plaster Top soil.

Fig. 4.82.2. H4 31-57-1. Standard Ware. Section. Husking Tray; grooved wall, impressed base. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Interior lower body plastered (5mm thick) Level A1. Open area.

Fig. 4.82.3. H4 61-114-2. Standard Ware. Section. Husking; grooved wall. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Ca. 5mm thick plaster both surfaces. Level A1. Open area.

Fig. 4.82.4. G5 33-80-101 (P05-91). Standard Ware. Section. Husking; grooved wall. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR6/6. Ca 6mm plaster interior body. Level A1. Room fill.

Fig. 4.83. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.83.1. I6 86-363-101 (P08-90). Standard Ware. Section. Husking Tray; grooved wall, impressed base. R. diam. oval. Ext. roughly smoothed. Int. very rough. Ext. 10YR6/3. Level A1. Room fill.

Fig. 4.83.2. I6 109-340-101 (P08-65). Standard Ware. Section. Husking Tray; grooved wall, impressed base; ca one-fourth preserved: original weight ca 10kg? R. diam. oval. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/4. Level A1. Room fill.

Fig. 4.84. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.84.1. F4 43-193-7. Standard Ware. Rim fragm. Vertical Pot. R. diam. 330 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Vol. 12.18 l. Level A1. Open area.

Fig. 4.84.2. F4 1-2-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 280 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR5/4. Vol. 13.02 l. Level A1. Room fill.

Fig. 4.84.3. D4 5-8-8. Standard Ware. Rim fragm. Vertical Pot. R. diam. 320 mm. Ext. eroded. Int. roughly smoothed. Ext. 10YR6/3. Vol. 8.74 l. Level A4. Open area.

Fig. 4.84.4. E4 19-160-1. Standard Ware. Rim fragm. Vertical Pot with cordon. R. diam. 280 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/4. Level A4. Room fill.

Fig. 4.85. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.85.1. G3 9-16-1. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 250 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR7/6. Vol. 5.42 l. Mixed levels A1/A2. Open area.

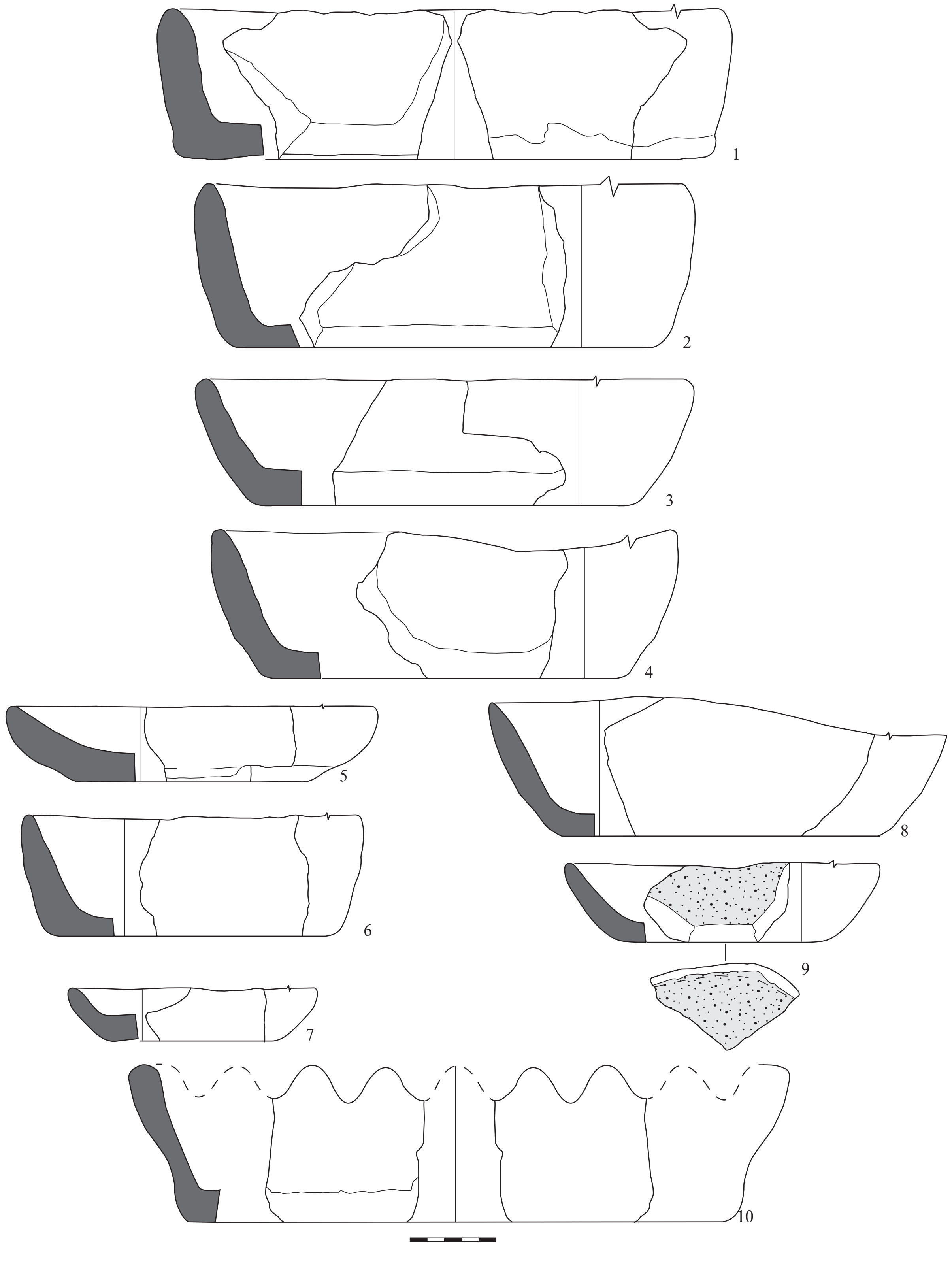


Fig. 4.79 Tell Sabi Abyad. Operation III. Standard Ware Everted Trays (nos. 1–9); Tray with Crenellated rim (no. 10) (scale 1:3).

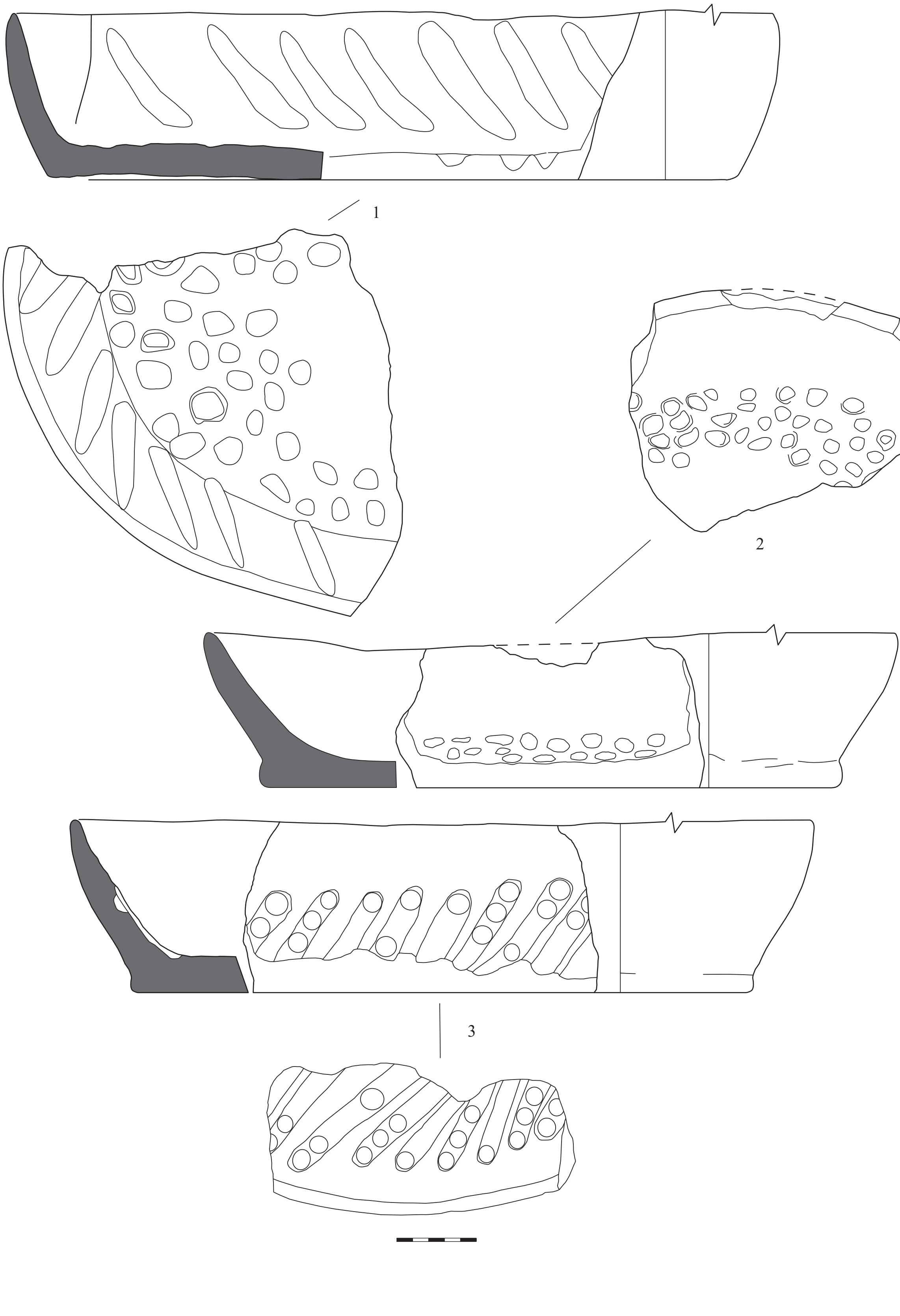


Fig. 4.80 Tell Sabi Abyad. Operation III. Standard Ware Husking Trays (scale 1:3).

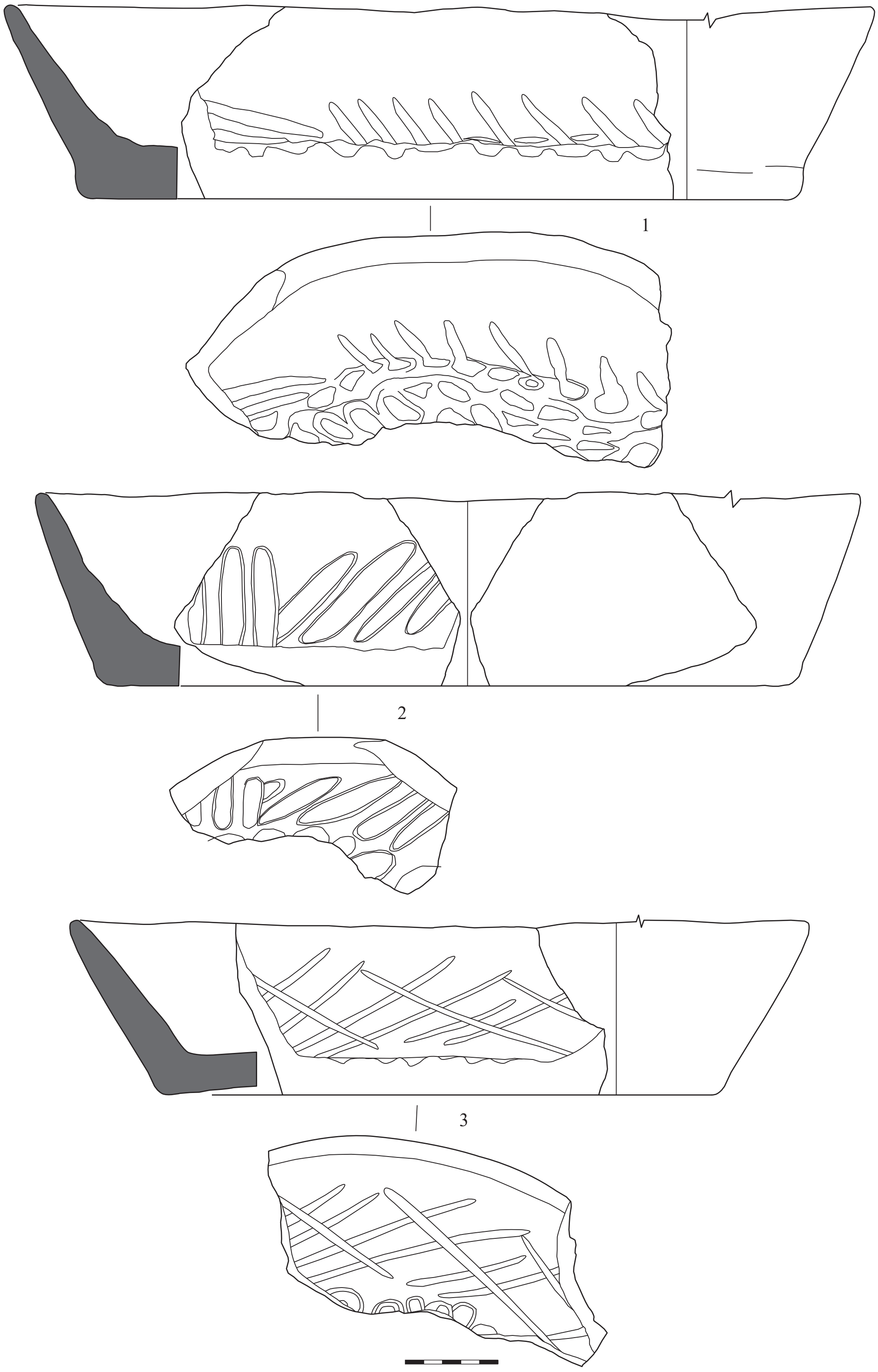


Fig. 4.81 Tell Sabi Abyad. Operation III. Standard Ware Husking Trays (scale 1:3).

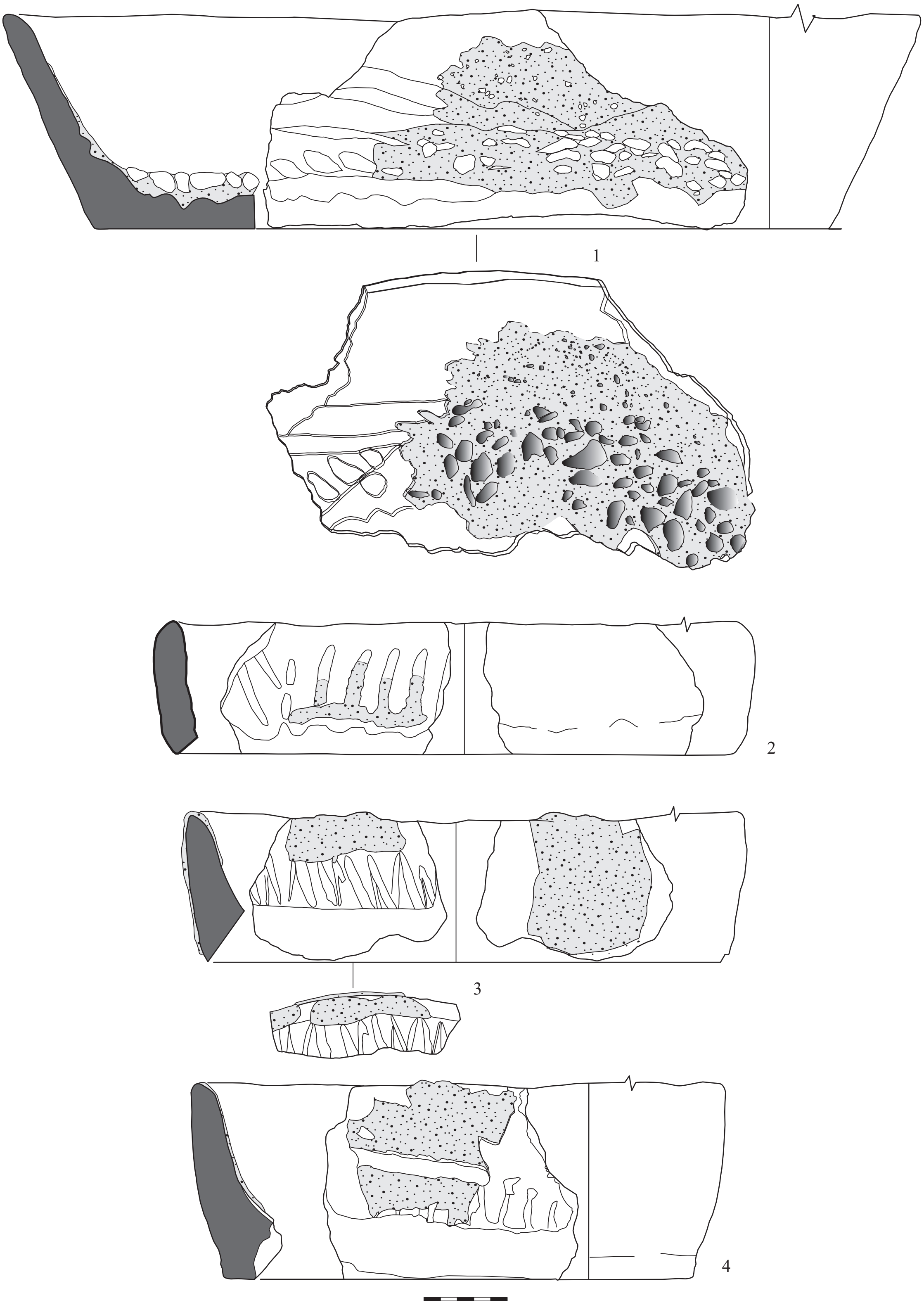


Fig. 4.82 Tell Sabi Abyad. Operation III. Standard Ware Husking Trays (scale 1:3).

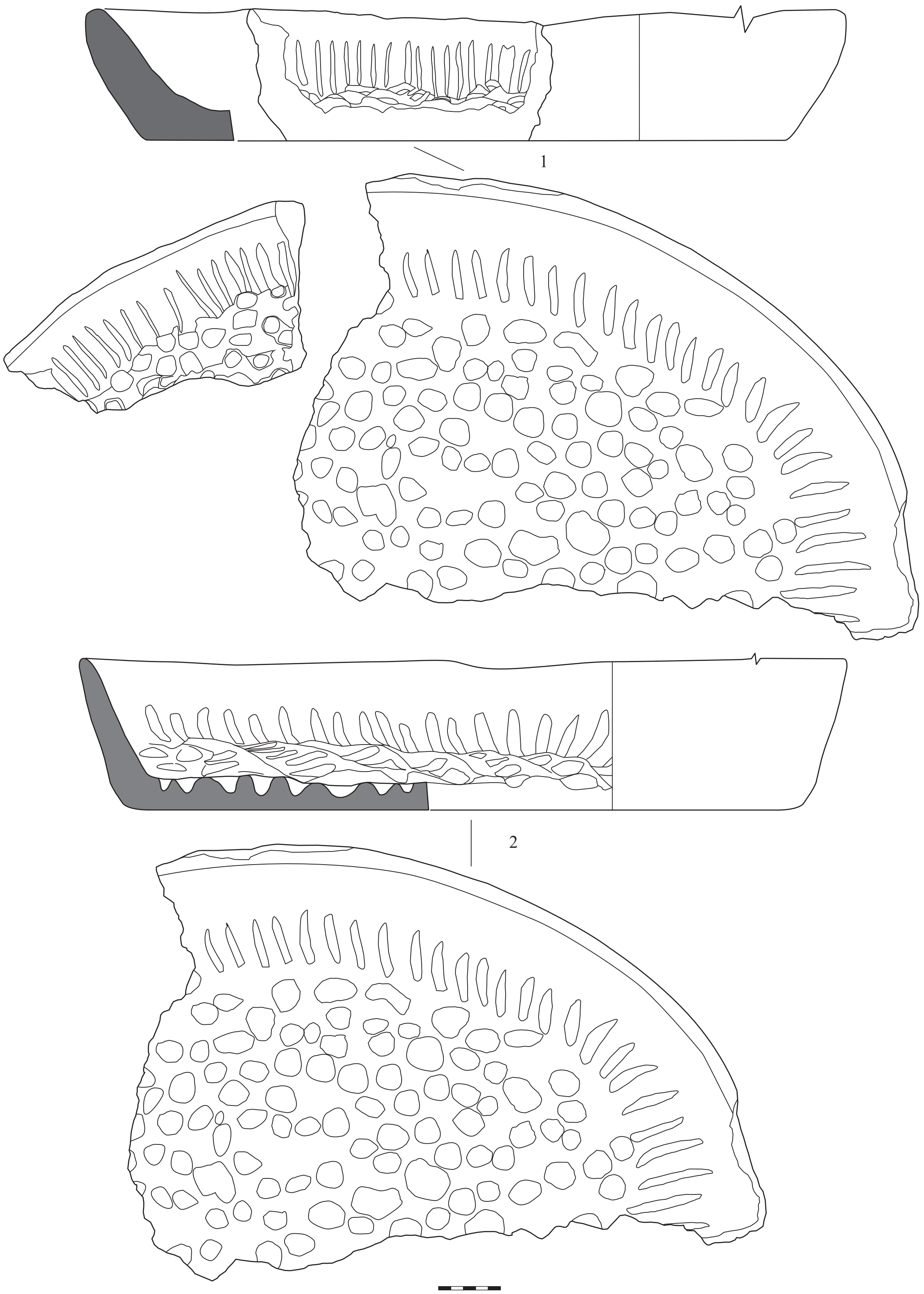


Fig. 4.83 Tell Sabi Abyad. Operation III. Standard Ware Husking Trays (scale 1:3).

Fig. 4.85.2. E4 19-61-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 260 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR7/4. Level A4. Floor.

Fig. 4.85.3. E4 83-247-20. Standard Ware. Rim fragm. Vertical Pot. R. diam. 250 mm. Ext. burnished. Int. finger pressed. Ext. 7.5YR5/4. Vol. 5.06 l. Level A8. Pit.

Fig. 4.85.4. E3 102-261-1. Standard Ware. Section. Vertical Pot with vertical loop handle. R. diam. 220 mm. Ext. burnished. Int. finger pressed. Ext. 7.5YR6/6. Vol. 9.04 l. Level A6. Floor.

Fig. 4.86. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.86.1. E4 82-236-6. Standard Ware. Rim fragm. Vertical Pot with 'ear'-shaped lug along the rim. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Mixed levels A7/A8/A9. Open area.

Fig. 4.86.2. H4 95-165-4. Standard Ware. Rim fragm. Vertical Pot with horizontal loop handle. R. diam. 210 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Level A1. Room fill.

Fig. 4.86.3. G4N 29-87-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 130 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 1.23 l. Level A2. Room fill.

Fig. 4.86.4. E4 75-201-3. Standard Ware. Rim fragm. Vertical Pot. R. diam. 140 mm. Ext. finger pressing. Int. finger pressed. Ext. 2.5R6/6. Vol. 1.47 l. Level A5. Platform.

Fig. 4.86.5. D4 20-25-2. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 150 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 1.47 l. Level A4. Open area.

Fig. 4.86.6. G5 687-828-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 240 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR8/3. Vol. 5.58 l. Level A2. Open area.

Fig. 4.86.7. E3 138-330-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 200 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR5/3. Vol. 2.56 l. Level A7. Open area.

Fig. 4.86.8. G4N 30-107-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 210 mm. Ext. roughly smoothed. Int. very rough. Ext. 5YR7/6. Vol. 7.59 l. Thin patches of plaster on interior. Level A2. Open area.

Fig. 4.86.9. E4 19-160-12. Standard Ware. Rim fragm. Vertical Pot. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 1.92 l. Level A4. Room fill.

Fig. 4.87. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.87.1. G3 30-101-2. Standard Ware. Rim fragm. Vertical Pot. R. diam. 240 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/6. Vol. 7.51 l. Level A4. Oven.

Fig. 4.87.2. D4 92-190-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 240 mm. Ext. burnished. Int. finger pressed. Ext. 5YR6/4. Vol. 5.81 l. Level A5. Hearth.

Fig. 4.87.3. D3 43-64-1. Standard Ware. Section. Vertical Pot. R. diam. 230 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/3. Vol. 5.70 l. Level A6. Floor.

Fig. 4.87.4. E3N 6-16-2. Standard Ware. Rim fragm. Vertical Pot. R. diam. 210 mm. Ext. burnished. Int. finger pressed. Ext. 5YR6/4. Vol. 4.07 l. Level A5. Room fill.

Fig. 4.87.5. E4 16-171-1 (P04-115). Standard Ware. Section. Vertical Pot. R. diam. 120 mm. Ext. finger pressing. Int. roughly smoothed. Ext. 2.5Y7/3. Vol. 0.97 l. Level A3. Pit.

Fig. 4.87.6. G5 557-589-1 (P07-122). Standard Ware. Section. Vertical Pot. R. diam. 160 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 1.04 l. Thin plaster interior lower body. Level A1. Room fill.

Fig. 4.87.7. F4 43-128-101 (P03-153). Standard Ware. Complete. Vertical Pot. R. diam. 200 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR5/4. Vol. 2.88 l. Thin plaster interior lower body. Level A1. Floor.

Fig. 4.87.8. D4 85-165-9. Standard Ware. Rim fragm. Vertical Pot. R. diam. 230 mm. Ext. burnished. Int. very rough. Ext. 7.5YR7/4. Spots of thin plaster exterior Level A6. Open area.

Fig. 4.87.9. F4 168-382-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 240 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/4. Vol. 3.72 l. Thin plaster interior lower body. Level A4. Open area.

Fig. 4.88. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.88.1. E4 76-206-8. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 200 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/3. Vol. 2.93 l. Level A5. Platform.

Fig. 4.88.2. E4 46-205-1. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 170 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5Y7/3. Vol. 2.39 l. Level A4. Construction.

Fig. 4.88.3. D4 101-198-1. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 150 mm. Ext. burnished. Int. roughly smoothed. Ext. 10YR7/4. Mixed levels A7/A8. Open area.

Fig. 4.88.4. E4 82-232-1. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 130 mm. Ext. finger pressing. Int. finger pressed. Ext. 2.5YR6/6. Vol. 1.49 l. Mixed levels A7/A8/A9. Open area.

Fig. 4.88.5. E3 3-8-2. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/3. Vol. 0.58 l. Level A3. Open area.

Fig. 4.88.6. F4 13-110-1. Standard Ware. Section. Vertical Pot. R. diam. 200 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR5/6. Vol. 5.89 l. Level A1. Floor.

Fig. 4.88.7. D3 25-46-1. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 180 mm. Ext. burnished. Int. very rough. Ext. 5YR5/6. Vol. 3.40 l. Level A5. Room fill.

Fig. 4.88.8. D4 56-95-1. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 160 mm. Ext. burnished. Int. roughly smoothed. Ext. 2.5YR6/6. Vol. 2.69 l. Level A5. Floor.

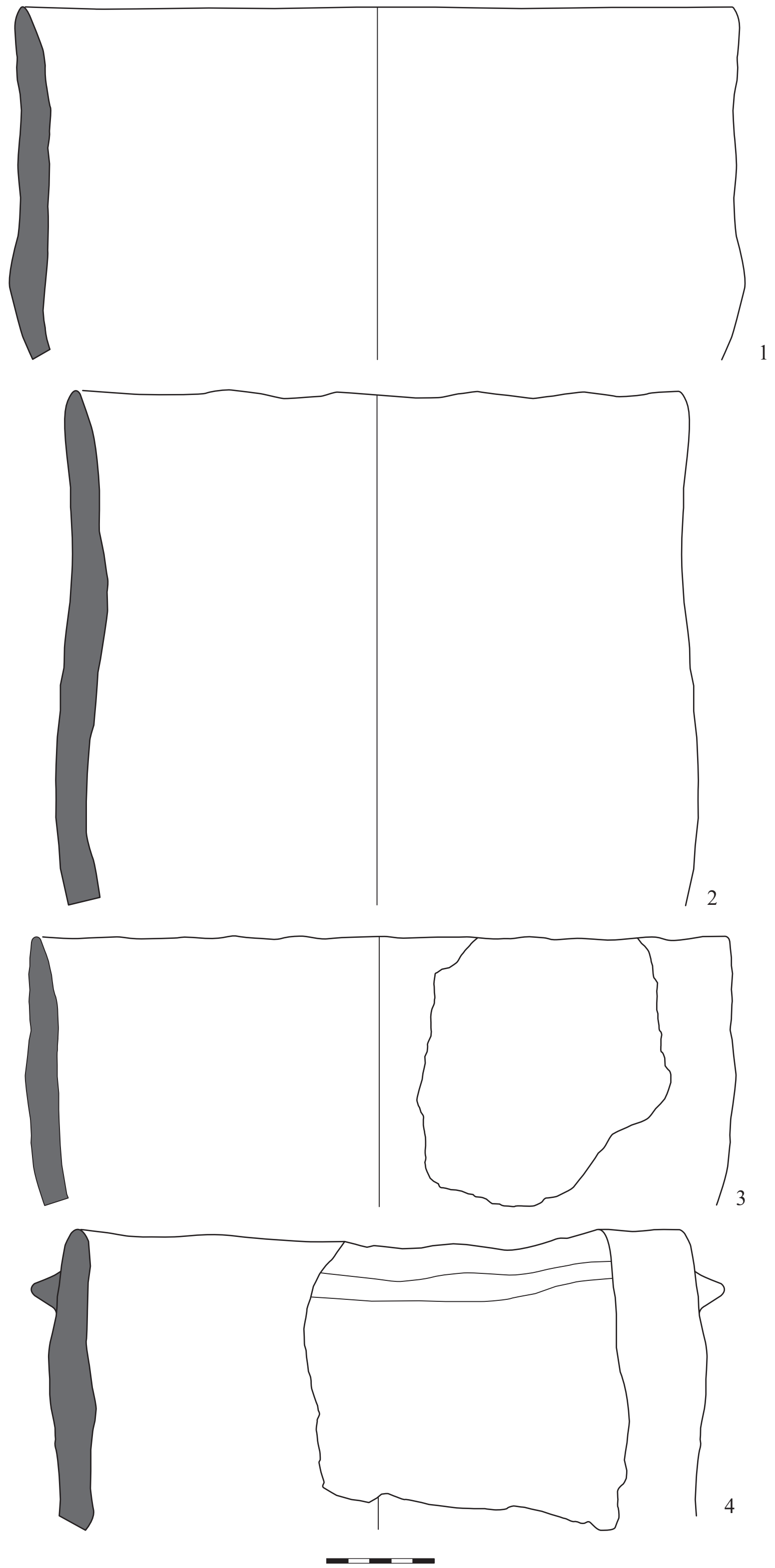


Fig. 4.84 Tell Sabi Abyad. Operation III. Standard Ware Vertical Pots (scale 1:3).

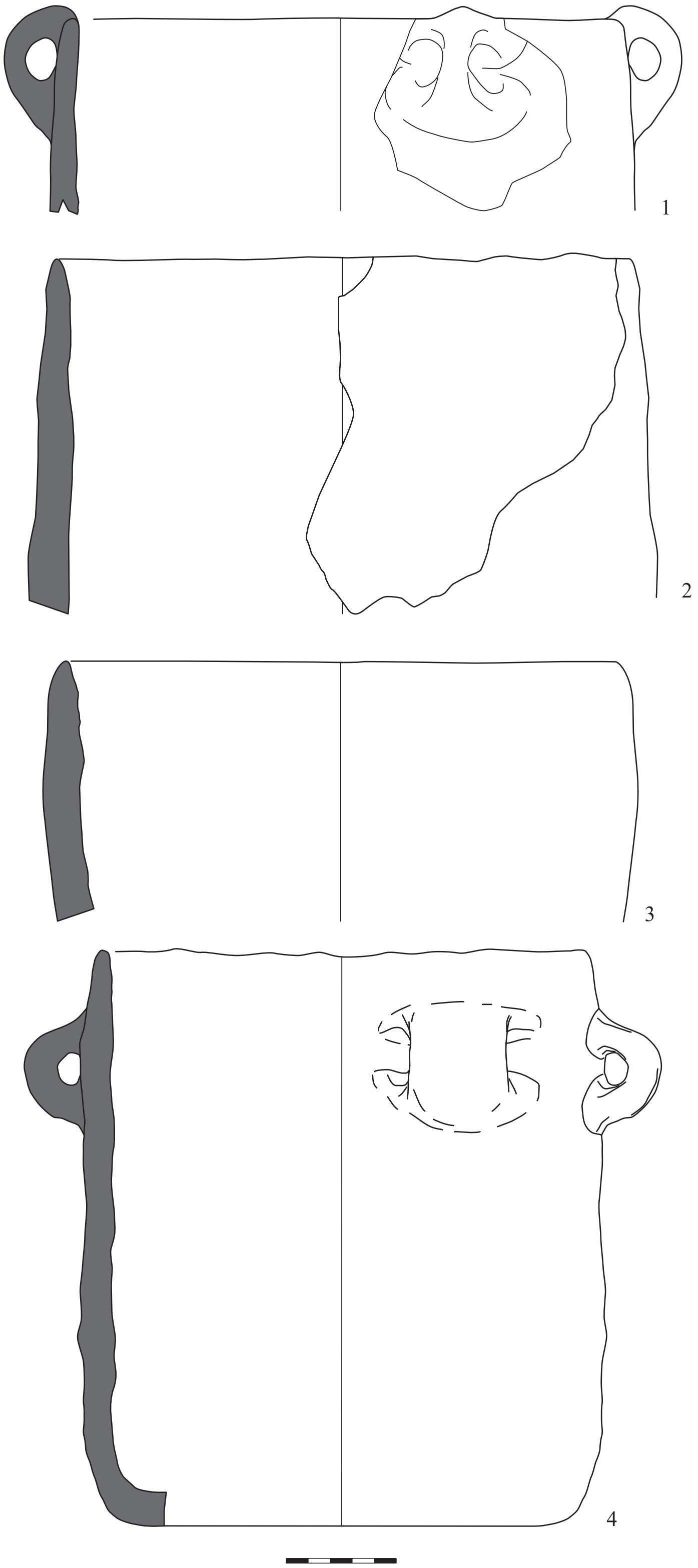


Fig. 4.85 Tell Sabi Abyad. Operation III. Standard Ware Vertical Pots (scale 1:3).

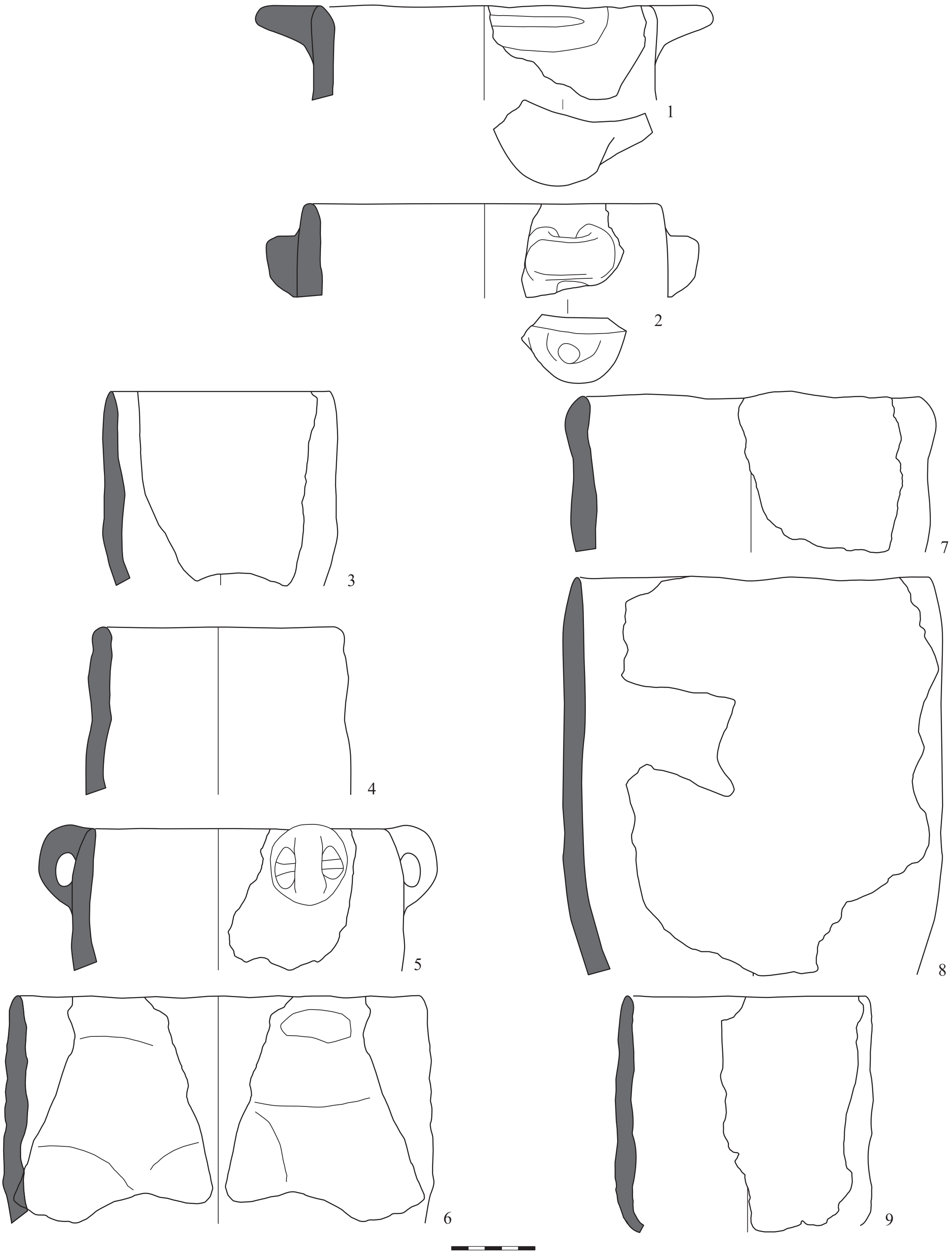


Fig. 4.86 Tell Sabi Abyad. Operation III. Standard Ware Vertical Pots (scale 1:3).

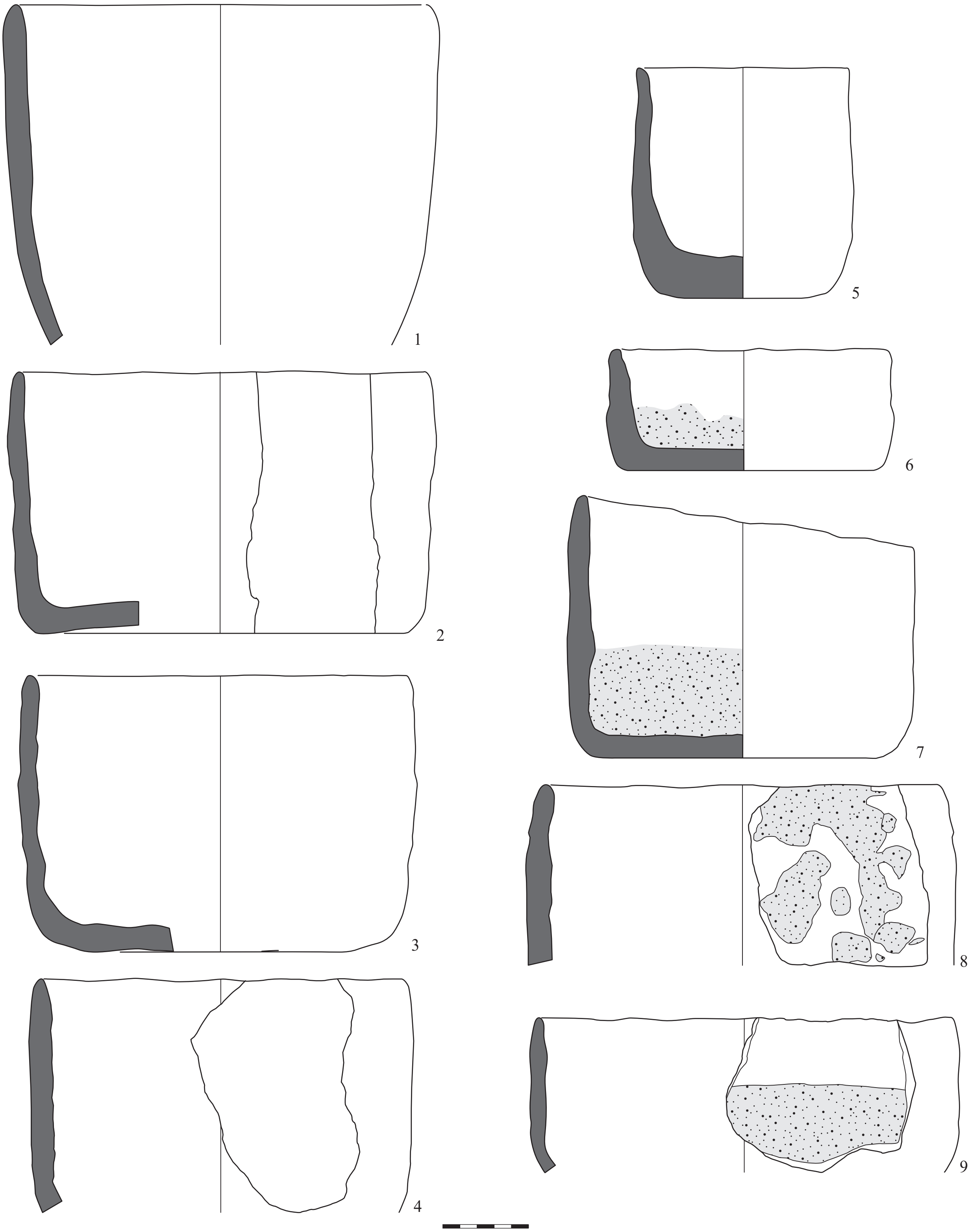


Fig. 4.87 Tell Sabi Abyad. Operation III. Standard Ware Vertical Pots (scale 1:3).

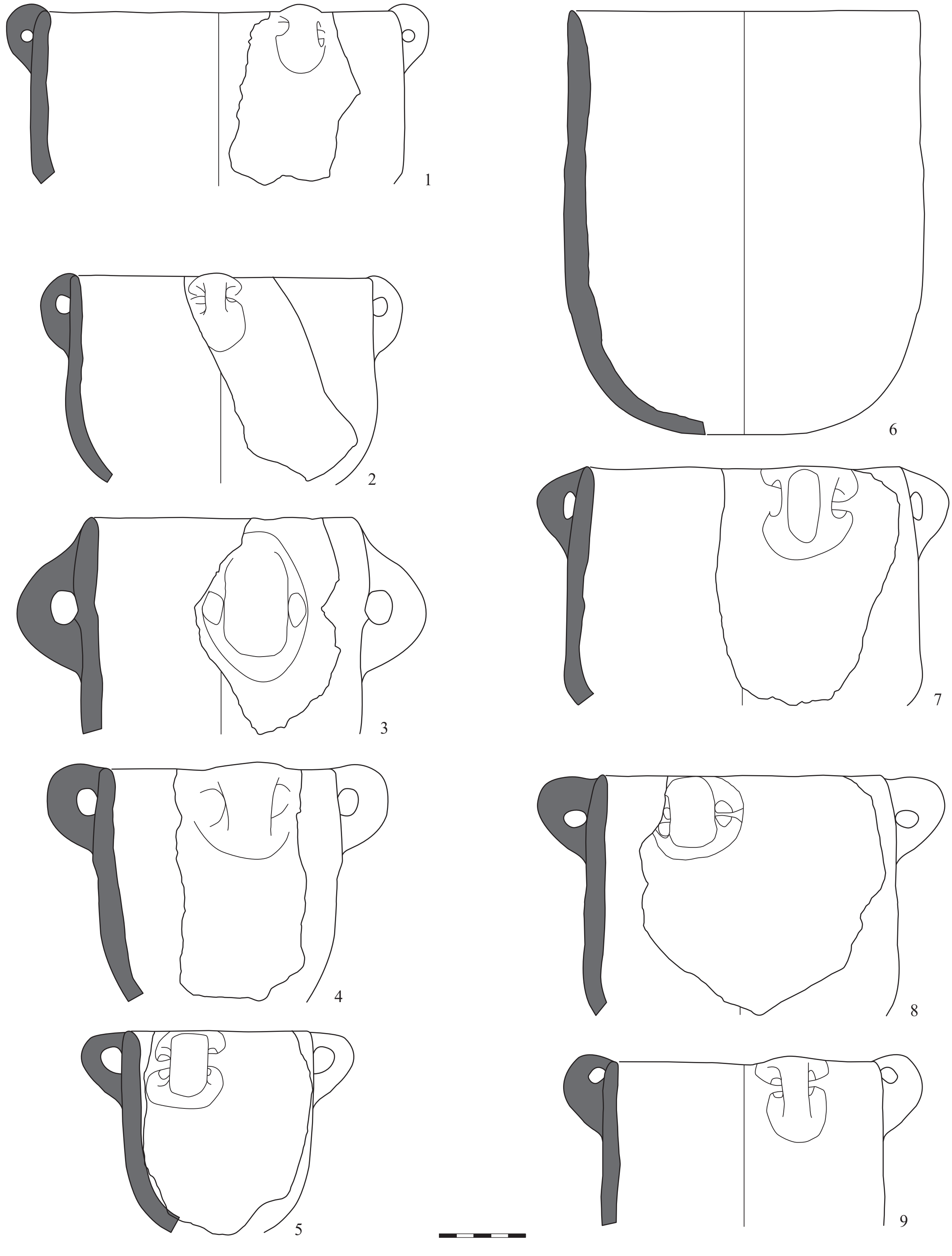


Fig. 4.88 Tell Sabi Abyad. Operation III. Standard Ware Vertical Pots (scale 1:3)

Fig. 4.88.9. E3 114-281-2. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 150 mm. Ext. burnished. Int. finger pressed. Ext. 10YR6/4. Vol. 1.58 l. Level A7. Open area.

Fig. 4.89. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.89.1. G4N 29-75-9. Standard Ware. Rim fragm. Vertical Pot. R. diam. 110 mm. Ext. roughly smoothed. Int. very rough. Ext. 5YR7/3. Level A2. Room fill.

Fig. 4.89.2. D4 41-66-4. Standard Ware. Rim fragm. Vertical Pot. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Vol. 0.37 l. Level A4. Room fill.

Fig. 4.89.3. I5 278-594-102 (P08-47). Standard Ware. Complete. Vertical Pot. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5Y6/2. Vol. 0.32 l. Level A2. Room fill.

Fig. 4.89.4. G5 9-26-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 50 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/3. Vol. 0.09 l. Level A1. Room fill.

Fig. 4.89.5. F4 9-22-2. Standard Ware. Rim fragm. Vertical Pot. R. diam. 110 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/6. Vol. 0.65 l. Level A1. Room fill.

Fig. 4.89.6. H3 213-508-101 (P08-14). Standard Ware. Complete. Vertical Pot. R. diam. 110 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/3. Vol. 0.50 l. Level A4. Open area.

Fig. 4.89.7. F4 86-200-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR8/3. Vol. 0.38 l. Level A1. Open area.

Fig. 4.89.8. G5 734-485-101 (P08-54). Standard Ware. Complete. Vertical Pot. R. diam. 45 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR8/4. Vol. 0.03 l. Level A4. Room fill.

Fig. 4.89.9. D4 32-38-2. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 80 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/6. Vol. 0.29 l. Level A5. Open area.

Fig. 4.89.10. E4 82-252-8. Standard Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 80 mm. Ext. burnished. Int. burnished. Ext. 7.5YR4/4. Level A9. Open area.

Fig. 4.89.11. G4N 23-62-101 (P07-43). Standard Ware. Complete. Vertical Pot with vertical loop handle. R. diam. 62 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/4. Vol. 0.17 l. Level A1. Construction.

Fig. 4.89.12. G3 105-329-101 (P07-33). Standard Ware. Complete. Vertical Pot with vertical loop handle; two perforations. R. diam. 57 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR7/4. Vol. 0.05 l. Level A1. Room fill.

Fig. 4.89.13. G5 667-798-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR8/3. Vol. 0.27 l. Level A3. Room fill.

Fig. 4.89.14. G5 760-391-102 (P08-60). Standard Ware. Complete. Vertical Pot. R. diam. 70 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR6/6. Vol. 0.22 l. Level A4. Room fill.

Fig. 4.89.15. I5 224-406-101 (P08-22). Standard Ware. Complete. Vertical Pot. R. diam. 70 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR7/4. Vol. 0.21 l. Level A1. Open area.

Fig. 4.89.16. G5 734-478-104 (P08-53). Standard Ware. Complete. Vertical Pot. R. diam. 65 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR8/3. Vol. 0.10 l. Thin plaster exterior. Level A4. Room fill.

Fig. 4.89.17. G3 14-29-5. Standard Ware. Rim fragm. Vertical Pot with perforation behind vertical loop handle. R. diam. 180 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR5/6. Level A2. Open area.

Fig. 4.89.18. E4 82-229-16. Standard Ware. Rim fragm. Vertical Pot with perforation behind vertical loop handle. R. diam. 160 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR5/6. Mixed levels A7/A8/A9. Open area.

Fig. 4.89.19. E4 19-53-2. Standard Ware. Rim fragm. Vertical Pot with perforation behind vertical loop handle. R. diam. 120 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR7/4. Level A4. Room fill.

Fig. 4.89.20. E3 10-27-1 (P03-142). Standard Ware. Section. Vertical Pot with Petalled Rim and vertical loop handle. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'orange'. Level A4. Floor.

Fig. 4.90. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.90.1. E3 32-66-1. Standard Ware. Rim fragm. Hole Mouth Pot with cordon. R. diam. 290 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/4. Level A4. Open area.

Fig. 4.90.2. E3 32-60-1. Standard Ware. Rim fragm. Hole Mouth Pot with 'rope' cordon. R. diam. 280 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Level A4. Open area.

Fig. 4.90.3. G3 3-3-1. Standard Ware. Rim fragm. Hole Mouth Pot. R. diam. 260 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5YR7/8. Level A2. Open area.

Fig. 4.91. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.91.1. I6 85-319-101 (P08-55). Standard Ware. Complete. Hole Mouth Pot. R. diam. 180 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR7/3. Vol. 18.30 l. Ca. 5mm plaster exterior lower body on half of vessel; other half exterior plastered from base to rim. Level A1. Room fill.

Fig. 4.91.2. H3 245-669-1. Standard Ware. Rim fragm. Hole Mouth Pot with a conical lug. R. diam. 220 mm. Ext. well smoothed. Int. very rough. Ext. 5YR6/4. Level A4. Open area.

Fig. 4.91.3. E3N 17-32-100 (P05-30). Standard Ware. Section. Hole Mouth Pot. R. diam. 220 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR6/4. Vol. 8.27 l. Level A5. Room fill.

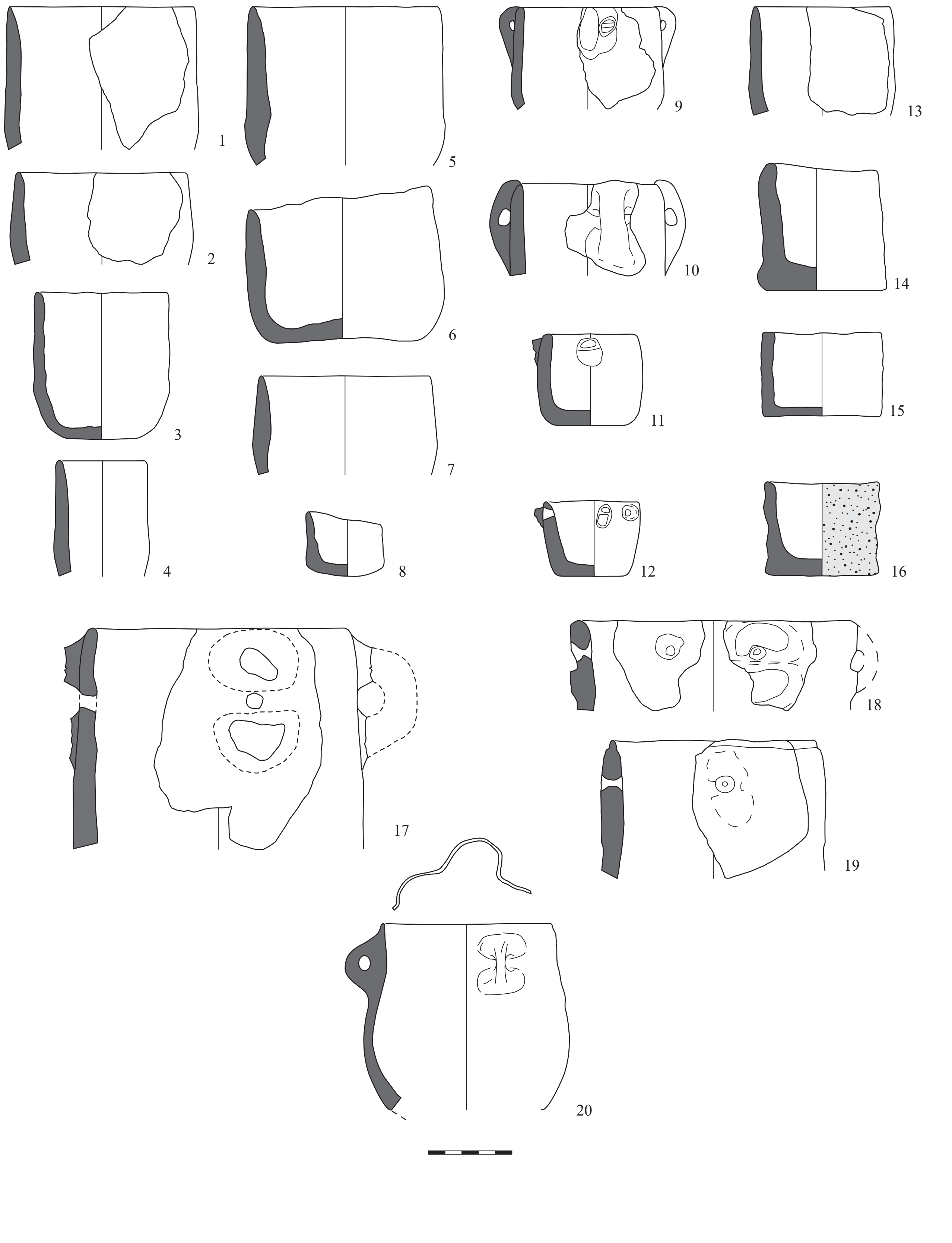


Fig. 4.89 Tell Sabi Abyad. Operation III. Standard Ware Vertical Pots (nos. 1–19); Vertical Pot with petalled rim (no. 20) (scale 1:3).

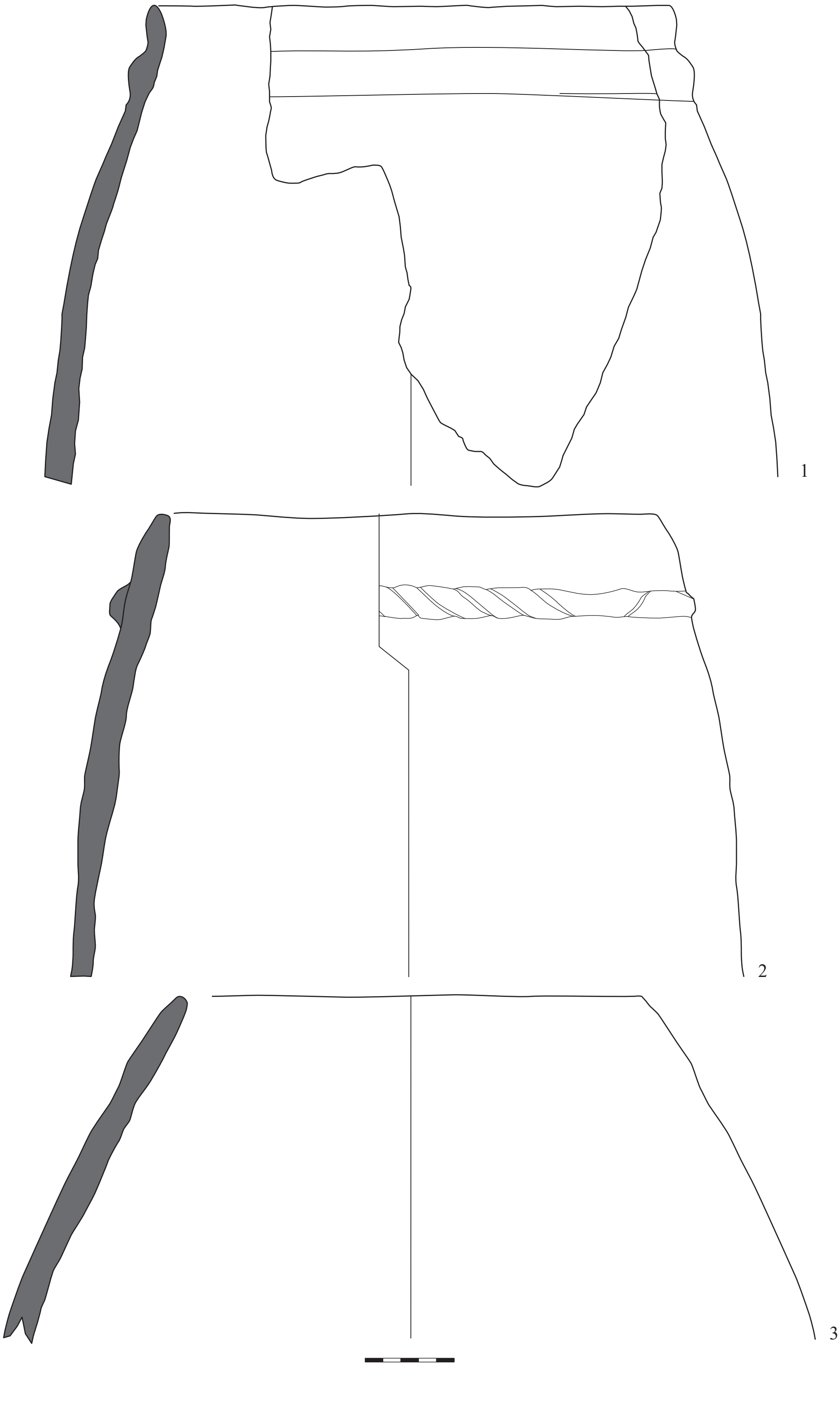


Fig. 4.90 Tell Sabi Abyad. Operation III. Standard Ware Hole Mouth Pots (scale 1:3).

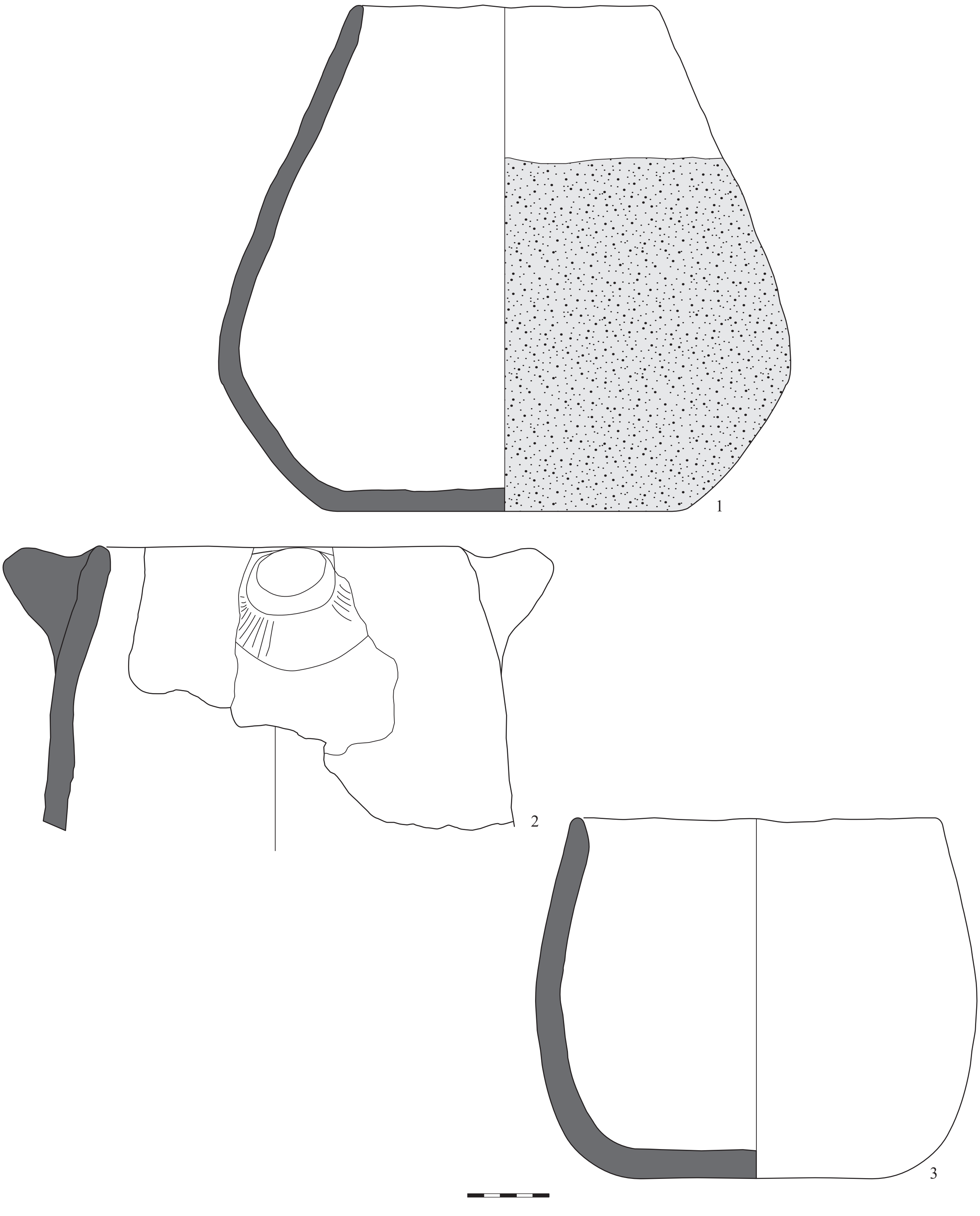


Fig. 4.91 Tell Sabi Abyad. Operation III. Standard Ware Hole Mouth Pots (scale 1:3).

Fig. 4.92. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.92.1. H3 141-371-101 (P07-107). Standard Ware. Complete. Oval Hole Mouth Pot; base thickens near centre. R. diam. oval. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/3. Vol. 28,17 l. Level A1. Bin.

Fig. 4.92.2. G4N 30-90-101 (P07-61). Standard Ware. Rim fragm. Oval Hole Mouth Pot. R. diam. oval. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR8/4. Vol. 13.47 l. Level A2. Open area.

Fig. 4.92.3. G4 522-587-101 (P08-57). Standard Ware. Section. Oval Hole Mouth Pot with vertical loop handle. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Vol. 8.84 l. Level A4. Open area.

Fig. 4.93. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.93.1. D4 63-136-1. Standard Ware. Rim fragm. Oval Hole Mouth Pot with cordon. R. diam. oval. Ext. burnished. Int. roughly smoothed. Ext. 2.5YR7/2. Vol. 14.94 l. Level A5. Platform.

Fig. 4.93.2. F4 216-496-101 (P08-32). Standard Ware. Complete. Oval Hole Mouth Pot with vertical loop handle. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5Y7/2. Vol. 14.17 l. Level A4. Open area.

Fig. 4.93.3. F4 229-513-101 (P07-119). Standard Ware. Complete. Tall Hole Mouth Pot; found with flattened gypsum stone as a lid *in situ*. R. diam. 260 mm. Ext. roughly smoothed. Int. eroded. Ext. 7.5YR7/4. Vol. 30,22 l. Very thick plaster (<=10mm) entire interior, sculpted into interior ledge near the rim, narrowing the opening of the pot to ca 14cm. Level A1. General fill layer.

Fig. 4.93.4. G4N 29-106-106. Standard Ware. Rim fragm. Oval Hole Mouth Pot. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'buff'. Vol. 18.10 l. Level A3. Open area.

Fig. 4.94. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.94.1. J4 190-357-101 (P07-86). Standard Ware. Section. Tall Hole Mouth Pot. R. diam. 380 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Vol. 78,00 l. Very thin plaster exterior base and lower body. Level B6. Open area.

Fig. 4.94.2. H5 209-424-101 (P08-36). Standard Ware. Complete. Tall Hole Mouth Pot. R. diam. 285 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/3. Vol. 46,14 l. Level A4. General fill layer.

Fig. 4.95. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.95.1. I3 134-175-200 (P05-86). Standard Ware. Complete. Small Jar. R. diam. 115 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/2. Level A1. Room fill.

Fig. 4.95.2. J3 600-860-102 (P09-123). Standard Ware. Complete. Small Jar. R. diam. 115 mm. Ext. roughly smoothed. Int. eroded. Ext. 'orange'. Vol. 2.13 l. Mixed levels A1/A2. Burial BN09-60.

Fig. 4.95.3. I3 230-598-101 (P08-70). Standard Ware. Complete. Small Jar. R. diam. 82 mm. Ext. burnished. Int. finger pressed. Ext. incised. Ext. 5YR5/3. Vol. 0.35 l. C-Sequence. Burial BN08-43.

Fig. 4.95.4. K4 91-240-101 (P09-109). Standard Ware. Complete. Small Jar. R. diam. 68 mm. Ext. eroded. Int. eroded. Ext. 'buff'. Vol. 0.24 l. Mixed levels B4/B6. Burial BN09-48.

Fig. 4.95.5. J4 385-775-101 (P08-84). Standard Ware. Complete. Small Jar. R. diam. 90 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 10YR8/2. Vol. 0.89 l. Mixed levels B8/B9. Burial BN08-60.

Fig. 4.95.6. I3 184-450-102 (P08-21). Standard Ware. Section. Small Jar. R. diam. 90 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/2. Vol. 1.14 l. Level uncertain. Burial BN08-8.

Fig. 4.95.7. I3 116-146-101. Standard Ware. Rim fragm. Small Jar. R. diam. 110 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/4. Mixed levels C-Sequence/B6/B7. Open area.

Fig. 4.95.8. G5 588-625-1. Standard Ware. Rim fragm. Small Jar. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Level A2. Open area.

Fig. 4.95.9. J4 190-332-5. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/3. Level B6. Open area.

Fig. 4.95.10. I2 11-31-101 (P08-40). Standard Ware. Complete. Small Jar. R. diam. 110 mm. Ext. burnished. Int. burnished below the rim. Ext. 5YR5/6. Vol. 0.77 l. Level A4. Room fill.

Fig. 4.95.11. K3 54-251-101 (P09-111). Standard Ware. Complete. Small Jar. R. diam. 80 mm. Ext. eroded. Int. eroded. Ext. 'orange'. Vol. 0.76 l. Mixed levels B4/B6. Burial BN09-56.

Fig. 4.95.12. G5 645-731-1. Standard Ware. Rim fragm. Small Jar. R. diam. 110 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 10YR8/3. Level A2. Open area.

Fig. 4.95.13. H4 19-101-10. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/3. Level A1. Open area.

Fig. 4.95.14. G5 610-672-4. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR7/4. Level A2. Open area.

Fig. 4.95.15. H4 69-133-2. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Level A1. Room fill.

Fig. 4.95.16. J5 66-125-4. Standard Ware. Rim fragm. Small Jar. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR8/4. Thin plaster interior. Level B8. Open area.

Fig. 4.95.17. H4 72-110-6. Standard Ware. Rim fragm. Small Jar with vertical loop handle. R. diam. 80 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/4. Level A1. Open area.

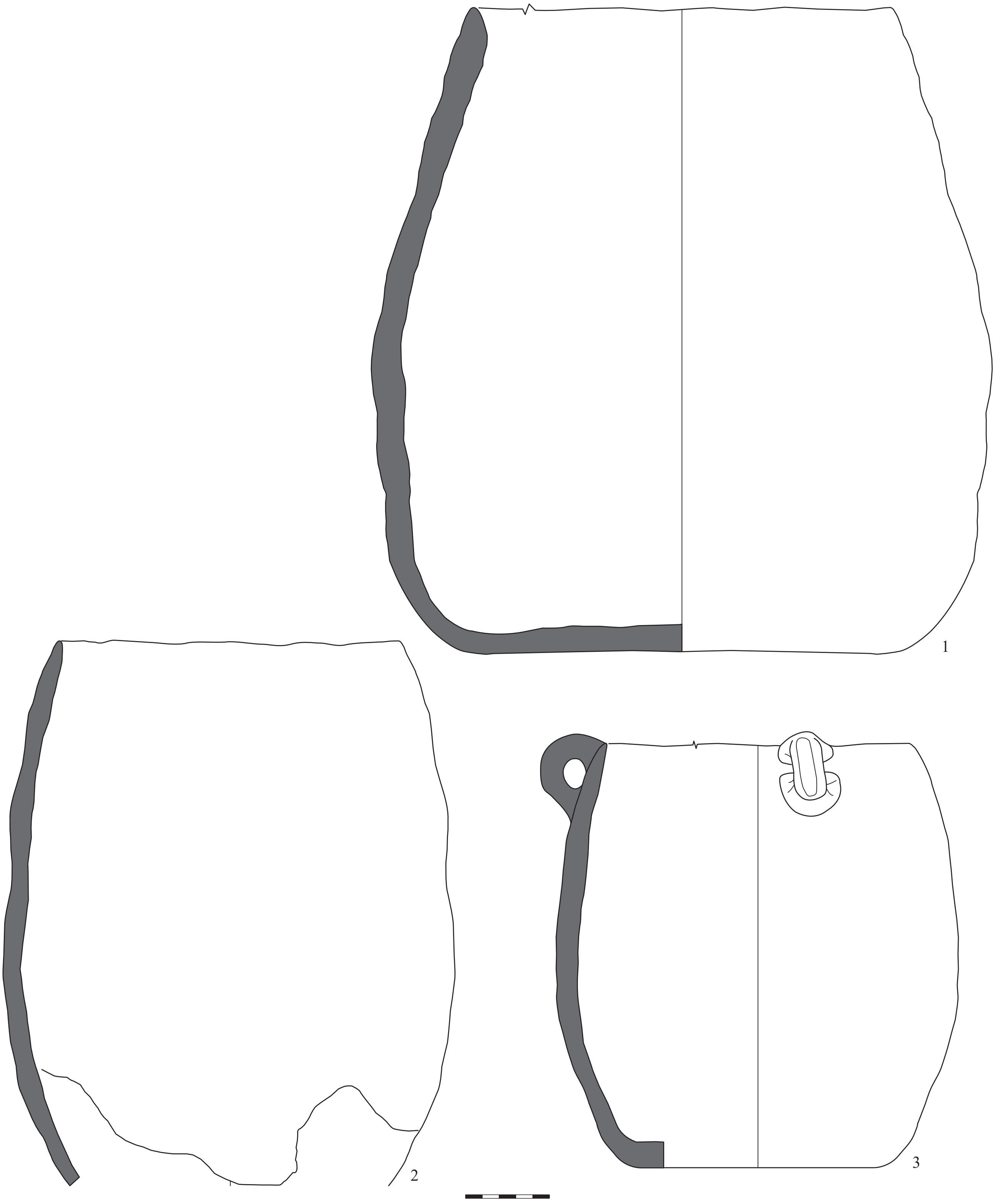


Fig. 4.92 Tell Sabi Abyad. Operation III. Standard Ware Oval Hole Mouth Pots (scale 1:3).

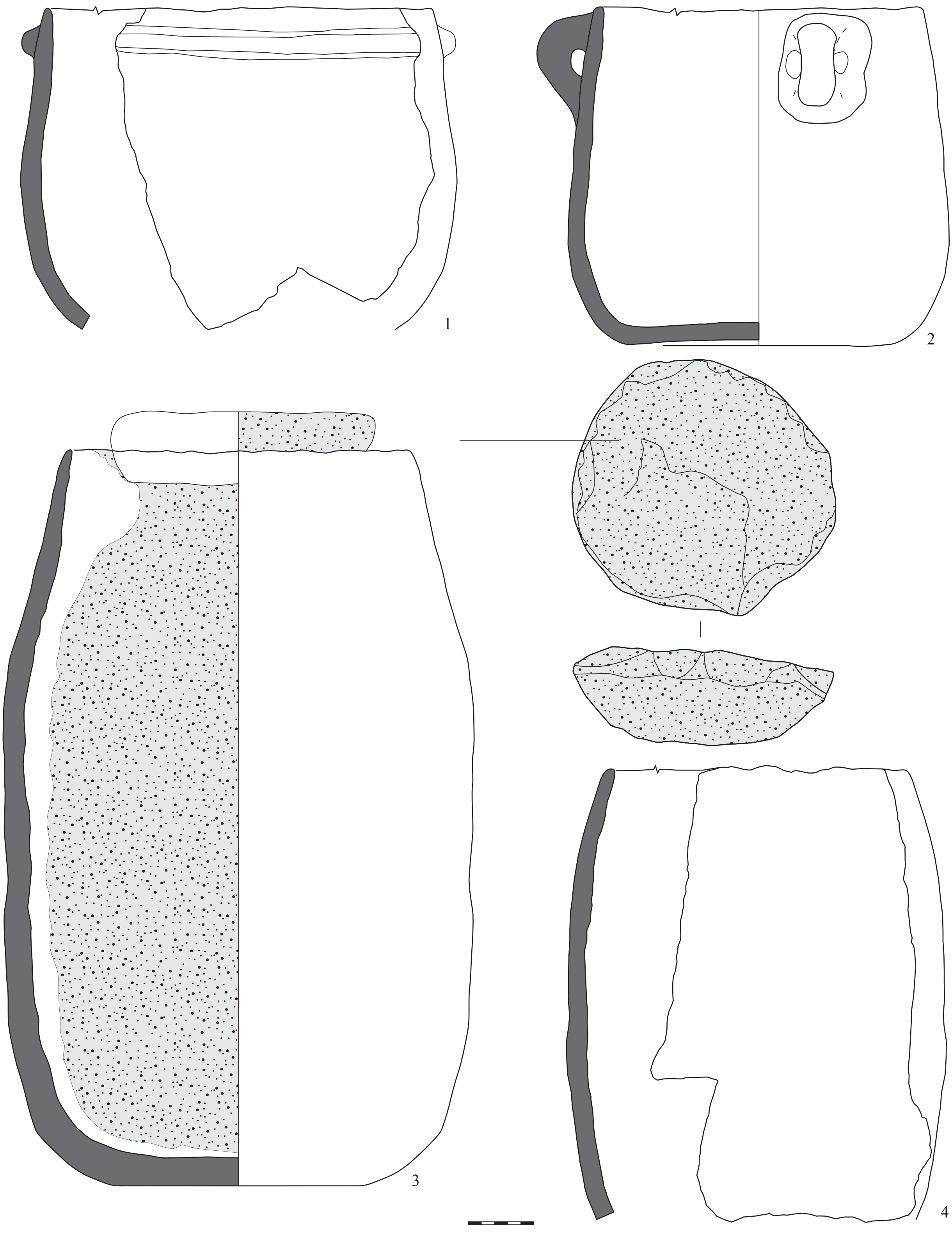


Fig. 4.93 Tell Sabi Abyad. Operation III. Standard Ware Oval Hole Mouth Pots (nos. 1–2, 4); Tall Hole Mouth Pot (no. 3) (scale 1:4).

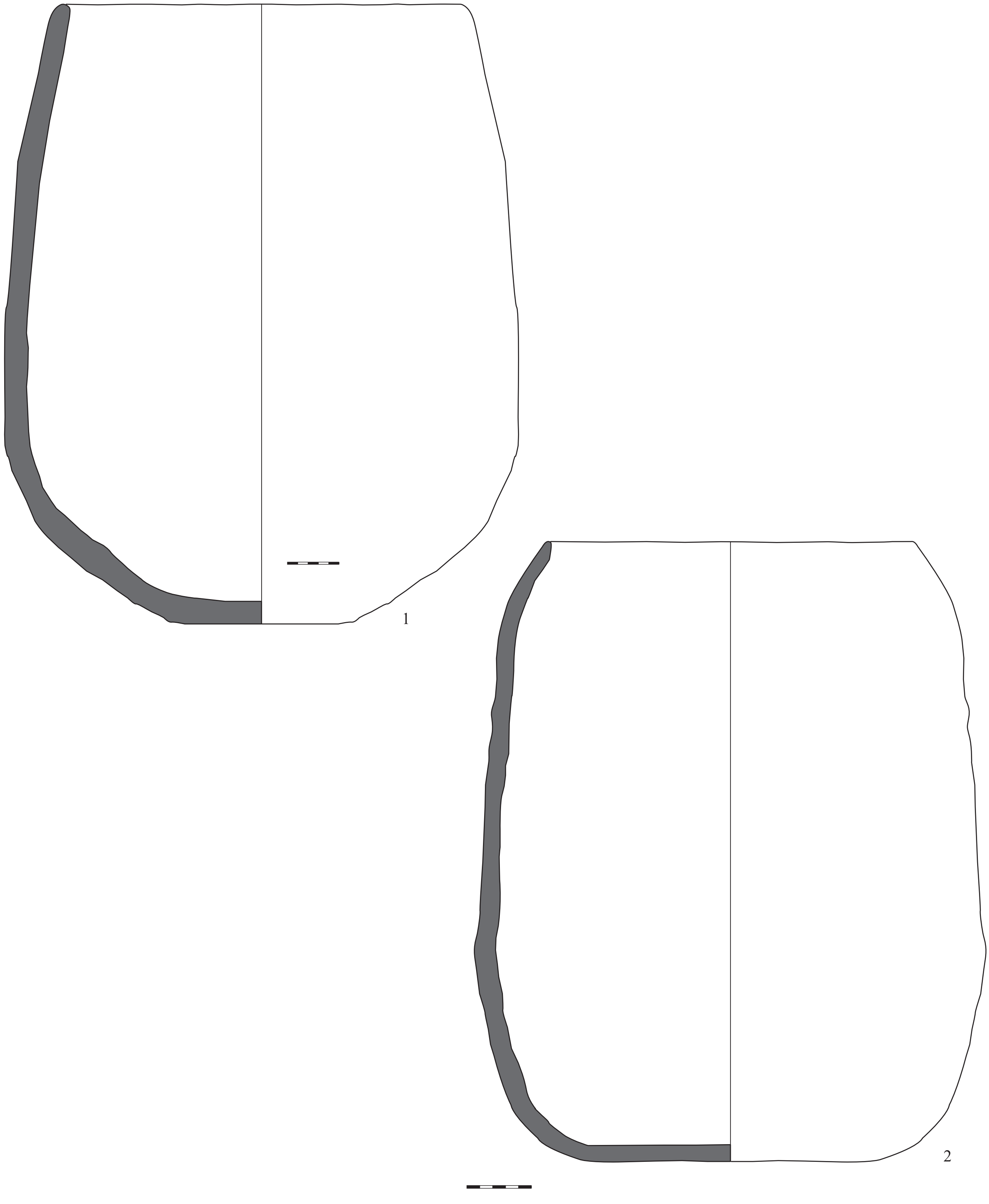


Fig. 4.94 Tell Sabi Abyad. Operation III. Standard Ware Tall Hole Mouth Pots (no. 1: scale 1:4; no. 2: scale 1:5).

Fig. 4.96. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.96.1. G4 562-613-101 (P07-118). Standard Ware. Complete. Medium-sized Jar. R. diam. 165 mm. Ext. well smoothed. Int. eroded. Ext. 5YR8/2. Vol. 8.16 l. Thin plaster covers entire interior. Level A1. General fill layer.

Fig. 4.96.2. I5 361-311-101 (P07-110). Standard Ware. Complete. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Vol. 31,09 l. Ca 3mm plaster interior base and lower body. Level uncertain.

Fig. 4.97. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.97.1. I3 160-230-101 (P07-117). Standard Ware. Complete. Medium-sized Jar. R. diam. oval. Ext. well smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Vol. 11.04 l. Mixed levels A1/A2. Open area.

Fig. 4.97.2. H3 168-372-101 (P07-106). Standard Ware. Complete. Medium-sized Jar. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 13.29 l. Thin plaster exterior lower body and lower part upper body. Level A1. General fill layer.

Fig. 4.97.3. H5 134-235-1 (P07-126). Standard Ware. Complete (broken). Medium-sized Jar. R. diam. 160 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Traces thin plaster interior. Level A1. Room fill.

Fig. 4.97.4. G5 42-111-100 (P05-34). Standard Ware. Complete. Medium-sized Jar. R. diam. 120 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5YR4/6. Vol. 7.75 l. Level A1. Floor.

Fig. 4.97.5. I5 283-485-101 (P08-81). Standard Ware. Complete. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/6. Vol. 8.42 l. Mixed levels A1/A2. Open area.

Fig. 4.97.6. I5 214-309-101 (P07-109). Standard Ware. Complete. Medium-sized Jar. R. diam. 120 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 10YR7/4. Vol. 14.69 l. Level A1. Open area.

Fig. 4.98. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.98.1. I4 170-229-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 190 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR6/3. Level A1. Pit.

Fig. 4.98.2. H4 109-190-3. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. very rough. Ext. 5YR7/6. Level A1. Room fill.

Fig. 4.98.3. G5 32-65-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 180 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/4. Traces of plaster exterior. Level A1. Open area.

Fig. 4.98.4. G5 591-628-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 160 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4. Level A1. Open area.

Fig. 4.98.5. G5 678-812-3. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. very rough. Ext. 10YR7/2. Level A2. Open area.

Fig. 4.98.6. G5 524-531-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 170 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR6/3. Level A1. Room fill.

Fig. 4.98.7. I3 16-36-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 110 mm. Ext. well smoothed. Int. scraped. Ext. 10YR8/2. Level A1. Open area.

Fig. 4.98.8. J5 75-145-3. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 120 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 5YR6/4. Level B7. Oven.

Fig. 4.98.9. G5 657-793-2. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 5YR6/6. Level A3. Room fill.

Fig. 4.98.10. K5 21-50-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 120 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/3. Level B1. Hearth.

Fig. 4.98.11. F4 26-68-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/4. Level A1. Room fill.

Fig. 4.98.12. G5 517-519-1. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A1. General.

Fig. 4.99. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.99.1. H4 74-176-101 (P07-68). Standard Ware. Complete. Large Jar; neck and shoulder removed, rest of vessel re-used. R. diam. 300 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/3. Vol. 76,53 l. Plaster on lower part of body above carination. Level A1. Room fill.

Fig. 4.99.2. H5 150-256-101 (P07-114). Standard Ware. Complete. Large Jar. R. diam. 220 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/4. Vol. 43,40 l. Ca 10-15mm thick plaster interior base and lower body. Level A1. Pit.

Fig. 4.99.3. I3 131-174-100 (P05-82). Standard Ware. Complete. Large Jar; plaster repair on the rim. R. diam. 210 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR7/2. Vol. 54,88 l. Ca 12 mm thick plaster interior and exterior lower body (at least 4 separate layers visible). Level A1. Room fill.

Fig. 4.100. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.100.1. G4N 30-110-101 (P07-116). Standard Ware. Section (incomplete). Large Jar; rim missing, perhaps purposely removed; circular plaster plug as repair. Bs. diam. 260 mm. Ext. roughly smoothed. Int. very rough. Ext. applique. Ext. 7.5YR6/4. Vol. 69,20 l. Level A2. Open area.

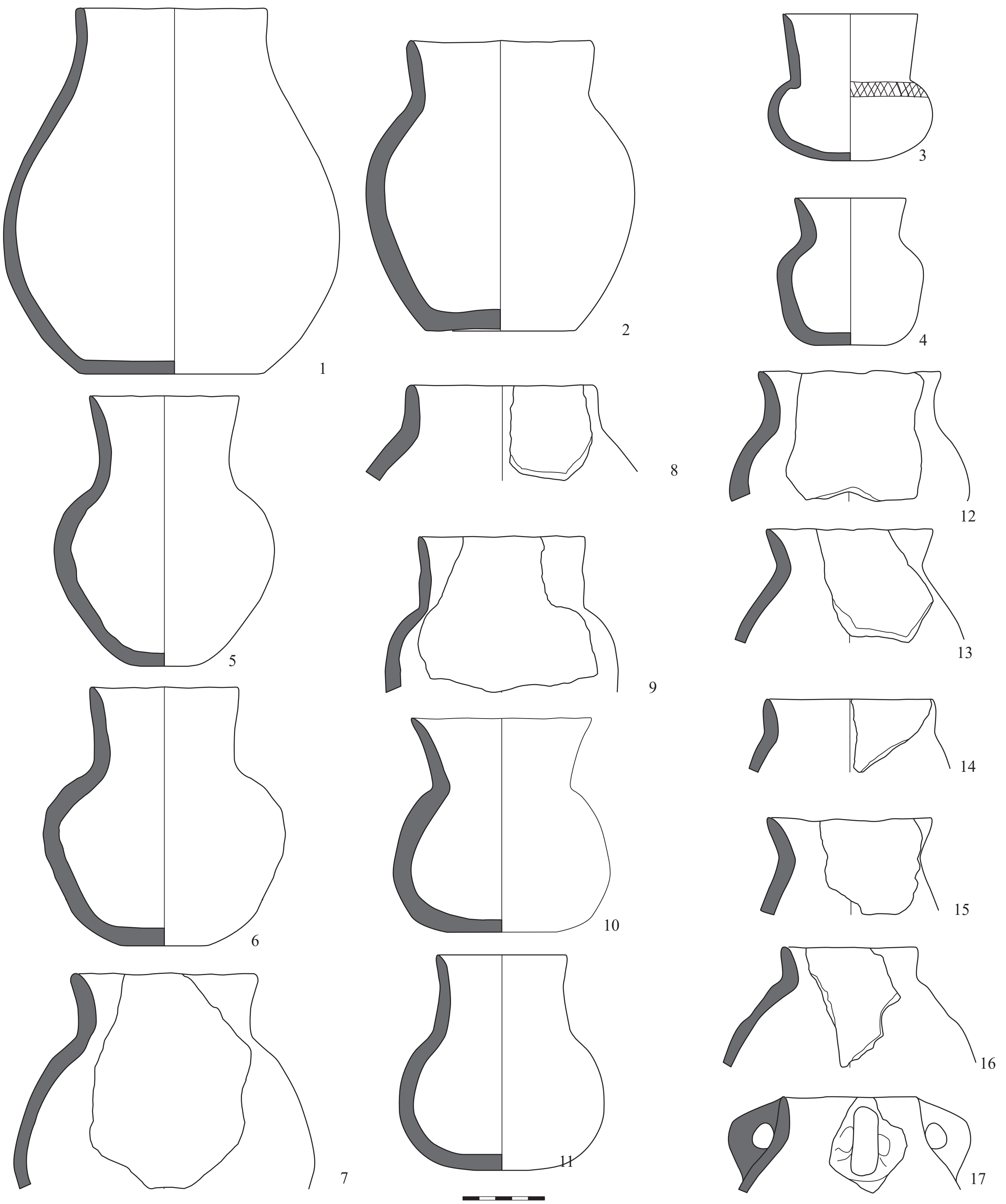


Fig. 4.95 Tell Sabi Abyad. Operation III. Standard Ware Small Jars (scale 1:3).

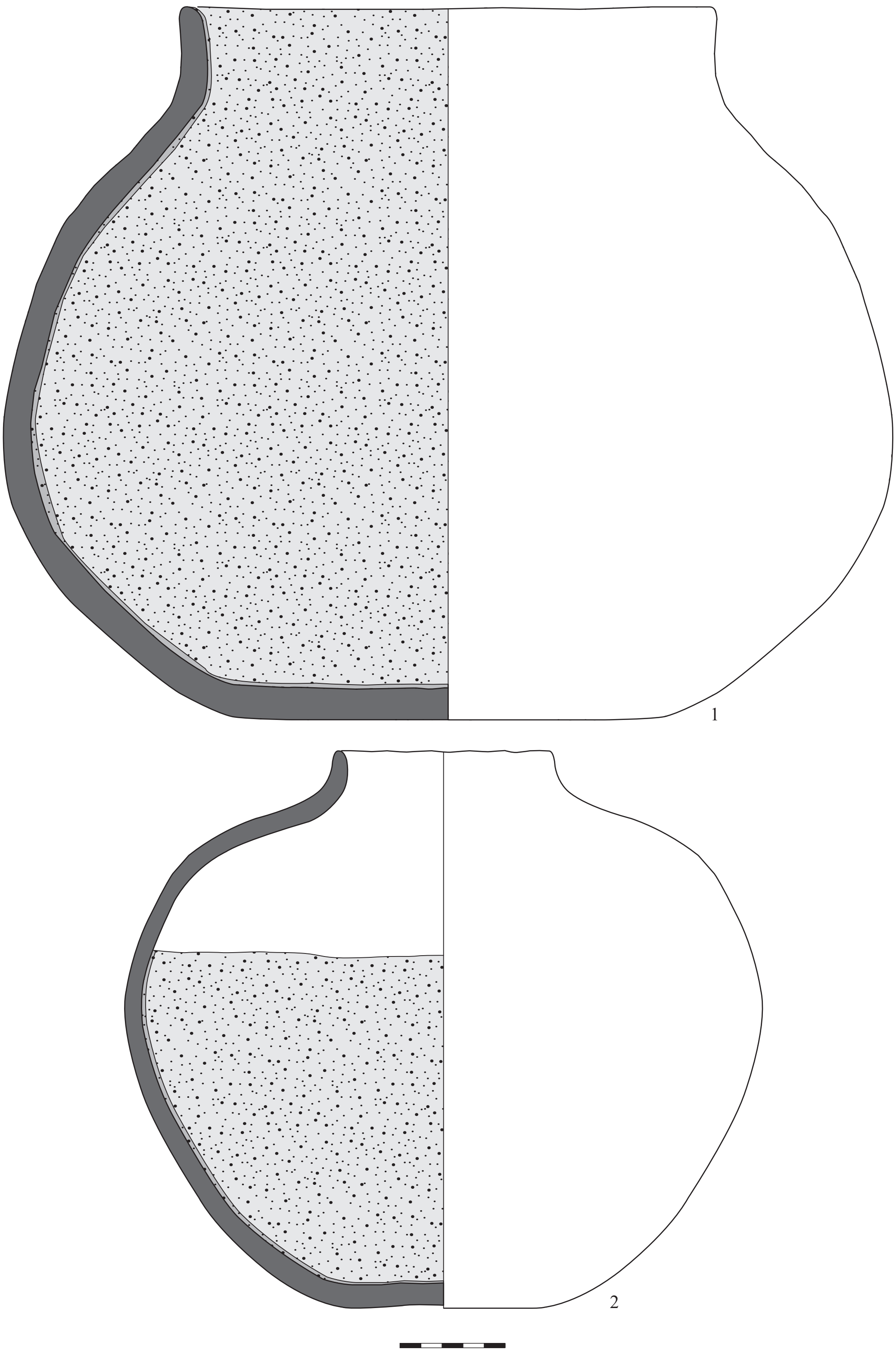


Fig. 4.96 Tell Sabi Abyad. Operation III. Standard Ware Medium-sized Jars (scale 1:3).

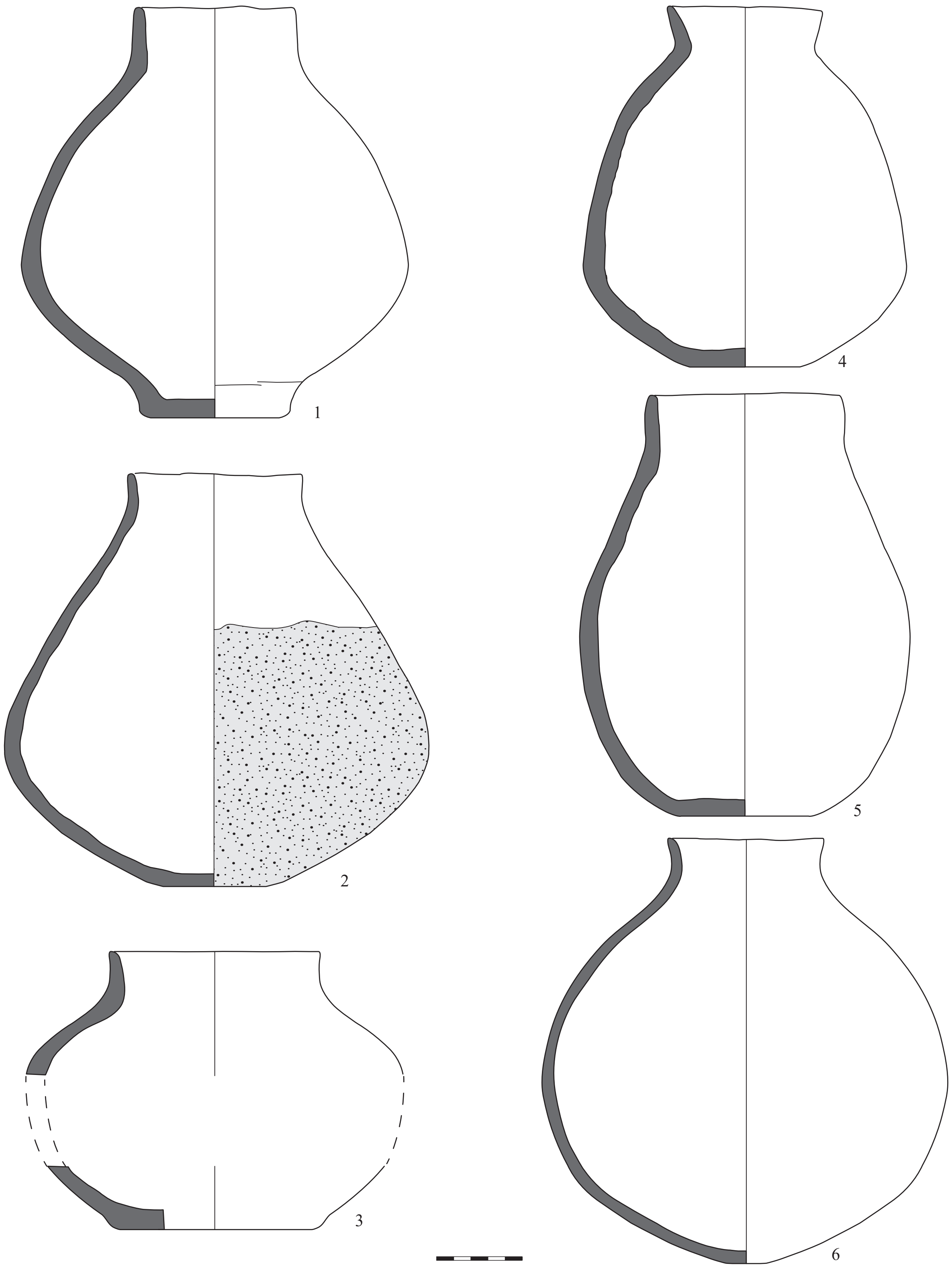


Fig. 4.97 Tell Sabi Abyad. Operation III. Standard Ware Medium-sized Jars (scale 1:3).

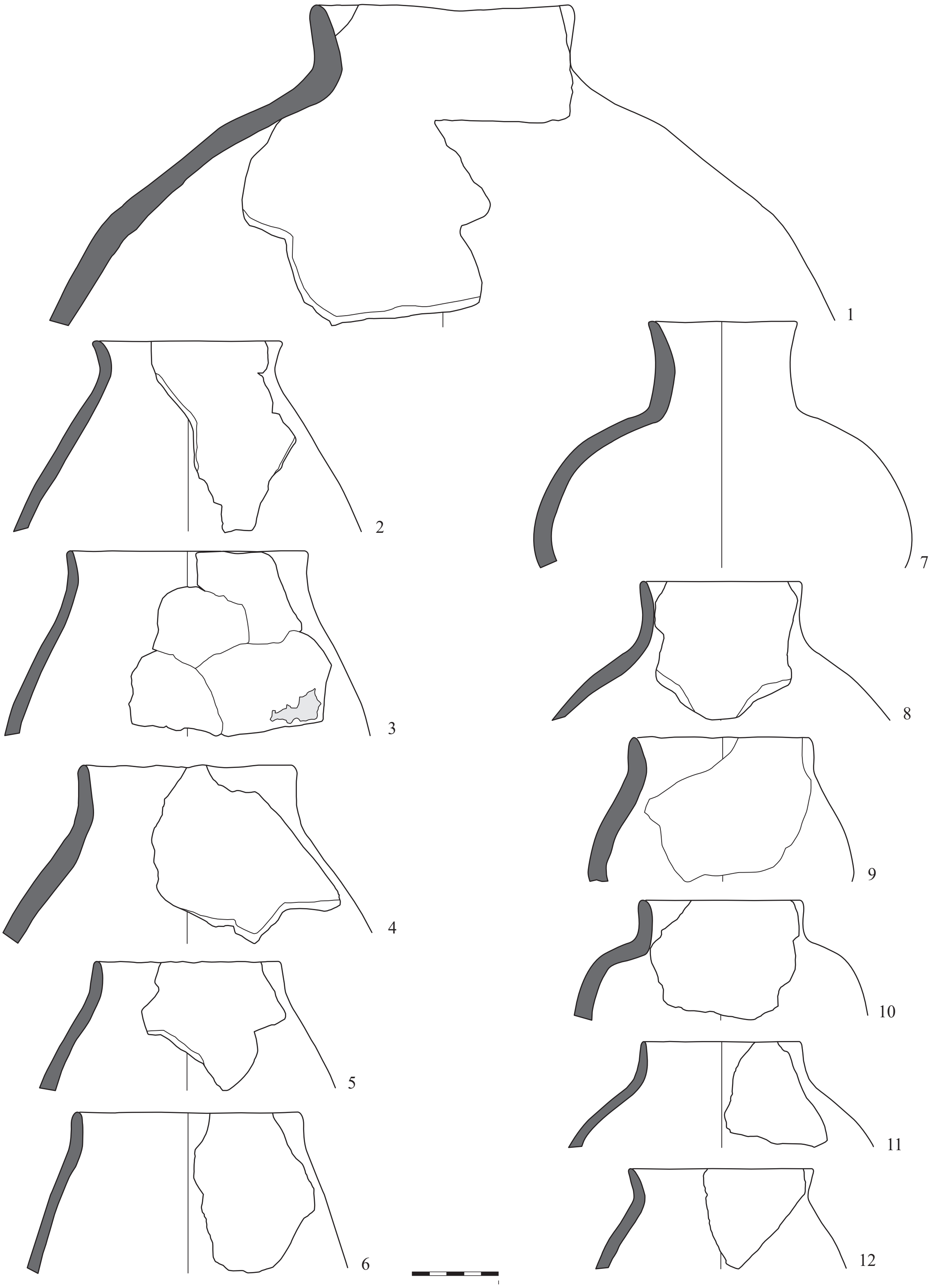


Fig. 4.98 Tell Sabi Abyad. Operation III. Standard Ware Medium-sized Jars (scale 1:3).

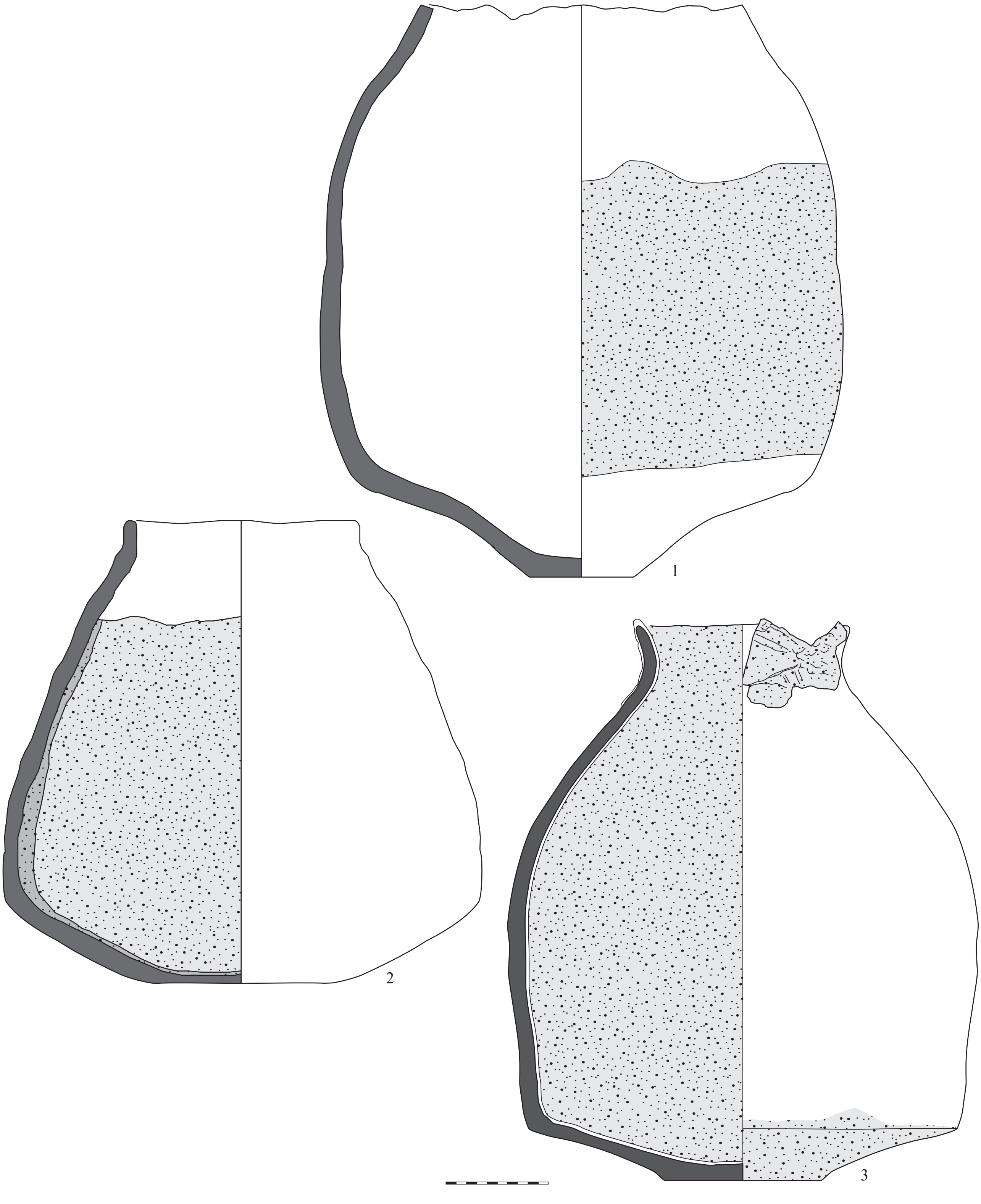


Fig. 4.99 Tell Sabi Abyad. Operation III. Standard Ware Large Jars (scale 1:5).

Fig. 4.100.2. I4 184-277-101 (P07-88). Standard Ware. Complete. Large Jar; crack covered with plaster as repair. R. diam. 230 mm. Ext. roughly smoothed. Int. eroded. Ext. 7.5YR7/3. Vol. 32,20 l. Thin plaster exterior lower body. Ca 4mm thick plaster entire interior (in several layers). Level A1. Room fill.

Fig. 4.100.3. G3 111-311-101 (P07-50). Standard Ware. Section. Large Jar; thick plaster sculpted over rim as repair. R. diam. 210 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'brown'. Vol. 32,10 l. Ca 14mm thick plaster covers entire interior. Level A1. Room fill.

Fig. 4.101. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.101.1. G5 527-535-100 (P05-83). Standard Ware. Complete. Large Jar. R. diam. 250 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 'brown'. Vol. 114.50 l. Traces of plaster on both surfaces. Level B8. Pit.

Fig. 4.101.2. I6 79-318-101 (P08-56). Standard Ware. Complete. Large Jar. R. diam. 190 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 7.5YR7/3. Vol. 32,80 l. Level A1. Room fill.

Fig. 4.101.3. H4 114-200-101 (P07-108). Standard Ware. Complete. Large Jar. R. diam. oval. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR6/4. Vol. 59,42 l. Level A1. Room fill.

Fig. 4.102. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.102.1. I4 177-218-101 (P07-112). Standard Ware. Complete. Large Jar. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR8/2. Vol. 103,20 l. Level B6. Pit.

Fig. 4.102.2. J5 75-144-2. Standard Ware. Rim fragm. Large Jar. R. diam. 220 mm. Ext. roughly smoothed. Int. scraped. Ext. 10YR8/3. Level B7. Oven.

Fig. 4.102.3. K5 15-41-1. Standard Ware. Rim fragm. Large Jar. R. diam. 280 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/4. Traces of plaster interior. Mixed levels D-Sequence/B1. Open area.

Fig. 4.102.4. I4 155-188-101 (P07-49). Standard Ware. Complete. Large Jar. R. diam. 210 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 10YR8/3. Level A1. Room fill.

Fig. 4.103. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.103.1. G5 600-747-2. Standard Ware. Section. Large Jar. R. diam. 200 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR7/4. Traces of plaster exterior. Level A1. Hearth.

Fig. 4.103.2. I3 120-173-200 (P05-87). Standard Ware. Complete. Holemouth Jar. R. diam. 150 mm. Ext. finger pressing. Int. finger pressed. Ext. 10R5/8. Vol. 43,72 l. Thick plaster exterior upper body. Mixed levels C-Sequence/B7. Open area.

Fig. 4.103.3. I3 178-410-101 (P08-15). Standard Ware. Complete. Holemouth Jar. R. diam. 240 mm. Ext. burnished. Int. finger pressed. Ext. 'brown'. Vol. 28,33 l. Level A1. Packed in loam and re-used as oven.

Fig. 4.104. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.104.1. D4 57-97-1. Standard Ware. Base fragm. Concave base. R. diam. 380 mm. Ext. finger pressing. Int. finger pressed. Ext. 'brown'. Thick plaster both sides; ext. ca 2mm; interior ca. 5mm to several cm in several layers at the base. Level A5. General fill layer.

Fig. 4.104.2. D4 5-8-3. Standard Ware. Base fragm. Concave base. Bs. diam. 100 mm. Ext. burnished. Int. well smoothed. Ext. 5YR6/6. Level A4. Open area.

Fig. 4.104.3. E3 86-195-1. Standard Ware. Base fragm. Concave base. Bs. diam. 165 mm. Ext. burnished. Int. roughly smoothed. Ext. 10YR7/4. Level A5. Floor.

Fig. 4.104.4. E3 29-57-1. Standard Ware. Base fragm. Concave base. Bs. diam. 210 mm. Ext. eroded. Int. eroded. Ext. 5YR5/6. Level A4. Open area.

Fig. 4.104.5. G5 586-697-5. Standard Ware. Base fragm. Concave base. Bs. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3. Level A2. Open area.

Fig. 4.104.6. E3 146-363-4. Standard Ware. Base fragm. Concave base. Bs. diam. 170 mm. Ext. burnished. Int. finger pressed. Ext. 10YR6/4. Level A9. Open area.

Fig. 4.104.7. E4 19-158-1. Standard Ware. Base fragm. Concave base. Bs. diam. 110 mm. Ext. finger pressing. Int. finger pressed. Ext. 10YR6/4. Level A4. Room fill.

Fig. 4.104.8. D4 59-100-2. Standard Ware. Base fragm. Flat base. Bs. diam. 160 mm. Ext. scraped. Int. scraped. Ext. 10YR7/3. Level A5. General fill layer (see Fig. 4.15).

Fig. 4.104.9. E3 142-335-3. Standard Ware. Base fragm. Flat base. Bs. diam. 150 mm. Ext. burnished. Int. roughly smoothed. Ext. 5YR5/6. Mixed levels A8/A9. Open area.

Fig. 4.104.10. E3 87-218-4. Standard Ware. Base fragm. Flat base. Bs. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/3. Level A5. Open area.

Fig. 4.104.11. G5 630-778-5. Standard Ware. Base fragm. Flat base. Bs. diam. 100 mm. Ext. finger pressing. Int. finger pressed. Ext. 7.5YR8/3. Level A1. Open area.

Fig. 4.104.12. F4 127-300-4. Standard Ware. Base fragm. Flat base. Bs. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A1. Open area.

Fig. 4.104.13. F4 182-407-11. Standard Ware. Base fragm. Flat base. Bs. diam. 130 mm. Ext. finger pressing. Int. finger pressed. Ext. 5YR6/4. Thin plaster interior. Level A4. Oven.

Fig. 4.104.14. D4 8-11-1. Standard Ware. Base fragm. Flat base. Bs. diam. 80 mm. Ext. roughly smoothed. Int. eroded. Ext. 5YR6/6. Ca 2mm plaster interior. Level A4. Construction.

Fig. 4.104.15. E4 60-148-11. Standard Ware. Base fragm. Flat base. Bs. diam. 180 mm. Ext. finger pressing. Int. eroded. Ext. 7.5YR6/4. Thin plaster interior. Level A5. Open area.

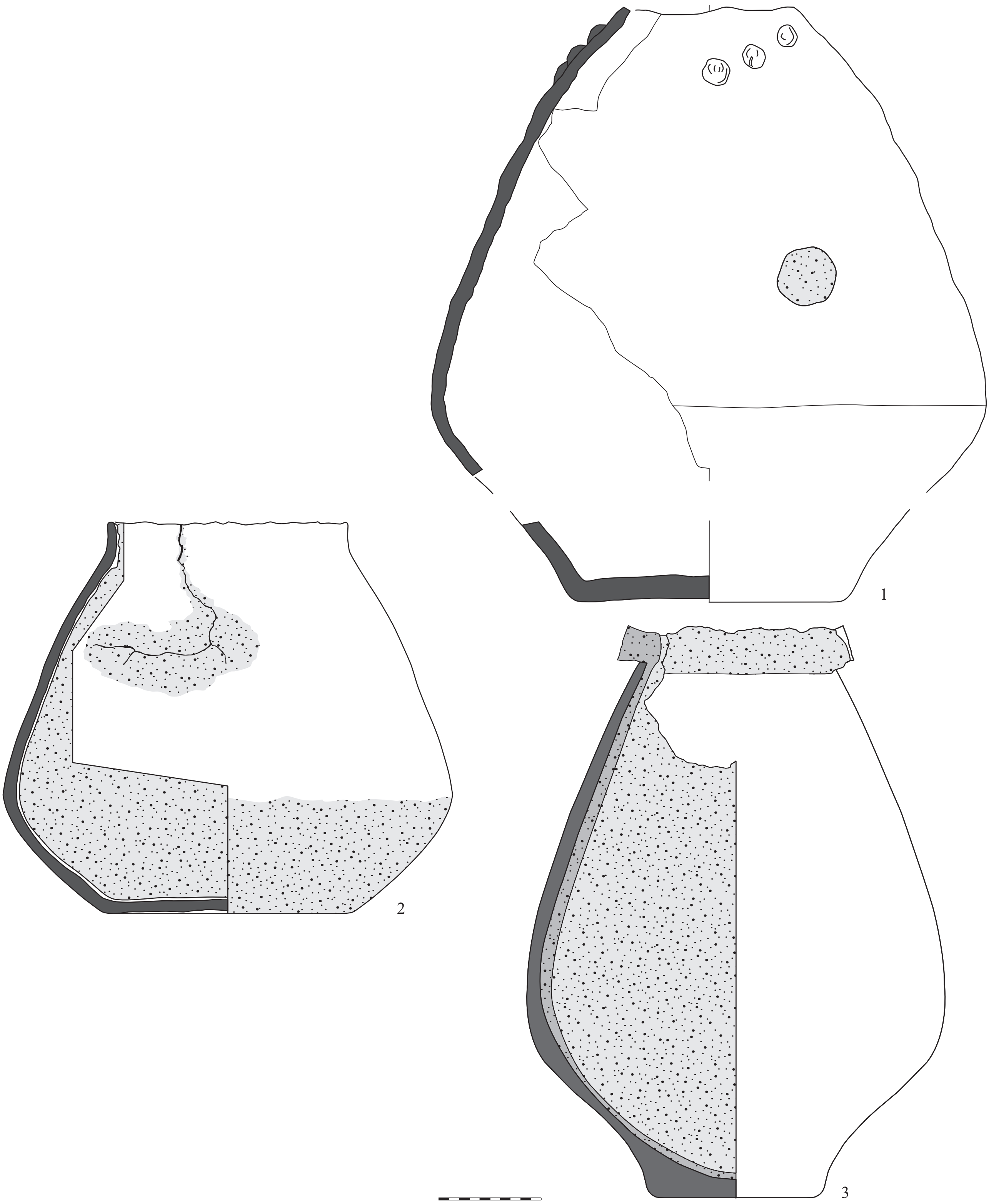


Fig. 4.100 Tell Sabi Abyad. Operation III. Standard Ware Large Jars (scale 1:5).

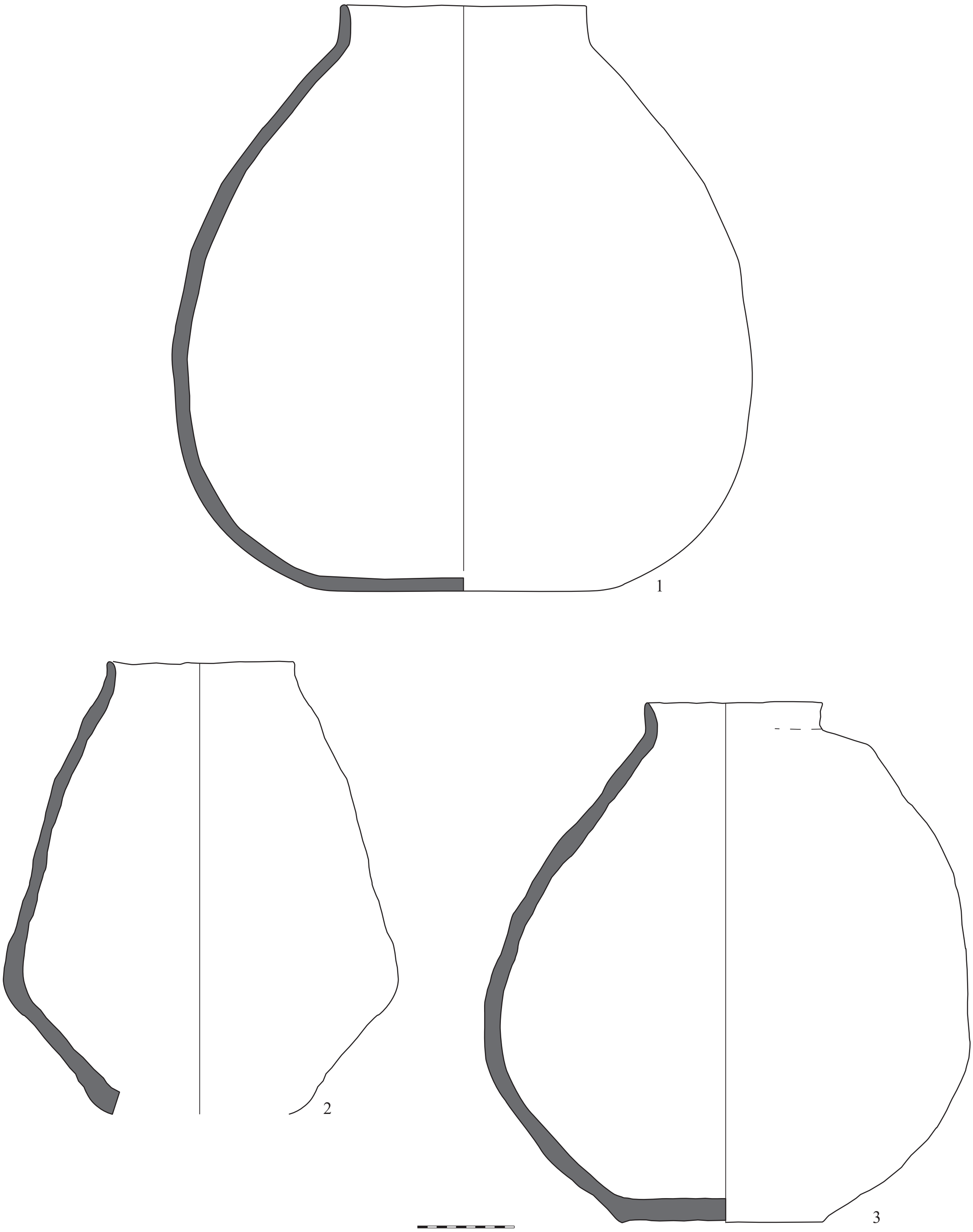


Fig. 4.101 Tell Sabi Abyad. Operation III. Standard Ware Large Jars (scale 1:5).

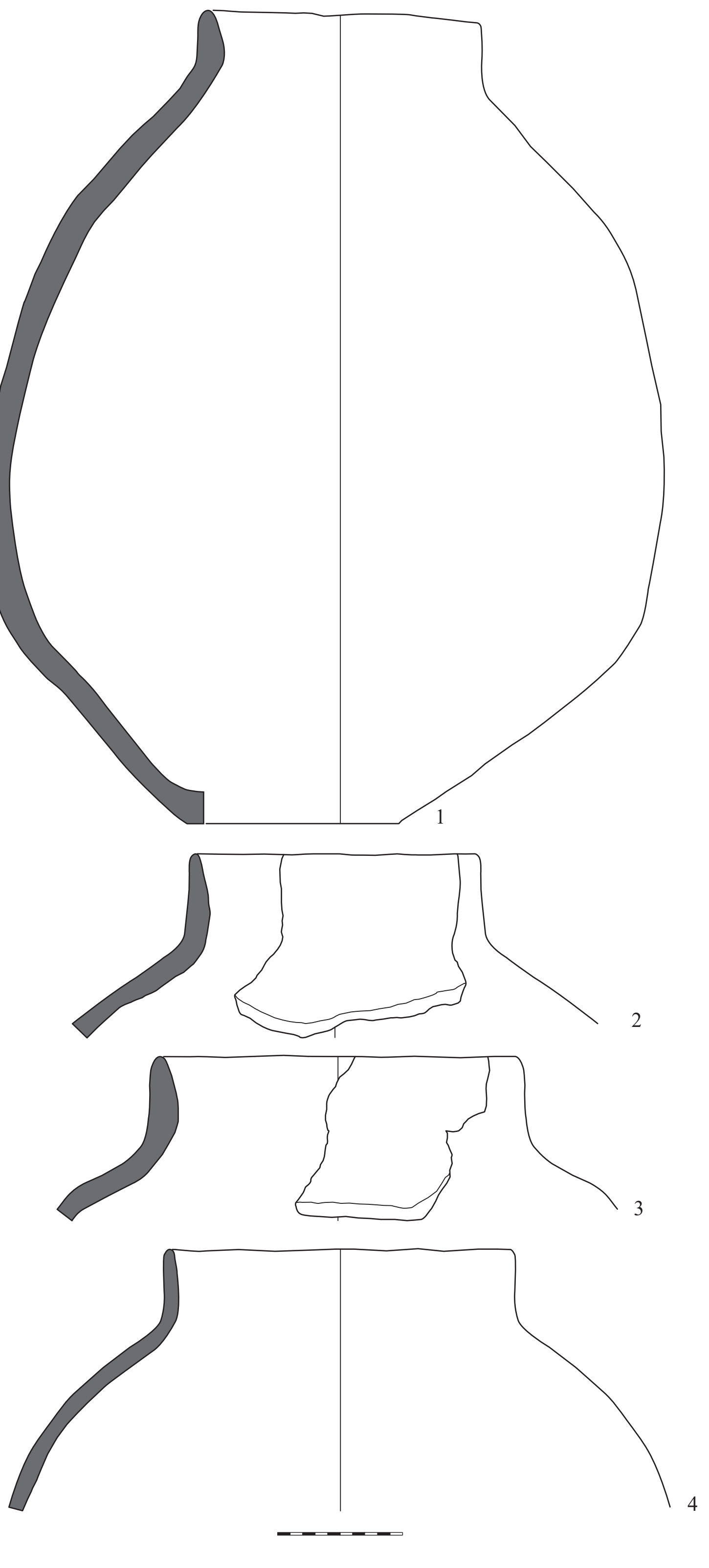


Fig. 4.102 Tell Sabi Abyad. Operation III. Standard Ware Large Jars (scale 1:5).

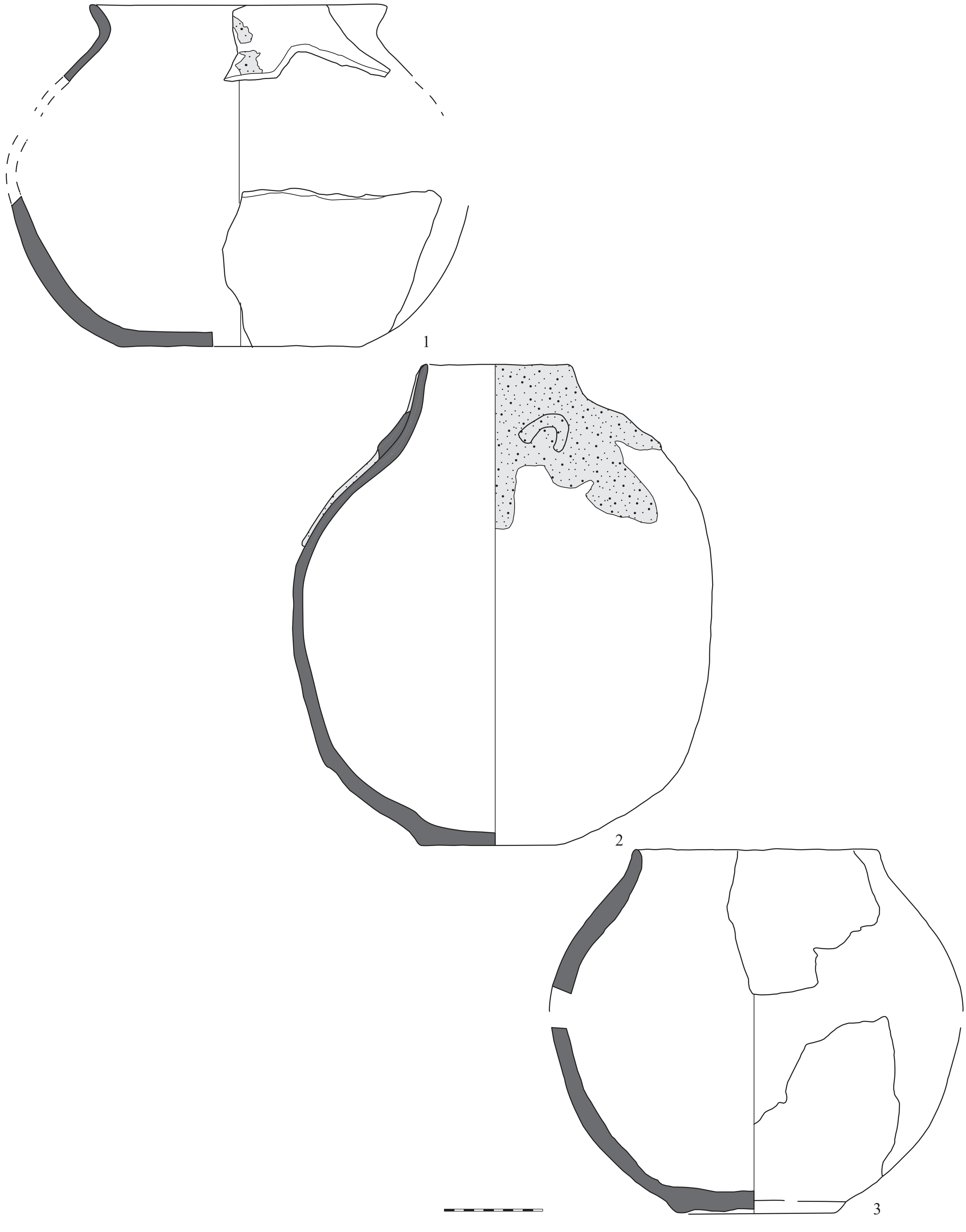


Fig. 4.103 Tell Sabi Abyad. Operation III. Standard Ware Large Jar (no. 1); Hole Mouth Jar (nos. 2–3) (scale 1:5).

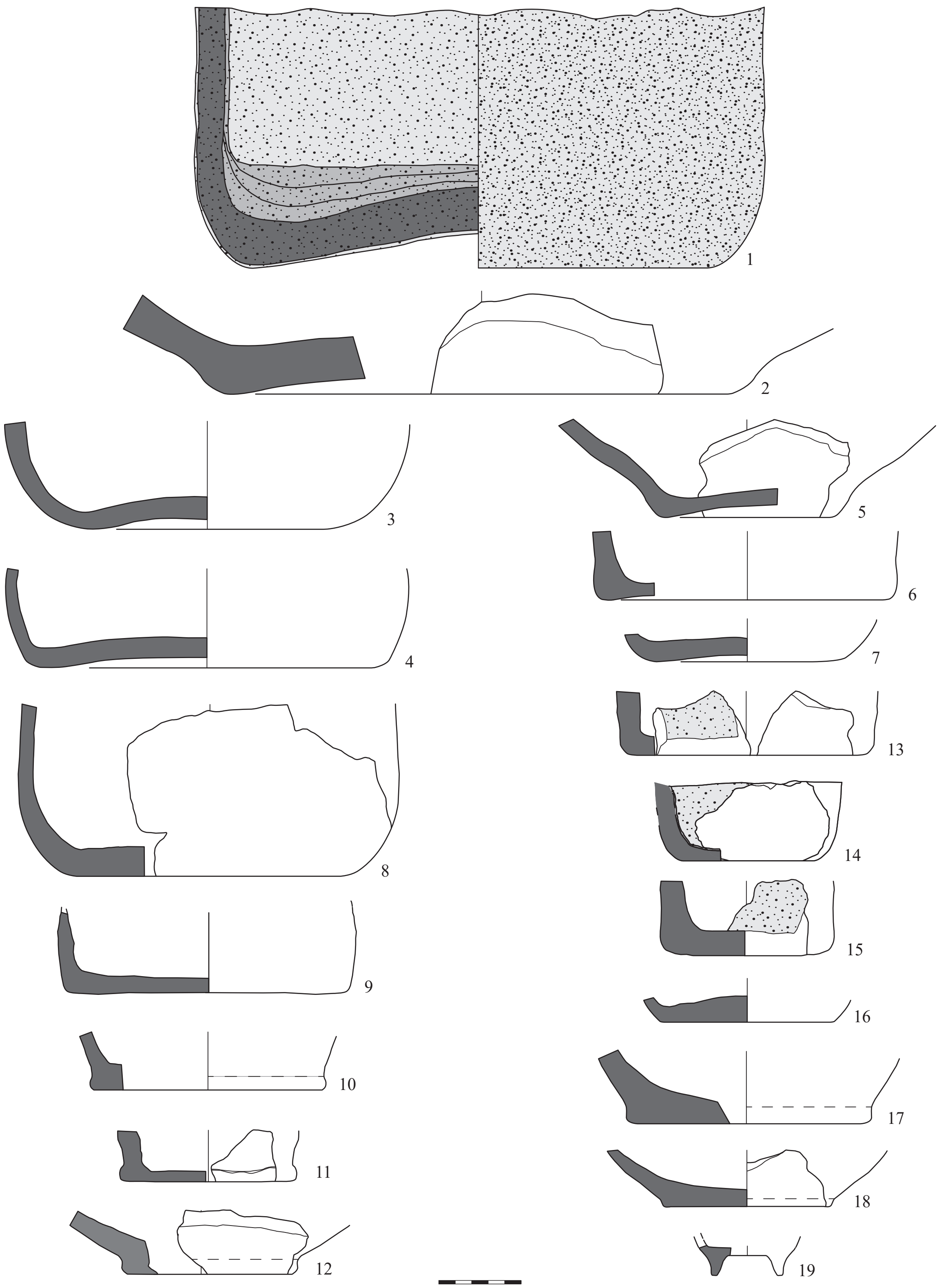


Fig. 4.104 Tell Sabi Abyad. Operation III. Standard Ware base fragments (scale 1:3).

Fig. 4.104.16. F4 43-193-6. Standard Ware. Base fragm. Flat base, thickening near centre. Bs. diam. 115 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/6. Level A1. Open area.

Fig. 4.104.17. E3 30-77-2. Standard Ware. Base fragm. Flat base. Bs. diam. 140 mm. Ext. eroded. Int. eroded. Ext. 5YR6/4. Level A3. Pit.

Fig. 4.104.18. D4 41-66-10. Standard Ware. Base fragm. Flat base. Bs. diam. 130 mm. Ext. roughly smoothed. Int. eroded. Ext. 7.5YR7/4. Level A4. Room fill.

Fig. 4.104.19. E3 114-294-14. Standard Ware. Base fragm. Pedestal base. Bs. diam. 40 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Level A7. Open area.

Fig. 4.105. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.105.1. F4 149-319-100 (P04-42). Standard Ware. Base fragm. Flat base; Large Jar; coiled basketry on exterior. Ext. basketry impressions. Int. roughly smoothed. Ext. 7.5YR8/3. Level A4. Room fill.

Fig. 4.105.2. H5 547-625-1. Standard Ware. Base fragm. Flat base; Large Jar. Ext. well smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Level A2. Room fill.

Fig. 4.106. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.106.1. G5 24-48-1. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 300 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 'red'. Dec. 'red'. Level A1. Open area.

Fig. 4.106.2. G5 575-610-5. Standard Ware. Rim fragm. Oval Everted Convex-sided Bowl. R. diam. oval. Ext. burnished. Int. burnished. Ext. red slipped. Ext. 10R4/8. Dec. 10R4/8. Level A2. Open area.

Fig. 4.106.3. G5 24-89-1. Standard Ware. Rim fragm. Straight-sided Flat-based Bowl. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R3/6. Dec. 10R3/6. Level A1. Open area.

Fig. 4.106.4. G5 93-164-5. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R4/4. Dec. 10R4/4. Level A1. Open area.

Fig. 4.106.5. G5 84-159-104. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Ext. 10R4/4. Dec. 10R4/4. Vol. 0.42 l. Level A1. Open area.

Fig. 4.106.6. H5 48-112-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 230 mm. Ext. burnished. Int. burnished. Ext. red slipped. Ext. 10R4/6. Dec. 10R4/6. Level A1. Floor.

Fig. 4.106.7. G5 500-500-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 5YR6/4. Dec. 5YR6/4. Level A1. Open area.

Fig. 4.106.8. J5 66-125-12. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 179 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R4/8. Dec. 10R4/8. Vol. 1.16 l. Level B8. Open area.

Fig. 4.106.9. F4 53-156-6. Standard Ware. Rim fragm. Oval Vertical Convex-sided Bowl. R. diam. oval. Ext. well smoothed. Int. roughly smoothed. Ext. red slipped. Int. red slipped. Ext. 5YR6/4. Dec. 5YR6/4. Level A1. Open area.

Fig. 4.106.10. K5 41-90-6. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. red slipped. Ext. 2.5YR4/6. Dec. 2.5YR4/6. Vol. 0.45 l. Mixed levels B3/B4. Open area.

Fig. 4.106.11. G5 98-170-2. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 2.5YR3/3. Dec. 2.5YR3/3. Vol. 0.90 l. Level B8. Pit.

Fig. 4.106.12. J5 70-137-22. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R5/4. Dec. 10R5/4. Vol. 1.13 l. Level B8. Open area.

Fig. 4.106.13. G5 62-126-5. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 70 mm. Ext. well smoothed. Int. finger pressed. Ext. red slipped. Int. red slipped. Ext. 10R4/6. Dec. 10R4/6. Vol. 0.15 l. Level A1. Open area.

Fig. 4.106.14. G5 627-695-7. Standard Ware. Base fragm. Convex-sided bowl with Pedestal Base. Bs. diam. 70 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Ext. 10R5/6. Dec. 10R5/6. Level A2. Room fill.

Fig. 4.106.15. J5 98-208-1. Standard Ware. Rim fragm. Vertical S-shaped Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R3/6. Dec. 10R3/6. Vol. 0.80 l. Level B8. Hearth.

Fig. 4.107. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.107.1. G5 518-532-100 (P05-76). Standard Ware. Section. Closed Convex-sided Bowl. R. diam. 280 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R5/6. Dec. 10R5/6. Vol. 6.22 l. Level A1. Floor.

Fig. 4.107.2. J5 93-186-101 (P07-70). Standard Ware. Complete. Closed Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. burnished below the rim. Ext. red slipped. Int. red slipped. Ext. 10R5/6. Dec. 10R5/6. Vol. 3.25 l. Level B8. Oven.

Fig. 4.107.3. J4 385-775-102 (P08-85). Standard Ware. Complete. Everted Straight-sided Carinated Bowl. R. diam. 280 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. red slipped. Ext. 2.5YR7/4. Dec. 10R5/6. Vol. 3.79 l. Mixed levels B8/B9. Burial BN08-60.

Fig. 4.107.4. J4 190-331-100 (P07-104). Standard Ware. Section. Everted Convex-sided Bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. red slipped. Int. red slipped. Ext. 'buff'. Dec. 'red'. Vol. 0.34 l. Mixed levels B4/B5/B6. Open area.

Fig. 4.107.5. J5 110-230-7. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. burnished. Int. roughly smoothed. Ext. red slipped. Ext. 10R5/6. Dec. 10R5/6. Mixed levels C-Sequence/B4. Construction.

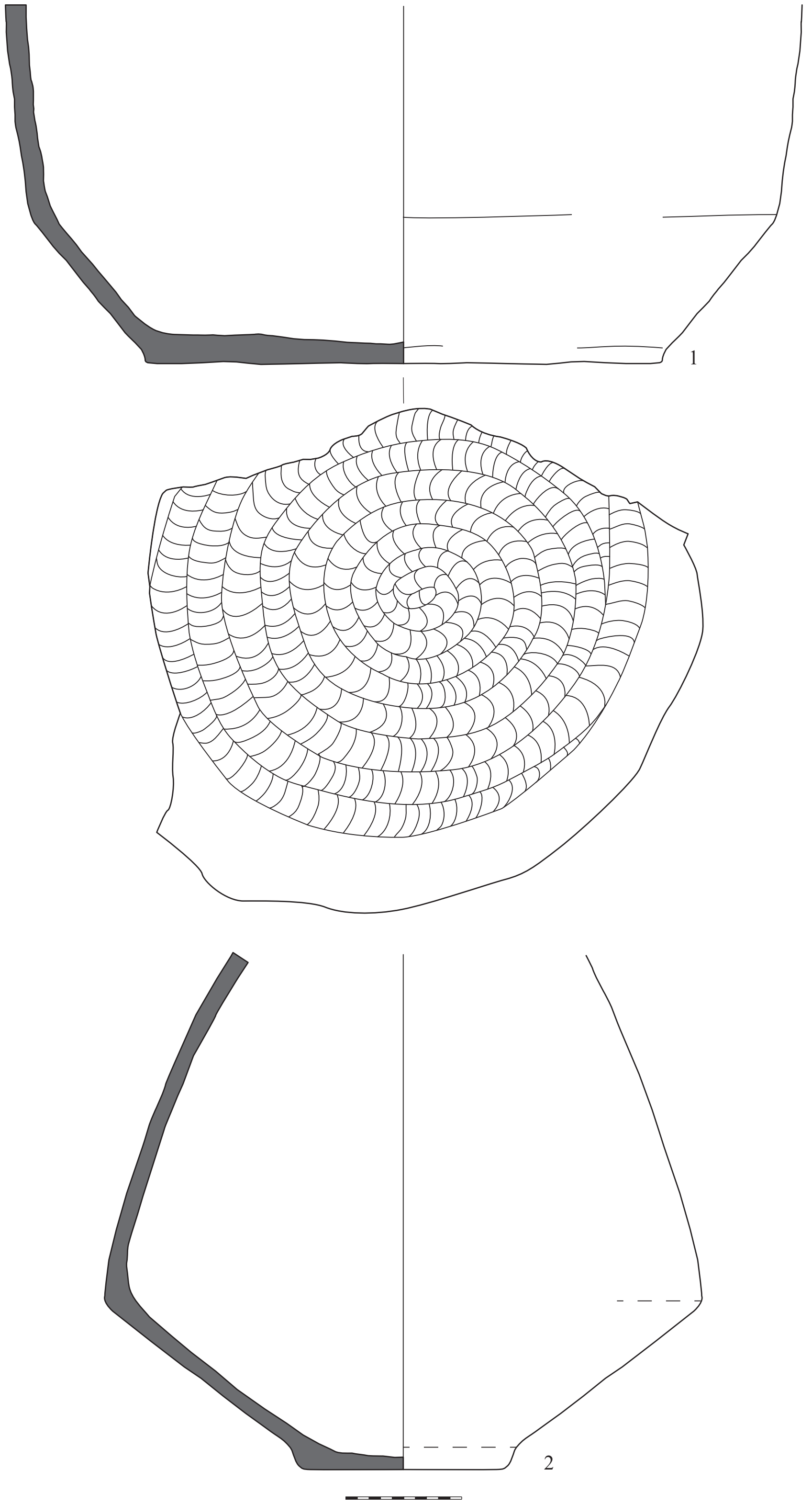


Fig. 4.105 Tell Sabi Abyad. Operation III. Standard Ware base fragments (scale 1:5).

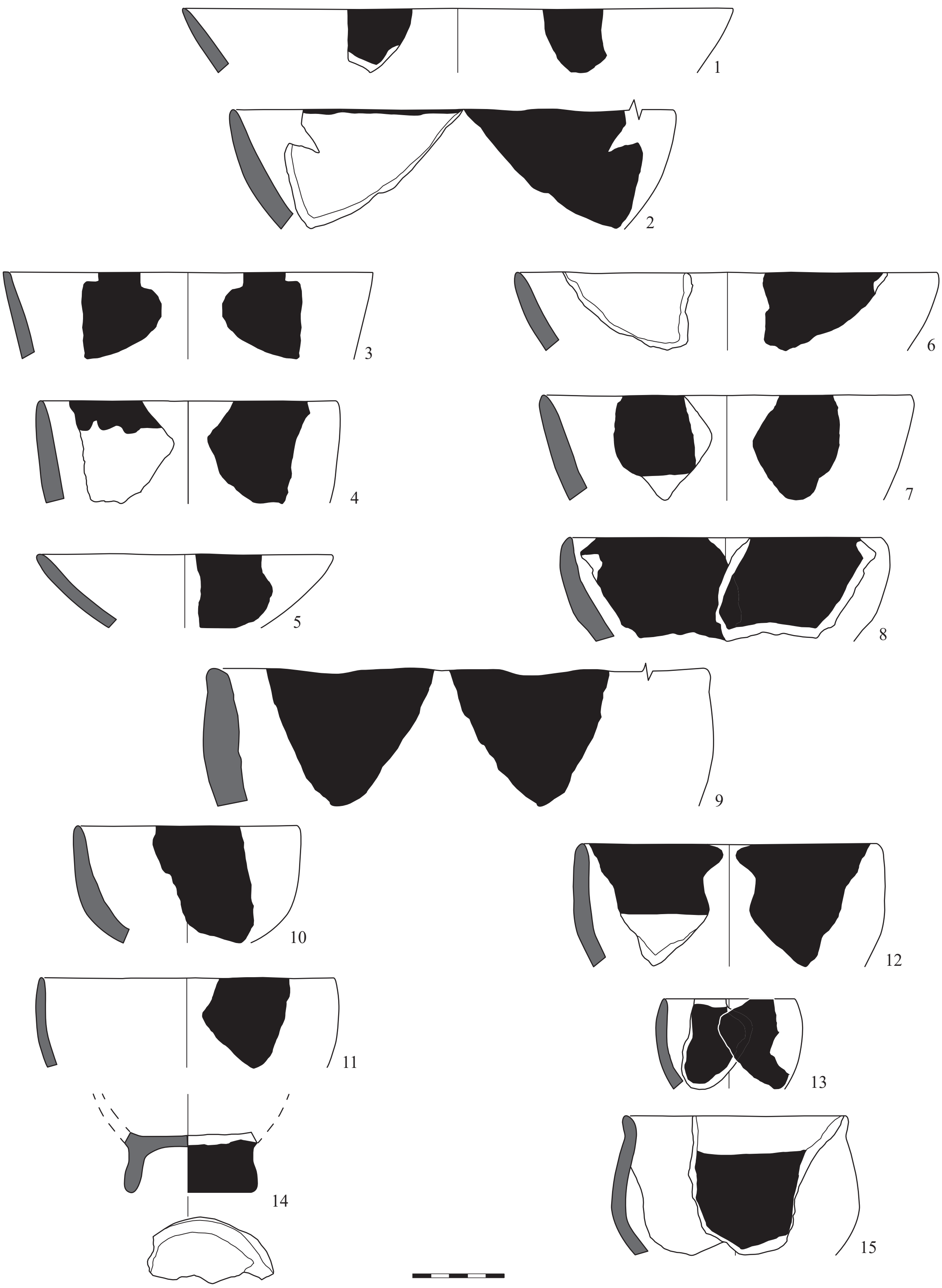


Fig. 4.106 Tell Sabi Abyad. Operation III. Standard Ware red slipped (scale 1:3).

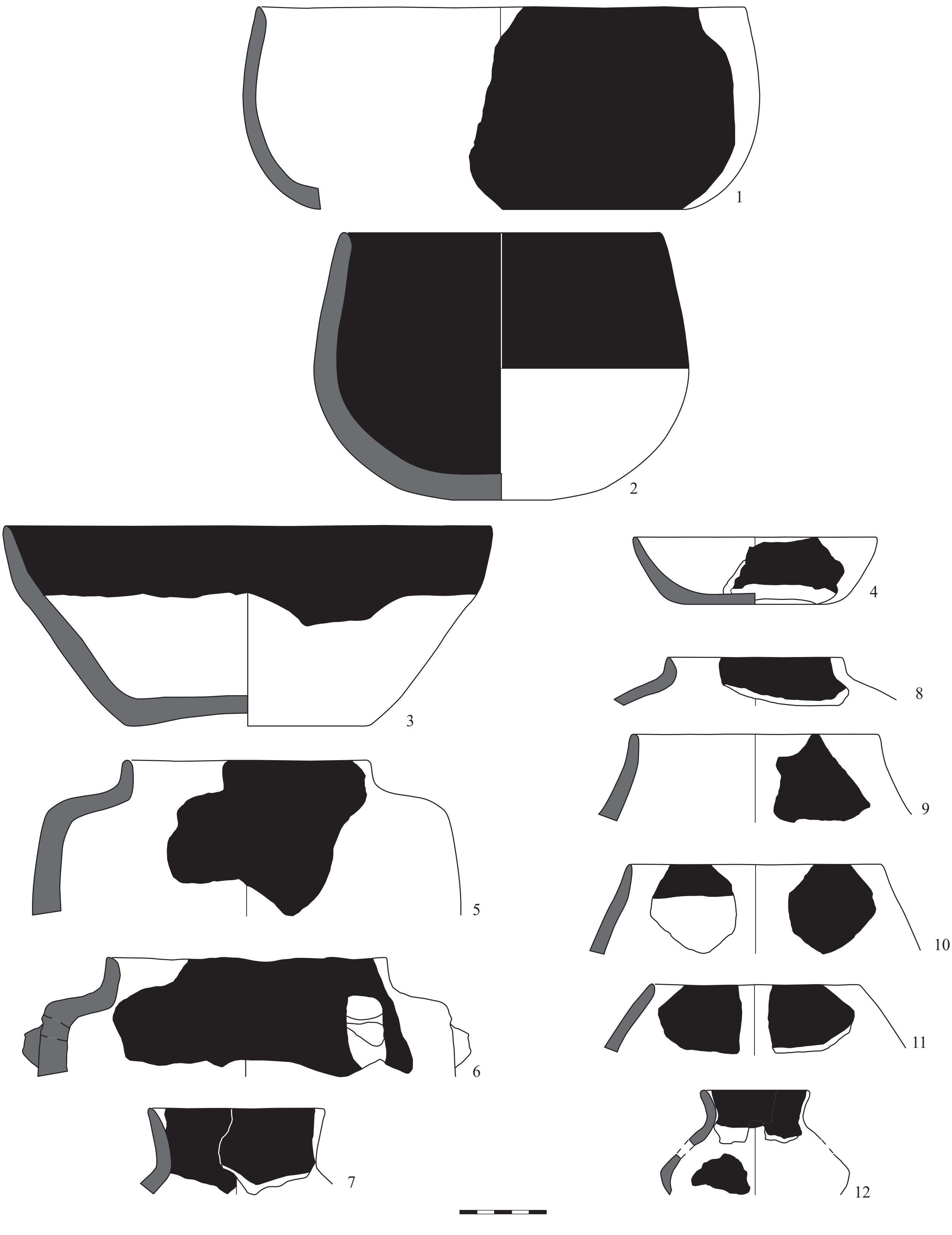


Fig. 4.107 Tell Sabi Abyad. Operation III. Standard Ware red slipped (scale 1:3).

Fig. 4.107.6. J5 75-144-7. Standard Ware. Rim fragm. Medium-sized Jar with vertical loop handle. R. diam. 160 mm. Ext. burnished. Int. roughly smoothed. Ext. red slipped. Int. red slipped. Ext. 10R5/6. Dec. 10R5/6. Level B7. Oven.

Fig. 4.107.7. H4 85-135-4. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. well smoothed. Int. roughly smoothed. Ext. red slipped. Int. red slipped. Ext. 10R4/4. Dec. 10R4/4. Level A1. Open area.

Fig. 4.107.8. J5 74-143-7. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 100 mm. Ext. burnished. Int. well smoothed. Ext. red slipped. Int. red slipped. Ext. 10R3/4. Dec. 10R3/4. Level B8. Open area.

Fig. 4.107.9. F4 26-94-1. Standard Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 140 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Ext. 10R4/3. Dec. 10R4/3. Level A1. Room fill.

Fig. 4.107.10. H4 56-98-12. Standard Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 150 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. red slipped. Ext. 10R5/6. Dec. 10R5/6. Level A1. Open area.

Fig. 4.107.11. J5 74-143-6. Standard Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R4/4. Dec. 10R4/4. Level B8. Open area.

Fig. 4.107.12. G5 680-818-3. Standard Ware. Rim fragm. S-shaped Goblet. R. diam. 60 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. red slipped. Ext. 10R5/6. Dec. 10R5/6. Level A2. Open area.

Fig. 4.108. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.108.1. L5 54-125-101. Standard Ware. Rim fragm. Vertical Straight-sided Carinated Bowl. R. diam. 220 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 2.5YR6/8. Dec. 2.5YR4/6. Vol. 2.85 l. Thin plaster interior. Level B3. Room fill.

Fig. 4.108.2. J4 117-172-101. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 210 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 10YR6/4. Dec. 2.5YR4/6. Vol. 2.05 l. Mixed levels D-Sequence/C-Sequence. Open area.

Fig. 4.108.3. J5 29-52-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. painted. Int. red slipped. Ext. 2.5YR6/6. Dec. 10R3/6. Mixed levels B4/B5/B8. Open area.

Fig. 4.108.4. J5 17-38-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. painted. Int. red slipped. Ext. 7.5YR7/3. Dec. 10R5/6. Vol. 1.01 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.108.5. J5 89-178-7. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. painted. Int. red slipped. Ext. 7.5YR6/6. Dec. 10R4/4. Vol. 0.94 l. Level B4. Open area.

Fig. 4.108.6. K5 30-80-3. Standard Ware. Rim fragm. Low Carinated Bowl. R. diam. 190 mm. Ext. burnished. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10R5/6. Vol. 1.14 l. Mixed levels B2/B3. Room fill.

Fig. 4.108.7. J4 107-149-101. Standard Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. painted. Ext. 5YR6/6. Dec. 10R4/4. Vol. 1.32 l. Level B4. Open area.

Fig. 4.108.8. H4 58-84-210. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 130 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 7.5YR4/8. Dec. 2.5YR4/8. Level A1. Open area.

Fig. 4.108.9. J5 23-45-6. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/4. Dec. 10R3/4. Mixed levels B5/B8. Open area.

Fig. 4.108.10. L5 54-123-101. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 130 mm. Ext. burnished. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5YR4/2. Dec. 10R3/3. Level B3. Room fill.

Fig. 4.108.11. J4 347-704-101. Standard Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 5YR6/4. Dec. 2.5YR3/4. Level B8. Open area.

Fig. 4.108.12. G5 524-531-10. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR6/4. Dec. 10R4/6. Level A1. Room fill.

Fig. 4.108.13. G5 62-128-13. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR6/4. Dec. 10R4/4. Level A1. Open area.

Fig. 4.108.14. L5 54-122-101. Standard Ware. Body fragm. Jar. Ext. burnished. Int. very rough. Ext. painted. Ext. 5YR5/4. Dec. 'red'. Level B3. Room fill.

Fig. 4.108.15. I3 100-123-5. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR8/3. Dec. 5YR4/4. Level A1. Open area.

Fig. 4.109. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.109.1. J5 29-52-2. Standard Ware. Rim fragm. Small Jar. R. diam. 80 mm. Ext. well smoothed. Int. roughly smoothed. Ext. impressed. Ext. 10YR8/2. Mixed levels B4/B5/B8. Open area.

Fig. 4.109.2. J5 59-119-1. Standard Ware. Body fragm. Jar. Ext. eroded. Int. roughly smoothed. Ext. impressed. Ext. 5YR3/1. Level B4. Pit.

Fig. 4.109.3. J5 31-74-8. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. impressed. Ext. 5YR7/4. Mixed levels B5/B8. Open area.

Fig. 4.109.4. I3 118-134-2. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. impressed. Ext. 10YR5/2. Level A1. Open area.

Fig. 4.109.5. J5 31-62-17. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. very rough. Ext. impressed. Ext. 5YR6/3. Mixed levels B5/B8. Open area.

Fig. 4.109.6. K5 26-62-3. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. impressed. Ext. 7.5YR6/4. Mixed levels B1/B2. Open area.

Fig. 4.109.7. J5 54-116-2. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. impressed. Ext. 7.5YR7/4. Mixed levels B4/B5. Open area.

Fig. 4.109.8. L5 54-124-101. Standard Ware. Body fragm. Jar. Ext. burnished. Int. well smoothed. Ext. incised. Ext. 10YR6/6. Level B3. Room fill.

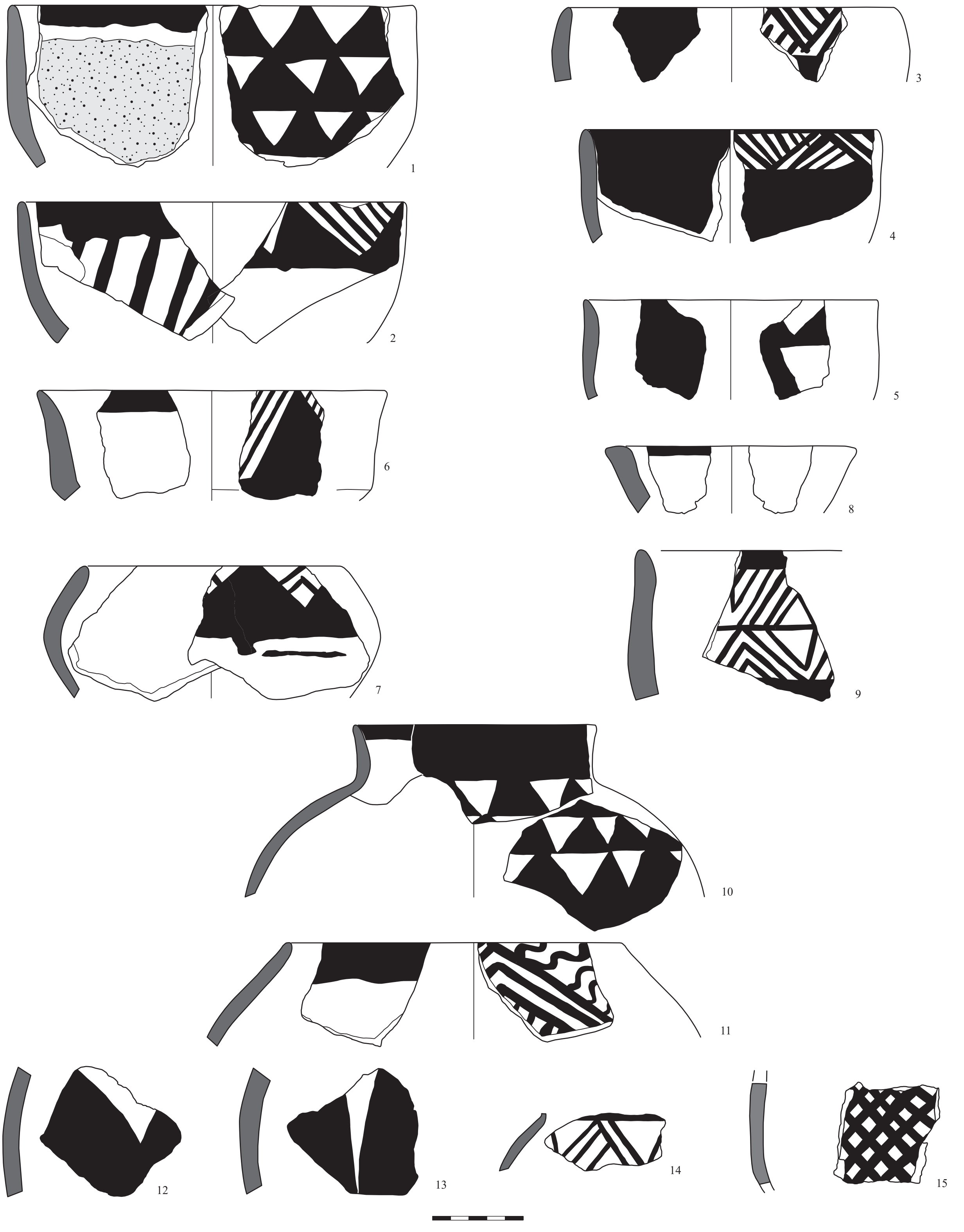


Fig. 4.108 Tell Sabi Abyad. Operation III. Standard Ware painted (scale 1:3).

Fig. 4.109.9. J5 91-188-1. Standard Ware. Body fragm. Jar. Ext. burnished. Int. roughly smoothed. Ext. incised. Ext. 10YR5/3. Mixed levels B4/B7/B8. Open area.

Fig. 4.109.10. J5 56-123-8. Standard Ware. Body fragm. Jar. Ext. burnished. Int. roughly smoothed. Ext. incised. Ext. 7.5YR7/4. Spot of plaster exterior. Mixed levels B5/B7/B8. Open area.

Fig. 4.109.11. G5 523-530-100 (P05-77). Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. eroded. Ext. incised. Ext. 10YR6/3. Level A1. Room fill.

Fig. 4.109.12. J5 111-231-2. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. finger pressed. Ext. incised. Ext. 'brown'. Level B8. Oven.

Fig. 4.109.13. H4 27-44-2. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. finger pressed. Ext. incised. Ext. 2.5YR7/4. Thin plaster interior. Level A1. Open area.

Fig. 4.109.14. G5 45-108-1. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. incised. Ext. 7.5YR6/4. Level A1. Open area.

Fig. 4.109.15. I3 12-23-3. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. finger pressed. Ext. incised. Ext. 7.5YR6/3. Mixed levels B4/A1. Open area.

Fig. 4.109.16. H5 26-93-11. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. incised. Ext. 2.5YR5/6. Level A1. Room fill.

Fig. 4.109.17. K5 32-67-9. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. burnished. Int. eroded. Ext. RPB'. Ext. 7.5YR6/3. Dec. 5YR4/4. Mixed levels B1/B3/B4. Open area.

Fig. 4.109.18. J5 34-60-15. Standard Ware. Body fragm. Jar. Ext. burnished. Int. roughly smoothed. Ext. RPB'. Ext. 10YR8/2. Dec. 2.5YR4/6. Mixed levels D-Sequence/B4. Open area.

Fig. 4.109.19. K5 39-91-104. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. scraped. Ext. RPB'. Ext. 10YR7/2. Dec. 2.5YR3/6. Level B2. Open area.

Fig. 4.109.20. J5 40-78-8. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. painted & impressed. Ext. 7.5YR7/2. Dec. 7.5YR3/2. Mixed levels D-Sequence/B4. Open area.

Fig. 4.109.21. K5 47-100-24. Standard Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 160 mm. Ext. burnished. Int. well smoothed. Ext. RPB'. Ext. 10YR4/1. Dec. 2.5YR4/4. Level B3. Pit.

Fig. 4.109.22. J5 74-163-14. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. painted & incised. Ext. 7.5YR7/3. Dec. 2.5YR6/6. Level B8. Open area.

Fig. 4.109.23. J5 118-251-6. Standard Ware. Body fragm. Jar. Ext. burnished. Int. eroded. Ext. painted & incised. Ext. 7.5YR7/4. Dec. 10R4/8. Mixed levels B6/B7/B8. Open area.

Fig. 4.109.24. K5 31-65-3. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. roughly smoothed. Int. finger pressed. Ext. bitumen-painted. Ext. 7.5YR5/2. Dec. 7.5YR3/1. Level B2. Room fill.

Fig. 4.109.25. K5 34-76-15. Standard Ware. Body fragm. Jar. Ext. burnished. Int. scraped. Ext. red slipped & bitumen-painted. Ext. 10R5/6. Dec. 'black'. Mixed levels B2/B4. Open area.

Fig. 4.110. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.110.1. G5 42-104-15. Standard Ware. Body fragm. Large Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. applique. Ext. 5YR6/4. Spots of plaster exterior. Level A1. Room fill.

Fig. 4.110.2. D4 85-161-1. Standard Ware. Rim fragm. Vertical Pot. R. diam. 230 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. applique. Ext. 5YR7/6. Level A5. Open area.

Fig. 4.110.3. G5 674-806-3. Standard Ware. Rim fragm. Vertical Pot. R. diam. 170 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. applique. Ext. 2.5YR7/4. Level A2. Open area.

Fig. 4.110.4. J5 51-93-1. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. finger pressed. Ext. applique. Ext. 7.5YR7/2. Mixed levels B4/B5. Open area.

Fig. 4.110.5. J5 108-217-9. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. Ext. roughly smoothed. Int. roughly smoothed. Ext. applique. Ext. 10YR8/3. Mixed levels B6/B7/B8. Open area.

Fig. 4.110.6. D4 72-141-1. Standard Ware. Body fragm. Jar. Ext. finger pressing. Int. finger pressed. Ext. applique. Ext. 5YR6/4. Level A4. Open area.

Fig. 4.110.7. F4 25-80-2. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. applique. Ext. 5YR6/6. Level A1. Room fill.

Fig. 4.110.8. J5 108-217-11. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. finger pressed. Ext. applique. Ext. 10YR8/3. Mixed levels B6/B7/B8. Open area.

Fig. 4.110.9. J5 73-159-2. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. well smoothed. Ext. applique. Ext. 10YR7/4. Mixed levels B4/B5. Open area.

Fig. 4.110.10. H4 109-190-145. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. applique. Ext. 7.5YR8/3. Level A1. Room fill.

Fig. 4.110.11. J5 48-85-1. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. red slipped & impressed. Ext. 2.5YR4/6. Dec. 10R4/1. Mixed levels B4/B5/B7/B8. Open area.

Fig. 4.110.12. J5 56-123-10. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. well smoothed. Ext. red slipped & impressed. Ext. 10R4/1. Dec. 10R4/1. Mixed levels B5/B7/B8. Open area.

Fig. 4.110.13. H4 19-101-16. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. well smoothed. Ext. red slipped & applique. Ext. 10R4/4. Dec. 10R4/4. Level A1. Open area.

Fig. 4.111. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.111.1. H5 26-93-9. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped. Int. white slipped. Ext. 10YR8/1. Level A1. Room fill.

Fig. 4.111.2. G5 612-665-2. Standard Ware. Rim fragm. Closed Convex-sided Bowl. Ext. well smoothed. Int. well smoothed. Ext. white slipped. Int. white slipped. Ext. 2.5YR8/1. Level A2. Open area.

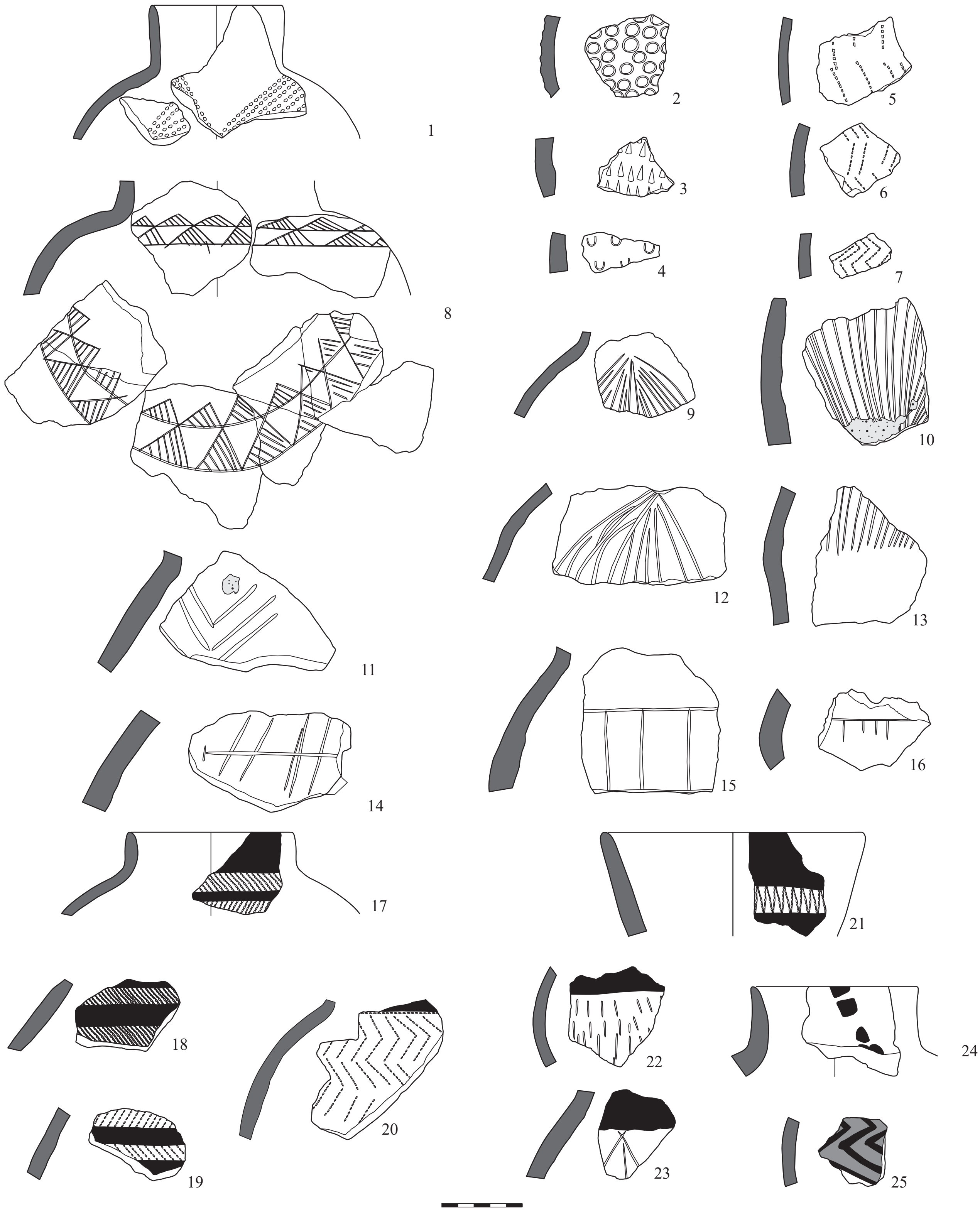


Fig. 4.109 Tell Sabi Abyad. Operation III. Standard Ware impressed (nos. 1–7); incised (nos. 8–16); 'RPB' (nos. 17–19); bitumen-painted (no. 24); various techniques combined (nos. 20–23, 25) (scale 1:3).

Fig. 4.111.3. H5 24-55-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 80 mm. Ext. well smoothed. Int. well smoothed. Ext. white slipped. Int. white slipped. Ext. 5YR8/2. Level A1. Room fill.

Fig. 4.111.4. H4 26-83-1. Standard Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 240 mm. Ext. very coarse. Int. roughly smoothed. Ext. white slipped. Int. white slipped. Ext. 7.5YR8/2. Vol. 2.76 l. Level A1. Open area.

Fig. 4.111.5. G5 72-138-1. Standard Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. white slipped and painted. Int. white slipped. Ext. 'white'. Dec. 10R3/3. Vol. 0.89 l. Level A1. Open area.

Fig. 4.111.6. G5 78-148-19. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 120 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped. Ext. 7.5YR7/4. Level uncertain.

Fig. 4.111.7. I3 12-30-5. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 180 mm. Ext. well smoothed. Int. well smoothed. Ext. white slipped and painted. Int. white slipped and painted. Ext. 7.5YR7/3. Dec. 'red'. Mixed levels B4/A1. Open area.

Fig. 4.111.8. G5 122-194-1. Standard Ware. Rim fragm. Small Jar. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped and painted. Int. white slipped. Ext. 'white'. Dec. 'red'. Level A1. Room fill.

Fig. 4.111.9. H4 19-82-3. Standard Ware. Rim fragm. Small Jar. R. diam. 100 mm. Ext. well smoothed. Int. well smoothed. Ext. white slipped and painted. Int. white slipped. Ext. 2.5Y8/2. Dec. 10R4/6. Level A1. Open area.

Fig. 4.111.10. H5 43-80-2. Standard Ware. Rim fragm. Medium-sized Jar. R. diam. 120 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped and painted. Int. white slipped. Ext. 10YR8/2. Dec. 7.5YR5/6. Level A1. Open area.

Fig. 4.111.11. H5 53-107-1. Standard Ware. Rim fragm. Small Jar. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped and painted. Int. white slipped. Ext. 2.5Y8/1. Dec. 7.5YR5/4. Level A1. Open area.

Fig. 4.111.12. H4 26-83-5. Standard Ware. Rim fragm. Small Jar. R. diam. 110 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped and painted. Int. white slipped. Ext. 2.5Y8/1. Dec. 10R4/6. Level A1. Open area.

Fig. 4.111.13. I3 133-171-11. Standard Ware. Body fragm. Jar. Ext. burnished. Int. roughly smoothed. Ext. white slipped and painted. Ext. 10YR8/3. Dec. 10R5/4. Level A1. Pit.

Fig. 4.111.14. H4 78-134-26. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped and painted. Ext. 10YR8/3. Dec. 10R5/6. Level A1. Open area.

Fig. 4.111.15. I3 115-147-8. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. finger pressed. Ext. white slipped and painted. Ext. 7.5YR8/3. Dec. 10R5/6. Mixed levels B7/B8/A1. Open area.

Fig. 4.111.16. G5 62-126-12. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. scraped. Ext. white slipped and painted. Ext. 7.5YR8/1. Dec. 10R4/6. Level A1. Open area.

Fig. 4.111.17. H4 67-124-14. Standard Ware. Body fragm. Jar. Ext. burnished. Int. roughly smoothed. Ext. white slipped and painted. Ext. 'white'. Dec. 10R5/4. Level A1. Open area.

Fig. 4.111.18. G5 12-50-3. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped and painted. Ext. 10YR8/1. Dec. 10R4/6. Level A1. Floor.

Fig. 4.111.19. G5 546-558-1. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. white slipped and painted. Ext. 7.5YR8/2. Dec. 10R4/6. Level A3. Room fill.

Fig. 4.111.20. H4 58-84-9. Standard Ware. Body fragm. Jar. Ext. well smoothed. Int. very rough. Ext. white slipped and painted. Ext. 10YR8/2. Dec. 10R4/4. Level A1. Open area.

Fig. 4111.21. H4 19-101-17. Standard Ware. Body fragm. Jar. Ext. roughly smoothed. Int. very rough. Ext. white slipped and painted. Ext. 10YR8/3. Dec. 5YR5/4. Level A1. Open area.

Fig. 4.112. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.112.1. I3 126-170-1 (P07-25). Standard Ware. Section. Medium-sized Jar. R. diam. 110 mm. Ext. roughly smoothed. Int. scraped. Ext. white slipped and painted. Ext. 7.5YR8/2. Dec. 10R5/4. Vol. 20.22 l. Level A1. Room fill.

Fig. 4.112.2. G5 9-25-1 (P05-90). Standard Ware. Body fragm. Medium-sized Jar. Ext. well smoothed. Int. finger pressed. Ext. white slipped and painted. Ext. 10YR7/3. Dec. 10R4/3. Level A1. Room fill.

Fig. 4.112.3. H5 50-91-6. Standard Ware. Body fragm. Medium-sized Jar. Bs. diam. 100 mm. Ext. well smoothed. Int. very rough. Ext. white slipped and painted. Ext. 10YR7/3. Dec. 10R4/4. Level A1. Open area.

Fig. 4.112.4. G5 66-135-1. Standard Ware. Rim fragm. Re-used Neck. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. white slipped and painted. Int. white slipped and painted. Ext. 7.5YR8/2. Dec. 10R5/8. Vol. 1.00 l. Level A1. Pit.

Fig. 4.113. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.113.1. F4 170-383-2. Early Mineral Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10R4/6. Vol. 0.44 l. Level A4. Open area.

Fig. 4.113.2. E4 110-335-2. Early Mineral Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 130 mm. Ext. burnished. Int. well smoothed. Ext. red slipped. Ext. 7.5YR4/2. Level A10. Open area.

Fig. 4.113.3. E4 110-335-3. Early Mineral Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 10YR6/2. Level A10. Open area.

Fig. 4.113.4. D3 399-501-2. Early Mineral Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. painted. Ext. 5YR5/6. Dec. 5YR5/6. Level A7. Open area.

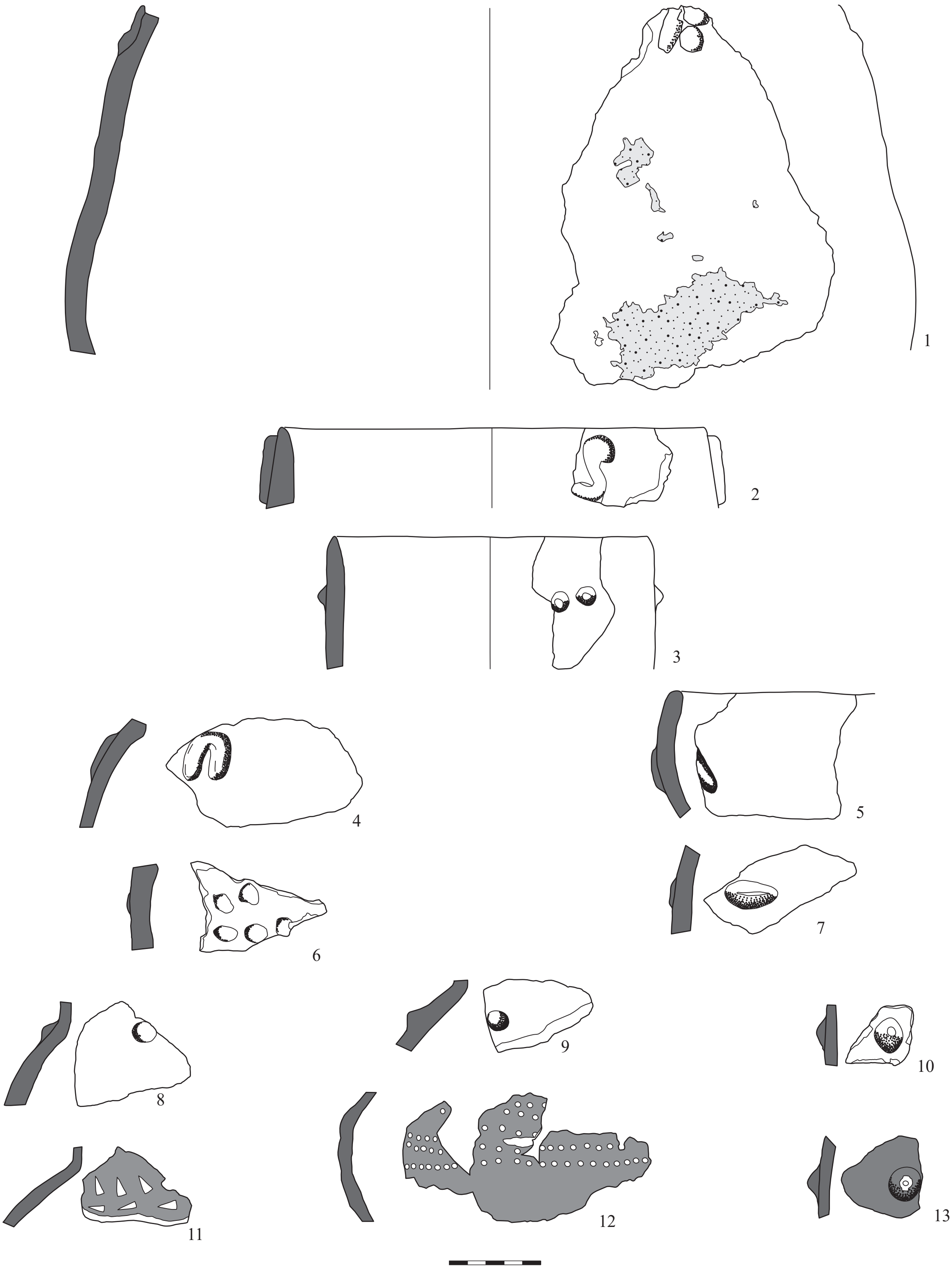


Fig. 4.110 Tell Sabi Abyad. Operation III. Standard Ware appliqué(nos. 1–10); various techniques combined (nos. 11–13) (scale 1:3).

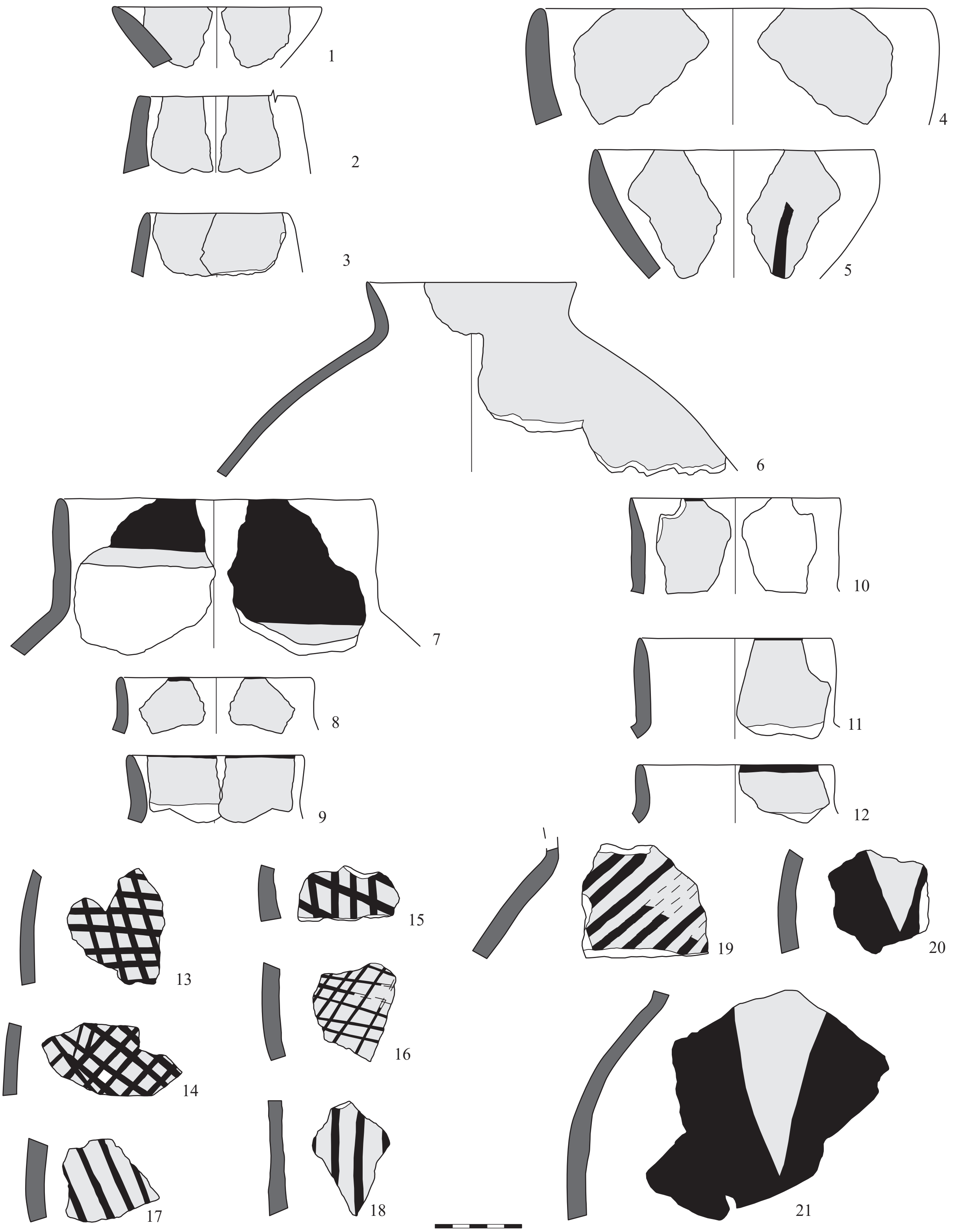


Fig. 4.111 Tell Sabi Abyad. Operation III. Standard Ware white slipped (nos. 1–4, 6); white-slipped and painted (nos. 5, 7–21) (scale 1:3).

Fig. 4.112 Tell Sabi Abyad. Operation III. Standard Ware white-slipped and painted (scale 1:3).

Fig. 4.113.5. E3 139-333-12. Early Mineral Ware. Rim fragm. Vertical Pot with vertical loop handle. R. diam. 140 mm. Ext. well smoothed. Int. burnished. Ext. red slipped. Int. painted. Ext. 10R5/8. Dec. 10R5/8. Level A8. Room fill.

Fig. 4.113.6. E3 191-428-1. Early Mineral Ware. Rim fragm. Hole Mouth Pot with 'ear'-shaped lug. R. diam. 90 mm. Ext. eroded. Int. eroded. Ext. 7.5YR6/4. Level A10. Open area.

Fig. 4.113.7. E3 234-521-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl with conical lug. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. 2.5Y7/3. Level A11. Open area.

Fig. 4.113.8. E3 206-515-1. Early Mineral Ware. Section. Closed Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 10YR6/4. Dec. 10R4/8. Vol. 1.67 l. Level A10. Pit.

Fig. 4.113.9. E3 220-488-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 10YR7/2. Dec. 10R3/3. Level A10. Pit.

Fig. 4.113.10. E3 205-468-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. 10YR6/3. Level A10. Open area.

Fig. 4.113.11. E3 226-511-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. well smoothed. Ext. 2.5Y6/2. Mixed levels A10/A11. Open area.

Fig. 4.113.12. E3 205-451-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR5/4. Level A10. Open area.

Fig. 4.113.13. E4 117-366-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. well smoothed. Ext. 10YR5/1. Level A11. Open area.

Fig. 4.113.14. E4 133-397-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR4/1. Level A11. Construction.

Fig. 4.113.15. E4 133-391-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 100 mm. Ext. burnished. Int. well smoothed. Ext. 10YR6/1. Level A11. Construction.

Fig. 4.113.16. E4 123-410-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 100 mm. Ext. burnished. Int. well smoothed. Ext. 10YR6/2. Level A12. Open area.

Fig. 4.113.17. E4 135-390-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 80 mm. Ext. burnished. Int. well smoothed. Ext. 10YR3/1. Level A10. Platform.

Fig. 4.114. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.114.1. E4 105-317-1. Early Mineral Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. eroded. Ext. 10YR5/2. Level A9. Platform.

Fig. 4.114.2. E3 220-488-2. Early Mineral Ware. Rim fragm. S-shaped Goblet. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 7.5YR6/4. Dec. 10R3/6. Level A10. Pit.

Fig. 4.114.3. E3 206-455-1. Early Mineral Ware. Body fragm. S-shaped Goblet. Ext. burnished. Int. finger pressed. Ext. painted. Ext. 10YR6/4. Dec. 2.5YR4/8. Level A10. Pit.

Fig. 4.114.4. E3 206-462-1. Early Mineral Ware. Body fragm. with 'ear'-shaped lug. Ext. burnished. Int. burnished. Ext. painted. Ext. 10YR6/4. Dec. 2.5YR6/8. Level A10. Pit.

Fig. 4.114.5. E4 82-253-6. Early Mineral Ware. Body fragm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR7/3. Dec. 10R4/6. Level A9. Open area.

Fig. 4.114.6. E3 194-452-1. Early Mineral Ware. Body fragm. Ext. burnished. Int. roughly smoothed. Ext. painted. Ext. 10YR7/4. Dec. 10R4/6. Level A10. Open area.

Fig. 4.114.7. E3 152-361-1. Early Mineral Ware. Body fragm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 7.5YR5/4. Dec. 10R3/3. Level A9. Open area.

Fig. 4.114.8. E3 187-420-1. Early Mineral Ware. Body fragm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 10YR6/2. Dec. 2.5YR4/6. Level A9. Pit.

Fig. 4.114.9. E3 164-385-2. Early Mineral Ware. Body fragm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 10YR6/3. Dec. 2.5YR3/4. Level A9. Open area.

Fig. 4.114.10. E3 159-360-11. Early Mineral Ware. Body fragm. Ext. burnished. Int. burnished. Ext. painted. Ext. 7.5YR6/3. Dec. 10R5/8. Level A9. General.

Fig. 4.114.11. E3 190-425-2. Early Mineral Ware. Body fragm. with vertical loop handle. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 10YR7/4. Dec. 2.5YR5/8. Mixed levels A9/A10. Open area.

Fig. 4.114.12. E3 211-459-2. Early Mineral Ware. Body fragm. with vertical loop handle. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 10YR6/3. Dec. 10R3/3. Level A9. Pit.

Fig. 4.114.13. E4 54-137-1. Early Mineral Ware. Body fragm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 10YR7/4. Dec. 10R4/4. Level A4. Open area.

Fig. 4.114.14. D3 372-427-1. Early Mineral Ware. Body fragm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 7.5YR6/6. Dec. 2.5YR3/4. Level A7. Hearth.

Fig. 4.114.15. E4 88-264-1. Early Mineral Ware. Body fragm. Ext. burnished. Int. burnished. Ext. painted. Ext. 10YR7/3. Dec. 5YR4/3. Level A9. Open area.

Fig. 4.114.16. E4 123-410-2. Early Mineral Ware. Base fragm. Flat base. Bs. diam. 110 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 10YR7/2. Level A12. Open area.

Fig. 4.115. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.115.1. G5 76-142-1. Fine Mineral Tempered Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 240 mm. Ext. burnished. Int. burnished. Ext. 5YR5/6. Vol. 2.38 l. Level A1. Room fill.

Fig. 4.115.2. G4N 29-106-1 (P07-91). Fine Mineral Tempered Ware. Section. Everted Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR6/4. Vol. 0.91 l. Level A3. Open area.

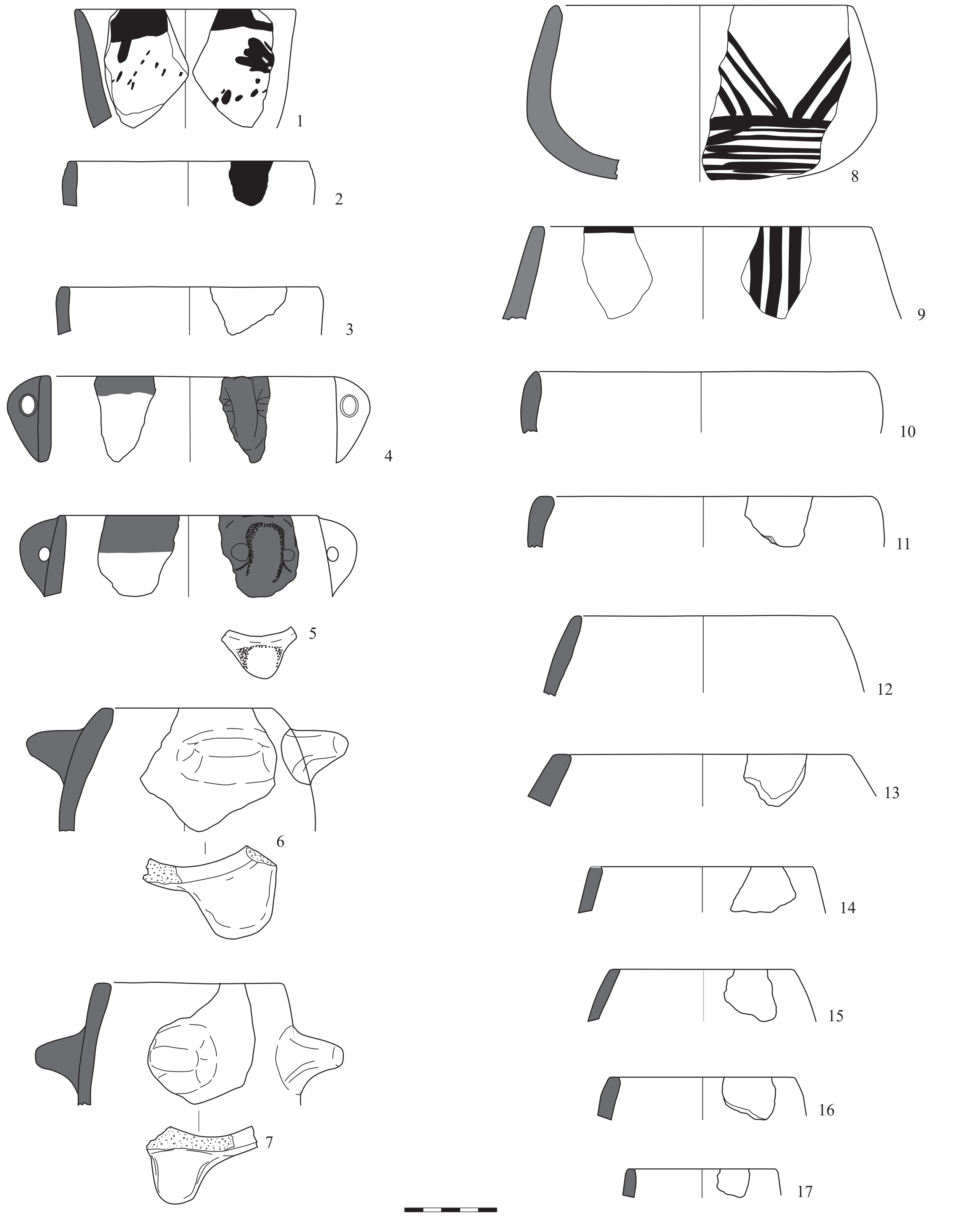


Fig. 4.113 Tell Sabi Abyad. Operation III. Early Mineral Ware (scale 1:3).

Fig. 4.115.3. H4 58-84-28. Fine Mineral Tempered Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. well smoothed. Ext. 5YR6/4. Vol. 0.59 l. Level A1. Open area.

Fig. 4.115.4. G3 7-9-2. Fine Mineral Tempered Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 170 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 5YR6/3. Top soil.

Fig. 4.115.5. E4 60-148-1. Fine Mineral Tempered Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 150 mm. Ext. burnished. Int. burnished. Ext. 7.5YR4/1. Vol. 0.26 l. Level A5. Open area.

Fig. 4.115.6. H4 58-91-9. Fine Mineral Tempered Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 5YR6/6. Vol. 0.34 l. Level A1. Open area.

Fig. 4.115.7. E3 29-52-100 (P03-145). Fine Mineral Tempered Ware. Complete. Everted Convex-sided Bowl; reshaped form. R. diam. 100 mm. Ext. well smoothed. Int. finger pressed. Ext. 5YR6/6. Vol. 0.10 l. Level A4. Open area.

Fig. 4.115.8. D4 16-21-2. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. 10YR6/4. Vol. 0.83 l. Level A4. Pit.

Fig. 4.115.9. F4 38-99-5. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 170 mm. Ext. burnished. Int. scraped. Ext. 2.5YR5/6. Vol. 1.98 l. Level A1. Open area.

Fig. 4.115.10. E4 16-154-2. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 100 mm. Ext. well smoothed. Int. finger pressed. Ext. 5YR6/4. Vol. 0.58 l. Level A3. Pit.

Fig. 4.115.11. G5 9-25-3. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 100 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR7/2. Vol. 0.27 l. Level A1. Room fill.

Fig. 4.115.12. J5 57-131-1. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 7.5YR5/1. Vol. 0.49 l. Level B4. Pit.

Fig. 4.115.13. G3 10-23-2. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 150 mm. Ext. burnished. Int. roughly smoothed. Ext. 2.5YR6/6. Level A2. Open area.

Fig. 4.115.14. E4 16-174-3. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl with 'nose'-shaped handle. R. diam. 120 mm. Ext. well smoothed. Int. finger pressed. Ext. 2.5YR6/4. Vol. 0.82 l. Level A3. Pit.

Fig. 4.115.15. E4 65-204-3. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl with vertical loop handle. R. diam. 130 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR3/1. Level A5. General.

Fig. 4.115.16. D3 8-15-8. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. 5YR5/6. Vol. 0.54 l. Level A4. Pit.

Fig. 4.115.17. E3 18-38-22 (P03-144). Fine Mineral Tempered Ware. Section. Vertical Convex-sided Bowl. R. diam. 30 mm. Ext. eroded. Int. roughly smoothed. Ext. 5YR5/6. Vol. 0.02 l. Top soil.

Fig. 4.116. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.116.1. E4 34-168-1. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 150 mm. Ext. burnished. Int. well smoothed. Ext. 2.5YR6/6. Level A3. Pit.

Fig. 4.116.2. E4 11-35-1. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl with vertical loop handle. R. diam. 160 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 2.5YR5/4. Mixed levels A3/A4. Open area.

Fig. 4.116.3. E4 26-92-4. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. 2.5YR5/6. Mixed levels A3/A4. Open area.

Fig. 4.116.4. E4 16-47-12. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 170 mm. Ext. burnished. Int. scraped. Ext. 10YR6/4. Level A3. Pit.

Fig. 4.116.5. F4 177-401-2. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. well smoothed. Ext. 2.5YR6/4. Vol. 1.66 l. Level A4. Open area.

Fig. 4.116.6. F4 94-222-6. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 110 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 7.5YR6/3. Level A3. Open area.

Fig. 4.116.7. F4 94-222-7. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl with 'nose'-shaped handle. R. diam. 80 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR7/4. Level A3. Open area.

Fig. 4.116.8. F5 47-196-100 (P04-93). Fine Mineral Tempered Ware. Section. Closed Convex-sided Bowl with 'tongue'-shaped lug. R. diam. 90 mm. Ext. well smoothed. Int. scraped. Ext. 7.5YR6/3. Vol. 0.52 l. Thick plaster interior base and lower body. Level A4. Room fill.

Fig. 4.116.9. E3 36-79-1. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl with 'nipple'-shaped lug. R. diam. 150 mm. Ext. well smoothed. Int. well smoothed. Ext. 7.5YR5/4. Mixed levels A3/A4. Open area.

Fig. 4.116.10. E3 110-274-4. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 190 mm. Ext. burnished. Int. roughly smoothed. Ext. 2.5YR6/6. Level A6. Open area.

Fig. 4.116.11. G3 2-2-30 (P02-4). Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl with 'nose'-shaped handle. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. 2.5YR5/6. Level A1. Open area.

Fig. 4.116.12. F4 190-420-16. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl with vertical loop handle. R. diam. 120 mm. Ext. burnished. Int. well smoothed. Ext. 5YR5/6. Level A4. Room fill.

Fig. 4.116.13. G3 12-64-3. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR4/4. Level A2. Pit.

Fig. 4.116.14. E3N 14-22-15. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl with broken appendage. R. diam. 130 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR7/3. Mixed levels A5/A6. Open area.

Fig. 4.114 Tell Sabi Abyad. Operation III. Early Mineral Ware (scale 1:3).

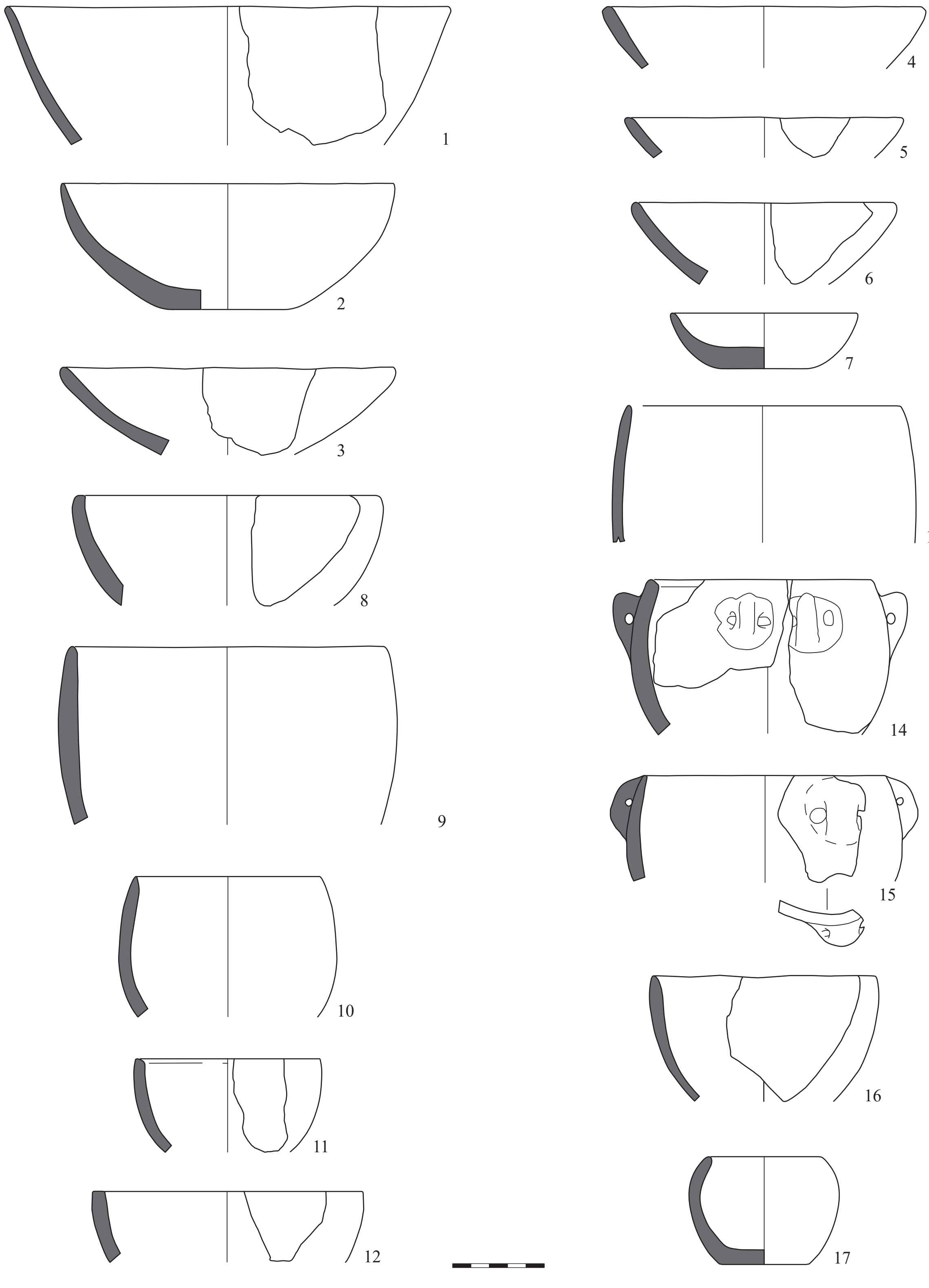


Fig. 4.115 Tell Sabi Abyad. Operation III. Fine Mineral Tempered Ware (scale 1:3).

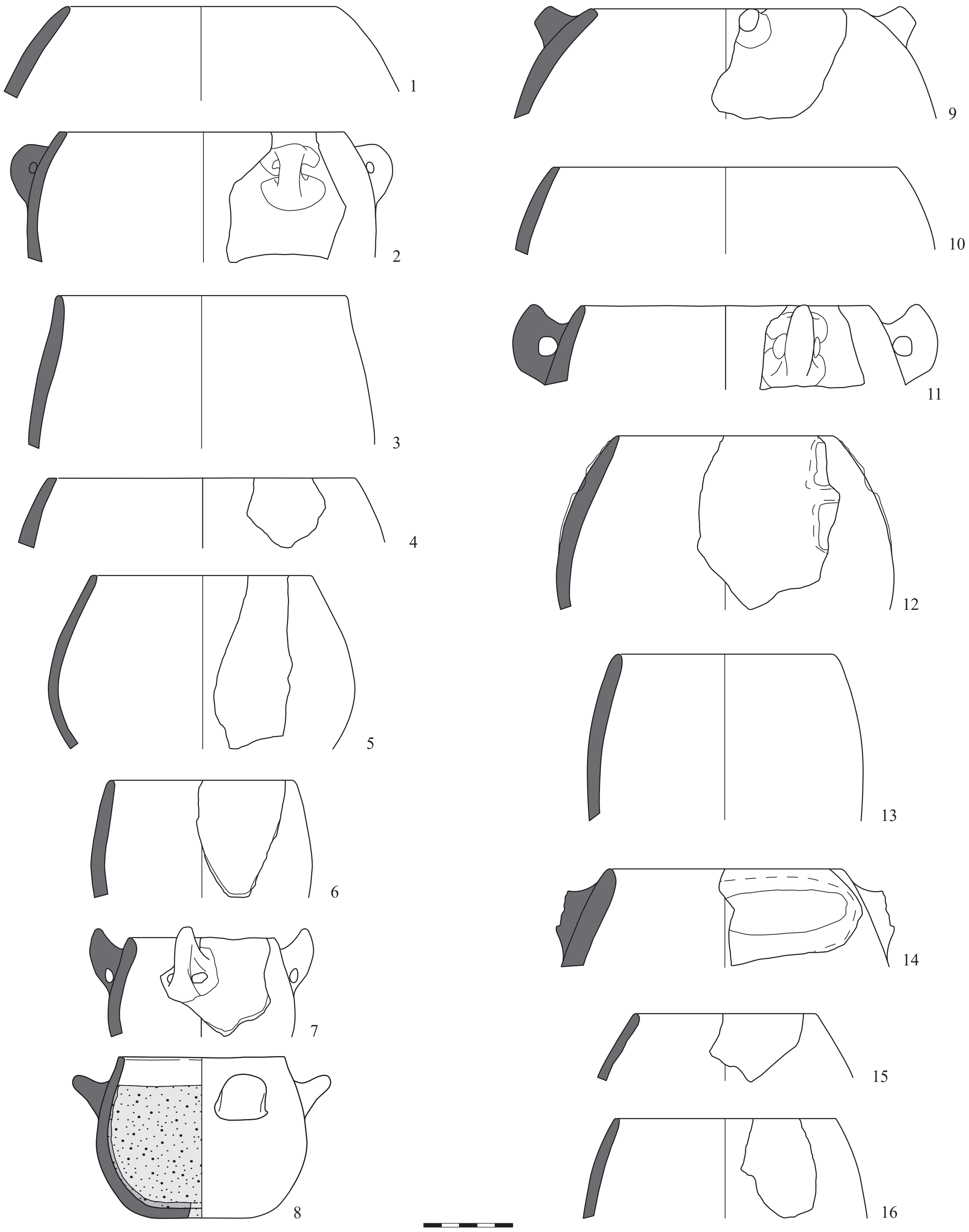


Fig. 4.116 Tell Sabi Abyad. Operation III. Fine Mineral Tempered Ware (scale 1:3).

Fig. 4.116.15. D4 21-46-3. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 100 mm. Ext. burnished. Int. scraped. Ext. 7.5YR6/3. Level A4. Open area.

Fig. 4.116.16. F4 65-336-1. Fine Mineral Tempered Ware. Rim fragm. Closed Convex-sided Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR6/4. Level A3. Open area.

Fig. 4.117. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.117.1. E4 9-14-10. Fine Mineral Tempered Ware. Rim fragm. Vertical S-shaped Bowl. R. diam. 170 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 5YR6/4. Mixed levels A3/A4. Open area.

Fig. 4.117.2. E4 16-156-15. Fine Mineral Tempered Ware. Rim fragm. Vertical S-shaped Bowl. R. diam. 160 mm. Ext. well smoothed. Int. scraped. Ext. 2.5YR5/6. Level A3. Pit.

Fig. 4.117.3. I3 115-147-1. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl with 'tongue'-shaped lug. R. diam. 140 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR7/3. Mixed levels B7/B8/A1. Open area.

Fig. 4.117.4. E4 78-220-18. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 190 mm. Ext. burnished. Int. roughly smoothed. Ext. 5YR5/6. Level A6. Open area.

Fig. 4.117.5. G4N 29-102-2. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 170 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR6/4. Level A3. Open area.

Fig. 4.117.6. E3 3-8-1. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 110 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR4/4. Vol. 1.92 l. Level A3. Open area.

Fig. 4.117.7. G4N 29-100-6. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 120 mm. Ext. burnished. Int. eroded. Ext. 7.5YR4/4. Level A2. Room fill.

Fig. 4.117.8. E4 42-202-1. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 110 mm. Ext. burnished. Int. well smoothed. Ext. 5YR5/4. Level A4. Construction.

Fig. 4.117.9. G5 550-574-1. Fine Mineral Tempered Ware. Rim fragm. S-shaped Goblet with broken appendage. R. diam. 100 mm. Ext. burnished. Int. scraped. Ext. 5YR6/3. Level A1. Room fill.

Fig. 4.117.10. G4N 29-81-25. Fine Mineral Tempered Ware. Rim fragm. S-shaped Goblet with 'tongue'-shaped lug. R. diam. 80 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR6/3. Level A2. Room fill.

Fig. 4.117.11. D4 40-56-4. Fine Mineral Tempered Ware. Rim fragm. S-shaped Goblet with vertical loop handle. R. diam. 80 mm. Ext. burnished. Int. well smoothed. Ext. 5YR6/4. Vol. 0.74 l. Level A4. Room fill.

Fig. 4.117.12. G3 30-101-3. Fine Mineral Tempered Ware. Rim fragm. S-shaped Goblet. R. diam. 90 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR6/3. Level A4. Oven.

Fig. 4.117.13. F4 91-213-6. Fine Mineral Tempered Ware. Rim fragm. S-shaped Goblet. R. diam. 80 mm. Ext. burnished. Int. scraped. Ext. 5YR5/2. Level A1. Open area.

Fig. 4.117.14. J3 537-694-101 (P08-91). Fine Mineral Tempered Ware. Complete. Low Carinated Bowl. R. diam. 63 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 2.5YR7/6. Vol. 0.06 l. C-Sequence. Burial BN08-66.

Fig. 4.117.15. E3 87-210-7. Fine Mineral Tempered Ware. Rim fragm. Vertical Pot. R. diam. 110 mm. Ext. burnished. Int. finger pressed. Ext. 7.5YR5/4. Level A5. Open area.

Fig. 4.117.16. E4 88-264-2. Fine Mineral Tempered Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. 5YR6/4. Level A9. Open area.

Fig. 4.117.17. G5 10-16-4. Fine Mineral Tempered Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 80 mm. Ext. roughly smoothed. Int. eroded. Ext. 2.5YR6/6. Level A1. Room fill.

Fig. 4.117.18. F4 53-156-4. Fine Mineral Tempered Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 150 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR7/3. Vol. 0.53 l. Level A1. Open area.

Fig. 4.117.19. G3 10-28-1. Fine Mineral Tempered Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 130 mm. Ext. burnished. Int. well smoothed. Ext. 5YR6/6. Vol. 0.36 l. Level A2. Open area.

Fig. 4.117.20. I5 278-640-101 (P08-83). Fine Mineral Tempered Ware. Complete. Everted Straight-sided Carinated Bowl. R. diam. 70 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR7/6. Vol. 0.11 l. Level A2. Room fill.

Fig. 4.118. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.118.1. G5 72-138-21. Fine Mineral Tempered Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 130 mm. Ext. burnished. Int. burnished. Ext. red slipped. Ext. 10R4/4. Dec. 10R4/4. Vol. 0.56 l. Level A1. Open area.

Fig. 4.118.2. G4N 30-109-3. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 130 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. red slipped. Ext. 10R5/6. Dec. 10R5/6. Level A2. Open area.

Fig. 4.118.3. H5 68-126-5. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. red slipped. Ext. 10R4/8. Dec. 10R4/6. Level A1. Room fill.

Fig. 4.118.4. H4 74-176-1. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 190 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 10R6/4. Dec. 10R6/6. Vol. 1.88 l. Level A1. Room fill.

Fig. 4.118.5. G3 15-43-1. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 10R4/6. Dec. 10R4/6. Level A2. Pit.

Fig. 4.118.6. H4 71-111-5. Fine Mineral Tempered Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 130 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 7.5YR7/6. Dec. 10R4/6. Vol. 0.44 l. Level A1. Open area.

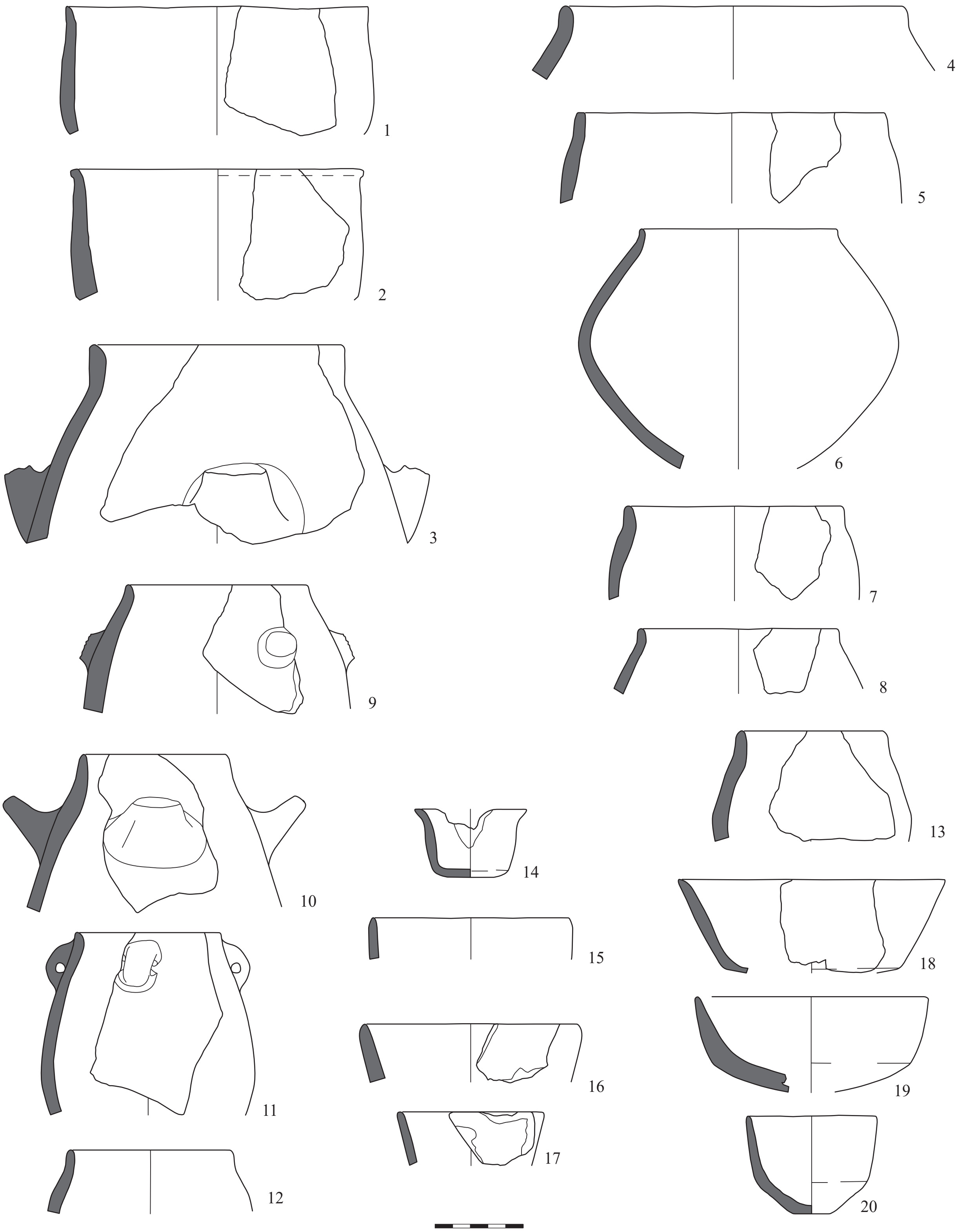


Fig. 4.117 Tell Sabi Abyad. Operation III. Fine Mineral Tempered Ware (scale 1:3).

Fig. 4.118.7. G3 17-54-1. Fine Mineral Tempered Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 220 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. painted. Ext. 10R3/6. Dec. 10R3/6. Vol. 1.87 l. Mixed levels A2/A3. Open area.

Fig. 4.118.8. H5 235-498-101 (P08-79). Fine Mineral Tempered Ware. Section. Everted Straight-sided Carinated Bowl. R. diam. 180 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. painted. Ext. 5YR7/6. Dec. 10R5/4. Vol. 1.33 l. Level A4. Room fill.

Fig. 4.118.9. E4 16-130-8. Fine Mineral Tempered Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 2.5YR4/6. Dec. 2.5YR4/6. Level A3. Pit.

Fig. 4.118.10. D3 326-338-6. Fine Mineral Tempered Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 160 mm. Ext. burnished. Int. roughly smoothed. Ext. red slipped. Ext. 10R4/8. Dec. 10R4/8. Level A6. Open area.

Fig. 4.118.11. F4 86-201-6. Fine Mineral Tempered Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 170 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 5YR6/6. Dec. 10R3/6. Level A1. Open area.

Fig. 4.118.12. F4 177-399-1. Fine Mineral Tempered Ware. Rim fragm. Low Carinated Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 10R5/6. Dec. 10R5/6. Vol. 0.71 l. Level A4. Open area.

Fig. 4.118.13. E3 34-68-1. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 130 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 5YR5/6. Dec. 10R4/4. Level A3. Pit.

Fig. 4.118.14. F4 169-381-1. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 150 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 10R4/4. Dec. 10R4/4. Level A4. Construction.

Fig. 4.118.15. G5 681-815-9. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 5YR5/6. Dec. 10R4/4. Level A2. Open area.

Fig. 4.118.16. H4 62-113-9. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 130 mm. Ext. burnished. Int. burnished. Ext. red slipped. Int. painted. Ext. 2.5YR6/8. Dec. 2.5YR6/8. Vol. 0.89 l. Level A1. Open area.

Fig. 4.118.17. F4 112-246-3. Fine Mineral Tempered Ware. Rim fragm. S-shaped Goblet with vertical loop handle. R. diam. 100 mm. Ext. well smoothed. Int. well smoothed. Ext. red slipped. Int. painted. Ext. 10R6/6. Dec. 10R6/6. Level A1. Room fill.

Fig. 4.118.18. I4 190-249-101. Fine Mineral Tempered Ware. Rim fragm. S-shaped Goblet. R. diam. 90 mm. Ext. burnished. Int. well smoothed. Ext. red slipped & impressed. Ext. 10R4/6. Dec. 10R4/6. Vol. 0.44 l. Mixed levels B7/B8. Open area.

Fig. 4.119. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.119.1. H5 50-91-1. Grey-Black Ware ('fine mineral' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 250 mm. Ext. burnished. Int. burnished. Ext. 2.5YR2.5/2. Level A1. Open area.

Fig. 4.119.2. G5 539-549-1 (P07-120). Grey-Black Ware ('fine mineral' variety). Section. Vertical Convex-sided Bowl. R. diam. 190 mm. Ext. burnished. Int. roughly smoothed. Ext. 5YR3/1. Vol. 1.67 l. Level B8. Pit.

Fig. 4.119.3. H5 53-101-109. Grey-Black Ware ('fine mineral' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. 7.5YR3/1. Level A1. Open area.

Fig. 4.119.4. G5 56-118-12. Grey-Black Ware ('fine mineral' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. 2.5YR4/1. Top soil.

Fig. 4.119.5. G5 84-154-13. Grey-Black Ware ('fine mineral' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 5YR2.5/1. Vol. 0.73 l. Level A1. Open area.

Fig. 4.119.6. J5 122-253-5. Grey-Black Ware ('fine plant' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 7.5YR5/1. Level B8. Oven.

Fig. 4.119.7. H4 72-109-9. Grey-Black Ware ('fine plant' variety). Section. Vertical Convex-sided Bowl. R. diam. 130 mm. Ext. burnished. Int. well smoothed. Ext. 5YR3/1. Level A1. Open area.

Fig. 4.119.8. I3 116-154-3. Grey-Black Ware ('fine plant' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 130 mm. Ext. burnished. Int. burnished. Ext. 'black'. Mixed levels C-Sequence/B6/B7. Open area.

Fig. 4.119.9. G5 89-158-16. Grey-Black Ware ('fine mineral' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 80 mm. Ext. burnished. Int. burnished. Ext. 7.5YR2.5/1. Level A1. Open area.

Fig. 4.119.10. H5 26-48-7. Grey-Black Ware ('fine mineral' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 60 mm. Ext. burnished. Int. burnished. Ext. 7.5YR2.5/1. Level A1. Room fill.

Fig. 4.119.11. K5 41-90-11. Grey-Black Ware ('fine plant' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 240 mm. Ext. burnished. Int. burnished. Ext. 7.5YR4/1. Vol. 1.14 l. Mixed levels B3/B4. Open area.

Fig. 4.119.12. G5 33-80-12. Grey-Black Ware ('fine mineral' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 225 mm. Ext. burnished. Int. burnished. Ext. 5YR2.5/1. Vol. 1.99 l. Level A1. Room fill.

Fig. 4.119.13. J5 75-144-8. Grey-Black Ware ('fine plant' variety). Section. Everted Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. 7.5YR4/1. Vol. 0.77 l. Level B7. Oven.

Fig. 4.119.14. C4 13-20-100 (P04-18). Grey-Black Ware ('fine mineral' variety). Section. Everted Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 7.5YR5/1. Vol. 0.73 l. Level A4. Open area.

Fig. 4.119.15. H4 19-101-18. Grey-Black Ware ('fine plant' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. 5YR4/2. Level A1. Open area.

Fig. 4.119.16. H4 58-84-26. Grey-Black Ware ('fine plant' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 5YR4/1. Vol. 0.36 l. Level A1. Open area.

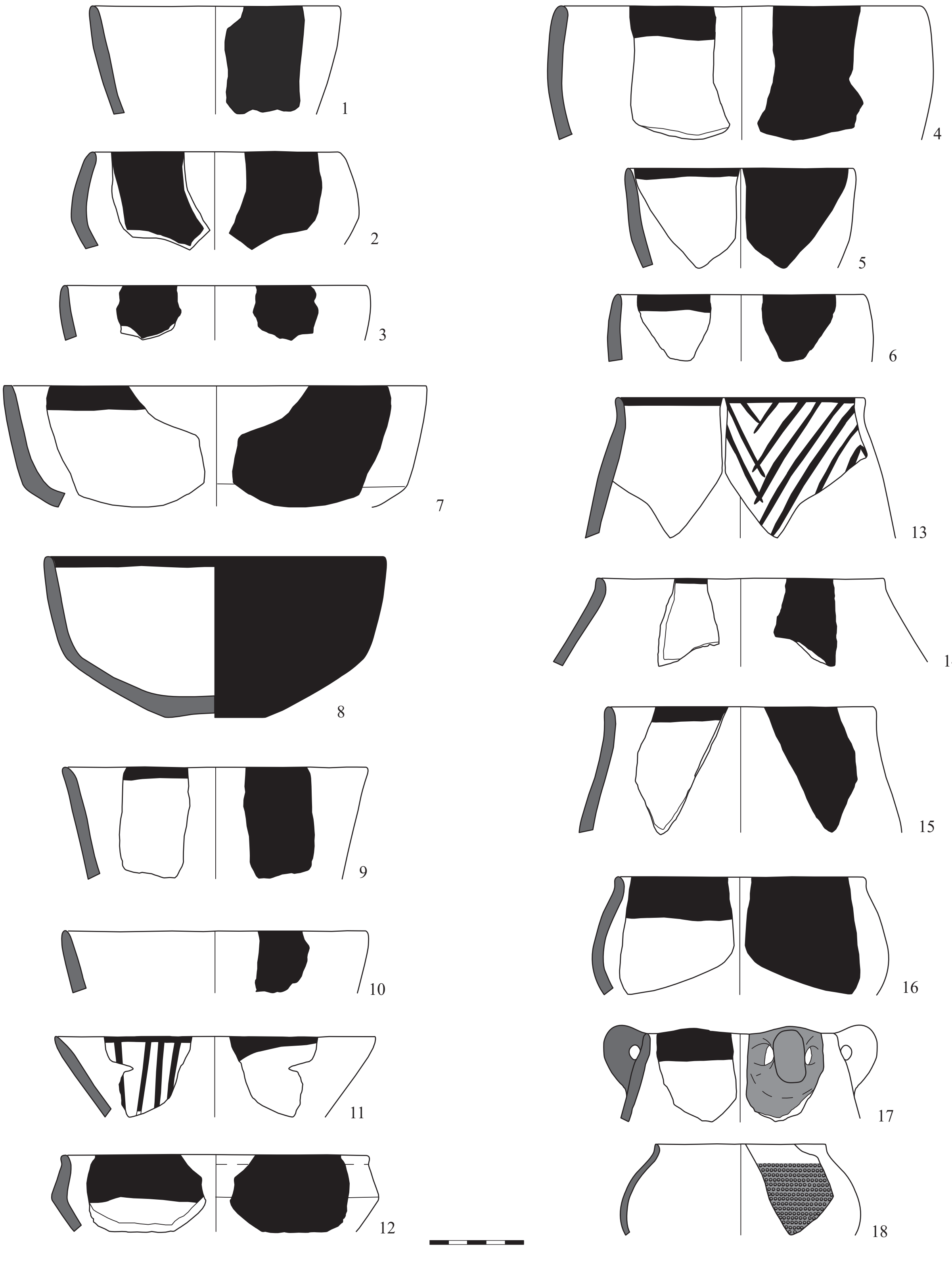


Fig. 4.118 Tell Sabi Abyad. Operation III. Fine Mineral Tempered Ware red slipped (nos. 1–10, 12, 14–17); painted (nos. 11, 13); impressed and red slipped (no. 18) (scale 1:3).

Fig. 4.119.17. H4 72-109-10. Grey-Black Ware ('fine plant' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 'black'. Level A1. Open area.

Fig. 4.119.18. K5 45-96-3. Grey-Black Ware ('fine plant' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 7.5YR3/1. Level B4. Open area.

Fig. 4.119.19. H5 44-81-5. Grey-Black Ware ('fine mineral' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. 5YR3/2. Level A1. Open area.

Fig. 4.119.20. H5 14-25-8. Grey-Black Ware ('fine mineral' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 100 mm. Ext. burnished. Int. burnished. Ext. 7.5YR2.5/1. Level A1. Open area.

Fig. 4.120. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.120.1. E4 16-171-7. Grey-Black Ware ('fine mineral' variety). Rim fragm. Closed Convex-sided Bowl with 'nose'-shaped handle. R. diam. 160 mm. Ext. well smoothed. Int. burnished. Ext. 5YR3/1. Level A3. Pit.

Fig. 4.120.2. I3 8-11-13. Grey-Black Ware ('fine mineral' variety). Rim fragm. Closed Convex-sided Bowl. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. 5YR3/1. Mixed levels B4/B8/A1. Open area.

Fig. 4.120.3. G3 17-68-1. Grey-Black Ware ('fine mineral' variety). Rim fragm. Closed Convex-sided Bowl. R. diam. 150 mm. Ext. roughly smoothed. Int. eroded. Ext. 7.5YR4/1. Mixed levels A2/A3. Open area.

Fig. 4.120.4. E3 18-38-18. Grey-Black Ware ('fine mineral' variety). Rim fragm. Closed Convex-sided Bowl. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. 7.5YR3/1. Top soil.

Fig. 4.120.5. E4 93-288-1. Grey-Black Ware ('fine mineral' variety). Rim fragm. Closed Convex-sided Bowl with vertical loop handle. R. diam. 120 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR4/1. Mixed levels A9/A10. Open area.

Fig. 4.120.6. E3 94-232-1. Grey-Black Ware ('fine plant' variety). Rim fragm. Closed Convex-sided Bowl. R. diam. 130 mm. Ext. burnished. Int. burnished. Ext. 2.5YR2.5/1. Level A6. Open area.

Fig. 4.120.7. J5 93-186-9. Grey-Black Ware ('fine plant' variety). Rim fragm. Closed Convex-sided Bowl. R. diam. 90 mm. Ext. burnished. Int. well smoothed. Ext. 5YR3/1. Level B8. Oven.

Fig. 4.120.8. J5 92-182-1. Grey-Black Ware ('fine plant' variety). Rim fragm. Everted S-shaped Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. 7.5YR2.5/1. Vol. 0.92 l. Mixed levels C-Sequence/B4. Oven.

Fig. 4.120.9. G5 42-104-13. Grey-Black Ware ('fine mineral' variety). Rim fragm. Vertical S-shaped Bowl. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR3/1. Level A1. Room fill.

Fig. 4.120.10. G5 570-692-9. Grey-Black Ware ('fine mineral' variety). Rim fragm. S-shaped Goblet. R. diam. 90 mm. Ext. burnished. Int. burnished. Ext. 5YR3/1. Level A2. Pit.

Fig. 4.120.11. G4N 29-78-27. Grey-Black Ware ('fine mineral' variety). Rim fragm. S-shaped Goblet. R. diam. 80 mm. Ext. burnished. Int. burnished. Ext. 7.5YR3/1. Level A2. Room fill.

Fig. 4.120.12. G5 23-119-9. Grey-Black Ware ('fine mineral' variety). Rim fragm. S-shaped Goblet. R. diam. 80 mm. Ext. burnished. Int. well smoothed. Ext. 5YR3/1. Level B8. Pit.

Fig. 4.120.13. G5 80-150-14. Grey-Black Ware ('fine mineral' variety). Rim fragm. S-shaped Goblet. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR2.5/1. Level A1. Open area.

Fig. 4.120.14. I5 278-594-101 (P08-58). Grey-Black Ware ('fine mineral' variety). Section. Closed S-shaped Bowl. R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. 10YR2/1. Vol. 2.29 l. Level A2. Room fill.

Fig. 4.120.15. J5 93-186-10. Grey-Black Ware ('fine plant' variety). Rim fragm. Closed S-shaped Bowl. R. diam. 100 mm. Ext. burnished. Int. burnished. Ext. 5YR5/1. Level B8. Oven.

Fig. 4.120.16. G3 2-2-1. Grey-Black Ware ('fine mineral' variety). Rim fragm. Closed S-shaped Bowl. R. diam. 100 mm. Ext. burnished. Int. well smoothed. Ext. 'black'. Level A1. Open area.

Fig. 4.120.17. G3 29-113-1. Grey-Black Ware ('fine mineral' variety). Rim fragm. Closed S-shaped Bowl. R. diam. 120 mm. Ext. burnished. Int. burnished. Ext. 5YR4/1. Level A4. Open area.

Fig. 4.121. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.121.1. I3 115-133-24. Grey-Black Ware ('fine plant' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 240 mm. Ext. burnished. Int. burnished. Ext. 10YR6/2. Mixed levels B7/B8/A1. Open area.

Fig. 4.121.2. J5 108-217-6. Grey-Black Ware ('fine plant' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 240 mm. Ext. burnished. Int. eroded. Ext. 5YR4/1. Vol. 1.79 l. Mixed levels B6/B7/B8. Open area.

Fig. 4.121.3. G5 589-626-5. Grey-Black Ware ('fine mineral' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 170 mm. Ext. burnished. Int. burnished. Ext. 7.5YR3/1. Level A1. Open area.

Fig. 4.121.4. K5 16-33-3. Grey-Black Ware ('fine plant' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. 'black'. Mixed levels D-Sequence/B1. Open area.

Fig. 4.121.5. I3 5-6-18. Grey-Black Ware ('fine mineral' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 150 mm. Ext. burnished. Int. burnished below the rim. Ext. 5YR3/1. Mixed levels B4/B8. Open area.

Fig. 4.121.6. K5 15-37-11. Grey-Black Ware ('fine plant' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 5YR3/3. Mixed levels D-Sequence/B1. Open area.

Fig. 4.121.7. G5 32-65-8. Grey-Black Ware ('fine mineral' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. 10YR2/1. Level A1. Open area.

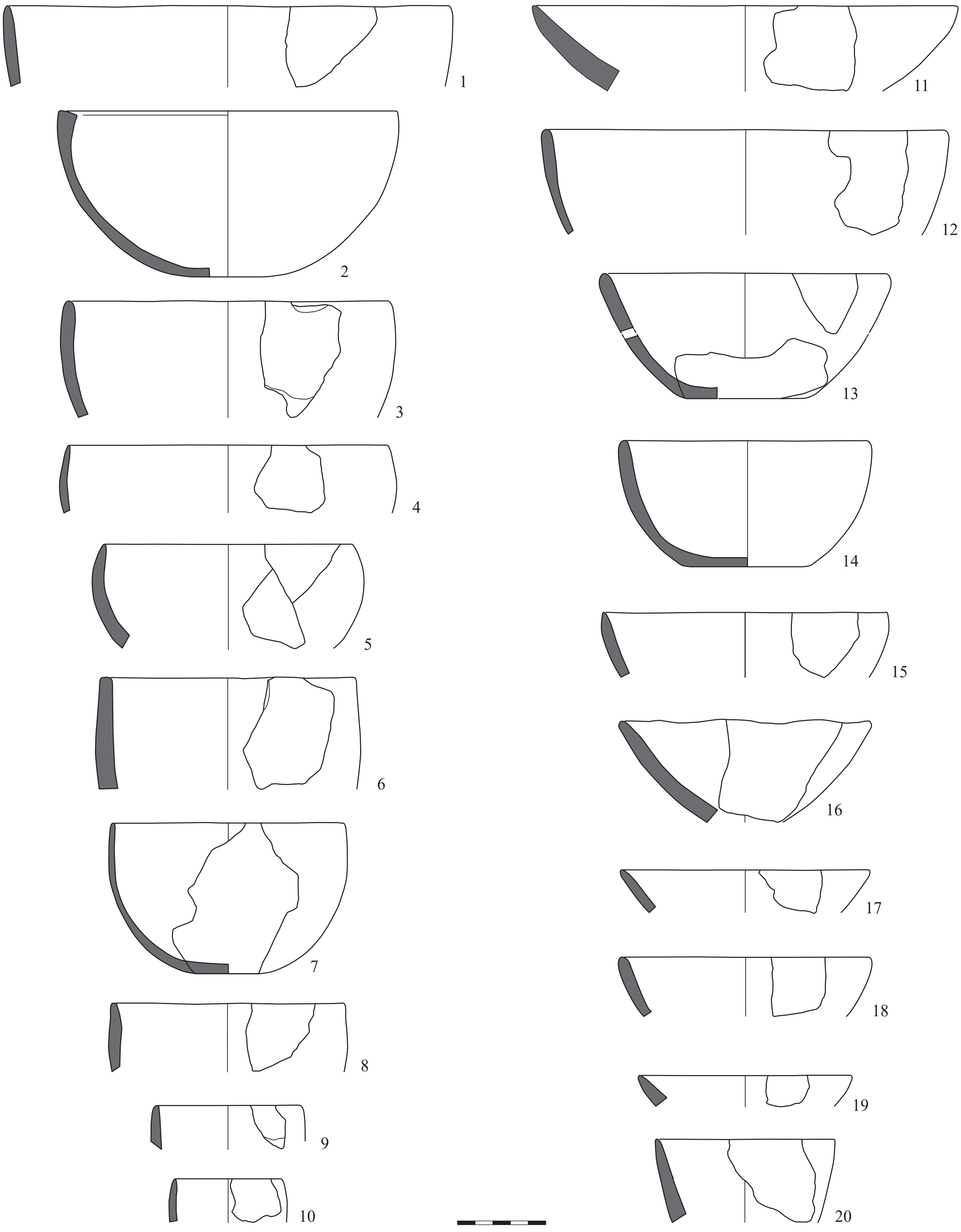


Fig. 4.119 Tell Sabi Abyad. Operation III. Grey-Black Ware (scale 1:3).

Fig. 4.121.8. J5 66-138-5. Grey-Black Ware ('fine plant' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 100 mm. Ext. burnished. Int. burnished. Ext. 2.5YR4/1. Level B8. Open area.

Fig. 4.121.9. J4 171-299-100 (P07-89). Grey-Black Ware ('fine plant' variety). Section. Everted Straight-sided Carinated Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. 'grey'. Vol. 0.26 l. Level B6. Room fill.

Fig. 4.121.10. G5 584-669-10. Grey-Black Ware ('fine mineral' variety). Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 130 mm. Ext. burnished. Int. burnished. Ext. 5YR3/1. Vol. 0.39 l. Level A2. Pit.

Fig. 4.121.11. J5 34-60-1. Grey-Black Ware ('fine plant' variety). Section. Everted Straight-sided Carinated Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. 5YR4/1. Vol. 0.55 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.121.12. F4 29-135-5. Grey-Black Ware ('fine mineral' variety). Rim fragm. Low Carinated Bowl. R. diam. 180 mm. Ext. burnished. Int. roughly smoothed. Ext. 5YR2.5/1. Vol. 1.09 l. Level A1. Room fill.

Fig. 4.121.13. H4 27-50-6. Grey-Black Ware ('fine plant' variety). Rim fragm. Small Jar. R. diam. 90 mm. Ext. burnished. Int. burnished below the rim. Ext. Black. Level A1. Open area.

Fig. 4.121.14. H4 82-167-13. Grey-Black Ware ('fine plant' variety). Rim fragm. Small Jar. R. diam. 80 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR2.5/1. Level A1. Open area.

Fig. 4.121.15. G4N 29-106-16. Grey-Black Ware ('fine mineral' variety). Base fragm. Flat Base. Bs. diam. 70 mm. Ext. burnished. Int. well smoothed. Ext. 7.5YR4/1. Level A3. Open area.

Fig. 4.121.16. G5 539-549-2. Grey-Black Ware ('fine mineral' variety). Base fragm. Flat Base. Bs. diam. 40 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR4/1. Level B8. Pit.

Fig. 4.121.17. G5 611-664-5. Grey-Black Ware ('fine mineral' variety). Base fragm. Flat Base. Bs. diam. 40 mm. Ext. burnished. Int. finger pressed. Ext. 2.5YR2.5/1. Level A3. Open area.

Fig. 4.121.18. G5 84-159-12. Grey-Black Ware ('fine mineral' variety). Base fragm. Flat Base. Bs. diam. 50 mm. Ext. burnished. Int. burnished. Ext. 7.5YR2.5/1. Level A1. Open area.

Fig. 4.121.19. G5 58-123-7. Grey-Black Ware ('fine mineral' variety). Base fragm. Flat Base. Bs. diam. 50 mm. Ext. burnished. Int. scraped. Ext. 10YR2/1. Level A1. Room fill.

Fig. 4.121.20. F4 191-421-1. Fine Mineral Tempered Ware. Base fragm. Flat Base. Bs. diam. 90 mm. Ext. burnished. Int. well smoothed. Ext. 2.5YR5/6. Level A4. Room fill.

Fig. 4.121.21. E4 16-98-1. Fine Mineral Tempered Ware. Base fragm. Flat Base. Bs. diam. 90 mm. Ext. well smoothed. Int. eroded. Ext. 7.5YR6/4. Level A3. Pit.

Fig. 4.121.22. E4 16-98-3. Fine Mineral Tempered Ware. Base fragm. Flat Base. Bs. diam. 100 mm. Ext. burnished. Int. well smoothed. Ext. 5YR5/6. Level A3. Pit.

Fig. 4.121.23. F4 41-101-1. Fine Mineral Tempered Ware. Base fragm. Flat Base. Bs. diam. 70 mm. Ext. burnished. Int. finger pressed. Ext. 5YR6/6. Level A1. Open area.

Fig. 4.122. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.122.1. K5 15-41-4. Mineral Coarse Ware. Rim fragm. Hole Mouth Pot with conical lug. R. diam. 260 mm. Ext. burnished. Int. eroded. Ext. 7.5YR6/4. Mixed levels D-Sequence/B1. Open area.

Fig. 4.122.2. J4 190-331-1. Mineral Coarse Ware. Rim fragm. Hole Mouth Pot with conical lug. R. diam. 240 mm. Ext. burnished. Int. burnished. Ext. 7.5YR6/4. Mixed levels B4/B5/B6. Open area.

Fig. 4.122.3. K5 15-32-1. Mineral Coarse Ware. Rim fragm. Hole Mouth Pot with conical lug. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. 7.5YR5/3. Mixed levels D-Sequence/B1. Open area.

Fig. 4.122.4. J5 87-169-12. Mineral Coarse Ware. Rim fragm. Hole Mouth Pot with conical lug (broken); doweled joint. R. diam. 220 mm. Ext. burnished. Int. burnished. Ext. 7.5YR7/3. Level B8. Open area.

Fig. 4.122.5. K5 15-25-1. Mineral Coarse Ware. Rim fragm. Hole Mouth Pot. R. diam. 180 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR6/2. Mixed levels D-Sequence/B1. Open area.

Fig. 4.122.6. J5 40-91-5. Mineral Coarse Ware. Rim fragm. Jar. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. 5YR5/6. Mixed levels D-Sequence/B4. Open area.

Fig. 4.123. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.123.1. I3 121-158-2. Dark-Faced Burnished Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. 7.5YR5/3. Level A1. Room fill.

Fig. 4.123.2. I3 16-36-5. Dark-Faced Burnished Ware. Rim fragm. Everted S-shaped Bowl. R. diam. 80 mm. Ext. eroded. Int. burnished. Ext. 'brown'. Level A1. Open area.

Fig. 4.123.3. J5 40-73-11. Dark-Faced Burnished Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 100 mm. Ext. burnished. Int. scraped. Ext. red slipped. Ext. 10R3/6. Dec. 10R3/6. Mixed levels D-Sequence/B4. Open area.

Fig. 4.123.4. J5 125-257-1. Dark-Faced Burnished Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. red slipped. Ext. 10R3/6. Dec. 10R3/6. Level B8. Oven.

Fig. 4.123.5. I3 116-145-2. Dark-Faced Burnished Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 80 mm. Ext. burnished. Int. scraped. Ext. red slipped. Int. painted. Ext. 10R3/4. Dec. 10R3/4. Mixed levels C-Sequence/B6/B7. Open area.

Fig. 4.123.6. J5 48-104-1. Dark-Faced Burnished Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 100 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR5/3. Mixed levels B4/B5/B7/B8. Open area.

Fig. 4.123.7. J5 118-251-28. Dark-Faced Burnished Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 120 mm. Ext. burnished. Int. roughly smoothed. Ext. 2.5YR4/4. Mixed levels B6/B7/B8. Open area.

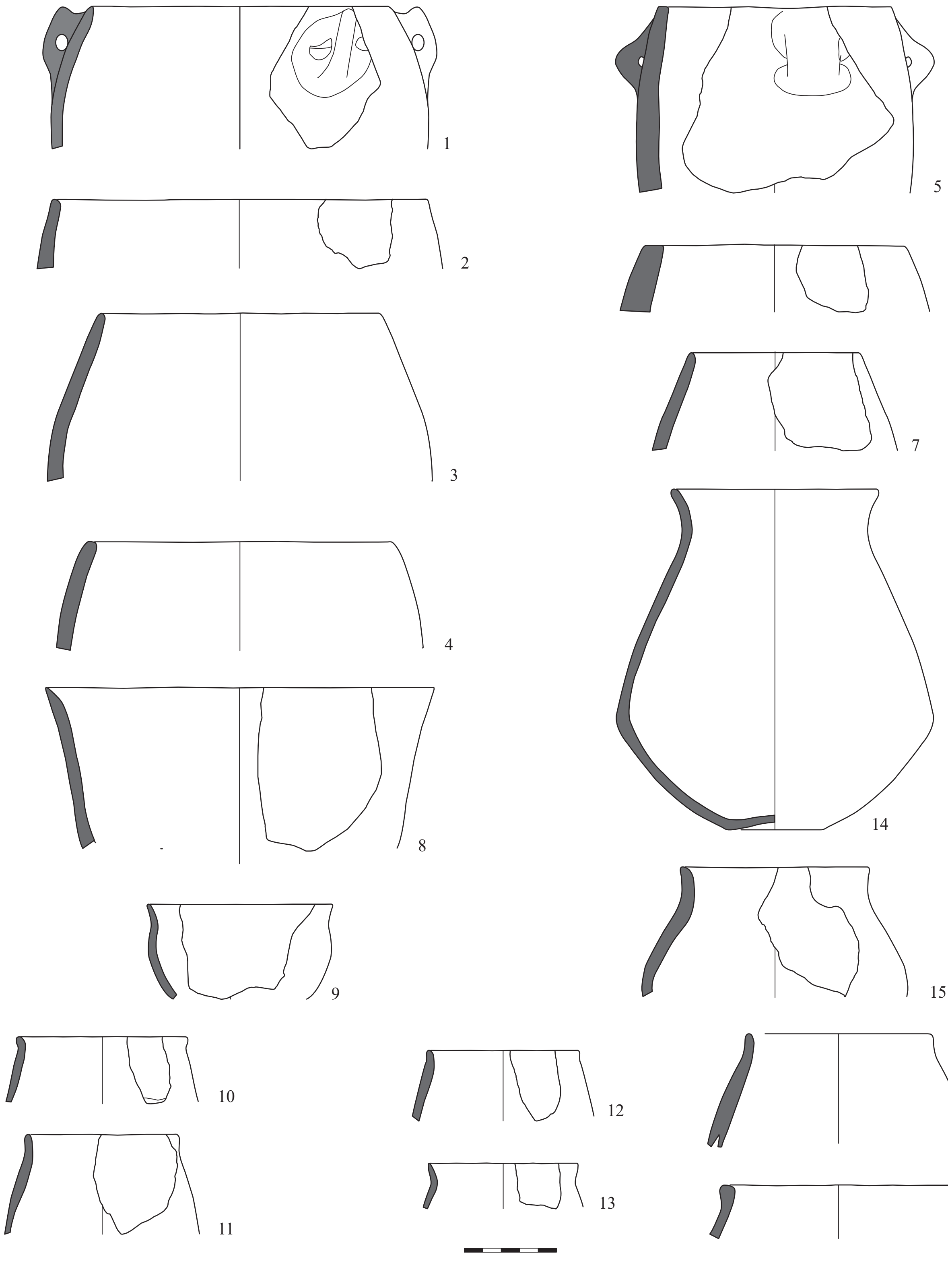


Fig. 4.120 Tell Sabi Abyad. Operation III. Grey-Black Ware (scale 1:3).

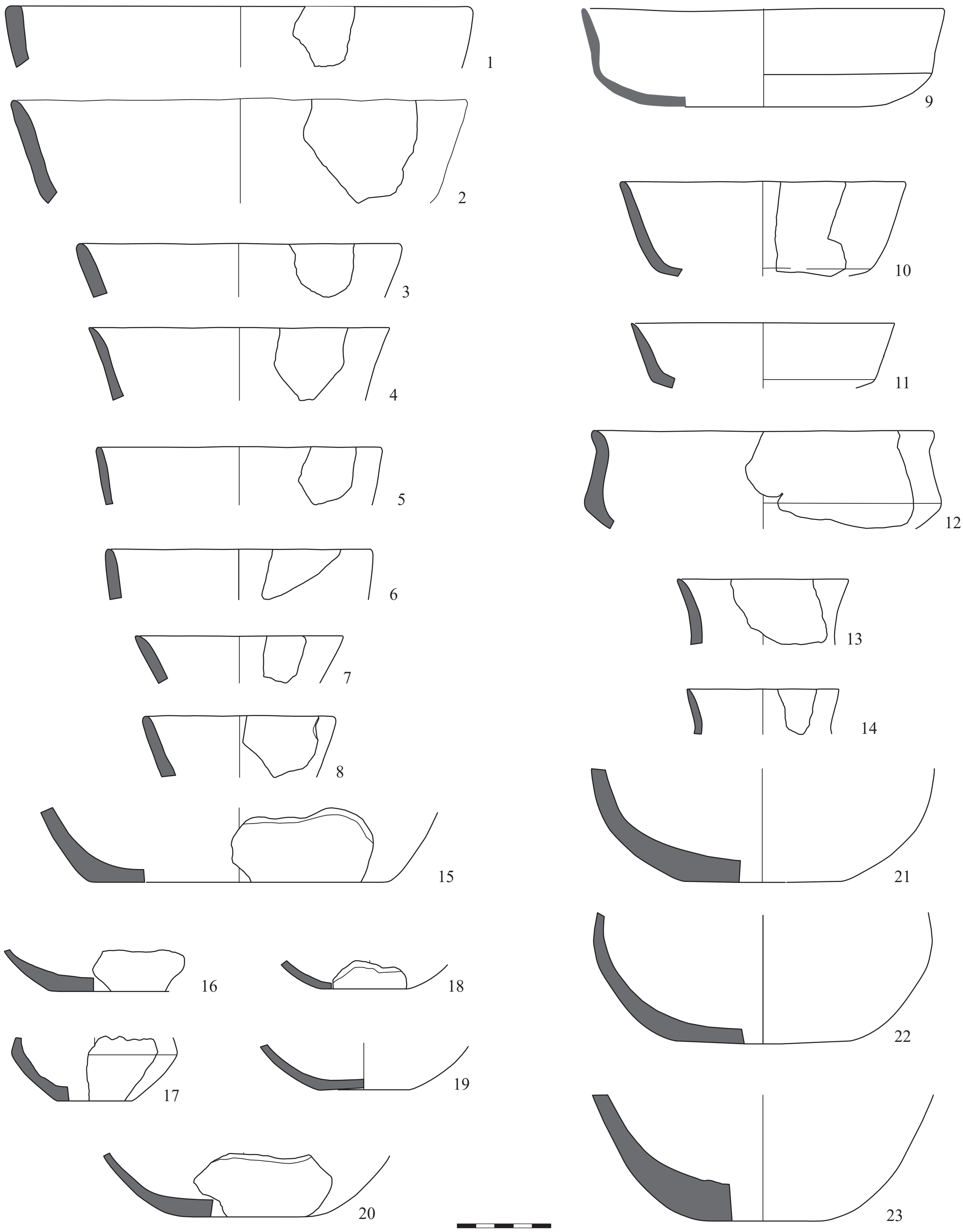


Fig. 4.121 Tell Sabi Abyad. Operation III. Grey-Black Ware (scale 1:3).

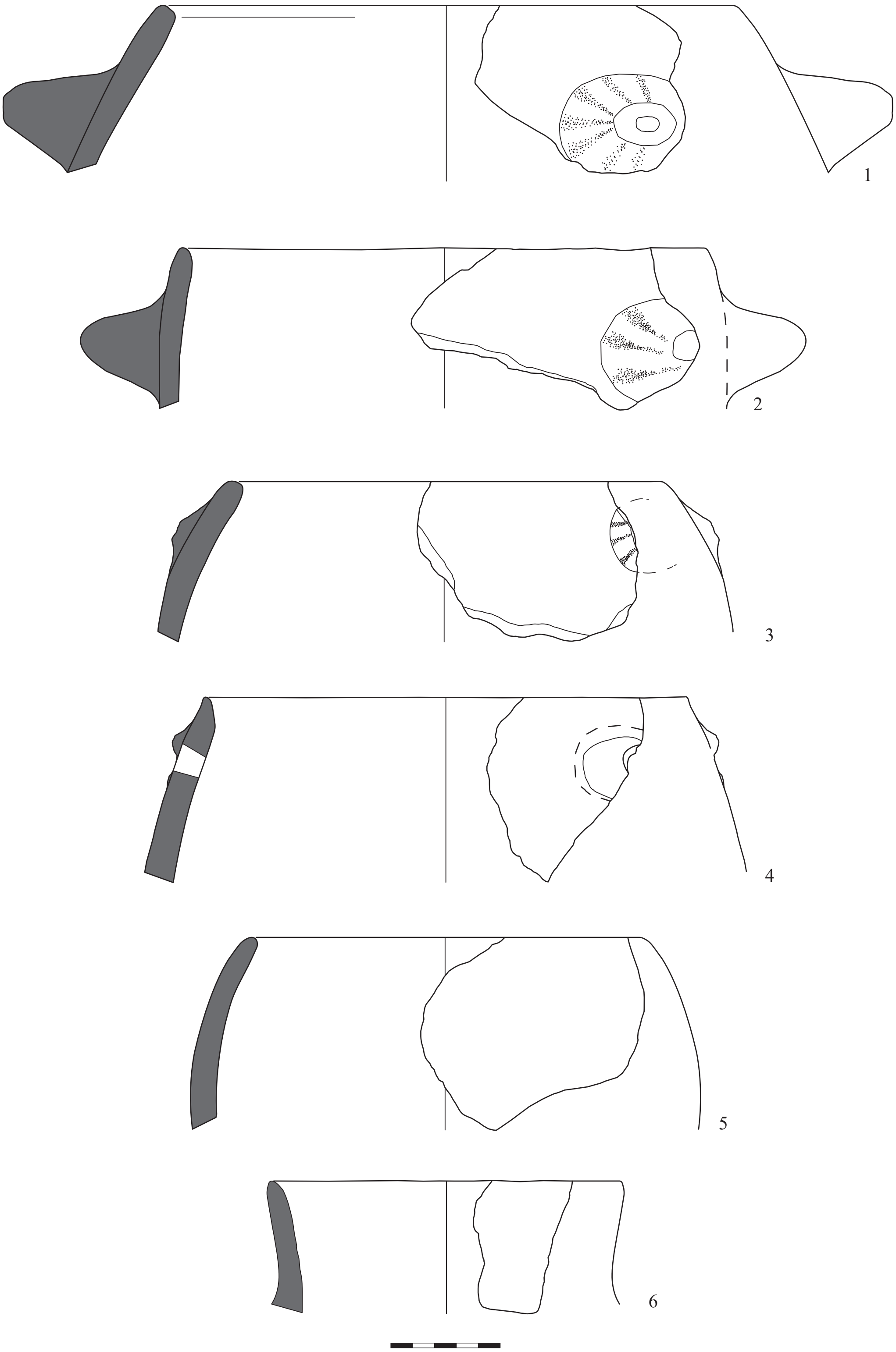


Fig. 4.122 Tell Sabi Abyad. Operation III. Mineral Coarse Ware (scale 1:3).

Fig. 4.123.8. I3 116-146-105. Dark-Faced Burnished Ware. Rim fragm. Hole Mouth Pot (reshaped vessel). R. diam. 140 mm. Ext. burnished. Int. roughly smoothed. Ext. red slipped. Ext. 10R3/6. Dec. 10R3/6. Mixed levels C-Sequence/B6/B7. Open area.

Fig. 4.123.9. I3 102-101-9. Dark-Faced Burnished Ware. Rim fragm. Hole Mouth Pot (reshaped vessel). R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. 2.5YR4/4. Mixed levels C-Sequence/B5. Open area.

Fig. 4.123.10. K5 21-46-1. Dark-Faced Burnished Ware. Rim fragm. Re-used Neck. R. diam. 40 mm. Ext. burnished. Int. burnished. Ext. red slipped. Ext. 10R3/4. Dec. 10R3/4. Level B1. Hearth.

Fig. 4.123.11. I3 7-17-1. Dark-Faced Burnished Ware. Section. Re-used Neck. R. diam. 130 mm. Ext. burnished. Int. well smoothed. Ext. red slipped. Int. painted. Ext. 10R3/4. Dec. 10R3/4. Level A1. Room fill.

Fig. 4.123.12. I3 116-154-1. Dark-Faced Burnished Ware. Section. Re-used Neck. R. diam. 100 mm. Ext. burnished. Int. scraped. Ext. red slipped. Ext. 10R3/6. Dec. 10R3/6. Mixed levels C-Sequence/B6/B7. Open area.

Fig. 4.123.13. I3 16-36-4. Dark-Faced Burnished Ware. Rim fragm. Jar. R. diam. 100 mm. Ext. burnished. Int. roughly smoothed. Ext. red slipped. Ext. 10R3/4. Dec. 10R3/4. Level A1. Open area.

Fig. 4.123.14. K5 34-81-24. Dark-Faced Burnished Ware. Rim fragm. Jar. R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. red slipped. Ext. 10YR3/1. Dec. 10R3/4. Mixed levels B2/B4. Open area.

Fig. 4.123.15. I3 112-114-5. Dark-Faced Burnished Ware. Body fragm. Jar. Ext. burnished. Int. scraped. Ext. pattern-burnished. Ext. 7.5YR5/1. Dec. 7.5YR2.5/1. Level A1. Open area.

Fig. 4.123.16. J5 72-140-2. Dark-Faced Burnished Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. incised. Ext. 7.5YR5/3. Level B8. Oven.

Fig. 4.123.17. J5 66-138-6. Dark-Faced Burnished Ware. Body fragm. Jar. Ext. burnished. Int. scraped. Ext. incised. Ext. 2.5YR2.5/2. Level B8. Open area.

Fig. 4.123.18. I5 151-179-101. Dark-Faced Burnished Ware. Body fragm. Jar. Ext. burnished. Int. roughly smoothed. Ext. painted & incised. Ext. 2.5YR5/3. Dec. 10R3/6. Level B4. Open area.

Fig. 4.123.19. J5 64-130-2. Dark-Faced Burnished Ware. Body fragm. Jar. Ext. burnished. Int. well smoothed. Ext. painted & incised. Ext. 5YR4/3. Dec. 10R3/6. Level B4. Pit.

Fig. 4.123.20. J5 66-138-7. Dark-Faced Burnished Ware. Body fragm. Jar. Ext. burnished. Int. roughly smoothed. Ext. painted & incised. Ext. 'grey'. Dec. 'red'. Level B8. Open area.

Fig. 4.124. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.124.1. J5 118-251-21. Orange Fine Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 260 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR7/4. Dec. 2.5YR4/6. Mixed levels B6/B7/B8. Open area.

Fig. 4.124.2. K5 40-84-201. Orange Fine Ware. Rim fragm. Everted S-shaped Bowl. R. diam. 140 mm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 7.5YR5/4. Dec. 2.5YR3/4. LBA strata.

Fig. 4.124.3. K5 19-44-6. Orange Fine Ware. Rim fragm. Straight-sided Flat-based Bowl. R. diam. 160 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 2.5YR6/8. Dec. 10R3/4. D-Sequence. Open area.

Fig. 4.124.4. K5 31-68-5. Fine Painted Ware. Rim fragm. Small Jar. R. diam. 90 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 2.5YR3/4. Level B2. Room fill.

Fig. 4.124.5. K5 19-44-2. Standard Fine Ware. Rim fragm. Straight-sided Bowl-unspecified; unfinished perforation at exterior as repair. R. diam. 240 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR2/1. D-Sequence. Open area.

Fig. 4.124.6. K5 17-42-3. Standard Fine Ware. Rim fragm. Straight-sided Bowl-unspecified. R. diam. 220 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 5YR5/6. Mixed levels D-Sequence/B1. Open area.

Fig. 4.124.7. K5 34-76-1. Standard Fine Ware. Rim fragm. Everted Straight-sided Carinated Bowl. R. diam. 200 mm. Ext. well smoothed. Int. scraped. Ext. painted. Int. painted. Ext. 2.5Y8/1. Dec. 5Y3/1. Vol. 1.54 l. Mixed levels B2/B4. Open area.

Fig. 4.124.8. K5 17-42-4. Standard Fine Ware. Rim fragm. Low Carinated Bowl. R. diam. 120 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/4. Dec. 10YR2/1. Vol. 0.40 l. Mixed levels D-Sequence/B1. Open area.

Fig. 4.124.9. K5 15-32-5. Standard Fine Ware. Rim fragm. Everted Convex-sided Bowl. R. diam. 240 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 7.5YR5/6. Vol. 1.72 l. Mixed levels D-Sequence/B1. Open area.

Fig. 4.124.10. K5 34-81-23. Standard Fine Ware. Rim fragm. Vertical Convex-sided Bowl. R. diam. 100 mm. Ext. well smoothed. Int. well smoothed. Ext. incised. Ext. 2.5Y8/2. Vol. 0.42 l. Mixed levels B2/B4. Open area.

Fig. 4.124.11. I2 71-211-102 (P09-86). Standard Fine Ware. Complete. Closed Convex-sided Bowl with vertical loop handle. R. diam. 140 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 'cream'. Dec. dark 'brown'. Vol. 1.01 l. C-Sequence. Burial BN09-40.

Fig. 4.124.12. K5 39-86-12. Standard Fine Ware. Rim fragm. Closed S-shaped Bowl. R. diam. 120 mm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 2.5Y8/2. Dec. 2.5Y5/2. Level B2. Open area.

Fig. 4.124.13. I2 71-211-101 (P09-85). Standard Fine Ware. Complete. Short-Collared Bowl. R. diam. 220 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 'cream'. Dec. 'black'. Vol. 2.01 l. C-Sequence. Burial BN09-40.

Fig. 4.124.14. K5 19-44-8. Standard Fine Ware. Rim fragm. Short-Collared Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/4. Dec. 5YR3/2. D-Sequence. Open area.

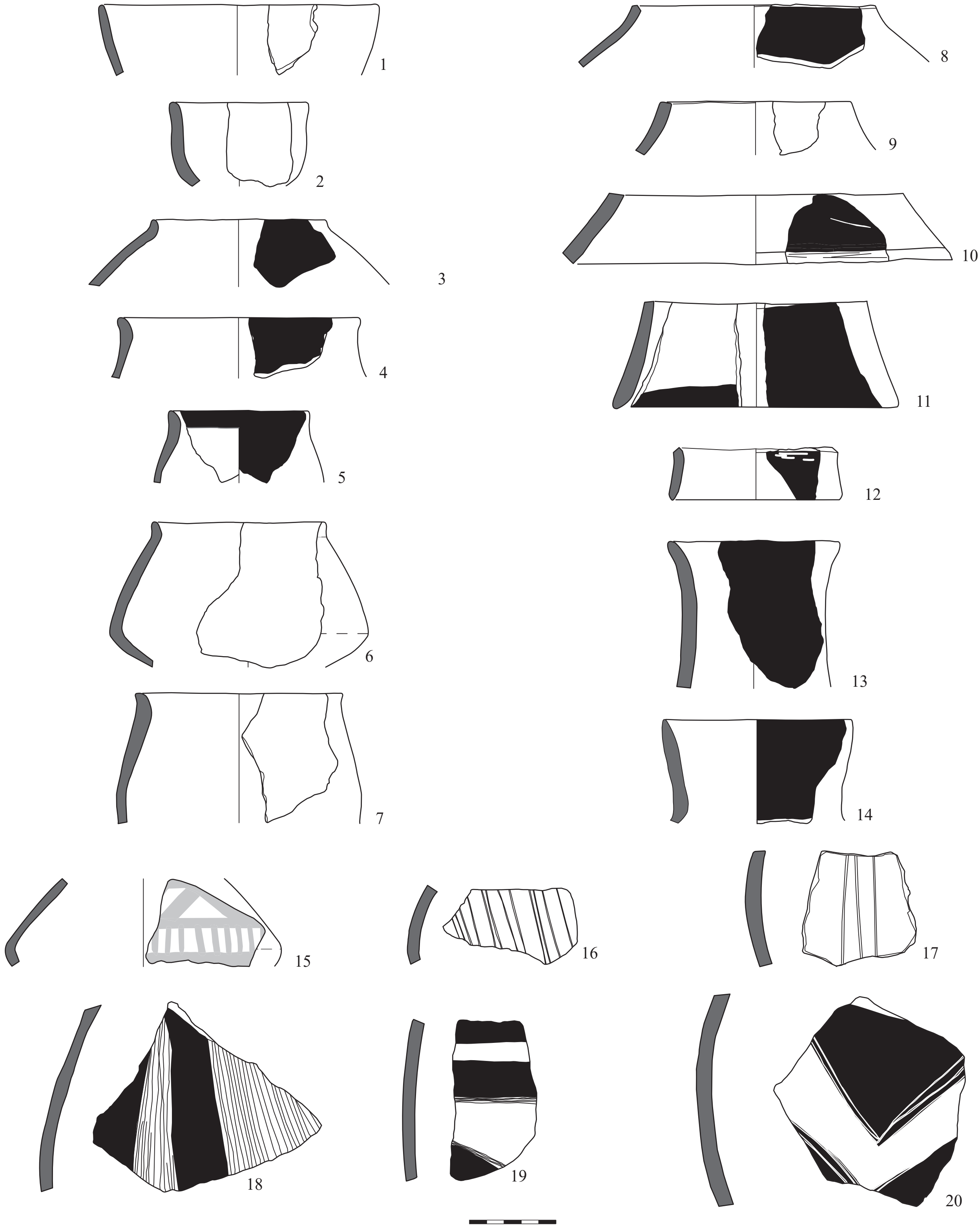


Fig. 4.123 Tell Sabi Abyad. Operation III. Dark-Faced Burnished Ware (scale 1:3).

Fig. 4.124.15. K5 22-52-1. Standard Fine Ware. Rim fragm. Short-Collared Bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR2/1. Level B1. Pit.

Fig. 4.124.16. K5 19-44-4. Standard Fine Ware. Rim fragm. Short-Collared Bowl; perforation as repair. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR7/3. Dec. 10YR2/1. Vol. 0.78 l. D-Sequence. Open area.

Fig. 4.125. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.125.1. J5 52-94-3. Standard Fine Ware. Rim fragm. Tall-necked Jar. R. diam. 130 mm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 10YR7/2. Dec. 2.5YR3/1. Level B4. Open area.

Fig. 4.125.2. J5 52-94-2. Standard Fine Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. eroded. Int. roughly smoothed. Ext. painted & impressed. Int. painted. Ext. 2.5Y8/2. Dec. 7.5YR4/3. Level B4. Open area.

Fig. 4.125.3. K5 24-54-3. Standard Fine Ware. Rim fragm. Medium-sized Jar. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR7/4. Dec. 10R3/3. Level B1. Open area.

Fig. 4.125.4. I2 71-211-104 (P09-88). Standard Fine Ware. Complete. Small Jar. R. diam. 100 mm. Ext. well smoothed. Int. eroded. Ext. painted. Int. painted. Ext. ‘cream’. Dec. ‘black’. Vol. 1.26 l. C-Sequence. Burial BN09-40.

Fig. 4.125.5. I2 71-211-103 (P09-87). Standard Fine Ware. Complete. Small Jar. R. diam. 110 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. ‘buff’. Dec. ‘black’. Vol. 0.65 l. C-Sequence. Burial BN09-40.

Fig. 4.125.6. J3S 203-267-101 (P09-29). Standard Fine Ware. Complete. Small Jar. R. diam. 35 mm. Ext. well smoothed. Int. eroded. Ext. painted. Int. painted. Ext. ‘cream’. Dec. ‘black’. Vol. 0.23 l. C-Sequence. Burial BN09-13.

Fig. 4.125.7. K5 17-27-3. Standard Fine Ware. Body fragm. Jar. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 10YR8/4. Dec. 7.5YR5/4. Mixed levels D-Sequence/B1. Open area.

Fig. 4.125.8. K5 19-47-7. Standard Fine Ware. Body fragm. Jar. Ext. well smoothed. Int. eroded. Ext. painted. Ext. 10YR8/4. Dec. 2.5YR4/6. D-Sequence. Open area.

Fig. 4.125.9. I3 102-101-8. Standard Fine Ware. Body fragm. Jar. Ext. well smoothed. Int. scraped. Ext. painted. Ext. 10YR8/2. Dec. 5YR5/3. Mixed levels C-Sequence/B5. Open area.

Fig. 4.125.10. K5 19-44-11. Standard Fine Ware. Body fragm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR8/3. Dec. 5YR4/4. D-Sequence. Open area.

Fig. 4.125.11. K5 16-29-4. Standard Fine Ware. Body fragm. Jar. Ext. well smoothed. Int. eroded. Ext. painted. Ext. 10YR8/3. Dec. 7.5YR3/4. Mixed levels D-Sequence/B1. Open area.

Fig. 4.125.12. K5 15-37-7. Standard Fine Ware. Body fragm. Ext. roughly smoothed. Int. roughly smoothed. Ext. painted. Ext. 10YR8/2. Dec. 10YR2/1. Mixed levels D-Sequence/B1. Open area.

Fig. 4.125.13. K5 16-38-3. Standard Fine Ware. Body fragm. Jar. Ext. well smoothed. Int. eroded. Ext. painted. Ext. 10YR8/3. Dec. 10YR3/1. Mixed levels D-Sequence/B1. Open area.

Fig. 4.125.14. K5 22-52-3. Standard Fine Ware. Body fragm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 2.5Y8/1. Dec. 2.5Y2.5/1. Level B1. Pit.

Fig. 4.125.15. K5 34-71-4. Standard Fine Ware. Body fragm. Jar. Ext. well smoothed. Int. finger pressed. Ext. painted. Ext. 2.5Y8/2. Dec. 2.5YR3/1. Mixed levels B2/B4. Open area.

Fig. 4.125.16. K5 34-71-5. Standard Fine Ware. Body fragm. Ext. well smoothed. Int. scraped. Ext. painted. Ext. 2.5Y8/2. Dec. 2.5YR3/4. Mixed levels B2/B4. Open area.

Fig. 4.126. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.126.1. J3 49-82-102 (P08-12). Halaf Fine Ware (‘early’ variety). Section. Straight-sided Flat-based Bowl. R. diam. 220 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR2/1. Vol. 2.73 l. C-Sequence.

Fig. 4.126.2. J3 518-660-101 (P08-72). Halaf Fine Ware (‘early’ variety). Section. Straight-sided Flat-based Bowl. R. diam. 200 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/2. Dec. 2.5Y3/1. Vol. 1.91 l. C-Sequence.

Fig. 4.126.3. J5 92-229-101 (P07-81). Halaf Fine Ware (‘early’ variety). Complete. Straight-sided Flat-based Bowl. R. diam. 190 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR3/1. Vol. 2.24 l. Mixed levels C-Sequence/B4. Oven.

Fig. 4.126.4. J3 30-51-101 (P08-6). Halaf Fine Ware (‘early’ variety). Section. Straight-sided Flat-based Bowl. R. diam. 220 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR2/2. Vol. 2.51 l. C-Sequence. General fill layer.

Fig. 4.126.5. I2 29-80-101 (P08-76). Halaf Fine Ware (‘early’ variety). Section. Straight-sided Flat-based Bowl. R. diam. 200 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR2/1. Vol. 1.73 l. C-Sequence. Pit.

Fig. 4.126.6. I3 187-545-101 (P08-38). Halaf Fine Ware (‘early’ variety). Section. Straight-sided Flat-based Bowl. R. diam. 200 mm. Ext. well smoothed. Int. scraped. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR3/1. Vol. 1.87 l. C-Sequence. Pit.

Fig. 4.126.7. I2 23-77-101 (P08-74). Halaf Fine Ware (‘early’ variety). Section. Miniature Bowl. R. diam. 75 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR2/1. Vol. 0.12 l. C-Sequence. Open area.

Fig. 4.126.8. J4 129-200-101. Halaf Fine Ware (‘early’ variety). Section. Small Cream Bowl. R. diam. 200 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR8/6. Dec. 7.5YR3/1. Vol. 1.16 l. D-Sequence. Room fill.

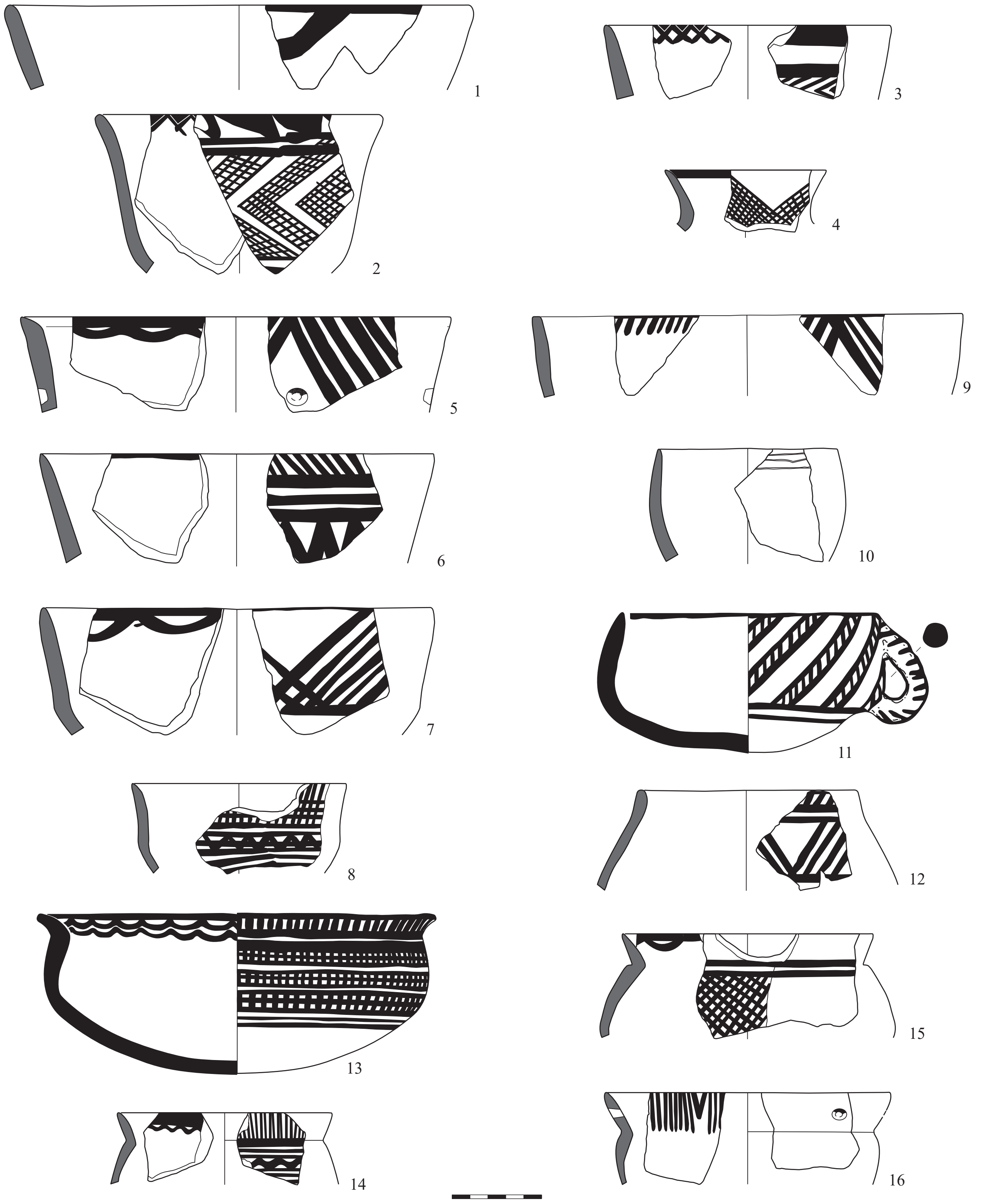


Fig. 4.124 Tell Sabi Abyad. Operation III. Orange Fine Ware (nos. 1–3); Fine Painted Ware (no. 4); Standard Fine Ware (nos. 5–16) (scale 1:3).

Fig. 4.126.9. J3 64-103-101 (P08-18). Halaf Fine Ware ('early' variety). Complete. Small Cream Bowl; bitumen used as repair. R. diam. 150 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR2/1. Vol. 1.06 l. C-Sequence. General fill layer.

Fig. 4.126.10. J4 77-98-102. Halaf Fine Ware ('early' variety). Rim fragm. Small Cream Bowl. R. diam. 140 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5Y7/3. Dec. 7.5YR4/3. Vol. 0.39 l. D-Sequence. Room fill.

Fig. 4.126.11. J3 49-82-101 (P08-11). Halaf Fine Ware ('early' variety). Section. Small Cream Bowl. R. diam. 130 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR7/2. Dec. 10YR2/1. Vol. 0.69 l. C-Sequence. General fill layer.

Fig. 4.126.12. J3 117-223-101 (P08-62). Halaf Fine Ware ('early' variety). Section. Small Cream Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR2/1. Vol. 0.48 l. C-Sequence. General fill layer.

Fig. 4.126.13. I2 6-51-1. Halaf Fine Ware ('early' variety). Rim fragm. Low Carinated Bowl; bitumen used as repair. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR2/1. Vol. 0.27 l. Mixed levels C-Sequence/A4. Open area.

Fig. 4.126.14. J3 22-33-101 (P08-2). Halaf Fine Ware ('early' variety). Body fragm. Bowl. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR7/2. Dec. 10YR3/1. C-Sequence. General fill layer.

Fig. 4.127. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.127.1. J3 148-268-101 (P08-75). Halaf Fine Ware ('early' variety). Rim fragm. Large Restricted Jar; bitumen used quite extensively as repair. R. diam. 100 mm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 5YR3/1. Vol. 12.74 l. C-Sequence. General fill layer.

Fig. 4.127.2. J5 92-182-5. Halaf Fine Ware ('early' variety). Body fragm. Jar. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 10YR8/3. Dec. 10YR2/1. Mixed levels C-Sequence/B4. Oven.

Fig. 4.127.3. J4 77-98-101. Halaf Fine Ware ('early' variety). Rim fragm. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5Y7/3. Dec. 10YR3/2. D-Sequence. Room fill.

Fig. 4.127.4. J3 515-624-101 (P08-69). Halaf Fine Ware ('early' variety). Section. Small Jar. R. diam. 90 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR2/1. Vol. 0.41 l. C-Sequence. Oven.

Fig. 4.127.5. J3 37-53-101 (P08-8). Halaf Fine Ware ('early' variety). Complete. Small Jar; re-shaped rim. R. diam. 45 mm. Ext. roughly smoothed. Int. finger pressed. Ext. 2.5Y8/2. Vol. 0.21 l. C-Sequence. General fill layer.

Fig. 4.127.6. J3 108-172-101 (P08-41). Halaf Fine Ware ('early' variety). Section. Small Jar. R. diam. 50 mm. Ext. well smoothed. Int. finger pressed. Ext. painted. Int. painted. Ext. 2.5Y8/1. Dec. 2.5Y3/1. Vol. 0.09 l. C-Sequence. General fill layer.

Fig. 4.127.7. J5 92-182-101 (P07-64). Halaf Fine Ware ('early' variety). Rim fragm. Everted Straight-sided Carinated Bowl with vertical loop handle. R. diam. 200 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 10YR8/3. Dec. 10YR2/1. Vol. 2.27 l. Mixed levels C-Sequence/B4. Oven.

Fig. 4.128. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.128.1. J5 40-78-11. Halaf Fine Ware ('later' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 260 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 5YR4/3. Vol. 3.24 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.128.2. J5 53-114-5. Halaf Fine Ware ('later' variety). Section. Everted Convex-sided Bowl. R. diam. 260 mm. Ext. well smoothed. Int. roughly smoothed. Ext. 'cream'. Vol. 1.83 l. Level B4. Open area.

Fig. 4.128.3. J5 40-78-12. Halaf Fine Ware ('later' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 240 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR6/3. Dec. 2.5YR5/6. Vol. 2.51 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.128.4. J5 53-115-3. Halaf Fine Ware ('later' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 190 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 10YR8/3. Dec. 10YR2/1. Level B4. Open area.

Fig. 4.128.5. J5 40-91-4. Halaf Fine Ware ('later' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 170 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 2.5YR3/2. Vol. 0.63 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.128.6. J5 53-99-1. Halaf Fine Ware ('later' variety). Rim fragm. Everted Convex-sided Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 10YR8/3. Dec. 10YR2/1. Vol. 0.32 l. Level B4. Open area.

Fig. 4.128.7. J5 56-106-9. Halaf Fine Ware ('later' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 7.5YR7/2. Dec. 7.5YR2.5/1. Vol. 0.65 l. Mixed levels B5/B7/B8. Open area.

Fig. 4.128.8. J5 24-46-11. Halaf Fine Ware ('later' variety). Rim fragm. Vertical Convex-sided Bowl. R. diam. 60 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 2.5YR2.5/1. D-Sequence. Open area.

Fig. 4.128.9. J5 52-94-10. Halaf Fine Ware ('later' variety). Rim fragm. Closed Convex-sided Bowl. R. diam. 80 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/3. Level B4. Open area.

Fig. 4.128.10. J5 40-73-14. Halaf Fine Ware ('later' variety). Body fragm. Bowl. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/4. Dec. 10R4/6. Mixed levels D-Sequence/B4. Open area.

Fig. 4.128.11. J5 40-68-24. Halaf Fine Ware ('later' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 210 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/3. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

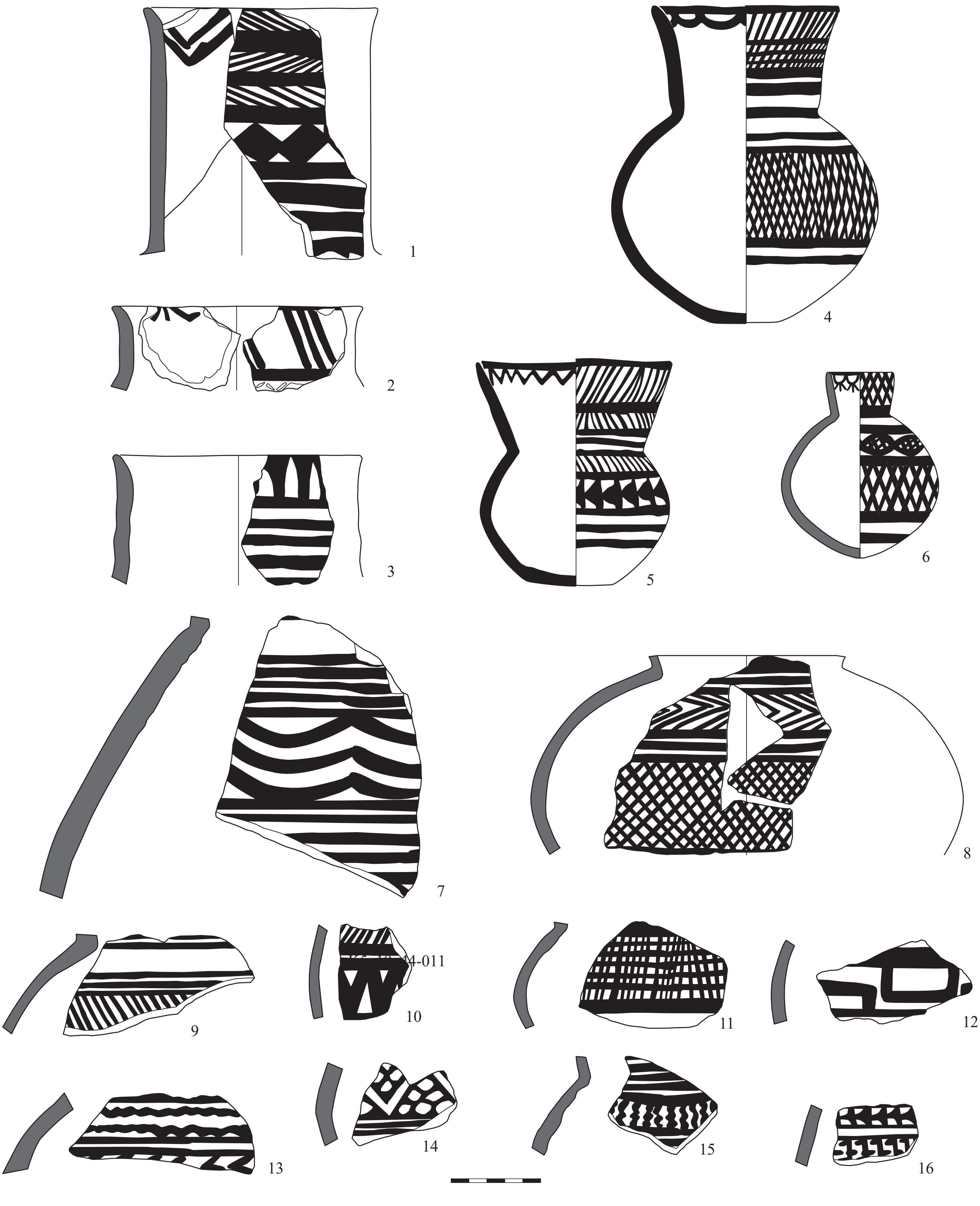


Fig. 4.125 Tell Sabi Abyad. Operation III. Standard Fine Ware (scale 1:3).

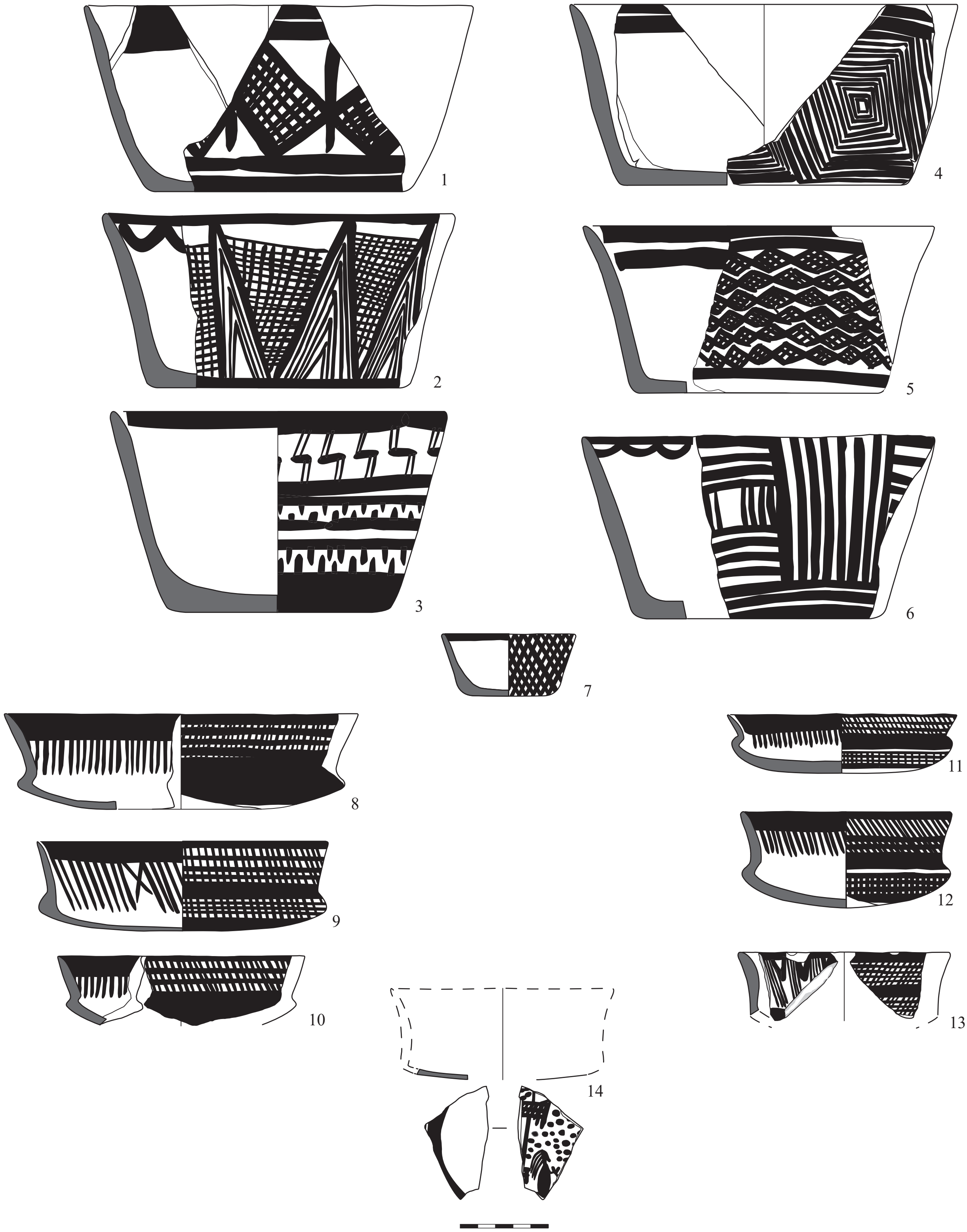


Fig. 4.126 Tell Sabi Abyad. Operation III. Halaf Fine Ware (Early Halaf) (scale 1:3).

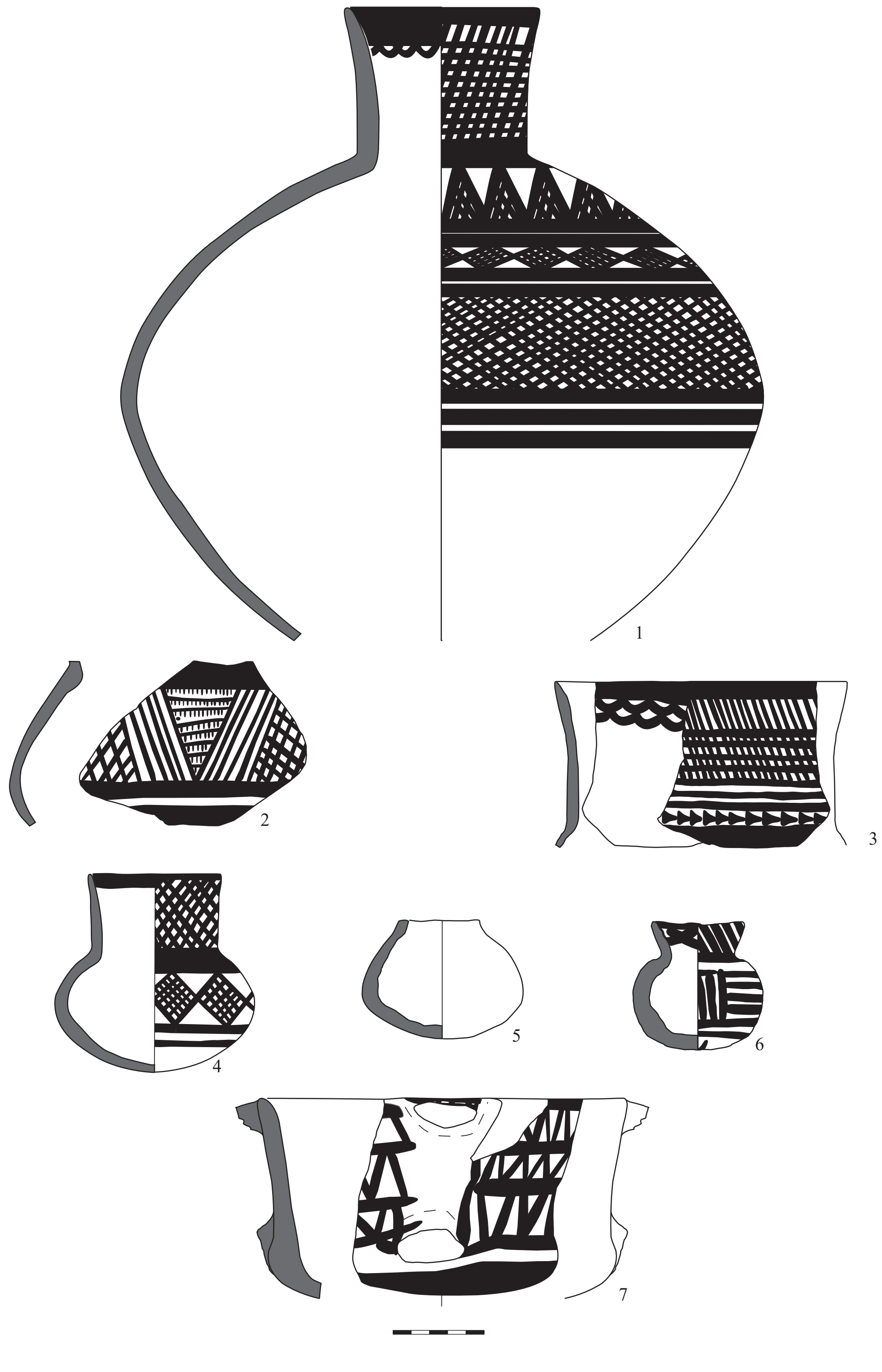


Fig. 4.127 Tell Sabi Abyad. Operation III. Halaf Fine Ware (Early Halaf) (scale 1:3).

Fig. 4.128.12. J5 40-68-26. Halaf Fine Ware ('later' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 160 mm. Ext. well smoothed. Int. well smoothed. Ext. 10YR8/4. Vol. 0.37 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.128.13. J5 53-115-5. Halaf Fine Ware ('later' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 140 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5YR5/4. Dec. 2.5YR5/4. Level B4. Open area.

Fig. 4.128.14. J5 40-78-13. Halaf Fine Ware ('later' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 360 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10R7/8. Dec. 10R4/8. Mixed levels D-Sequence/B4. Open area.

Fig. 4.128.15. J5 40-78-20. Halaf Fine Ware ('later' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 320 mm. Ext. well smoothed. Int. well smoothed. Ext. 2.5Y8/2. Mixed levels D-Sequence/B4. Open area.

Fig. 4.128.16. J5 40-68-25. Halaf Fine Ware ('later' variety). Rim fragm. Straight-sided Bowl-unspecified. R. diam. 280 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Mixed levels D-Sequence/B4. Open area.

Fig. 4.129. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.129.1. J5 52-94-20. Halaf Fine Ware ('later' variety). Body fragm. Large Cream Bowl. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 2.5Y8/2. Dec. 2.5YR4/3. Level B4. Open area.

Fig. 4.129.2. J5 24-44-15. Halaf Fine Ware ('later' variety). Rim fragm. Wide Globular Bowl. R. diam. 250 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/4. Dec. 5YR2.5/2. D-Sequence. Open area.

Fig. 4.129.3. J5 24-53-3. Halaf Fine Ware ('later' variety). Rim fragm. Wide Globular Bowl. R. diam. 280 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5YR7/4. Dec. 2.5YR4/8. D-Sequence. Open area.

Fig. 4.129.4. J5 52-94-4. Halaf Fine Ware ('later' variety). Rim fragm. Wide Globular Bowl. R. diam. 320 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/4. Dec. 3/10B. Level B4. Open area.

Fig. 4.129.5. J5 40-91-1. Halaf Fine Ware ('later' variety). Rim fragm. Large Restricted Jar. R. diam. 160 mm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/3. Dec. 5YR2.5/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.129.6. J5 40-91-2. Halaf Fine Ware ('later' variety). Rim fragm. Large Restricted Jar. R. diam. 120 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/1. Dec. 5YR2.5/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.129.7. J5 40-68-31. Halaf Fine Ware ('later' variety). Rim fragm. Small Jar. R. diam. 90 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR7/3. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.129.8. J5 40-91-3. Halaf Fine Ware ('later' variety). Rim fragm. Small Jar. R. diam. 90 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/3. Dec. 5YR2.5/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.130. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.130.1. J5 40-68-29. Halaf Fine Ware ('later' variety). Rim fragm. Large Steep Cream Bowl. R. diam. 380 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR6/4. Dec. 7.5YR2.5/2. Vol. 8.85 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.130.2. J5 53-115-12. Halaf Fine Ware ('later' variety). Rim fragm. Large Steep Cream Bowl; bitumen used as repair. R. diam. 290 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 2.5YR6/8. Vol. 3.44 l. Level B4. Open area.

Fig. 4.130.3. J5 40-68-30. Halaf Fine Ware ('later' variety). Rim fragm. Large Steep Cream Bowl. R. diam. 260 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR7/3. Dec. 10YR2/1. Vol. 2.89 l. Mixed levels D-Sequence/B4. Open area.

Fig. 4.130.4. J5 53-115-6. Halaf Fine Ware ('later' variety). Rim fragm. Large Steep Cream Bowl. R. diam. 240 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR2/1. Level B4. Open area.

Fig. 4.130.5. J5 40-78-10. Halaf Fine Ware ('later' variety). Rim fragm. Large Steep Cream Bowl. R. diam. 230 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/3. Dec. 2.5YR4/6. Mixed levels D-Sequence/B4. Open area.

Fig. 4.130.6. J5 52-94-8. Halaf Fine Ware ('later' variety). Rim fragm. Large Steep Cream Bowl. R. diam. 150 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 7.5YR7/4. Dec. 5YR3/2. Level B4. Open area.

Fig. 4.130.7. J5 24-50-100 (P07-40). Halaf Fine Ware ('later' variety). Rim fragm. Large Cream Bowl with Curved Mouth. R. diam. 270 mm. Ext. well smoothed. Int. well smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 2.5YR4/6. Vol. 6.61 l. D-Sequence. Open area.

Fig. 4.131. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre). Plaster. Level. Context.

Fig. 4.131.1. J5 53-99-8. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 7.5YR7/4. Dec. 7.5YR3/1. Level B4. Open area.

Fig. 4.131.2. J5 40-73-21. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 10YR8/2. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.3. J5 53-99-7. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. finger pressed. Ext. painted. Ext. 10YR8/4. Dec. 7.5YR3/2. Level B4. Open area.

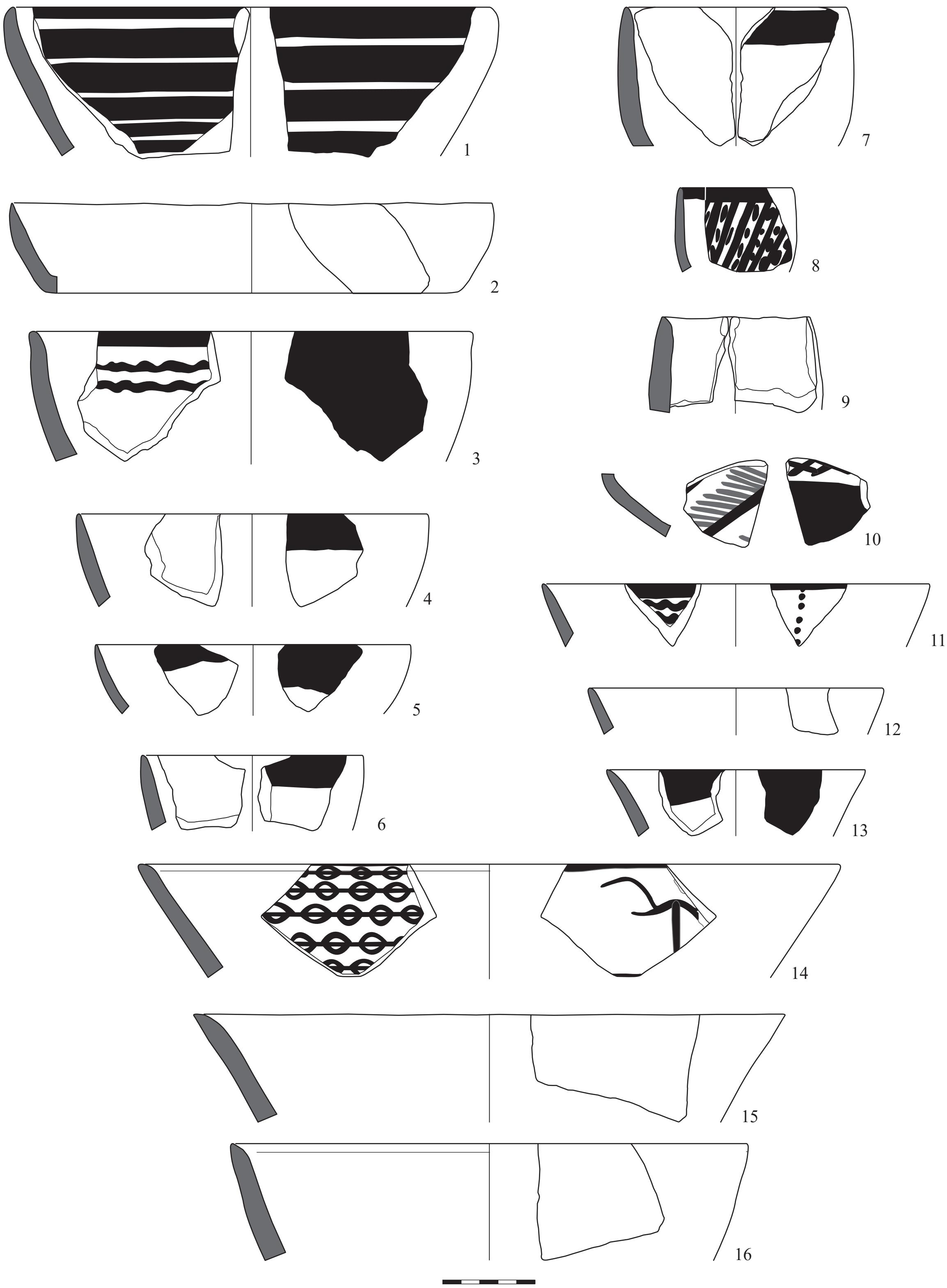


Fig. 4.128 Tell Sabi Abyad. Operation III. Halaf Fine Ware (Middle–Late Halaf) (scale 1:3).

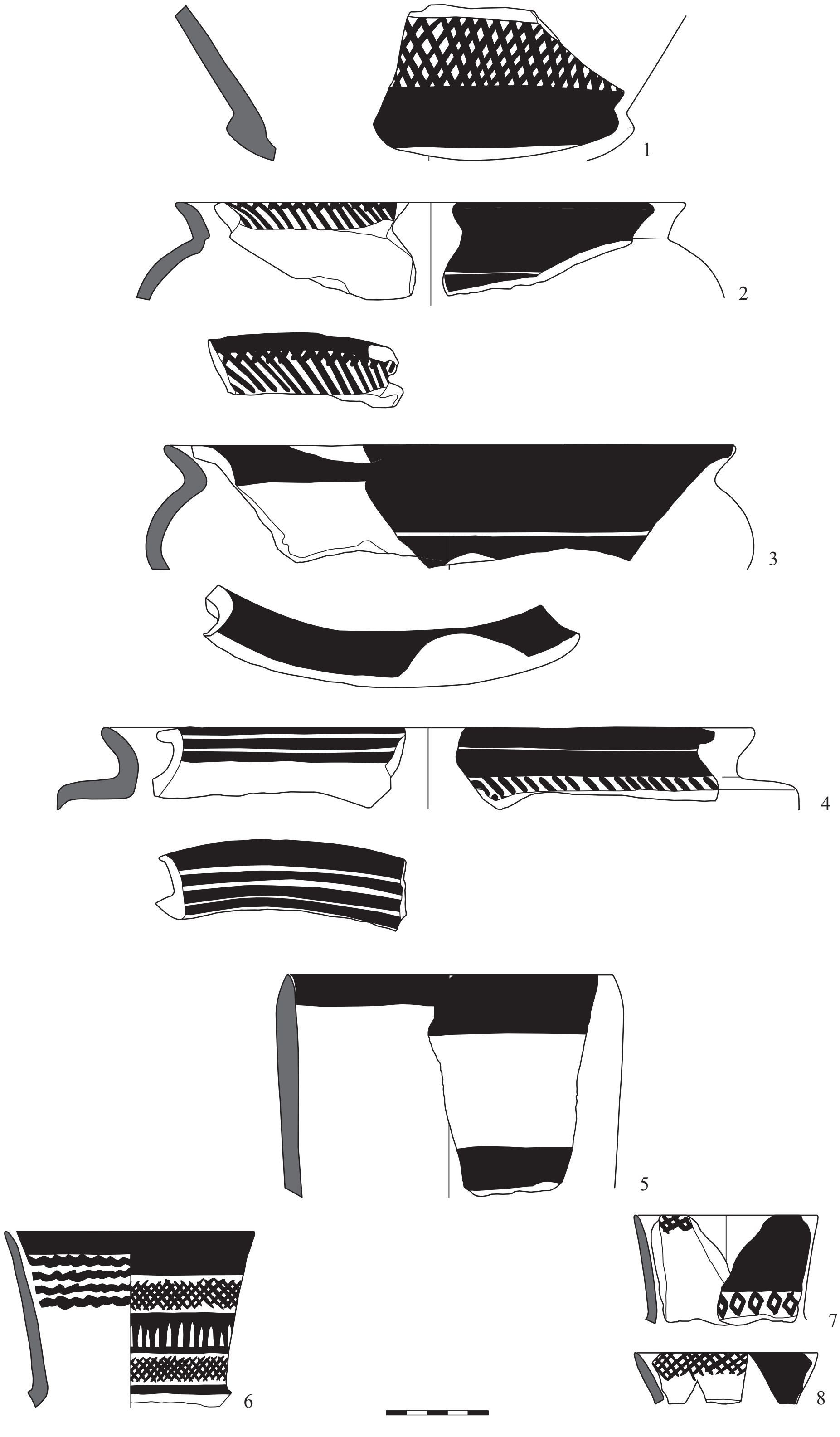


Fig. 4.129 Tell Sabi Abyad. Operation III. Halaf Fine Ware (Middle–Late Halaf) (scale 1:3).

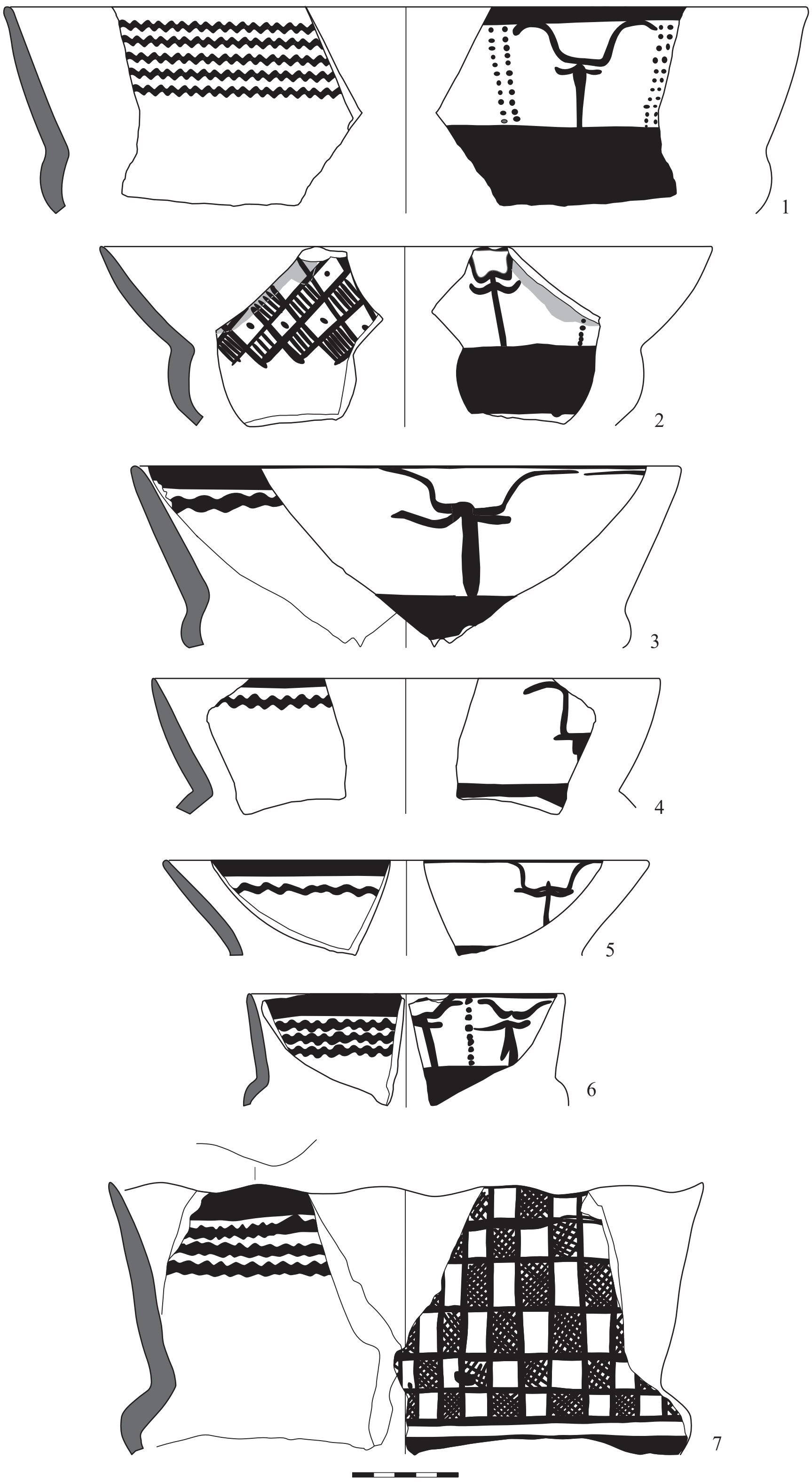


Fig. 4.130 Tell Sabi Abyad. Operation III. Halaf Fine Ware (Middle–Late Halaf) (scale 1:3).

Fig. 4.131.4. J5 40-68-22. Halaf Fine Ware ('later' variety). Body fragm. with vertically perforated knob. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 10YR8/2. Dec. 2.5YR3/2. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.5. J5 40-78-18. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 7.5YR7/4. Dec. 7.5YR2.5/2. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.6. J5 40-68-21. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 10YR8/3. Dec. 7.5YR7/4. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.7. J5 53-99-6. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. scraped. Ext. painted. Ext. 10YR8/4. Dec. 10YR2/1. Level B4. Open area.

Fig. 4.131.8. J5 40-68-20. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 10YR8/3. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.9. J5 40-78-17. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. finger pressed. Ext. painted. Ext. 10YR8/4. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.10. J5 53-128-1. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 10YR8/3. Dec. 10YR2/1. Level B4. Open area.

Fig. 4.131.11. J5 53-114-7. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. roughly smoothed. Ext. painted. Ext. 'cream'. Dec. 'black'. Level B4. Open area.

Fig. 4.131.12. J5 40-78-16. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. finger pressed. Ext. painted. Ext. 7.5YR7/4. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.13. J5 40-73-23. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. scraped. Ext. painted. Ext. 7.5YR7/3. Dec. 5YR2.5/2. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.14. J5 32-58-6. Halaf Fine Ware ('later' variety). Body fragm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 7.5YR5/4. Dec. 10YR3/2. D-Sequence. Open area.

Fig. 4.131.15. J5 40-68-15. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. scraped. Ext. painted. Ext. 10YR8/4. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.16. J5 52-94-17. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 7.5YR7/4. Dec. 10R4/4. Level B4. Open area.

Fig. 4.131.17. J5 37-67-1. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. well smoothed. Ext. painted. Ext. 2.5YR7/4. Dec. 10R4/8. D-Sequence. Pit.

Fig. 4.131.18. J5 40-68-16. Halaf Fine Ware ('later' variety). Body fragm. Ext. well smoothed. Int. finger pressed. Ext. painted. Ext. 10YR8/3. Dec. 10YR2/1. Mixed levels D-Sequence/B4. Open area.

Fig. 4.131.19. J5 24-44-4. Halaf Fine Ware ('later' variety). Body fragm. Ext. burnished. Int. well smoothed. Ext. painted. Ext. 7.5YR7/4. Dec. 2.5YR5/6. D-Sequence. Open area.

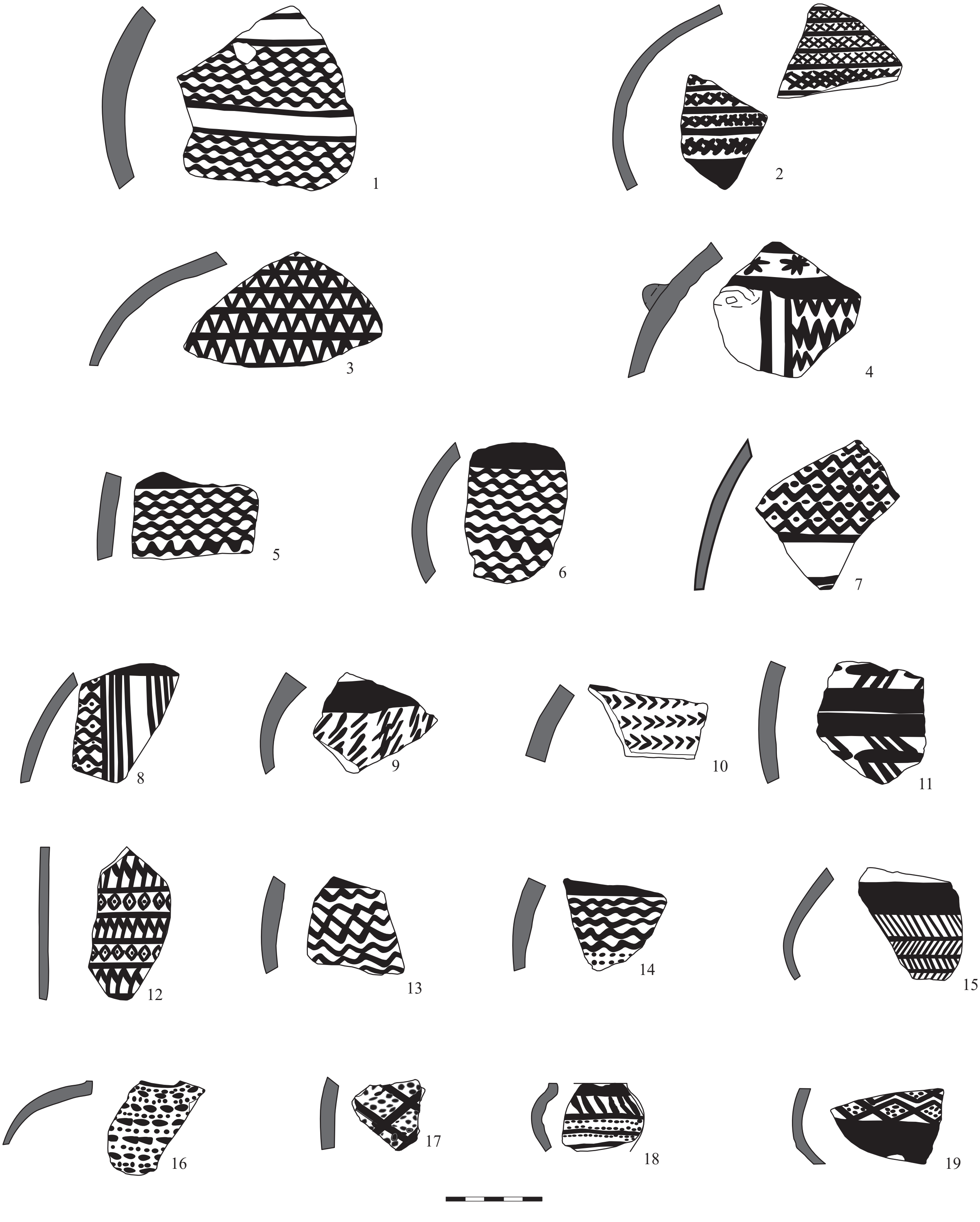


Fig. 4.131 Tell Sabi Abyad. Operation III. Halaf Fine Ware (Middle–Late Halaf) (scale 1:3).

Chapter 5

Raw materials for early ceramic production at Tell Sabi Abyad

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5.1. Introduction

Petrographic analyses form an essential part of ceramic studies, as they provide sophisticated information on the texture of the pottery and the non-plastic inclusions present in the clay matrix. These inclusions may be naturally present in the clay selected by the potter, *or* impurities deriving from the manufacturing process, or they may be deliberately added by the potter in order to improve the workability of the clay or to achieve certain properties for the final product. The petrographic analysis may permit the identification of these processes, and act as an essential step towards reconstructing the ceramic *chaîne opératoire* and the possible subsequent uses of the pottery vessels. Together with shaping and firing, the selection and preparation of the raw materials have a major impact on the suitability of the ceramic containers for various activities such as cooking above a direct fire, holding liquid contents, or processing foodstuffs.

At Tell Sabi Abyad a complex categorisation of the ceramic assemblage was visually made in the field. A suite of ceramic wares was distinguished on the basis of the operational chain necessary for reaching a particular end product (Chapter 4). Identifying the clay fabric, the specific composition of the clay matrix, voids and mineral and organic inclusions, all play an important role in the definition of these wares. In the field, however, the descriptions of the amounts, sizes and types of inclusions were only performed macroscopically. The fabric of the sherd was studied with the aid of a hand-held 10× magnifying loupe, and without the assistance of a microscope. The densities and sizes of the non-plastic inclusions were estimated intuitively by experts, and in a relative manner. The geological identification of the mineral non-plastic inclusions was particularly not possible, or it was possible only at the most general level. We felt the need to complement and critically evaluate the work in the field with more quantitative laboratory work.

In this chapter we present the results of the preliminary petrographic study to elucidate the use of raw materials for the 7th millennium pottery recovered from Tell Sabi Abyad. This includes a microscopic fabric analysis of some 107 sherds performed at the Archaeological Sciences division of the Faculty of Archaeology at Leiden University, as well as thin-section petrographic analyses of twenty-four sherds carried out at the Institute for Geo- and Bio-archaeology at the Vrije Universiteit Amsterdam.[1]

5.2. The microscopic fabric analysis

A total of 107 pottery sherds from Tell Sabi Abyad were selected for microscopic fabric analyses. Most of these came from Operation III, but we also included material from Operations IV and V (Table 5.1). In addition, we included a few samples from contemporaneous Tell Sabi Abyad III (see Chapter 2). The vast majority of the fabric samples came from strata attributed to the middle to later stages of the Early Pottery Neolithic (Operation I, levels A6–A2, and Operations IV and V; together n = 73). The early stages of the Early Pottery Neolithic (Operation I, levels A9–A7) and the Initial Pottery Neolithic (Operation I, levels A12–A10, and SAB III) were much less represented (respectively, n = 15 and n = 19). The selection was guided by the pottery samples available at the Faculty of Archaeology of Leiden University.

In terms of the ceramic classification developed at the site, the following four ware categories were included: Early Mineral Ware, Standard Ware, Fine Mineral Tempered Ware, and Grey-Black Ware. However, we stress that the field classification did not guide the microscopic fabric analysis; the ware attributions made

Table 5.1 Tell Sabi Abyad. Late Neolithic wares and excavation areas selected for fabric analysis

	SAB I Operation III	*SAB I Operation IV*	*SAB I Operation V*	*SAB III*	*Total*
Early Mineral Ware (EMW)	13	–	–	7	20
Standard Ware (SW)	35	–	–	1	36
Fine Mineral Tempered Ware (FMTW)	8	24	9	–	41
Grey-Black Ware (GBW)	4	–	6	–	10
Total	60	24	15	8	107

Fig. 5.1 Estimating the amounts and sizes of the non-plastic inclusions (image Loe Jacobs).

in the field were omitted when the microscopic inspection began. The individual samples were studied with 10–50× magnification. The amounts and sizes of both organic and inorganic inclusions were described for each sample, using standardised reference collections available at the Faculty of Archaeology of Leiden University, which include a large number of clays and pottery samples collected in Syria. With this comparative method the percentage of fibres by volume can be estimated rather quickly and with accuracy (Fig. 5.1).

After the microscopic inspection of the individual samples, we classified the sherds into fabric groups on the basis of the composition of the non-plastic inclusions, taking into account the types, amounts, shape and sizes (dimensions) of the inclusions. This method established the presence of eleven distinct fabric groups (Table 5.2). These fabric groups are assumed to represent the combined effects of the use of different sources of clay together with differences in clay preparation strategies utilised by prehistoric potters. Notwithstanding the variation observed between these fabric groups, it is possible to regroup them into three broad fabric categories, *viz*. fabric groups 1 and 3 together, fabric groups 2 and 4 together, and fabric groups 5–11 all together.

The two fabric groups 1 and 3 are highly similar when taken together. The main shared aspect of both groups is the very dense amount of non-plastic inclusions, which without exception are mineral in nature. The mineral inclusions contain two main types: coarse-grained, angular basalt and rounded limestone. There can be little doubt that the basalt was purposely added to the clay. While basalt traces may occur as part of the calcareous or

Table 5.2 Tell Sabi Abyad. Fabric groups distinguished in the microscopic analysis

Fabric	*Main non-plastic inclusions*	*Size*	*Vol. %*	*Total*
Group 1:	Non-organic: basalt and limestone	50 µm–1 mm	30–45	18
	Organic: -			
Group 2:	Non-organic: limestone grains, some basalt	50 µm–1 mm, up to 5 mm!	±15–20	8
	Organic: fibres	5–10 mm	5–10	
Group 3:	Non-organic: basalt, some limestone	50 µm–2 mm	±30	3
	Organic: fibres	up to 5 mm	5–10	
Group 4:	Non-organic: fine sand or limestone, natural to the clay	<250 µm	±10	
	Organic: fibres	up to 5–10 mm	±10–25	27
Group 5:	Non-organic: limestone, some crystalline calcite, incidentally quartz, sporadically basalt	< 250 µm, some up to 500 µm, incidentally up to 5 mm	±20–40	28
	Organic: incidentally fibres		< 2	
Group 6:	Non-organic: limestone and some basalt	< 150 µm–1 mm	±10–25	5
	Organic: -			
Group 7:	Non-organic: limestone, basalt, some quartz	< 1000 µm, incidentally up to 2 mm	±0–35	6
	Organic: -			
Group 8:	Non-organic: grog (added), limestone, sporadically basalt	< 1 mm, incidentally up to 2 mm	±25–30	2
	Organic: -			
Group 9:	Non-organic: basalt and some limestone (calcite)	< 1.5 mm	±25–30	5
	Organic: -			
Group 10:	Non-organic: basalt (probably added)	< 1 mm	±25–30	3
	Organic: -			
Group 11:	Non-organic: basalt (probably added), some limestone	< 1 mm	±15–20	2
	Organic: some fibres	up to 5 mm	±10	
Total				107

marl clay formations that characterise the Balikh Valley (Duistermaat 2008), the high densities unequivocally point to its use as a temper. The crushed basalt was roughly selected by the potter on grain size, with sizes falling between 50µm and 2 mm. and then added to the paste. In contrast, the even dispersion of rounded calcite particles in all cases suggests that they were natural to the clay. Calcareous clays are easily detected in thin sections, as the fine microcrystalline calcite gives a distinctive light yellow-brown colour in XPL (Quinn 2013, 44). The difference between the two fabric groups is the presence of a small volume percentage (<10%) of vegetal fibres in fabric group 3, in addition to the basalt and limestone particles. These may well have been naturally present in the clay, and are unlikely to constitute a purposeful temper. Both fabric groups originally were fired under neutral or reducing circumstances and at temperatures not exceeding 800°C. Re-firing the samples above this temperature causes the calcination reaction of limestone grains, instigating their disintegration.

The two fabric groups 2 and 4 are clearly distinguished by the relatively high-volume percentage of plant fibres. In addition to these fibres, small amounts (<20 volume percent) of mineral inclusions are observed in both groups. These include fine sand, some limestone and some basalt. These mineral non-plastics appear to have been part of the natural composition of the clay rather than being added as a deliberate 'temper'. The main distinction between these two groups is in the amounts of plant materials. In fabric type 2 these include between 5 and 10 volume percent; in fabric type 4 the density reaches to 25 volume percent of plant fibres. In both groups the fibres are relatively large, ranging between 0.5 cm and 1 cm in length. As for fabric group 4, this fibrous material was most certainly added purposefully to the paste, and may represent chopped straw included as tempering material. For fabric group 2, however, the low density of occurring fibres make it less certain that this material was purposefully added; some of it, at least, may represent organic material that was part of the natural clay composition.

Fabric groups 5–11, finally, represent a rather heterogeneous category, characterised by a suite of different mineral inclusions. The densities are structurally less than observed with fabric types 1 and 3; the amounts of the mineral inclusions range fairly consistently between 10 and 35 volume percent in most samples. Also, these fabric types exhibit a very different composition than the coarsely mineral-tempered fabric types 1 and 3. Plant fibres, on the other hand, are largely absent in this category. We separated fabric types 5 and 11 because these both do in fact contain some plant fibres. However, in these two fabric groups, the amounts of fibres are rather

Table 5.3 Tell Sabi Abyad. The relation between microscopic fabric groups distinguished in the microscopic analysis and ware categories distinguished in the field

Fabric group	*Early Mineral Ware*	*Standard Ware*	*Fine Mineral Tempered Ware*	*Grey-Black Ware*	*Total*
1	18	–	–	–	18
2	–	8	–	–	8
3	2	1	–	–	3
4	–	27	–	–	27
5	–	–	24	4	28
6	–	–	3	2	5
7	–	–	5	1	6
8	–	–	2	–	2
9	–	–	3	2	5
10	–	–	2	1	3
11	–	–	2	–	2
Total samples	20	36	41	10	107
No. fabric groups	2	3	7	5	11

low (< than 10%) and this may have been part of the natural composition of the clay rather than being added as tempering material. Apart from the slight presence of fibres, these two groups closely resemble other fabric types without plant inclusions.

The main inclusion component in most samples within fabric groups 5–11 is limestone. Small limestone particles (generally <1 mm) are characteristic and occur in almost all samples. Crystalline calcite and basalt are present as well in many of the samples. The relative proportions of limestone versus basalt suggests two main sub groups, *viz*. fabric types 5–7 together and fabric groups 9 to 11 together. In the former, limestone constitutes the main component, with other types of minerals occurring in much smaller quantities. In contrast, the latter group contains basalt as the dominant type of non-plastic inclusion, while small amounts of limestone are secondary. In the former, the limestone and crystalline calcite minerals occasionally show an angular or sub-angular shape suggesting that they represent crushed materials and, hence, were added as a temper. In many cases, however, the rounded to sub-rounded shape of the inclusions suggests that these minerals were part of the natural composition of the clay. Despite the presence of such natural grains in the clays, the potters apparently considered it necessary to add a small fraction of finely-crushed calcite. As to the basalt inclusions, the angular to sub-angular shape indicates that these were crushed and added as temper. The high proportion of calcareous materials suggests a relatively low firing temperature not much over 750°C. Fabric type 8, finally, here represented with just two samples, shows small fragments of ground pottery sherd (grog), which were deliberately added as tempering material.

How do these observations correspond to the ware categorisations made in the field? It appears that the microscopic analysis corroborates the field groupings reasonably well. What has been termed *Early Mineral Ware* in the field almost exclusively consists of fabric type 1. This field category is fairly homogeneous in terms of fabric analysis. In addition to fabric type 1, just two sherds of EMW were attributed to fabric group 3. The other way around, these two fabric types are virtually exclusively associated with what has been termed Early Mineral Ware, making this ceramic category very distinct at Tell Sabi Abyad (Table 5.3).

As for the so-called *Standard Ware*, this category at first sight appears to have been slightly more varied, as it is represented by three different fabric types. This should come as no surprise given the long time span in which Standard Ware was made and used, from the start of the early Pottery Neolithic (ca 6700) to the end of the Transitional Period (ca. 5900 cal BC). Furthermore, excluding one exception, all samples currently analysed belong to just two fabric types, *viz*. fabric types 2 and 4. Inversely, these two fabric types are not represented in any of the other wares distinguished in the field. Standard Ware, too, comes out as a fairly distinct ceramic category at Tell Sabi Abyad.

Fine Mineral Tempered Ware and *Grey-Black Ware* appear to be very similar in terms of clay composition. Both wares are relatively heterogeneous and are represented in the analysis with a large number of different fabric groups. A darker surface colour of sherds attributed to the category of Grey-Black Ware suggests slightly reducing circumstances at the end of the firing process. The observation made earlier regarding a possible distinction between fabrics dominated by limestone (fabric types 5–7) versus fabrics dominated by basalt temper (fabric types 9–11) does not translate into a difference between Fine Mineral Tempered Ware and Grey-Black Ware. As a category, however, these two wares distinguish themselves from both Early Mineral Ware and from Standard Ware (Table 5.3). The main difference between these two categories lies in the firing circumstances.

If we examine the chronological distributions of the various fabric groups, the fabric analysis suggests that the

Table 5.4 The distribution of microscopic fabric groups in the ceramic sequence, distinguishing between Initial Pottery Neolithic (Operation I levels A12–A10 and Tell Sabi Abyad III), Early Pottery Neolithic 'early' (Operation I levels A9–A7), Early Pottery Neolithic 'middle' (Operation I levels A6–A5), Early Pottery Neolithic 'late' (Operation I levels A4–A2, Operation IV, Operation V)

Fabric group	*Initial PN*	*Early PN 'early'*	*Early PN 'middle'*	*Early PN 'late'*	*Total*
1	13	4	1	–	18
2	3	5	–	–	8
3	3	–	–	–	3
4	–	6	4	17	27
5	–	–	3	25	28
6	–	–	2	3	5
7	–	–	–	6	6
8	–	–	–	2	2
9	–	–	–	5	5
10	–	–	–	3	3
11	–	–	–	2	2
Total samples	19	15	10	63	107
No. fabric groups	3	3	4	8	11

diversity in clay fabrics increased over time (Table 5.4). In the early parts of the ceramic sequence just three or four different fabric types are documented. In the later stages of the Early Pottery Neolithic, the variety increased to some eight different fabric types. This is for the most part associated with the introduction and increasing proportion of both Fine Mineral Tempered Ware and Grey-Black Ware within the ceramic assemblage of the middle to later stages of the Early Pottery Neolithic. These two categories were the most heterogeneous in terms of their fabric composition.

Table 5.5 Tell Sabi Abyad Late Neolithic wares and excavation areas selected for thin-section analysis

	SAB I Operation III	*SAB I Operation IV*	*Total*
Early Mineral Ware (EMW)	5	–	5
Standard Ware (SW)	13	–	13
Fine Mineral Tempered Ware (EFW)	3	3	6
Total	21	3	24

5.3. The thin-section analysis

A total of 24 sherds were subsequently selected for thin-section analyses, all from Tell Sabi Abyad I. Three of these came from Operation IV, with the remainder coming from Operation III (Table 5.5). They mostly belonged to the so-called Standard Ware, but also included Early Mineral Ware and Fine Mineral Tempered Ware. As with the microscopic fabric analysis, however, the field attribution of the material into wares was not taken as a starting point. Instead, we selected representative samples of the fabric groups distinguished through the microscopic analysis. Specifically, microscopic fabric groups 1, 2, 3, 4 and 7 were further investigated by means of thin-sectioning. No thin-sections could be performed for samples from the other fabric groups.

The thin-sections were prepared to thickness of 30 μm, which is a standard, optimum thickness for studying the optical properties of crystalline inclusions (Peterson 2009; Riederer 2004). All samples were examined under a polarising transmission light microscope using birefringence optical properties at magnifications of 10×, 20× and 40×. The polarising microscope uses polarised light controlled by a polariser and an analyser. In plain polarised light (PPL), without the analyser inserted, it is possible to study the section 'as is', showing its true colours and the light transitions between areas. Voids are more easily studied in PPL and one can estimate the refractive index of minerals, thereby facilitating identification. Inserting the analyser changes the light into cross-polarised light (XPL) in which the minerals will change their interference colour, depending on their [an-]isotropic properties. The type of interference colour in XPL, or the lack thereof, is therefore an important identification marker. We investigated the textural and quantitative (volume percent) properties of the fabric, the distribution of the naturally-occurring mineral grains, temper and voids (pores), but also the average size and the shape (angularity versus sphericity) of the inclusions and voids. The colour and the optical activity (isotropy) of the groundmass, and the orientation of the grains and voids were also noted (Whitbread 1986).

The petrologic examination of the thin-sections resulted in five different types, some of which can be further sub divided. The descriptions of these five groups are summarised in Tables 5.6–5.10. These five types match the five microscopic fabric groups, and broadly support the ware categorisation made in the field.

Type 1, which may be sub divided into two sub types, corresponds to the so-called Early Mineral Ware

Table 5.6 Tell Sabi Abyad. Description of thin-section type 1

Type 1 (*n* = 5) (Fig. 5.2: 1–2)

Fabric: Medium-tanned colour of the matrix in plain polarised light (PPL). The clay matrix is optically active and speckled in cross polarised light. Some samples show striated optical orientation. The silt (<5%) includes mainly feldspar but also minor quantities of quartz, calcite, micas, and iron oxides. Group 1 is divided into two subgroups: 1a (n=3) and 1b (n=2). The main differences are in the matrix which is medium coarse and unevenly distributed within group 1a, but very fine and evenly distributed within group 1b. Also in group 1b, the mineral temper is more unevenly distributed and distinctively larger, while displaying some elongated voids.

Temper: The temper is fairly well distributed but poorly sorted (in 1a more than in 1b),with the inclusions varying in size from 0.1 mm to 1 mm. Rounded quartz grains are occasionally observed. Iron oxides are present as semi-translucent red stains to brownish to opaque (the latter presumable magnetite and haematite), and are well distributed (5–10%). A few grains of rounded micrite (microcrystalline calcite mud seen as sub-translucent greyish or brownish) (up to 500 µm) are present as is some sparite (coarsely crystalline mosaic calcite crystals). The main temper (30–45%) is derived from basic igneous rocks (spilitic basalt and micro-gabbro with the minerals). Lime speckles are also present. In one sample limestone is present, and in another up to 5% of sparite (up to 600 µm) is seen. The calcite elements show in most cases no signs of alteration at all and may be derived from spilite, as this vesicular rock is often veined with calcite. One sample has some angular grog inclusions (5%).One sample also contains some larger pieces (500 µm–1 mm) of rounded grog (5%). One sample (no. 10) has some carbonized plant material that most likely was naturally occurring in the clay given its minor distribution.

Voids: A rather low volume percentage of voids. The few voids present are mainly rounded, and show no alignment.

(Table 5.6; Pl. 17:1). Both sub types were tempered with dense amounts of igneous material (spilitic basalt or micro-gabbro) and to some extent with lime, which may be an impurity from spilitic basalt. The matrix is fully active, and if we consider the presence of calcinated lime in several samples, this may suggest firing at low to medium temperatures (max. 850°C).

Types 2, 3, and 4 closely mirror the distinction between fabric groups 2, 3, and 4, and they broadly correspond to the field classification of Standard Ware (Tables 5.7–5.9; Pls 17–19). Type 3 (Table 5.8) also includes material classified as Early Mineral Ware. This overlap is limited to the very early stages of the Early Pottery Neolithic, and points to difficulties in distinguishing these two ware categories from the earliest stages of Standard Ware production. Type 2 (Table 5.7) was tempered with both calcitic and plant material, but to what extent the plant material was deliberately added remains questionable. The optical activity of the matrix is medium active and there is a certain degree of altered carbonates, suggesting that firing temperatures reached over 850°C. The matrix is not completely isotropic, however, which suggests that the firing temperatures did not exceed 900°C. Interestingly enough there is some anhydrite present, a mineral that normally decomposes at 700°C. This anomaly may be explained by secondary impurities. Type 3 was tempered

Table 5.7 Tell Sabi Abyad. Description of thin-section type 2

Type 2 (*n* = 2) (Fig. 5.2: 3)

Fabric: A dark brownish to greyish tan in PPL. The matrix of one of the two samples is optically less active but not completely isotropic. The second sample is optically active and also displays a weak optical orientation. The distribution of the samples is even in a rather fine matrix. The calcitic clay matrix (15–20%) has fine silt quartz and incidental grains of feldspar, pyroxene, and mica as well as some iron oxide.

Temper: The temper is fairly well distributed but poorly sorted. The elongated voids filled with charred material are good indicators of now-vanished plant temper (10–20%). Some altered carbonates (calcite and dolomite) are also present, and are a good indication that the material was fired at temperatures above 700°C. Non-altered gypsum and anhydrite are present in some samples but are most likely secondary impurities. The main mineral temper is limestone (10–35%), which may occur as fossiliferous fragments (one sample) or angular calcite crystals, but mostly occurs as rounded dark micrite and lighter sparite. Ferruginous clay inclusions with rather sharp boundaries with a size up to 0.5 mm are found in the material as impurities of the clay.

Voids: Approximately 10–20% by volume of voids. Most are elongated with sharp boundaries that identifies the original plant material as straw or grass. Cracks are also frequent but there is no clear direction visible. The surfaces are medium dense.

Table 5.8 Tell Sabi Abyad. Description of thin-section type 3

Type 3 (*n* = 3) (Fig. 5.3: 1)

Fabric: A light brownish tan in PPL. The matrix is optically less active but not completely isotropic in XPL. A certain dichotomy is visible in the matrix. The surfaces are medium dense while the rest of the silty calcitic matrix (5%) is rather fine to medium coarse. The silt displays very fine grains of epidote, feldspar and possibly pyroxene.

Temper: The temper is poorly sorted and unevenly distributed. The average size ranges from 0.25– 2 mm. Plant fibres compose 5–10% of the temper, of which carbonized remains are visible in the voids. A few dispersed quartz grains (rounded and angular, up to 1 mm) are seen in addition to altered calcite; however, in some cases only the edges of the calcite grains are decomposed. The main temper (20–30%) is different varieties of limestone, from angular monocrystalline calcite, fossiliferous limestone to microcrystalline sparite and micrite. There are also 5–10% of crushed igneous rocks (spilitic basalt or micro-gabbro). A few ferruginous clay inclusions are also present as well as occasional chunks of both round and angular grog (up to 1mm).

Voids: Approximately 10–20% of 0.5–1 mm large irregular voids but also a fair amount of cracks. Gypsum and anhydrite are seen as secondary material in some voids.

Table 5.9 Tell Sabi Abyad. Description of thin-section type 4

Type 4 (*n* = 8) (Fig. 5.3: 2–3; 5.4: 1–2)

Fabric: Varying greatly from dark brown to an ochre, orange tan in PPL. The edges are in most cases quite porous and the otherwise coarse matrix is optically active, in some cases with optic direction visible as striation in XPL. The natural calcareous clay also displays some silt grains of calcite (up to 20%) but also quartz and in some cases grains of mica, epidote and iron oxides. The distribution, both of the silt of the matrix and the inclusions, varies from even to uneven depending on the sample.

Temper: Most of the larger inclusions (ca. 1%) are quartz, calcite, dolomite, pyroxenes and alkali-feldspar, and are seen as monocrystals most likely present as impurities in the natural clay. The same is also the case with some fragments of sparite and micritic limestone. Other impurities are ferruginous clay inclusions that occur in nearly every sample (1–3%).Organic plant temper is by far the most obvious added material (25%). For some of the samples the plant material was distinctively identified as being straw. The ceramics were fired above 500oC as in many cases the plant material is seen only as a negative fibre shape, in some cases with carbonized remains in the void, especially at the core of the sherd. Most samples show a combination of both unaltered calcite and a light reaction of calcite alteration. One sample contained a significantly higher proportion of limestone (10–20%) and therefore represents a distinct subtype (4b).

Voids: The very coarse material with larger voids (up to 30% by volume) distinguishes this type. Some of the elongated voids have sharp boundaries after the now vanished plant material. In addition to the elongated and irregular shaped voids, round voids also occur. Most of the samples show alignment of the voids. Cracks occur but are not abundant. Some of the voids are filled up with secondary material such as quartz sand, gypsum, or anhydrite.

Table 5.10 Tell Sabi Abyad. Description of thin-section type 5

Type 5 (*n* = 6) (Fig. 5.4: 3)

Fabric: The mainly medium-coarse matrix has a light brownish tan in PPL and shows optical activity with a weak optical orientation. The calcite matrix shows an even distribution of mainly silt and quartz.

Temper: The temper, too, is evenly distributed but not always well sorted. The average size of the inclusions is 0.1–0.5 mm. One sample has a few organic inclusions, which are most likely natural impurities within the clay. Ferruginous aggregates such as red translucent spots (most likely iron oxides from pigment) and opaques (magnetite and haematite) are found in all samples (3–5%). A few rounded (up to 1 mm) grog fragments are present as temper in several of the samples too. The ceramics seems to have been lightly fired (below 700 °C) as grains of both unaltered and altered calcite (1–3%) are present. Gypsum and some anhydrite are also common (3–5%), but may be secondary as they often fill voids. The main temper added is different varieties of limestone, from crystalline calcite or limestone with or without fossils present, to sparite and micrite. Other ancillary minerals are micas (biotite and sericite), hornblende and feldspar.

Voids: Type 5 consists mainly of a medium-coarse matrix with a few mostly rounded voids of an average size of 0.1–0.5 mm. Cracks are common but the surfaces show a denser texture.

Table 5.11 Tell Sabi Abyad. The relation between microscopic fabric groups and thin-section types

Fabric group	Type 1	Type 2	Type 3	Type 4	Type 5	Total
1	5	–	–	–	–	5
2	–	2	2	–	–	4
3	–	–	1	–	–	1
4	–	–	–	8	–	8
5		(no thin-sections)				0
6		(no thin-sections)				0
7	–	–	–	–	6	6
8		(no thin-sections)				0
9		(no thin-sections)				0
10		(no thin-sections)				0
11		(no thin-sections)				0
Total	5	2	3	8	6	24

mainly with calcitic material but also to some extent with igneous material. Our two samples both show medium activity to inactivity, which suggests a slightly higher firing temperature than for type 1. However, the partial activity, especially around the igneous inclusions, may be attributed to the tendency of the igneous material to radiate heat longer.

Type 4 (Table 5.9) was tempered deliberately with much organic (plant) material (Pl. 18:2–4, Pl. 19:1). Most samples were fired at relatively low temperatures, as the organic material has not been fully combusted (this normally begins at 600°C), leaving charred material in some of the voids. One sample (no. 45), however, contained a high proportion of limestone (10–20%) and represents a distinct sub type (type 4b; Pl. 19:2). It was fired at a high temperature (above 750°C) which led to the decomposition and alteration of the micritic limestone. Secondary calcite is also visible as a filling in some pores, or as fringe deposits on the interior surface of voids. This may be caused by ground water transportation of the surrounding calcareous burial soil or as redistribution of the altered calcareous material within the sample itself.

Type 5, finally, corresponds to fabric group 7 and consists of Fine Mineral Tempered Ware (Table 5.10; Pl. 19:3). This pottery was mainly tempered with calcitic material that remained fairly unaltered. Based on this observation we may reconstruct the firing temperature to have been rather low, below 700–800°C.

5.4. Discussion and conclusions

Both microscopic and thin-section studies have each investigated pottery samples recovered from 7th millennium contexts excavated at Tell Sabi Abyad. They broadly arrive at a similar classification, which by and large corroborates the classifications made in the field. Four main ware categories have been investigated: so-called Standard Ware, Early Mineral Ware, Fine Mineral Tempered Ware and Grey-Black Ware. The petrographic analysis clearly confirms the existence of three distinct composites of raw materials and tempers, which reflect the existence of three distinct operational chains for, respectively, Standard Ware (fabric groups 2 and 4; thin-section types 2 and 4), Early Mineral Ware (fabric group 1; thin-section type 1) and Fine Mineral Tempered Ware – Grey-Black Ware (fabric groups 5 to 11; thin-section type 5). The two categories of Fine Mineral Tempered Ware and Grey-Black Ware are similar, although heterogeneous, in terms of clay selection and tempering; the main difference between these two categories is in the way the vessels were fired, *viz*. oxidising (FMTW) or reducing (GBW).

The major discrepancy within the categorisation made in the field lies with samples recovered from the interface between the Initial Pottery Neolithic and the Early Pottery Neolithic, here represented by our fabric group 3 (thin-section type 3). The two petrographic studies come to a somewhat different classification for these samples (compare Tables 5.3 and 5.11). In these stratigraphic levels the Early Mineral Ware and the Standard Ware are not always very distinctive, as the earliest Standard Ware was not yet as strongly tempered with organic inclusions as in later stages of the Early Pottery Neolithic (Chapter 4). Thus, it is likely that in the field several early Standard Ware sherds classified as 'Early Mineral Ware' should rather be placed together with Standard Ware following a more detailed petrographic inspection.

There were clear shifts through time in the preference for particular fabrics. In the Initial Pottery Neolithic, potters preferred a coarse, mineral-tempered fabric, as exemplified in our fabric group 1 (thin-section type 1). For this pottery, the potters selected highly calcareous clay and very deliberately added a large amount of crushed basalt as a temper. In several of the samples, the total amounts of mineral non-plastics reached up to 45 volume percent. This would have made some of the clays much less workable in terms of their plasticity than would be desirable from a potter's perspective. The use of plant materials as a deliberate temper does not appear to have played a role in this stage, although some fibrous material is occasionally observed as a likely natural element within the selected clays (e.g. fabric group 3; thin-section type 3). These coarsely mineral-tempered fabrics are documented also in the early stages of the Early Pottery Neolithic phase, but afterwards went into steep decline. After the Initial Pottery Neolithic, the practice of using coarsely ground basalt for temper seems to have been completely abandoned.

The deliberate addition of plant materials as a temper began in the earliest phases of the Early Pottery Neolithic. Already in its early stages, the samples include fabrics in which relatively limited amounts of plant inclusions are found, at first in combination with coarse minerals (e.g. fabric group 2, thin-section type 2). Fabric group 2 may constitute an intermediate stage between the earlier, exclusively mineral-tempered fabrics and the later, predominantly plant-tempered fabrics. It may also be, however, that in this fabric group the organic inclusions were not (yet) purposely added as a temper but instead formed part of the natural composition of the clay. Indeed, some of the early Standard Ware sherds have virtually no macroscopically visible non-plastics whatsoever (Chapter 4). From a potters' perspective such low-workability clays would have been rather unsuitable for making large, thick-walled ceramic containers, as they would sag during shaping, crack whilst drying, or break in the firing. Indeed, Standard Ware shapes at this stage were relatively small.

A coarsely plant-tempered fabric (our fabric group 4; thin-section type 4) is demonstrated for the first time in the early stages of the Early Pottery Neolithic, and became dominant by the middle stages of this period (levels A6–A5). This fabric characterises the bulk of the excavated material from the later Early Pottery Neolithic and Pre-Halaf levels at the site. For the Standard Ware, then, the main trend during the 7th millennium was a rising volume density of organic inclusions, reflecting an increasing preference for coarse plant tempers (Chapter 4). In our limited sample this is reflected in the shift from fabric groups 2 and 3 (each between 5 and 10 volume percent of organic materials) to fabric group 4 (between 10 and 25 volume percent of organic materials). Whereas the first two were restricted to levels attributed to the Initial Pottery Neolithic and the early parts of the Early Pottery Neolithic, fabric group 4 is characteristic for the great bulk of coarsely-made plant-tempered pottery found throughout the Early Pottery Neolithic sequence (Table 5.4). If in the earlier EPN levels it may be questionable whether the macroscopically observed plant inclusions were purposely added as a temper, little doubt of this process remains in later stages. The development of a coarse plant temper contributed to improved cohesion within the individual coils or slabs during the shaping process, and countered the risks of subsequent structural weakness, which allowed the potters to create vessels of larger size.

Finally, the use of a fine, mineral-tempered fabric is attested from the middle stages of the Early Pottery Neolithic onwards, particularly in the later stages of this period. The heterogeneity reflected in fabric groups 5–11 all suggest a preference for using clay containing small-sized mineral inclusions of a diverse nature; this material preference made possible the production of two distinct series of thin-walled and burnished pottery, so-called Fine Mineral Tempered Ware and Grey-Black Ware. The potters selected a diverse range of clays for this pottery, most of them already containing minimal quantities of limestone, quartz and other mineral types as part of the natural composition. They prepared some of these clays by adding finely-crushed calcite or basalt, which possess excellent heat-conducting properties (Rye 1981). Together with the thin, regular shape of the vessel wall, the burnished surfaces and the frequent lugs, this refined petrographic recipe made these vessels very suitable as 'cooking vessels'.

A clear shift is thus shown in the selection of raw materials during the transition from the Initial Pottery Neolithic to the Early Pottery Neolithic. Was this a case of continuity characterised by rapid transformation? Did the Standard Ware and the mineral-tempered Fine Mineral Tempered Ware/ Grey-Black Ware evolve from the earlier Early Mineral Ware? Alternatively, were these wholly independent ceramic traditions, with the earlier method entirely replaced? The ceramic assemblages associated with these two phases are distinctive in virtually every aspect: in terms of vessel shape, surface treatment and decoration (Chapter 4), but also in terms of the overall quantities of pottery vessels in circulation (Chapter 11). The chronological position of fabric group 3 (thin-section type 3) at the interface of these two periods might argue for continuity. In the field sherds from this fabric type were variously attributed to either Standard Ware or Early Mineral Ware on visual grounds, and in terms of composition they are perhaps an intermediate phase between these two categories.

In general, however, the petrographic analysis would suggest an image of discontinuity. There are huge differences between the coarsely mineral-tempered wares from the Initial Pottery Neolithic phase and the plant-tempered Standard Ware that initially developed in the Early Pottery Neolithic. As well, they represent diverse provenances (Chapter 9). The present study suggests that the later mineral tempered wares, Fine Mineral Tempered Ware and Grey-Black Ware, did *not* evolve out of the Early Mineral Ware. The strong differences in selected clays and tempering materials reflect very different technologies and raw materials. Moreover, while Early Mineral Ware virtually disappeared from the ceramic assemblage after level A9, Fine Mineral Tempered Ware and Grey-Black Ware were not introduced in meaningful quantities before level A6 (Chapter 11). In other words, from levels A8 to A7, a period of over a century between ca. 6630–6500 cal BC., there may not have been any mineral-tempered pottery in circulation in the village whatsoever. This argues against continuity, and would suggest that by ca. 6500 cal BC potters re-invented the production of mineral-tempered pottery.

Note

1 A study visit to Damascus by van As and Jacobs was made possible by the generous support of the Foundation Friends of Sabi Abyad (FOSA). We are most grateful to Astrid Rijbroek at the Netherlands Institute for Academic Studies in Damascus for providing accommodation during this study visit. At the Faculty of Archaeology (Leiden University) Renate van Oosterhout subjected most of the samples to microscopic fabric analysis in the framework of her MA thesis. The thin-sections were made at the Vrije Universiteit Amsterdam (VU) for which we are most grateful to Henk Kars, director of the Institute for Geo- and Bioarchaeology, and Wynanda Koot, support Geotechnical laboratory.

Chapter 6

Plastered ceramics at Tell Sabi Abyad

Olivier Nieuwenhuyse and Ewout Koek

6.1. Introduction

The application of plaster to pottery vessels was relatively common at 7th-millennium Operation III (Fig. 6.1). This should perhaps come as no surprise, given that the very same levels also revealed an abundant production of containers made of lime and gypsum plaster, the so-called White Ware (Nilhamn and Koek 2013; Nieuwenhuyse and Nilhamn 2010). It seems safe to suggest that the craft persons responsible for producing the white ware were often identical to those who made the pottery containers. Beyond its applications for ceramic technology, plaster was also utilised in architectural construction and as a coating for various types of pits and bins made of unfired clay. Apparently, knowledge and expertise flowed freely from one field of technological practice to the other in the Late Neolithic.

The occasional presence of plaster coatings has already been briefly referred to in the descriptions presented in the preceding chapters. Here we wish to draw special attention to this intriguing practice and explore *why* pots were plastered. We shall begin with investigating the frequency of plaster application to pottery vessels, and identify which pottery types were deemed more suitable for plastering than others. Also, using the available stratigraphic evidence, we shall explore the time-depth of pottery plastering. Finally, we wish to present the preliminary results of an archaeometric pilot study that investigates the raw materials used for plastering Late Neolithic ceramics at Tell Sabi Abyad.[1]

6.2. Plastered Late Neolithic ceramics

As a result of previous practices of ceramic analysis, the presence of a plaster coating was not included in the basis pottery counts; plastered sherds simply did not gain a separate entry on the counting lists. However, numerous sherds that had a plaster layer were selected as 'diagnostic' sherds that required further detailed description. For the distribution of plastered sherds in the ceramic sequence of Operation III, we may therefore cautiously consult the database of the diagnostic material, keeping in mind that these figures represent an underestimation (Table 6.1). This shows that plastering a pottery vessel was almost exclusively limited to the category of Standard Ware. The ceramic sample from Operation III contains just a single plastered Halaf Fine Ware sherd and only four plastered Fine Mineral Tempered Ware sherds. The remaining sherds ($n = 387$) are Standard Ware. This corresponds with the information from Operation I (Nieuwenhuyse 2007) and Operations IV and V (Chapter 12). In the first instance, plastering occurs exclusively with Standard Ware. In sum, we may safely say that at Sabi Abyad, plaster was only applied to pottery vessels composed of Standard Ware.

What was the time range of this practice? Interestingly, not a single plastered sherd was retrieved from the Initial Pottery Neolithic strata. The practice developed in the wake of the initial introduction of Standard Ware pottery. In Operation III, plastered sherds are found already at the very beginning of the Early Pottery Neolithic sequence (level A9), with the practice continuing throughout the entire phase. We find plastered Standard Ware sherds in each and every level of the A-Sequence. A clear peak in their numbers can be observed in level A1 (Fig. 6.2: lower). Interestingly, plastering continued into the very early stages of the Pre-Halaf period, as represented by levels A1 and B8. In these two levels we still find significant numbers of plastered pots.

However, this practice dwindled, with a minimal number of plastered sherds found scattered through the B-Sequence, and only occasionally present even in the C- and D-levels. The examples from the D-Sequence are stratigraphically unreliable and cannot be unequivocally

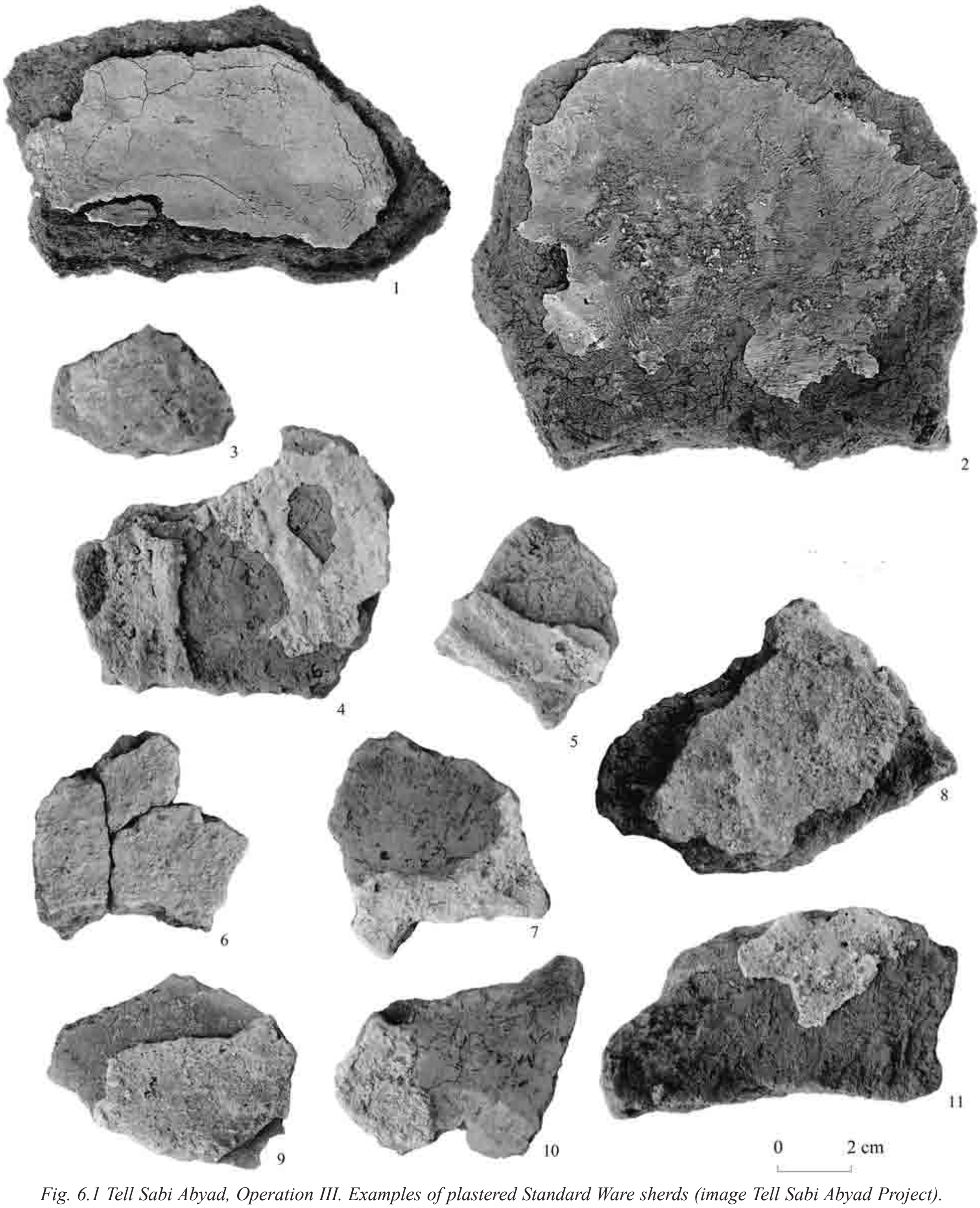


Fig. 6.1 Tell Sabi Abyad, Operation III. Examples of plastered Standard Ware sherds (image Tell Sabi Abyad Project).

associated with the Middle Halaf period, to which these stratigraphic units have been ascribed (Chapter 11). The material from the C-levels, the D-levels and the upper B-levels was almost exclusively recovered from open area contexts (Table 6.3), a depositional category susceptible to stratigraphic mixing. In short, it is doubtful whether the plastered sherds recovered from deposits younger than level B8 truly belong to the archaeological phases represented by these levels. Elsewhere at Tell Sabi Abyad plastered pottery was recovered in meaningful numbers only from Operation IV and from the Early Pottery Neolithic strata of Operation V (Chapter 12). Very few plastered vessels were recovered from the later levels of Operation V, or from the Pre-Halaf strata of Operation I (Nieuwenhuyse 2007). All this suggests that the practice of plastering pottery vessels came to an end soon after the Early Pottery Neolithic.

Table 6.1 Tell Sabi Abyad, Operation III. Frequencies of plastered sherds by level distinguishing between ware (based on diagnostic sample)

Level	Standard Ware	Halaf Fine Ware	Fine Mineral Tempered Ware	Total
D-Sequence	4	1	–	5
C-Sequence	3	–	–	3
Mixed B	18	–	–	18
B2	2	–	–	2
B3	1	–	–	1
B4	3	–	–	3
B6	1	–	–	1
B7	1	–	–	1
B8	17	–	–	17
Mixed A	27	–	–	27
A1	152	–	–	152
A2	24	–	–	24
A3	47	–	2	49
A4	31	–	2	33
A5	20	–	–	20
A6	20	–	–	20
A7	6	–	–	6
A8	2	–	–	2
A9	8	–	–	8
Total	387	1	4	392

Evidently, the absolute counts do not accurately reflect the vastly different sizes of the pottery samples studied for the various levels. But if we incorporate sample size into calculating the proportions of plastered Standard Ware vessels (Fig. 6.2: upper), a complex, yet erratic pattern emerges. In the first instance, when expressed in terms of Raw Counts, the *proportions* of plastered Standard Ware remain fairly low in most levels (including level A1), thus minimising the 'peak' observed in the absolute counts in this level. Interestingly enough a similar trend to the absolute count emerges in the Estimated number of Vessels Represented (EVR) and Estimated Vessel Equivalent (EVE) values: there are very low proportions of plastered Standard Ware vessels in the earliest phases of the Early Pottery Neolithic (i.e. levels A9–A6), followed by a definite rise in the subsequent levels A5 to B8. With the proportion of plastered vessels comprising less than one percent of all Standard Ware vessels in levels A9 to A6 (EVR), this statistic rose between 2% and 6% compared with levels A5–B8. Completely preserved plastered vessels are restricted to levels A5–B8, with the exception of two examples from the C–D strata. The extraordinary high EVE for level A1 is likely skewed due to the relatively large number of complete plastered Standard Ware vessels recovered from this level, including a few with plaster repair (see Chapter 8). The EVR

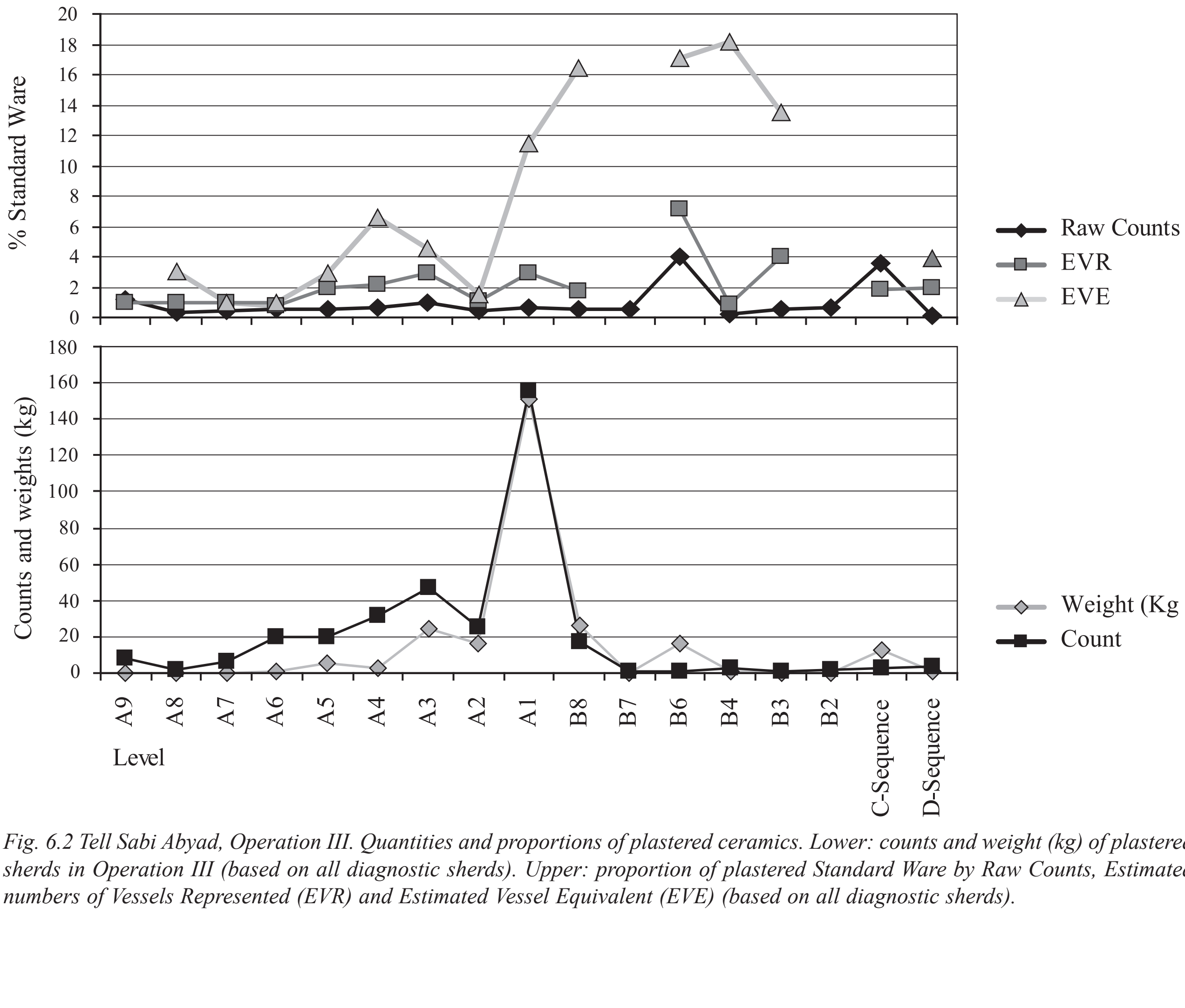


Fig. 6.2 Tell Sabi Abyad, Operation III. Quantities and proportions of plastered ceramics. Lower: counts and weight (kg) of plastered sherds in Operation III (based on all diagnostic sherds). Upper: proportion of plastered Standard Ware by Raw Counts, Estimated numbers of Vessels Represented (EVR) and Estimated Vessel Equivalent (EVE) (based on all diagnostic sherds).

and EVE computations from many of the subsequent B-levels should likewise be taken with a healthy degree of scepticism, given the minimal size of these pottery samples. In conclusion, it appears that the practice of plastering Standard Ware vessels began at the very start of the Early Pottery Neolithic and continued into the early stages of the Pre-Halaf, after which it largely disappeared.

6.3. The typology of plastered Standard Ware

Given the especially strong correlation between plaster coating and Standard Ware, is it possible to associate plaster with specific functional types or with Standard Ware vessels of a particular size? Interestingly enough, the potters do not seem to have been very explicit regarding which types of vessel could or could not be plastered. Throughout the Operation III sequence, plastering seems to have been applied rather uniformly to the entire range of vessel types distinguished in the typological analysis (Chapter 4). The most common types of plastered vessels are those that were common in the wider Standard Ware repertoire. Most often we find plastered vertical pots and convex-sided bowls (Table 6.2). Shifts in the pottery types associated with plaster coating closely follow the broader developments observed in the Standard Ware. For instance, the introduction of Standard Ware jars in the

Fig. 6.3 Tell Sabi Abyad, Operation V. Plastered Standard Ware Medium-sized Jar (P01-54; from the Pre-Halaf strata). The vessel is coated by a thick plaster patch on the exterior base and lower body, while patches of plaster remain visible on the exterior of the upper body (see Pl. 8.2) (image Tell Sabi Abyad Project).

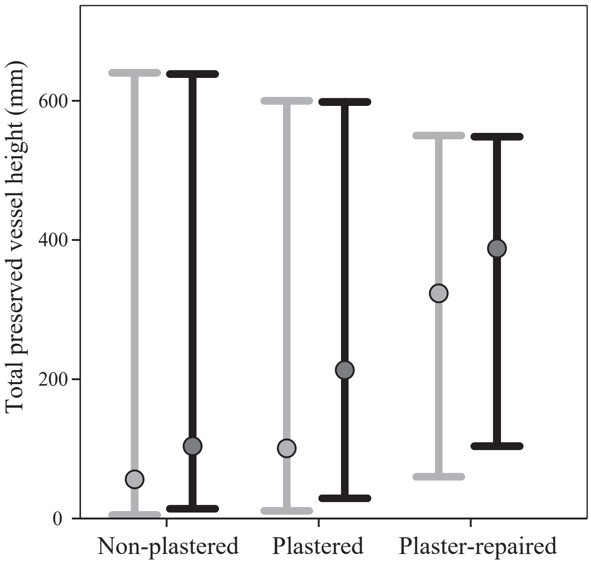


Fig. 6.4 Tell Sabi Abyad, Operation III. Comparing the preserved height (mm) of non-plastered, plastered and plaster-repaired Standard Ware vessels. Minimum, maximum and average values. Grey: EVR. Black: only complete profiles.

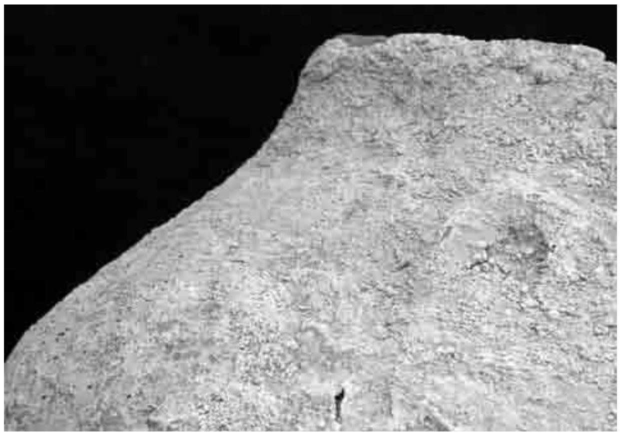


Fig. 6.5 Tell Sabi Abyad, Operation III. Detail of plastered Standard Ware jar P05-87 (Pl. 15). The curved bulb visible to the right is a covered applied crescent (image O. Nieuwenhuyse).

later A-levels is subsequently followed by the application of plaster to this new vessel shape. Perhaps curiously, when husking trays appeared in level A1, these too, were occasionally treated with plaster (Fig. 6.6).

The frequencies presented in Table 6.2 are based on EVR and are therefore selective (Chapter 3). Large numbers of additional plastered Standard Ware body sherds were found (n = 255). Judging by their curvature, most of these would have belonged to closed shapes, such as hole mouth pots or jars (Fig. 6.3, Fig. 6.5, Pl. 15, Pl. 20.1). This does not mean that the typological range presented in Table 6.2 should be mistrusted or that closed shapes formed the majority of the plastered Standard Ware vessels. Rather, the taller, often more voluminous jars and hole mouth pots would on average have produced more body fragments upon breakage, explaining their over-representation in the Raw Counts. When all is said and done, we cannot unequivocally demonstrate typological differences between plastered and non-plastered Standard Ware pottery.

However, even if formal typological differences between plastered and non-plastered Standard Ware containers are hard to demonstrate, these two groups certainly seem to have differed in size. Plastered sherds are on average somewhat thicker than non-plastered sherds. The difference is admittedly not very impressive (ca. 2 mm), yet it is significant.[2] Plastered Standard Ware sherds reach an average weight nearly seven times that of non-plastered sherds.[3] As wall thickness and weight reflect size, and more specifically height (Chapter 4), this would indicate that plastered vessels were on average larger. Of course, both the subtle difference in average wall thickness and the increased weight to some extent simply reflect the presence of an additional plaster coating. However, if we compare the total preserved height of plastered and non-plastered vessels, a large difference in average vessel height is demonstrated. Plastered Standard Ware vessels are on average preserved to a height almost double to that of non-plastered vessels.[4] Finally, plastered containers were on average (much) more voluminous.[5] Interestingly, Standard Ware vessels carrying plaster repairs are even larger: these include some of the tallest, most voluminous vessels found in Operation III (Fig. 6.4).[6]

A plaster coating was most often applied to the exterior surface (51% of all plastered sherds), somewhat less often on the interior (40% of all plastered sherds) and only occasionally upon both surfaces (9% of all plastered sherds). Apparently, it was deemed sufficient to apply the plaster to only one of the surfaces. In the case of closed shapes, the slightly higher proportion of exterior plasters may simply be given in by practical considerations: the outside surfaces of such vessels are far easier to reach than the interior. On the other hand, the fact that many of the closed Standard Ware vessels *were* treated on their interior, overriding what we might see as pragmatic limitations, perhaps suggests that an interior treatment was preferred for such containers (Pl. 20.1).

The plaster coatings were usually roughly textured, suggesting no further treatment after the plastic material was smeared and sculpted over the surface. Often the plaster was applied in layers, which, have the natural tendency to flake off over time (Pl. 20.1). In many instances most of the coating had been flaked off entirely, leaving only thin patches to indicate that a plaster had originally been present. In most cases the plastering was a thin layer with a maximum thickness of 1–2 mm. Much thicker applications are not uncommon, however, and in some cases the total thickness of the plaster reached well beyond one centimetre. In many of these examples, layering could be observed in such thicker patches, demonstrating that it had been applied in several layers.

As far as we can gauge, the thickest patches were often at the base, with only rare rim exceptions. When the interior was treated, the plaster was often brought up to the rim and sculpted over it. Some tall, closed vessels

Table 6.2 Tell Sabi Abyad, Operation III. Frequencies of plastered Standard Ware pottery types by level (based on EVR)

	A9	*A8*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*A7*	*Mix A*	*B8*	*B6*	*B4*	*B3*	*Mix B*	*C-Sequence*	*D-Sequence*	*Total*
Uncertain	–	–	–	1	–	1	–	1	–	2	–	–	–	–	–	–	–	4
Everted convex-sided bowl	1	–	–	–	–	2	–	1	1	–	–	–	–	–	–	–	–	5
Vertical convex-sided bowl	–	1	3	–	1	4	1	3	–	3	1	–	1	–	1	–	1	19
Closed convex-sided bowl	–	–	–	1	2	4	1	1	1	1	–	–	–	–	–	–	–	11
Large convex-sided bowl	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Oval vertical convex-sided bowl	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	2
Oval everted convex-sided bowl	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1
Oval closed convex-sided bowl	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Straight-sided bowl – unspecified	–	–	–	–	1	1	–	3	–	1	–	–	–	–	–	–	–	6
Straight-sided flat-based bowl	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Vertical straight-sided carinated bowl	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	2
Closed S-shaped bowl	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	2
S-shaped goblet	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Everted tray	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	2
Vertical tray	–	–	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	3
Husking tray	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	–	–	6
Hole mouth pot	–	–	–	1	–	–	–	3	–	–	–	–	–	–	–	–	–	4
Oval hole mouth pot	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Vertical pot	–	–	1	2	7	3	2	3	–	6	–	–	–	–	2	–	–	26
Oval vertical pot	–	–	–	1	1	–	–	1	–	–	–	–	–	–	–	–	–	3
Tall hole mouth pot	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	2
Large jar	–	–	–	–	–	–	–	8	–	–	1	–	–	–	–	–	1	10
Medium-sized jar	–	–	–	–	–	–	–	6	–	–	1	–	–	–	1	–	–	8
Small jar	–	–	–	–	–	–	–	3	–	–	1	–	–	–	2	–	–	6
Hole mouth jar	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	2
Total	1	1	4	8	14	17	5	48	2	14	5	1	1	1	6	1	3	132

Table 6.3 Tell Sabi Abyad, Operation III. Frequencies of depositional context of plastered sherds by level

Level	*Bin*	*Burial*	*Construction*	*Floor*	*Hearth*	*Open area*	*Oven*	*Pit*	*Platform*	*Room*	*Unknown*	*Total*
D-Sequence	–	–	–	–	–	5	–	–	–	–	–	5
C-Sequence	–	–	–	–	–	3	–	–	–	–	–	3
Mixed B	–	–	–	–	–	18	–	–	–	–	–	18
B2	–	–	–	–	–	2	–	–	–	–	–	2
B3	–	–	–	–	–	–	–	–	–	1	–	1
B4	–	–	–	–	–	2	–	1	–	–	–	3
B6	–	–	–	–	–	1	–	–	–	–	–	1
B7	–	–	–	–	–	–	1	–	–	–	–	1
B8	–	1	–	–	1	8	2	5	–	–	–	17
Mixed A	–	–	–	–	–	27	–	–	–	–	–	27
A1	–	–	2	5	1	84	3	2	1	50	8	156
A2	–	–	–	–	–	17	–	3	–	5	–	25
A3	–	–	1	–	–	34	–	4	–	10	–	49
A4	–	–	1	2	–	15	1	2	–	13	–	34
A5	1	–	–	2	–	7	–	–	4	4	2	20
A6	–	–	–	–	–	11	–	–	9	–	–	20
A7	–	–	–	–	–	3	–	–	–	–	3	6
A8	–	–	–	–	–	–	–	1	–	1	–	2
A9	–	–	–	–	–	5	–	3	–	–	–	8
Total	1	1	4	9	2	242	7	21	14	84	13	398

have an extraordinary thick plaster 'collar'-like crust applied to the uppermost part of their profile (Fig. 6.5). Most interestingly, in some cases this was part of an attempt to repair the vessel (Chapter 8). In other cases, it appears to have functioned as an alternative to the original rim. For instance, in the case of a tall, hole mouth pot, thick plaster functioned as an interior ledge to hold a circular limestone disc as a tightly-fitting lid (Pl. 7). In this exceptional case the vessel and lid were found together *in situ*; several other examples of tall, plastered Standard Ware vessels found without such lids may have carried them in the past.

Such general measurements of height preservation ignore potential differences in preservation contexts between plastered and non-plastered pottery vessels. Perhaps plastered vessels were stronger because of their extra layer, or perhaps they were deposited differently, increasing their chance of reaching the archaeologist intact? To avoid this possible bias, we also compared the preserved heights of complete ceramic profiles. When only complete profiles are considered, plastered vessels on average measure about twice the height of non-plastered vessels (Fig. 6.4). Plaster-repaired Standard Ware vessels were, on average, even taller.[7] We conclude that even if plastered and non-plastered Standard Ware vessels may not have differed much in their formal typology, the potters certainly favoured the taller, more voluminous vessels for plastering.

We briefly inspected the types of depositional contexts that produced the plastered pottery. We should again reiterate that the contexts of recovery represent a mixture of mostly secondary or even tertiary depositions (Chapter 2). Perhaps the only unequivocal primary context was a plastered vessel used as a container for a juvenile burial (Chapter 14). Two contextual categories are especially common with plastered sherds: open areas and room fills. If deposition bears any meaningful relationship to the systemic locus of activity, this distribution might suggest that activities involving plastered pottery were conducted mainly on the open areas and inside buildings. This would correspond well with the observations of the excavators: large plastered Standard Ware jars were often recovered from within the buildings and were found occasionally situated with their lower parts buried in a pit on the open courtyards.

Other find contexts include depositions covering floors, the ashy fills of ovens and, in particular, pits. The latter is intriguing if one considers the frequent presence of plastered storage pits in these levels. Plaster may have been employed both to line the pits and to coat the jars placed inside them. The most diverse range of contexts is attested in levels A5–B8, which corresponds to the phase in which plastered vessels were most frequent. After level B8 the contextual diversity narrows down, and most of the plastered sherds from the subsequent levels were recovered from open areas (Table 6.3). As open areas are more susceptible to stratigraphic mixing than closed spaces such as pits or rooms, this supports our view that at least a small percentage of these later finds were intrusive from earlier levels.

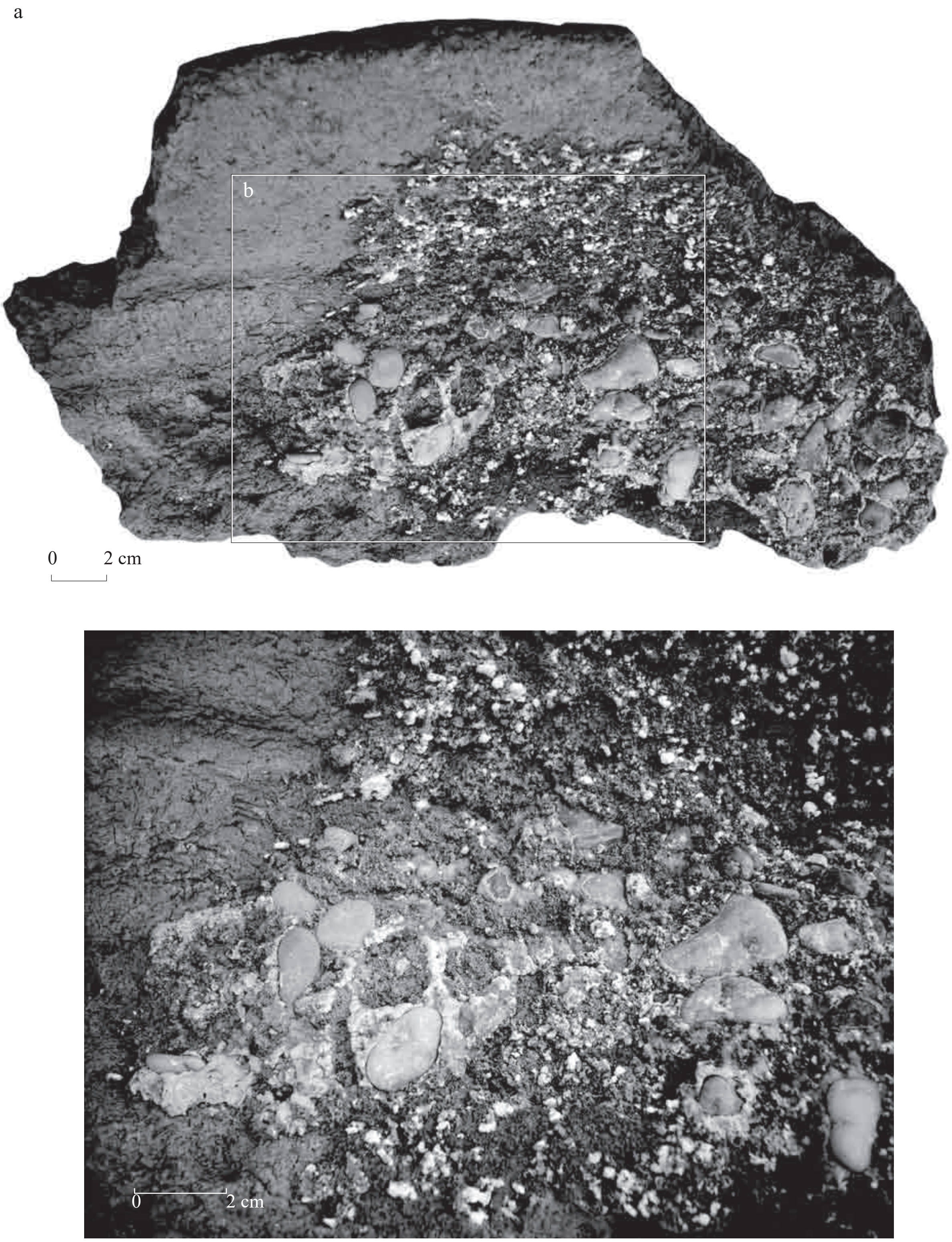


Fig. 6.6 Tell Sabi Abyad, Operation III. A thick plaster coating the interior surface of a Standard Ware husking tray (P07-10; level A1). Pebbles of varying size (0.5–2.5 cm) have been pressed into the 1–1.5 cm thick plaster (for a reconstruction see Fig. 4.82: 1) (image O. Nieuwenhuyse).

6.4. Analysing the raw materials

In order to gain an insight into the raw materials used for plastering the pottery in Operation III, a selection of plastered Standard Ware sherds was submitted to archaeometric analysis (*n* = 15). The sherds were investigated at the Netherlands Institute for Cultural Heritage to evaluate the possibilities of conserving White Ware artefacts from the ancient Near East (Koek

Table 6.4 Tell Sabi Abyad, Operation III. Plastered Standard Ware sherds selected for archaeometrical analysis

No.	*Trench-locus-lot-no*	*Type*	*Context*	*Level*
31	G05:032-065-015	Body sherd. Exterior plastered (1 mm).	Open area	A1
32	G05:042-083-002	Body sherd. Interior completely plastered. Basketry impressions visible in the plaster.	Room fill	A1
33	G05:042-083-016	Body sherd. Interior plastered (<1 mm).	Room fill	A1
34	G05:062-128-011	Body sherd. One surface plastered.	Open area	A1
35	G05:072-138-015	Body sherd of a jar. Interior plastered (8 mm).	Open area	A1
36	G05:084-154-107	Body sherd. Exterior plastered (<1 mm).	Open area	A1
37	G05:084-154-109	Body sherd. Exterior plastered (33 mm).	Open area	A1
38	G05:084-154-012	Body sherd of a jar. Exterior plastered (3 mm); 6 mm-thick patch of plaster on interior.	Open area	A1
39	G05:084-154-110	Body sherd of a jar. Exterior plastered (3 mm). Plaster shows two distinct layers.	Open area	A1
40	G05:084-159-010	Body sherd of a jar. Exterior plastered (3 mm).	Open area	A1
41	G05:085-155-008	Body sherd of a jar. Both surfaces plastered (4 mm).	Open area	A1
42	G05:085-155-009	Body sherd of a jar. Exterior plastered (4 mm).	Open area	A1
43	G05:093-164-009	Body sherd. Interior plastered (<1 mm).	Open area	A1
44	G05:094-165-007	Base fragment. Exterior plastered (4 mm).	Room fill	A1
46	I03:131-174-100	Complete large jar. Interior very thick plaster. At least four distinct layers. Plaster used for repair.	Room fill	A1

2009). For this larger conservation project, a total of 45 samples were studied, 30 of which belonged to White Ware vessels (samples 1–30), while the remaining 15 were plaster coatings on pottery sherds (samples 31–44, 46) (Table 6.4).[8] Plastered Standard Ware sherds were studied alongside the White Ware sherds to establish if similar raw materials were used for both categories. Research has shown that Neolithic communities were aware of at least two very different raw materials and attendant technologies for the production of White Ware (also known as *vaissele blanche*). They may have employed either lime (calcinated calcium carbonate, $CaCO_3$) or gypsum (hydrated calcium sulphate, $CaSO_4.2H_2O$) (Kingery *et al.* 1988; Maréchal 1982; Nilhamn 2017; Nilhamn *et al.* 2008; Nilhamn and Koek 2013; Rehoff *et al.* 1990). These materials have very different requirements for their method of initial processing, the workability of the material, and the performance properties of the finished product.

The fifteen plastered pottery sherds, admittedly, form a quite small sample not fairly representative of the long time-depth of plastered vessels in Operation III. Nor does it adequately reflect the spatial-contextual and functional heterogeneity of the plastered pottery. With the exception of one sample from trench I3, all samples were from a single trench, G5. All samples come from the stratigraphic level A1, that corresponds to the start of the Pre-Halaf phase, a time when the practice of plastering was at its peak (Table 6.4). Most of the samples were recovered from the extensive open areas between the excavated buildings; others were retrieved from room fills.

To determine whether lime or gypsum was used for the production of White Ware and the plaster coatings, X-ray fluorescence (XRF) analyses were performed on all of the White Ware and plastered pottery samples.[9] To confirm the identification of the material based on the elemental analysis by XRF, a selection of White Ware samples has furthermore been analysed using X-ray diffraction (XRD) (Koek 2009). Four White Ware thin-sections were prepared to examine the large-scale features of the material, such as the composition and the texture of the grains, and the geometrical relationships between the matrix, the inclusions, and any aggregate material. An even more detailed analysis of the different minerals embodied in the matrix of gypsum was performed on eight White Ware samples using a scanning electron microscope (SEM) equipped with an energy dispersive x-ray analysis detector (EDX).[10]

Without exception, *all* tested samples proved to be composed of gypsum. This holds for the White Ware samples as well as for the plaster applied to the pottery sherds. In the XRF spectra large peaks of calcium (Ca) accompanied by peaks of sulphur (S) are visible alongside smaller peaks of strontium (Sr) and iron (Fe) (Fig. 6.7). The XRF spectra of the 15 plastered pottery samples are all very similar to one another. The XRD analyses of the White Ware showed that the elements calcium (Ca) and sulphur (S) were present in the form of gypsum. Although the plastered pottery samples were not analysed using XRD, it was assumed that their highly similar XRF spectra also consisted of gypsum. Examined under polarised light, the White Ware samples show a gypsum matrix with pores of different sizes. Impurities of clay minerals, probably some sand, and Celestine minerals are present. Their random distribution and presence implies that they were not added as temper during the production of the plaster, but rather were enclosed during the formation of the gypsum. In other words, they were naturally present in the raw material.

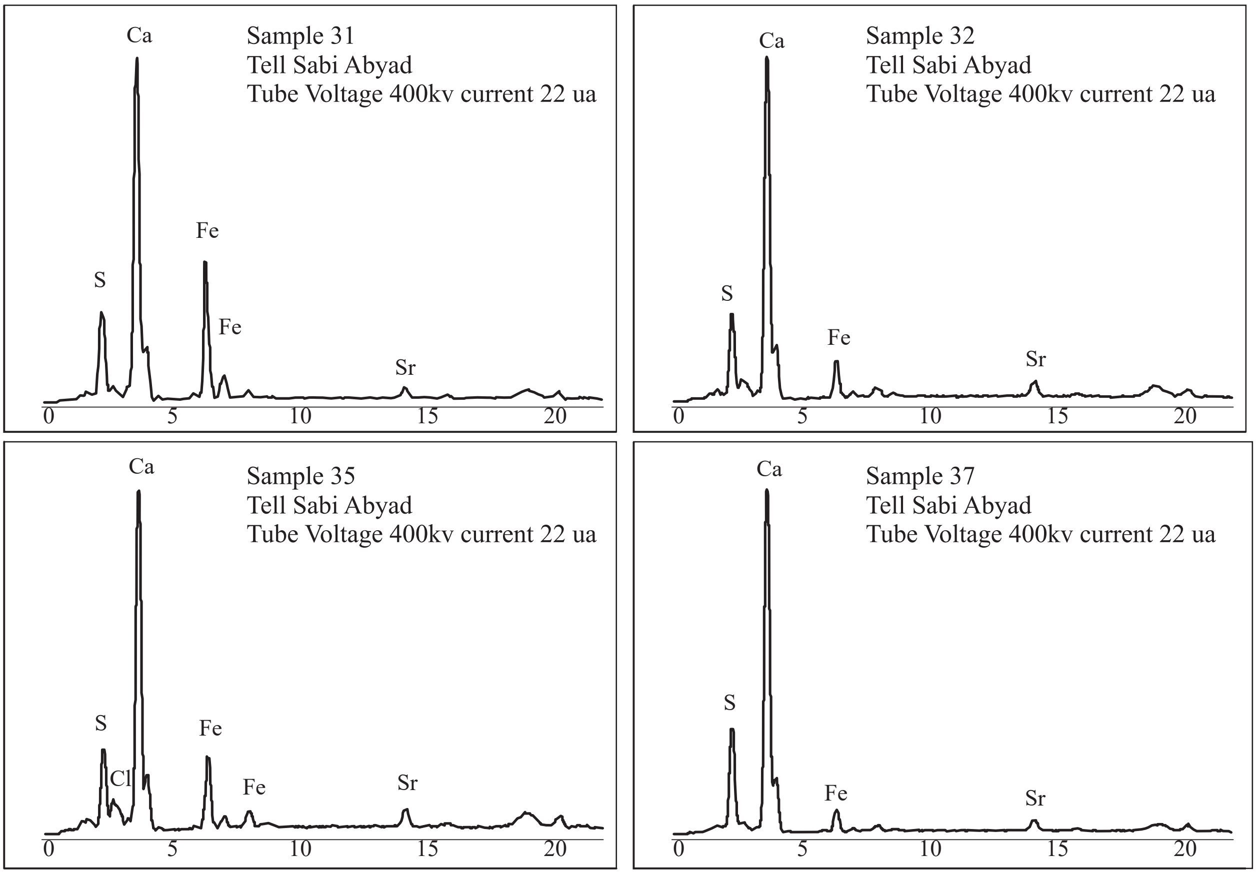


Fig. 6.7 Tell Sabi Abyad, Operation III. XRF spectra of the plaster layers of Standard Ware samples 31, 32, 35 and 37 (image E. Koek).

Although a more detailed look at the plastered Standard Ware sherd samples is necessary to be conclusive, these first analyses indicate that, at least for the start of the Pre-Halaf phase, the plasters used for the production of White Ware and the plasters used as coating on Standard Ware vessels were of a similar composition.

6.5. Discussion and conclusions

In conclusion, it appears that the practice of plastering Standard Ware vessels began at the very start of the Early Pottery Neolithic and continued into the early stages of the Pre-Halaf, after which it largely disappeared. During this long period, however, the popularity of plastered vessels was certainly not constant. The practice began at a very modest scale at the start of the Early Pottery Neolithic (levels A9–A6, 6675–6485 cal BC), when plastering constituted less than 1% of all pottery vessels. Plastered Standard Ware vessels became somewhat more prominent in the second half of the 7th millennium, representing only 2% of all Standard Ware vessels by levels A5 and A4. Plastering reached a peak in the final stages of the 7th millennium (levels A3–B8, 6395–6105 cal BC), when apparently between 2% and 6% of the Standard Ware pottery was coated with plaster.

All samples analysed thus far identified the same coating material to be gypsum. The raw materials and basic technology for plastering the pottery vessels appear to have been the same as those used for the production of White Ware containers. Certainly, the sample is quite small. Future work should seek to corroborate the validity of this pattern, incorporating earlier examples and exploring other material categories for which plaster was employed such as architecture, plastered pits and storage bins. Nevertheless, the consistency of the pattern is intriguing. Gypsum was apparently the preferred raw material for creating *thick* plasters. Ongoing analyses suggest that for other purposes that required the application of a *thin* plaster coating, the potters adopted other raw materials in addition to gypsum, including lime plaster and calcareous clay (Chapter 7). Crafts persons in the community were aware of the different properties and requirements of the various materials, and they used them alongside one another for different purposes.

The (apparent) strong preference for gypsum is intriguing, as this raw material does not seem to have been widely available in the immediate vicinity of the settlement. A geological study on the Balikh basin by Mulders (1969) shows that Tell Sabi Abyad does not lie in a 'gypsum environment'. Rather, the local geology is characterised mostly by limestone formations. The closest significant gypsum formations known are located some 30 km to the south. This would be just over an average day's walk on foot, especially if we consider the heavy weight of the material that people would have most likely carried on their backs. Possibly this material came to the village through 'middle men'; several contemporaneous intermediate villages have been attested in surveying (Akkermans 1993). Interestingly, the regional 'mega site' of Tell Mounbatah lies close to an important gypsum outcrop (Mulders 1969).[11] Perhaps this gateway community functioned as an important starting point for the trade network through which gypsum was circulated through the Balikh basin.

The function of the gypsum plaster remains to be further investigated, but current evidence suggests that gypsum coating had multiple usages, depending on the type of vessel and the intended activities. In terms of application this was an expedient technology. Almost certainly it was applied in order to reduce the porosity of the vessel wall, and perhaps to increase the vessel strength. Plastering was often exclusively associated with Standard Ware. This pottery was very porous and permeable to liquids, due to the abundant coarse plant temper and the low firing temperature, but also because of the occasionally poor bonding between individual clay coils. The latter fact may have been of relevance especially in the earliest stages of the Early Pottery Neolithic, when people first began to explore the use of plaster with these vessels. In these early levels, to be sure, Standard Ware vessels were often burnished, a major alternative strategy to reduce porosity, but the burnishing was not done very thoroughly in these levels, and it may not have been technically sufficient. In the later stages of the Early Pottery Neolithic when plastering flourished, burnishing nearly disappeared (Chapter 4). Gypsum may have been less water-resistant, less durable and more susceptive to fungal and bacterial growth than lime plaster would have been, but the production of gypsum took less energy than plaster due to the lower heating temperatures required. Gypsum was more practical for sculpting thick layers of sometimes irregular shape, as is seen with the artificial internal rim in a tall hole mouth pot or with the occasional plaster repair (Chapter 8).

Certainly, there is a strong relationship between plastering and closure. On average, plastered Standard Ware vessels were taller, more thickly walled and, presumably, more voluminous than non-plastered vessels. The strong relationship between the application of plaster and increased vessel size suggests that plastering played a role in enhancing the potential for long-term, bulk storage. Many plastered vessels were closed shapes (e.g. jars or hole mouth pots), for which bulk storage would have been a likely usage (Nieuwenhuyse and Nilhamn 2010). Interestingly, vertical pots with loop handles were also frequently plastered, which additionally may suggest that part of their function lay in the realm of storage. However, this relationship between plastering and closure was far from exclusive. Plaster coating was also very frequently applied to open shapes, even onto husking trays, for which long-term storage of goods is a much less likely reconstructed usage. For plastered bowls and trays the reduced porosity may have been a relevant factor, perhaps suggesting that liquid substances were processed in these vessel types.

It cannot be excluded that aesthetic and symbolic considerations, too, played a role in the application of plasters. In many cultures brilliant white surfaces have connotations with life and death, or with concepts of purity (Douglas 1966). The association of plaster with, specifically, large, closed vessels recalls a similar association with appliqué motifs in the Pre-Halaf phase. These may have had an apotropaic, protective function (Nieuwenhuyse 2007, in press, c). However, for the gypsum plasters this was probably not a very relevant factor in their application.[12] The characteristically rough, coarsely-finished surfaces and the strong utilitarian uses reconstructed for the plastered pottery containers suggest that pragmatic concerns prevailed. Significantly, when Late Neolithic people intended to achieve a smooth, eye-catching white surface, for instance as a basis for painted designs, they often resorted to using lime plaster of a clay slip instead (Chapter 7).

Finally, an additional benefit of a gypsum plaster would have been its relatively high hygroscopicity when applied to the exterior surface of the vessel. Water evaporating from the plaster would have cooled both the vessel wall and its contents. While the effect would not have been very large, it would have been noticeable, and it may well have been deemed to be desirable, especially in the hot summer months. The plastered bowls and vertical pots, then, may have been the prehistoric counterpart of today's refrigerated picnic boxes, offering cool refreshments for the family, noisy kids and patient guests.

Notes

1 These analyses were carried out as part of a study of conservation practices at the Netherlands Cultural Heritage Agency (Koek 2009). We wish to thank Dr Luc Megens for the XRF analyses.

2 The average wall thickness of plastered Standard Ware sherds is 14.4 mm, instead of 12.2 mm for non-plastered Standard Ware sherds. The difference is significant at the .01 level.

3 Whereas the average non-plastered Standard Ware fragment weighs a mere 90 g, plastered sherds on average weigh 647 g.

4 The average preserved total height of plastered Standard Ware vessels is 10.1 cm, opposed to 5.6 cm for non-plastered vessels (measured as EVR). The difference is significant at the .01 level.

5 The average volume of non-plastered pottery containers in Operation III is 3.1 litres, whereas plastered containers on average held 16.3 litres. The difference is significant at the .01 level.

6 Standard Ware vessels carrying a plaster repair have an average height of 32.3 cm and an average volume of 37.8 litres.

7 If only complete profiles are taken into account, the average preserved height of plastered vessels is 21.5 cm, with only 10.5 cm for non-plastered vessels. The difference is significant at the .01 level. Complete Standard Ware vessels carrying a plaster repair are, on average, 39 cm tall.

8 Sample nos 45 and 46 were from the same vessel; only no. 46 is included here.

9 A Bruker-AXS Tracer III-V handheld XRF was used to obtain the data.

10 For these analyses a SEM JEOL5910LV; EDX Thermo Scientific NORAN System 7Xray was used.

11 The University of Amsterdam survey in the Balikh basin (Akkermans 1993) documented two contemporaneous Late Neolithic villages situated between Tell Sabi Abyad and the local 'mega site' of Tell Mounbatah, which itself lies at the foot of an important gypsum outcrop. These are Tulul Breilat (BS 161–162) and Mafraq Slouq (BS 316).

12 Plasters and appliqué decoration have so far not been attested occurring together on the same vessel at Tell Sabi Abyad.

Chapter 7

The decoration techniques of 'white-slipped-and-painted' Standard Ware

Luc Megens

7.1. Introduction

In the course of the ceramic analysis at Tell Sabi Abyad, the so-called white-slipped-and-painted Standard Ware was identified as a visually distinct typological group in Operation III (Chapter 4). While this group appears to be very similar to the majority of coarse Standard Ware, it was distinguished on the basis of its particular surface treatment, which typically exhibit matte, reddish-brown paints on a light-coloured background (Pl. 20.2, Fig. 7.1). Equally characteristic is the fugitive quality of both the pigments and the whitish surface coating, which erode easily and may disappear during a thorough washing. This white slip treatment is rather unusual for 7th millennium Standard Ware pottery. Standard Ware was in fact very often red slipped, but white slips have so far not been unequivocally attested. Previous excavations in Operation I had already yielded a few possible examples from the Pre-Halaf levels (Nieuwenhuyse 2007, 159). Most of the examples from Operation III came from levels A1–B8, firmly fixing the chronological distribution of this category to the very earliest stages of the Pre-Halaf period. At Tell Sabi Abyad this intriguing decorative style was in vogue for only a rather limited period of time. What might be the nature of the whitish surface coating?

In order to elucidate the use of raw materials and the *chaîne opératoire* of this intriguing pottery group, a small selection of white-slipped, red-slipped, and white-slipped-and-painted Standard Ware sherds was studied with materialographic and microchemical techniques. We selected examples of different surface treatments (i.e. white-slipped, red-slipped, white-slipped-and-painted) in order to compare these techniques and to place the white-slipped-and-painted decoration within the broader context of Late Neolithic ceramic technology. This preliminary study aims to address the following questions: What raw materials constitute the white slips and red-painted designs observed on Standard Ware pottery? What technologies did Late Neolithic potters employ to produce white-slipped-and-painted Standard Ware pottery? Finally, is this sub-category of Standard Ware ceramics homogeneous from an archaeometric perspective?[1]

7.2. Sampling and analytical procedures

In total, 24 fragments of Standard Ware sherds were analysed. They included white-slipped ($n = 14$), red-slipped ($n = 4$), and white-slipped-and-painted ($n = 6$) sherds. Apart from a single rim fragment these were all body sherds. The majority of the samples came from level A1 ($n = 19$), with levels A3 and B8 yielding two sherds each, and one isolated sherd originating from the topsoil debris layer. The material was mostly recovered from the extensive middens and open areas between the excavated buildings, although a few sherds came from pit fills or room fills (Table 7.1).

Materialographic and microchemical analyses of the sherds were performed at the Cultural Heritage Agency of the Netherlands, which specialises in conservation science and art technological studies. The analytical facilities of the laboratory were used to determine the materials and techniques applied to the decoration of the different types of Standard Ware. In the laboratory, the colours of the surface layers of all sampled sherds were measured. To investigate how the surface layers were applied, small samples, taken with a scalpel, were embedded in a polyester resin (Polypol PS-230, Poly Service, Amsterdam, Netherlands). Cross sections were prepared by grinding and polishing the embedded samples on SiC paper with grits from 220 to 2400 (Streurs GmbH, Maassluis, Netherlands). The cross sections were studied under an optical microscope (Zeiss Axioplan 2 imaging) with incident and polarised incident light, and subsequently with a scanning electron microscope (SEM, JEOL LV5910) with energy dispersive

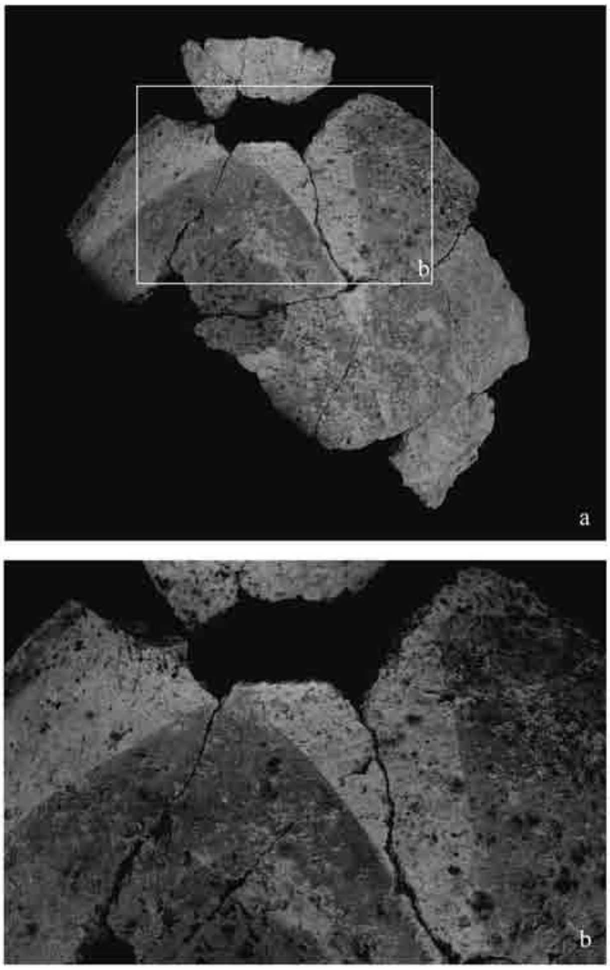


Fig. 7.1 Tell Sabi Abyad, Operation III. Example of 'white-slipped-and-painted' Standard Ware from level 1 (fragment of Fig. 4.112: 1) (image Tell Sabi Abyad Project).

x-ray analysis (EDX, Thermo Scientific, Noran System Six) for observation of the microstructure and chemical analysis of the sherd and slip and paint layers.

The materials of the surface layers on the fragments were identified non-destructively using an x-ray micro-diffractometer (XRD, Bruker AXS D8 Discover) with GADDS (Bruker AXS, Karlsruhe, Germany). The instrument was equipped with a copper anode x-ray tube, operating at 40 kV and 30 mA. The radiation passed through a parallel graphite monochromator, and the resulting CuK_α radiation was directed on the surface of the sherd by a 0.8 mm collimator. The diffracted radiation was detected with a 2D HiStar detector. The resulting 2D frames were integrated using the Bruker AXS GADDS software and, with the help of the EVA program, the diffractograms were matched with patterns from the PDF database (ICDD PDF2).

7.3. Results

The white slip on the Standard Ware sherds varies in colour from 10YR8/1 (white) to 10YR7/4 (very pale brown) on the Munsell scale. Examination of the cross sections of the white slipped surfaces with optical microscopy shows semi-transparent white to light-orange coloured layers. With the scanning electron microscope (SEM) it became clear that the white layers do not contain coarse grains like in the body of the sherds. The chemical composition of the white layers as analysed by energy-dispersive X-ray analysis (SEM-EDX) differs from one sherd to another. From an archaeometrical perspective, at least three different technologies seem to be included in this typological category that imply different raw materials and operational chains, *viz*. lime plaster, gypsum plaster, and clay slip.

The first category is represented by five fragments in which the white layer consists mainly of calcium (samples 3, 15, 17, 18 and 24). X-ray diffraction analysis (XRD) confirms that the calcium in these white layers is present as calcium carbonate. The structure as visible in the backscattered electron image indicates that the layer was applied as a lime slurry, which subsequently reacted with carbon dioxide from air to calcium carbonate (Pl. 21.1.a). These sherds were most probably plastered after firing.

The second category is represented by just a single fragment (sample 20), with a white layer consisting of gypsum plaster (Pl. 21.1.b). This layer may have been a thin gypsum coating, deliberately applied as a thin layer or 'slip'. If so, this would have constituted a post-firing treatment. Alternatively, and perhaps more likely, the white layer perceived in the field as a 'slip' was never applied as such but instead represents the remaining traces of a thick gypsum plaster that has not been preserved. Many gypsum-plastered pottery sherds show very uneven preservation of the gypsum, which can range from several centimetres thick to a barely-perceptible veneer on the same sherd (Chapter 6).

The third category is represented by seven fragments (samples 4, 5, 12, 16, 19, 22 and 23), in which the white layer consists of a layer of clay minerals with a similar composition as the body of the sherd, in some cases with a somewhat higher amount of calcium. The main difference with the body is that no coarse grains are present in these layers, and it is not completely clear whether these layers were applied before or after firing. In the backscattered electron image (BEI) of some samples (Pl. 21.c, photo on the right) a rather sharp boundary between the body and the layer is observed. This suggests that the layer was applied on a fired (or at least well dried) clay body. The potters may have treated the vessel surface with a calcareous, watery clay slurry.

In other samples a separate layer was not discernible with electron microscopy. These samples might represent objects on which a lighter layer was formed as a so-called self-slip: The potters may have wiped the vessel with the hands or with a piece of cloth immediately after the shaping, when the surface was still plastic and the clay still wet. This would have caused the lighter particles in the clay body to come to the surface. In firing this thin surface coating would then gain a lighter colour.

Table 7.1 White-slipped, red-slipped and white-slipped-and-painted Standard Ware sherds from Operation III selected for study

Sample	*Shape*	*Surface treatment*	*Level*	*Context*	*Composition of surface layers (SEM-EDX)*
1 (G5, 24-89:3)	Bodysherd	White slip	A1	Open area	White: clay
2 (G5, 105-184:22)	Bodysherd	White slip	A1	Open area	White: first a thin layer of gypsum followed by a layer of clay minerals
3 (G5, 72-138:18)	Bodysherd	White slip	A1	Open area	White: calcium carbonate
4 (G5, 24-89:7)	Bodysherd	White-slipped-and-painted	A1	Open area	White: clay Red: iron rich clay
5 (G5, 7-79:2)	Bodysherd	White-slipped-and-painted	A1	Room fill	White: calcium rich clay Red: iron rich clay
6 (G5, 105-178:4)	Bodysherd	Red slip	A1	Open area	Red: clay minerals (layer not discernible in BEI)
7 (H5, 53-97:9)	Bodysherd	White-slipped-and-painted	A1	Open area	White: calcium carbonate and quartz Red: iron rich clay
8 (H5, 30-59:4)	Bodysherd	Red slip	A1	Open area	Red: clay (layer not discernible in BEI)
9 (H5, 48-86:1)	Bodysherd	Red slip	A1	Room fill	No discernible layer in BEI
10 (G5, 68-132:8)	Bodysherd	Red slip	Top soil	Debris layers	Red: clay (layer not discernible in BEI)
11 (G5, 93-164:10)	Bodysherd	White slip	A1	Open area	No discernible layer in BEI
12 (G5, 30-77:2)	Bodysherd	White-slipped-and-painted	A1	Pit fill	White: clay (chemically similar to sherd) Red: clay (chemically similar to sherd)
13 (G5, 122-194:1)	Rim sherd	White-slipped-and-painted	A1	Room fill	White 1: clay White 2: gypsum
14 (H5, 30-59:5)	Bodysherd	Red slip	A1	Open area	Red: iron rich clay
15 (G5, 26-56:8)	Bodysherd	White slip	A1	Room fill (tholos)	White: calcium carbonate
16 (G4, 29-102:22)	Bodysherd	White slip?	A3	Open area	White: clay, EDX similar to body
17 (G5, 93-164:11)	Bodysherd	White slip	A1	Open area	White: calcium carbonate
18 (G5, 87-157:12)	Bodysherd	White slip	B8	Pit fill	White: calcium carbonate
19 (G5, 105-178:3)	Bodysherd	White slip	A1	Open area	White: clay
20 (G5, 85-155:6)	Bodysherd	White slip	A1	Open area	White: gypsum
21 (G4, 29-102:23)	Bodysherd	White slip?	A3	Open area	No discernible layer in BEI
22 (G5, 105-184:26)	Bodysherd	White slip	A1	Open area	White: calcium rich clay
23 (G5, 92-162:5)	Bodysherd	White-slipped-and-painted	B8	Pit fill	White: calcium rich clay
24 (G5, 9-26:5)	Bodysherd	White slip	A1	Room fill (tholos)	White: calcium carbonate

BEI: Backscattered Electron Imagery; EDX: Energy-Dispersive x-ray analysis

The salty, calcareous clays typical for northern Syria are especially prone to this effect (Jacobs 1992). A self-slip may result inadvertently from shaping the pot, but it is likely that potters were aware of the effect and manipulated it to their advantage. A self-slip is more likely to occur on wheel-made than on hand-formed pottery. However, some of the Fine Ware pottery from the Early Halaf period gained its light surface colour in this way (Nieuwenhuyse 2007, 93). Also, a scum layer, a deposition of soluble salts from the clay on the surface, might be responsible for the light-coloured surface (Jacobs 1992).

Most intriguingly, these different techniques seem to have been combined occasionally. In two cases, what appears to be a single white layer with optical microscopy, at closer inspection can be shown to consist of two distinct layers. One fragment (sample 2) showed a layer of gypsum, 10–15 µm thick, covered with a layer consisting of clay minerals (Pl. 21.2.a). The exact opposite is observed in sample 13, where a white layer consisting of clay minerals is covered with a thin layer of gypsum (Plate 21.b). The first combination almost certainly was applied after firing. It is possible that the two different layers were not applied at the same stage. They may represent successive episodes of white-plastering and re-plastering the same vessel. The second combination, too, may have been applied after firing. In this case, however, it is also possible that the first layer constituted a 'self-slip' resulting from shaping and firing the vessel, at a later, post-firing stage followed by the application of a gypsum slip or plaster.

Moving on to the red slips, on all examples (samples 6, 8, 9,10 and 14) a thin red layer on top of the sherd can be observed with optical microscopy (Pl. 21.3). Except for sample 9, the layer seems to be a clearly separate layer, but in the backscattered electron image no separation between the body of the sherd and the layer is visible. This suggests that the red layer was applied before firing. The composition of the red layers seems to be very similar to that of the body of the sherd, but is possibly richer in iron oxide.

The red paint on the white-slipped-and-painted sherds, finally, typically exhibits a matte, reddish-brown paint (10R4/8-8, red). Three of the white-slipped fragments that were painted (samples 4, 5 and 12) have a white layer consisting of clay minerals, which in the backscattered electron image is clearly different from the body of the sherd and is well separated from both the body and the red paint layer (Pl. 21.4). This suggests that a clay slip was applied after firing. The red layer consists of clay minerals that have more iron than in the body of the sherd. A fourth sample of white-slipped and painted sherd (sample 7) shows a red paint layer of iron oxide containing clay minerals on top of a white layer of chalk.

One white-slipped and painted fragment (sample 13) has already been discussed above. Intriguingly, this sample displays two different white layers, namely clay minerals covered with a thin layer of gypsum. In this case both the white surface layer and the red-painted decoration were applied after firing. A red paint layer was not visible in this sample.

7.4. Discussion and conclusions

The discrete typological category of 'white-slipped-and-painted' pottery as construed in the field, appears thus to be more complex when subjected to archaeometric analyses in the laboratory. Various raw materials and technologies were used at Tell Sabi Abyad to apply a white layer on Standard Ware pottery. On some sherds it appears that a lime slurry was applied after firing that created a calcium carbonate layer after drying. In one case a gypsum layer was attested. On other sherds the white layer consists of clay minerals, but it is not yet clear whether this layer was applied before or after firing. The clay slurry seems to have been deliberately applied as a slip in some cases, but in others a self-slip cannot be excluded. In either case, the potters would have been aware of the effects. In subsequent stages (in the Early Halaf) they would regularly apply a self-slip to create a light-coloured background to the painted designs.

In a few cases the sherds were covered with a double white layer, one of clay minerals and one of gypsum. These layers were probably applied after firing as well. In these cases, the potters seem to have combined several raw materials and technologies to achieve the same effect, a white surface coating. It is possible that different layers, sometimes employing different materials, were applied at different stages in the production process and afterwards. What at first sight appears to be a single layer in these cases may be a palimpsest of multiple episodes in the *chaîne opératoire* of white-plastering the vessel. In this regard, coarse pottery vessels were perhaps treated in a way similar to buildings, which could also be plastered repeatedly in the Neolithic.

The red layers are similar in chemical composition to the clay of the sherds, but they are usually richer in iron and they lack the coarse particle composition as the sherd itself. The red-painted decoration was applied onto white layers that, while visually appearing homogenous, upon closer inspection turn out to represent manifold raw materials and technologies. Most of the sherds painted with a red layer of slipped clay or ochre investigated in this limited study were painted onto a white layer of clay minerals, which in most cases seems to have been applied on a fired or at least well dried surface. A layer of chalk has also been found as a background for the red-painted decoration. One sample of red pigment was found on a double background layer consisting of gypsum over clay minerals. In these cases, the painted design was most likely applied after firing.

The white layer may have had different functions, which would certainly not have been mutually exclusive. As with a thick gypsum plaster (Chapter 6), a lime coating may have been applied to reduce the porosity of the vessel. The typological analysis suggests that plastered-and-painted pottery was relatively thick-walled and that closed shapes were common, especially hole mouth pots and jars (Chapter 4). These types were quite common in the Pre-Halaf period and likely functioned for storage purposes. A thin lime or gypsum layer upon these containers would have contributed somewhat to the efficient preservation of surpluses and goods. A similar functional association between plastering and storage activities is observed with plain Standard Ware, both from the Pre-Halaf and much earlier levels, that were covered with a thick plaster (Chapter 6).

At the same time, the technology may have had aesthetic and symbolic roles. In combination with paint, the white surface layer would have offered a bright, reflective background to the red-coloured designs. One noticeable effect was to increase the visibility of the painted designs by enhancing the contrast between the painted motifs and the surface background of the vessel. Almost certainly the contrasting colours red-on-white carried deep symbolic meanings as well (Charvat 2005). If so, the meanings presently escape us. In many cultures across the world the colour red is associated with blood, fire, and danger but also with life and protection (Hovers *et al.* 2003; Petru 2006). Conjecturally, the post-firing application of red-painted designs perhaps had an apotropaic function.

We are still poorly informed with regard to the temporal and geographic distribution of white-slipped-and-painted pottery. To a large degree this may simply reflect the short time span with white-slipped-and-painted pottery seems to have occurred, limiting opportunities for its preservation in the archaeological record. At Tell Sabi Abyad this ceramic category was chronologically restricted to the very early stages of the Pre-Halaf period, mostly levels A1 and B8, radiocarbon dated to between 6335–6225 and 6180–6105 cal BC (Table 2.1). Few other Upper Mesopotamian sites presently excavated have exposed layers dating to the final centuries of the 7th millennium. Elsewhere in the Balikh Valley, similar pottery was collected at the surface of Tell Mounbatah, the largest Late Neolithic settlement in the valley (Akkermans 1993). Although no other find spots have so far been identified in the region, the finds from Mounbatah in any case suggest that this was not a highly localised 'Sabi Abyad style' but instead was present in Late Neolithic communities at a larger, supra-local level.

Moving beyond the Balikh Valley, a review of the archaeological literature suggests that pottery similar to the white-slipped-and-painted Standard ware from Tell Sabi Abyad was exceptionally uncommon in Late Neolithic Upper Mesopotamia. Archaeologists working in the region have occasionally reported coarse, plant-tempered vessels coated with plaster, but they have so far not reported plastered-and-painted pottery. Perhaps in the Northern Levant this treatment was more common: at Tell el-Kerkh the plastered surface of Coarse Ware pottery was sometimes painted with a red pigment (Tsuneki *et al.* 1998, 16). At this site such pottery appears to have been in circulation from the later stage of the Rouj 2c period (Tsuneki *et al.* 1999, 10) into the early Rouj 2d period (Tsuneki *et al.* 2000, 10). Radiocarbon dating places these periods between ca. 6300 and 5900 cal BC, overlapping with the final part of the Early Pottery Neolithic to the Early Halaf periods at Tell Sabi Abyad. Close to Tell el-Kerkh, plastered-and-painted coarse pottery also occurs in very low numbers at Shir, in levels that date to the final part of the 7th millennium (Nieuwenhuyse 2009a). As the examples from Shir and Kerkh suggest, it is possible that in the Northern Levant this practice began slightly earlier than in northern Syria, and perhaps lingered on longer. Conjecturally, the practice of painting a plastered pottery container may even have derived from the Northern Levant, to be emulated by Upper Mesopotamian communities at the end of the 7th millennium.

Intriguingly, however, the combination of various technologies using gypsum, lime or clay plaster attested in this pilot study would seem to go back to much older Neolithic practices in Upper Mesopotamia where red pigments were applied to walls and floors of buildings (Coquegniot 2014; Molist 1998). The extension of this practice to ritual plaster objects is known from the grandiose statues from 'Ain Ghazal in the southern Levant (Grissom 2000; Rollefson 1983, 1986), the famous wall sculptures from Çatalhöyük in Central Anatolia (Hodder 2006) or even the plastered-and-painted skulls from the PPNB period (Verhoeven 2002), a practice that continued into the later Neolithic in some parts of the Near East (Bonogofsky 2005). At the end of the 7th millennium in Upper Mesopotamia these technologies were apparently transferred to pottery containers. At Çatalhöyük, too, visual symbolism shifted from architectural sculpture to painted ceramics at the end of the 7th millennium, just before its inhabitants moved their village from the East Mound to the West Mound (Hodder 2006). This suggests certain commonalities in the trajectories of plain and painted pottery across cultural and geographic boundaries in the later 7th millennium.

Perhaps the technological transfer of plastering techniques from architecture to pottery stimulated potters to experiment with clay slips as an alternative to lime or gypsum. At Tell Sabi Abyad one factor stimulating such experimentation may well have been the abandonment of White Ware production and the technology of plastering in general in the Pre-Halaf period (Koek and Nilhamn 2013), which would have made it fortuitous to have an alternative. Importantly, at Tell Sabi Abyad the practice of plastering and subsequently painting a pottery vessel was among the earliest decorative styles attested for ceramic containers. This technological style signalled a radical new departure after centuries of relentlessly plain pottery, heralding the beginning of the extraordinary rise of painted ceramics during the Pre-Halaf, Transitional and Early Halaf stages (Akkermans 1993; Campbell 1992; Nieuwenhuyse 2007).

Note

1 We wish to thank L. Jacobs for his advice.

Chapter 8

Early pottery repairs at Tell Sabi Abyad

Olivier Nieuwenhuyse and Renske Dooijes

8.1. Introduction

Pottery repairs have long tended to be neglected in archaeological reports perhaps because they are not very common or simply because the practice at first sight seems to be so self-evident. This neglected aspect of research makes it difficult to place individual finds within their proper historical framework or to discuss the meaning of such alterations. As physical attestations of the vessel's biography (Kopytoff 1986) pottery repairs have recently begun to gain serious attention from both restorers and ceramic specialists (Ambers *et al.*, eds., 2009; Appelbaum 2007; Bentz and Kästner, eds., 2007; Bernbeck 1994, 263–265; Blanco-González 2014; Campbell 2012; Caple 2006; Chapman and Gaydarska 2007; Dooijes and During 2016; Dooijes and Nieuwenhuyse 2007, 2009; Dooijes *et al.* 2007; Gomez-Bach 2012, 473–475; Hsieh 2016; Madsen 2009; Maeir 2016; Nunn 2012; Tomkins 2007; White *et al.* 2009). These studies call for a more careful recording and documenting of ceramic repairs observed at archaeological sites. The excavations in Operation III yielded sixteen examples of pottery repairs. These are the topic of this chapter.[1]

Three distinct strategies for repairing pottery are attested at Operation III: using plaster to fill gaps or cracks, gluing fragments together with bitumen, or applying perforations on either side of the break allowing the sherds to be bound together with a piece of rope or leather (Table 8.1). The latter two techniques were often used in combination. As we shall argue, to repair a pot or not was far from self-evident in the Late Neolithic.

Table 8.1 Tell Sabi Abyad, Operation III. Frequencies of pottery repairs by level. The identification of a bitumen repair in level A8 is tentative

Level	*Repair with holes*	*Repair with bitumen*	*Repair with holes & bitumen*	*Plaster repair*	*Total*
D-Sequence	2	–	–	–	2
C-Sequence	–	2	–	–	2
Mixed C/ level A4	–	1	–	–	1
Mixed B	–	–	1	–	1
B4	–	1	–	–	1
B8	–	1	–	–	1
A1	–	–	–	4	4
A2	–	–	–	2	2
A4	–	–	–	1	1
A8	–	1 (?)	–	–	1
Total	2	6	1	7	16

8.2. Plaster repairs

Here we discuss nine examples of Standard Ware vessels that were repaired with plaster during the Early Pottery Neolithic and the early stages of the Pre-Halaf period. Seven came from Operation III (Table 8.1); two additional examples came from Operation V. The basic principle was that of a *fill* that sealed conspicuous cracks and gaps with a plastic, yet waterproof material. The vessels would have been fully functional after the repair.

The earliest attested example is a small goblet recovered from one of the buildings of level A4 (Fig. 8.1). At some point in the past, part of the upper body was broken, leaving a large gap. Gypsum was pressed into this gap from the exterior. The rough, unfinished exterior surface of the plaster suggests that a handful of plaster was simply plugged into the gap without much further ado. No traces of tools are visible at the exterior, nor have traces of pressing or smearing the soft material been observed. On the interior, however, a support was necessary to provide

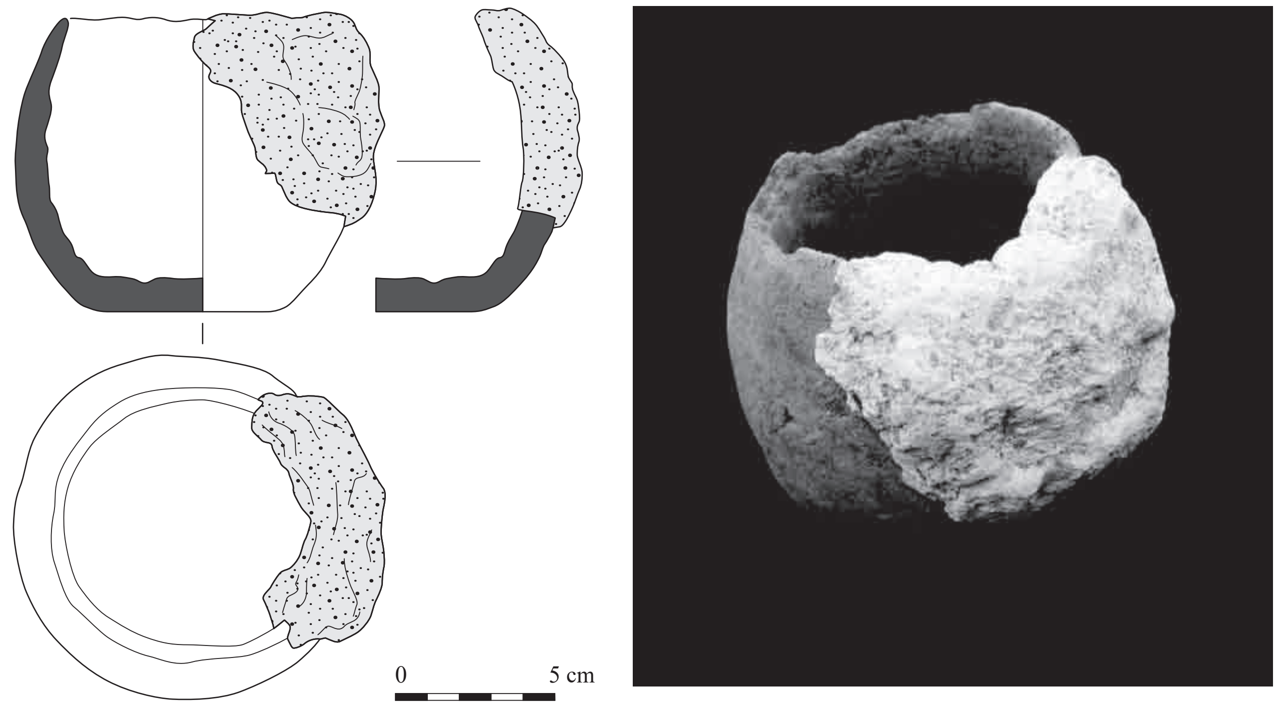


Fig. 8.1 Tell Sabi Abyad, Operation III. A plaster-repaired Standard Ware goblet recovered from a level A4 room fill (P08-52; see Pl. 4.6: 8) (image Tell Sabi Abyad Project).

counter pressure. This is clearly shown by the smooth and somewhat concave shape of part of the interior plaster fill. A low ridge at the lower end of this smoothened surface suggests that the support was pushed into the soft gypsum for a few millimetres. The support may have been a piece of cloth or leather, but the regular, concave surface suggests something more solid was used, for instance a reused pottery sherd. Evidently, the support must have been held in place while the plaster was hardening, which would have taken a very short period of time. It is possible that something was used to fill the ceramic vessel to press the support against the wall, for instance a piece of wrapped cloth or even sand. Perhaps more likely, the person responsible for the repair simply sat it out, keeping the vessel in their hands until the plaster had hardened sufficiently.

Another repair, which is unique in the prehistory of the ancient Near East (as far as we are aware), is represented by a large jar from level A2, unfortunately found in a very fragmented state (Pl. 16.1). In this case, the plastic material was placed into a circular perforation of about 5 cm in the vessel wall, filling it completely. It remains unclear how this hole had come about; it may have been broken, but it is also possible that the perforation had been made deliberately, for unknown purposes. The repair is a roughly circular plug of about 6 cm in diameter. A blob of plaster was gently pushed into the hole from the exterior. Counter pressure was applied from the interior, perhaps simply with the palm of the hand. The plaster pushed against the counter support inside, resulting in the slightly convex shape of the interior of the plug. It was made sure that the plaster covered the broken edge of the surrounding perforation completely, thus making a strong bond between the plaster and the ceramic. The exterior surface was very roughly smoothed afterwards.

Further, a large jar recovered from a building in level A1 shows what appears to be a gap in the rim filled with plaster (Pl. 16.2; cf. Pl. 20.1). The vessel was heavily plastered on the interior, while the exterior lower body was also plastered. Analysis of samples from this plaster showed it to be gypsum (Chapter 6). The interior plaster, with a total thickness of some 12 mm, comprises several distinct layers. Each successive layer was applied only after the previous layer had set. This resulted in a poor cohesion between the layers, and caused them to come apart in the past. It is possible that the repair was done at the same time as the surface coatings were applied. The ceramic jar shows part of the rim missing, in the form of a triangular gap approximately 8 cm long. The plaster was sculpted into a thick layer over the break, covering part of the exterior as well. In contrast to the interior plastering, no layered structure was observed in the repair, suggesting that it was applied in one action. The exterior of the repair shows no traces of finishing; the interior was roughly smoothed. The plaster appears to have been applied and then left to dry without significant further treatment.

The excavations so far yielded five additional examples attesting to the same strategy (Fig. 8.2). Another large Standard Ware jar, recovered from one of the level A1 rooms, sported a thick, plaster fix on its rim (Fig. 8.2: 1). The original rim appears to have been missing. The plaster rim formed part of a thick plaster coating consisting of at least three distinct layers that covered the entire interior surface of the vessel. A new, plaster rim was sculpted

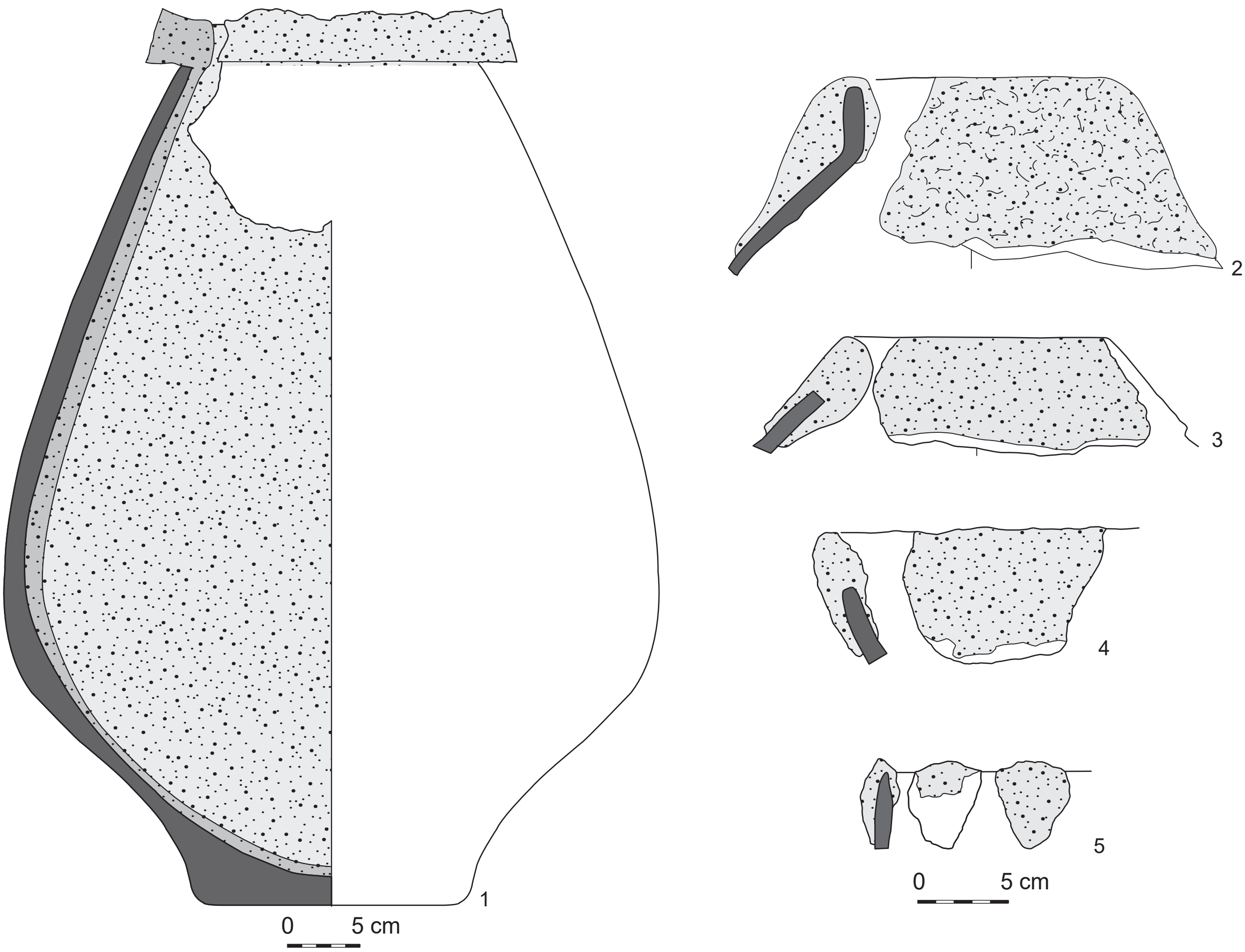


Fig. 8.2 Tell Sabi Abyad. Standard Ware vessels with plaster repairs. No. 1. Operation III. Large jar from a level A1 room fill (P07-50; see Fig 4.100: 3). No. 2. Operation V. Hole mouth pot or reused jar from the Pre-Halaf strata of trench H12 (P01-86). No. 3. Operation III. Hole mouth pot from a level A1 room fill (I3, 126-164: 102). No. 4. Operation V. Convex-sided bowl from the Early Pottery Neolithic strata of trench G12 (G12, 12-41: 14). No. 5. Operation III. Vertical pot from a level A2 open area (G5, 104-177: 8).

into place, measuring about 4 cm thick and sticking out above the broken pottery rim for about 5 cm. The unusual squared shape of the new rim perhaps acted to allow a lid to be placed on the container. The Pre-Halaf strata from trench H12 (Operation V) yielded a large hole mouth pot or reused jar carrying a plastered rim (Fig. 8.2: 2). Another large, thick-walled hole-mouth pot, from level A1, had suffered from a broken rim (Fig. 8.2: 3). The break was covered with a large blob of plaster that was sculpted into a 3 cm thick rounded rim, itself some 3 cm above the broken pot. The fragmented rim no longer retains enough of the original vessel mouth to say if the entire mouth of the pot was broken or just a part. The new plaster rim may have been at the same height as the original ceramic rim. Further, Operation V yielded a closed convex-sided bowl from the Early Pottery Neolithic strata of trench G12 that was provided with a thick and extensive new plaster rim. (Fig. 8.2: 4). Finally, a fragment of what seems to have been a vertical pot was recovered from a level A2 open area (Fig. 8.2: 5). The fragment shows a thick (8 mm) plaster extension of the rim of about 0,8 cm tall, covering a small part of the surface. In this case it is not entirely clear if the original pottery rim was broken or not.

The last plaster repair to be discussed demonstrates a somewhat different approach. A jar from level A1 shows two ancient cracks in the upper part of the body (Fig. 8.3). The damage would have been sufficiently serious to reduce significantly the vessel's level of performance. One long, winding crack branched downward from the rim for about 20 cm. It is possible that this crack had already formed during the firing stage. The uppermost part of the crack, where it was the widest, was repaired by filling it with plaster, whereas a wide area surrounding the lower, curving part was smeared with a thin layer of plaster. A second, vertically oriented crack on the other side of the vessel may have resulted from some form of blunt impact stress: a missing part of the rim may have been where this stress exerted its major impact. The upper part of this crack was covered in a ca. 3 cm wide band of thin plaster, running down for about 12 cm. As plaster preserves poorly upon the surface, it is possible that in the past a thicker layer was present. As with the previous

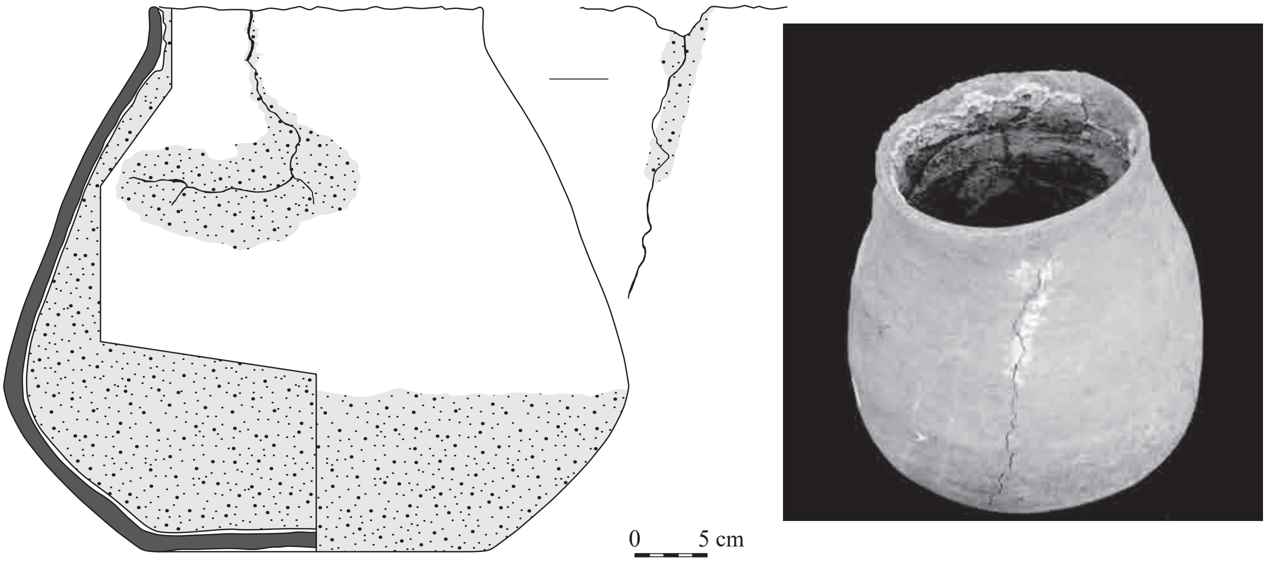


Fig. 8.3 Tell Sabi Abyad, Operation III. A Standard Ware jar with a slightly concave base, a convex lower body, a carinated contour and an oval mouth. The entire interior surface was covered with several layers of gypsum plaster, with a joint thickness of 4 mm. The exterior lower body was covered with a thin layer of plaster. Excavated from a level A1 room fill (P07-88; see Fig. 4.100: 2; photo after restoration) (image Tell Sabi Abyad Project).

example, the vessel interior and exterior lower body had been extensively plastered (Chapter 6).

8.3. Perforations and bitumen

The other two main techniques for repairing pottery vessels were drilling perforations on either side of the break and using a piece of cloth, leather or rope to bind the fragments together, and the use of dark, organic material as glue. The technique is based on the principle of mechanical *bonding*, by which we mean refitting different elements together. Characteristic for mechanical bonding is the occasional employment of additional adhesives. Perforations with or without adhesives represent early examples of a practice that *mutatis mutandis* remained in use until modern times (Dooijes and Nieuwenhuyse 2007). At Tell Sabi Abyad a dark, pitch-like material was sometimes used that is identified as bitumen (Connan *et al*. 2004). Bitumen is what restorers call a 'melt-freeze' adhesive; bees wax and shellac are other examples. These thermoplastic substances are prepared as a solid, then heated and applied as a molten (or softened) liquid, then allowed to 'freeze' again to a solid (Ashley-Smith 1992, 21, 56–57). They have the advantage that they can be applied easily without damaging the object. The excavations at Tell Sabi Abyad have yielded what may well be the oldest examples of this principle applied to ceramic containers in the Near East. The excavations yielded just one example of the two techniques (perforations and bitumen) used in combination. From earlier work at the site in Operation I (Nieuwenhuyse 2007) as well as from many other excavated Halaf sites, however, we know that these techniques were often combined.

The earliest example of what may constitute the use of bitumen for a repair is an enigmatic Standard Ware rim fragment from a bowl recovered from a level A8 room fill (Fig. 8.4: 1). Part of the break and the adjacent exterior surface show a dark stain that may or may not have been bitumen. The identification of this stain as a repair remains tentative. If the interpretation is correct, this vessel would be the oldest example of a pottery repair at Tell Sabi Abyad. The vessel remains an isolated oddity, however, as the earliest plaster repairs occur several centuries later (level A4), while the next-oldest bitumen repair is from level B8. A time lag of about half a millennium separates these two early bitumen repairs (Table 2.1) The example from level B8 is in any case much clearer. This is a Standard Ware oval convex-sided bowl that shows bitumen on and along part of the break (Fig. 8.4: 2). The same level (a mixed B5/B8 open area context) yielded the example of a Standard Ware straight-sided bowl carrying traces of bitumen as well as a biconical perforation along the break (Fig. 8.4: 3). The biconical shape of the perforation shows that it was made by drilling from both sides.

Perforations are found with two Standard Fine Ware bowls, both recovered from open area contexts in the stratigraphically confusing D-Sequence. While some of the Halaf pottery from the D-Sequence dates to the Middle-Late Halaf period, these two Standard Fine Ware fragments date to the Transitional period, ca. 6100–5900 cal BC. One shows a biconical piercing through the rim (Fig. 4.124: 16). No bitumen was observed in association with this perforation. In all likelihood it was intended as a repair, but it is also possible that the perforation functioned to attach a lid with a piece of rope; an alternative hypothesis is that it may also have facilitated suspension of the vessel. The second example shows a partially finished perforation on the exterior surface (Fig. 4.124: 5). For some reason the corresponding piercing from the interior was never made.

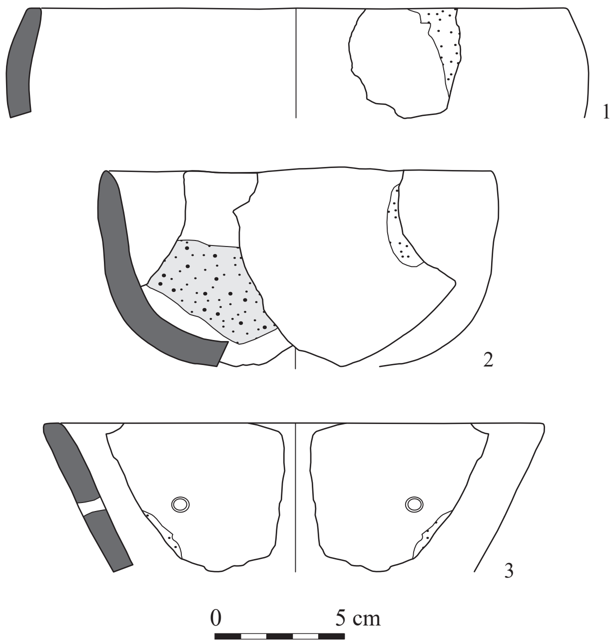


Fig. 8.4 Tell Sabi Abyad, Operation III. Examples of repairs made with bitumen and/or perforations. 1. Level A8 room fill; identification as a repair uncertain (E3 140-339: 1). 2. Level B8 open area (Fig. 4.71: 5). 3. Mixed level B5/B8 open area (Fig. 4.73: 11).

Four Halaf Fine Ware vessels were repaired with bitumen. Three of them were bowls. These include a Middle–Late Halaf cream-coloured bowl recovered from a level B4 Pre-Halaf context in which, obviously, it was intrusive (Fig. 4.130: 2). The strongly fragmented bowl shows bitumen on both sides of the broken edge of its rim. A small cream bowl (Fig. 8.6) and a low, carinated bowl (Fig. 4.126: 13), both from an Early Halaf (C-Sequence) context, likewise show bitumen smeared upon both surfaces along the broken part. The small cream bowl was preserved completely. In the past a crack through the rim and part of the base had caused about one-fourth of the vessel to come apart. The piece was put back with the aid of bitumen. The final example of this technique is a Halaf Fine Ware jar that shows a quite extreme form of bitumen repair (Fig. 4.127: 1). The vessel was found broken in many sherds that had all been put back together in the past with the use of bitumen as glue. The jar was recovered from a pit located inside a section baulk; as this pit could not be entirely excavated part of the vessel had to remain where it was found. It is possible that it was broken but complete.

8.4. The introduction of pottery repairs

The repairs discussed above raise a series of intriguing questions. For instance, it is interesting to note that apparently repairs came remarkably *late* in the history of pottery. If we take the relative fragility of pottery containers into consideration and the circumstance that at Tell Sabi Abyad the earliest pottery already appears by ca. 7000–6700 cal BC, it is surprising that no examples are attested at all for the earliest levels. If we exclude the single, enigmatic example of a bitumen-repair from level A8 it is only by levels A2–A1 (ca. 6385–6225 cal BC), at the very end of the Early Pottery Neolithic period, that pottery repairs are consistently documented. For the first half millennium or so of pottery production, it seems that vessels were discarded and replaced, not repaired.

This cannot simply be attributed to a lack of technological expertise or to the absence of examples of broken containers. Stone vessels repaired with perforations are attested much earlier in the archaeological record of the Near Eastern Neolithic, such as the engraved stone bowls of Körtik Tepe already in the PPNA period (Özkaya 2009). Perforations were sometimes used for mending broken stone bowls at Late Neolithic Tell Sabi Abyad as well (Fig. 8.5; Akkermans *et al.* 2006, fig. 14.k; Collet and Spoor 1996, figs. 7.6.2, 9, 11).[2] As to the repairs made with bitumen, the fact that bitumen was readily available as a raw material by itself does not necessitate its use for repairs. Already in the PPNB period bitumen was used at Tell Sabi Abyad for hafting flints or for coating baskets (Copeland 2000, 52; Verhoeven 2000a, 102–103). Prior to the Pre-Halaf period people did not adopt this bitumen for gluing sherds back together. Apparently, in spite of the familiarity with practices of repair as such, and in spite of the availability of materials and technologies, repairing vessels when they broke was a practice not deemed suitable or necessary for pottery containers.

Reinhard Bernbeck (1994, 263–265) offers the interesting suggestion that the presence of repairs in a ceramic assemblage points to seasonal organisation of pottery production. In a strictly seasonal mode of production, no new pottery vessels are made available during extended parts of the year. In these long months, anticipating the arrival of replacements, people resort to repairing their vessels when they break. Bernbeck gives the example of two prehistoric pottery groups from western Iran: plant-tempered Sefid-Black-on-Red and mineral-tempered Susiana-Black-on-Buff. Pottery repairs were much more frequent on the former, leading Bernbeck to the conclusion that Sefid-Black-on-Red was produced seasonally, more precisely during harvest time when straw was readily available, while Susiana-Black-on-Buff was produced year-round (Bernbeck 1994, 263).

Applied to Tell Sabi Abyad, this model would suggest that pottery production shifted from year-round to seasonal by level A2/A1. There is as yet no additional, independent evidence to support this proposition. In contrast to Bernbeck's example, repairs with perforations and bitumen mostly occur with mineral-tempered Fine Wares at Tell Sabi Abyad. Yet the hypothesis should not be dismissed entirely. If we place the production of pottery in a broader socio-economic perspective, the onset of the Pre-Halaf period by level A1 appears to have been characterised by a shift to a semi-pastoralist economy. The village gained a new role as a focal point for a mobile population. Only a small part of the Pre-Halaf community may have remained within the village year-round while a substantial part of the population seasonally moved into the steppes with the herds (Akkermans and Duistermaat 1996; Akkermans and Verhoeven 1995). This would almost certainly have had repercussions for the annual scheduling of craft activities like pottery production, perhaps stimulating a search for new solutions to broken pots. However, this would not tally well with the very low frequencies of repairs: we would expect more valuable pots to break during the quiet months when some people still resided in the village. Furthermore, if repairs simply reflect delayed replacements, one would expect them to be found with a much more diverse range of pottery types. In contrast, the material record shows strong correlations between specific types of repair and types of pot (see below).

To what extent can we interpret the very low numbers of pottery repairs recorded at the site as a realistic reflection of the number of repairs in the past? As to the plaster repairs, it is important to note that although the seven examples discussed in this chapter are so far the only ones known at the site, it is likely that in the past plaster repairs were more common. Plaster is extremely fragile and very susceptible to fragmentation. Once detached from the pottery vessel, a plaster repair is unlikely to remain intact to the degree that it may be recognised as such by the archaeologist. Most of the excavated contexts at Tell Sabi Abyad, as at most other prehistoric sites in the Near East, represent secondary or tertiary depositions. The proportion of plaster repairs observed in such contexts should therefore considered to be an underestimation. The chances of finding a complete plaster container or an intact plaster coating on a vessel are very low, unless circumstances of preservation significantly increased changes of survival. Might we have missed additional examples of plaster repairs from the earlier levels?

In this regard the apparent concentration of plaster repairs in levels A2–A1 might reflect a change in practices of pottery use and deposition specific to these levels. Their preservation would increase considerably by the practice of placing big closed shapes inside buildings as stationary items, where archaeologists can recover them *in situ* and intact. Indeed, virtually all plaster repairs were recovered from room fills (Table 8.4). They were often placed in pits inside the buildings and embedded in constructions made of loam, plaster or both. This protective coating not only significantly increased their chances of survival, but to the prehistoric inhabitants it also would have made them more suitable for a repair; a whole-sale replacement would have been costlier in terms of time and resources. However, the occurrence of such depositional practices in levels A2–A1 by itself is insufficient to explain the dearth of evidence for plaster repairs from earlier levels. The heavy use of plaster was already characteristic for the early stages of the Early Pottery Neolithic (Nilhamn and Koek 2013). Already by level A5 large storage pots were frequently located inside buildings. Yet in spite of the much earlier availability of the necessary raw materials, technologies and depositional practices this did not instigate the application of plaster repairs until at the very end of the Early Pottery Neolithic.

Moving later in time, the practice of embedding storage pots in constructions inside buildings certainly continued into later stages of the Pre-Halaf, as attested in Operation I (Nieuwenhuyse 2007, 59). By then, however, people had virtually completely stopped making use of lime or gypsum plaster. The large-scale production of White Ware came to a nearly complete stop at around 6200 cal BC (Nilhamn and Koek 2013). With the demise of architectural plasters and the disappearance of White Ware it appears that plaster repairs also were no longer made. Not a single plaster repair has so far been recorded for the extensively investigated Pre-Halaf levels at Operation I (Akkermans 1989b; Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007). We are not aware of additional examples from other Late Neolithic sites or from later stages of Syrian prehistory. Interestingly, a comparable technology for restoring pottery was in vogue at Tell Sabi Abyad much later in time during the Late Bronze Age, however without any historical connection to the Late Neolithic precursors. An Assyrian potter's workshop dated to ca. 1200 cal BC yielded several examples of damaged vessels repaired with plaster (Duistermaat 2008). In sum, the time span of Late Neolithic plaster repairs appears to have been limited to the final stages of the Early Pottery Neolithic and the initial stages of the Pre-Halaf period, when a unique constellation of circumstances apparently favoured their application and survival.

8.5. Repairs in context

The choice for a specific type of repair seems to have been far from random at Late Neolithic Tell Sabi Abyad. Limited as the data sample is, it shows a clear association between repair type and ware type. Whereas plaster was employed almost exclusively for Standard Ware, perforations and bitumen are most often found with the Fine Wares (Table 8.2). The latter relationship appears to be characteristic for Late Neolithic ceramic assemblages across Upper Mesopotamia (e.g. Gomez-Bach 2012, 473–475; Lloyd and Safar 1945, 266, 282; Mortensen 1970, 77; Watson 1983, 550). At Tell Sabi Abyad, as at these other sites, perforations and bitumen repairs are associated almost exclusively with the Fine Wares in the Transitional and Early Halaf periods (for Operation I: Nieuwenhuyse 2007, 104–105).

To a very large degree this relationship will have had a practical background. Bitumen is less susceptible to abrasion and does not dissolve in water; this makes it useful for refitting broken serving vessels which, presumably, carried liquid contents. Gypsum on the other hand is not an adhesive but a *filler*. It suffers from wear and tear and is soluble in water (if slowly), hence it is less useful for fitting together; however, it makes an excellent fill. Plaster adheres much better to the coarse, porous surfaces of heavily plant-tempered ceramics than to compact, mineral-tempered, well-smoothed or even burnished pottery. The rougher and more porous the surface the better, because of the increased contact area

Table 8.2 Tell Sabi Abyad, Operation III. The relationship between repair type and ceramic ware

	Repaired with holes	*Repaired with bitumen*	*Repaired with holes & bitumen*	*Plaster repair*	*Total*
Standard Ware	–	2	1	7	10
Standard Fine Ware	2	–	–	–	2
Halaf Fine Ware	–	4	–	–	4
Total	2	6	1	7	16

that the material can fill up (Ashley-Smith 1992). The lack of refits in the Early Pottery Neolithic may therefore have had a very practical reason: the low-fired, fibrous Standard Ware was less suitable to neat perforations, and more force would be needed to keep the individual parts closely together. Refitting might return the overall shape of such porous vessels but the repair might not be considered sufficiently adequate to prolong its use in the same way. In principle the porosity of the break could have been reduced by impregnating it with bitumen (or other resins). For a thick-walled, low-fired and plant-tempered vessel, however, this would have required relatively large amounts of bitumen. As access to this exotic raw material depended on the flow of exchange with neighbouring communities (Connan *et al.* 2004), it may have made the repair rather costly.

Such technological inducements and constraints may explain partly the absence of perforations and bitumen on Standard Ware and the near-exclusive application of these techniques on Fine Wares. As already pointed out, however, they do not explain why people did not practice plaster repairs much earlier. Moreover, at Tell Sabi Abyad the introduction of perforations with bitumen as a repair technique followed long after the first development of mineral-tempered Fine Mineral Tempered Ware, which occurred already by level A6 (Chapter 11). Nor is the relationship between repair and Fine Ware types a perfect fit. If we leave aside the sole example from level A8, the earliest perforations and bitumen repairs occur in levels B8–B4 in the Pre-Halaf period. Standard Fine Ware was introduced at the start of the Transitional Period in Operation III, and is represented by levels B2–B1, several human generations after the first known repairs. Thus, perforations and bitumen repairs precede the painted Fine Wares with which they are commonly associated. Factors other than technological constraints must have been involved as well.

Significantly, the two broad categories of pottery repair – plaster versus perforations-and-bitumen – are associated with containers that broadly fall in two distinct functional categories. Associated with different sets of activities, this dichotomy perhaps guided the technological choice for particular repairs. Specifically, plaster repairs are associated mainly with large, closed pottery types such as hole mouth pots and, in particular, large jars (Table 8.3). Such large, closed shapes would have been used primarily for storage. The perforations with or without bitumen, on the other hand, were applied almost exclusively to bowl types. These vessels held

Table 8.3 Tell Sabi Abyad, Operation III. The relationship between repair type and vessel type

	Repaired with holes	*Repaired with bitumen*	*Repaired with holes & bitumen*	*Plaster repair*	*Total*
Bowl	2	5	1	1	9
Jar	–	1	–	4	5
Pot	–	–	–	2	2
Total	2	6	1	7	16

roles in contexts in which food and drink were served and consumed (Karsgaard 2010; Nieuwenhuyse 2013a). They would have been touched frequently with hands and tools, and they would have had to be cleaned regularly. These activities would make plaster fills impractical but bituminous refits quite efficient. In the Pre-Halaf period (levels B8–B3) stylistically elaborated serving vessels were made of finer, thin-walled varieties of Standard Ware; in the Transitional and Halaf levels this functional category shifted to Fine Ware. This might explain the start of refits with Standard Ware and their subsequent shift to Fine Ware. It would also suggest a link between pottery bowls and stone bowls, which occasionally received the same type of repair (Fig. 8.5).

Might the two broad categories of repair reflect different aesthetic principles? These two functional categories – and the repairs they carried – would have differed in the spatial context of their use. The consumption and display of food and drink would have taken place mostly outdoors, in full view of others (Pollock 2013). The elaborately painted Fine Ware vessels were pots to be seen (Hole 2017; Nieuwenhuyse 2017c). Their use involved everyday habitual commensality but also larger gatherings and ritual festivities (Nieuwenhuyse 2007, 223–226, 2013a). Large storage containers on the other hand were often kept indoors. Presumably they were frequented mainly by the social groups immediately associated with the building. These distinct spatial locations may be reflected in the spatial contexts from which the repairs were recovered at the site (Table 8.4). Whereas plaster repairs were mostly recovered from room fills, the other repairs mostly came from open areas.

All repair techniques discussed above were highly visible. Hence, the visual appearance of the ceramic container after the repair may have carried different meanings depending on the type of pot and its intended use. For the plaster-repaired storage containers, mostly kept in dark, shaded rooms visited primarily by inhabitants

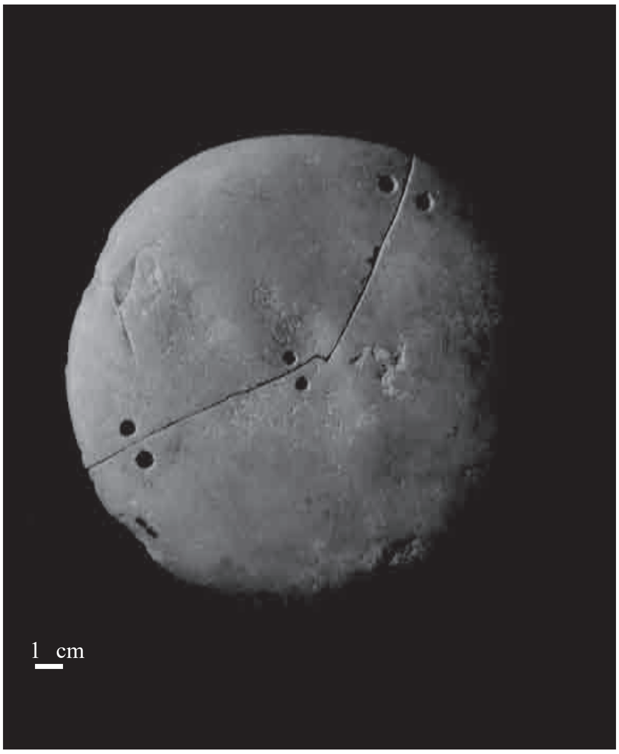
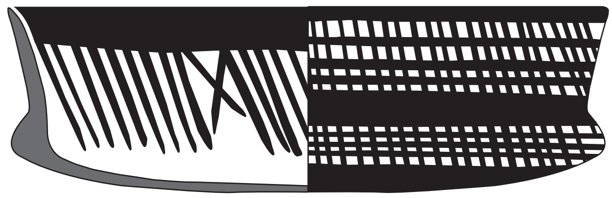


Fig. 8.5 Tell Sabi Abyad, Operation III. A stone bowl broken and repaired with perforations drilled along the break. No bitumen is attested; the parts were presumably kept together with a piece of rope. From an open area dated to Pre-Halaf levels B8 to B6 (S07-681; shown from the base) (image Tell Sabi Abyad Project)

Table 8.4 Tell Sabi Abyad, Operation III. The depositional context of pottery repairs

	Repaired with holes	*Repaired with bitumen*	*Repaired with holes & bitumen*	*Plaster repair*	*Total*
Open area	2	3	1	2	8
Room fill	–	1	–	5	6
Hearth fill	–	1	–	–	1
Pit fill	–	1	–	–	1
Total	2	6	1	7	16

of the household, the circumstance that a repair was visibly present may simply have been irrelevant. For repaired storage jars functional requirements may have been of primary concern. For the perforated-and-bitumen-repaired serving-and-display vessels on the other hand, a conspicuous repair might be thought to have been at odds with the elaborately executed painted design. For these, a conspicuous repair may in fact have *added* to the value of the object. The repair would have signalled that the object was valuable enough to merit restoration (Dooijes and Nieuwenhuyse 2009; Nieuwenhuyse 2007, 104–105). As with the famous gold lacquer repaired ceramic masterpieces from China and Korea (Wood 1999) or the Greek drinking vessels recovered from La Tène burials in France (Dooijes 2000, 69–70; Vickers and Gill 1994, 184) the repairs may have been an index for



a

b

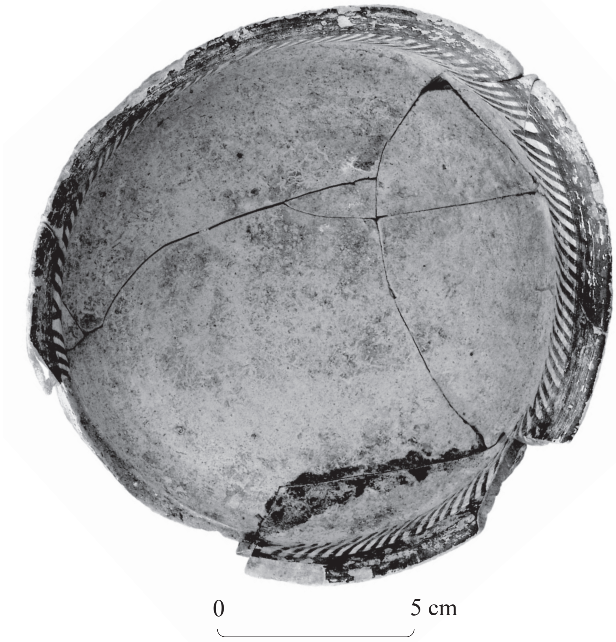


Fig. 8.6 Tell Sabi Abyad, Operation III. A Halaf Fine Ware small cream bowl showing a bitumen repair (P08-18; see Fig. 4.126: 9) (image Tell Sabi Abyad Project).

age and a recognised marker suggestive of an impressive biography. Might they have been heirlooms? We know that some of these Fine Ware vessels were exchanged from village to village, sometimes across considerable distances (Le Mière and Picon 2008; Chapter 9). Some of these vessels will have acquired lengthy biographies known and cherished by the time they reached the village at Tell Sabi Abyad. Were these the ones that were repaired?

Continuing this thread of reasoning, one speculates whether some outstanding Fine Ware vessels may have been carefully broken on purpose in order to provide them with a visible repair; the extravagant bitumen-repaired Halaf jar (Fig. 4.127: 1) comes to mind. Some of the repaired Fine Ware show neat breaks and almost no chips along the breaks, suggestive of deliberate, careful taking apart. Breakage and fragmentation are key elements in Late Neolithic ritual behaviour in the ancient Near East (Verhoeven 2013). Breakage and refitting of selected pottery containers, may have held ritual connotations as well.

8.6. Concluding remarks

The detailed research at Tell Sabi Abyad demonstrates how a careful recording of rare or inconspicuous pottery repairs may give new perspectives on the use and social roles of pottery containers in the past. The long sequence documented at Operation III allows us to monitor the introduction and early development of pottery repairs in detail. The repairs discussed in this chapter may well represent the earliest pottery repairs documented thus far in the ancient Near East. However, the decision whether or not to repair a vessel is not self-evident. The decision to apply a repair is informed by a complex mix of social, economic and symbolic factors. The availability of specific raw materials and existing technologies should also be taken into consideration, as well as the physical properties of both the raw materials and the restored object. Functional and aesthetic considerations all play a role. We still face challenges explaining why the Late Neolithic inhabitants at the site adopted specific repair techniques and why they did not start repairing their pottery much earlier. As we have seen, the practice of repairing ceramic containers was adopted more than half a millennium after the start of sustained pottery production. Repairs were not made on pottery in spite of the availability of the necessary raw materials, tools, techniques and even examples of repairs on other types of containers.

Future work may start from the insight that the introduction of pottery repairs in the later 7th millennium BC was not an isolated phenomenon. The recent work at Tell Sabi Abyad has shown that pottery vessels, both broken and complete, could gain complicated life histories in the Late Neolithic. An extraordinary variety of re-used pottery vessels are documented at the site. Large Standard Ware jars could be reused as ovens (Nieuwenhuyse 2007, 59). Jars sometimes had their neck removed after which both the separated neck and the body part were kept in use as new types of pottery containers (Nieuwenhuyse 2007, 127–129). This practice continued into the Halaf period (Campbell 2012, 308). Flat fragments of pottery were often employed to pave the floors of kilns (Nieuwenhuyse 2007, 59). Pottery sherds were occasionally adopted as a structural skeleton for shaping white ware containers (Nilhamn and Koek 2013). They were frequently shaped into small tools, such as discs, scrapers or spindle whorls (Brüning *et al.* 2014; Nieuwenhuyse 2007, 59; Spoor and Collet 1996, 440–441). Sherd tools were used for various productive activities but also in burial rites, as scrapers for removing fleshy body parts or as lids covering burials (Akkermans 2008). As ritualised items, copious quantities of pottery fragments were deposited inside buildings during their deliberate conflagration (Akkermans *et al.* 2012; Verhoeven 1999).

In short, what these conclusions suggest is that the end of the 7th millennium BC saw a major shift in the conceptualisation of the potential life histories of ceramic containers. Previously, pottery vessels were discarded when they broke; from the final stages of the Early Pottery Neolithic onwards they were occasionally repaired. The numbers of pottery vessels selected for a repair were always very small, but pottery repairs formed a consistent element of the ceramic assemblages after around 6300 cal BC. The introduction of pottery repairs at the end of the Early Pottery Neolithic should therefore be seen within the wider context of changes in pottery production and consumption during the Pre-Halaf period and subsequently. Extending the biographies of ceramic objects broadened their potential for creating shared memories linking people together (Blanco-González 2014). The new approach of prolonging the use-life of ceramic containers is but one element in a whole series of innovations that led to a new role for pottery as a medium for expressing social identities both locally and beyond the local horizon.

Notes

1 A discussion of plaster repairs was previously published (Nieuwenhuyse and Dooijes 2008). Based on an outdated stratigraphy the associated contexts in that paper are no longer correct.

2 So far at Tell Sabi Abyad stone bowls with perforations have been documented only from Pre-Halaf to Early Halaf levels. A large corpus of stone bowls from the Early Pottery Neolithic levels at Operation III remains to be studied, however.

Plate 1. Tell Sabi Abyad. Project staff member Henneh al-Salem al-Mughlif proudly showing plain pottery containers (image P. Akkermans; Tell Sabi Abyad project).

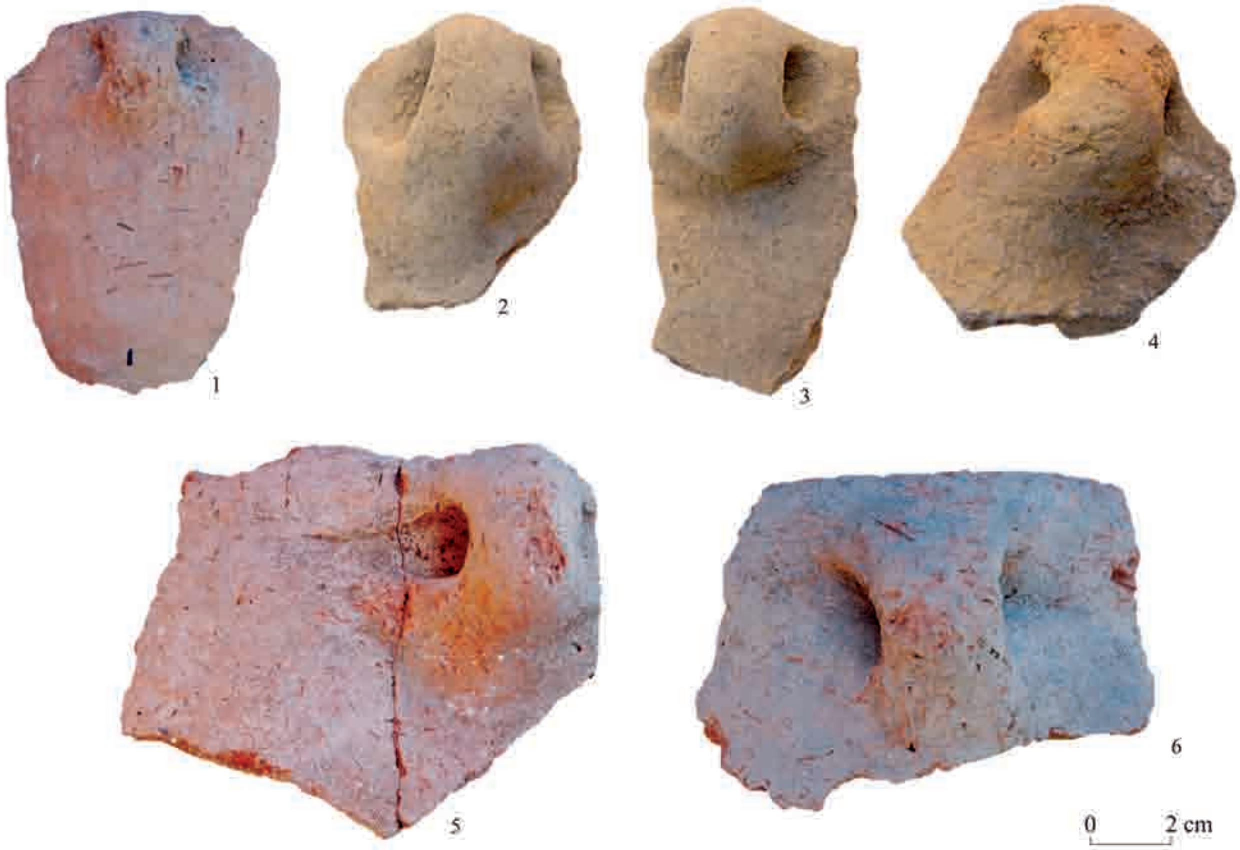


Plate 2.1 Tell Sabi Abyad, Operation III. Examples of Standard Ware loop handles (image Tell Sabi Abyad project).

Plate 2.2. Tell Sabi Abyad, Operation III. Example of Standard Ware loop handle with a perforation below the handle (see Fig 4.89:18) (image Tell Sabi Abyad project).

Plate 3. Tell Sabi Abyad, Operation III. Examples of Standard Ware cordons (1: see Fig. 4.90: 2; 2: F4 170-283: 1, Vertical Pot from a level A4 open area; 3: see Fig. 4.90: 1; 4. E3 18-38:11, Hole Mouth Pot from a top soil stratum; 5. D3 11-20:1, Closed Convex-sided Bowl from a level A5 floor; 6: see Fig. 4.70: 9; 7: see Fig. 4.93: 1) (image Tell Sabi Abyad project).

Plate 4.1. Tell Sabi Abyad, Operation III. Standard Ware Vertical Tray with a flattened rim (P02-2; from a level A1 open area). Height of the vessel 9.5 cm; volume 1.04 litre (image Tell Sabi Abyad project).

Plate 4.2. Tell Sabi Abyad, Operation III. Standard Ware husking tray (P08-65; from a level A1 room fill). Height of the vessel 12 cm (see Fig. 4.83: 2) (image Tell Sabi Abyad project).

Plate 5. Tell Sabi Abyad, Operation III. Standard Ware vertical pot with loop handles (P04-73; from a level A3 room fill). Height of the vessel 27 cm (image Tell Sabi Abyad project).

Plate 6. Tell Sabi Abyad, Operation III. Standard Ware hole mouth pot with oval mouth (P04-111; from a level A3 room fill). Height of the vessel 43 cm; volume 52.9 litres (image Tell Sabi Abyad project).

Plate 7. Tell Sabi Abyad, Operation III. Tall hole mouth pot with gypsum lid still in place (P07-119; from a level A1 unspecified context). Height of the vessel 56 cm; volume 30.22 litres (see Fig 4.93: 3) (image Tell Sabi Abyad project).

Plate 8.1. Tell Sabi Abyad, Operation III. Standard Ware Medium jars. No. 1: P07-106 (Fig. 4.97: 2); no. 2: P07-109 (from a level A1 open area, height 35 cm, volume 14.7 litres); no. 3: P07-117 (Fig. 4.97: 1) (image Tell Sabi Abyad project).

Plate 8.2. Tell Sabi Abyad, Operations III and V. Standard Ware Small and Medium-sized jars. From left to right: Operation V, P01-54 (see Fig. 6.3); P05-86 (Fig. 4.95: 1); P05-34 (Fig. 4.97: 4) (image Tell Sabi Abyad project).

Plate 9. Tell Sabi Abyad, Operation III. Standard Ware Large Jar standing on a bench in the Tell Sabi Abyad dig house (P07-112; Fig. 4.102: 1) (image Tell Sabi Abyad project).

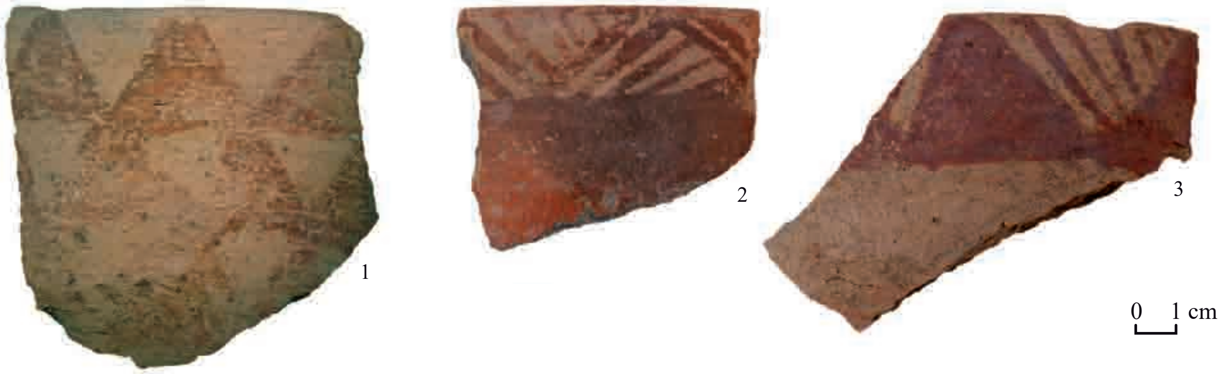


Plate 10.1. Tell Sabi Abyad, Operation III. Examples of red-painted Standard Ware (no. 1: Fig. 4.108: 1; no. 2: Fig 4.108: 4; no. 3: Fig. 4.108: 2) (image Tell Sabi Abyad project).

Plate 10.2. Tell Sabi Abyad, Operation III. Examples of incised, impressed and appliqué Standard Ware (no. 1: Fig. 4.109: 9; no. 2: Fig. 4.110: 3; no. 3: J5 73-147:1, body sherd of a jar, from a level B4 open area; no. 4: J5 17-38:2, body sherd of a jar, from a mixed level B5/B4 open area; no. 5: Fig. 4.109: 2; no. 6: Fig. 4.110: 2; no. 7: Fig. 4.109: 12; no. 8: Fig. 4.109: 20) (image Tell Sabi Abyad project).

Plate 11. Tell Sabi Abyad, Operation III. Examples of painted and red-slipped Early Mineral Ware (no. 1: Fig. 4.114: 2; no 2: Fig. 4.114: 9; no. 3: Fig. 4.114: 15; no. 4: Fig. 4.113: 9; no. 5: Tell Sabi Abyad III, tench H7; no. 6: Fig. 4.114: 7; no. 7: Tell Sabi Abyad III, trench H7) (image Tell Sabi Abyad project).

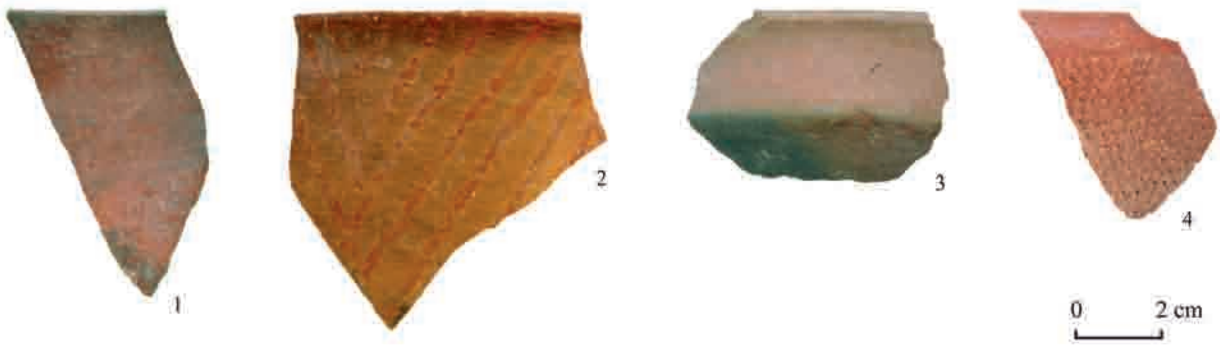


Plate 12.1. *Tell Sabi Abyad, Operation III. Examples of decorated Fine Mineral Tempered Ware. No. 1: red slipped (Fig. 4.118: 15); no. 2: painted (Fig. 4.118: 13); no. 3: red-slipped (Fig. 4.118: 12); no. 4: red-slipped and impressed (Fig. 4.118: 18) (image Tell Sabi Abyad project).*

Plate 12.2. Tell Sabi Abyad, Operation III. Examples of painted-and-incised Dark-Faced Burnished Ware (no. 1: Fig. 4.123: 18; no. 2: J5 73-174: 1, from a mixed level B5/B4 open area; no. 3: Fig. 4.123: 19) (image Tell Sabi Abyad project).

Plate 12.3. Tell Sabi Abyad, Operation III. Example of painted Orange Fine Ware bowl (Fig. 4.124: 2) (image Tell Sabi Abyad project).

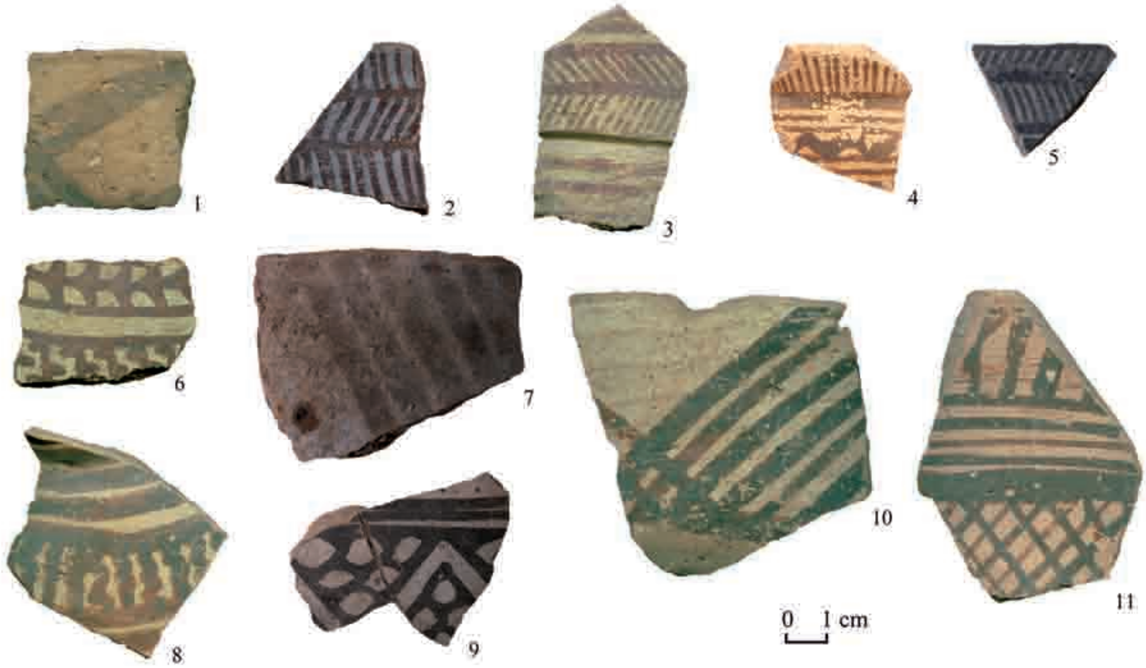


Plate 13.1. Tell Sabi Abyad, Operation III. Examples of painted Standard Fine Ware. Nos. 1, 6, 8, 10: from a level B4/B2 open area; no. 2: from top soil; nos. 3, 11: from the fill of a Late Bronze Age burial into level B1; nos 4, 7: from the D-Sequence; no. 5: from a level B5/C open area; no. 9: from a level B1 pit (no. 4: Fig. 4.124: 14; no. 6: Fig. 4.125: 16; no. 7: Fig. 4.124: 5; no. 8: Fig. 4.125: 15; no. 9: Fig. 4.125: 14; no. 10: Fig. 4.124: 7) (image Tell Sabi Abyad project).

Plate 13.2. Tell Sabi Abyad, Operation III. Painted Halaf Fine Ware. The complex geometric design configurations on four Everted straight-sided bowls. From C-Sequence unspecified contexts (no. 1: Fig. 4.126: 2; no. 2: Fig. 4.126: 4; no. 3: Fig. 4.126: 5; no. 4: Fig. 4.126: 6) (image Tell Sabi Abyad project).

Plate 14.1. Tell Sabi Abyad, Operation III. Examples of painted Halaf Fine Ware typologically dated to the Middle-Late Halaf period. From D-Sequence open areas (no. 1: Fig. 4.131: 5; no. 2: Fig. 4.131: 12; no. 3: Fig. 4.128: 10; no. 4: Fig. 4.131: 14; no. 5: Fig. 4.131: 9; no. 6: Fig. 4.131: 3; no. 7: Fig. 4.131: 1; no. 8: Fig. 4.131: 7) (image Tell Sabi Abyad project).

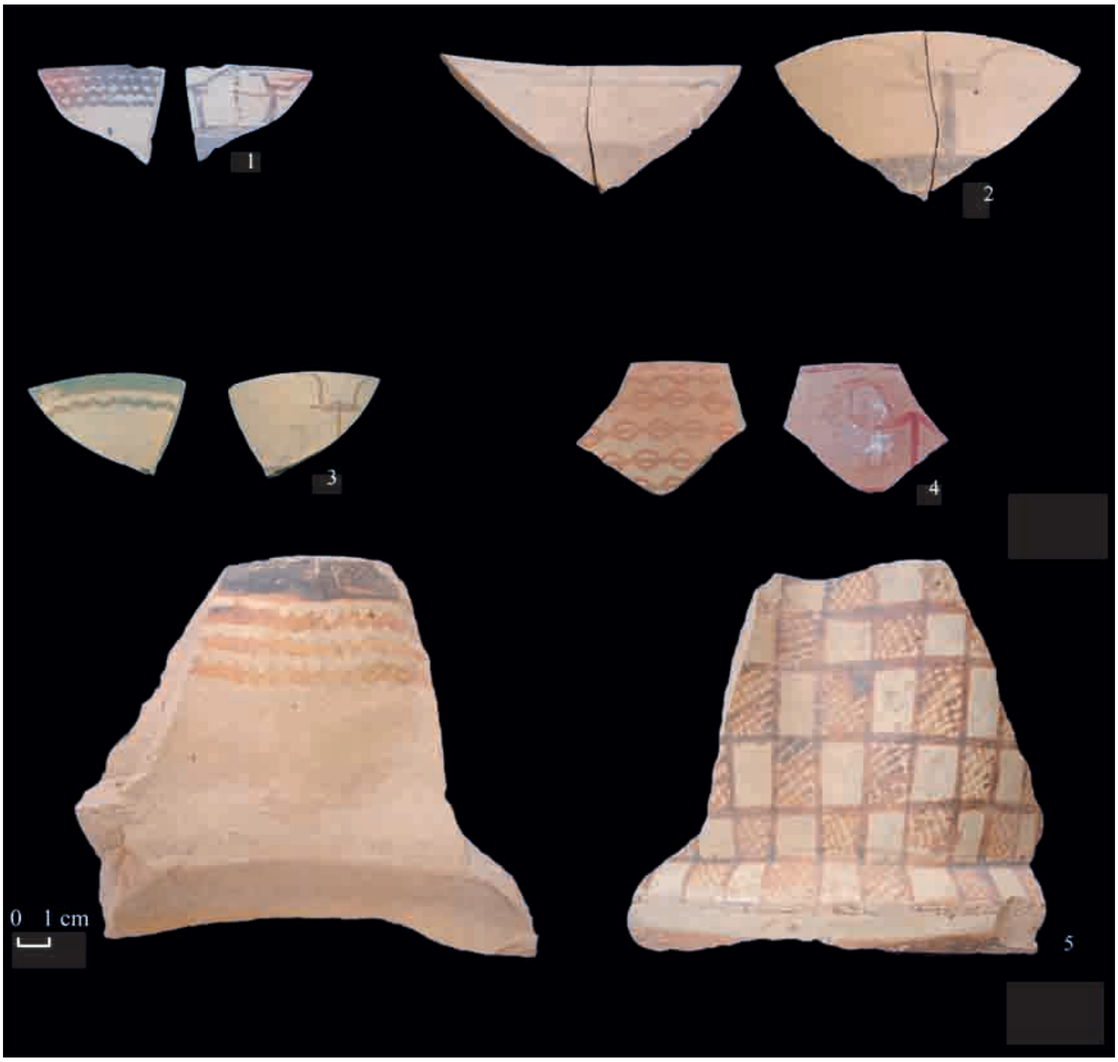


Plate 14.2. Tell Sabi Abyad, Operation III. Examples of painted Halaf Fine Ware typologically dated to the Middle-Late Halaf period. From D-Sequence open areas (no. 1: Fig. 4.130: 6; no. 2: Fig. 4.130: 3; no. 3: Fig. 4.130: 5; no. 4: Fig. 4.128: 14; no. 5: Fig. 4.130: 7) (image Tell Sabi Abyad project).

Plate 15. Tell Sabi Abyad, Operation III. Plastered Standard Ware Hole mouth Jar (P05-87; mixed level B7–Sequence C). A thick plaster covers the entire interior, the rim and the upper body. Scale in cm (see Fig. 4.103: 2) (image Tell Sabi Abyad project).

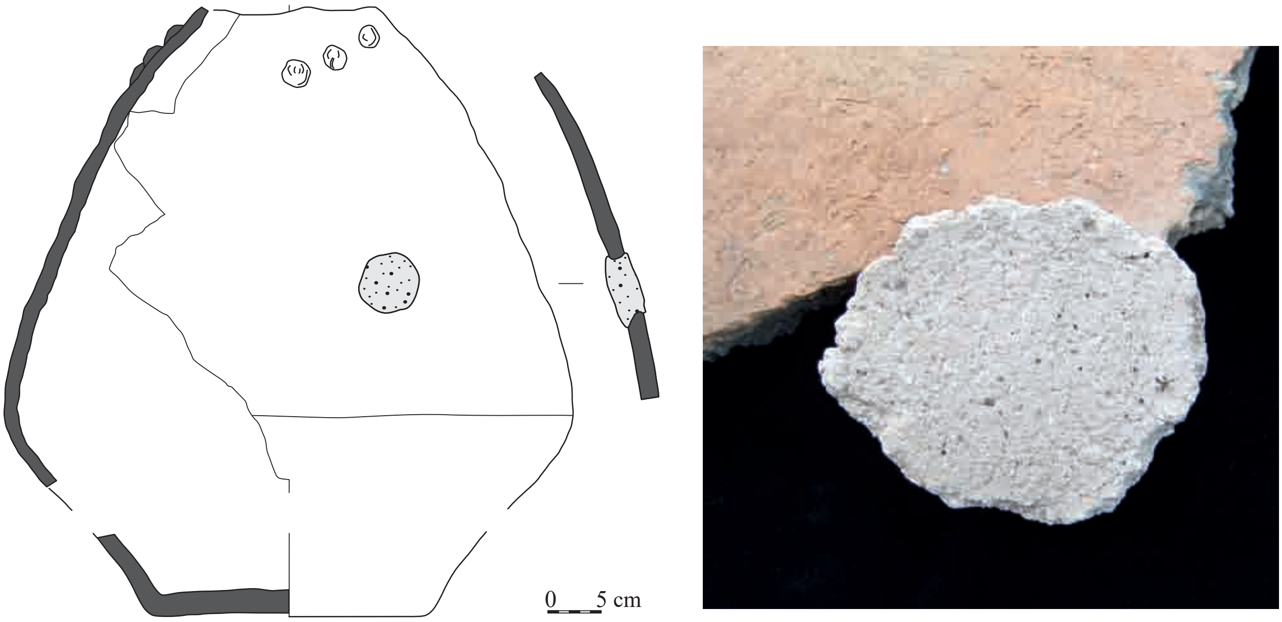


Plate 16.1 Tell Sabi Abyad, Operation III. The lower part of a large Standard Ware jar with a flat base, a slightly concave lower body and a carinated contour. Heavily fragmented and tentatively reconstructed. Appliqué decoration on the upper body, consisting of three circular blobs placed in a diagonal row. Recovered from a level A2 open area (P07-116; see Fig. 4.100: 1) (image R. Dooijes; Tell Sabi Abyad project).

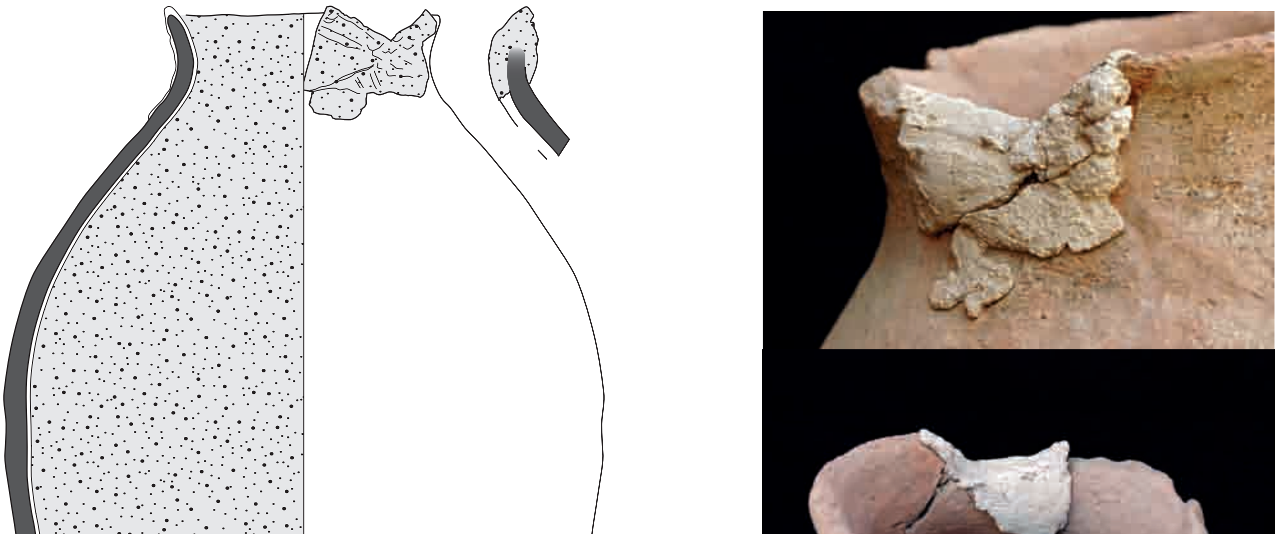
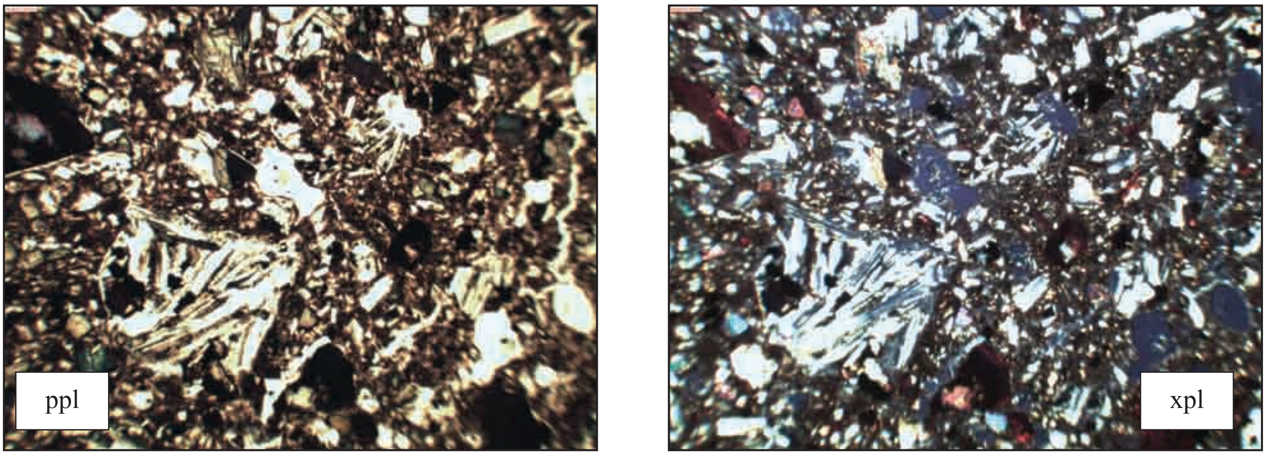
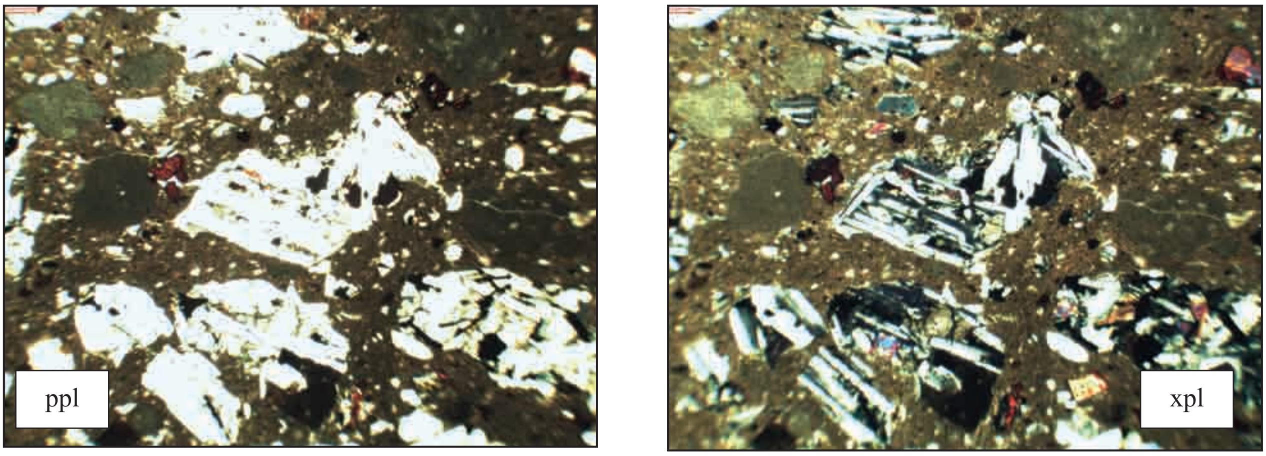


Plate 16.2 Tell Sabi Abyad, Operation III. A large Standard Ware jar with flat base, concave lower body and carinated contour. A 12 mm plaster covered the interior surface from base to shoulder. Excavated from a level A1 room fill (P05-82; see Fig 4.99: 3; also Pl. 20.1) (image R. Dooijes; Tell Sabi Abyad project).

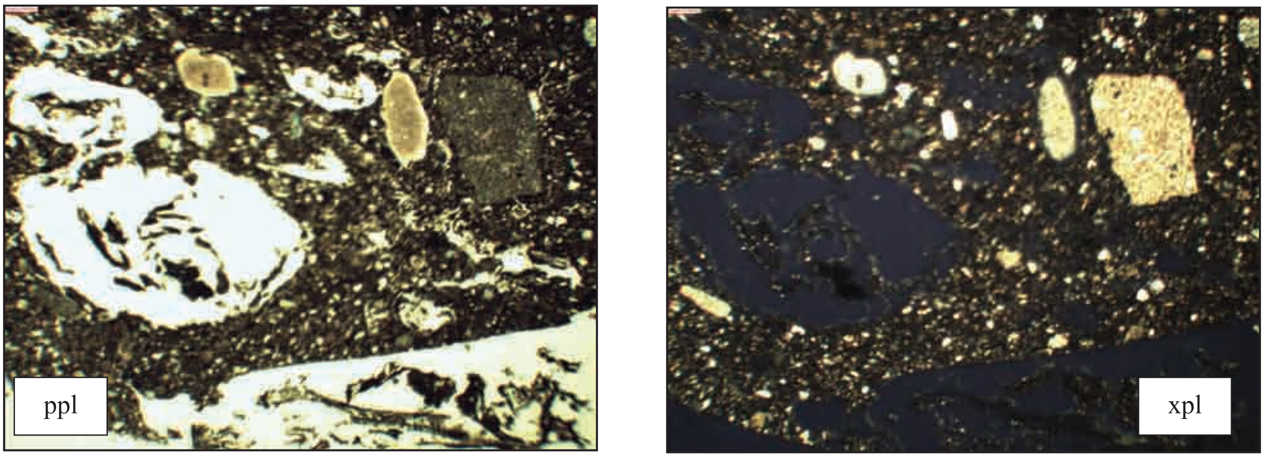
1. Type 1 (sub group 1a) (sample 10)



2. Type 1 (sub group 1b) (sample 22)



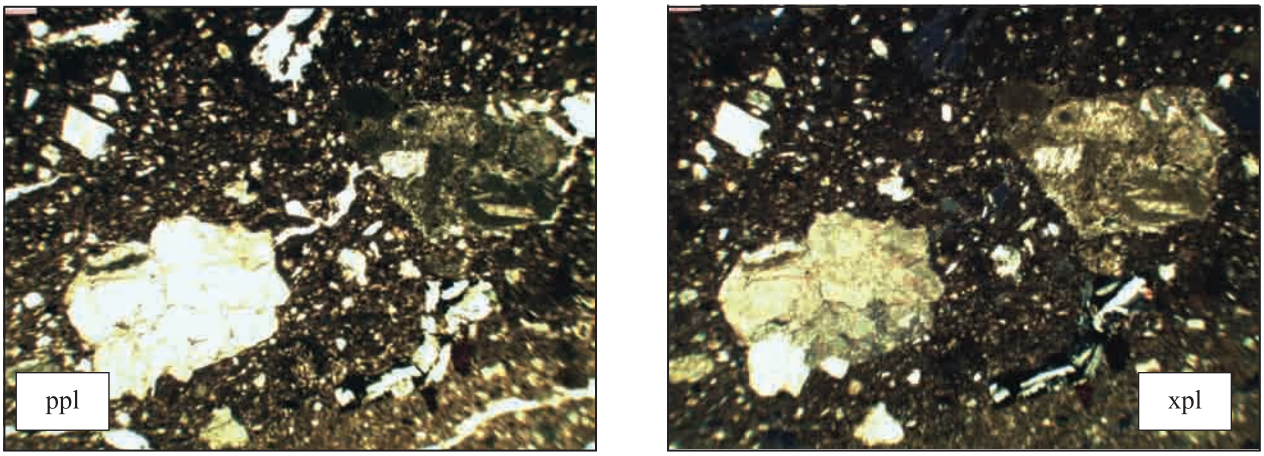
3. Type 2 (sample 11)



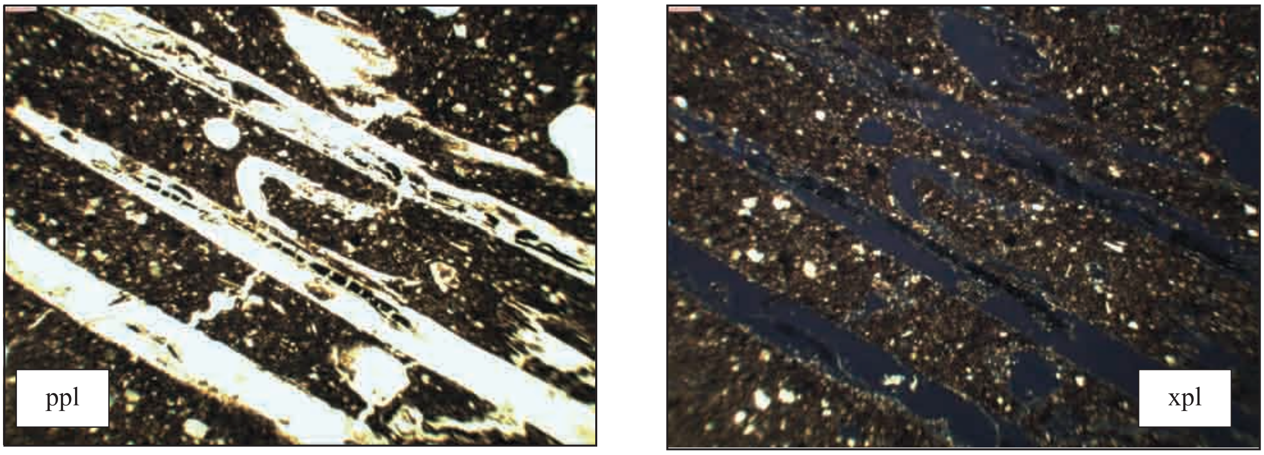
0,5mm

Plate 17 Tell Sabi Abyad. Photographs of thin-section types 1 and 2 in plain polarised light (PPL) and cross-polarized light (XPL) (image B. Nilhamn).

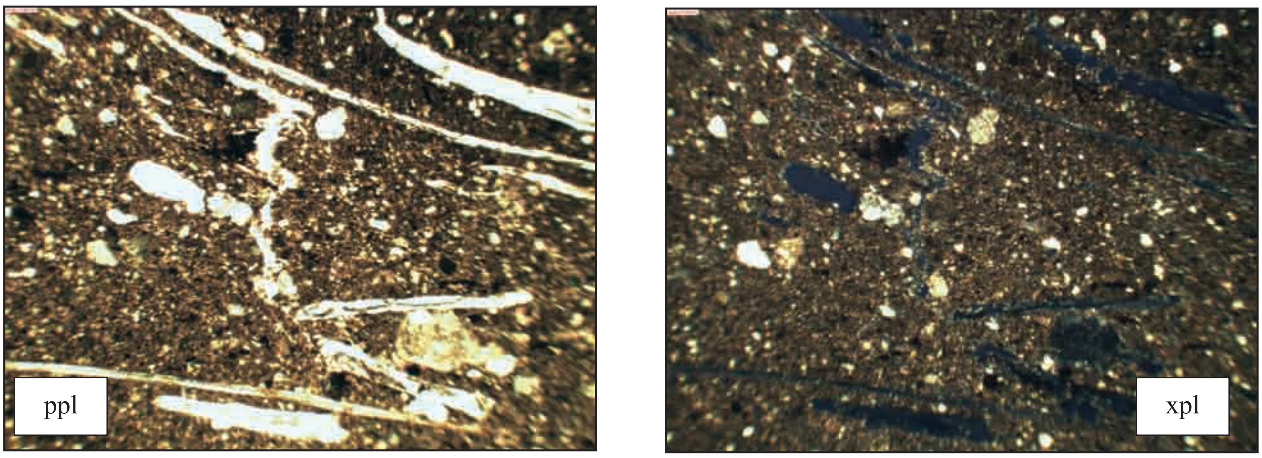
1. Type 3 (sample 16)



2. Type 4 (sample 39)



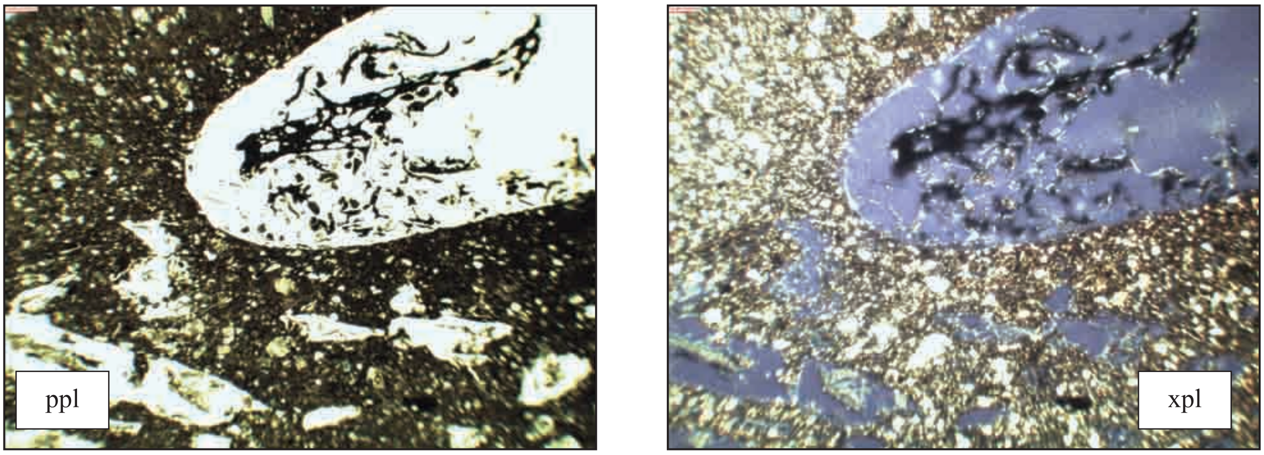
3. Type 4 (sample 142)



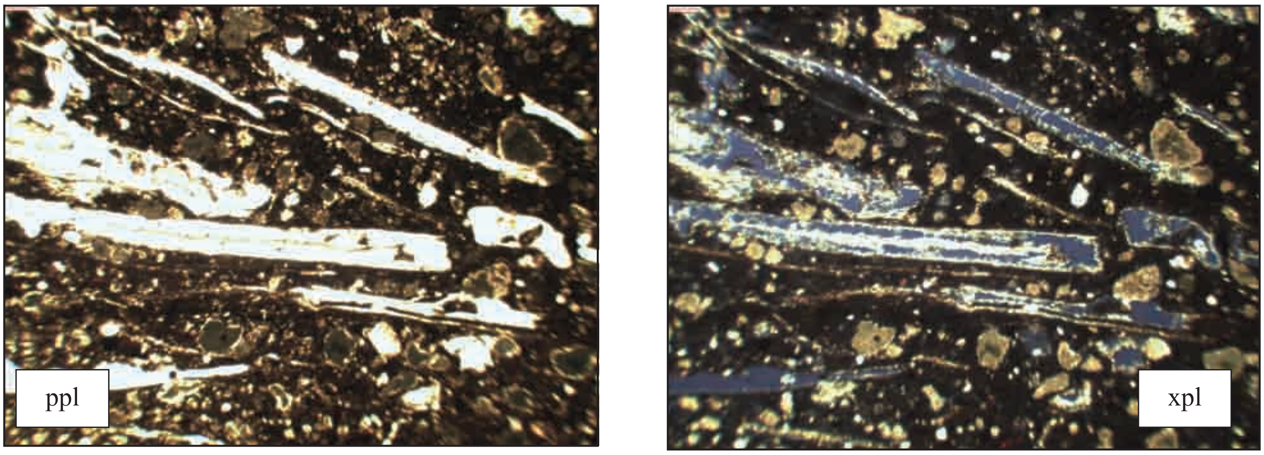
0,5mm

Plate 18. Tell Sabi Abyad. Photographs of thin-section types 3 and 4 in plain polarised light (PPL) and cross-polarized light (XPL) (image B. Nilhamn).

1. Type 4 (sample 59)



2. Type 4b (sample 45)



3. Type 5 (sample 101)

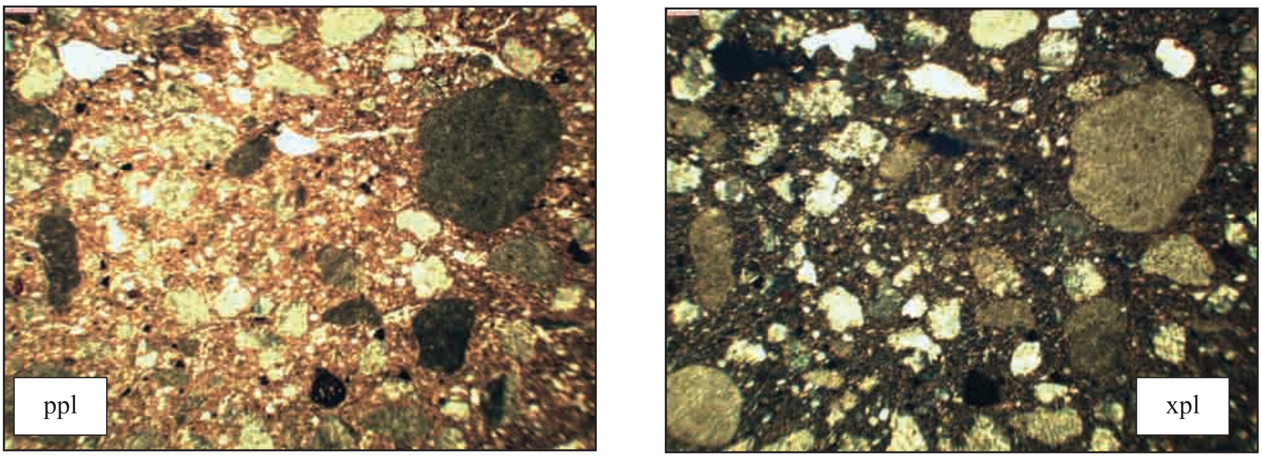


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Plate 19. Tell Sabi Abyad. Photographs of thin-section types 4, 4b and 5 in plain polarised light (PPL) and cross-polarized light (XPL) (image B. Nilhamn).

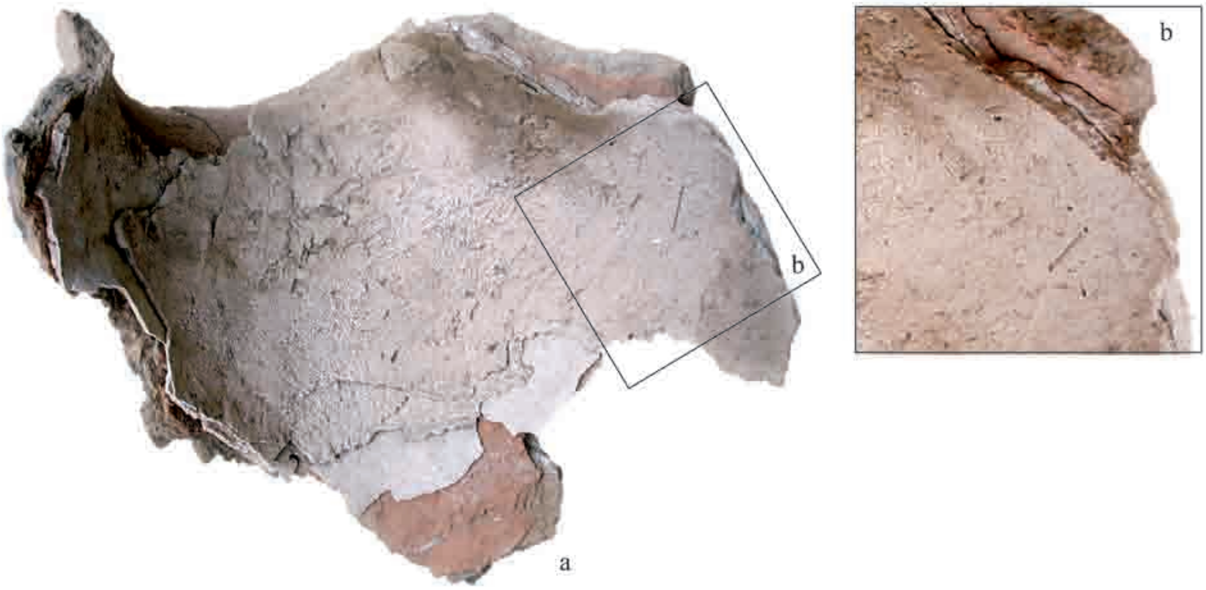


Plate 20.1. Tell Sabi Abyad, Operation III. A thick plaster coating the interior surface of a Standard Ware Large Jar (P05-82; level A1). Several individual layers are clearly visible (for a reconstruction see Fig. 4.99: 3, also Pl. 16.2) (image Tell Sabi Abyad project).

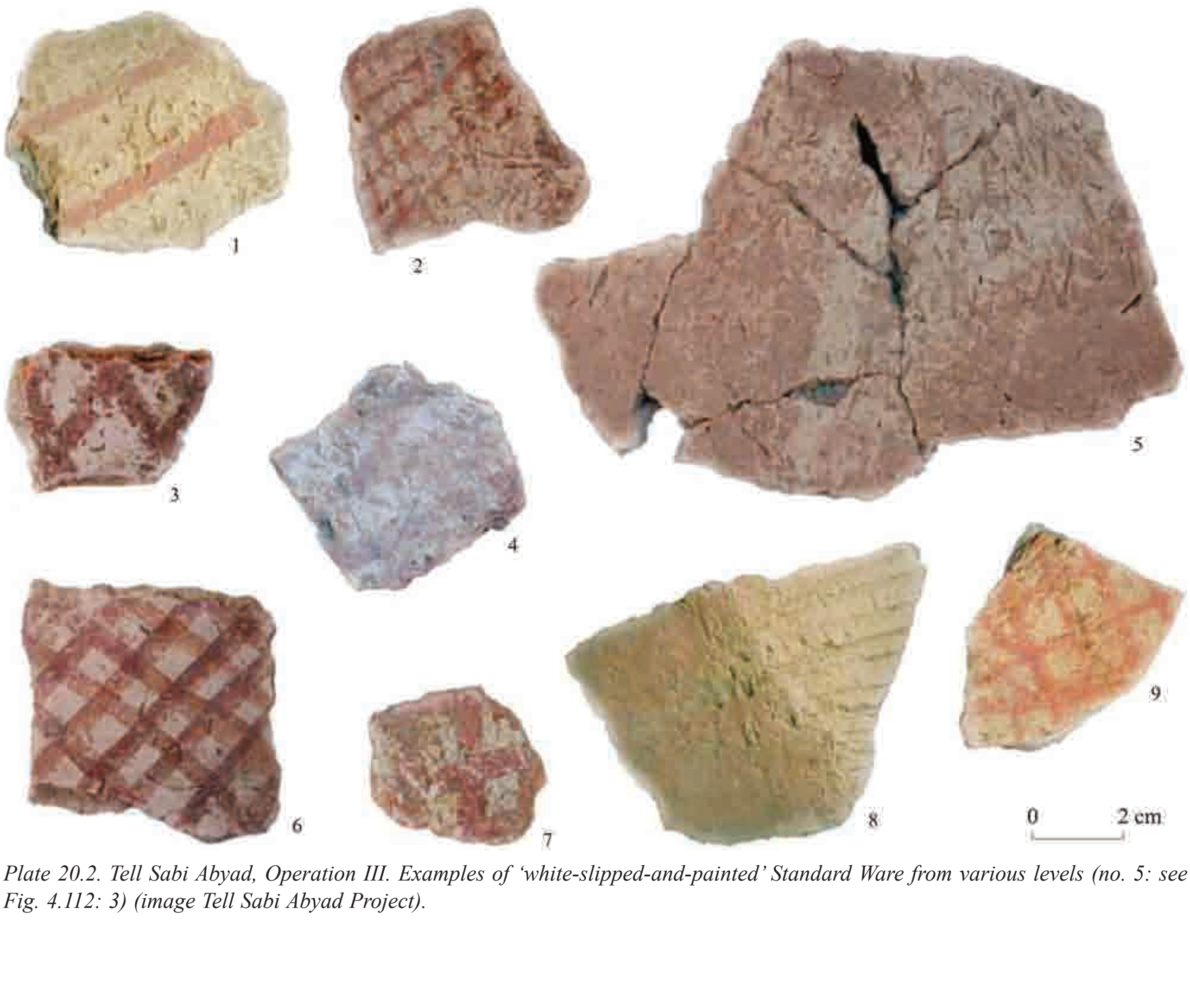


Plate 20.2. Tell Sabi Abyad, Operation III. Examples of 'white-slipped-and-painted' Standard Ware from various levels (no. 5: see Fig. 4.112: 3) (image Tell Sabi Abyad Project).

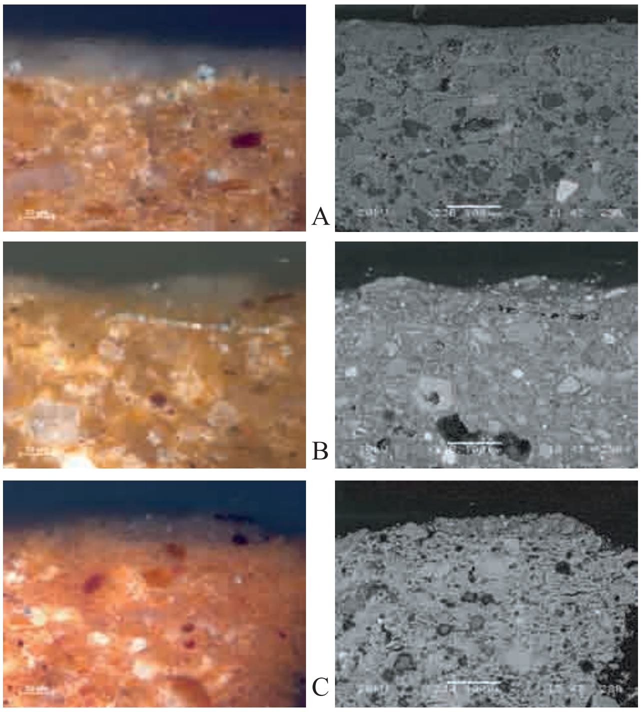


Plate 21.1 Tell Sabi Abyad, Operation III. Photomicrograph in incident polarised light (left) and backscattered electron images (right) of cross sections of white slip layers A: Sample 3 with a white layer of calcium carbonate. B: Sample 20 with a white layer of gypsum. C: Sample 16 with a white layer consisting of clay minerals (image L. Megens; Netherlands Cultural Heritage Agency).

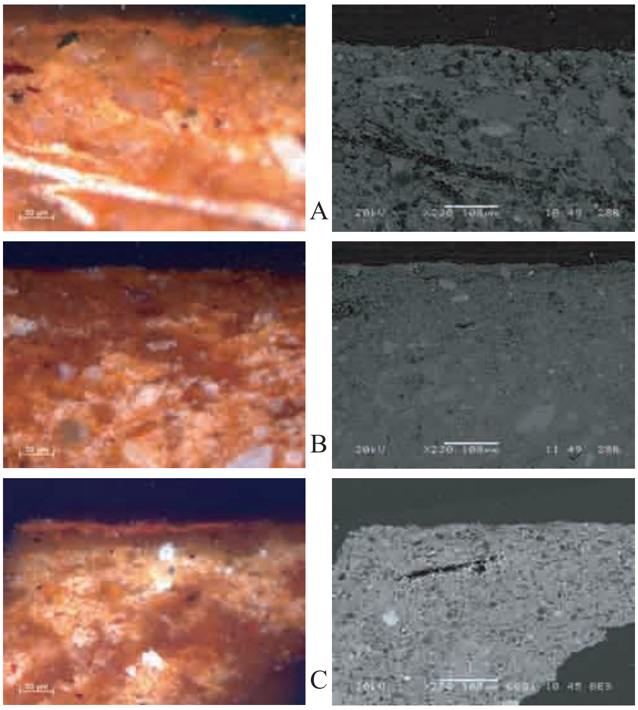


Plate 21.3. Tell Sabi Abyad, Operation III. Photomicrograph in incident polarised light (left) and backscattered electron images (right) of cross sections of red-slipped samples. A: Sample 10. B; Sample 6. C: Sample 8 minerals (image L. Megens; Netherlands Cultural Heritage Agency).

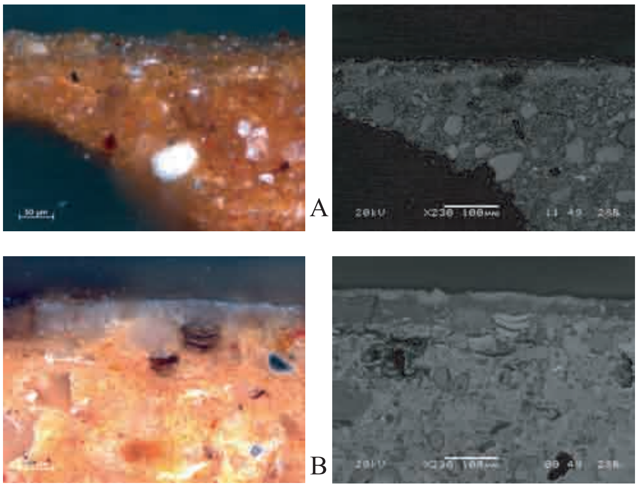


Plate 21.2. Tell Sabi Abyad, Operation III. Photomicrograph in incident polarised light (left) and backscattered electron images (BEI, right) of cross sections of double white slip layers. A: Sample 2. As can be seen on the enlarged BEI on the right, on the body of the shard lies a layer of small gypsum crystals, followed by a layer of clay minerals. B: Sample 13. A white layer consisting of clay minerals is covered with a thin layer of gypsum minerals (image L. Megens; Netherlands Cultural Heritage Agency).

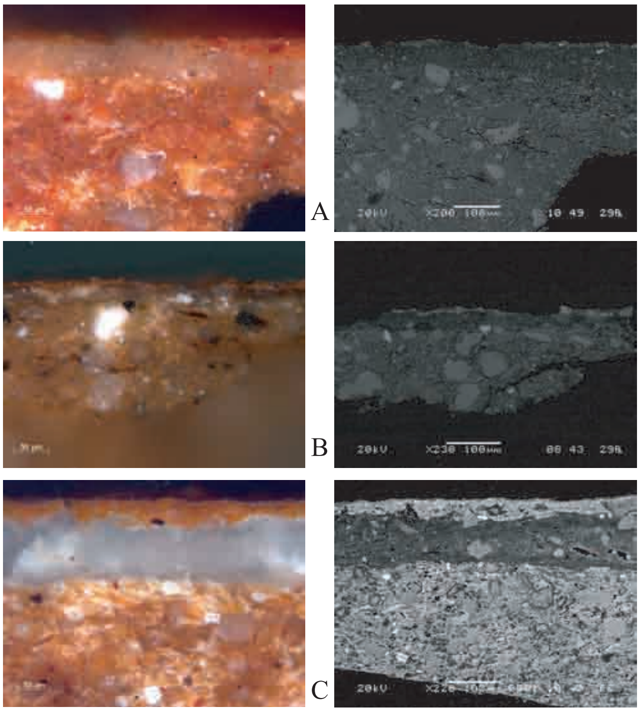
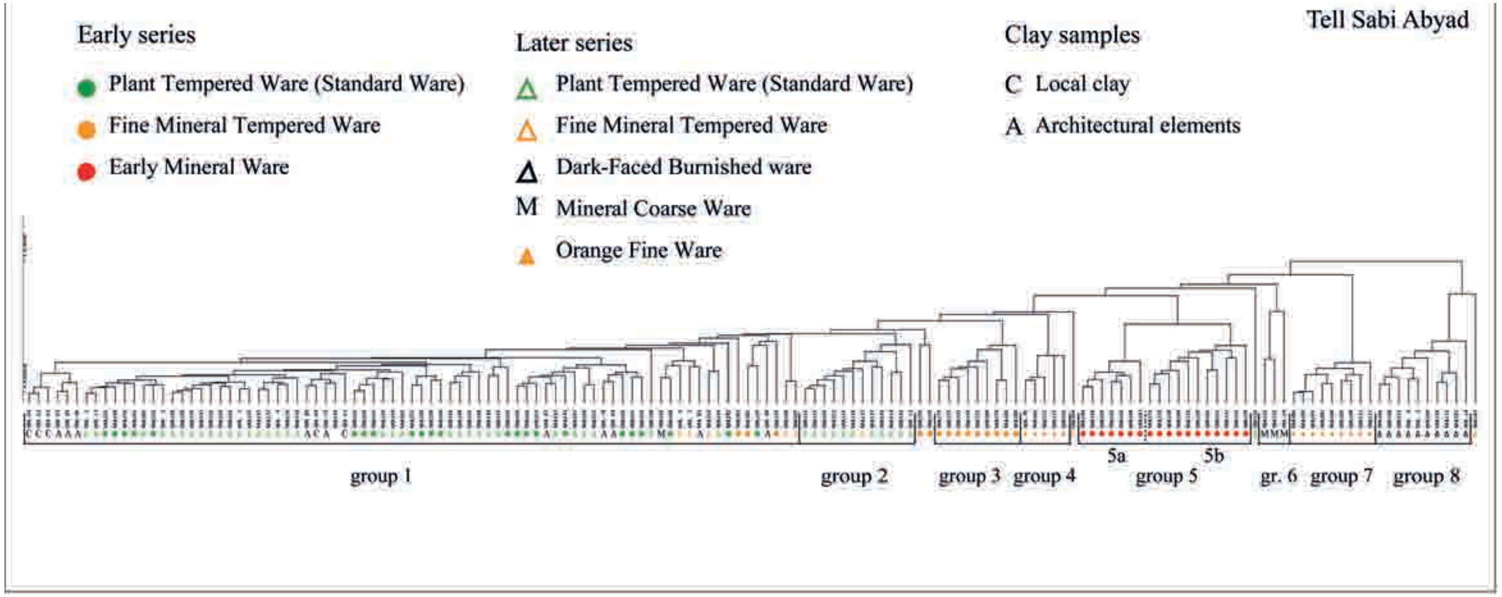


Plate 21.4. Tell Sabi Abyad, Operation III. Photomicrograph in incident polarised light (left) and backscattered electron images (right) of cross sections of white slip layers with red paint. A: Sample 12, showing a red layer of clay minerals on top of a whitish layer of clay minerals; both the whitish and red layer have a composition similar to the sherd body. B: Sample 5, showing a red layer of iron rich clay minerals on top of a whitish layer of clay minerals, with more calcium than the sherd body. C: Sample 4, showing a white layer with a similar composition as the sherd body, and a red layer of clay minerals with more iron than the sherd body minerals (image L. Megens; Netherlands Cultural Heritage Agency).



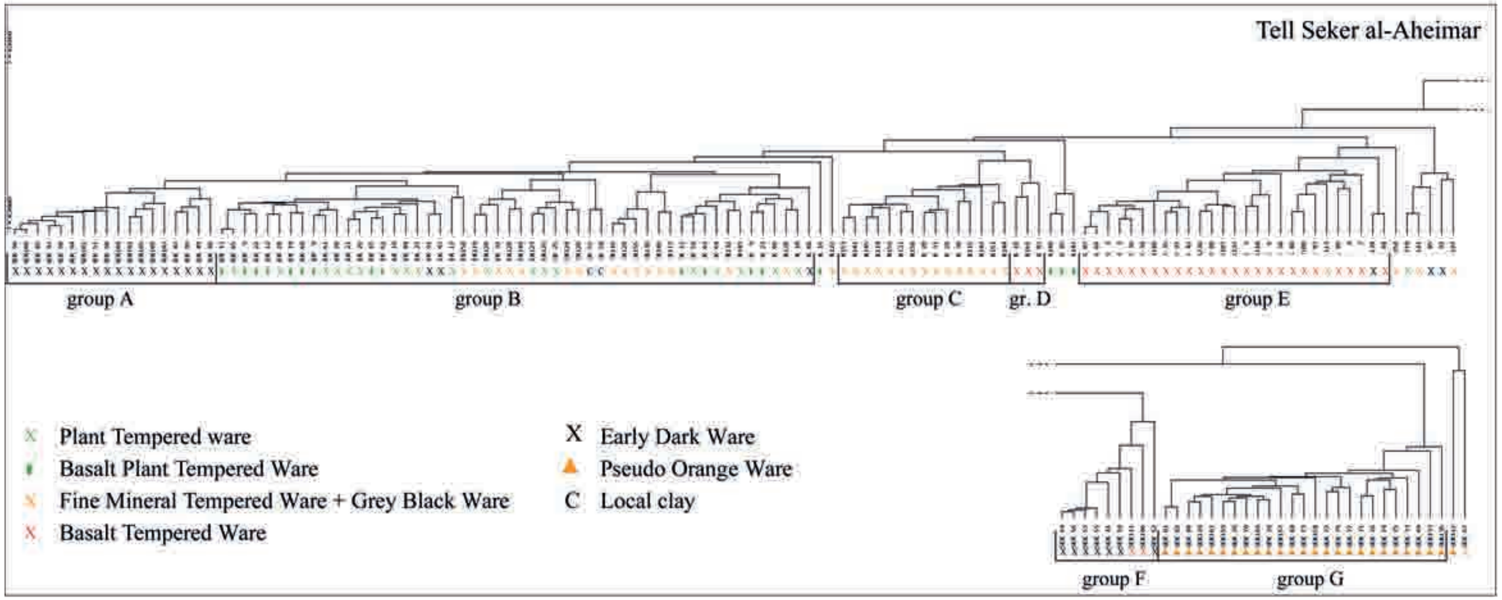
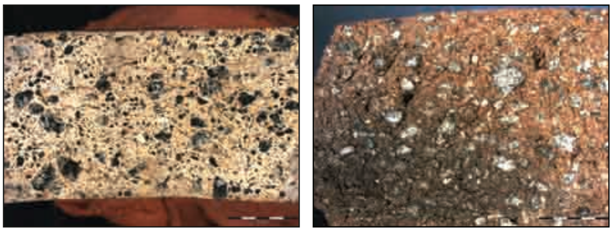
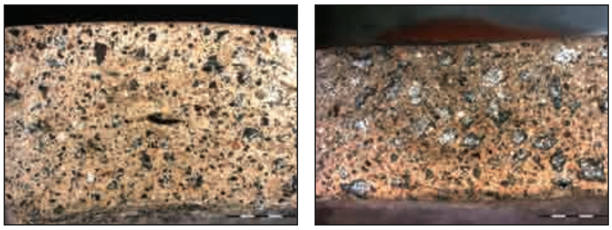


Plate 22. Tell Sabi Abyad and Tell Seker al-Aheimar dendrograms. Tell Sabi Abyad: cluster analysis of 152 samples, calculated on 17 components. Tell Seker al-Aheimar: cluster analysis of all the analysed samples, calculated on 17 components (image V. Thirion-Merle; ArAr, Maison de l'Orient et de la Méditerranée).



SBA245 (Group 5a) SBA234 (Group 5b)

Plate 23.1. Tell Sabi Abyad. Fabric of samples characteristic of compositional sub-groups 5a (SBA 245, left) and 5b (SBA234, right) (image A. Bernet; ArAr, Maison de l'Orient et de la Méditerranée).



SEK 7 SEK 37

Plate 23.2. Tell Seker al-Aheimar. Fabric of samples characteristic of Basalt Tempered Ware: SEK 7 (left), SEK 35 (right) (image A. Bernet; ArAr, Maison de l'Orient et de la Méditerranée).

Plate 23.3. Similarity between the painted Early Mineral Ware from Tell Sabi Abyad (a) and the painted Basalt Tempered Ware from Tell Seker al-Aheimar (b, c) (not to scale) (no. a: Pl. 4.51: 2) (image A. Bernet; ArAr, Maison de l'Orient et de la Méditerranée).

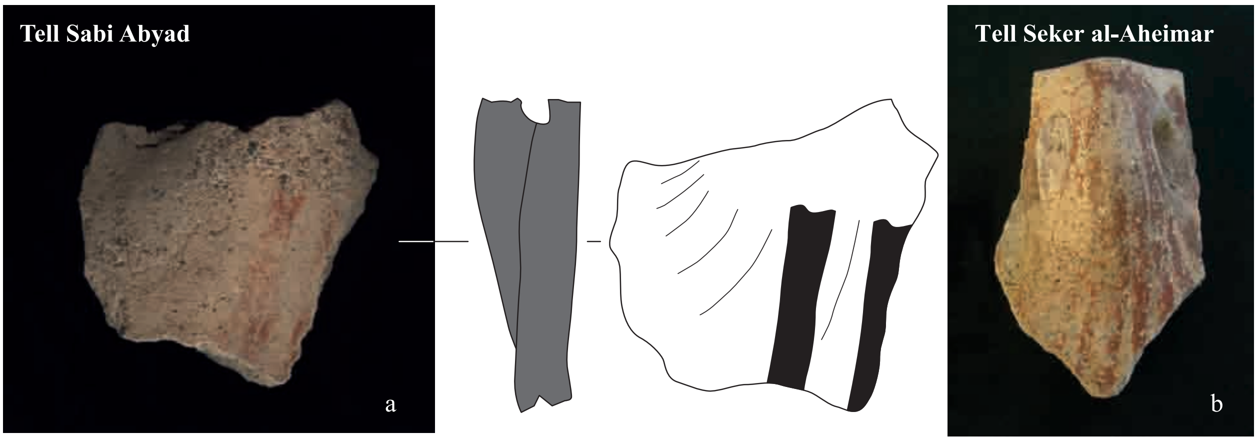


Plate 23.4. Two very similar painted lugs from Tell Sabi Abyad (Early Mineral Ware) (a) and Tell Seker al-Aheimar (Basalt Tempered Ware) (b) (not to scale) (no. a: Fig. 4.114: 11) (image M. Le Mière; Maison de l'Orient et de la Méditerranée).

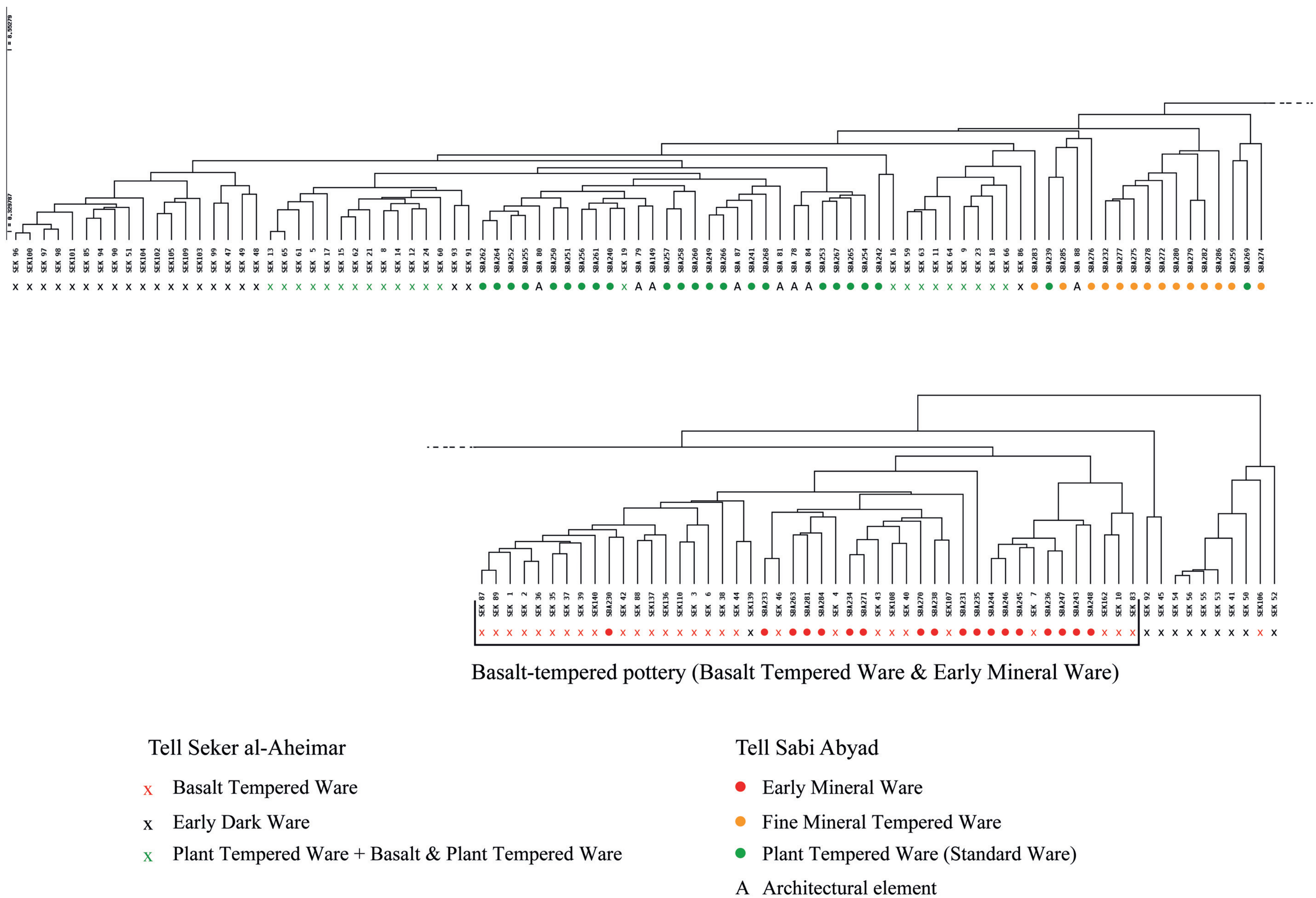


Plate 24 Dendrogram of cluster analysis of samples of the earliest periods of Tell Sabi Abyad (Initial Pottery Neolithic and Early Pottery Neolithic stages) and Tell Seker al-Aheimar (Pre-Proto-Hassuna period), calculated on 17 components (image V. Thirion-Merle; ArAr, Maison de l'Orient et de la Méditerranée).

Plate 25.1 Tell Sabi Abyad, Operation IV. Complete and restored pottery vessels from Building I. From left to right: hole mouth pot P02-166, convex-sided bowl P02-133, vertical pot with loop handles P02-16, hole mouth pot P02-26, and Fine Mineral Tempered Ware closed S-shaped pot P02-208. For locations: Fig. 13.11 (restoration by R. Dooijes, National Museum of Antiquities Leiden) (image Tell Sabi Abyad Project).

Plate 25.2. Halaf sherds recovered from Assyrian mud bricks on the high western part of Tell Sabi Abyad I (image O. Nieuwenhuyse).

Plate 26. Tell Sabi Abyad I, Operation III. Standard Ware base fragments carrying the impressions of coiled basketry on the exterior surface. (1. E4 18-51:100; Level A4. 2. E4 11-26:4; Level A4/A3. 3. E3 168-384:28; Level A2. 4. E4 49-172:2; Level A5. 5. D4 89-184:2; Level A8/A7. 6. E4 21-69:3; Level A4/A3. 7. E4 69-187:1; Level A3. 8. F4 111-276:12; Level A3. 9. E4 75-201:100; Level A5. 10. E4 44-210:1; Level A4). For descriptions, see Table 10.1 (image Tell Sabi Abyad Project).

Plate 27.1. Tell Sabi Abyad I, Operation III. Standard Ware base fragment carrying the impression of coiled basketry on the exterior surface (Fig. 4.105: 1; for description, see Table 10.1) (image Tell Sabi Abyad Project).

Plate 27.2. Tell Sabi Abyad I, Operation III. Standard Ware body fragment of a Vertical Pot carrying the impression of coiled basketry on the interior surface (E4 16-176: 1, from a level A3 pit) (see Fig. 10.1: 1; for description see Table 10.1) (image Tell Sabi Abyad Project).

Plate 28.1. Tell Sabi Abyad, Operation V. Standard Ware medium-sized jar P01-54 placed on the floor of a room embedded between lumps of plaster (room 3; Fig. 13.11, item 3)

Plate 28.2. Tell Sabi Abyad, Operation V. The lower part of a re-used plastered Standard Ware jar placed in a shallow pit through the floor in a corner between two walls (room 5; Fig. 13.11, item 5) (image Tell Sabi Abyad Project).

Plate 29. Tell Sabi Abyad, Operation III. An exceptional burial of a young woman and her burial gifts (BN09-40, Cemetery 3). These include four painted Standard Fine Ware vessels (P09-85, P09-86, P09-87 and P09-88, see Figs. 4.124:13, 4.124:11, 4.125:5 and 4.125:4, resp.), a stone bowl, a needle, two beads and a labret (image Tell Sabi Abyad Project).

Plate 30.1. Tell Sabi Abyad, Operation III. Burial of a 63–73-year-old man with a bone awl and a Standard Ware bowl (P08-73) placed upside-down near the face (BN08-40, Cemetery 5) (image Tell Sabi Abyad Project).

Plate 30.2. Tell Sabi Abyad, Operation III. A sherd used to cover the orifice of vessel P09-109 (Fig. 4.95: 4), which is placed with the body of an infant (BN09-48, Cemetery 4) (image Tell Sabi Abyad Project).

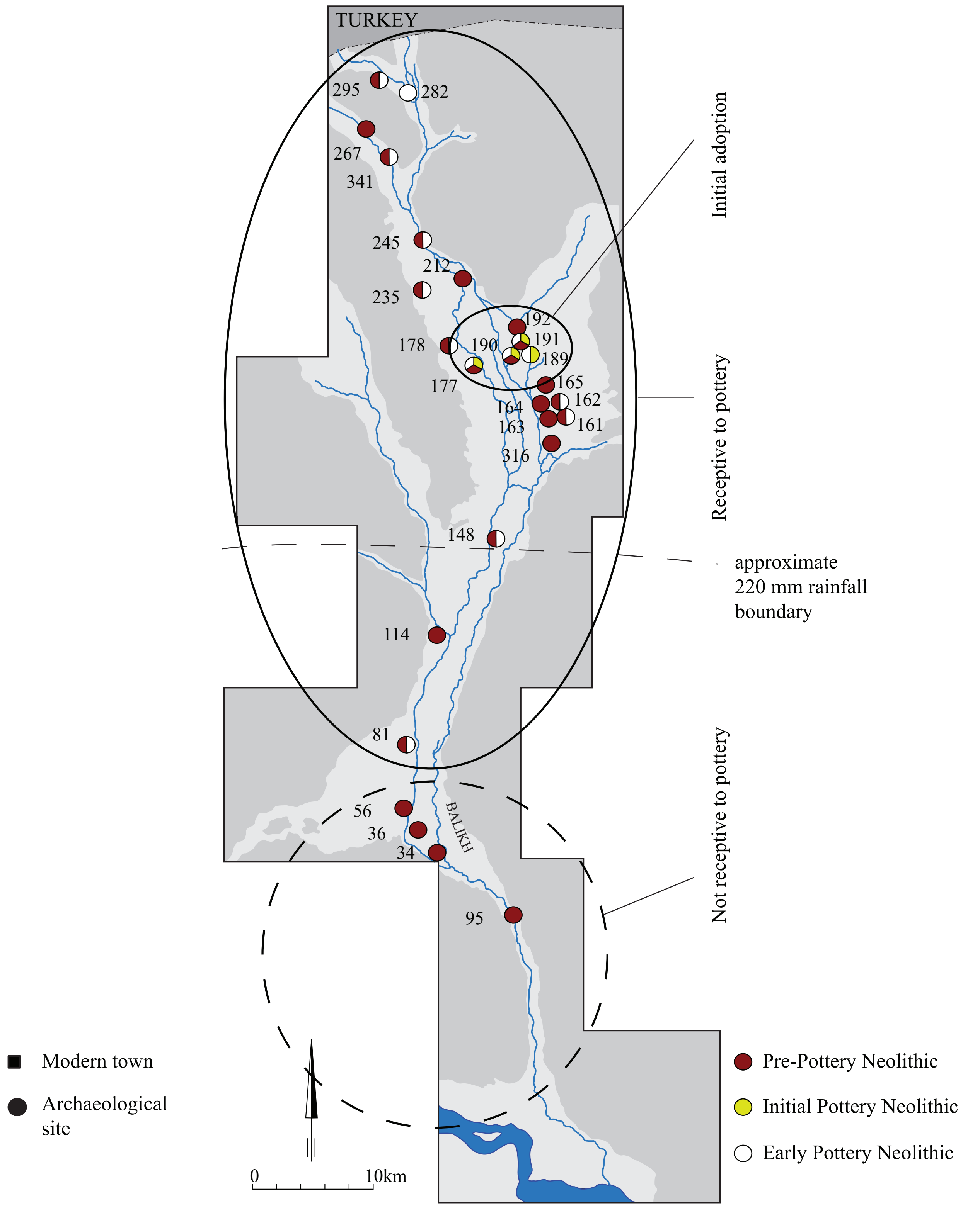


Plate 31. The distribution of Pre-Pottery Neolithic, Initial Pottery Neolithic and Early Pottery Neolithic sites in the Balikh Valley. Initial Pottery Neolithic sites: No. 177. Tell Damishliyya. No. 189. Tell Sabi Abyad I; No. 190. Tell Sabi Abyad II. No. 191. Tell Sabi Abyad III. Other sites: No. 245. Tell Assouad; No 148. Tell Mounbateh (image O. Nieuwenhuyse, after Akkermans 1993; Wilkinson 1996; Nieuwenhuyse n.d.).

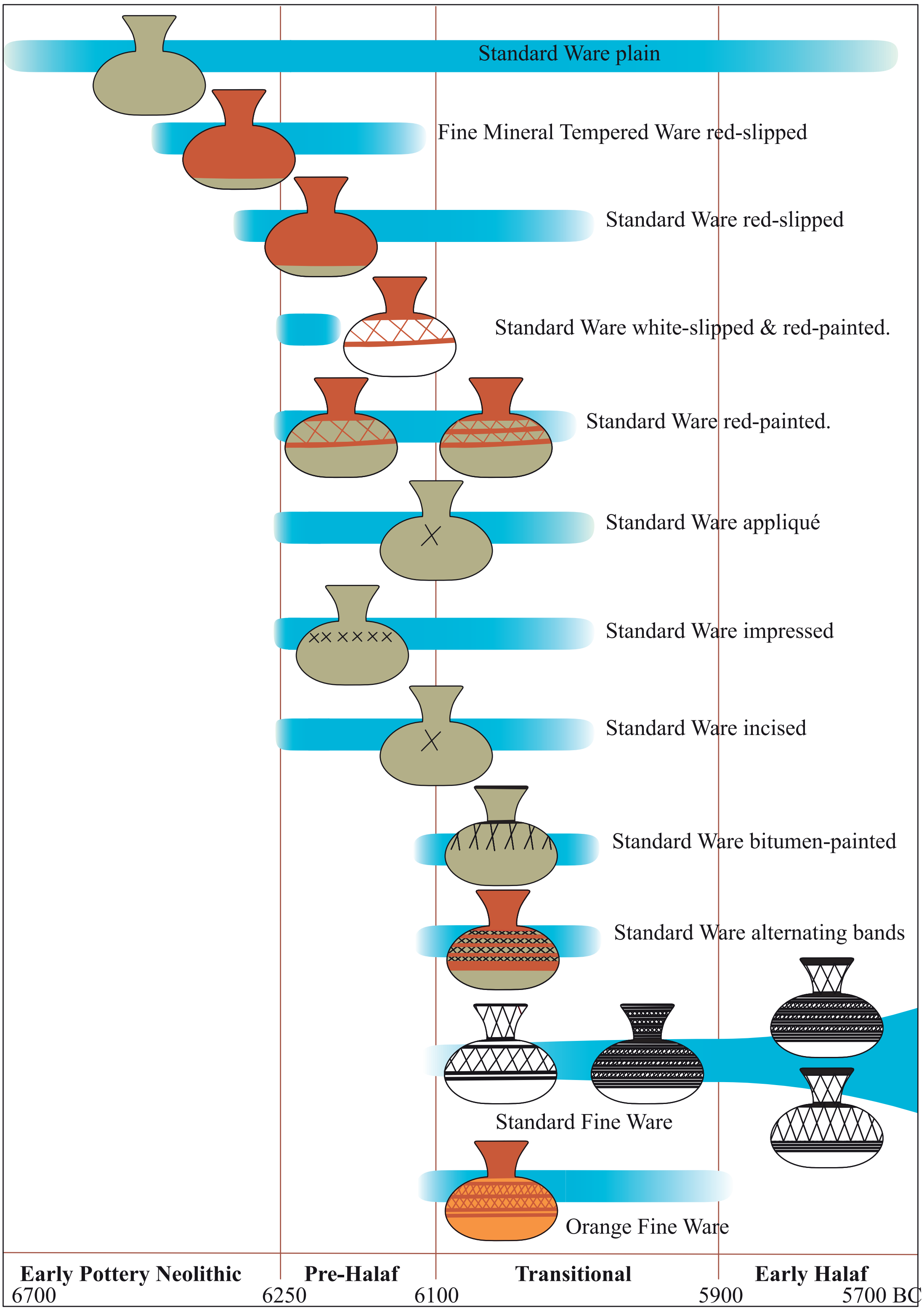


Plate 32.Tell Sabi Abyad. The development of stylistic complexity of decorated pottery types in the Early Pottery Neolithic to Early Halaf stages. The chart shows standardised forms and abstracted design configurations (image O. Nieuwenhuyse).

Chapter 9

Investigating the provenance of the early pottery from Tell Sabi Abyad

Marie Le Mière, Valérie Thirion-Merle and Maurice Picon (†)

9.1. Introduction

The earliest pottery currently known from Upper Mesopotamia (Le Mière 2009) dates back to the beginning of the 7th millenium BC. It was found at a series of sites situated in the *Jezirah*, stretching from the upper Tigris to the Euphrates valley, as well as from three sites in the northern Levant (Fig. 9.1). This pottery is extremely uniform and is characterised by its exclusively mineral temper, which is usually large in size and abundant. Previous chemical analyses that processed material from nine of the *Jezirah* sites revealed imports present together with local production at most of these sites. This mixture of local and imported material seems to be another character of this early pottery (Le Mière 2013, 325). The earliest pottery from Tell Sabi Abyad, the so-called Early Mineral Ware (Chapter 4 3), presents all the technical and morphological characteristics of the *Jezirah* early pottery and clearly also belongs to this Upper Mesopotamian group.[1]

To investigate whether the early pottery from Tell Sabi Abyad was locally made and/or imported, chemical analyses of this material were carried out on a total of 57 samples from the Initial Pottery Neolithic and Early Pottery Neolithic periods. These results add to a large number of previously analysed pottery samples from Tell Sabi Abyad of later periods (186 samples) as well as from many other Neolithic sites of the Balikh valley (31 sites, 158 pottery samples). Together with a rather large series of clay samples (n = 25) collected in the Balikh valley and ten samples of diverse elements of architecture from Tell Sabi Abyad, this material constitutes a solid database of local and regional references.

9.2. Analytical procedures and sampling

The analytical method applied to this ceramic material was chemical analyses by Wavelength Dispersive X-Ray Fluorescence Spectrometry (WD-XRF), and followed the standard procedures of the Archaeology and Archaeometry Laboratory (CNRS–University of Lyon). This procedure supplies the bulk chemical composition of the ceramic (matrix and sandy fraction), and consequently the composition of the material used in its manufacturing (Picon and Le Mière 1987; Thirion-Merle 2014). Measurement is carried out on glass tablets of a homogenous composition that contain 800 mg of the powdered sample mixed with fluxes. For each sample, twenty or twenty four (for the most recently analysed samples) components were determined: ten major[2] and fourteen traces.[3]

Several uni-, bi- and multivariate statistical data treatments have been applied to interpret the chemical results. Among the multivariate methods used, here we present results mainly from the cluster analysis, which is a statistical treatment that uses Euclidian distances, calculated in this case on 17 chemical components (Na, P, La, Y, Th, Pb and Cu have not been used because they are not relevent and/or measurement of several of them is below the quantitative limit). The resulting dendrogram (see for example Pl. 22) represents the relative distances between samples, where the most similar samples are linked at the lowest distances (see Baxter 1994; Picon 1984). Thus, on the dendrogram, we have clusters of individuals of similar compositions and all the more similar as they are linked at a lower level.

This study focuses on the earliest pottery from Tell Sabi Abyad. Since the number of analysed samples from Tell Sabi Abyad is very large (242), only the pottery from the earliest periods, the Initial and Early Pottery Neolithic as well as Pre-Halaf and early Transitional, were selected, which numbers 138 samples. Additionally, five clay samples collected on the site itself or nearby were included, as were ten samples of architectural elements, and one of a sling-bullet made of unfired clay. Table 9.1 presents the analysed samples by categories:

Table 9.1 Tell Sabi Abyad. Analysed samples used in this study. A: Initial and Early Pottery Neolithic; B: Pre-Halaf and early Transitional

Sample type	*Sample numbers*	*Total*
	A. *Earlier periods: Initial and Early Pottery Neolithic*	
Early Mineral Ware	SBA 230–231, 233–238, 243–248, 263, 270–271, 281, 284	19
Fine Mineral Tempered Ware	SBA 232, 259, 272–280, 282–283; 285–286	15
Plant Tempered Ware (Standard Ware)	SBA 239–242, 249–258, 260–262, 264–269	23
Total		57
	B. *Later periods: Pre-Halaf and early Transitional*	
Fine Mineral Tempered Ware	SBA123, 164	2
Grey Black Ware	SBA 6–7, 102, 104–105, 107	6
Plant Tempered Ware (Standard Ware)	SBA 1–4, 11–12, 114–116, 118–119, 124–148, 150, 153, 159–160, 163, 165–167, 185	45
Mineral Coarse Ware	SBA 50, 120–122	4
Dark-Faced-Burnished Ware	SBA 8–9, 14, 103, 106, 108–112	10
Orange Ware	SBA 45, 113, 117, 156–157, 202–209, 215	14
Architectural elements	SBA 78–81, 83–88	10
Sling-bullet	SBA 149	1
Clays	SBA 59–61, 63, 82	5
Total		97

the characteristics of each ware are given in Chapter 4. We draw attention here to the fact that the plant-tempered (Standard Ware) pottery of the early periods, from the Initial and Early Pottery Neolithic periods, is characterised by the frequent occurrence of very large plant inclusions when in later periods, the Pre-Halaf and early Transitional, those inclusions gradually disappear; and a fabric characterised by small plant temper appears alongside the more common ceramic with large plant tempered fabric (Le Mière and Nieuwenhuyse 1996, table 3.2a, note 1).

9.3. Classifying the Tell Sabi Abyad ceramics by chemical composition

Most of the samples present calcareous compositions, sometimes with very high contents, although, as shall be detailed below, we also identified several examples of non-calcareous pottery. In order to classify the analyses and to test any resemblances, multivariate statistical data treatment was processed. The cluster analysis dendrogram is presented on the upper part of Plate 22. This classification shows eight groups (named group 1 to group 8) and several isolated sherds.

Group 1 is the largest one, including 81 samples, and is 53% of the whole sample. It is chemically very homogeneous and is composed essentially of plant tempered ware (Standard Ware) sherds with a few Fine Mineral Tempered Ware examples. It very likely represents the local production since this group includes not only what is usually considered as locally produced, namely the plant tempered pottery, but also all the architectural elements as well as the sling-bullet and several clay samples collected around the site. The mean composition of this group is given Table 9.2, with those of the other groups.

Group 2 is mainly composed, as group 1, of plant tempered ware (Standard Ware) sherds, with only one Fine Mineral Tempered Ware example. However, these plant-tempered sherds differ from those of group 1 by the size of their plant inclusions, which is small (see above). The group is chemically homogeneous, it is less calcareous than group 1 with lower contents of correlated strontium and it has higher contents of iron and nickel. Nevertheless it shares many common characteristics with group 1.

Next to group 2 in Plate 22 (upper part) we find two Fine Mineral Tempered Ware samples. These present several compositional particularities, amongst them a high content of manganese. Nevertheless, their compositions are very similar to those of group 1 and, though marginal, we can consider these samples also as local productions, probably made of raw material from different clay pits. Group 3 is also chemically homogeneous and includes only early Fine Mineral Tempered Ware samples. This group is much more calcareous than group 1 (m CaO=36.2% *versus* 18.9%).

Actually, if we consider groups 1–3, as well as the unclassifiable samples situated between them, all of them have common characteristics which differ from those of most of the groups situated further to the right on the dendrogram. All of them are calcareous, having low contents of rubidium and with similar contents of manganese and most of the other traces; most of the samples also possess less than 1% of titanium. These groups gather together the main part of the samples (68.5% of the whole sample) and also include the local references,

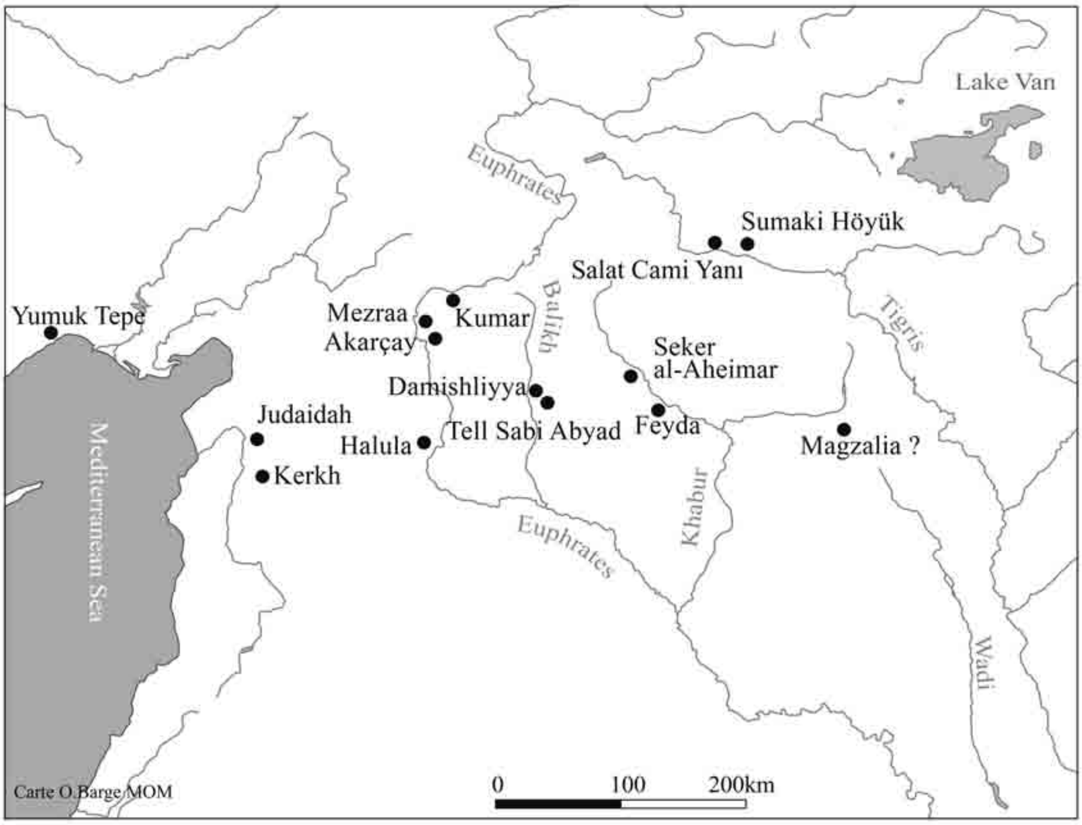


Fig. 9.1 Map showing the locations of early Pottery Neolithic sites in the Jezirah *and the Northern Levant (image O. Barge; Maison de l'Orient et de la Méditerranée).*

clays and architectural elements. Therefore they would represent the local production, with the diverse groups displaying different local or sub-local productions.

Group 6 is composed of three Mineral Coarse Ware samples, characterised by very high contents of calcium and low contents of titanium. They do not really form a homogeneous compositional group as some of their components strongly vary. The fabrics of those three sherds present a lot of white inclusions which are clearly crushed calcite (Le Mière and Picon 2003).

Except this group 6, the remaining groups (4, 5, 7, and 8), differ clearly from the chemical composition of the local productions, as mentioned above. Group 4 and group 7, both include solely samples of Orange Fine Ware. The composition of these two groups have several characteristics in common, namely a high content of rubidium and a low content of nickel. The two groups also display some differences: in group 4 iron, manganese, zinc contents are low, whereas in group 7 the calcium content is very low and barium rather high. As already discussed elsewhere, both Orange Fine Ware groups are probably imports, from an as yet unprovenanced source (Le Mière and Picon 2008).

Group 8 also gathers together all the samples of a single, very distinct, category of pottery, Dark-Faced Burnished Ware. This group presents a very peculiar chemical composition: it is non-calcareous and characterised by high contents of iron and correlated vanadium, very high contents of magnesium, and overall very low contents of titanium. The chromium and nickel contents are also notably high. These compositions are very typical of clays found in ophiolitic areas, which do not surround Tell Sabi Abyad. Such geological areas can be found in northern Syria along the Mediterranean coast and in southern Turkey along the Taurus. Hence, this group has been recognised as most probably imported from these regions (Le Mière and Picon 1987; Picon and Le Mière 1987).

Group 5, finally, gathers together all the Early Mineral Ware samples. This group is actually composed of two clearly distinct sub-groups, here termed groups 5a and 5b. Early Mineral Ware (EMW) in general is characterised by the presence of many black basalt inclusions (Chapter 5), but our analysis indicates that there are two types of fabrics: the first one is very light in colour, contains small inclusions of basalt and is painted; all the samples of this type gather in sub-group 5a. The second type of fabric is darker in colour and contains basalt inclusions of a larger size, and sometimes can be very large; the samples of this type gather in sub-goup 5b.

Thus, our analysis suggests an important sub-division in the general category of Early Mineral Ware, one that has so far not been identified in either the macroscopic description (Chapter 4), or the petrographic analysis (Chapter 5).[4] The characteristic fabrics of these two sub-groups can be seen in Plate 23.1. The two sub-groups differ in the content of calcium, with the sub-group 5a showing

Table 9.2 Tell Sabi Abyad. Mean and standard deviation of the eight compositional groups (majors are given in percentage of oxide, traces in parts per million of metal)

Group 1 (n=81)

	CaO	Fe_2O_3	TiO_2	K_2O	SiO_2	Al_2O_3	MgO	MnO	Na_2O	P_2O_5	Zr	Sr	Rb	Zn	Cr	Ni	La*	Ba	V	Ce
m	18.92	7.10	0.876	3.11	50.26	13.45	4.25	0.1317	1.21	0.49	200	574	70	124	257	158	29	356	142	75
s	4.19	0.54	0.079	0.43	2.79	1.04	0.53	0.0256	0.40	0.22	22	183	10	21	40	16	11	66	16	12
s%	22	8	9	14	6	8	12	19	33	45	11	32	14	17	16	10	37	19	11	16

La * : mean calculated on 54 values (other <l.q.)

Group 2 (n=12)

	CaO	Fe_2O_3	TiO_2	K_2O	SiO_2	Al_2O_3	MgO	MnO	Na_2O	P_2O_5	Zr	Sr	Rb	Zn	Cr	Ni	La*	Ba	V	Ce
m	12.10	8.89	0.898	2.74	52.37	14.88	5.58	0.1809	1.80	0.38	186	415	62	141	289	261	17	339	171	69
s	1.95	0.64	0.048	0.24	1.17	0.74	0.65	0.0433	0.27	0.06	12	70	12	17	65	30	6	65	12	5
s%	16	7	5	9	2	5	12	24	15	17	6	17	19	12	22	11	38	19	7	7

La * : mean calculated on 8 values (other <l.q.)

Group 3 (n=9)

	CaO	Fe_2O_3	TiO_2	K_2O	SiO_2	Al_2O_3	MgO	MnO	Na_2O	P_2O_5	Zr	Sr	Rb	Zn	Cr	Ni	La*	Ba	V	Ce
m	36.23	6.24	0.887	2.43	39.32	10.77	3.03	0.1394	0.56	0.22	170	456	47	111	281	131	n.c.	294	128	109
s	4.85	0.52	0.109	0.29	3.20	0.80	0.22	0.0229	0.13	0.04	17	112	8	17	53	10	n.c.	58	13	23
s%	13	8	12	12	8	7	7	16	23	16	10	25	16	16	19	7	n.c.	20	10	22

n.c. = not calculated

Group 4 (n=5)

	CaO	Fe_2O_3	TiO_2	K_2O	SiO_2	Al_2O_3	MgO	MnO	Na_2O	P_2O_5	Zr	Sr	Rb	Zn	Cr	Ni	La*	Ba	V	Ce
m	14.11	5.72	0.903	4.08	54.04	15.83	3.91	0.0569	0.90	0.29	201	273	118	68	227	94	34	224	165	73
s	2.79	0.12	0.102	0.76	1.16	1.45	0.53	0.0065	0.21	0.07	31	53	15	11	38	21	11	24	15	11
s%	20	2	11	19	2	9	14	11	23	25	15	19	13	16	17	23	33	11	9	15

La * : mean calculated on 4 values (other <l.q.)

Group 5: 5a (n=7)

	CaO	Fe_2O_3	TiO_2	K_2O	SiO_2	Al_2O_3	MgO	MnO	Na_2O	P_2O_5	Zr	Sr	Rb	Zn	Cr	Ni	La	Ba	V	Ce
m	26.91	10.72	1.786	1.18	39.27	11.32	6.27	0.1738	1.88	0.34	116	508	18	103	228	172	n.c.	148	191	40
s	4.47	0.62	0.123	0.21	2.41	0.76	0.54	0.0209	0.15	0.08	9	27	3	9	21	25	n.c.	17	15	10
s%	17	6	7	18	6	7	9	12	8	23	7	5	19	9	9	15	n.c.	12	8	25

n.c. = not calculated

Group 5: 5b (n=11)

	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*
m	10.45	12.47	2.183	1.96	49.07	15.04	6.06	0.1589	2.04	0.38	168	410	36	122	301	186	n.c.	268	239	51
s	2.11	1.00	0.352	0.38	1.94	0.56	0.90	0.0157	0.45	0.10	17	78	7	11	63	40	n.c.	93	19	10
s%	20	8	16	19	4	4	15	10	22	27	10	19	20	9	21	21	n.c.	35	8	19

n.c. = not calculated

Group 6 (n=3)

	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*
m	42.87	4.90	0.574	1.83	34.31	9.53	4.58	0.1051	0.80	0.30	145	861	44	86	183	117	n.c.	215	92	57
s	6.95	0.54	0.062	0.44	4.60	0.95	0.29	0.0337	0.15	0.05	15	610	13	10	16	18	n.c.	34	14	8
s%	16	11	11	24	13	10	6	32	19	15	10	71	30	12	8	16	n.c.	16	15	14

n.c. = not calculated

Group 7 (n=9)

	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*
m	2.22	8.85	1.079	3.91	55.76	24.15	2.82	0.0985	0.66	0.27	163	189	161	154	126	79	63	604	152	112
s	1.82	0.30	0.058	0.27	1.24	1.79	0.26	0.0145	0.26	0.09	24	24	19	11	8	9	14	48	11	9
s%	82	3	5	7	2	7	9	15	39	33	14	12	12	7	6	11	22	8	7	8

Group 8 (n=10)

	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La**	*Ba*	*V*	*Ce*
m	4.90	11.08	0.425	1.51	52.72	18.44	9.23	0.1657	1.14	0.22	86	156	15	95	522	247	20	118	251	45
s	0.98	0.42	0.078	0.16	1.51	1.15	1.53	0.0136	0.14	0.07	13	34	4	12	81	53	6	30	40	4
s%	20	4	18	11	3	6	17	8	13	34	15	22	29	12	15	21	30	25	16	9

La * : mean calculated on 4 values (other <l.q.)

much higher percentages (21–35% *versus* 8–14%). The whole of group 5 is chemically characterised by a very high content of iron with correlated vanadium, very high contents of titanium and magnesium, and low contents of potassium with correlated rubidium: such characteristics are linked to the presence of basalt inclusions. Such chemical compositions do not show any resemblance at all with any of the local groups at Tell Sabi Abyad, regardless of period. We also tested resemblances with all the available data from the Balikh valley pottery and clays, which led to a similar conclusion. Most probably the entire group of Early Mineral Ware was imported to Tell Sabi Abyad.

To complete the presentation of the Tell Sabi Abyad chemical analyses, two samples were not included in the cluster analysis: SBA237 (Early Mineral Ware sample) and SBA273 (early Fine Mineral Tempered Ware) because of their very particular compositions. SBA237 contained a huge percentage of calcium oxide (63%) which impacted the percentage of all of the other chemical components. Therefore this sample is unclassifiable. The second one, SBA273, contained 2858 ppm of strontium, which is a particulary high fraction. If we make a cluster analysis omiting the strontium, this sample integrates group 1, one of the local production groups.

9.4. Discussing the Tell Sabi Abyad results

For the purposes of this contribution we focus on two important questions: the choice of clays and local versus non-local production.

Groups 1, 2, and 3 represent diverse local or sub-local productions. Since each group consists primarily of one type of pottery – plant tempered fabrics[5] in group 1, plant tempered fabrics[6] with very fine plant inclusions in group 2, and Fine Mineral Tempered Ware of the earlier periods in group 3 – it would seem that potters selected their raw material according to specific productions. If group 1 includes samples of all periods, all samples of group 2 belong to the later periods, fine plant tempered pottery appearing only during the Pre-Halaf period. Hence the difference of clay in this case might be related to the type of pottery produced, the large plant tempered pottery from the Pre-Halaf period belonging to group 1 and not to group 2. Group 3 consists only of Fine Mineral Tempered Ware from the earlier stages of the sequence and the later Fine Mineral Tempered Ware samples belong to diverse groups. Therefore, this suggests that, in this case, the clay corresponding to the composition of this group was used at a certain period and was later abandonned.

As mentioned above, our group 5, comprising the Early Mineral Ware, includes two sub-groups divided on the basis of calcium percentages. This division matches differences mainly of colour. The samples from sub-group 5a have a fabric and surface of whitish or cream colour, whereas 5b samples are much darker, with a light brown to dark grey or even black colour. The distinctive light colour is partly due to the high percentages of calcium and a firing temperature over 800° C, while the dark colour of the Early Mineral Ware can be attributed to a firing temperature lower than 800° C, as discussed previously (Le Mière *et al.* 2017).

Significantly, the white colour of sub-group 5a seems to be related to an important factor characterising this sub-group: all the samples studied so far are painted. The white colour was apparently produced purposefully to enhance the decorative effect of the reddish painting. Thus, we can infer a specific choice of calcareous clay since the higher percentage of calcium is not due to added inclusions, as it would be in the case of calcite for example, since the added inclusions of this sub-group are basaltic ones.

The principal result of the chemical analyses carried out on the early pottery from Tell Sabi Abyad is that during the Initial Pottery Neolithic period the so-called Early Mineral Ware, which constituted the single ceramic category of this period, was in all likelihood imported. There seems to have been no local production of pottery at the site. The situation during the Initial Pottery Neolithic thus appears to have been very different from what happened during the subsequent Early Pottery Neolithic and even later periods, when a large part of the pottery was locally produced and some part imported as well. In this regard the situation at Tell Sabi Abyad represents a unique case. All the other *Jezirah* sites studied so far, even when the analysed sample was very small, revealed, beside the probable imports, a local production of the earliest pottery (Le Mière 2009).

When one talks about imports, the question immediately arises over the provenance of these imports. The basalt temper and the corresponding compositional characters of Early Mineral Ware indicate a basaltic environment. However, although basalt was used at Tell Sabi Abyad, for example for making grinding stones, the surrounding Balikh valley is not a basaltic area (Ponikarov 1963a, 1963b, 1963c, map J-37-III and J-37-IV). Early basalt tempered pottery is not very common but it does exist elsewhere, namely at Tell Seker al-Aheimar in the Khabur valley and at Sumaki Höyük in the upper Tigris region. The nearly identical visual resemblance between the painted samples from Tell Sabi Abyad and those from Tell Seker al-Aheimar (Pl, 23.3 and 4), suggest a comparison of the chemical compositions of pottery from these sites.

9.5. Comparing Tell Sabi Abyad and Seker al-Aheimar

In order to facilitate the comparison between Tell Sabi Abyad and Tell Seker al-Aheimar pottery we present the chemical composition of pottery from Tell Seker al-Aheimar in order to characterise the main groups and to distinguish the local production from probable imports (Le Mière 2009, fig. 29.4).

A total of 160 sherds have been analysed so far, including samples of every category of pottery (Nishiaki and Le Mière 2005), as well as two samples of local clay collected near the site (Table 9.3). The dendrogram of all these samples is given in the lower half of Plate 22. We can

Table 9.3 Tell Seker al-Aheimar. Analysed samples used in this study

Sample type	*Sample numbers*	*Total*
Early Dark Ware	SEK 41, 45, 47–56, 85–86, 90–94, 96–105, 109, 139	31
Basalt Tempered Ware	SEK 1–4, 6–7, 10, 35–40, 42–44, 46, 83, 87–89, 106–108, 110–111, 136–137, 140, 162	30
Basalt and Plant Tempered Ware	SEK 5, 8–9, 11–16, 22–23, 60, 62–63, 95, 147–148	17
Plant Tempered Ware	SEK 17–21, 24–27, 59, 61, 64–66, 84, 118, 120, 123, 125, 143	20
Fine Mineral Tempered Ware	SEK 28–30, 67, 113–117, 119, 121–122, 126–132, 138, 141, 144–145, 149–150, 152–156	30
Grey-Black Ware	SEK 31–32, 124, 142, 146, 151	6
Pseudo-Orange Ware	SEK 33–34, 68–82, 112, 133–135, 157–161	26
Clays	SEK 57–58	2
Total		162

observe several groups, whose average compositions are given in Table 9.4; beside these groups there are several isolated samples. We will not examine in detail the seven compositional groups A-G but just mention what is the most relevant to the present discussion for each of them.

The first two groups, group A and group B, have very similar compositions (Table 9.4). Group A gathers together Early Dark Ware and group B gathers together different types of pottery including Plant Tempered Ware, Basalt and Plant Tempered Ware, three Early Dark Ware samples and Fine Mineral Tempered Ware as well as two local clay samples. Group C, composed excusively of Fine Mineral Tempered Ware, is more calcareous and has a few other compositional differences in its content of iron, titanium or manganese and nickel. Nevertheless it presents common characteristics with the previous two groups. Group B gathers together practically all the plant tempered pottery as well as the local clay samples, and it is the largest group (52 samples, 32.1% of the whole sample); together with Groups A and C, group B can be considered as diverse groups of local production.

Group D and group E are both composed of Basalt Tempered Ware sherds with, respectively, three and 25 samples. The principal difference between groups D and E is their calcium content, which is higher for group D than for group E: the painted samples are more calcareous (Pl. 23.2). Group E presents a high content of iron (and correlated vanadium), titanium, magnesium, sodium and nickel, most probably due to its basaltic inclusions. If we take into account the basalt contribution in the composition of this group, it appears to be very similar to the composition of group B. Group D, beside its common characteristics with group E, shows some similarities to the local clays. The two groups of Basalt Tempered Ware can also be considered as locally produced, with basalt being common in the geological environment of Tell Seker al-Aheimar (Ponikarov 1963a, 1963b, map J-37-V, XI).

The remaining two groups F and G are both chemically very different from the previous groups, as well as from each other. Group F, made up of Early Dark Ware and Basalt Tempered Ware, is very heterogeneous. It is very calcareous with lower contents of iron and nickel. Group G, which exclusively contains one special type of pottery, the so-called Pseudo-Orange Ware, is a non-calcareous group with a very high content of titanium, a high content of rare earth elements (Ce, La, Y), as well as low content of magnesium, nickel and chromium. The compositions of each of these last two groups are very peculiar. They must be related to geological environments completely different to Tell Seker al-Aheimar and its surroundings, and are most likely imports.

To compare the compositions of the productions found at Tell Sabi Abyad to those found at Tell Seker al-Aheimar, we have used cluster analysis in the same way, but for reasons of legibility the dendrogram exclusively deals with the ceramic material from the earliest periods of both sites. These are the Initial Pottery Neolithic and the Early Pottery Neolithic phases from Tell Sabi Abyad, and the Pre-Proto-Hassuna phase at Tell Seker al-Aheimar (Nishiaki and Le Mière 2005). The dendrogram is presented in Plate 24.

We can observe that pottery from Tell Sabi Abyad and Tell Seker al-Aheimar gathers in separate groups which correspond to the groups of each site with a few exceptions: some samples are isolated or in a marginal position to the main groups. The remarkable exception is the integrated clustering of all the Tell Sabi Abyad Early Mineral Ware groups with the Tell Seker al-Aheimar Basalt Tempered Ware groups. This large basalt tempered pottery group (marked by a bracket on Pl. 24) is, like the Tell Sabi Abyad Early Mineral Ware group and Tell Seker al-Aheimar Basalt Tempered Ware one, separated into two sub-groups (see above). This corresponds to the two types of fabrics of this ware, less calcareous and more calcareous.

Thus, the basalt tempered pottery discovered at Tell Sabi Abyad and at Tell Seker al-Aheimar have very probably been made with the same clay materials. Since the Basalt Tempered Ware from Tell Seker al-Aheimar is very likely locally produced, the Tell Sabi Abyad pottery was likely imported from Tell Seker al-Aheimar. The possibility that basalt tempered pottery would have been produced elsewhere and that another site could be an alternative for the provenance of Tell Sabi Abyad material should also be considered. As mentioned above, to date only one other site has provided early pottery of

Table 9.4 Tell Seker al-Aheimar. Mean and standard deviation of the seven compositional groups (majors are given in percentage of oxide, traces in parts per million of metal)

Group A (n=18)																							
	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*	*Y*	*Th**	*Pb*	*Cu*
m	15.23	7.72	1.027	2.45	55.76	12.83	3.39	0.1354	0.90	0.36	164	582	41	103	236	136	28	315	149	74	27	12	14	40
s	1.86	0.46	0.082	0.24	1.36	0.55	0.21	0.0085	0.16	0.11	12	187	4	9	53	10	5	55	13	13	1	2	3	4
s%	12	6	8	10	2	4	6	6	18	29	7	32	9	9	23	7	19	17	9	18	5	13	20	11
Th* : mean calculated on 11 values (other <l.q.)																								
Group B (n=52)																								
	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*	*Y*	*Th**	*Pb**	*Cu*
m	18.40	8.66	1.451	2.73	49.58	12.95	4.58	0.1390	1.00	0.31	199	486	49	114	307	144	27	303	179	75	29	12	17	39
s	4.39	0.92	0.287	0.55	2.46	1.18	0.77	0.0161	0.19	0.08	23	137	9	17	53	23	5	57	22	13	2	2	4	7
s%	24	11	20	20	5	9	17	12	19	26	12	28	19	15	17	16	19	19	13	17	7	14	26	17
Th* : mean calculated on 36 values (other <l.q.), Pb* : mean calculated on 45 values (other <l.q.)																								
Group C (n=15)																								
	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*	*Y*	*Th**	*Pb**	*Cu*
m	32.67	5.30	0.637	2.32	43.78	9.53	4.70	0.0917	0.60	0.22	165	422	36	102	247	96	20	265	100	79	28	12	17	33
s	3.34	0.36	0.046	0.29	2.24	0.65	0.58	0.0178	0.11	0.04	18	91	5	21	39	8	3	63	18	15	2	1	5	7
s%	10	7	7	13	5	7	12	19	18	19	11	21	14	20	16	8	17	24	18	19	6	12	31	20
Th* : mean calculated on 8 values (other <l.q.), Pb* : mean calculated on 6 values (other <l.q.)																								
Group D (n=3)																								
	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*	*Y*	*Th*	*Pb*	*Cu*
m	33.25	8.66	1.072	1.75	37.44	10.43	5.55	0.1069	1.40	0.17	114	499	31	87	256	155	20	252	171	46	17	12	n.c.	35
s	6.54	0.89	0.150	0.50	3.56	1.13	0.86	0.0081	0.30	0.02	6	48	8	9	14	37	6	70	11	4	3	3	n.c.	3
s%	20	10	14	28	9	11	16	8	21	12	6	10	24	10	5	24	33	28	6	8	16	24	n.c.	8
n.c. = not calculated																								
Group E (n=27)																								
	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*	*Y*	*Th**	*Pb**	*Cu*
m	14.22	11.67	1.994	1.83	46.89	13.92	6.91	0.1620	1.81	0.38	188	589	29	113	294	197	25	444	221	64	24	12	14	51
s	3.77	0.89	0.239	0.27	2.22	1.10	0.83	0.0102	0.36	0.07	27	181	8	8	34	23	5	191	16	14	2	1	3	6
s%	26	8	12	15	5	8	12	6	20	19	14	31	29	7	11	12	20	43	7	23	7	12	21	11
Th* : mean calculated on 7 values (other <l.q.), Pb* : mean calculated on 12 values (other <l.q.)																								

Group F (n=9) (These values are only indicative since this group is very heterogeneous and should rather be considered as an ensemble)																								
	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*	*Y*	*Th**	*Pb*	*Cu*
m	49.67	6.28	0.913	1.55	28.87	7.52	3.80	0.1362	0.85	0.21	124	767	23	74	198	73	14	398	118	53	21	13	n.c.	38
s	4.61	1.30	0.250	0.35	2.56	1.15	0.64	0.0118	0.21	0.06	12	109	5	12	30	16	6	205	27	26	2	2	n.c.	7
s%	9	21	27	23	9	15	17	9	24	28	9	14	22	16	15	22	44	52	23	49	11	17	n.c.	20
Th* : mean calculated on 6 values (other <l.q.)																								
n.c. = not calculated																								
Group G (n=25)																								
	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*	*Sr*	*Rb*	*Zn*	*Cr*	*Ni*	*La*	*Ba*	*V*	*Ce*	*Y*	*Th*	*Pb*	*Cu*
m	0.99	8.20	2.520	2.38	56.03	27.94	1.08	0.0378	0.38	0.24	540	330	81	61	188	65	93	186	208	195	68	30	32	24
s	0.25	1.14	0.188	0.38	2.18	1.43	0.14	0.0145	0.20	0.08	37	124	10	11	37	7	15	34	22	35	5	3	8	7
s%	3	1	1	2	0	1	1	4	5	3	1	4	1	2	2	1	2	2	1	2	1	1	2	3

a similar type, namely that from Sumaki Höyük (Erim-Özdoğan 2011). A good sample of this material has been chemically analysed, and the results show that the composition of the Basalt Tempered Ware from this site is completely different of that of both Tell Seker al-Aheimar and Tell Sabi Abyad. We may therefore safely exclude the possibility that the Tell Sabi Abyad Early Mineral Ware was imported from Sumaki Höyük (Table 9.5).

9.6. Concluding remarks

The provenance investigations of the early pottery from Tell Sabi Abyad lead to consider that all of this pottery very probably was imported and likely from Tell Seker al-Aheimar. We will discuss the limits of these results as well as some of their implications concerning the first stages of pottery craft in *Jezirah*.

Our results pose two important issues, *viz*. the reliability of the chemical analyses, and the possible alternatives to Tell Seker al-Aheimar as a provenance. With regard to the first issue, it is necessary to insist on the obvious: chemical analyses can give only probabilities, never absolute results. Neither our interpretation of the local production of Basalt Tempered Ware from Tell Seker al-Aheimar nor the common production of this group and of the Early Mineral Ware from Tell Sabi Abyad are certain, they are only very probable.

As to the second issue, Sumaki Höyük is the only site which to date has provided early pottery with a basalt mineral temper. If our chemical analyses exclude it as a possible provenance for Tell Sabi Abyad Early Mineral Ware, the available data to scrutinise the provenance of the earliest pottery in the *Jezirah* are still limited. Currently we know of just a dozen sites for the whole *Jezirah*. Therefore new candidates for Tell Sabi Abyad Early Mineral Ware provenance could appear in future field research. Our current interpretation of its provenance from Tell Seker al-Aheimar should be taken as provisional.

Having said this, the statistical probabilities are fully supported by non-chemical arguments, in particular the striking visual similarity between the painted samples from both sites (see Pl, 23.3 and 4). Such similarity is particularly conspicuous in the context of the earliest pottery, which is rather unstandardised. Thus, it would appear that for the first time in Near Eastern archaeology, chemical analyses of Neolithic pottery from a large number of sites have provided such a close match between pottery groups coming from two different sites that we may hypothesise an exact provenance.

The insight that early pottery containers were circulating from village to village should by itself not come as a surprise when considering the known circulation of diverse types of materials and objects already since the beginning of the Neolithic period, such as obsidian among many others. But it does suggest that at the start of the Initial Pottery Neolithic this new craft was already developed enough to produce a surplus. This could be an additional sign that the earliest pottery currently found in

Table 9.5 Sumaki Höyük. Mean and standard deviation of Basalt Tempered Ware groups

	CaO	*Fe_2O_3*	*TiO_2*	*K_2O*	*SiO_2*	*Al_2O_3*	*MgO*	*MnO*	*Na_2O*	*P_2O_5*	*Zr*
m	12,88	11,48	2,508	1,50	50,96	13,65	3,02	0,1720	2,22	1,34	225
s	4,29	1,44	0,401	0,29	3,22	0,77	0,28	0,0174	0,48	0,34	15
s%	33	13	16	20	6	6	9	10	22	26	7

	Sr	*Rb*	*Zn*	*Cr*	*Ni*	*La**	*Ba*	*V*	*Ce*	*Y*	*Th*	*Pb**	*Cu*
m	361	43	114	94	59	42	1532	200	90	44	n.c.	14	26
s	59	6	10	25	17	9	750	47	11	5	n.c.	4	4
s%	16	15	8	27	29	20	49	24	12	11	n.c.	26	16

Majors are given in percentage of oxide, traces in parts per million of metal. N = 15; La *: mean calculated on eight values (other <l.q.): Pb *: mean calculated on nine values (other <l.q.)

the *Jezirah* does not represent the real beginning of the potter's craft. Although it is always found in very small quantities in the levels where it appears and although it generally presents a large variability, it is yet technically very advanced and does not display characteristics which strongly suggest the beginning of the technique.

In the case of Tell Sabi Abyad, since no local production of the earliest pottery could be identified, this new technique was very likely imported. The probable imports of early pottery at Tell Sabi Abyad from Tell Seker al-Aheimar concern a certain amount of pottery and suggest rather close relations between the two sites. The distance between them, some 120 km as the crow flies, would not have been an insurmountable obstacle. The ceramic provenance data point to a degree of regional mobility of people and goods not yet testified by other archaeological data. This deserves much further investigation.

Notes

1 The preliminary results of this study have previously been presented as a poster at the XIXth GMPCA symposium (Caen, 22–26 April 2013) by two of the authors (M. Le Mière and M. Picon).

2 Sodium oxide (Na_2O), magnesium oxide (MgO), alumina (Al_2O_3), silica (SiO_2), phosphorus oxide (P_2O_5), potassium oxide (K_2O), calcium oxide (CaO), titanium oxide (TiO_2), manganese oxide (MnO) and iron oxide (Fe_2O_3). For simplification, the term 'oxide' will be omitted for these components in the remainder of the text.

3 Vanadium (V), chromium (Cr), nickel (Ni), zinc (Zn), rubidium (Rb), strontium (Sr), zirconium (Zr), barium (Ba), lanthanium (La) and cerium (Ce) ; and for some samples also copper (Cu), yttrium (Y), lead (Pb) and thorium (Th).

4 It is indeed somewhat surprising that this division was not made in these previous analyses. In the macroscopic inspection in the field, surface colour was in fact taken into account in the initial categorization and counting; this led to a diffuse differentiation between what distinguished a 'lighter' from a 'darker' Early Mineral Ware. In the absence of petrographic analyses to support this distinction, it was not recorded in the subsequent statistical analysis (Nieuwenhuyse, pers. comm., October 2015). The sample subsequently submitted for petrographic analyses (Chapter 5) was small and apparently did not include any examples of the painted, light-coloured Early Mineral Ware.

5 In Chapter 4 the plant-tempered category is described as Standard Ware.

6 Termed Standard Ware.

Chapter 10

Basketry-impressed pottery from Late Neolithic Tell Sabi Abyad

Koen Berghuijs

10.1. Introduction

Material evidence for the production and use of Late Neolithic basketry is extremely scarce in the Near East in general and the evidence from Upper Mesopotamia is no exception. As the term itself indicates, perishable artefacts simply do not preserve well in the region's archaeological record due to adverse ecological conditions (Hurcombe 2014). Basketry research is therefore primarily dependent on indirect evidence from phytolith traces (Wendrich and Ryan 2012) or impressed negatives left behind on previously malleable surfaces, such as house floors or fired clay (Wendrich and Ryan 2012; Adovasio 2010, 10; Wendrich 1991, 19). Although the study of basketry (and textiles, for that matter) has largely been neglected within archaeological research (Wendrich 1991, 1), several recent in-depth publications demonstrate the growing academic appreciation for basketry and perishable artefact data (Berghuijs 2013; Breniquet *et al.* 2012, 2014; Di Lernia *et al.* 2012; El Hadidi and Hamdy 2011; Hutcheson 2008; Nieuwenhuyse *et al.* 2012a, 2012b; Rooijakkers 2012; Stordeur 1989).

Contemporaneous evidence for early basketry technology was found at various sites in the region, including the famously well-preserved artefacts from Nahal Hemar in Israel (Schick 1988). Basketry impressions were furthermore unearthed at Çatalhöyük (Wendrich 2006; Wendrich and Ryan 2012) and Tepecik-Çiftlik in Central Anatolia (Biçakçi *et al.* 2012), Beidha in Jordan (Kirkbride 1967, 10), Shir in Syria (Nieuwenhuyse *et al.* 2012a), Jarmo and Bestansur in Iraqi Kurdistan (Adovasio 1975; Nieuwenhuyse *et al.* 2012b), and Tell Ali Kosh in southwestern Iran (Hole *et al.* 1969, 220–222). The dispersion of these finds indicates that basketry craft was already widespread throughout the Near East and adjacent regions during the Late Neolithic, and as such provides a comparative framework for the impressions presented here.

The excavations at Tell Sabi Abyad I in Operations II–III and at the nearby mounds Tell Sabi Abyad II and III have produced several hundred basketry impressions on fragments of White Ware, bitumen, clay seals, and pottery (Akkermans and Duistermaat 1996; Akkermans and Duistermaat 2004; Berghuijs 2013; Duistermaat 1996; Verhoeven 2000a). Together these constitute the largest known corpus of Late Neolithic basketry impressions from Upper Mesopotamia, and offer a unique insight into the diverse usage of perishable artefacts in the *chaîne opératoire* of the various impressed objects (Pl. 26).

However, the importance of this material goes beyond the documentation of early basketry. Tell Sabi Abyad offers from a well-dated, carefully-documented cultural sequence that documents both the first adoption of pottery containers and their subsequent development. The basketry impressions discussed here come from a cultural context in which containers made in several raw materials and technologies thrived. Thus, for the purposes of the present volume the site provides an opportunity to study afresh the relationships between the potters' craft and basketry during the early stages of pottery production in Upper Mesopotamia.

10.2. Of basketry and pottery

The relation between basketry and pottery has a long history of thought. Much of the early thinking had a decidedly unilinear evolutionist flavour. Modern 'savages' and their material culture were seen as direct representatives of putative Neolithic groups inventing early pottery. The relationship between baskets and pots has traditionally been characterised in terms of causality, in which the latter is presented as a logical and superior successor to the former. Firmly rooted in 19th-century imperialist notions concerning the moral-political concept of the human 'state of nature' (Corbey 1989; Morgan

1877; Van Reybrouck 2012), early researchers described the invention of basketry based on ethnographic analogies from still 'uncivilised' parts of the New World from a rather romanticised and, above all, pejorative viewpoint:

> The earliest vessels used by mankind undoubtedly were shells, broken gourds or other natural receptacles that presented themselves opportunely to the needs of the aborigine. As his intelligence grew and he moved from place to place, the gourd as a receptacle for water when he crossed the hot and desert regions became a necessary companion. But accidents doubtless would happen to the fragile vessel and then the suggestion of strengthening it by means of fiber nets arose and the first step towards basket-making was taken. (James 1909, 11).

Once basketry had become a ubiquitous category of artefacts in the daily life of these 'savages', their supposed increased intelligence paved the way for the next step towards civilisation. Ethnographers recognised the 'progressive steps of their manufacture [as] a preparatory training for pottery, weaving and other primitive arts' (James 1909, 13), regarding basketry production as a primordial impetus for subsequent cognitive and technological advances (awkwardly deemed 'peaceful industries' (Anonymous 1887, 25) in which naturally only women were engaged). The 'savages' conceptualised '[t]he clay vessel [as] an intruder, [which] … usurps the place and appropriates the dress of its predecessor in wicker. The forms [of particular ceramic vessel types] … are undoubtedly taken from basketry shapes …' (James 1909, 18).

Pottery, then, became a superior replacement of the preceding basketry techniques. Its adoption was seen as an accidental invention, yet bound to happen somewhere along the road of becoming human. Ethnographic sources again provided support for this notion in that various indigenous American communities were found to coat basketry artefacts with clay for cooking purposes:

> The manner in which a clay lining to a vessel of another material may result in the production of an earthenware dish, is exemplified by a practice of the Coconinos Indians of Arizona, who roasted seeds, crickets, bits of meat, etc., in wicker trays coated inside with clay, which was pressed in whilst soft and allowed to dry. The food to be roasted was placed on the tray, together with glowing wood-embers, and the tray shaken to and fro, with constant blowing to keep the embers burning. The food was thus cooked, and incidentally the clay became baked. (Harrison 1924, 22).

The potential of accidentally fired clay lining was eventually recognised and was improved upon by using basketry artefacts as moulds for the first non-accidental ceramics. Harrison acknowledges that other theories as to the origins of pottery may be put forward, 'but in any case it has developed in close association with baskets and other vessels, especially as regards form and ornamentation' (1924, 23).

Literally building on basketry technology, raw clay was now shaped in or around baskets, leaving behind impressions on the interior or exterior surface of the vessel. This practice was not only inferred from thousands of basket-impressed sherds found during pioneering archaeological surveys throughout North America, but was of course still observable at the beginning of the twentieth century among 'these ignorant and savage people' (James 1909, 19). It embodied a past cognitive transition yet simultaneously confirmed the rudimentary nature of the natives, since comparisons to their archaeological forebears showed that pottery techniques had obviously not changed since their initial application (Rice 1987, 9).

Significantly, early pottery was not only shaped by means of basketry artefacts: basically, it *was* basketry – the difference being the raw materials used during the production process. As James (1909, 19) states, the techniques that were employed in the making of ceramic containers were similar to those used in the *chaîne opératoire* of basketry objects. He illustrates this view with an example from the American Southwest, where 'an application of coiled methods of weaving to the manufacture of pottery' (James 1909, 19) was documented. Disregarding the other two common basketry techniques (i.e. plaiting and twining), coiling was seen as the common denominator or even the pivotal aspect of the causal relation between basketry and pottery. Continuing this line of thought, it is therefore not surprising that the earliest attestation of pottery in the archaeological record was expected to display 1) impressions of the basketry object in or around which it was shaped, and 2) techniques similar to those employed in the production of basketry.

Doubts concerning the validity of these views were already expressed around the turn of the Victorian century, but were also heavily influenced by and simultaneously representative of the colonial *Zeitgeist*. American explorer and anthropologist William H. Holmes, for example, states that

> We cannot say in any case whether the potter's art, as practiced in the northern districts, is exclusively of local development, springing from suggestions offered by the practice of simple culinary arts, especially basketry, or whether it represents degenerate phases of southern art, radiating from far-away culture centers and reduced to the utmost simplicity by the unfriendly environment. (Holmes 1901, 397–398).

Although leaving room for other explanations than the prevailing evolutionary scheme, his environmental determinism went hand-in-hand with the aforementioned *social* evolutionary presuppositions, as Holmes continues:

> We are certainly safe, however, in assuming that this particular phase of the art represents its initial stage – a stage through and from which the higher and more complex phases characterizing succeeding stages of barbarism and civilization arose. (Holmes 1901, 398)

Already by 1917, however, serious critique to the assumed causal relation between basketry and pottery was voiced by Earl H. Morris. He rightly questioned the underlying assumptions of such notions, and was the first to actually examine the archaeological evidence in a remarkably factual discussion. Morris looked at the stratigraphic context of a specific type of coiled pottery from a site in New Mexico, which was then known as the earliest ceramic analogy of coiled basketry – and thus seen as the first ever type of ceramics. Since his article 'does not discredit the possibility that the coiling process was the first to be used in the Southwest', it was 'the belief of the writer that such was the case, but only a more detailed study than has yet been made of the structure of pre-Pueblo pottery can settle the question' (Morris 1917, 28). So, while looking for evidence to confirm the supposed causal relation between basketry and ceramics through stratigraphic analysis, Morris found the exact opposite to be the case:

> The fact of importance is that the variety of coiled ware which has generally been accepted as the most ancient of Southwestern pottery, is shown to be the product of the culmination and not of the beginning, of an intricate and highly elaborate technique. Moreover, these facts have a vital bearing upon the relation of ceramics to basketry. (Morris 1917, 28)

Written almost a century ago, the conclusion of his paper was in many ways ahead of its time, and as we will see it is still quite relevant today:

> Until there was no stratigraphic evidence to the contrary, it was permissible, though not justifiable when relative difficulty of construction was considered, to postulate a genetic relationship between coiled baskets and the coiled pottery of the Southwest. The spiral coils of clay were the analogues of the spiral coils of baskets, and the indentations made by the thumb closely correspond to the irregularities of surface produced by the intertwining of the strips which pass at right angles to the coils. It was supposed that in a change of materials from rolls of fibre and withes, to clay, as many motor correlations, and as much of the established technique as possible, were carried over to the new art. However, stratigraphy has shown that coiled ware most closely resembling basketry made its appearance long after Southwestern tribes had learned to make vessels of clay. Hence it appears that proofs based upon coiled ware mean nothing at all, and other arguments must be brought forward if the theory that the pottery if the Southwest is a direct outgrowth of basketry is to be substantiated. (Morris 1917, 28–29)

Some of the extraordinary abstracts quoted above reveal a paradigmatic approach to material culture thought long extinct in archaeology. The idea of a linear evolution of mutually exclusive material culture, in this case exemplified by the causal relation between basketry and pottery, however, is in fact still very much present in several of the assumptions underlying the current debates on early ceramic technology (Chapter 1). Near Eastern research is no exception, as old-fashioned ideas about the origins of pottery in the region (Amiran 1965; Moore 1995) have not been refuted explicitly on the basis of actual archaeological evidence (see Nieuwenhuyse *et al.* 2010, 74). Transposing Morris's innovative ideas *mutatis mutandis* to the region under study here, the well-documented site of Tell Sabi Abyad provides a much-needed case-study into the relation between the earliest pottery production and basketry technology in Late Neolithic Upper Mesopotamia.

10.3. The dataset

The 19 basketry-impressed pottery sherds recorded during Operation III at Sabi Abyad I are the particular focus of this chapter (Table 4.1). Twelve of these 19 sherds were photographed in the field, and while not initially identified by a textile specialist, their documentation permitted initial metric analyses (Table 10.1). However, following a detailed examination of this photographic evidence, a base fragment from level A9, (E3, 168–384: 28) did not show a convincing basketry imprint, leaving 11 imprints for analysis.

The impressions were all found on rather fragmented sherds of coarse, plant-tempered Standard Ware (Fig. 10.1). The large majority of these could be identified as base fragments, but the sample also included one body sherd with impressions on the interior body surface. The impressed sherds were recovered from a variety of depositional contexts, mostly from open areas, and were in all likelihood secondary or even tertiary deposits.

All 11 sherds showed negatives of so-called coiled basketry. Coiling (as discrete from twining and plaiting: Balfet 1952) is one of the three main basketry techniques that involves the sewing of passive, horizontal elements with active, vertical elements, thereby forming a coil around which the next horizontal element can be wrapped (Adovasio 2010, 53). In this manner, an endless array of spirally wrapped mats and containers can be made, which are limited in shape and size only by the expertise and creativity of the maker. Botanical analyses confirm that potential basketry materials found in the surroundings of Tell Sabi Abyad were mainly sedges or grasses and reeds. Herbaceous flora included *Carex* (sedge), *Eleocharis* (spike-rush), and *Scirpus maritimus* (sea club-rush) and could have easily been collected year-round or during particular seasons for multiple purposes, including the production of basketry (Van Zeist and Waterbolk-Rooijen 1996, 540).

The impression size ranged from 3.2 × 4.9 cm to 12.5 × 23.5 cm (Table 10.1). The coil width varied between 0.5 cm and 1.2 cm, while the strand width deviates between 0.2 cm and 1.0 cm. These measurements merely approximate the original sizes of the elements, as the impressed clay undoubtedly shrank during firing. Several impressions ($n = 5$) were present on the exterior surface of the original vessel's base, whereas one coiled

Table 10.1 Tell Sabi Abyad I, Operation III. Standard Ware sherds carrying basketry-impressions (only photographed items)

Context (square, locus-lot: no)	*Level*	*cal BC*	*Size (cm)*	*Type*	*Coil width (cm)*	*Strand width (cm)*	*Remarks*
D4, 89-184: 2	Mixed A7/A8	6625–6490	3.2×4.9	Coiling	0.6	–	Exterior base (Figs. 10.1:5, 10.4: 3)
E4, 11-26: 4	Mixed A3/A4	6455–6375	5.6×8.0	Coiling	0.9–1.1	0.3–0.4	Exterior base (Fig. 10.1:2)
E4, 16-176: 1	A3	6395–6375	8.6×9.9	Coiling	0.5–0.6	0.3–0.4	Interior body (Figs. 10.3, 10.4:1)
E4, 18-51: 100	A4	6455–6385	12.5×23.5	Coiling	–	–	Exterior base (Figs. 10.1:1, 10.4: 4)
E4, 21-69: 3	Mixed A3/A4	6455–6375	5.0×8.2	Coiling	0.6	–	Exterior base (Fig. 10.1:6)
E4, 44-210: 1	A4	6455–6385	6.1×6.8	Coiling	–	–	Exterior base (Figs 10.1:10, 10.4: 7)
E4, 49-172: 2	A5	6485–6450	4.7×4.8	Coiling	0.9	1.0	Exterior base (Fig. 10.1:4)
E4, 69-187: 1	A3	6395–6375	4.3×6.2	Coiling	0.9	0.3–0.4	Exterior base (Fig. 10.1:7)
E4, 75-201: 100	A5	6485–6450	10.5×17	Coiling	0.8	–	Exterior base (Fig. 10.1:7)
F4, 111-276: 12	A3	6395–6375	6.5×14.3	Coiling	1–1.2	–	Exterior base (Figs 10.1:8, 10.4:5)
F4, 149-319: 100	A4	6455–6385	ø 11	Coiling	0.8	0.2–0.3	Exterior base (Fig. 10.2)

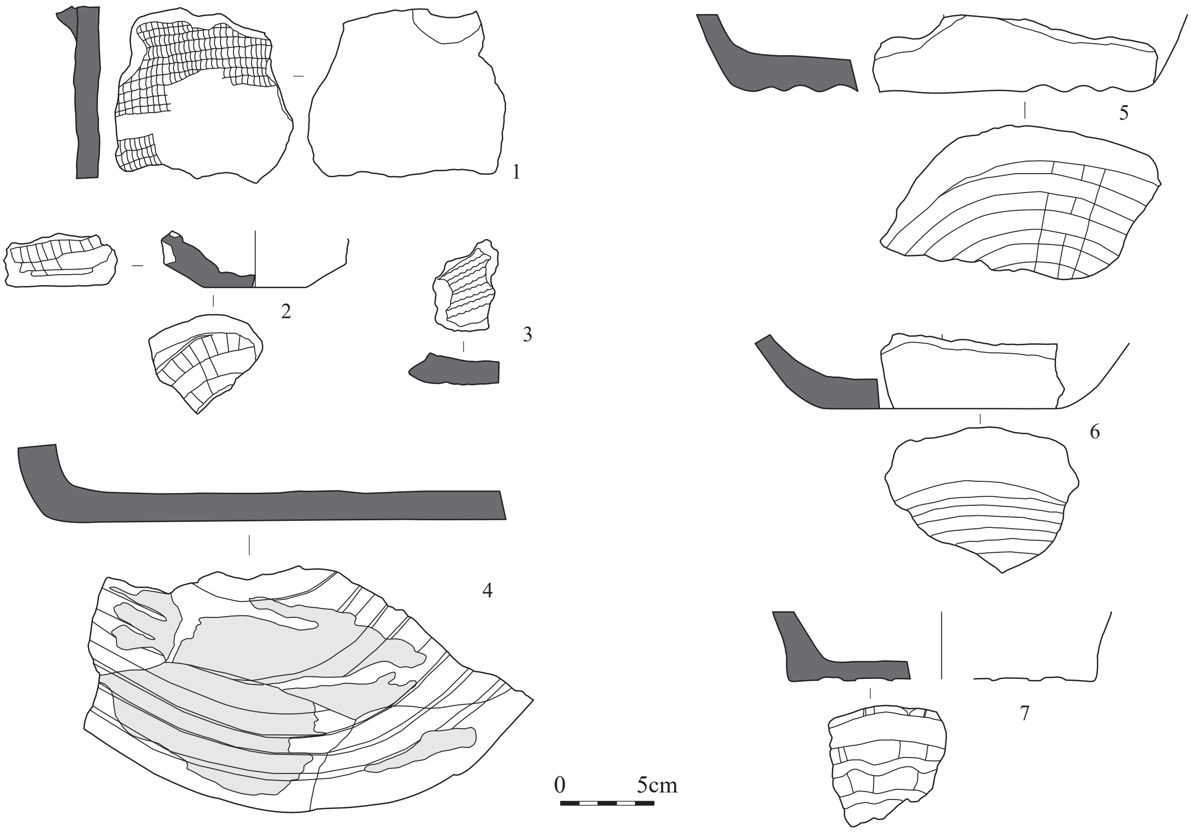


Fig. 10.1 Tell Sabi Abyad I, Operation III. Standard Ware sherds carrying the impression of coiled basketry on the interior (nos. 1–3) or exterior surface (nos. 4–7) (for descriptions, see Table 10.1; nos. 2 and 6 were not photographed in the field and are not included in Table 10.1) (image Tell Sabi Abyad Project).

structure was impressed on the interior body surface, indicating that basketry was used in at least two different ways in the ceramic production sequence. Firstly, pottery vessels may have been shaped on flat-coiled mats or shallow baskets (Pl. 27.1; for a photograph from 1905 of this technique being used in Ramallah, see Fig. 10.2). Secondly, as suggested by the interior impression, clay was also shaped around larger baskets (Pl. 27.2). Depending on the shape of the basket used, it may have been removed prior to firing or left to be burned; in both instances, impressions would remain visible on the contact surface (Chapter 4: Fig. 4.7).

As shown in Table 10.1 (cf. Table 4.2), the stratigraphic layers from which the basketry impressions originate have been securely dated to the second half of the 7th millennium cal BC (Van der Plicht *et al.* 2011). The chronological distribution of the impressions as recorded in the field would be between level A9 and level A3, thus spanning the period from about 6675–6620 to about 6395–6375 cal BC. However, it should be emphasised that based on the available photographic documentation it is unclear whether the earliest isolated sherd (from level A9) carries a basketry impression. Excluding this sherd would subsequently place the earliest recorded instance of a basketry impression on a pottery sherd in level A6 (Table 4.2). Three examples have been recovered from level A5. The majority of the samples ($n = 7$) were found in levels A4 and A3, dated to 6375–6455 cal BC (Table 4.2).

10.4. Discussion

The earliest ceramics from Tell Sabi Abyad (Early Mineral Ware, EMW) date to between ca. 7000 and 6900 cal BC, Operation III levels A16–A10 (Chapter 11; Nieuwenhuyse *et al.* 2010). Applying the cultural-evolutionary train of thought outlined above, one would perhaps expect these initial ceramics to be of a 'primitive' nature: coarse, plant-tempered, and – above all – to display evidence for basketry influences in the form of either impressions or the used shaping technique, i.e. coiling. This, however, seems not to be the case, as EMW is characterised by a fine texture and mineral temper, as well as occasional slip decorations. Traces of employed shaping methods were completely obliterated during subsequent smoothing and burnishing (*ibid*., 78), rendering any speculation fruitless.

Basketry-moulded ceramics do occur at Tell Sabi Abyad, but they are found several centuries after the introduction of EMW. Using coiled basketry for making pottery appears to have been most common during levels A4 and A3; occasional earlier examples have been recorded from levels A6 and A5. Significantly however, these imprints do not represent the earliest evidence for basketry at prehistoric Tell Sabi Abyad. Plaiting was identified on several bitumen fragments at Tell Sabi Abyad II (Verhoeven 2000a, 102–103). One exceedingly early example came from level 8, which was dated to the Late Middle PPNB; several others came from Late PPNB to Initial Pottery Neolithic levels 5, 3, and 2 (Verhoeven 2000a, 92). Bitumen was most likely applied to waterproof the containers, which may have been used for storing water or dairy products. Interestingly, there is so far no evidence for the presence of twined basketry at the site, though this technique was already known in the Near East during the PPNB (Schick 1988).

The earliest evidence for coiling at the site currently dates to the first half of the 7th millennium. Levels A7–A9 (mixed) and A8 in Operation III yielded several White Ware fragments with coiled basketry impressions (Berghuijs 2013); soon afterwards this technique was adopted for shaping pottery at the site. Significantly, the period in which we find the majority of the ceramic basketry imprints is characterised by an overall increase in pottery production and an accompanying diversification in techniques. While we must remain cautious with such a small sample, it may tentatively be suggested that the use of basketry in the ceramic operational chain was most popular during this brief time span but already occurred sporadically slightly earlier. With these figures, one must be aware that the number of ceramic containers shaped with the help of basketry always remained very small indeed. This technique was utilised alongside several other ceramic shaping techniques but never became really common.

Interestingly, a similar scenario emerges from Shir, a Late Neolithic site in the Northern Levant. Here, the earliest layers are dominated by Dark Faced Burnished Ware (DFBW), which is roughly contemporaneous with the EMW from Tell Sabi Abyad. It is characterised by a fine texture and mineral inclusions; its surface finish is usually limited to burnishing, although decoration in one form or another does occur sporadically (Nieuwenhuyse 2009a, in press, d.). In levels dated to ca. 6600 and 6300 cal BC, so-called cord-impressed DFBW occurs. These carry the imprints from various woven materials that, very occasionally, included basketry (Nieuwenhuyse *et al.* 2012a; Nieuwenhuyse in press, d). In addition, in the same levels coiled basketry is sometimes found imprinted on the bases of coarsely made pottery, the so-called Coarse Unburnished Ware. These levels post-date the first manifestation of pottery at the site by several centuries, contradicting the previously assumed causal relation between basketry and the emergence of pottery in the Northern Levant.

10.5. Concluding remarks

The dataset from Tell Sabi Abyad shows that at this site basketry production was an established craft from the Late PPNB onwards. Impressions on a variety of non-ceramic materials indicate that basketry fulfilled a diverse range of purposes; shaping the earliest ceramics, however, appears not to be one of them, as the chronology of both material categories does simply not overlap. The basketry impressions consistently date to several centuries after the first appearance of pottery. The evidence furthermore suggests that pottery was not only moulded in or around baskets, but also shaped while standing on two-dimensional basketry artefacts, such as coiled mats (Chapter 4). This suggests that ceramic shaping technology had already developed to a certain level of expertise in which moulds were not deemed of vital importance and that clay could be shaped with or without the use of such optional implements, thereby relegating any assumed causal relation between basketry and initial pottery to the realm of speculation.

The appearance of basketry imprints at Tell Sabi Abyad was not random, however. They occur at an important crossroads in the history of pottery production. The levels in which they are found document an important phase in which the production of pottery containers

Fig. 10.2 Modern ethnographic example from Ramallah in 1905 of potters using coiled basketry as a base for shaping pottery with coils (after Kawar 2011: 80; Library of Congress, Prints & Photographs Division, LC-USZ62-69091).

increased considerably quantitatively (Chapter 11). It also changed qualitatively. This period saw the potters experimenting with new tempering strategies, changes in surface finishing techniques, and improved control over the firing (Chapter 4). Importantly, they began to shape pots of increasingly larger sizes. When ceramic vessels grew taller, they also became heavier, and perhaps this hints at the need to search for alternative ways of shaping the base. Using flat coiled basketry as a base or even as a turning table had the advantage that the pots could be moved about during the shaping, and the vessel more easily removed afterwards (Özdemir 2007).

The introduction of basketry supports and moulds as one element in an enriched productive repertoire was the *outcome* of a long progress of ceramic innovation, not its cause. The imprints testify to remarkably advanced ceramic-technological expertise developed in the preceding centuries, not to its putative 'primitive' beginnings. However, basketry was by far not the only tool employed for shaping pottery containers (Chapter 4.2.3.2). And for reasons to be elucidated, it did not last. At the end of the seventh millennium the practice of shaping pots with basketry disappeared again, and for good. In the subsequent Pre-Halaf and Halaf periods pots certainly continued to be shaped in moulds, but these did not include moulds made of basketry (Nieuwenhuyse 2007).

Finally, I should like to seize this opportunity to stress the importance of proper documentation of cordage, textile, and basketry impressions found during archaeological fieldwork. These form a valuable and unique source of information about past technologies and craft development, and they deserve better field documentation than is currently customary on excavation projects. All impressed materials should at least be digitally photographed together – with a scale bar! An even better method is making casts of the impressions. Making casts is not very time-consuming, it is fun, and when correctly executed the results are often astonishing (Hutcheson 2008). Even the most detailed photographs and drawings cannot replace the artefact or a three-dimensional negative thereof. As numerous countries in the Middle East have heritage preserving laws that prohibit the export of archaeological objects, casts enable specialists to study exact copies of the original finds off-site.

Chapter 11

Neolithic assemblages, periodisation and sequences

Olivier Nieuwenhuyse

11.1. Introduction

Chapter 4 discussed the ceramic wares currently distinguished at Tell Sabi Abyad individually. However, as is characteristic for Late Neolithic pottery across Upper Mesopotamia, the assemblages recovered from this prehistoric site were, literally, an 'assemblage', a composite. The composition of this assemblage was dynamic over the longer term; during the more than one millennium documented at the site the proportions of specific wares varied strongly. This dynamic forms a major factor in the construction of culture-historic terminology at the site. This chapter will investigate the proportions with which the individual wares occur throughout the A–B and C–D sequences in Operation III (sections 11.3 and 11.4, respectively).

Apart from the *proportions* of the individual wares, the sheer *quantity* of pottery also varied through time. This impression, at first based rather intuitively on observations made in the field, was fully corroborated during the subsequent ceramic analysis: the upper levels yielded substantially more sherds than the more deeply buried levels. This can only reflect increasing amounts of pottery containers coming into circulation in the course of the 7th millennium. We fully acknowledged the subjectivity of this impression, however, and the degree to which it is affected by circumstances of excavating rather than past human practices. After all, the earliest levels were exposed at the base of a narrow trench (Chapter 2). We should compensate for fluctuating size of the exposures with some sort of density measure. In this chapter we shall present such an attempt to compute sherd densities for Operation III, in order to gain a more quantified grip on the availability of pottery containers (section 11.2).

At the start of the excavations in Operations III, IV, and V, it was unforeseen that this would result in what now appears to be a *continuous* cultural sequence, leading from the first sustained production of ceramic containers into the Halaf period. The marked changes in the ceramics over the long term coupled with the new radiocarbon dating framework for the earlier parts of the 7th millennium necessitated a reconsideration of existing terminology and the culture-historical framework for the site (section 11.5). Finally, we wished to frame the site of Tell Sabi Abyad within its regional context, comparing the newly updated ceramic sequence and culture-historical framework developed for this site with those of the surrounding regions (section 11.6).

11.2. Operation III: quantities and densities

The numbers of pottery sherds recovered from the excavations in Operation III were huge. This is perfectly typical for later 7th to early 6th millennium sites across Upper Mesopotamia. When excavation began in Operation III it was clear that the pottery team would not be able to study all of the excavated material. Over the years a total of 27 10×10 m trenches were opened for excavation (Fig. 2.5), yielding vast quantities of ceramic material. All together some 13 trenches were selected for pottery study (Fig. 11.1). The selection of trenches for full analysis aimed to obtain a representative sample for each level. The other trenches were not ignored entirely: the pottery team analysed the complete vessels coming from these trenches.[1] At the completion of the project almost 90.000 individual items had been counted (n = 87.459), with a total weight of some 2.676 kg.[2]

The bulk ceramics recovered from Operation III derived from the A-sequence and B-sequence levels (Fig. 11.2). Units that were attributed to a stratigraphically mixed context (e.g. level A4/A3 or level B8/B7/B4) were grouped into a single category of 'Mixed-A' or 'Mixed-B'. On the basis of the stratigraphic analysis, most of the

Period	Level	C4	D3	D4	E3	E4	E5	F3	F4	F5	G2	G3	G4	G5	G6	H3	H4	H5	I2	I3	I4	I5	I6	J3	J4	J5	K5	L5
Top soil		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0/1	0	0	0	0	0	0	0	0	0
Roman-Islamic		-	-	-	-	-	-	-	-	-		-	1	-	-	1	1	1	-	1	1	1	1	-	1	1	-	-
Late Bronze Age		-	-	-	-	-	-	-	-	1		-	2	1	1	-	2	2	-	2	2	2	2	-	2	2	1	-
Middle Halaf	D	-	-	-	-	-	-	-	-	-		-	-	-	-	2	3	-	-	-	3	-	-	-	3	3	2/3	1
Early Halaf	C	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	2	3	-	-	-	1	4	-	-	-
		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	3	4	-	-	-	2	5	-	-	-
		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	5	-	-	-	3	-	-	-	-
		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-
		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	4/5	6	-	-	-	6	-	-	-	-
		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-
Transitional	B1	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4/5	-
	B2	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	2
Pre-Halaf	B3	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7/8	3/4
	B4	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	7/8	4/5	3	-	8	6/7	4	9	
	B5	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	9	6	4	-	8	8	5		
	B6	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	10	7	5	-	9	9	6		
	B7	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	11	8	6	-	10	10	7		
	B8	-	-	-	-	-	-	-	-	-		-	-	1	-	3	4	3	-	12	9	7	3	11	11/12	8/9/10		
	B9	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-		-	-		
	A1	-	-	-	-	-	-	1/2/	1/2/3	2/3		1/2/3/4	3/4	2/3	2/3	4/5	4/5	4/5	-	13/14/15	10/11/12/13	8/9	4		13	11		
Early Pottery Neolithic	A2	-	-	-	-	-	-	-	-	3		5/6	5	4/5	4/5	6	7	6	6	16	14	10						
	A3	-	-	-	1	1	1	4	4	4		7	6	6		7	8	7	-	-		11						
	A4	1/2	1/2	1/2/3	2/3	2/3		5		5/6		8/9	7/8/9	7/8		8/9		8/9/10/11	7	17								
	A5	3	2	4/5/6	4	4		6	8			10	10			10/11		12	8	18								
	A6	4	2	7	5	5																						
	A7	5	3/4	8	6/7	6/7																						
	A8	5	5	8	8	8																						
	A9	5		9/10	9/10	9/10																						
	A10	6		11/12	11/12/13	11/12																						
Initial Pottery Neolithic	A11			13	14	13/14																						
	A12			14a		15/16																						
	A13			15																								
	A14			16																								
	A15			17																								
	A16			18																								

Fig. 11.1 Tell Sabi Abyad. The stratigraphy of Operation III showing trenches selected for complete ceramic processing (dark shade) (image by A. Kaneda; Tell Sabi Abyad Project).

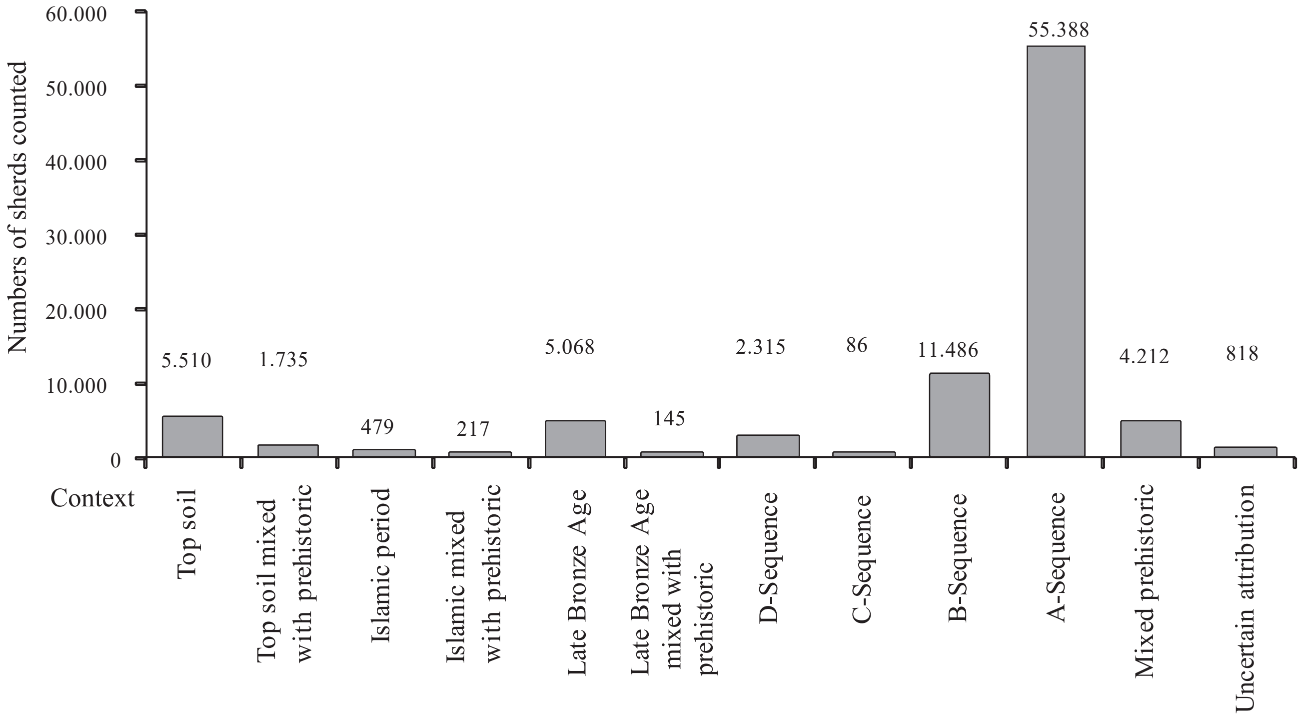


Fig. 11.2 Tell Sabi Abyad, Operation III. The stratigraphic context of the ceramic material studied. Frequancy counts for main stratigraphical-chronological phases distinguished in Operation III (image by A. Kaneda; Tell Sabi Abyad Project).

units excavated in the A-sequence levels were attributed to a single stratigraphic level. For the B-sequence levels the majority of the material was attributed to a 'mixed' stratigraphic unit (Fig. 11.3).

As visualised in Figure 11.3, the material recovered from the various levels in the A–B Sequences differs enormously in terms of sheer quantity. Two factors are responsible for these very wide fluctuations: variability in the amounts of ceramic evidence – or rather fragments thereof – contained in the archaeological soil matrix, and differences in the volumes excavated. In general, those levels that yielded a great deal of pottery were also those that were exposed over larger areas (compare Fig. 11.3 with Fig. 2.6). This relationship is far from perfect, however. For instance, the number of sherds recovered from level A1 is much higher than those from the levels immediately preceding it, in spite of the fact that these levels were exposed over essentially the same amount of area. The earliest levels included in the analysis (levels A12 to A10) yielded very limited quantities of ceramic material *and* were excavated at a small scale. For these early levels the low absolute quantities are mirrored in very low ceramic densities (see below).

To factor out the biases caused by trenches of different sizes we calculated sherd densities; Table 11.1 and Fig. 11.4 show estimated densities of total sherd counts per cubic meter, expressed in frequency counts as well as by weight. When we computed these densities, it became apparent that there were huge discrepancies in ceramic sherd densities between trenches within the *same* level (Table 11.1). Given the large number of uncertainties involved in calculating these densities, we considered it unwise to put too much emphasis on these discrepancies, or to interpret them prematurely in terms of spatially differentiated activities or deposition. Future studies may further explore the nature of these differences; here we shall present densities averaged by level. Especially the values reached for the B-levels fluctuated wildly. This we attributed to the fairly small sample sizes for many of the B-levels, in combination with the stratigraphical complexities of these depositions that caused large parts of the sample to be attributed to the category of 'B-mixed'. For this reason, we decided to aggregate the B-levels into a single category and present the average sherd density for the B-levels as a whole, including the various 'mixed' B-levels (Fig. 11.4).

The results suggest fluctuating ceramic densities through time, with some important long-term trends emerging. At first sight, if considered separately for each level, the frequency densities would suggest a 'peak' by level A7, followed by a strong decrease observed by level A4, followed by a second peak in level A1, followed by a slight decrease into the B-levels (Fig. 11.4: above). Given the many uncertainties involved, however, we believe one should not take these fluctuations too strictly. As to the peak in level A7: the densities for this level were computed on the basis on just a single trench, which perhaps makes it less reliable in contrast to the other levels, for which the density measures were averaged over multiple trenches. Furthermore, this level contrasted with the others by a total absence of architecture; level A7 consisted of two super-imposed open areas filled with trash, featuring many small hearths and fireplaces. It is possible that these contexts were associated with increased numbers of deposited ceramic. Curiously, contradicting the increased density estimates for frequencies in A7, those using weight show a (minor) reduction in this level (Fig. 11.4: below).

More enigmatic is the apparent reduction in densities in level A4. Characterised by numerous sub-levels, this level contained a great deal of architecture and many open trash-filled areas. In terms of its spatial organisation and depositional composition this level seems to be very similar to levels A6 and A5, but it yielded suspiciously lower sherd densities.[3] The 'reduction' in level A4, if valid, would be a short-lived one, running counter to a longer-term trend of increasing densities. In this case, perhaps our estimates of excavated soil volume were (much) too high. This suggestion finds support in the (marginally) lower densities for stone vessels and the greatly reduced estimates for White Ware in this level (Fig. 11.7). The suspicious reduction of artefact densities across a range of different object categories suggests that our computations for level A4 should perhaps not be given too much weight.

Furthermore, a comparison with the very few Late Neolithic contexts for which ceramic densities are available show that in an absolute sense the computations from Operation III rank as quantitatively rather low. The Operation III statistics fall well below those computed for contemporaneous contexts at Operation IV (Chapter 13.4). Farther away, the 7th millennium strata excavated at Shir in the Northern Levant yielded densities of about 40–50 pottery sherds per cubic metre already in the early levels, rising to several hundreds of sherds per cubic metre in the upper levels (Nieuwenhuyse in press, d). At nearby Hama, strata from the same period show a similar pattern (Thuesen 1988). The Northern Levantine sequence is of course distinct from Upper Mesopotamia, but the much higher values from these sites throw doubt upon the validity of the Operation III data in an absolute sense. Accepted at face value they would suggest that the Late Neolithic community living at Operation III used significantly lower amounts of pottery containers than other contemporaneous groups.

One partial, methodological explanation may be that at Shir and for Operation IV excavated volumes were computed *excluding* the space occupied by standing architecture (e.g. walls, buttresses and so on). Instead, for Operation III excavated volumes were calculated by taking the space occupied by entire stratigraphic units as a whole, *including* the volumes of extant architecture. The density values currently available for Operation III should therefore best be seen as rough approximations of broader trends. The very exact-looking statistical values should not be taken too literally, but instead can be seen

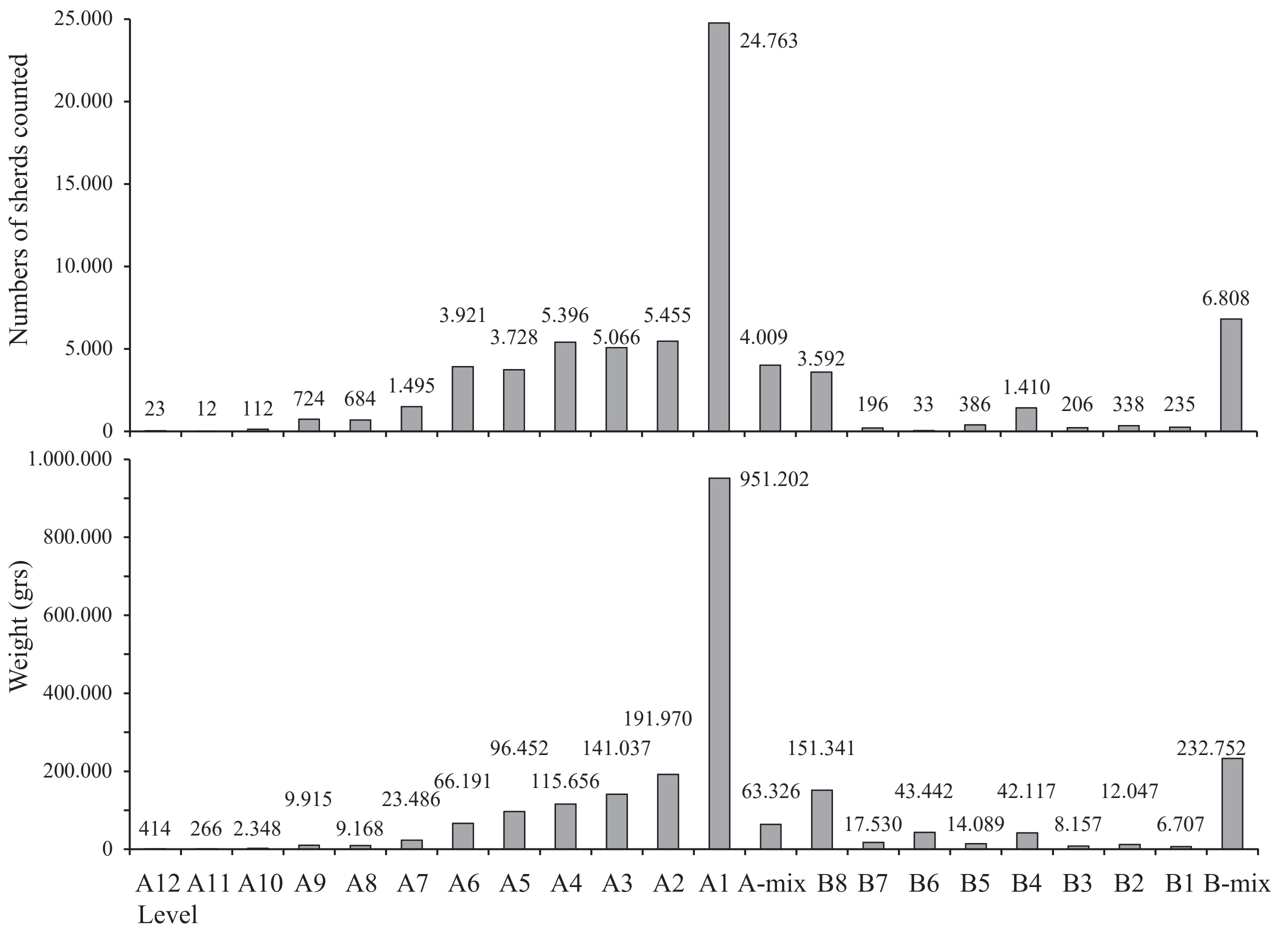


Fig. 11.3 Tell Sabi Abyad, Operation III. Quantities of sherds by level of the A-B Sequences. Above: sherd frequencies; below: weights (g).

as a reflection of long-term trends at the site (Fig. 11.5). If we may look at these statistics in a relative manner, patterns emerge that are closely comparable to what is observed in the Northern Levant. An earlier phase of the Pottery Neolithic is characterised by very low ceramic sherd densities, and this is followed by a long secondary phase characterised by progressively rising densities.

Another way to explore the changing sherd densities is to chart the *increase* of sherd densities from one level to the next, as a proxy for the *rate* of ceramic change (Fig. 11.6). This suggests that during the Initial Pottery Neolithic, levels A12–A10 (ca. 6865–6670 to 6750–6675 cal BC), sherd densities remained pretty much the same; the rate of increased density from one level to the next fluctuated around zero. Put differently, not only was the availability of pottery containers (predominantly early Mineral Ware) very low throughout this stage, but it also remained remarkably constant at this low level. Levels A12–A11 can be characterised as being almost without pottery in a practical sense. These levels yielded just about one or two sherds per cubic metre, weighing in total less than 10g. Such very low values make it easy to misinterpret these strata as belonging to the final PPNB. Indeed, this is exactly what happened at Tell Sabi Abyad II when this pottery was first excavated (Nieuwenhuyse 2017a). The extremely low ceramic densities formed an important consideration for adopting separate terminology for these levels: The Initial Pottery Neolithic period.

In contrast, the early phase of the Early Pottery Neolithic, levels A9 and A8 (ca. 6675–6620 to 6630–6590 cal BC) not only saw the rise of ceramic densities themselves but also of the *rate* of increase, which accelerated dramatically. Sherd densities began to rise rapidly: in absolute terms, this phase saw a more than twelve-fold increase in pottery. It is nonetheless emphasised that sherd densities remained comparatively very low. The availability of pottery containers may have accelerated even further during Level A7, but this is observed only in terms of sherd frequencies,

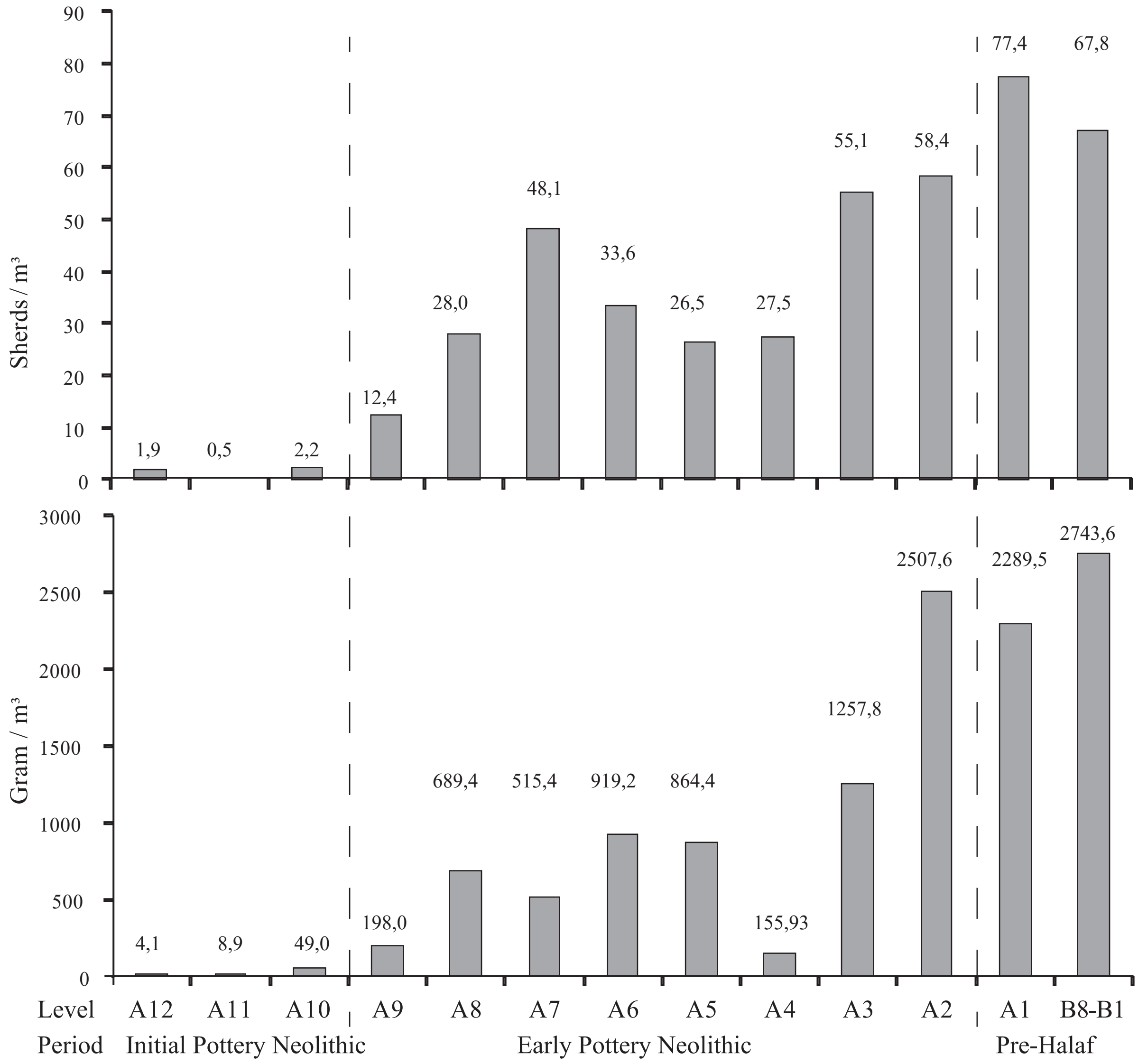


Fig. 11.4 Tell Sabi Abyad, Operation III. Estimated sherd densities for the A-B Sequences. Above: based on frequency counts (sherds/ m^3); below: based on weights (g/m^3).

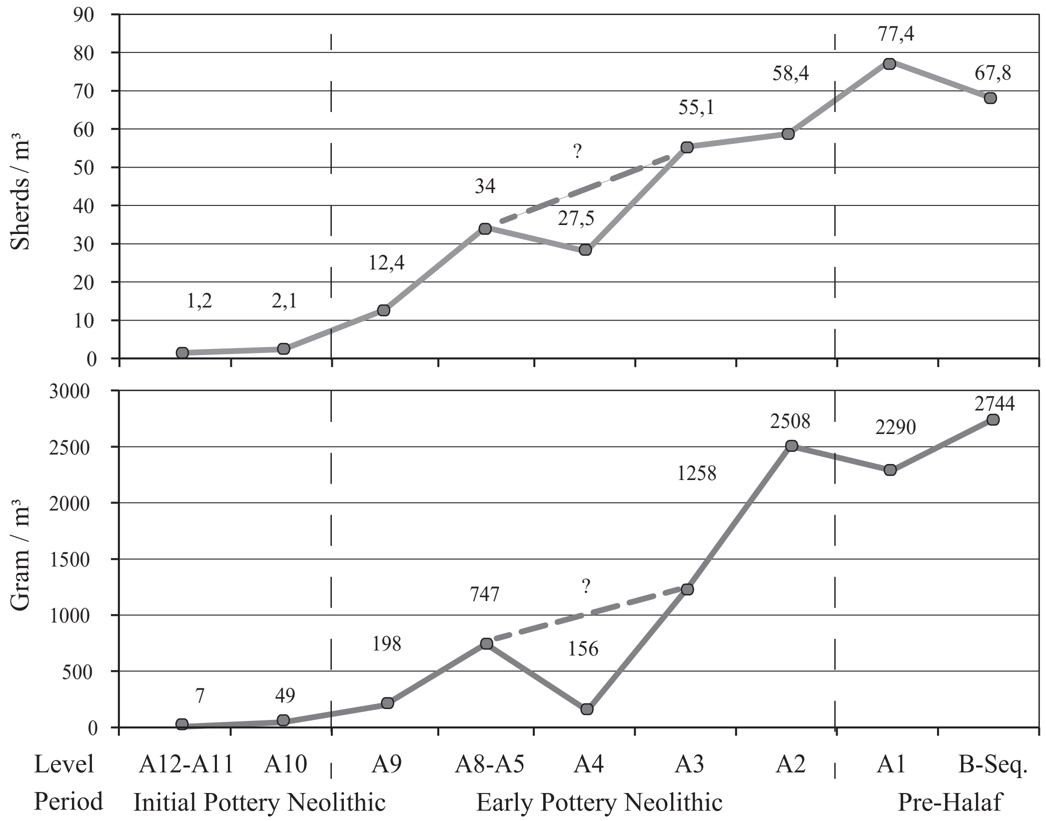


Fig. 11.5 Tell Sabi Abyad, Operation III. Simplified long-term trends in sherd densities for the A–B Sequences. Above: based on frequency counts (sherds/m³); below: based on weights (g/m³).

not in weight (Fig. 11.6). This pattern, curiously, began to be reversed by level A6. Erratic fluctuations and opposing patterns in frequencies and *weights* characterise levels A7–A4. A lack of clear patterning may well be explained by problematic assumptions made in calculating the densities (see above), but it may also mean that overall, pottery containers as a class did not increase very significantly quantitatively during levels A7–A4 (ca. 6605–6495 to 6455–6390 cal BC).

Finally, in stark contrast, the final parts of the Early Pottery Neolithic, represented by Levels A3 and A2 (ca. 6395–6375 to 6385–6330 cal BC), are characterised by some of the highest rates of increase of the entire Operation III ceramic sequence. In these levels the numbers of sherds deposited almost doubled compared to the previous levels A7–A4. This acceleration led to the unprecedented quantities of pottery sherds recovered from level A1. By level A1 ceramics included almost 80 sherds per cubic metre, with an average weight of over 2 kg; here pottery rightly deserves the epithet of the 'most numerous artefact'.

Intriguingly, in spite of having lumped their individual values into a blunt average, the B-levels may again show a slight decrease in pottery densities in terms of counts (Fig. 11.5, above). We already noted above that these levels are stratigraphically problematic. Excavated on the steep slopes of the older tell (Chapter 2), quite a number of excavation units were ambiguously attributed to mixed A–B contexts; mixed A–B units were not included in the average for level B as a whole. This may go a long way in explaining the apparent reduction in densities. In addition to stratigraphic complexities, post-depositional factors also may have contributed to the reduced densities. The circumstance that the B-Sequence was deposited on steeply sloping surfaces may have contributed to increased washing-down of heavier materials such as pottery sherds (Gopher and Eyal 2012; Mills *et al.* 1992; Rick 1976). Significantly, located at a much lower elevation some fifty meters to the southeast of Operation III, the Neolithic pottery characterising level 11 at the base of sounding P15 in Operation I was very eroded, suggesting that it was in fact slope wash coming down from the older tell (Akkermans 2014, 27; Le Mière and Nieuwenhuyse 1996, 126). Perhaps interestingly, density values computed from sherd *weights* in the B-Sequence show a continuing increase compared to the final A Sequences (Fig. 11.5, below). So, the remaining fragments were less in number but, on average, heavier. Did soil erosion at this location favour the removal of smaller, relatively light-weight materials?

As a comparison, we computed similar densities for stone vessels and White Ware. Artefacts in both categories were mostly broken and very fragmented, and the large majority consisted of body sherds. Their compact mass and relative weight should make them as susceptible to the effects of slope erosion as sherds made of pottery. Stone vessel fragments show a marked reduction in the B-Sequence, which at first sight seem similar to

Table 11.1 Tell Sabi Abyad, Operation III. Excavated soil volumes, sherd counts and weights, and calculated sherd densities for selected trenches

Square	*Level*	*Excavated volume (m^3)*	*Sherd counts*	*Count densities (sherds/m^3)*	*Sherd weight (g)*	*Weight densities (g/m^3)*
E04	Level A12	12.06	23	1.91	414	34.33
E04	Level A11	14.03	9	0.64	174	12.46
E03	Level A11	17.21	3	0.17	92	5.34
E03	Level A10	22.31	75	3.36	1952	87.48
E04	Level A10	37.61	37	0.98	396	10.53
E03	Level A9	25.00	462	18.48	9.002	360.08
E04	Level A9	25.50	262	10.28	913	25.81
E03	Level A8	12.75	382	29.96	8.790	689.4
E04	Level A8	11.16	291	26.09	–	–
E03	Level A7	14.03	674	48.06	7.229	515.43
E03	Level A6	50.76	799	15.74	1.824	35.93
E04	Level A6	12.43	720	57.91	–	–
D04	Level A6	10.20	277	27.16	18.386	1802.54
E03	Level A5	27.54	881	31.99	–	–
E04	Level A5	21.04	585	27.81	2.009	95.50
D04	Level A5	81.00	1584	19.56	70.018	864.42
E03	Level A4	81.68	848	10.38	–	–
E04	Level A4	49.73	2213	44.51	2.213	44.5
F04	Level A4	94.50	574	6.07	25.266	267.36
E03	Level A3	2.55	180	70.59	–	–
E04	Level A3	25.50	1442	56.55	–	–
F04	Level A3	29.70	1878	63.23	41.482	1396.69
G05	Level A3	41.18	1248	30.31	46.072	1118.92
G05	Level A2	47.25	3391	71.77	118.481	2507.57
G03	Level A2	16.20	729	44.99	–	–
F04	Level A1	51.57	3948	76.56	50.865	986.34
G05	Level A1	102.00	8048	78.9	293.163	2874.15
H04	Level A1	102.06	7822	76.64	307.001	3008.03
J05	Level B8	21.04	1754	83.37	53.509	2543.20
G05	Level B8	21.04	524	24.91	44.304	2105.961
H04	Level B8	37.61	704	18.72	27.182	722.69
J05	Level B7	1.59	177	111.06	16.302	10,228.71
J05	Level B5	15.94	325	20.39	11.814	741.28
J05	Level B4	15.00	1247	83.13	36.237	5167.32
K05	Level B4	15.30	157	10.26	5.201	339.94
K05	Level B3	12.11	197	16.26	6.096	503.28
K05	Level B2	8.61	338	39.27	12.047	1399.82
K05	Level B1	26.46	235	8.88	6.707	253.51
Total		1213.25	45,043	37.13	1,224,727	40748.521

(no weight measurements were available for E3 levels 5 to 3, E4 levels 8, 6, 5 and 3, and G3 levels 4 and 2)

the reduction observed with pottery (Fig. 11.7: above). However, apart from potential post-depositional factors, in this case there is a clear long-term trend towards a diminished investment in the production of polished stone vessels, of which the B-Sequence appears to be the nadir. At Tell Sabi Abyad stone vessel consumption was most abundant in the Initial Pottery Neolithic (levels A12–A10), with density values roughly similar to those of pottery. This was followed by a sharp decrease during levels A9 and A8, coinciding with the introduction of Standard Ware. Stone

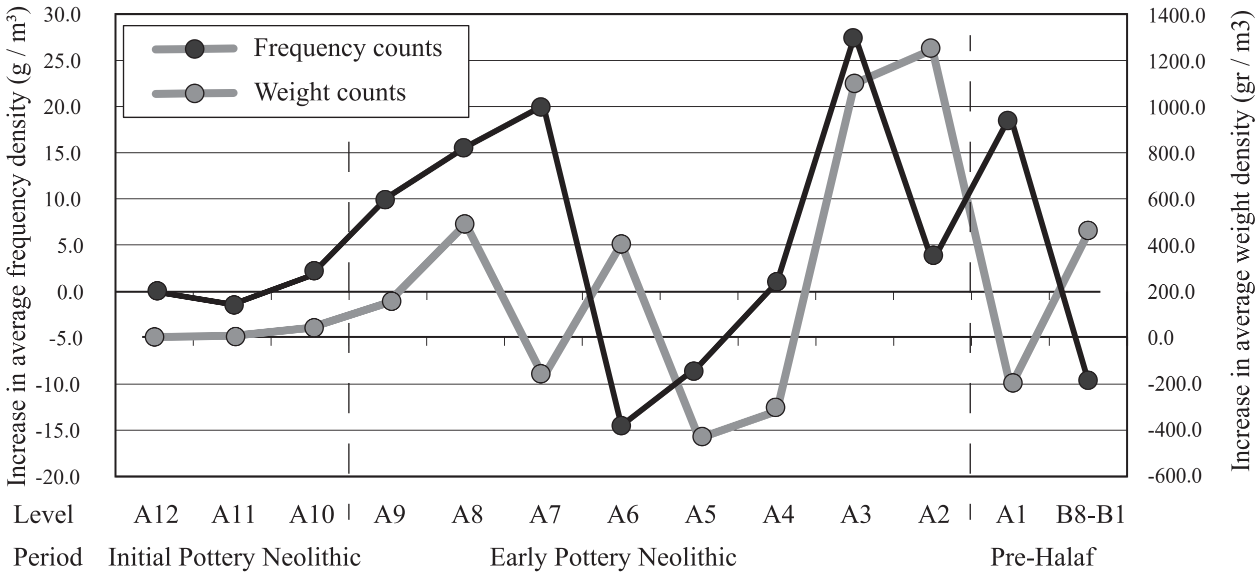


Fig. 11.6 Tell Sabi Abyad, Operation III. Increasing ceramic densities from one level to the next, expressed in frequency counts (black: sherds/m³; values shown left) and weights (grey shade: g/m³; values shown right).

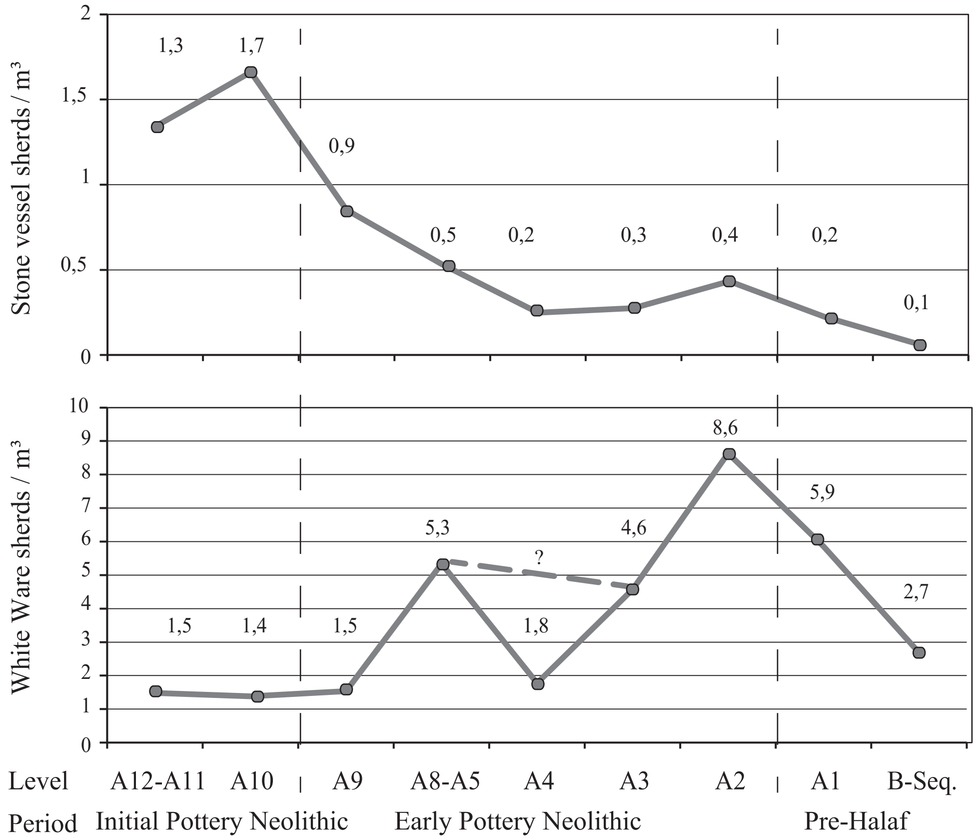


Fig. 11.7 Tell Sabi Abyad, Operation III. Simplified long-term trends in sherd densities for stone vessels (above) and White Ware (below) for the A–B Sequences (frequency counts, sherds/m³).

vessel densities remained roughly stable during levels A7 to A2, alongside the progressive increase of pottery. This was followed by another drastic reduction in the B-levels. The production of these objects did not cease entirely, as limited numbers of polished stone vessels continued to be made and used during the Halaf period, but production never returned to early 7th millennium levels.

In contrast, White Ware containers show a pattern structurally rather similar to pottery, even if in absolute terms White Ware densities always remained much below those of pottery (Fig. 11.7: below).[4] Low densities of White Ware characterise the earliest levels A12–A10 in the A-Sequence. Perhaps interestingly, White Ware shows a similar low density in level A9, alongside the rising densities of pottery. The density estimates suggest that White Ware became really important only *after* level A9. Density values rose steeply during levels A8–A3, and they show the same enigmatic level A4 drop already observed with the pottery. The peak in the production and consumption of White Ware was reached in level A2, after which densities began to decline. White Ware densities returned to early 7th millennium levels again in the B-Sequence. The production of White Ware at Tell Sabi Abyad was abandoned soon afterwards.

In sum, containers made in different raw materials sometimes show comparable (White Ware), sometimes opposing (polished stone) trajectories over the longer term. All three categories show reduced densities in the B-Sequence. As all three may have been susceptible to gravitational effects and the erosion of the steep B-Sequence slopes, the role of such post-depositional factors in contributing to reduced densities remains difficult but necessary to assess. Alternatively, the density values may reflect a genuine reduction in ceramic containers deposited in the B-Sequence levels. If so, this remains difficult to explain. Activities associated with the B-levels may have involved less pottery containers than was common elsewhere in Pre-Halaf and Transitional-Period times. Many of the B-layers in Operation III comprised open areas without architecture; others held small-scale architecture very different from the extensive multi-roomed buildings characterising the contemporaneous levels in Operation I (Akkermans 2014). In Operation I, the fills of these buildings contained much pottery, some of it *in situ* (Nieuwenhuyse 2007). An alternative interpretation would characterise the Pre-Halaf and Transitional period as a whole by diminished numbers of pottery vessels in daily use. This might reflect broader socio-economic changes in this period, in particular the development of more mobile, semi-pastoralist societies (Akkermans and Verhoeven 1995). These possibilities cannot be tested at present.

11.3. The assemblages of the A–B sequences

Here we shall be concerned with estimating the proportional contributions of the various wares to the total ceramic assemblage. These may be expressed statistically in various ways: sherd counts, Estimated Numbers of Vessels Represented (EVR) or Estimated Vessel Equivalents (EVE). The first two of these statistics are computed on the basis of frequency counts as well as by weight. The EVE is calculated on the basis of the descriptions of the diagnostic sherds (Chapter 3). The statistics are listed in Table 11.2, visually summarised in Figure 11.8, and shall briefly be discussed below. Each of them provides a slightly different reconstruction of the pottery assemblage and of its changing composition over time.

Quantifying the composition of the ceramic assemblages remains an approximation. In addition to the (mostly slight) discrepancies between the various statistics, a degree of stratigraphic mixing is common to tell sites. The excavated material includes two problematic categories. Late Bronze Age pottery was recovered from many prehistoric contexts throughout the A–B Sequences (Chapter 4.12, Chapter 13). This material can safely be considered to be intrusive. Discovered in many contexts in the A and B Sequences, Halaf Fine Ware sherds also may be put aside, given that the overall properties of the pottery from these levels suggest a much older date. The status of the Standard Fine Ware (SFW), finally, is less obvious. We believe that this category is at home in the final stages of the B-Sequence, but it does not belong in the underlying A-Sequence. While the first two wares were excluded, the SFW was included in the estimates presented below.

Standard Ware (SW) constitutes the great bulk of the pottery in each and every measure (between 91% and 99 %) (Table 11.2, Fig. 11.8: A). In the face of this, it would be perfectly reasonable to call the Operation III pottery a ‘Coarse Ware’ assemblage. Notable exceptions are at the two extremes of the chronological sequence. In the early stages (levels A12–A10), SW is a minority in an assemblage overwhelmingly dominated by Early Mineral Ware (EMW). Estimates range from 5% (raw sherd counts) to 46% (weight of EVR). Did Standard Ware form an integral component of the pottery assemblage from the start, if in very small numbers? We argue that most likely SW is *not* at home in these early levels. The sample sizes are very small for these levels (fewer than 100 sherds); a single item already carries much weight proportionally. In levels A12 and A11 Standard Ware is in fact represented by a single sherd (!) per level. By level A10 slightly more substantial numbers are found ($n = 22$), but the real manifestation of Standard Ware occurred in level A9, when it included between 91% and 99 % of the assemblage. Level A9 is accepted here as the real start of Standard Ware at Tell Sabi Abyad.

On the opposite side of the chronological spectrum, the sequence saw the introduction of new ware categories already by levels A6–A5, and certainly by level A4. As a consequence, from level A4 onwards the proportions of Standard Ware began to be somewhat reduced. At the end of the Operation III sequence, in level B1, Standard Ware became proportionally much less important as it was gradually replaced by the Fine Ware categories of the Transitional Period (Nieuwenhuyse 2007). Previous work at Operation I has shown that the production of plant-tempered Standard Ware was gradually abandoned by the Early Halaf period (Akkermans 1993; Nieuwenhuyse 2007). Thus, we can now reconstruct the duration of Standard Ware production at Tell Sabi Abyad between ca. 6675–6620 cal BC (Operation III, level A9) and ca. 5900 cal BC, a period of about 6–7 centuries.

The Early Mineral Ware was characteristic for levels A12–A10. In these levels it included between 54% and

Table 11.2 Tell Sabi Abyad, Operation III. Proportions (%) of the main 7th-millennium ceramic wares in the A–B Sequences A: sherd counts. B: Estimated numbers of vessels represented (EVR). C: sherd weight. D: weight of estimated numbers of vessels represented. E: Estimated vessel equivalents (EVE)

A	*A12*	*A11*	*A10*	*A9*	*A8*	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*B8*	*B7*	*B6*	*B5*	*B4*	*B3*	*B2*	*B1*	*Total*
SW	5	8	20	96	100	99	99	99	97	97	98	98	98	98	76	95	94	98	88	75	98%
EMW	95	92	80	3	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
FMTW	–	–	–	–	–	–	1	1	2	3	1	1	–	–	6	–	–	–	–	–	1%
GBW	–	–	–	1	–	–	–	–	–	–	1	1	1	1	3	1	1	–	1	1	1%
DFBW	–	–	–	–	–	–	–	–	–	–	–	–	1	1	12	2	3	2	6	3	0%
MCW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	1	–	–	4	0%
FPW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
OFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	0%
SFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	3	16	0%

B	*A12*	*A11*	*A10*	*A9*	*A8*	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*B8*	*B7*	*B6*	*B5*	*B4*	*B3*	*B2*	*B1*	*Total*
SW	25	–	10	97	99	99	98	98	96	95	92	94	91	91	88	95	86	96	93	74	94%
EMW	75	100	90	1	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1%
FMTW	–	–	–	1	–	–	1	2	4	4	6	3	2	–	–	–	3	–	–	–	3%
GBW	–	–	–	1	–	–	–	–	–	1	2	3	4	5	6	2	5	–	2	–	2%
DFBW	–	–	–	–	–	–	–	–	–	–	–	–	2	5	–	–	2	4	–	9	0%
MCW	–	–	–	–	–	–	–	–	–	–	–	–	1	–	6	2	2	–	–	4	0%
FPW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	0%
OFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	0%
SFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	2	13	0%

C	*A12*	*A11*	*A10*	*A9*	*A8*	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*B8*	*B7*	*B6*	*B5*	*B4*	*B3*	*B2*	*B1*	*Total*
SW	7	16	25	96	99	99	99	10%	98	99	99	99	98	100	99	94	94	98	90	75	99%
EMW	93	84	75	4	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
FMTW	–	–	–	–	–	–	1	–	2	1	1	–	–	–	–	–	–	–	–	–	0%
GBW	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	1	–	1	1	0%
DFBW	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	2	3	2	7	5	0%
MCW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	7	0%
FPW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
OFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	0%
SFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	2	12	0%

D	*A12*	*A11*	*A10*	*A9*	*A8*	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*B8*	*B7*	*B6*	*B5*	*B4*	*B3*	*B2*	*B1*	*Total*
SW	46	–	9	99	98	99	99	100	98	99	95	99	98	99	100	98	89	99	99	75	99%
EMW	54	100	91	1	2	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
FMTW	–	–	–	–	–	–	1	–	2	1	3	–	–	–	–	–	1	–	–	–	1%
GBW	–	–	–	–	–	–	–	–	–	–	3	–	1	1	–	1	4	–	–	–	0%
DFBW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	11	0%
MCW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	–	4	0%
FPW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
OFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
SFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	10	0%

E	*A12*	*A11*	*A10*	*A9*	*A8*	*A7*	*A6*	*A5*	*A4*	*A3*	*A2*	*A1*	*B8*	*B7*	*B6*	*B5*	*B4*	*B3*	*B2*	*B1*	*Total*
SW	–	–	13	91	99	9	98	97	93	92	87	94	90	98	93	97	85	96	89	71	93%
EMW	100	100	87	3	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0%
FMTW	–	–	–	3	–	–	2	3	6	7	10	2	1	–	–	–	4	–	–	–	4%
GBW	–	–	–	3	–	–	–	–	1	1	3	3	6	2	4	3	4	–	3	–	2%
DFBW	–	–	–	–	–	–	–	–	–	–	–	1	3	–	–	–	3	4	–	7	1%
MCW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	1	–	–	5	0%
FPW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	–	0%
OFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	0%
SFW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	2	17	0%
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

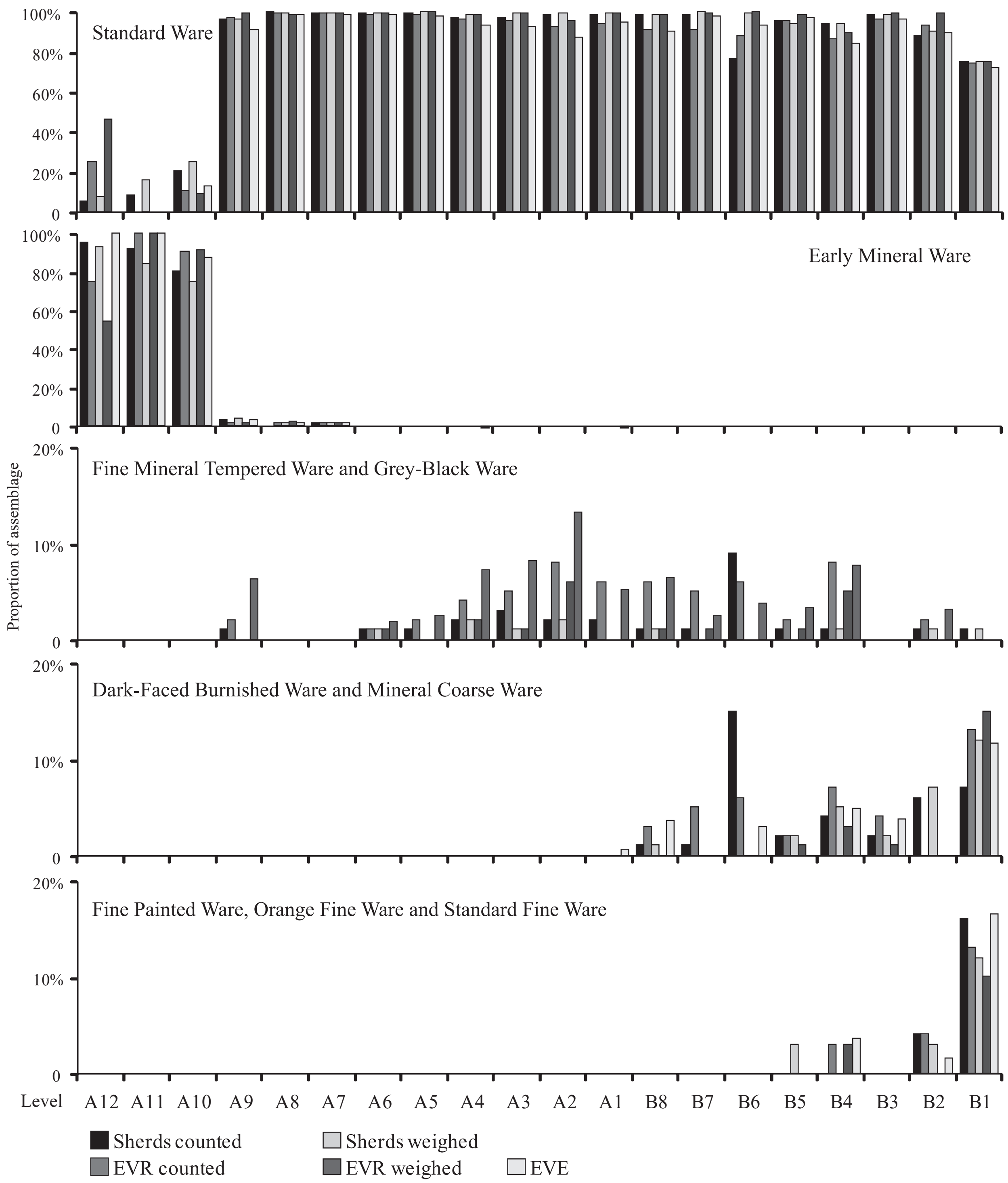


Fig. 11.8 Tell Sabi Abyad, Operation III. Estimates of ceramic proportions: sherd counts, estimated numbers of vessels represented (EVR), sherds weighed, weight of estimated numbers of vessels represented and estimated vessel equivalents (EVE). From top to bottom: Standard Ware; Early Mineral Ware; Fine Mineral Tempered Ware and Grey-Black Ware together; Dark-Faced Burnished Ware and Mineral Coarse Ware together; Fine Painted Ware, Orange Fine Ware and Standard Fine Ware together.

100% of the pottery, depending on the estimate (Fig. 11.8: B). However, again the very limited sizes of the samples from these levels must be kept in mind. If we disregard the few Standard Ware sherds from levels A12 and A11 as 'intrusive', then Early Mineral Ware constitutes the *only* ceramic category in these levels. This pottery continued to be present in very small proportions in levels A9–A7, representing between 1% and 4% of the bulk. It is perhaps more likely that in these levels the few EMW sherds recovered were intrusive from the earlier levels. Almost certainly some older material would have been vertically lifted in the stratigraphy by the ongoing constructing and reconstructing of buildings on platforms that characterises the architectural tradition at this phase. Level A9 in fact yielded two EMW sherds from the fill of a platform. However, it cannot be excluded entirely that very small proportions of Early Mineral Ware were an integral part of the ceramic assemblages of these levels. In even later levels, too, this pottery is found very sporadically (Table 4.20).

Fine Mineral Tempered Ware (FMTW) and Grey-Black Ware (GBW) were introduced halfway through the A-Sequence. Although in very small numbers these two categories appear already in level A9 (Tables 4.48 and 4.57), yet they are here proportionally insignificant (Fig. 11.8: C). As already pointed out, moreover, the GBW examples from level A9 are somewhat coarser than common for this group and perhaps were misattributed EMW sherds instead (Chapter 4.5.2). The introduction of these two wares may therefore more realistically be placed at level A6 for the FMTW, and at level A4 for the GBW (Chapters 4.4.2, 4.5.2, resp.). In levels A5 and A4 these two groups together comprise between 1% and 6%, rising to between 1% and 13% in levels A3–B4 (Fig. 11.8). After level B4, FMTW and GBW became less important, but some Grey-Black Ware was still in use during the Early Halaf period (Le Mière and Nieuwenhuyse 1996).

Dark-Faced Burnished Ware (DFBW) and Mineral Coarse Ware (MCW) were both introduced by level A1 (Table 4.65). However, proportionally their presence was marginal in this level, including less than 1% in most estimates (Table 11.2, Fig. 11.8: D). Both groups were characteristic mainly for the B-Sequence when together they included between 1% and 15% of the assemblage. The proportion of Dark-Faced Burnished Ware began to rise slightly earlier than that of Mineral Coarse Ware. DFBW was proportionally more important than MCW throughout the B-Sequence, but in the ultimate level B1 the proportions became more equal (Table 11.2). This pattern is supported by the evidence from the younger occupation phases documented in Operation I. These showed that while DFBW gradually went out of use at the end of the Transitional period (Operation III, level B1), and was replaced by Mineral Coarse Ware during the Early Halaf (Nieuwenhuyse 2007).

Finally, Figure 11.8: E shows the proportions of the Fine Wares from the Transitional period collectively. They include Fine Painted Ware (FPW), Orange Fine Ware (OFW), and Standard Fine Ware (SFW). With the exception of two OFW sherds from level A1 and just one SFW sherd from level A4 (Tables 4.68 and 4.69), these categories were not introduced before the period covered by the B-Sequence. They comprise fairly small proportions of the assemblage in levels B5–B2, including between 1% and 3% collectively (Table 11.2). These statistics rose very significantly to between 10% and 17% of the assemblage in the final level B1. While the exact proportions differ from those of Operation I (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007), the B-Sequence shows essentially the same development: an introduction of these three wares in very limited proportions, followed by a steep rise of Standard Fine Ware.

11.4. The assemblages of the C–D sequences

As the project did not include a systematic study of the ceramics recovered from the C-levels, the team studied only a few handful of items (*n* = 86; Fig. 11.2). However, as part of the regular procedures for find processing at Tell Sabi Abyad, all complete artefacts ('objects', see Chapter 3), were given a description. This includes a number of intact pottery containers recovered from prehistoric burials (Chapter 14). Apart from these complete objects, the small amount of C-Sequence material that came across our desks were only those excavated from the C-levels in trench I3, which our team analysed in its entirety. Contextually this material all came from the terrace fill in which the Halaf architecture was erected, cutting into earlier periods (Fig. 2.15). As a result, only a most preliminary evaluation of the C-Sequence ceramic assemblage can be presented.

Standard Ware comprises only about half of the C-Sequence sample, but this certainly was not representative for the C-assemblage as a whole. Most characteristic for this phase are the Halaf Fine Ware (Chapter 4.11). The Halaf Fine Ware from the C-Sequence was in most cases painted, it was stylistically rather homogeneous, and it can all be attributed to the Early Halaf period. The Halaf Fine Ware studied so far from the C-Sequence is very similar to what was recovered earlier from Operation I, levels 3–1 (Akkermans 1989b, 1993; Le Mière and Nieuwenhuyse 1996). We therefore attribute the excavated remains to the Early Halaf period. The older, Pre-Halaf pottery types almost certainly resulted from the terracing.

Continuing chronologically to the next stratigraphic deposit, the D-Sequence represents the very poorly preserved foundation remains of Halaf circular buildings dug into underlying layers, and the stratigraphic depositions associated with these remains. The Halaf levels themselves had in turn been truncated by Late Bronze Age building activities (Chapter 2). As a result of these complexities, the material recovered from the D-levels was a mixture of things from widely different periods: Halaf Fine Ware pottery, wares characteristic for much earlier periods such as Standard Ware or Fine Mineral Tempered Ware, and Late Bronze Age material (Fig. 11.9).

Characteristic for the earlier periods is the Standard Ware, which represents the largest category recovered from the D-levels (78% in terms of raw sherd counts), as well as some Fine Mineral Tempered Ware and Grey-Black Ware. These three fit closely with the later parts of the Early Pottery Neolithic as documented in the final stages of the A-Sequence (levels A4–A2). Some Dark-Faced Burnished Ware may have come from Pre-Halaf strata, while Orange Fine Ware and Standard Fine Ware represent strata from the Transitional period between Pre-Halaf and Early Halaf. However, probably the most diagnostic for a relative date *ante quem* is the Halaf Fine

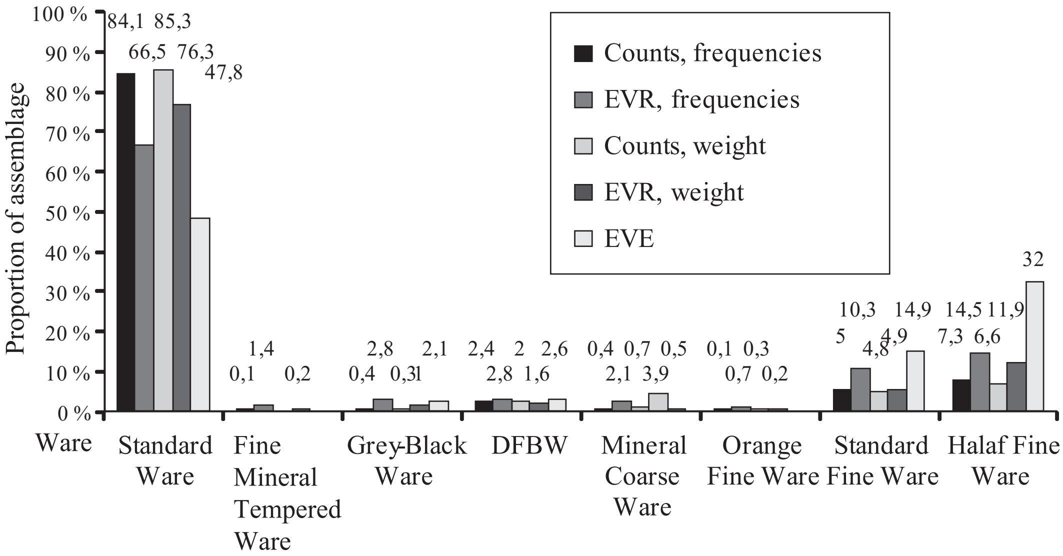


Fig. 11.9 Tell Sabi Abyad, Operation III. Different estimates of ceramic proportions in the D-Sequence: sherd counts, estimated numbers of vessels represented (EVR), sherd weight, weight of estimated numbers of vessels represented and estimated vessel equivalents (EVE).

Ware, even if this comprises no more than between 7% and 32% of the D-Sequence pottery (Fig. 11.9). As with the C-Sequence terracing, the mixture probably resulted from Halaf-period foundation activities.

These wares have already been discussed in some detail (Chapter 4.11). Contrasting with the painted Halaf pottery from the C-Sequence, the Halaf Fine Ware from the D-Sequence can be dated to the Middle-Late Halaf period. Given the mixed character of the D-Sequence depositions, it is impossible to estimate the proportion of the Halaf Fine Ware in the systemic ceramic assemblage. At Middle to Late Halaf sites elsewhere in Upper Mesopotamia, Fine Ware represents the bulk of the pottery, but coarse, mineral-tempered wares are often found as well (Akkermans 1993). It is difficult to identify examples of such coarser pottery from the D-Sequence with any certainty, but the excavations yielded a Mineral Coarse Ware jar that perhaps dates to the Middle–Late Halaf (Chapter 4.6).

Befitting the severely disturbed situation, the material excavated from the D-Sequence overwhelmingly came from 'open area' contexts. This holds true for the painted Halaf pottery as well. Only four of the Halaf Fine Ware sherds were recovered from within what remained of the Halaf architecture; the remainder all came from 'open areas' or from the fills of pits excavated in these unroofed spaces. The excavations yielded no complete vessels and just a single intact profile. The preserved radius of the extant rim fragments averages 46°, which is similar to the average radius of the bulk of the pottery in the later A-Sequence levels where it was interpreted as reflecting non-primary depositions (Chapter 4.2.2).

11.5. Periodisation

One of the aims of the excavations at Tell Sabi Abyad was the definition of a ceramic sequence for the 7th to early 6th millennium. It soon became clear that the younger part of the cultural sequence of Operation III overlapped with previous work in Operation I, for which culture-historical terminology already existed (Akkermans 1988, 1993; Le Mière and Nieuwenhuyse 1996). This chronological terminology could easily be adapted to the findings from the upper levels of Operation III. The earlier stages, however, had not been explored in any detail before at the site. This necessitated a reconsideration of terminology for these earlier phases.

To be sure, bits and pieces of this earlier sequence had already been identified elsewhere in the Balikh Valley. Coarsely-made, plant-tempered pottery had been recovered from Tell Assouad (Le Mière 1986), Tell Damishliya (Akkermans 1988), and Tell Sabi Abyad II (Nieuwenhuyse 2000b). At the time, this material was thought to represent the earliest ceramics in northern Syria. Although its absolute dating remained notoriously difficult (Akkermans 1993), it was seen as chronologically intermediate between the final PPNB and the, presumably, much later Pre-Halaf assemblage. In terms of the local, regional sequence for the Balikh, it was dubbed 'Balikh IIA', the start of the Pottery Neolithic or 'Balikh II' period (Akkermans 1993). The well-dated stratigraphic sequence now available for Operation III allows us to place these earlier finds in perspective. As is now known, an earlier, previously unknown phase in fact existed. Moreover, the period characterised by coarsely-made, plant-tempered pottery was far from static: this long phase saw much innovation in ceramic technology, style, and vessel use. Finally, it is now clear that the start of the Pre-Halaf phase should be dated much later in the 7th millennium than was previously assumed.

Properties of the ceramic assemblage selected as diacritical keys to specific periodisations should be made explicit. Astute readers may have noticed that we have in fact cheated: new culture-historical terminology has already surfaced at various chapters throughout this book

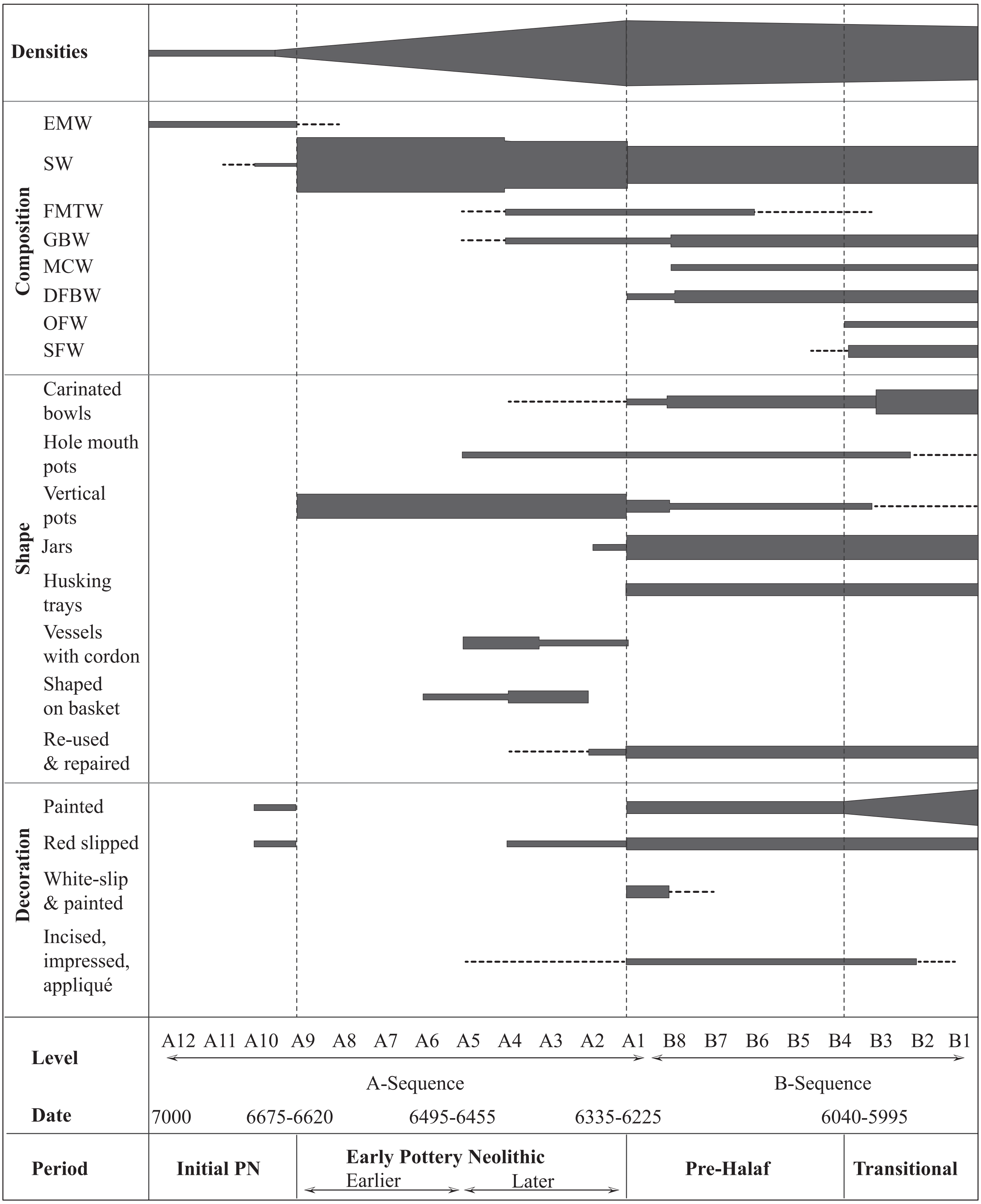


Fig. 11.10 Tell Sabi Abyad, Operation III. Selected properties of the ceramic sequence in Operation III (A–B Sequences), culture-historical definitions and absolute dates.

(e.g. Fig. 2.3). Here we shall provide definitions for the new chronological terms currently employed at Tell Sabi Abyad. Measurable properties of the ceramic assemblage include: its composition, the technological, morphological, and stylistic properties of the constituent ceramic wares, the amounts of pottery in circulation compared with sherd densities, and finally the presence-absence of specific vessel types and decoration (Fig. 11.10).

At Tell Sabi Abyad, the sheer *amount* of pottery available, as expressed in sherd density estimates, has been shown to be chronologically sensitive. In this regard, a clear shift was observed in level A9, when

Table 11.3 Main period definitions at Tell Sabi Abyad and calibrated ^{14}C date (cal BC; after Akkermans and Van der Plicht 2014; Van der Plicht et al. *2011)*

Period definition	*cal BC*
Early Halaf	5940–5905 to 5900–5845
Transitional	6020–6005 to 5980–5925
Pre-Halaf	6335–6225 to 6125–6075
Early Pottery Neolithic	6675–6620 to 6385–6330
Initial Pottery Neolithic	7000–6800 to 6750–6675

ceramic densities began to rise. From level A10 to level A9, sherd densities rather abruptly rose by six times. This upward trend continued in subsequent levels. By itself, this momentous change already merits distinctive terminology for either side of level A9. Furthermore, the rapid increase in sherd densities was accompanied by conspicuous changes in the *composition* of the ceramic assemblage. The earlier Early Mineral Ware characteristic for levels A12–A10 virtually disappeared, to be replaced entirely by coarsely-made, plant-tempered Standard Ware. Decorated items were occasionally present in the earlier levels, but these disappeared almost entirely after level A10. We adopted the term *Initial Pottery Neolithic* for those levels preceding level A9, and *Early Pottery Neolithic* for level A9 onwards. The available radiocarbon dates frame the Initial Pottery Neolithic phase at Tell Sabi Abyad to between ca. 7000–6800 and ca. 6675–6620 cal BC (Table 11.3).

Subsequently, from level A10 to about level A1, between ca. 6675–6620 and 6385–6330 cal BC, the composition of the pottery assemblage remained relatively constant. Characterised by slowly rising sherd densities, it consisted almost entirely of plain Standard Ware. Vertical pots with loop handles remained the archetypal vessel shape throughout this period. Carinated shapes and necked vessels (jars) were not (yet) available. Starting in level A5, and certainly by level A4, two new wares made their entry: Fine Mineral Tempered Ware and Grey-Black Ware. Strictly speaking, this might be a criterion to establish another terminological boundary, especially since additional changes can be indicated around this time (Fig. 11.10). Ceramic innovations manifested around levels A5 to A4, such as the development of hole mouth pots as a distinct vessel type, cordons, pottery shaped on basketry, and decorated pottery (red-slipped Fine Mineral Tempered Ware) in very limited amounts. These various innovations were significant, as they pointed to a gradual diversification in the social, economic, and symbolic roles of pottery containers. However, in quantitative terms these innovations remained quite limited. In all other respects, the evidence speaks out in favour of continuity. Anticipating further study, we propose to keep a singular term for levels A9 to A1 – the *Early Pottery Neolithic* – and to sub-divide this long phase into 'earlier' and 'later' stages.

By level A1 a heterogeneous constellation of changes is manifested (Fig. 11.10). Some of these were a continuation of trends already begun in levels A5/A4. For example, the use of red-slipped vessels increased. But true innovations are apparent as well. These include the introduction of non-local Dark-Faced Burnished Ware, soon after followed by Mineral Coarse Ware. Husking trays appeared by level A1. Closed vessels had slowly developed S-shaped collars in the previous levels; from level A1 onwards jars carrying a distinct neck formed a characteristic element of the ceramic assemblage. New types of decoration included painting, white-slip-and-painting, incisions, impressions and appliqué. The use of a red slip was no longer applied exclusively to Fine Mineral Tempered Ware, and became one of the major decorative techniques for Standard Ware. Characteristic aspects for the earlier phase either disappeared entirely or became much less prominent. Vessels carrying a cordon, pots shaped on basketry, and vertical pots with loop handles largely disappeared.

The collective properties of the ceramic assemblage after level A1 were far from unfamiliar. They were previously identified as defining the so-called *Pre-Halaf* period (Le Mière and Nieuwenhuyse 1996, 126–144). The start of the Pre-Halaf phase at Tell Sabi Abyad is therefore established at level A1. This means that the Pre-Halaf phase lasted much shorter than was previously thought. On the basis of earlier absolute dates from Operation I and the new radiocarbon dates available for Operation III, this phase ended at ca. 6000 cal BC (Akkermans 2014; Van der Plicht *et al.* 2011). So, the Pre-Halaf period at Tell Sabi Abyad can now be dated to a period of about three centuries between ca. 6335–6225 and 6000 cal BC.

Following previous definitions (Akkermans 1996; Le Mière and Nieuwenhuyse 1996), the Pre-Halaf stage formally ended with the introduction of new Fine Wares, which heralded the start of the Transitional (Proto-Halaf) stage (Cruells and Nieuwenhuyse 2005). These included Fine Painted Ware, Orange Fine Ware and, above all, the Standard Fine Ware. In Operation III these wares are scattered through the sequence, but they appear to be most at home in the later B-levels, levels B4 to B1. Standard Fine Ware may have begun even somewhat earlier, in level B5 (Table 4.69). Levels B4 to B1 also yielded other indicators for the Transitional period, including bitumen-painted Standard Ware, and Standard Ware with burnished, red-painted bands alternating with diagonal impressions (RPB style) (Le Mière and Nieuwenhuyse 1996; Nieuwenhuyse 2007). Levels B4 to B1 are dated to the Transitional (or Proto-Halaf) period.

11.6. The regional framework

A full discussion of the positioning of Late Neolithic Tell Sabi Abyad *vis à vis* the broader Mesopotamian chronological framework would lead beyond the scope of this report. But a brief assessment may be useful to scrutinise how Tell Sabi Abyad 'hangs out' together with other key sites. Here I shall follow a chronological

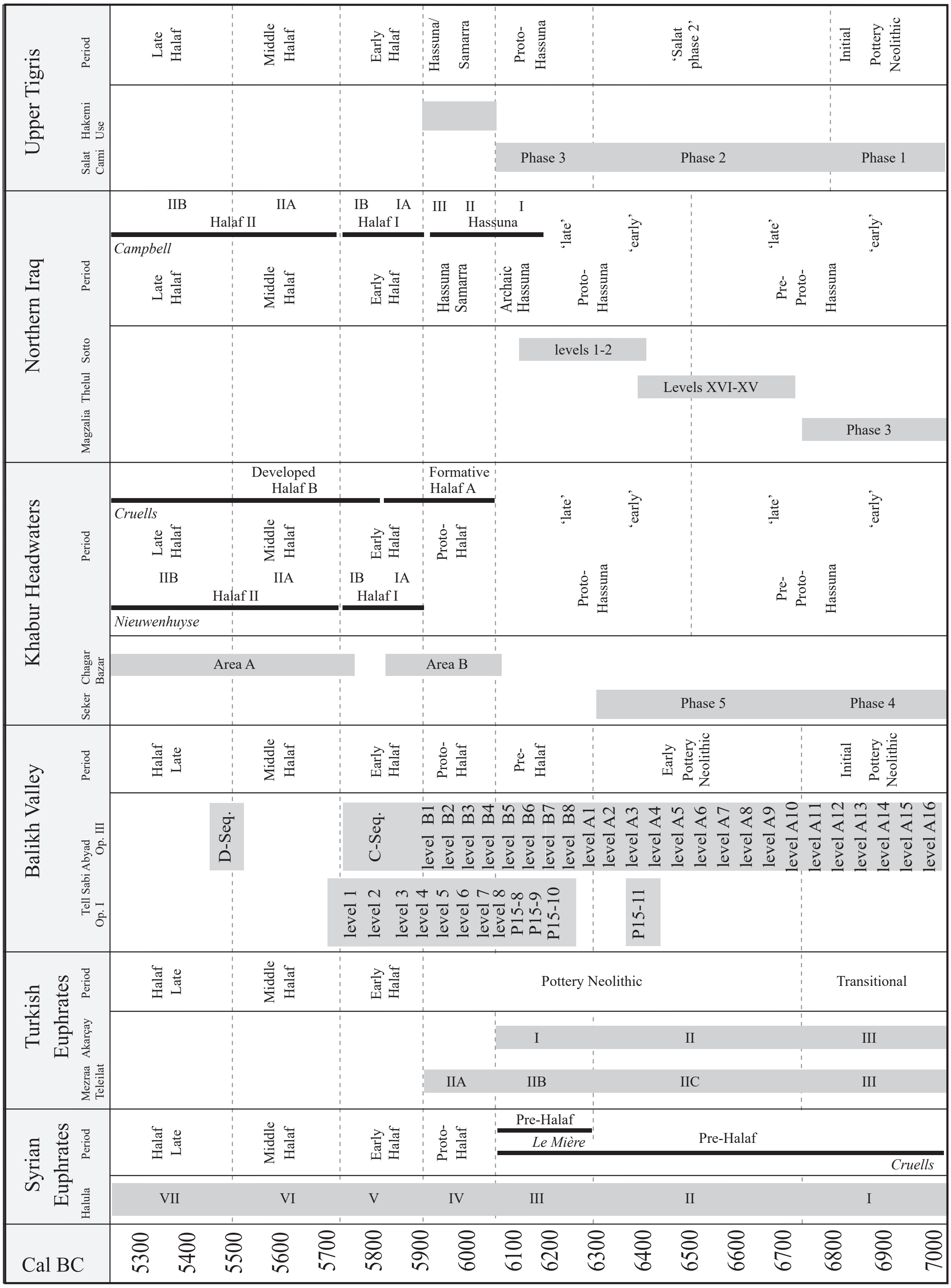


Fig. 11.11 The Late Neolithic ceramic sequence of Tell Sabi Abyad in the broader chronological framework for Upper Mesopotamia.

discussion already presented elsewhere (Bernbeck and Nieuwenhuyse 2013), comparing the Operation III sequence with the frameworks proposed for the Late Neolithic period of the Euphrates Valley west of the Balikh, and the Khabur triangle to the east. Refraining from in-depth, site-based comparisons, I shall limit the discussion to a brief review of some of the main terms presently used in the broader region.

Immediately to the west of the Balikh, key sites include Tell Halula on the Syrian Euphrates and Mezraa Teleilat and Akarçay Höyük on the Turkish site of the border (Arimura *et al.* 2000; Balkan-Atlı *et al.* 2002, 2004; Cruells *et al.* 2004; Karul *et al.* 2002; Molist *et al.* 2013; Özdoğan 2003, 2009; Özdoğan *et al.* 2011). Excavations at these locations have yielded lengthy ceramic sequences for the 7th and 6th millennia. In spite of clear local features at each of these sites, broader patterns of ceramic change appear to be rather similar (Balkan-Atlı *et al.* 2002; Campbell 2017; Cruells *et al.* 2004; Özdoğan 2009). However, on either site of the Syrian-Turkish border researchers use different terminologies for what may have been comparable horizons. Thus, an initial stage of the Pottery Neolithic has been identified, characterised by very low quantities of well-made, mineral-tempered pottery. In Turkey this stage is termed 'Transitional' between Pre-Pottery Neolithic and Pottery Neolithic (Phase III at both Mezraa and Akarçay); on the Syrian Euphrates it is recognised as an early stage of the Pre-Halaf period (Phase I at Tell Halula).

However, Le Mière proposes a somewhat different use of the term Pre-Halaf (Le Mière 2001, 190–195). She prefers to limit the term to the later stages of the 7th millennium (Phase IIIB at Halula, Fig. 11.11). Similar to Tell Sabi Abyad, mid-7th millennium contexts at all Euphrates sites show the disappearance of the earlier mineral-tempered wares, the introduction and progressive increase of plain coarsely-made plant-tempered wares, and vessel shapes without carinations or necks. Local peculiarities notwithstanding, Halula II, Mezraa IIC, and Akarçay II compare well with the Early Pottery Neolithic of the Balikh. Subsequently, carinated shapes, vessels carrying distinct necks, and decorated plant-tempered wares characterise later 7th millennium contexts (Halula III, Mezraa IIB, Akarçay I), corresponding well to the Pre-Halaf period in the Balikh.

Moving east, the Khabur headwaters of northeastern Syria and the steppes of northern Iraq have often been considered as a singular cultural entity in the Late Neolithic. Here recent work has greatly elucidated the chronologies of the later 7th to early 6th millennium, from what is known as the Proto-Hassuna period into the Halaf period (Campbell 1992; Cruells 2006, 2009; Cruells *et al.* 2004, 2013; Hijara 1997; Le Mière 2001; Merpert and Munchaev 1987, 1993a, 1993b). While the earlier parts of the 7th millennium remain much less understood chronologically, important sequences have been excavated at Tell Seker al-Aheimar in Syria and at Salat Cami Yanı on the Turkish Tigris (Le Mière 2009; Le Mière and Picon 1998; Miyake 2005, 2013; Nishiaki 2007; Nishiaki and Le Mière 2005). Le Mière and Bader (2013) have reviewed evidence from earlier excavations at Maghzalia, Thelul et-Thalatat, and Sotto in northern Iraq. This has made it clear that across the region an initial stage of the Pottery Neolithic existed, characterised by low densities of carefully crafted, mineral-tempered ceramics. On the Upper Tigris this phase is known as the Initial Pottery Neolithic (Miyake 2013); in the Khabur and northern Iraq it is known as an 'early phase' of the Pre-Proto-Hassuna period (Le Mière and Bader 2013; Nishiaki and Le Mière 2005).

Across these realms these early ceramic horizons gave way to assemblages consisting mostly of coarsely-made, undecorated, plant-tempered pottery in the middle to later 7th millennium. These evolved into the Proto-Hassuna horizon by the later 7th millennium. The properties of the Proto-Hassuna assemblage closely resemble those of the Pre-Halaf at Tell Sabi Abyad (Nieuwenhuyse 2013b). However, scholars employ different chronological schemes for the development of the Proto-Hassuna. For the Upper Tigris, Miyake (2013) distinguishes an intermediate phase 'Salat Phase 2', between the Initial Pottery Neolithic and the Proto-Hassuna; Le Mière and Bader (2013) place the boundary much later in time, instead distinguishing between 'early' and 'late' sub-phases for both periods (Fig. 11.11). Anticipating ongoing debate and the collection of crucial radiocarbon dates, we suggest that the 'late Pre-Proto-Hassuna' shares many of the characteristics of the earlier part of the Early Pottery Neolithic phase at Tell Sabi Abyad, while the 'early Proto-Hassuna' shares many characteristics of the later part of that period.

Notes

1 The ceramics from the final campaign in Operation III (2009) have not been investigated apart from a small number of objects recovered from the burials (Chapter 14).

2 The material studied from the 2002 and 2003 campaigns has not been weighed. It may have weighed an additional 400 kg.

3 The stratigraphic database contains few lots that 'mix' level A4 pottery with other levels. The numbers of pottery sherds from a mixed level A5/A4 context are insufficient to entirely explain the reduced sherd densities.

4 White Ware densities initially yielded a suspiciously high estimate for level A2 (15 sherds/m^3). This was caused by a single concentration of sherds (n = 600) in a pit. Other contexts systematically produced much lower sherd counts. Filled with 'architectural debris', the pit probably included a plastered wall. The contents of the pit were excluded from the estimates computed in Figure 11.7.

Chapter 12

The pottery from Operations IV and V

Olivier Nieuwenhuyse

12.1. Introduction

This chapter will present the pottery from Operations IV and V. Starting in 2001, the excavations at Operations IV and V on the southwestern slopes were the first at Tell Sabi Abyad that targeted 7th millennium habitation layers. They immediately showed the huge potential of the site for investigating this period (Chapter 2). An enormous amount of pottery was recovered from these relatively small-scale exposures: 10,278 sherds from Operation IV and 11,216 sherds from Operation V. This included a number of very well-preserved containers. After their restoration, this nice collection of vessels was brought to the archaeological museum in Damascus for public display (Fig. 3.14, Pl. 25.1). The study of the material commenced as soon as it was excavated (Akkermans *et al.* 2006). The focus of work at Tell Sabi Abyad may thereafter have shifted to Operation III, but the exposures in Operations IV and V document a valuable, independent, record of the still very poorly understood transition from the Early Pottery Neolithic to the Pre-Halaf period.

Complicating the interpretation of this pottery even more than with Operation III, however, the prehistoric exposures in both areas were situated directly underneath well- preserved remains from the Late Bronze Age. The massive Late Bronze Age ditch was in fact dug right through the prehistoric building excavated in Operation IV, removing part of it. A low but consistent scatter of Halaf Fine Ware and Late Bronze Age wares characterised the underlying prehistoric layers. Given these complexities, and considering that the stratigraphic-contextual analysis of the excavated remains had not yet reached a similar level of detail as with Operation III, simplified procedures were adopted for analysing the pottery (Akkermans *et al.* 2006). For both areas the material was counted.[1] Subsequently a limited selection of the diagnostic material was described to gain a minimum of descriptive data. For Operation IV the team selected trench F9, which covered the outlines of a building dated to the Early Pottery Neolithic. For Operation V the diagnostic material from trenches G12 (Early Pottery Neolithic), and H12 (Pre-Halaf) was described. Trench H13 was not analysed any further, but some Transitional-period painted pottery shall be briefly discussed.

12.2. The prehistoric pottery from Operation IV

The pottery recovered from Operation IV is rather homogeneous and generally resembles that from the later Early Pottery Neolithic levels from Operation III. Situated immediately below the Late Bronze Age strata, intrusive Late Bronze Age and Halaf Fine Ware pottery was found in varying amounts, mostly between ca. 5% (trenches E8 and F9) and 11% of the bulk (trench F8).[2] After filtering-out these intrusive categories, the pottery assemblage consisted for the most part of plant-tempered Standard Ware with very minor contributions of Fine Mineral Tempered Ware and Grey-Black Ware (Table 12.1).

The Standard Ware from these trenches was quite coarsely finished. It was mostly superficially smoothed leaving its characteristic rough surface. Traces of this shaping process could in many instances still be observed. For instance, the work in Operation IV yielded numerous examples that showed the attachments of coils, further attesting to the role of this shaping technique for making pottery at Late Neolithic Tell Sabi Abyad (Fig. 12.1). Less than 2% of all the sherds counted were burnished (Fig. 12.2). Many vessels were plastered, either on the interior or on the exterior, or upon both surfaces. Most of the plastered sherds were body sherds that were wholly undiagnostic in terms of vessel shape, but plastering was applied at least to one vertical pot with loop handles and one everted straight-sided bowl (Fig. 12.6:1). Quite often

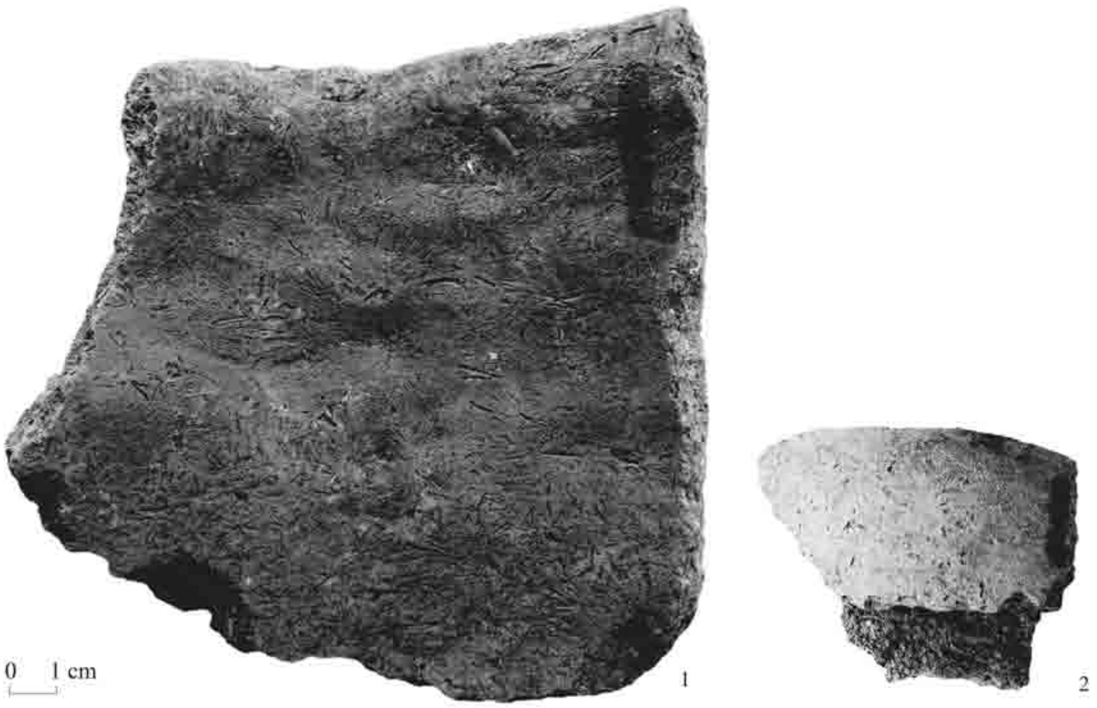


Fig. 12.1 Tell Sabi Abyad, Operation IV. Examples of Standard Ware showing traces of coiling. No. 1: Faint horizontal ridges on the interior. No. 2: rim fragment broken at the attachment of two coils (image O. Nieuwenhuyse; Tell Sabi Abyad Project).

plastering was observed on the lower parts and bases of Standard Ware vessels.

Decoration is virtually absent from the Operation IV Standard Ware, and from the Operation IV pottery as a whole. Decorated vessels together represent less than 1 % of total amount of Standard Ware (Fig. 12.2). The very rare examples of decoration comprise a few handfuls of red slipped sherds (*n* = 11), and five painted sherds. The latter were all quite fragmented and showed little more than simple parallel lines, crosshatching, or chevrons.[3]

The Standard Ware vessel types from trench F9 closely resemble those from the A-Sequence in Operation III. In contrast to later, Pre-Halaf contexts, no husking trays were found and (almost) no jars. Identified by the presence of a distinct collar, a 'neck', the very few items classified as 'jars' all belong to the category of 'small to medium-sized' jars (Chapter 4; Figs 12.8, 13–14). Together they comprise no more than about 2% of the Standard Ware evidence; however, their small size together with the rather non-distinctiveness of the collars would perhaps more properly suggest their classification as 'S-shaped bowls (Fig. 12.3). Far more common are the various types of S-shaped bowls (Figs. 12.8, 10, 12, 15). Closed S-shaped bowls, representing a precursor to real jars, include about 5% of the Standard Ware (Table 12.2). Characterised by low, non-distinct, S-shaped upper parts (rather than by real necks), they sometimes reach diameters of up to 26 cm (with an average of 14 cm). Even more present are the convex-sided bowls (Figs. 12.6, 1–8) which collectively comprise about 20% of the bulk (Table 12.2).

The most characteristic vessel shape for Operation IV was the vertical pot (Figs. 12.7, 3–6). Vertical pots comprise almost one-quarter of the Standard Ware excavated in trench F9. Similar to the vertical pots from Operation III, a number of larger fragments of such containers show that they were sometimes made with a lug and sometimes without. One complete pot from Operation IV had two loop handles, which were placed symmetrically on either side of the vessel (Fig. 12.4). Characteristically, the loop handles protrude above the level of the rim. While their average rim diameter measures 18 cm, the diameters of these containers can vary widely, between as small as 8 cm and as large as 33 cm. The presence of a loop handle so far cannot be associated with vessels of any particular size. They were applied to vertical pots ranging in rim diameter between 10 cm and 25 cm.

Special attention is here drawn to one example of a ceramic sieve (Fig. 12.6, 14). Recovered from an exterior surface close to the western entrance of Building I, this may well represent the earliest example of a pottery sieve attested so far at Tell Sabi Abyad. It was a plain, thin-walled, convex-sided, bowl-like container perforated with circular holes measuring ca. 4 mm in diameter. Several of these perforations can still be observed on what remains of this object. With a rim diameter of approximately 7 cm, it may have been employed by placing it inside the mouth of another vessel. A similar way of using perforated shapes was observed in two sieves from the Pre-Halaf levels of Operation I (Nieuwenhuyse 2007, 111).

Just as in Operation III, there was a small number of Grey-Black Ware and Fine Mineral Tempered Ware in the assemblage of operation IV (Fig. 12.5; Figs. 12.8, 1–9,11). The majority of those wares were convex-sided bowls, mostly with a vertically oriented wall (Table 12.3). Closed

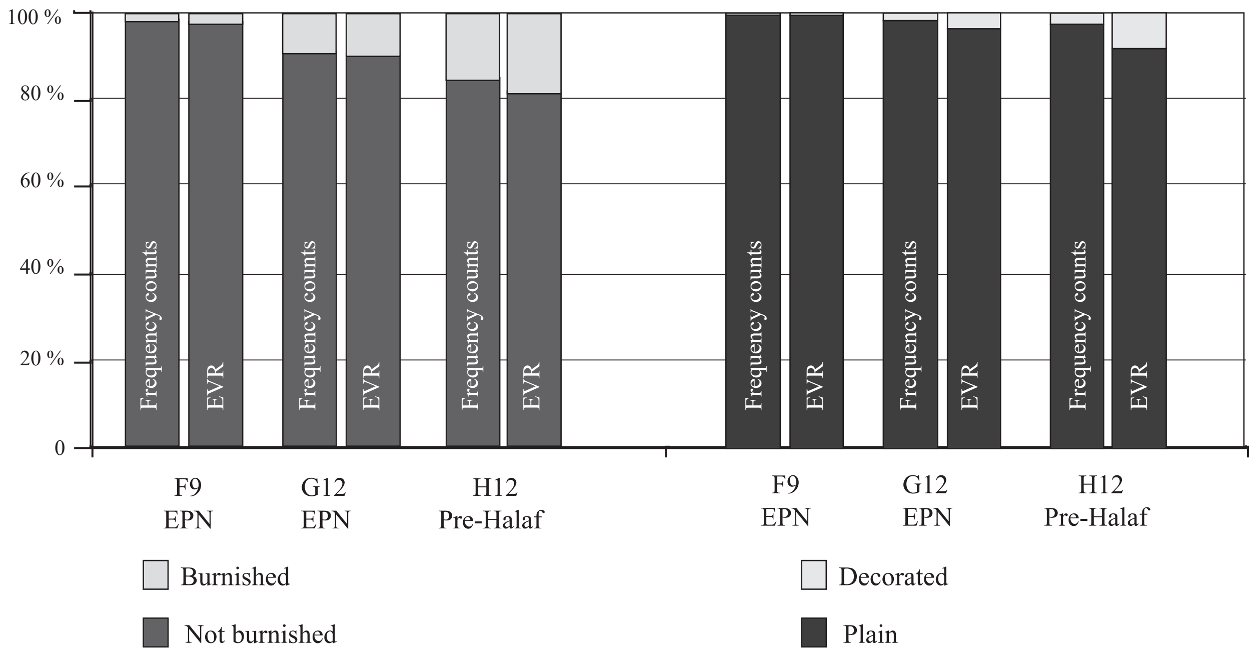


Fig. 12.2 Tell Sabi Abyad, Operation IV (Early Pottery Neolithic) and Operation V trenches G12 (Early Pottery Neolithic) and H12 (Pre-Halaf). Proportions of burnished and decorated Standard Ware using different quantification statistics.

S-shaped pots, too, were common (Fig. 12.5). Some of these finely made, mineral-tempered vessels display a peculiar type of lug that has the shape of an 'inverted nose' (e.g. Figs. 12.8, 2–3). One unique Grey-Black Ware closed S-shaped pot was decorated with what appears to be a patterned burnish, showing parallel diagonal lines forming zigzags (Fig. 12.8, 9). This intriguing pot is the only example attested so far at Tell Sabi Abyad of this decorative technique in the Early Pottery Neolithic period.

The analysis of the Operation III ceramic material allows for a tentative relative date for the Operation IV excavations (Fig. 2.3). In terms of overall ware composition, the presence of Grey-Black Ware and Fine Mineral Tempered Ware argue for a *terminus post quem* after Operation III level A6. The absence of typical Pre-Halaf wares such as Dark-Faced Burnished Ware or Mineral Coarse Ware, on the other hand, clearly date the pottery to before level A1. The well-developed, strongly plant-tempered fabric and the style of firing find the closest match in levels A4–A2 in Operation III, further narrowing down the time frame. Similar to the coarse surface finishing of the Operation IV Standard Ware, burnishing in Operation III reached a minimum by levels A3 and A2. The very low proportion of decorated pottery, finally, would correspond well to the assemblage of level A3. The assemblage of Operation IV is therefore tentatively dated to the same general phase as level A3 in Operation III, radiocarbon dated to between 6395 and 6375 cal BC.[4]

12.3. The prehistoric pottery from Operation V

The three main phases represented in Operation V are Early Pottery Neolithic, Pre-Halaf, and Transitional. The prehistoric strata from trench G12, Operation V Phase I, are the earliest (Fig. 12.9). The pottery from this trench can be dated in its entirety to the Early Pottery Neolithic period. More specifically, it suggests a relative date towards the end of that stage, as the best comparisons are found in Operation III level A2. This would mean that it was slightly younger than Building I in Operation IV (Fig. 2.3). There was, of course, an overburden of Late Bronze Age material intruding into the underlying prehistoric depositions; even after putting aside all Bronze Age stratigraphic units there remains some 6% of LBA and intrusive Halaf Fine Ware. But if we consciously ignore these, the resulting prehistoric assemblage closely resembles that of Operation III. Basically, it is almost all Standard Ware. There are very minor contributions of Fine Mineral Tempered Ware and Early Grey-Black Ware (both ca. 1% of the bulk) (Table 12.1).

The vessel types from G12 closely mirror those from the later A-levels in Operation III, namely levels A3–A2 (Table 12.2). The majority of the Standard Ware are convex-sided bowls, mostly with vertically oriented walls (Figs. 12.9, 1–3). A second main group are the vertical pots, which very frequently carry loop handles (Figs. 12.9, 4–7). S-shaped bowls and bowls with straight walls also occur (Fig. 12.9, 8). Significantly, a few examples of husking trays were recovered from this stratum. In Operation III these begin to appear by levels A3 and A2. Collared vessels, finally, are an important part of the typological repertoire (Figs. 12.9, 9–15), comprising about 17% of the Standard Ware pottery (Table 12.2). Jars form an important feature of the Pre-Halaf period pottery. However, the Standard Ware jars from G12 are notably *smaller* than the jars from Operation III level A1 and subsequent levels. Evidently, we should keep in mind the limited sample size from G12, as in Operations III

Table 12.1 Tell Sabi Abyad, Operation IV trenches E8 to F10 (Early Pottery Neolithic) and Operation V trenches G12 (Early Pottery Neolithic) and H12 (Pre-Halaf). The composition of the ceramic assemblage (Raw Counts; LBA and Halaf Fine Ware omitted; the two Pre-Halaf levels of H12 put together)

	Complete	*Section*	*Rim*	*Body*	*Base*	*Other*	*Total*	*%*
Operation IV: Trenches E8-F10								
Standard Ware	4	13	781	7826	299	19	8.942	97.1
Fine Mineral Tempered Ware	0	1	62	114	24	12	213	2.3
Grey-Black Ware	1	14	18	24	8	3	54	0.6
Total E8-F10	5	28	861	7964	331	34	9205	100.0
Operation V: Trench G12								
Standard Ware	0	5	164	1189	41	3	1402	98.9
Fine Mineral Tempered Ware	0	0	1	7	2	0	10	0.7
Grey-Black Ware	0	0	2	4	0	0	6	0.4
Total G12	0	5	167	1200	43	3	1418	100.0
Operation V: Trench H12								
Standard Ware	2	14	286	2877	64	0	3243	97.7
Grey-Black Ware	0	0	9	24	3	0	36	1.1
Dark-Faced Burnished Ware	0	0	0	33	0	0	33	1.0
Mineral Coarse Ware	0	0	2	3	0	1	6	0.2
Fine Mineral Tempered Ware	0	0	1	0	0	0	1	0.0
Total H12	2	14	298	2937	67	1	3319	100.0

and I the larger jar types are relatively uncommon. Yet, the best comparisons would be with the jars from level A3 and, in particular level A2 in Operation III (Chapter 4.2.4.7). In addition to these Standard Ware vessel types, the assemblage included a Fine Mineral Tempered Ware vertical pot, and two Grey-Black Ware convex-sided bowls.

The Standard Ware from G12 was quite coarsely finished on the whole and included a rather small proportion of burnished items. As well, it was almost entirely plain (Fig. 12.2). Between 1.5% and 4% of the pottery from G12 carried decoration (sherd frequency versus EVR, respectively). Chronologically sensitive, however, both values are somewhat higher than those of the Operation IV pottery, attesting to a slightly younger date for trench G12. The main type of decoration consists of red slipping (Figs. 12.9, 3, 15). The slips were in most cases carefully burnished, although a few unburnished, smoothed slipped vessels were attested as well. The only other decorative technique attested in trench G12 were a handful of Standard Ware sherds showing plastered-and-painted decoration. In Operation III this technique first appears in level A2, flourished during level A1, and subsequently disappeared entirely.

The fragmentation of the G12 pottery is rather strong. The average radius of Standard Ware rims is 33.4° (9.3% of the rim preserved), which ranks well below the score of outdoor, open contexts in Operation III. Although the collection included a number of intact profiles, no complete vessels were found. Apart from indicating a high

Table 12.2 Tell Sabi Abyad. Operations IV and V. Standard Ware vessel shapes in trenches F9 (Early Pottery Neolithic). G12 (Early Pottery Neolithic) and H12 (Pre-Halaf) (EVR; the two Pre-Halaf phases from H12 put together)

	F9	*G12*	*H12*	*Total*
Everted convex-sided bowl	15	13	4	32
Vertical convex-sided bowl	18	35	16	69
Closed convex-sided bowl	15	9	3	27
Strongly everted convex-sided bowl	1	0	1	2
Everted straight-sided bowl unspecified	5	7	4	16
Everted straight-sided bowl	0	1	0	1
Vertical S-shaped bowl	0	2	0	2
Everted S-shaped bowl	3	4	2	9
Closed S-shaped bowl	12	3	4	19
Everted carinated bowl	0	0	1	1
Vertical carinated bowl	0	0	2	2
Low carinated bowl	0	0	1	1
Tray	1	10	3	14
Husking tray	0	4	7	11
Vertical pot	54	34	12	100
Hole mouth pot	8	11	4	23
Small to medium-sized jars	6	31	27	64
Uncertain	111	24	18	153
Total	249	188	107	544

degree of fragmentation and dispersal, it may also reflect the circumstance that no interior room contexts happened to be excavated in this small trench.

Strata attributed to the Pre-Halaf period, Operation V Phase II, were excavated in trench H12 and in the basal levels of H13 (Figs. 12.10–12.14). As with Operations IV and V in general, later activities left a background 'noise' of intrusive material in the Pre-Halaf contexts, which in this case was not insignificant. About 19% of all sherds counted from the two Pre-Halaf strata were either Bronze Age or Halaf Fine Ware. If these intrusive categories are ignored, we arrive at a ceramic assemblage that consists mostly of Standard Ware, comprising 96–98% of the bulk (Table 12.1). Although these figures resemble the composition of adjacent G12, some characteristic Pre-Halaf wares occur as well, albeit in very small proportions. There is also some Dark-Faced Burnished Ware, Grey-Black Ware and a bit of Mineral Coarse Ware. At a qualitative level, this composition matches that of the Pre-Halaf levels excavated elsewhere at the mound, but the proportion of Standard Ware in H12 is notably higher than in the Pre-Halaf levels of Operation III or Operation I in Pre-Halaf times (Nieuwenhuyse 2007).

One explanation for these differences would be that activities involving different types of pottery were carried out at different spatial locations of the mound. Alternatively, like in Operation V, the Pre-Halaf layers lie directly on top of Early Pottery Neolithic strata; so, Standard Ware from these older strata might have mixed with the Pre-Halaf material from H12 without having been identified as such. In any case, this distinction would be almost impossible to identify from individual sherds. *Vice-versa*, the small amount of 'non-Standard Ware' might represent intrusions from the Late Bronze Age. Perhaps more likely, the pottery from H12 may represent a very *early* stage of the Pre-Halaf period (Fig. 2.3). On the whole the Standard Ware from H12 resembles that of G12 closely, but some of its properties suggest that it is intermediate between the Standard Ware from the Early Pottery Neolithic (trench G12) and the Standard Ware from later, Pre-Halaf contexts documented in Operations I and III.

For instance, the excavations at Operation IV and V document a gradually increasing proportion of burnished Standard Ware, as well as a slowly rising proportion of decorated items (Fig. 12.2). In Operations III and I these trends characterise the shift from the Early Pottery Neolithic to the Pre-Halaf periods. The proportion of burnished items in H12 (16–18% depending on which value is calculated) is already higher than it was in G12 (9–10%), but it is less than is common with Standard Ware in Pre-Halaf contexts from Operation I (Nieuwenhuyse 2007). The proportion of decorated pottery rose from 2–4% in G12 to 3–8% in H12, but this figure remains less than in Operation I and III (Nieuwenhuyse 2007). Plastered vessels are still found in H12 but less often than in G12, further attesting to the gradual demise of plastered Standard Ware already observed in Operation III. Interestingly, excavations in H12 yielded an additional example of a plaster repair, which finds good comparisons in Operation III in levels A2 and A1 (Chapter 8; Fig. 8.2:2).

Table 12.3 Tell Sabi Abyad. Operations IV and V. Fine Mineral Tempered Ware and Grey-Black Ware vessel shapes in trenches F9 (Early Pottery Neolithic). G12 (Early Pottery Neolithic) and H12 (Pre-Halaf) (EVR; the two Pre-Halaf phases from H12 put together)

	F9	*G12*	*H12*	*Total*
Everted convex-sided bowl	0	1	0	1
Vertical convex-sided bowl	2	0	0	2
Closed convex-sided bowl	9	1	0	10
Everted straight-sided bowl unspecified	0	0	1	1
Vertical S-shaped bowl	1	0	0	1
Everted S-shaped bowl	0	0	2	2
Closed S-shaped bowl	4	0	0	4
Vertical pot	1	1	0	2
Uncertain	0	0	1	1
Total	*17*	*3*	*4*	*24*

The Standard Ware decorative styles from trench H12 and H13 on the whole resemble those already attested in Pre-Halaf levels from Operations I and III. We find red slipping (Figs. 12.10, 10–11, Figs. 12.11, 6–8), painting (Figs. 12.10, 2, 4–6, 8–9, 14, Figs. 12.11, 7, Figs. 12.14, 10, 12), incising, impressing (Figs. 12.14, 7, 9), and appliqué (Fig. 12.14, 8). A notable difference is the virtual absence of different technologies combined on a single vessel. We counted just a few examples of painted-and-incised designs (Fig. 12.14, 11). As well, the potters did not yet pay much attention to the elaboration of the design structure. The diversity in design configurations is quite low; the painted sherds, for instance, are all variations on the same theme of 'solid triangles'. Whereas elsewhere at Pre-Halaf Tell Sabi Abyad painted Standard Ware often shows multiple design fields, the examples from Operation V present just one, singular field for decoration. The simplified designs are another indication that this pottery represents a rather early stage of the Pre-Halaf period.

The Standard Ware from H12 shows a range of vessel types basically very similar to G12 (Table 12.2). Subtle differences include a somewhat more prominent role of collared vessels (i.e. jars) and husking trays, two pottery types that are characteristic for the Pre-Halaf period. A single example of a low, carinated bowl foreshadows later morphological developments with the Fine Wares from the Transitional period (Fig. 12.11, 6). Significantly, vertical pots still occur in H12 but in contrast to G12 they no longer carry any loop handles. In fact, the excavations in H12 did not yield a single example of a perforated, vertical loop handle whatsoever. The sole exception is a unique S-shaped goblet sporting several such loop handles in miniature size spread symmetrically around its body (Fig. 12.11, 10).

A notable difference with the Pre-Halaf period as attested elsewhere at Tell Sabi Abyad comes from the rather limited size of the Standard Ware jars (Figs. 12.14,

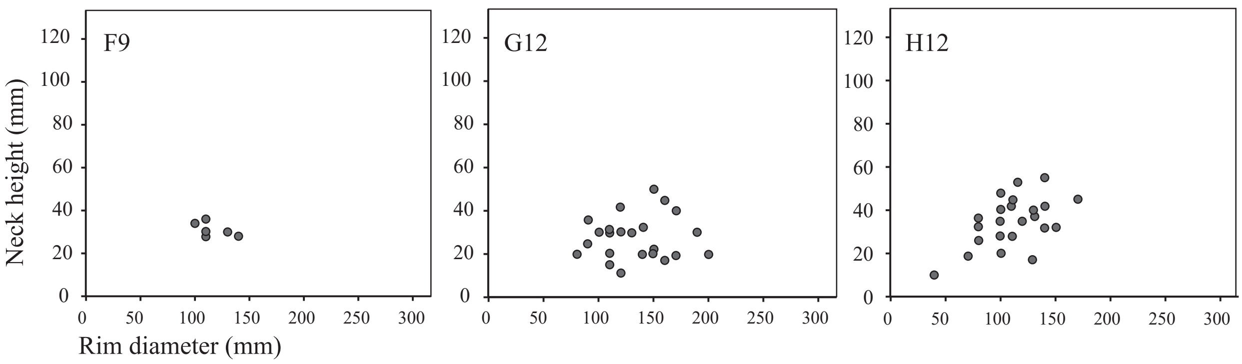


Fig. 12.3 Tell Sabi Abyad, Operations IV and V. Plot of rim diameter (mm) and neck height (mm) of Standard Ware collared vessels from trenches F9 (Early Pottery Neolithic), G12 (Early Pottery Neolithic) and H12 (Pre-Halaf; the two Pre-Halaf phases put together).

Fig. 12.4 Tell Sabi Abyad, Operation IV. Vertical pot with loop handles P02-16 after restoration. For location: Fig. 13.11: 1 (restoration by Renske Dooijes, National Museum of Antiquities Leiden) (see Pl. 12.2:6) (image Tell Sabi Abyad Project).

1–6). Judging by the limited variation in the shape and size of their necks, they fall in a rather homogeneous group of vessels with straight, vertically-oriented necks between 7 cm and 20 cm in diameter and between 2 cm and 6 cm in height (Fig. 12.3). Following the criteria set out for Operations I and III, they would represent 'small jars' and 'medium-sized jars'. However, as with G12, the limited size of the sample must be taken into account: in Operations I and III the larger types of jars are proportionally uncommon. In H12 at least one example was found of a damaged jar (the upper part with the neck missing) that may have had a somewhat larger size.

Finally, the excavations in trench H12 yielded a few remarkably well-preserved husking tray fragments. One vessel was found broken into several large fragments lying turned upside-down on a courtyard close to the entrance of a room. When the sherds were laid out together about half of the original vessel could be reconstructed (Fig. 12.12, 1). At Tell Sabi Abyad this is rather unusual; husking trays are invariably found in much more fragmented conditions. This was a large, thick-walled monster of a tray, with incisions in the wall and deep impressions in the base that may have formed a concentric pattern (Fig. 12.12, 1). Although the team could not reconstruct the shape completely, it may originally have measured between about 35 cm and 40 cm in width and 60–80 cm in length, and could have contained up to ca. 15 litres. Quite heavy and difficult to move, the object can only have been used

Fig. 12.5 Tell Sabi Abyad, Operation IV. Fine Mineral Tempered Ware closed S-shaped pot P02-208 after restoration. For location: Fig. 13.11: 3 (restoration by Renske Dooijes, National Museum of Antiquities Leiden) (see Pl. 12.3: 8) (image Tell Sabi Abyad Project).

in a stationary position. Its original weight cannot be estimated with any degree of certainty but judging on the basis of finds from Operation III it may have weighed up to 15 kg (Chapter 4.2.4.5).

The final prehistoric phase documented in Operation V (Phase III) belonged to the later stage of the Transitional Period (Fig. 2.3). This phase was spatially limited to the strongly sloping layers of trench H13, located on the southwestern slopes of the mound. The pottery recovered from these depositions contain mostly Standard Ware but in addition small proportions of Standard Fine Ware and Orange Fine Ware were found. Stylistically this material very closely resembles the "later Transitional" ceramics from Operation I (Fig. 12.15, Fig. 12.16). The proportion of Fine Ware in Operation V reaches almost 40 %, which is very similar to that of levels 5 to 4 in Operation I (Nieuwenhuyse 2007).[5] No characteristic "Early Transitional" indicators such as bitumen-painted Standard Ware or Fine Painted Ware were recovered from H13. Typical for the later Transitional period are carinated bowls (Figs. 12.15:13-15) and short-collared bowls (Figs. 12.15:9-12), as well as the so-called "birds-on-telegraph-wire" painted motif (Figs. 12.15:10, 12). A fenestrated pedestal base (Fig. 12.16:12) remains so far the unique example known from Tell Sabi Abyad, but finds a good parallel at the Samarra site of Tell Baghouz (Nieuwenhuyse 1999). One intriguing small jar was reshaped: its neck had been separated after which the edge was carefully grounded into a flat rim punctuated with shallow oval-shaped impressions (Fig. 12.16:11).

Notes

1 For Operation IV only the pottery from trenches E8 to F9, F10, and G7 was counted. The adjacent trenches forming prehistoric Operation IV were left aside as the trench supervisors judged them to be too disturbed by Late Bronze Age activities. The pottery from Operations IV and V was not weighed, as weighing did not (yet) form part of the pottery processing procedures in these campaigns.

2 In contrast to other trenches counted, the pottery from trench G7 consisted about 80 % of Halaf Fine Ware (128 out of 161 sherds). Clearly no 7th millennium strata were reached in these excavations. However, it is unlikely that the Halaf pottery reflects Halaf remains at this location. More likely the material represents the fill of eroded mud bricks from Late Bronze Age buildings (Chapter 13.2).

3 In addition, three incised Standard Ware sherds were recovered from trench E9. However, the strata that yielded these items were effectively part of the mound's top soil.

4 This chronological assessment replaces an earlier, preliminary suggestion of between 6300–6200 cal BC (Akkermans *et al.* 2006).

5 In the 'Transitional Period' strata from trench H13, SFW and OFW together include 37% of the Neolithic pottery (both in terms of Raw Counts and EVR).

Catalogue

Fig. 12.6. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.6.1. F9 29-40-1. Standard Ware. Rim fragm. Everted straight-sided bowl unspecified; ext. patches of plaster. R. diam. 320 mm. Ext. traces finger pressing. Int. traces finger pressing. Ext. 5YR6/8. Vol. 3.88 l.

Fig. 12.6.2. F9 24-70-1 (P02-83). Standard Ware. Section. Vertical convex-sided bowl. R. diam. 240 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR5/6. Vol. 3.55 l.

Fig. 12.6.3. F9 20-34-1. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 200 mm. Ext. roughly smoothed. Int. burnished. Ext. 5YR6/4. Vol. 1.96 l.

Fig. 12.6.4. F9 24-70-2. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 250 mm. Ext. roughly smoothed. Int. smoothed. Ext. 5YR7/6. Vol. 2.85 l.

Fig. 12.6.5. F9 33-45-2. Standard Ware. Rim fragm. Closed convex-sided bowl. R. diam. 150 mm. Ext. smoothed. Int. traces finger pressing. Ext. 10YR7/6. Vol. 1.08 l.

Fig. 12.6.6. F9 48-86-101 (P02-133). Standard Ware. Complete. Vertical convex-sided bowl. R. diam. 95 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 7.5YR6/6. Vol. 0.50 l.

Fig. 12.6.7. E8 2-4-100 (P02-30). Standard Ware. Section. Vertical convex-sided bowl. R. diam. 85 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 2.5YR5/8. Vol. 0.25 l.

Fig. 12.6.8. E9 7-13-1 (P02-183). Standard Ware. Section. Vertical convex-sided bowl. R. diam. 80 mm. Ext. smoothed. Int. roughly smoothed. Ext. 2.5Y7/3. Vol. 0.10 l.

Fig. 12.6.9. F9 23-37-11. Standard Ware. Rim fragm. Tray. R. diam. oval. Ext. roughly smoothed. Int. eroded. Ext. 5YR7/6.

Fig. 12.6.10. F9 23-32-1. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 70 mm. Ext. smoothed. Int. traces finger pressing. Ext. 5YR6/6. Vol. 0.44 l.

Fig. 12.6.11. F9 35-57-1. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 80 mm. Ext. smoothed. Int. smoothed. Ext. 5YR6/6. Vol. 0.51 l.

Fig. 12.6.12. F9 33-46-7. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 260 mm. Ext. roughly smoothed. Int. eroded. Ext. 2.5YR6/4.

Fig. 12.6.13. F8 6-18-19 (P02-200). Standard Ware. Section. Vertical pot. R. diam. 30 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/4. Vol. 0.01 l.

Fig. 12.6.14. E9 11-32-1. Standard Ware. Rim fragm. Sieve. R. diam. 70 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5Y7/4.

Fig. 12.7. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.7.1. F9 38-74-110 (P02-166). Standard Ware. Complete. Hole moth pot. R. diam. 225 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 23.80 l.

Fig. 12.7.2. F9 33-46-100 (P02-26). Standard Ware. Complete. Hole moth pot. R. diam. 190 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 7.5YR5/6. Vol. 6.50 l.

Fig. 12.7.3. F9 33-53-201. Standard Ware. Rim fragm. Vertical pot. R. diam. 130 mm. Ext. smoothed. Int. smoothed. Ext. 5YR6/6. Vol. 2.47 l.

Fig. 12.7.4. E9 8-15-1. Standard Ware. Rim fragm. Vertical pot. R. diam. 240 mm. Ext. traces finger pressing. Int. traces finger pressing. Ext. 10YR7/4. Vol. 7.44 l.

Fig. 12.7.5. F9 33-45-1. Standard Ware. Rim fragm. Vertical pot. R. diam. 210 mm. Ext. smoothed. Int. traces finger pressing. Ext. 2.5Y8/3. Vol. 6.31 l.

Fig. 12.7.6. F9 33-45-100 (P02-16). Standard Ware. Complete. Vertical pot. R. diam. 170 mm. Ext. traces finger pressing. Int. traces finger pressing. Ext. 2.5YR6/8. Vol. 4.90 l.

Fig. 12.8. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.8.1. E9 5-5-1. Mineral Tempered Ware. Rim fragm. Closed convex-sided bowl. R. diam. 200 mm. Ext. burnished. Int. roughly smoothed. Ext. 7.5YR4/3.

Fig. 12.8.2. E9 5-16-6. Fine Mineral Tempered Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 150 mm. Ext. smoothed. Int. burnished. Ext. 2.5YR6/4.

Fig. 12.8.3. E9 15-50-1. Fine Mineral Tempered Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 160 mm. Ext. smoothed. Int. smoothed. Ext. 2.5YR4/1.

Fig. 12.8.4. E9 12-47-1. Fine Mineral Tempered Ware. Rim fragm. Closed convex-sided bowl. R. diam. 190 mm. Ext. burnished. Int. smoothed. Ext. slipped. Int. painted. Ext. 10YR7/2. Dec. 10R5/3.

Fig. 12.8.5. F9 24-72-1. Grey-Black Ware (min. temp. variety). Rim fragm. Closed convex-sided bowl .R. diam. 150 mm. Ext. burnished. Int. smoothed. Ext. 2.5YR6/6.

Fig. 12.8.6. F9 31-43-1. Fine Mineral Tempered Ware. Rim fragm. Closed convex-sided bowl. R. diam. 70 mm. Ext. burnished. Int. smoothed. Ext. 5YR5/6.

Fig. 12.8.7. F9 30-41-1. Fine Mineral Tempered Ware. Rim fragm. Closed convex-sided bowl. R. diam. 110 mm. Ext. burnished. Int. burnished. Ext. 5YR5/4.

Fig. 12.8.8. F9 30-42-102 (P02-208). Fine Mineral Tempered Ware. Complete. Closed S-shaped bowl. R. diam. 110 mm. Ext. smoothed. Int. roughly smoothed. Ext. 7.5YR4/1. Vol. 6.50 l.

Fig. 12.8.9. F9 21-30-1. Grey-Black Ware (min. temp. variety). Rim fragm. Closed S-shaped bowl. R. diam. 80 mm. Ext. pattern burnished. Int. traces finger pressing. Ext. 7.5YR4/1. Vol. 2.20 l

Fig. 12.8.10. E9 4-28-1. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 90 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 10YR7/4.

Fig. 12.8.11. F9 36-61-1. Fine Mineral Tempered Ware. Rim fragm. Closed S-shaped bowl. R. diam. 130 mm. Ext. smoothed. Int. roughly smoothed. Ext. 7.5YR7/4.

Fig. 12.8.12. F9 22-31-1. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. eroded. Ext. 10YR7/4.

Fig. 12.8.13. F9 24-33-1. Standard Ware. Rim fragm. Small jar. R. diam. 100 mm. Ext. smoothed. Int. traces finger pressing. Ext. 5YR6/6.

Fig. 12.8.14. F9 24-64-1. Standard Ware. Rim fragm. Small jar. R. diam. 110 mm. Ext. smoothed. Int. smoothed. Ext. 5YR6/6.

Fig. 12.8.15. F9 21-30-2. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 110 mm. Ext. roughly smoothed. Int. eroded. Ext. 5YR5/8.Vol. 0.79 l.

Fig. 12.9. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.9.1. G12 17-31-1. Standard Ware. Rim fragm. Everted convex-sided bowl. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. 10YR7/3.

Fig. 12.9.2. G12 18-33-1. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 220 mm. Ext. burnished. Int. burnished. Ext. 10YR7/3. Vol. 3.69 l.

Fig. 12.9.3. G12 15-29-1. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 140 mm. Ext. traces scraping. Int. traces scraping. Ext. slipped. Int. slipped. Ext. 2.5YR5/6. Dec. 2.5YR5/6.

Fig. 12.9.4. G12 20-36-4. Standard Ware. Rim fragm. Vertical pot. R. diam. 210 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR6/6.

Fig. 12.9.5. G12 17-27-1. Standard Ware. Rim fragm. Vertical pot. R. diam. 170 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/4.

Fig. 12.9.6. G12 25-47-7. Standard Ware. Rim fragm. Vertical pot. R. diam. 160 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/4.

Fig. 12.9.7. G12 11-39-2. Standard Ware. Rim fragm. Vertical pot. R. diam. 240 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 10YR8/4.

Fig. 12.9.8. G12 11-26-1. Standard Ware. Rim fragm. Hole moth pot. R. diam. 340 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/4.

Fig. 12.9.9. G12 22-42-1. Standard Ware. Rim fragm. Medium-sized jar. R. diam. 150 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 5YR7/6.

Fig. 12.9.10. G12 20-36-7. Standard Ware. Rim fragm. Medium-sized jar. R. diam. 200 mm. Ext. traces scraping. Int. traces scraping. Ext. 7.5YR6/4.

Fig. 12.9.11. G12 20-36-3. Standard Ware. Rim fragm. Medium-sized jar.R. diam. 150 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 7.5YR7/6.

Fig. 12.9.12. G12 20-36-1. Standard Ware. Rim fragm. Medium-sized jar.R. diam. 130 mm. Ext. smoothed. Int. traces finger pressing. Ext. 10YR7/3.

Fig. 12.9.13. G12 17-31-2. Standard Ware. Rim fragm. Small jar. R. diam. 80 mm. Ext. roughly smoothed. Int. traces scraping. Ext. 10YR7/3.

Fig. 12.9.14. G12 11-39-1. Standard Ware. Rim fragm. Small jar. R. diam. 100 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR7/6.

Fig. 12.9.15. G12 20-38-4. Standard Ware. Rim fragm. Small jar. R. diam. 120 mm. Ext. burnished. Int. smoothed. Ext. slipped. Ext. 2.5YR5/6. Dec. 2.5YR5/6.

Fig. 12.10. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.10.1. H13 32-100-3. Standard Ware. Rim fragm. Everted convex-sided bowl.R. diam. 230 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR8/3. Vol. 2.37 l.

Fig. 12.10.2. H13 32-123-2.Standard Ware. Rim fragm. Everted convex-sided bowl.R. diam. 220 mm. Ext. burnished. Int. burnished. Ext. slipped. Int. painted. Ext. 10YR8/6. Dec. 10R4/8.

Fig. 12.10.3. H12 64-190-1. Standard Ware. Rim fragm. Vertical convex-sided bowl; both sides plastered. R. diam. 160 mm. Ext. smoothed. Int. burnished. Ext. 7.5YR7/6. Vol. 1.12 l.

Fig. 12.10.4. H13 19-66-4. Standard Ware. Rim fragm. Everted convex-sided bowl. R. diam. 200 mm. Ext. burnished. Int. burnished. Ext. slipped. Int. painted. Ext. 7.5YR7/6. Dec. 10R3/6.

Fig. 12.10.5. H13 25-68-1. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 190 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. slipped. Ext. 7.5YR7/4. Dec. 2.5YR5/6. Vol. 1.59 l.

Fig. 12.10.6. H13 32-123-11. Standard Ware. Rim fragm. Everted convex-sided bowl. R. diam. 190 mm. Ext. burnished. Int. burnished. Ext. painted. Int. slipped. Ext. 5YR7/6. Dec. 10R4/6. Vol. 0.72 l.

Fig. 12.10.7. H12 38-97-101. Standard Ware. Section. Everted convex-sided bowl. R. diam. 120 mm. Ext. smoothed. Int. smoothed. Ext. 7,YYR6/4. Vol. 0.19 l.

Fig. 12.10.8. H12 8-118-1. Standard Ware. Rim fragm. Everted convex-sided bowl. R. diam. 250 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 7.5YR6/6. Dec. 10R4/4. Vol. 1.91 l.

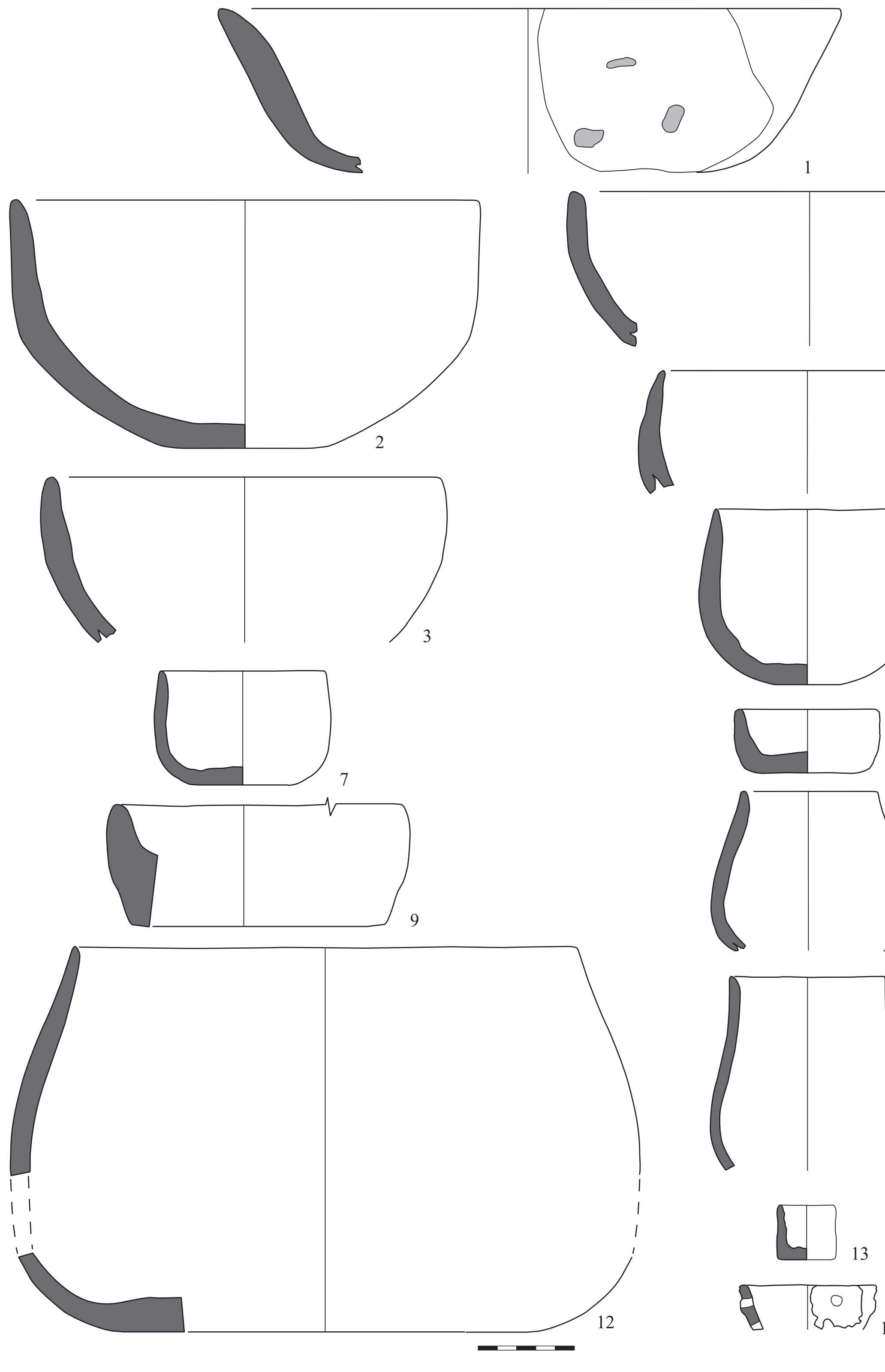


Fig. 12.6 Tell Sabi Abyad. Pottery containers from Operation IV (scale 1:3).

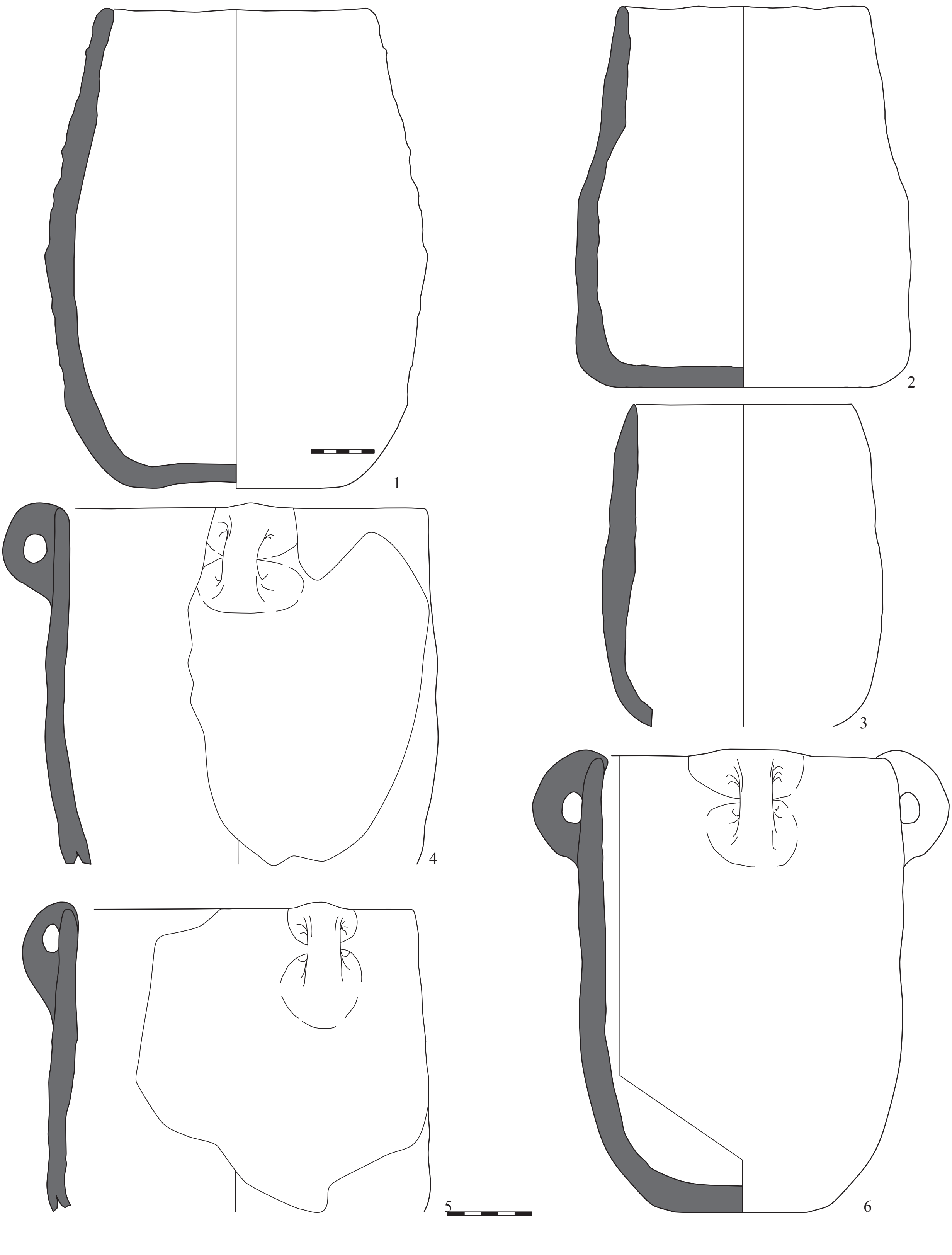


Fig. 12.7 Tell Sabi Abyad. Pottery containers from Operation IV (scale 1:3).

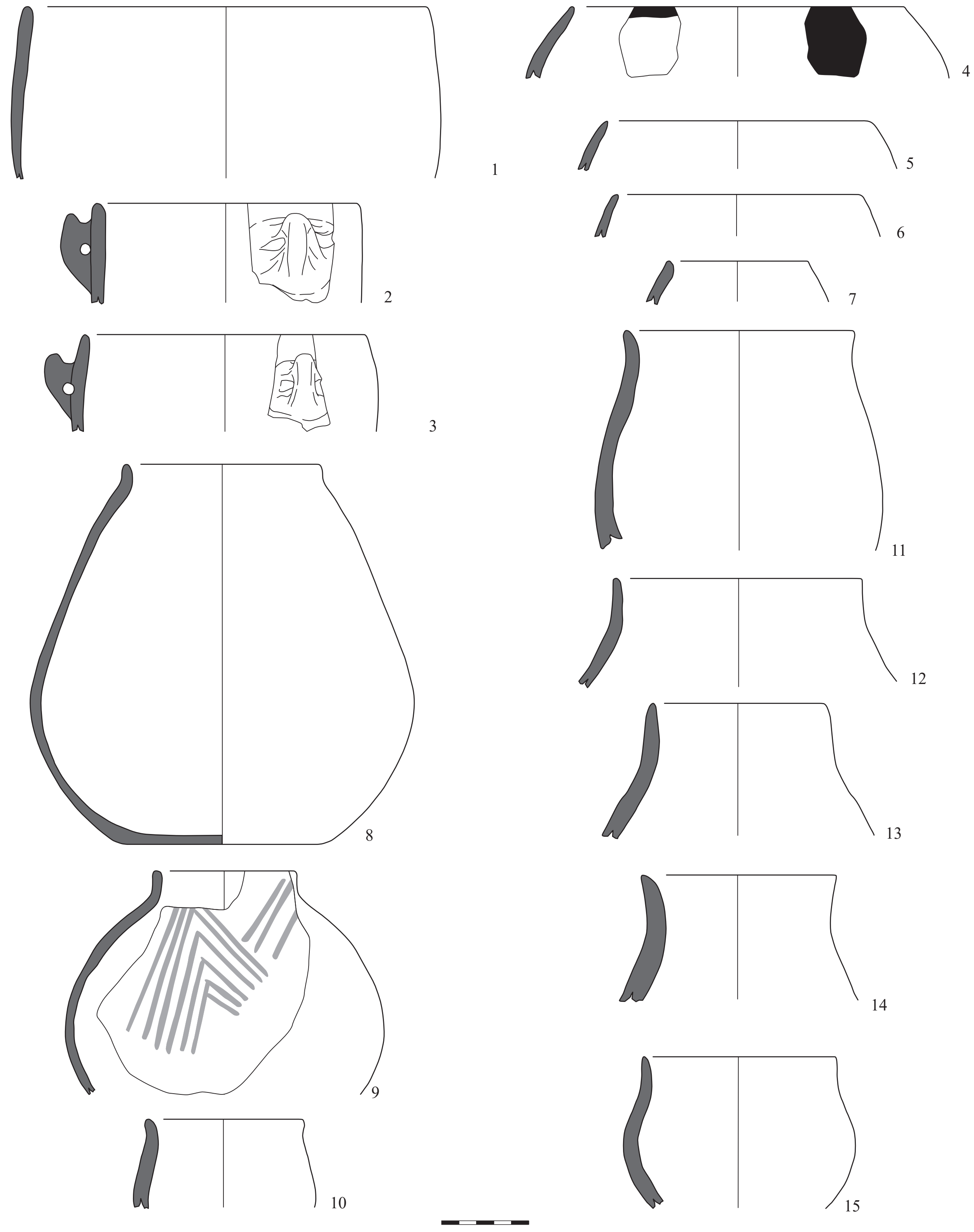


Fig. 12.8 Tell Sabi Abyad. Pottery containers from Operation IV (scale 1:3).

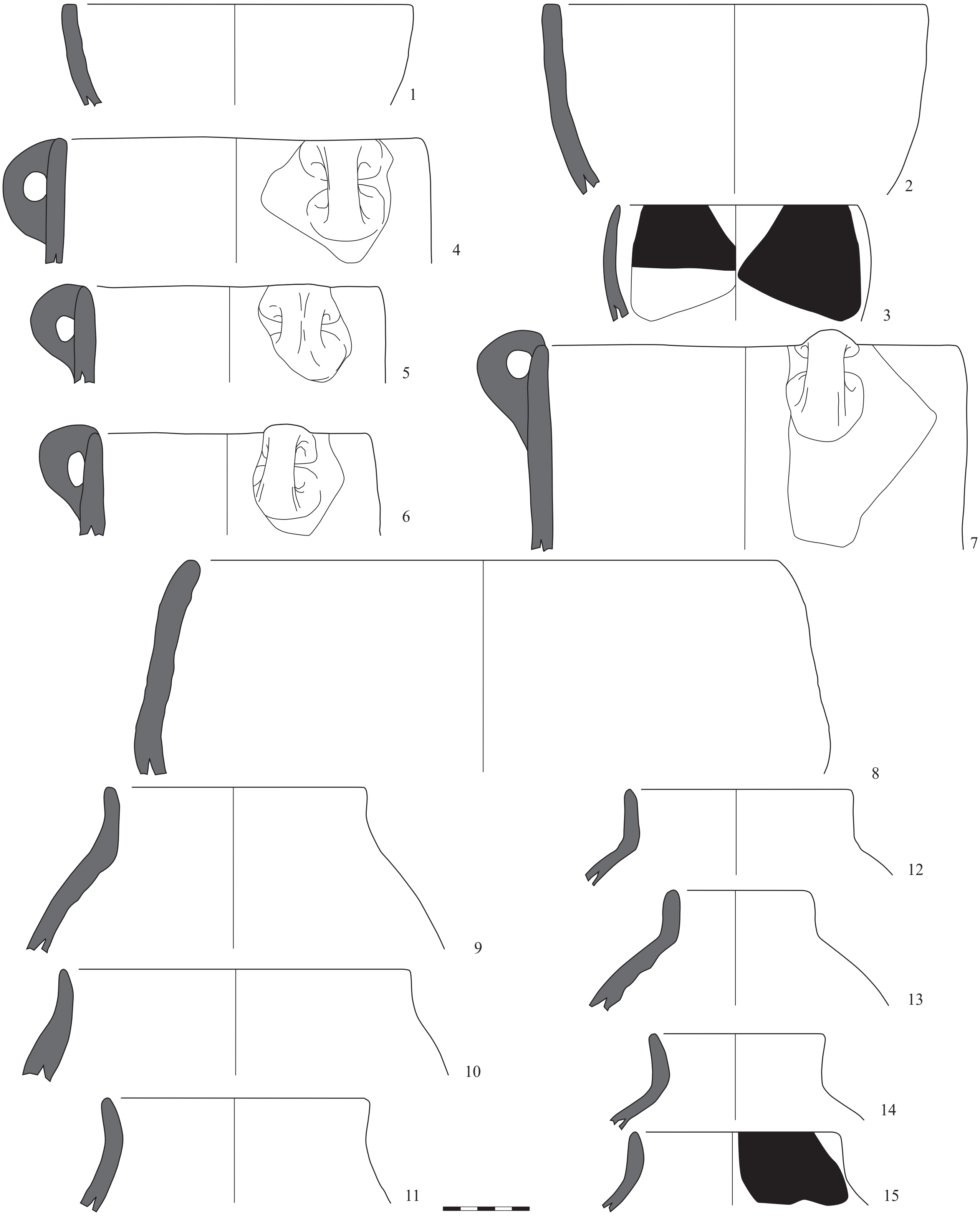


Fig. 12.9 Tell Sabi Abyad. Pottery containers from Operation V (trench G12) (scale 1:3).

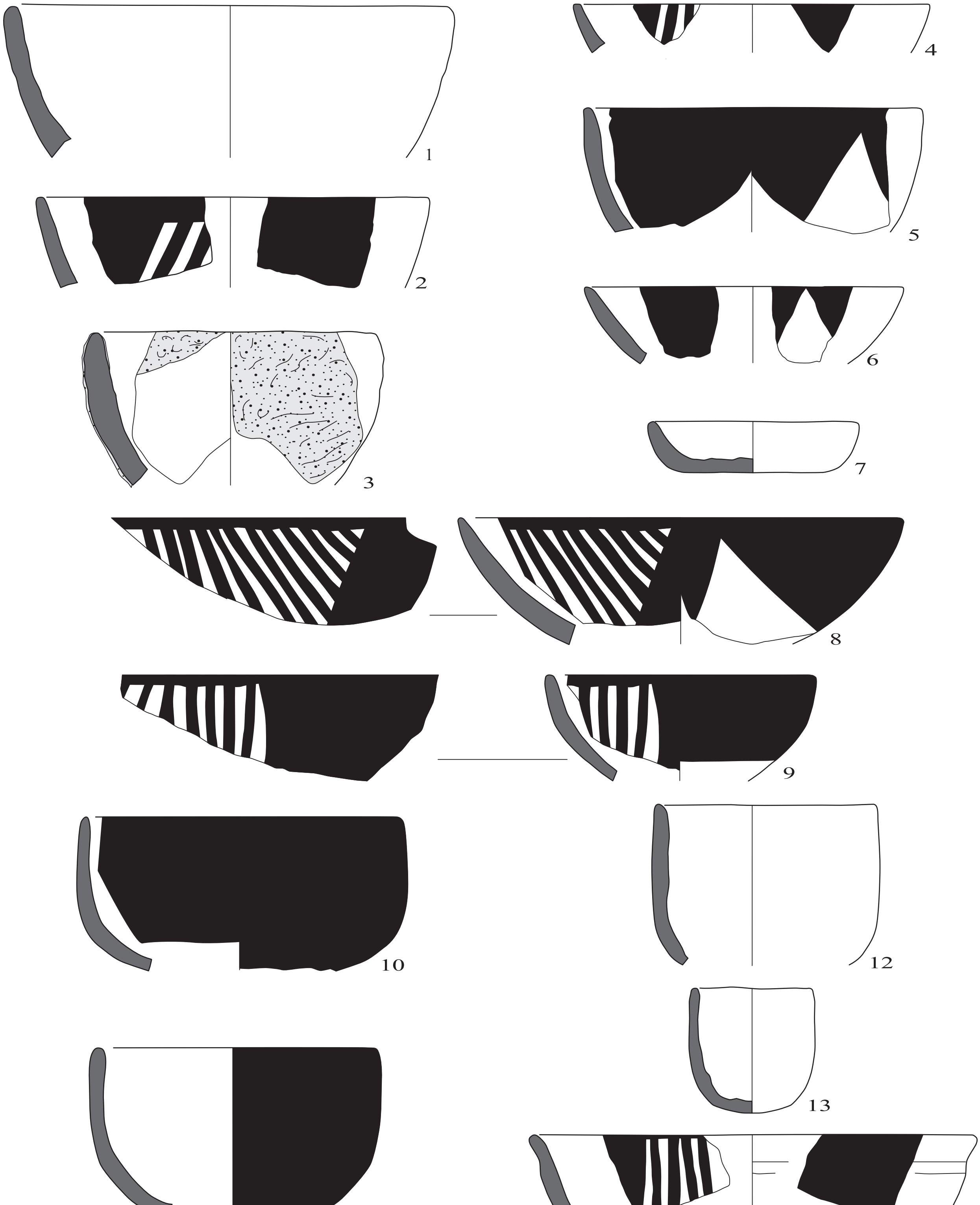


Fig. 12.10 Tell Sabi Abyad. Pottery containers from Operation V (trenches H12 and H13) (scale 1:3).

Fig. 12.10.9. H13 31-96-1. Standard Ware. Rim fragm. Everted convex-sided bowl. R. diam. 150 mm. Ext. burnished. Int. burnished. Ext. slipped. Int. painted. Ext. 7.5YR7/6. Dec. 2.5YR4/4. Vol. 0.63 l.

Fig. 12.10.10. H13 39-112-3. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. slipped. Int. slipped. Ext. 7.5YR7/6. Dec. 2.5YR4/6. Vol. 1.83 l.

Fig. 12.10.11. H12 57-151-1. Standard Ware. Section. Vertical convex-sided bowl. R. diam. 160 mm. Ext. smoothed. Int. roughly. smoothed. Ext. slipped. Ext. 5YR4/6. Dec. 5YR4/6. Vol. 1.52 l.

Fig. 12.10.12. H12 39-94-4. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 140 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR6/6. Vol. 0.59 l.

Fig. 12.10.13. H12 77-219-1. Standard Ware. Section. Vertical convex-sided bowl. R. diam. 70 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 7.5YR7/4. Vol. 0.22 l.

Fig. 12.10.14. H13 32-123-1. Standard Ware. Rim fragm. Everted straight-sided bowl unspecified. R. diam. 250 mm. Ext. burnished. Int. burnished. Ext. slipped. Int. painted. Ext. 5YR7/8. Dec. 10R4/8.

Fig. 12.11. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.11.1. H12 64-174-1. Standard Ware. Rim fragm. Hole moth pot; ext. plastered. R. diam. 390 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3.

Fig. 12.11.2. H12 19-173-1. Standard Ware. Section. Vertical convex-sided bowl. R. diam. 190 mm. Ext. smoothed. Int. smoothed. Ext. 2.5Y8/3. Vol. 1.45 l.

Fig. 12.11.3. H12 64-174-2. Standard Ware. Rim fragm. Vertical carinated bowl. R. diam. 120 mm. Ext. smoothed. Int. smoothed. Ext. 10YR8/4. Vol. 0.40 l.

Fig. 12.11.4. H12 64-198-1. Standard Ware. Rim fragm. Vertical convex-sided bowl. R. diam. 130 mm. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/6. Vol. 0.35 l.

Fig. 12.11.5. H12 64-221-1. Standard Ware. Rim fragm. Everted carinated bowl. R. diam. 250 mm. Ext. smoothed. Int. burnished. Ext. 10YR7/3.

Fig. 12.11.6. H12 64-221-2. Standard Ware. Rim fragm. Low carinated bowl. R. diam. 230 mm. Ext. burnished. Int. burnished. Ext. slipped. Ext. 2.5YR5/6. Dec. 2.5YR5/6.

Fig. 12.11.7. H13 15-44-1. Standard Ware. Rim fragm. Vertical S-shaped bowl. R. diam. 210 mm. Ext. burnished. Int. burnished. Ext. painted. Int. painted. Ext. 10YR6/4. Dec. 2.5YR4/4.

Fig. 12.11.8. H12 64-206-2. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 140 mm. Ext. burnished. Int. burnished. Ext. slipped. Ext. 7.5R5/8. Dec. 7.5R5/8.

Fig. 12.11.9. H13 33-98-1. Standard Ware. Section. Everted straight-sided bowl unspecified. R. diam. 270 mm. Ext. roughly smoothed. Int. traces scraping. Ext. 7.5YR6/4. Vol. 3.51 l.

Fig. 12.11.10. H12 64-161-1 (P01-21). Standard Ware. Complete. Closed S-shaped bowl; nine miniature loop handles spread around upper body. R. diam. 40 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 7.5YR6/4. Vol. 0.19 l.

Fig. 12.11.11. H12 78-199-1. Standard Ware. Base fragm. Closed S-shaped bowl; rim cut off. R. diam. 60 mm. Ext. smoothed. Int. traces finger pressing. Ext. 5YR7/6. Vol. 0.46 l.

Fig. 12.11.12. H13 19-76-1. Standard Ware. Section. Miniature (vertical pot). R. diam. 40 mm. Ext. traces finger pressing. Int. traces finger pressing. Ext. 10YR7/3. Vol. 0.02l.

Fig. 12.11.13. H12 39-94-1. Grey-Black Ware. Rim fragm. Closed S-shaped bowl. R. diam. 90 mm. Ext. burnished. Int. burnished. Ext. 2.5Y3/1.

Fig. 12.11.14. H13 15-74-2. Dark-Faced Burnished Ware. Rim fragm. Closed convex-sided bowl. R. diam. 180 mm. Ext. burnished. Int. burnished. Ext. slipped. Ext. 2.5YR4/4.

Fig. 12.12. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.12.1. H12 68-269-100 (P01-84). Standard Ware. Almost complete Husking tray. R. diam. oval. Ext. traces finger pressing. Int. traces finger pressing. Ext. 10YR7/3. Vol. 14.6 l.

Fig. 12.13. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.13.1. H12 95-254-100 (P01-78). Standard Ware. Section. Husking tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 5YR6/8.

Fig. 12.13.2. H13 24-86-100 (P01-36). Standard Ware. Section. Husking tray. R. diam. oval. Ext. roughly smoothed. Int. roughly smoothed. Ext. 10YR7/3.

Fig. 12.13.3. H12 64-198-2. Standard Ware. Section. Husking tray. R. diam. oval. Ext. traces finger pressing. Int. traces finger pressing. Ext. 10YR7/4.

Fig. 12.14. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.14.1. H12 66-223-200 (P01-54). Standard Ware. Complete Medium-sized jar; ext. low. Body plastered; interior clear coiling ridges. R. diam. 115 mm. Ext. roughly smoothed. Int. eroded. Ext. 5YR6/6. Vol. 6.5 l.

Fig. 12.14.2. H12 66-223-100 (P01-86). Standard Ware. Rim fragm. Medium-sized jar; exterior thick plaster as repair. R. diam. 140 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. 5YR6/4.

Fig. 12.14.3. H13 33-82-1. Standard Ware. Rim fragm. Small jar. R. diam. 100 mm. Ext. roughly smoothed. Int. traces scraping. Ext. 7.5YR6/6. Vol. 3.98 l.

Fig. 12.14.4. H12 39-94-2. Standard Ware. Rim fragm. Small jar. R. diam. 100 mm. Ext. smoothed. Int. roughly smoothed. Ext. 7.5YR6/4.

Fig. 12.14.5. H13 32-97-1. Standard Ware. Rim fragm. Small jar. R. diam. 120 mm. Ext. smoothed. Int. roughly smoothed. Ext. 2.5Y8/4.

Fig. 12.14.6. H12 55-122-1. Standard Ware. Rim fragm. Closed S-shaped bowl. R. diam. 70 mm. Ext. smoothed. Int. traces finger pressing. Ext. 7.5YR6/4.

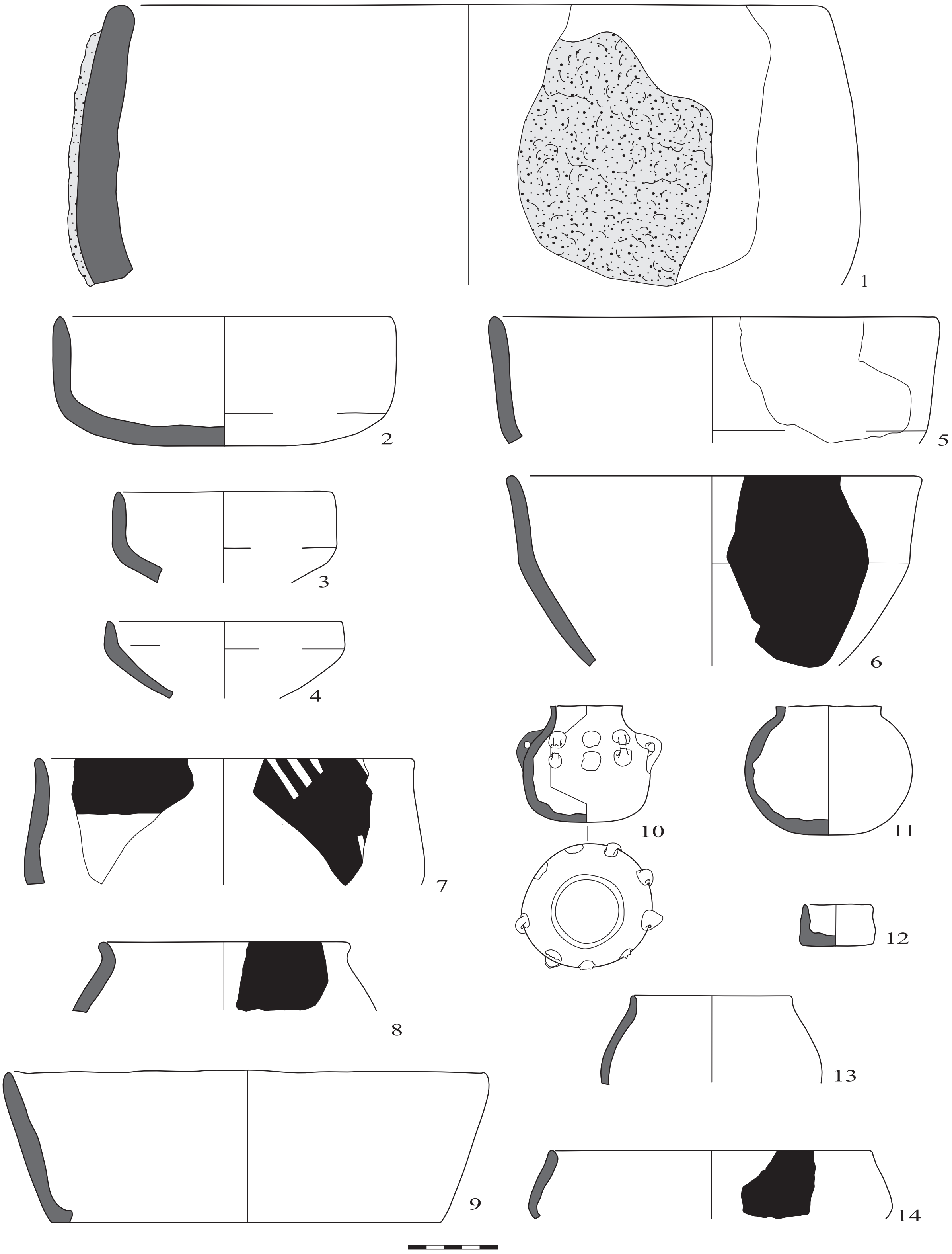


Fig. 12.11 Tell Sabi Abyad. Pottery containers from Operation V (trenches H12 and H13) (scale 1:3).

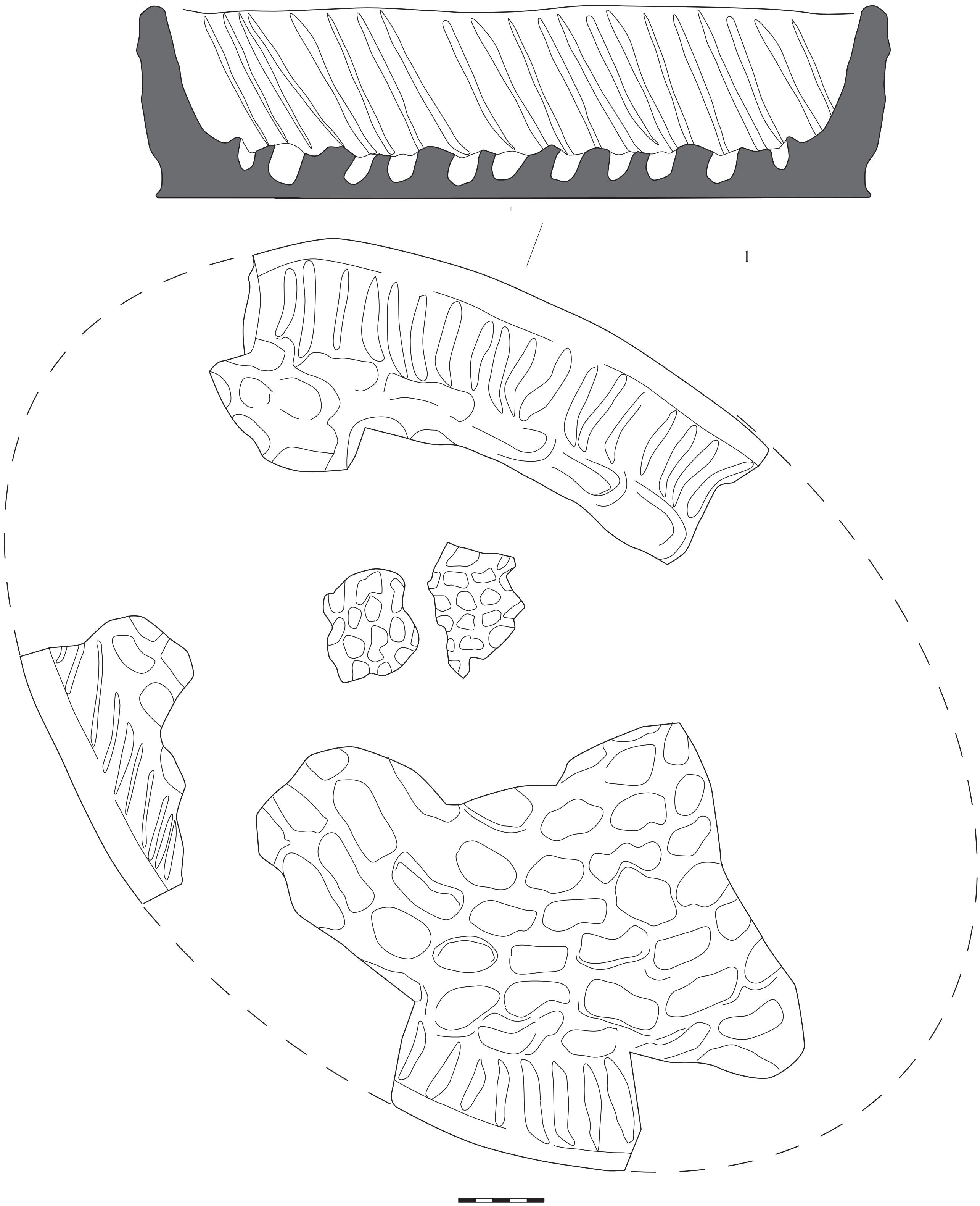


Fig. 12.12 Tell Sabi Abyad. Pottery containers from Operation V (trench H12) (scale 1:3).

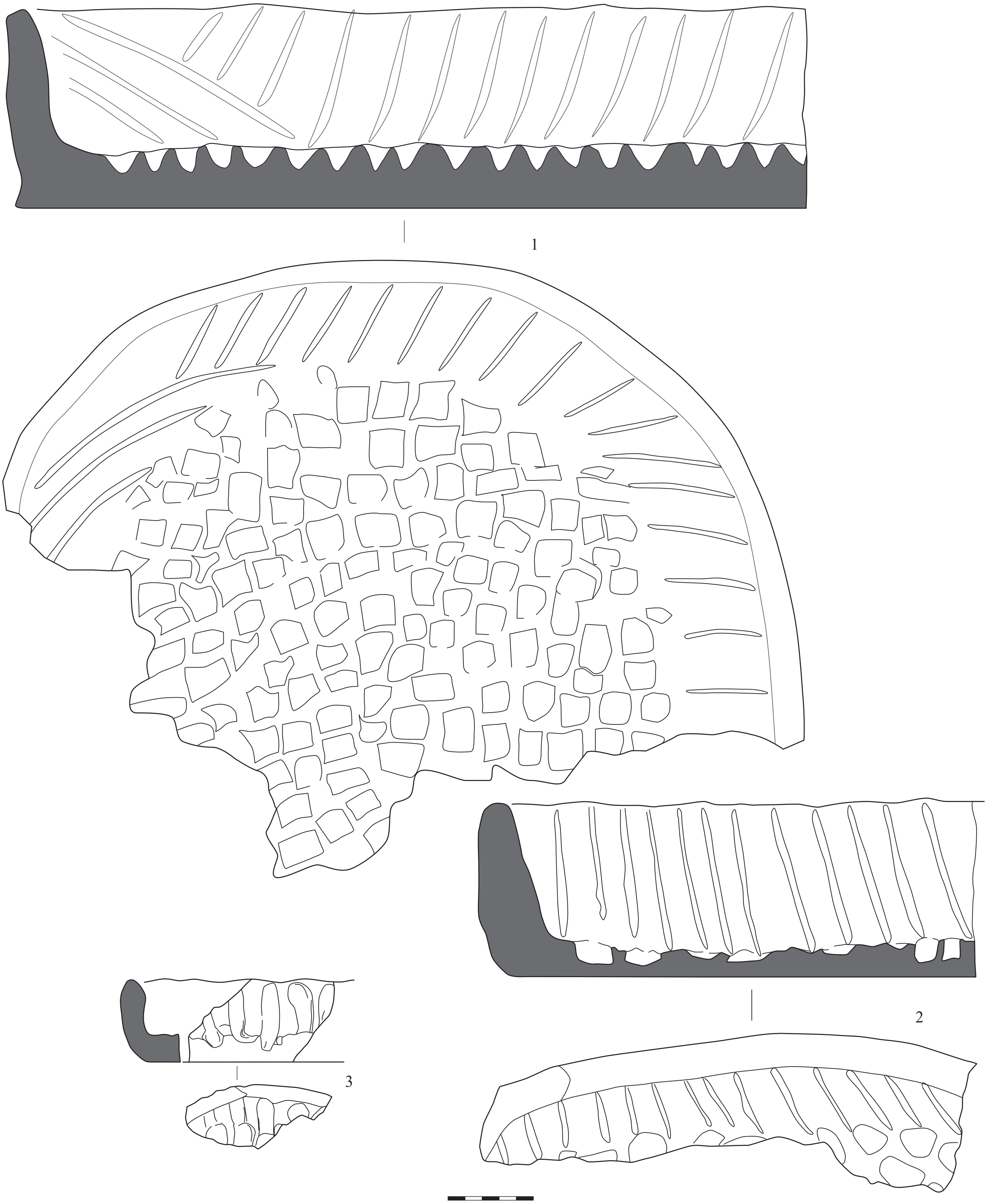


Fig. 12.13 Tell Sabi Abyad. Pottery containers from Operation V (trenches H12 and H13) (scale 1:3).

Fig. 12.14.7. H12 60-156-1. Standard Ware. Body fragm. Closed shape. Ext. smoothed. Int. smoothed. Ext. impressed. Ext. 7.5YR6/4.

Fig. 12.14.8. H12 41-102-1. Standard Ware. Body fragm. Closed shape. Ext. roughly smoothed. Int. eroded. Ext. appliqué. Ext. 7.5YR6/4.

Fig. 12.14.9. H13 15-51-1. Standard Ware. Body fragm. Closed shape. Ext. smoothed. Int. roughly smoothed. Ext. impressed. Ext. 10YR6/4.

Fig. 12.14.10. H13 32-123-13. Standard Ware. Body fragm. Closed shape. Ext. burnished. Int. traces scraping. Ext. painted. Ext. 5YR7/6. Dec. 10R4/6.

Fig. 12.14.11. H13 19-66-1. Standard Ware. Body fragm. Closed shape. Ext. smoothed. Int. smoothed. Ext. painted, incised. Ext. 10YR6/8. Dec. 2.5YR4/6.

Fig. 12.14.12. H13 41-118-1. Standard Ware. Body fragm. Closed shape. Ext. burnished. Int. traces scraping. Ext. painted. Ext. 5YR6/4. Dec. 10R4/4.

Fig. 12.15. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.15.1. H13 10-40-1. Standard Fine Ware. Rim fragm. Everted straight-sided bowl unspecified. R. diam. 270 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR4/2.

Fig. 12.15.2. H13 9-25-2. Standard Fine Ware. Rim fragm. Everted S-shaped bowl. R. diam. 260 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 7.5YR2.5/1.

Fig. 12.15.3. H13 11-30-2. Standard Fine Ware. Rim fragm. Everted straight-sided bowl unspecified. R. diam. 240 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/2. Dec. 2.5Y4/1.

Fig. 12.15.4. H13 15-35-1. Standard Fine Ware. Rim fragm. Everted straight-sided bowl unspecified. R. diam. 240 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR3/1.

Fig. 12.15.5. H13 9-25-7. Standard Fine Ware. Rim fragm. Everted straight-sided bowl unspecified. R. diam. 240 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 10YR7/3. Dec. 5YR5/4.

Fig. 12.15.6. H13 11-27-2. Standard Fine Ware. Rim fragm. Everted straight-sided bowl unspecified. R. diam. 190 mm. Ext. smoothed. Int. traces scraping. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 7.5YR4/4.

Fig. 12.15.7. H13 16-58-1. Standard Fine Ware. Rim fragm. Everted straight-sided bowl unspecified. R. diam. 130 mm. Ext. roughly smoothed. Int. traces finger pressing. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 2.5YR5/4.

Fig. 12.15.8. H13 16-36-1. Standard Fine Ware. Rim fragm. Closed convex-sided bowl. R. diam. 110 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/3. Dec. 2.5Y2.5/1.

Fig. 12.15.9. H13 9-25-6. Standard Fine Ware. Rim fragm. Short-collared bowl. R. diam. 200 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR3/2.

Fig. 12.15.10. H13 11-27-3. Standard Fine Ware. Rim fragm. Short-collared bowl. R. diam. 150 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/2. Dec. 2.5Y3/1.

Fig. 12.15.11. H13 11-27-4. Standard Fine Ware. Rim fragm. Short-collared bowl. R. diam. 120 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/2. Dec. 2.5Y3/1.

Fig. 12.15.12. H13 16-45-1. Standard Fine Ware. Rim fragm. Short-collared bowl. R. diam. 170 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 5Y8/1. Dec. 5Y2.5/1.

Fig. 12.15.13. H13 9-25-5. Standard Fine Ware. Rim fragm. Low carinated bowl. R. diam. 230 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/2. Dec. 10YR3/2.

Fig. 12.15.14. H13 10-40-2. Standard Fine Ware. Rim fragm. Low carinated bowl. R. diam. 200 mm. Ext. smoothed. Int. traces scraping. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 7.5YR5/4.

Fig. 12.15.15. H13 10-26-1. Standard Fine Ware. Rim fragm. Low carinated bowl. R. diam. 160 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 5Y8/2. Dec. 5Y2.5/1. Vol. 0.67 l.

Fig. 12.16. Catalogue number. Project ID. Ware. Shape. Type. Rim diameter (mm). Exterior and interior surface. Exterior and interior decoration. Exterior surface colour (Munsell). Decoration colour (Munsell). Volume (litre).

Fig. 12.16.1. H13 10-32-3. Standard Fine Ware. Rim fragm. Medium-sized jar. R. diam. 230 mm. Ext. smoothed. Int. traces scraping. Ext. painted. Ext. 10YR7/4. Dec. 10YR3/1.

Fig. 12.16.2. H13 10-46-1. Standard Fine Ware. Rim fragm. Medium-sized jar. R. diam. 140 mm. Ext. smoothed. Int. traces scraping. Ext. painted. Ext. 10YR8/2. Dec. 2.5YR5/6.

Fig. 12.16.3. H13 11-27-102. Standard Fine Ware. Rim fragm. Small jar. R. diam. 90 mm. Ext. smoothed. Int. smoothed. Ext. painted. Ext. 10YR8/2. Dec. 10YR3/1.

Fig. 12.16.4. H13 16-33-2. Standard Fine Ware. Rim fragm. Medium-sized jar. R. diam. 150 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 10YR8/3. Dec. 10YR3/1.

Fig. 12.16.5. H13 11-30-1. Standard Fine Ware. Rim fragm. Medium-sized jar. R. diam. 160 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 2.5Y8/3. Dec. 2.5Y3/1.

Fig. 12.16.6. H13 11-27-1. Standard Fine Ware. Rim fragm. Small jar. R. diam. 120 mm. Ext. smoothed. Int. smoothed. Ext. painted. Int. painted. Ext. 10YR8/2. Dec. 10YR3/1.

Fig. 12.16.7. H13 16-58-3. Standard Fine Ware. Body fragm. Closed shape. Ext. smoothed. Int. traces scraping. Ext. painted. Ext. 2.5Y8/3. Dec. 2.5Y3/1.

Fig. 12.16.8. H13 16-36-2. Standard Fine Ware. Body fragm. Closed shape. Ext. smoothed. Int. smoothed. Ext. painted. Ext. 10YR7/4. Dec. 10YR3/1.

Fig. 12.16.9. H13 11-30-4. Standard Fine Ware. Body fragm. Closed shape. Ext. smoothed. Int. traces scraping. Ext. painted. Ext. 7.5YR7/6. Dec. 5YR6/6.

Fig. 12.16.10. H13 15-35-2. Standard Fine Ware. Body fragm. Closed shape. Ext. smoothed. Int. traces finger pressing. Ext. painted. Ext. 10YR8/3. Dec. 5YR5/6.

Fig. 12.16.11. H13 11-27-101. Standard Fine Ware. Rim fragm. Jar; reshaped into closed convex-sided bowl; flat rim punctuated. R. diam. 200 mm. Ext. smoothed. Int. smoothed. Ext. painted. Ext. 7.5YR7/6. Dec. 2.5YR5/6.

Fig. 12.16.12. H13 9-25-3. Standard Fine Ware. Base fragm. Fenestrated pedestal base. Bs. diam. 130 mm. Ext. smoothed. Int. smoothed. Ext. painted. Ext. 10YR8/2. Dec. 10YR3/1.

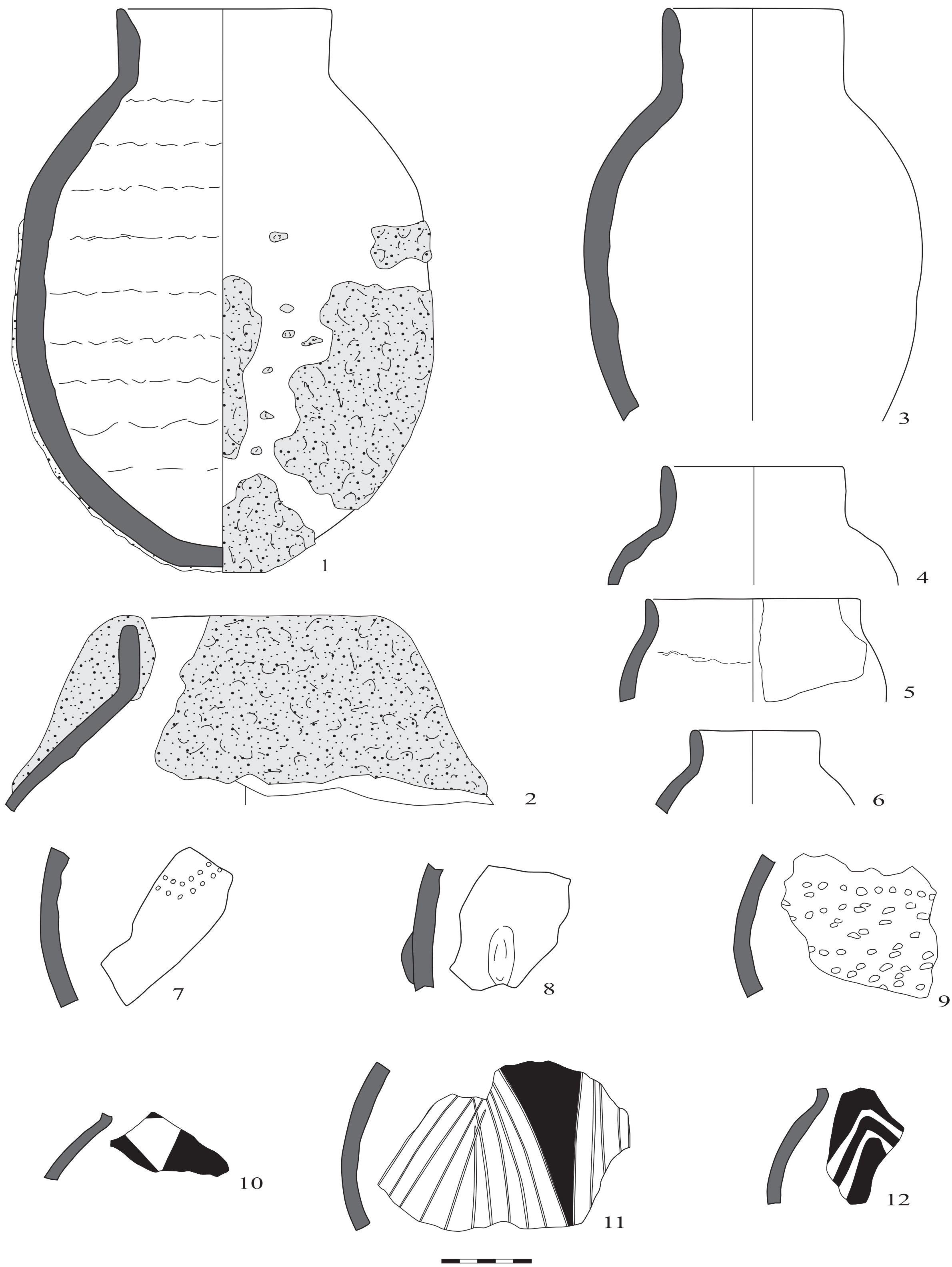


Fig. 12.14 Tell Sabi Abyad. Pottery containers from Operation V (trenches H12 and H13) (scale 1:3).

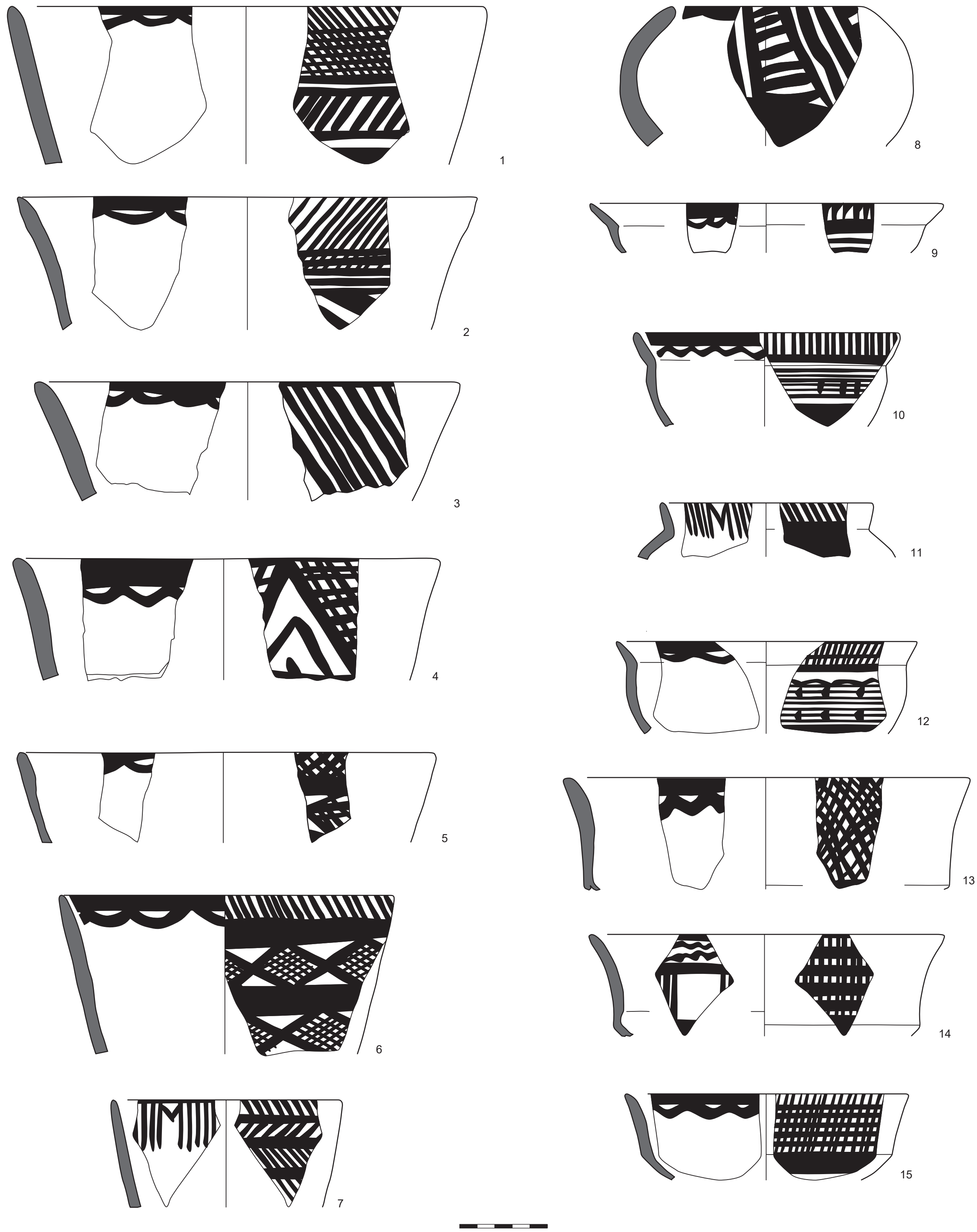


Fig. 12.15 Tell Sabi Abyad. Pottery containers from Operation V (trench H13) (scale 1:3).

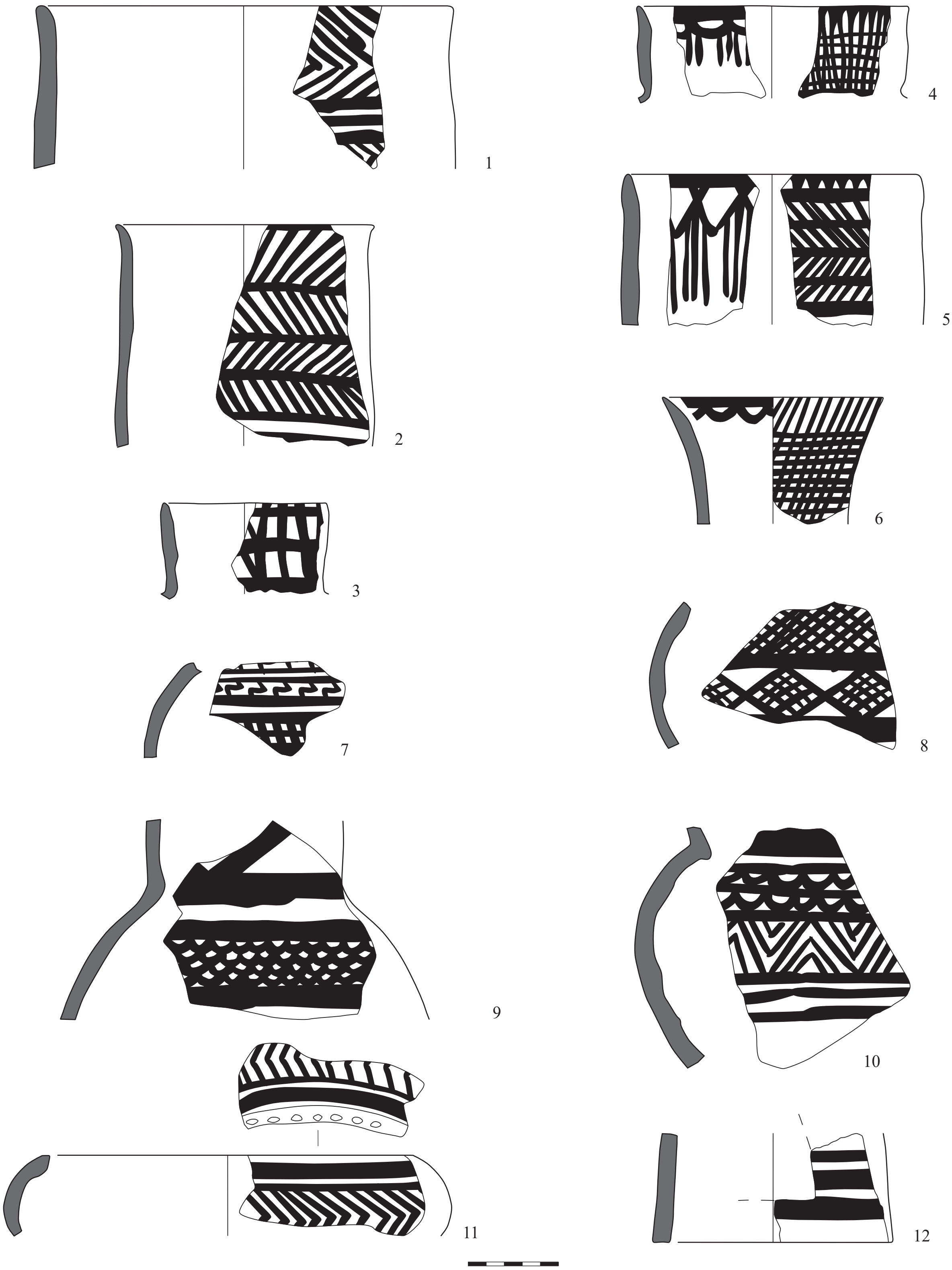


Fig. 12.16 Tell Sabi Abyad. Pottery containers from Operation V (trench H13) (scale 1:3).

Chapter 13

The depositional context of the pottery

Olivier Nieuwenhuyse

13.1. Introduction

The excavations at Tell Sabi Abyad hold great potential for investigating spatial patterns in the various pottery-dependent practices of a Late Neolithic village. For the more limited purposes of this book this chapter shall offer some observations on the state of fragmentation of the pottery and its general contextual deposition in Operations III, IV, and V. Understanding the depositional background of the ceramics discussed in this book is an important prelude to contextualising studies in the future. Here I shall treat the pottery sample as a whole and not descend into a level-by-level discussion of contextual patterns for each ware separately (section 13.3). The human burials represent a distinct, and important, contextual category for the deposition of pottery containers: these are discussed separately (Chapter 14).

For the two small excavations in Operations IV and V this chapter shall go somewhat further, exploring the depositional context and the spatial distributions of pottery containers. Building I in trench F9, dated to the Early Pottery Neolithic, yielded several complete artefacts from its fill. The buildings from trench H12, representing an early phase of the Pre-Halaf period, also yielded several complete pottery containers. Located inside buildings and on adjacent courtyards, these vessels may give a rare spatial perspective on ceramic consumption in the later 7th millennium Upper Mesopotamian household (section 13.4).

The northwestern slopes of Tell Sabi Abyad have a rich and turbulent biography (Chapter 2). In Operation III this resulted in four stratigraphically distinct episodes of mound formation, so-called Sequences A to D. Complicating this considerably, when the prehistoric mound was selected as the location for a *dunnu* in the Late Bronze Age, a new phase of tell-scaping began. Mute to contemporary issues of heritage preservation, Late Bronze Age authorities initiated an ambitious building program, flattening the mound by removing the top of it and digging a several-metres deep moat around their settlement (Klinkenberg 2016). A large number of Medieval (also called 'Islamic') burials attest to the later usage of the mound. To what degree did these activities affect the composition of the prehistoric pottery assemblage? While this book focuses on the Late Neolithic pottery, the detailed stratigraphy for Operation III (Fig. 2.5) made it clear that some of the strata studied were stratigraphically ascribed to post-Neolithic periods, including some 16% of all sherds counted (Fig. 11.2). Rather than simply leaving them out we may use them to gain insights into formation processes in these later periods and their impact on the integrity of the prehistoric depositions (section 13.2).

13.2. Top soil, Islamic and Late Bronze Age contexts

Underneath the modern topsoil layers, two main post-Neolithic phases have been distinguished stratigraphically, namely the Late Bronze Age and Medieval-Islamic. Here we shall briefly inspect the ceramic finds from these three layers. Characteristic for the site, these three contextual categories all contain a mixture of Neolithic and Late Bronze Age materials. However, the exact proportions of these materials vary, as do fragmentation indices. This may inform on the specific depositional pathways that formed these contexts.

The weathered topsoil strata from Operation III contain a mixture of material from various periods, but the large majority consists of 7th millennium pottery. Relatively small admixtures of Late Bronze Age and 6th millennium Halaf Fine Ware pottery are found (Fig. 13.1: upper). The average weight of prehistoric body sherds (the BMI, see Chapter 3) recovered from the topsoil is quite low,

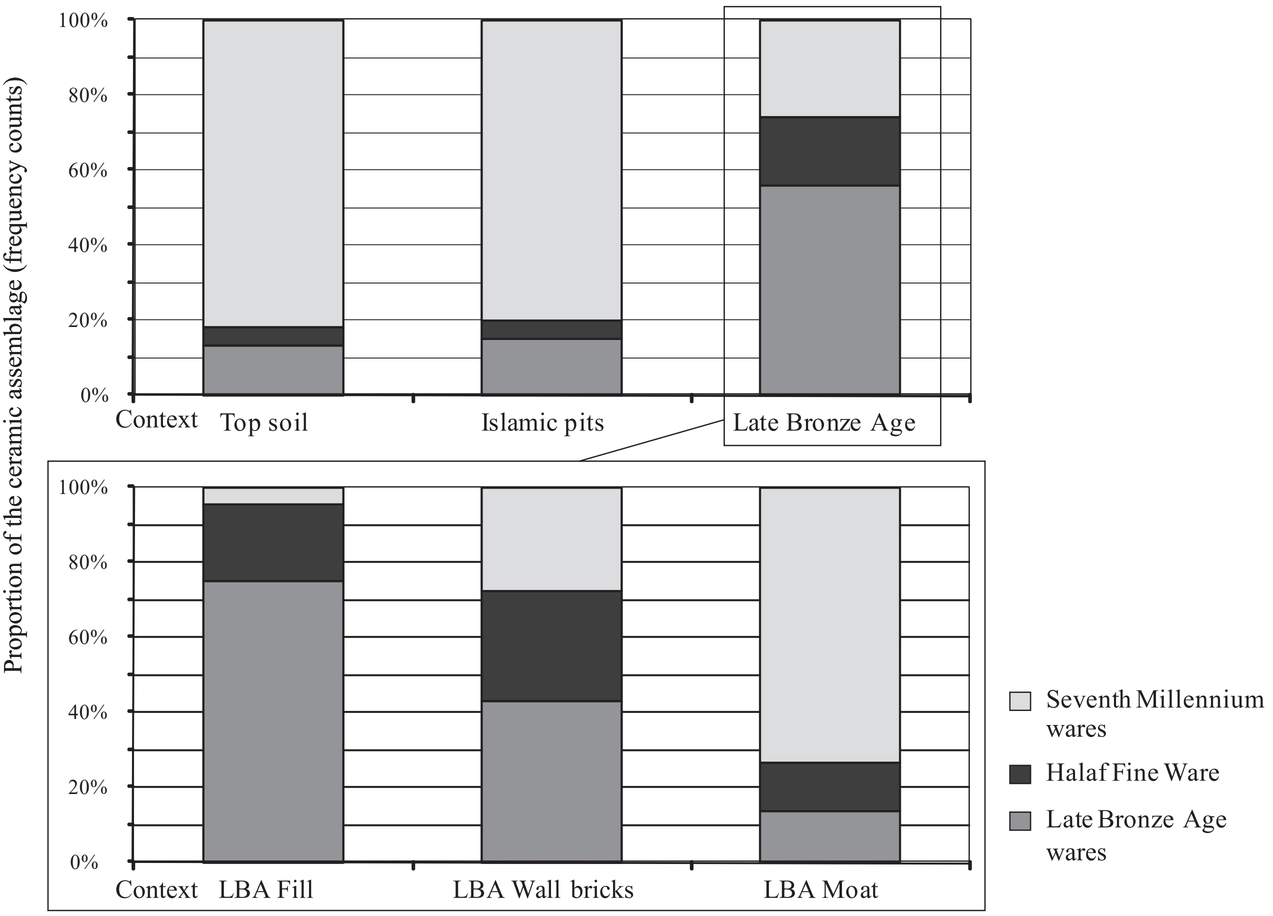


Fig. 13.1 Tell Sabi Abyad, Operation III. The proportions of 7th-millennium pottery, Halaf Fine Ware and Late Bronze Age sherds in various post-Neolithic contexts. Upper: the assemblages recovered from top soil layers, Islamic pits and Late Bronze Age layers. Lower: the assemblages recovered from LBA fill layers, LBA wall fills and the LBA moat (Raw Counts).

suggestive of heavy fragmentation. It appears that the excavated top soil layers were not disturbed significantly in the Late Bronze Age, as this would have resulted in much more intrusive Late Bronze Age and Halaf pottery. They may largely represent the slow erosion and weathering of the upper Late Neolithic depositions.

The pottery composition of the fill layers of the Medieval ('Islamic') burial pits closely resembles that of the topsoil (Fig. 13.1: upper). No ceramic vessels were given with the dead in these burials, yet the fills included numerous pottery sherds. Similar to topsoil, the burial fill assemblage is mostly composed of very fragmented 7th millennium material, with small proportions of Halaf and Late Bronze Age sherds (Fig. 13.1: upper). Completing the burial ritual, Medieval people refilled the pits with the soil they had dug for the pit, cutting through top soil and underlying 7th millennium strata.

In stark contrast, the pottery assemblage recovered from Late Bronze Age strata presents a wholly different composition. Perhaps surprisingly at first sight, it consists not only of Late Bronze Age pottery. Slightly more than half of all the sherds recovered from the Late Bronze Age strata from Operation III come from the Late Bronze Age itself. The other half are Halaf Fine Ware and 7th millennium wares (Fig. 13.1: upper). In these strata the prehistoric sherds must obviously be considered as intrusions but these figures conflate different contextual groups. Interestingly, the ceramic finds suggest that different Late Bronze Ages context types may reflect distinct depositional pathways. This becomes clear if we distinguish between the three general categories of LBA fill layers, LBA wall construction material, and the fill of the moat encircling the Late Bronze Age settlement (Fig. 13.1: lower).

Within the general category of Late Bronze Age fill layers, the great majority of the collected material consists of Late Bronze Age pottery. These presumably represent the quotidian remains of the Middle Assyrian inhabitants of Tell Sabi Abyad, their refuse and discarded artefacts (Duistermaat 2008; Klinkenberg 2016). We find the occasional complete vessel, but the bulk of the collected material consists of vast amounts of fragmented Late Bronze Age body sherds. There is almost no 7th millennium material in this contextual category, but it did yield a small proportion of Halaf Fine Ware sherds. These were originally present as filling in the mud bricks that composed the buildings at this location as a kind of natural 'pottery temper'. When these buildings were

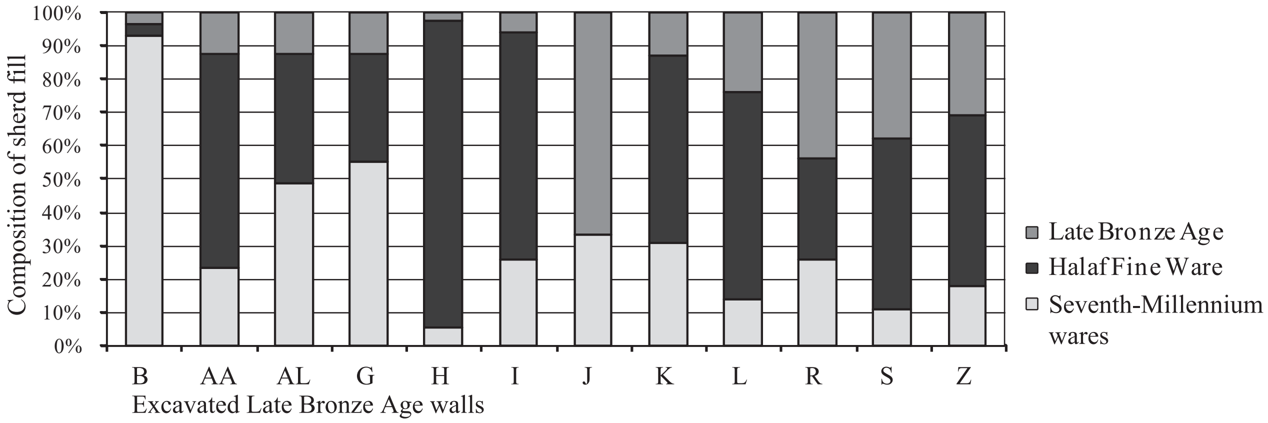


Fig. 13.2 Tell Sabi Abyad, Operation V. The proportions of seventh-millennium pottery, Halaf Fine Ware and Late Bronze Age sherds in Late Bronze Age wall fills (Raw Counts).

subsequently abandoned and eventually collapsed, the filling material became mixed with the Middle Assyrian refuse (Nieuwenhuyse 1997).

This explains why, in contrast, the majority of pottery sherds within the bricks of the excavated Late Bronze Age walls are prehistoric (Fig. 13.1: lower). In Operation III, both 7th millennium and Halafian sherds are found inside the LBA bricks in roughly equal proportions. The proportion of Halaf Fine Ware is higher, however, than in the two other Late Bronze Age contextual categories. This Halafian material is not much eroded and often contains large fragments or even complete profiles. Chronologically the material is fairly consistent and it may be dated to the Middle-Late Halaf period. A very similar situation is observed in Operation V. Here, excavations removed the well-preserved remains of Late Bronze Age architecture (section 13.4). The Operation V walls, too, were found to be full of prehistoric pottery sherds. About half or even more of these ceramic inclusions were Halaf Fine Ware (Fig. 13.2). Typologically they date to the same Middle-Late Halaf phase as the Halaf Fine Ware from the Operation III walls. Occasionally they yielded remarkably well-preserved pottery vessels and Halaf small finds.

This association between Late Bronze Age architecture and the spread of Middle to Late Halaf pottery appears to be remarkably consistent across the mound of Tell Sabi Abyad. The surface distribution of Halaf pottery across the western, higher part of the mound of Tell Sabi Abyad may to a large part reflect the extent of Late Bronze Age building activities rather than the actual spatial spread of a Halaf settlement (Pl. 25.2). The pottery is what remains from what must have been a well-preserved Halaf tell selected as raw material for making mud bricks (Nieuwenhuyse 1997). As has now become clear, the D-Sequence of Operation III yielded typologically similar Halaf Fine Ware (Chapter 11.4). The poorly-preserved remains of the D-Sequence may be all that is left of a Middle–Late Halaf occupation at Tell Sabi Abyad levelled by the Assyrians.

Interestingly, however, the walls contain Late Bronze Age sherds as well. In some of them Late Bronze Age sherds even surpass Halaf Fine Ware proportionally. This suggests a different provenance for some of the Assyrian bricks. Whereas many bricks were apparently formed of Halafian soil, others were made of earth dug from the Assyrian settlement itself. This pottery, obviously, is (somewhat) older than the stratigraphic LBA levels in which it is found. A good part of the material recovered from the Late Bronze Age fills may represent redeposited items, deriving from eroded architecture. Estimating on the basis of the mud-brick pottery fills from Operations III and V, about one-quarter of the Late Bronze Age sherds recovered from the Late Bronze Age levels at Tell Sabi Abyad may originate from eroded wall debris.[1]

The moat fill, finally, displays a remarkably different pattern (Fig. 13.1: lower). The composition of the ceramic assemblage recovered from the in-filled moat resembles that of top soil and Islamic burial pits much more than Late Bronze Age levels. The moat certainly contains some Late Bronze Age material and some Halaf painted Fine Ware, but the far majority is much older and dates to the 7th millennium.[2] The relatively low proportions of LBA and Halaf Fine Ware perhaps suggest that Late Bronze Age people kept the moat fairly clean during most of its use. When it went out of use, it was not actively refilled, as this would have introduced more LBA and Halaf Fine Ware materials into its fill. Instead it was left to erode naturally, slowly filling in from its subsiding sides exposing 7th millennium strata.

We may take the average weight of the body sherds (BMI, see Chapter 3) as a proxy of (relative) degrees of fragmentation. If we take both the context type and ceramic type into account, interesting discrepancies emerge that corroborate the impressions gained from the sherd compositions. The prehistoric wares, especially Halaf Fine Ware, have the highest average BMI values when they come from Late Bronze Age mud bricks, and the lowest values in Assyrian fill layers or the moat fill. The Late Bronze Age wares show the exact opposite (Fig. 13.3). They display the highest average BMI in general fill layers or the moat, and very low values in mud bricks. This presumably reflects distinct depositional pathways of ceramic materials from these periods. As to the Halaf Fine Ware, their encapsulation in mud bricks immediately after being freshly excavated would have offered protection against erosion and fragmentation. Only after the Late Bronze Age buildings had themselves collapsed did this prehistoric material become exposed to the elements and ensuing fragmentation, resulting in increased fragmentation of Halaf sherds in their presence in the Late Bronze Age fills and moat. In contrast, Late Bronze Age sherds recovered from general fill layers or the moat presumably represent primary or secondary refuse. Late Bronze Age sherds recovered from the LBA bricks represent tertiary material instead and accordingly can be expected to have higher rates of fragmentation.

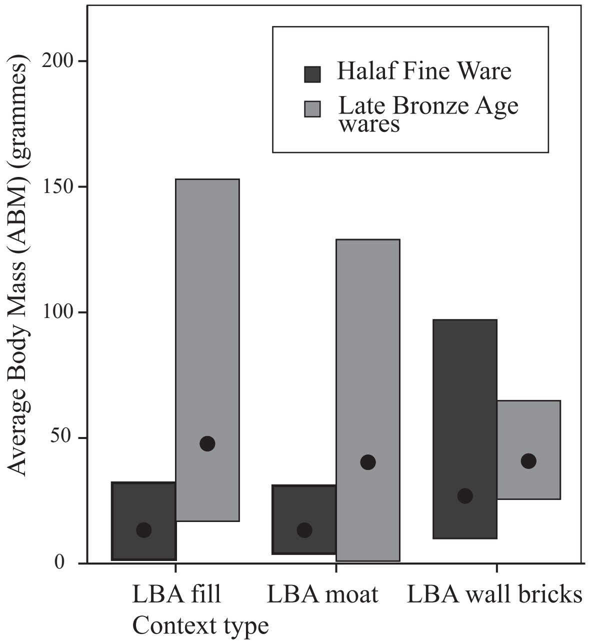


Fig. 13.3 Tell Sabi Abyad, Operation III. Average Body Mass Index (BMI) as a proxy for relative degrees of fragmentation, comparing Halaf Fine Ware and Late Bronze Age sherds from LBA fill layers, LBA defensive moat and LBA mud brick walls (Raw Counts).

Activities during the Late Bronze Age and subsequent periods had a significant impact on the shape of the mound but to what degree did they affect the integrity of the prehistoric contexts excavated in modern times? The stratigraphic analysis suggests that post-Neolithic stratigraphic disturbances of the A–B Sequences were on the whole minimal. In most cases the Late Bronze Age, Islamic, and Neolithic strata could be separated clearly. However, characteristic for the prehistoric strata at Operation III is a low-density background 'noise' of intrusive material. This is identified by the distributions of two unequivocally anachronistic ceramic categories, Late Bronze Age and Halaf Fine Ware as far down as level A5 (Fig. 13.4). Their stratigraphic distributions correlate strongly: wherever one finds Late Bronze Age sherds at Tell Sabi Abyad, one also tends to find Halaf Fine Ware sherds. This may at least partly be explained by the circumstance that both periods were present at Operation III and by the circumstance that both categories found their way into Late Bronze Age mud bricks and fill levels. The amounts of these intrusions remain very low, fortunately. Relatively large numbers of intrusions are found only in the final A-level (level A1), which lies quite close to the surface of the mound. However, this bias is minimal (less than 1%) proportional to the huge sample size of the level A1 ceramic assemblage. We may conclude that the Late Neolithic depositions survived pretty much intact from the Assyrian onslaught and the Medieval burials.

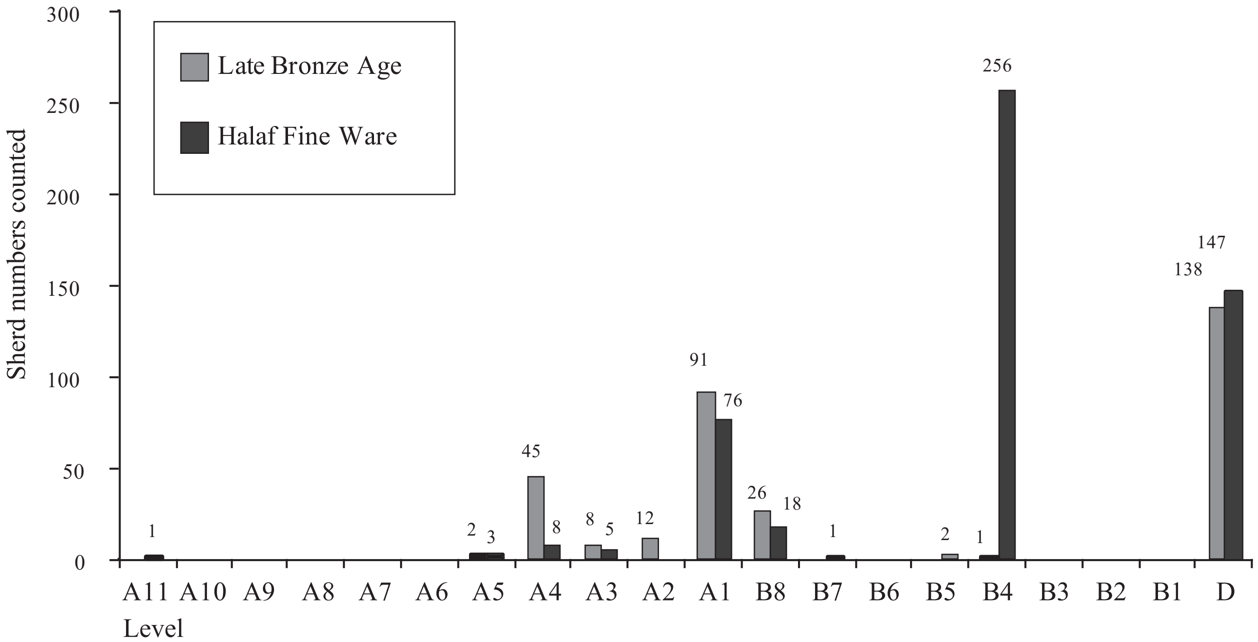


Fig. 13.4 Tell Sabi Abyad, Operation III. The co-varying distributions of Late Bronze Age and Halaf Fine Ware sherds in the A, B and D sequences (Raw Counts).

Two conspicuous exceptions deserve some discussion: level B4, dated to the Pre-Halaf period, and the various strata constituting the D-sequence. Much of the Halaf pottery recovered from Pre-Halaf level B4 all stem from a single feature: an enigmatic silo-like feature dug into the Pre-Halaf levels in trench J5. On typological grounds this material may be attributed to the Early Halaf, and it has been presented as such in this report (Chapter 4.11). The other Halaf Fine Ware sherds from this level all come from the same trench (trench J5), but they are typologically dated to the later Halaf period. In contrast to the common pattern of LBA-Halaf covariance, however, no Late Bronze Age sherds were recovered from level B4. This suggests that this Halaf material cannot be dismissed so easily as intrusive from the LBA. Rather, it is provisionally interpreted as coming from the later Halaf strata of the D-Sequence in these trenches (Chapter 4.11). The D-levels, yielded Halaf Fine Ware and Bronze Age pottery in almost equal amounts (Fig. 13.4). The D-levels are associated with the poorly-preserved remains of Halaf tholoi, severely maltreated by Late Bronze Age activities. All this resulted in a unique mixture of material from various periods (Chapter 11.4).

13.3. Late Neolithic fragmentation and deposition in Operation III

The classification of depositional contexts as presented in Table 2.2 allows for an exploration of the depositional context of the Neolithic pottery from Operation III. This shows that the ceramics from the A and B Sequences overwhelmingly came from outdoor, 'open area' contexts (Fig. 13.5). Almost two-thirds of the material comes from an open area (62% of all sherds counted). Room fills and pits, too, are quantitatively relevant, yielding 17% and 9% of the material, respectively. These distributions are quite similar to those observed for the faunal material (Russell 2010, 99, table 6.8). The relevance of these three categories varies from level to level, but in almost each level they are quantitatively the most important (Fig. 13.6). Much less important are platforms (3% of the bulk), ovens (2%), floors (3%), and the general category of 'construction' (2%). Other spatial-contextual groups yielded even less pottery, including bins, basins, hearths, and the left-over category of 'general' layers. Although comparative data are scarce, it would seem that this pattern is fairly similar to what was observed earlier at Operation I (Nieuwenhuyse 2007, 55–61), and perhaps it is to some extent characteristic for Late Neolithic sites from Upper Mesopotamia.

As can be expected, there is considerable diachronic variation in the contributions of each of these depositional categories (Fig. 13.6). The excavated levels differed greatly in their spatial layout. Only the earliest levels in

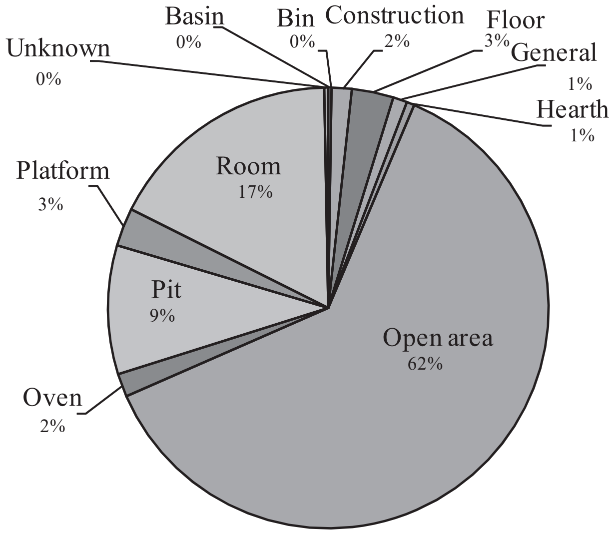


Fig. 13.5 Tell Sabi Abyad, Operation III. The broad depositional context of the pottery excavated from the A-B Sequences. Halaf Fine Ware, Bronze Age and burial contexts excluded (based on sherd frequency counts).

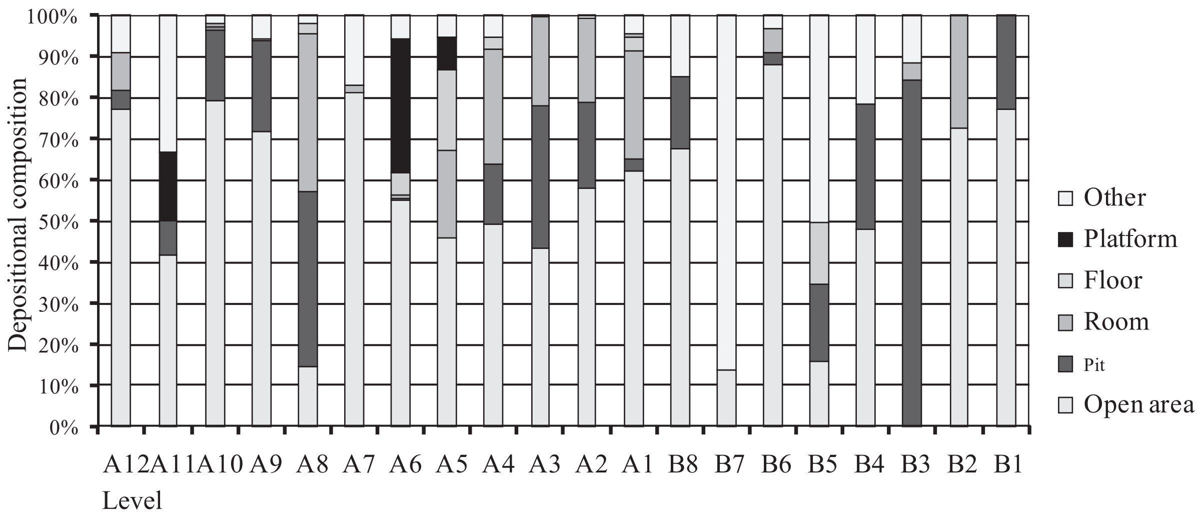


Fig. 13.6 Tell Sabi Abyad, Operation III. Changes in depositional context of the pottery excavated from the A–B Sequences. Halaf Fine Ware, Bronze Age and burial contexts excluded (based on sherd frequency counts).

Operation III demonstrated spatial continuity, as buildings alternated with platforms upon(?) the same location. But even here the contextual composition of the ceramic sample varies strongly from one level to the next (Fig. 13.6). Apart from changes in spatial layout, variability in depositional practices will have influenced the nature of the pottery sample. Rooms may have been abandoned in various manners, sometimes filling up quickly with eroded materials, sometimes being reused, sometimes ending up being gradually filled with trash. Open areas were often used for activities involving the use or abandonment of pottery containers in some quantity, but sometimes they appear to have been kept relatively empty. The present data set does not allow us to disentangle this variability beyond simply indicating its existence.

Thus, the proportion of 'open areas' present in a context varies strongly, without any apparent trends. Open areas are particularly important, proportionally, for levels A12, A10, A7, B8 and B2-1 (Fig. 13.6). Room fills, on the other hand, come to the fore in levels A10– A8, A4–A2, and in some of the B-levels. Interestingly, the proportions with which these two outdoor-indoor categories contributed to the pottery sample do not seem to be inversely related. Likewise, the part played by the category of 'floors' cannot be directly related to the presence of rooms; floors are particularly relevant for levels A6 to A5, and level B5. Platforms were not excavated from each and every level; they contributed to the pottery sample especially in levels A11, A6, and A5. Finally, the category of 'other' collects various contextual groups that differ in importance for different levels. Level A11 yielded a very small pottery sample, of which part came from 'construction'. 'Construction' is proportionally relevant, too, for level A7. In levels B8 and B5 the excavations of ovens situated on outdoor courtyards yielded much of the pottery from these levels. In level B7, although excavated at a limited scale, most of the excavated material in fact came from the fill of a single oven.

As became already apparent from the individual descriptions of the various wares (Chapter 4), the pottery recovered from these contexts was on the whole very fragmented. This comes across from the low percentages of complete pottery containers, the limited remaining radiuses of the rims and bases, and the small average weight of the extant body sherds (the BMI, see Chapter 3). This may generally be interpreted as reflecting secondary or tertiary depositions for most of the excavated remains. A similar conclusion was gained from the faunal material (Russell 2010, 241). The obvious exception are the prehistoric burials, quite a number of which yielded intact pottery vessels. These ritually buried, complete pots were left untouched *in situ* for eight millennia (Chapter 14).

Apart from the burials, large ceramic fragments, quite a number of intact profiles, and a considerable amount of complete pottery artefacts were recovered from a range of contexts. This points to a more dynamic depositional and post-depositional context than can be captured with the crude estimates from the pottery analysis alone. The distinction between a 'complete' pot and a 'sherd' may at first sight appear to be relatively straight-forward. It might be thought that the identification of 'completes' is analytically easy: complete pottery 'objects should be intact with minimal damage. A pragmatic formal definition of a 'pottery object' was employed at Tell Sabi Abyad: 'objects' are containers that have *both* a rim and a base preserved, hence showing a complete profile (Chapter 3). During the pottery processing a subtler distinction was maintained between 'completes', entirely or almost intact, and 'sections', broken but with both a rim and a base. This approach kept them analytically distinct from rim fragments and body sherds.

Confronted with archaeological field data, however, these neat categories run into difficulties. Where does one draw the analytical boundary between the extremes of 'really very fragmented' and 'wonderfully preserved intact'? A gradual continuum between these opposites typically characterises ceramic fragmentation. Moreover, the plant-tempered Standard Ware shows a strong tendency for low, thick-walled shapes to be much more often preserved with both a rim and a base. Thus, the small-find register of formal 'pottery objects' of the Tell Sabi Abyad project is dominated by sections of small bowls and sordid husking trays. Tall, thin-walled jars are rarely preserved intact; not a single example of a complete Mineral Coarse Ware cooking pot 'object' has ever been recorded at the site.

By allowing the ceramic data to speak for itself, we may use both 'sherds' and 'completes' to scrutinise the spread of pottery fragmentation. One useful proxy for the 'completeness' of the vessel is its radius, the proportion of the rim preserved. Complete vessels, ideally, should have a radius approximating 360^{o}, or 100% of the rim preserved. Figure 13.8 shows the distribution of the radiuses of rim fragments, sections, and complete pottery vessels from Operation III. A clear three-fold categorisation emerges. To the 'complete' end of the spectrum is a small group of vessels that have their orifice preserved entirely (360^{o}, or 100%), or almost entirely. This category consists of objects formally classified in the field as 'pottery objects'; items within this group at least may unequivocally be considered 'complete pots'.

Moving closer to the opposite end, a second category displays a radius ranging between ca. 180^{o} and 300^{o} (between 50% and 8 % of the rim preserved) (Fig. 13.8). This category, too, formally includes some 'pottery objects', including a few items counted as 'complete' even if part of their rim is missing. Items in this category may provisionally be termed 'large fragments'. Finally, there is the great mass of rim sherds. They have a radius (much) less than 180^{o} (50% of the rim present). Items in this category were sometimes still counted as a 'section' (if they had both a rim and a base) but technically they are all 'fragments'. Grounded in the pottery data this 'bottom up' categorisation may provide a useful starting point for exploring the spatial distributions of pottery containers at Late Neolithic Tell Sabi Abyad. Not every item formally registered as an 'object' was in fact complete. *Vice-versa*,

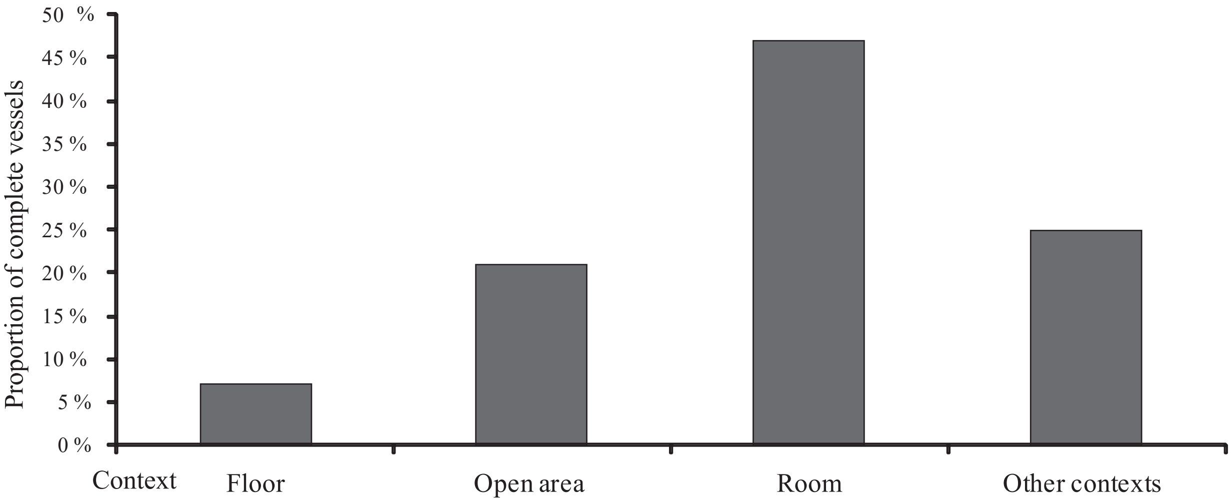


Fig. 13.7 Tell Sabi Abyad, Operation III. Proportions of context types from which complete pottery objects were recovered comparing floor contexts, open areas, room fills and 'other' context types (basin, bin, construction, hearth, oven, pit, and platform) (based on sherd frequency counts).

large fragments may be a relevant category to consider in addition to the very small group of complete objects.

Complete pottery containers comprise no more than approximately 0.1% of all the excavated material in Operation III. An additional 0.4% (frequency counts) were described as 'sections': they were incomplete but had both a rim and a base preserved, hence showing the complete profile. In total, only 0,5 % of the bulk permits the reconstruction of the intact vessel's shape. While these complete pottery objects were recovered from a range of depositional contexts, not all context types yielded similar amounts of complete pottery vessels. Contexts that only very rarely yielded complete artefacts include bins, hearths and ovens. These were mostly small Standard Ware bowls or small goblets. The context group 'construction' includes two small Standard Ware bowls that were buried within the walls of a level A1 building.

A major depositional group for the recovery of complete objects is the general category of 'open areas'. Of all the complete artefacts recorded about 21% came from an open area (Fig. 13.7). This high figure may seem remarkable considering the open, unprotected character of many of the courtyards excavated at Operation III. Yet, it points to considerable numbers of pottery containers being used and/or discarded outside of the buildings. To put this into perspective, the greater majority of the ceramic material recovered from open areas are sherds, 'fragments' (ca.99,7 % of all sherds counted). Complete artefacts thus represent a minute proportion of the material recovered from open areas. The enormous volume of open areas excavated in Operation III simply ensured a relatively high number of complete vessels collected from these contexts

Perhaps surprisingly, very few complete vessels were recovered from contexts designated as 'floors'. However, quite a number came from 'room fills', the stratified fills immediately above the floors. The category of 'room fills' in fact contains the highest proportion of complete pottery containers of all context types, after the burials. Room fills comprise only 17% of all excavated depositional contexts containing pottery, yet they yielded almost *half* of all complete vessels (Fig. 13.7). In many rooms the pottery containers appear to be 'floating' in the fills. This perhaps suggests that they were deposited inside the rooms after the room itself had been abandoned, or that the biography of the rooms included multiple levels of floors. The identification of floors remains problematic with the macro-scale excavation methods employed at Tell Sabi Abyad, and some floors may not have been recognised as such.

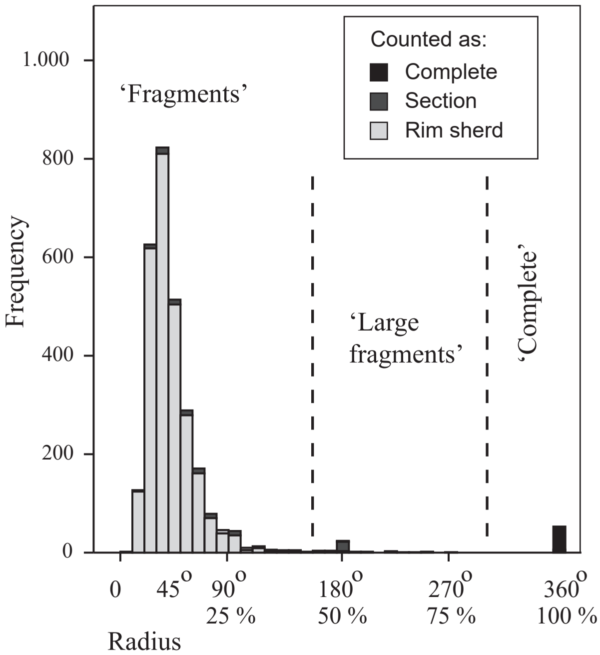


Fig. 13.8 Tell Sabi Abyad, Operation III. Distribution of Standard Ware rim radius, distinguishing between items counted as 'complete', 'section' (holding both a rim and a base) and 'rim sherd'. The radius suggests a three-fold categorisation, provisionally termed 'Fragments', 'Large fragments', and 'Completes'.

The potential of room fills as a depositional category for complete pottery containers reflects two main factors: tell formation and cultural practices of discarding. Characteristic for prehistoric inhabitation mounds across Upper Mesopotamia, the ongoing sequence of alternating construction, abandonment, erosion, and reconstruction of buildings made of loam stimulated the rapid vertical build-up of archaeological strata. This process filled up abandoned spaces, thereby burying and safe-guarding abandoned features (Akkermans 2014; Rosen 1986; Wilkinson 2003). Practices of discard directly influence what was deposited inside abandoned buildings, and how much of it. At Tell Kurdu in the Amuq, rooms were kept relatively clean during their lifetime: high densities of archaeological finds were concentrated in the open areas between the buildings (Özbal and Gerritsen 2013). At Tell Sabi Abyad some rooms were apparently regularly used for the discard of intact pottery objects, and these were buried fast enough to survive as identifiable artefacts.

We may further probe the distinctiveness of rooms as a depositional category by examining two proxies for ceramic fragmentation: the average weight of the body sherds (BMI), and the preserved proportion of the rim preserved (Chapter 3). Both estimates were calculated on the basis of a single ware group, Standard Ware, to minimise biases from differential breakage rates(?) between wares. Standard Ware represents the bulk of the material and was recovered from all context types. If we compute the BMI on the basis of the pottery counts, including *all* body sherds counted, subtle differences between indoor and outdoor contexts emerge. Room fills gain slightly larger BMI's than open areas (38.6 g *versus* 31.4 g, respectively). In spite of wide standard deviations these differences turn out to be statistically significant. However, other context types such as pits, ovens, and especially bins have large BMI's as well (75.0 g, 36.8 g, and 193.8 g, respectively), putting the values from rooms and open area into perspective. To the degree that BMI does reflect differential preservation, a broader range of contexts apparently offered good preservation. If we had considered only diagnostic sherds, the distinctiveness of room fills would increase. The overall Standard Ware BMI values are higher with diagnostic sherds; this is because the smallest, non-diagnostic sherds, duly included in the overall counts, were not selected for further description. Rooms now gain the highest values of all context types (an average BMI of 82 g). In contrast, diagnostic Standard Ware body sherds from open areas have a BMI of 43 g, half that of room fills.[3]

Exploring the preserved radiuses of Standard Ware rims again yields subtle but meaningful differences between context types. Once again, the highest values come from 'bins', followed, curiously, by 'construction' contexts. Also in this measurement, room fills score relatively high, with an average radius of 66^o (18% of the rim preserved), rather similar to floors with an average radius of 69^o (19% of the rim preserved). In contrast, open areas and outdoor 'general' layers score the lowest values with average radiuses of 49^o and 46^o (14% and 13%, respectively).[4] In conclusion, room fills not only yielded complete pottery vessels more often, but also have relatively high BMI and rim preservation in comparison to open spaces. We tentatively conclude that a combination of pottery use, discard patterns, and the enclosed character of rooms resulted in a reduced fragmentation of the pottery deposited in them.

The category of 'platforms' displays the exact opposite pattern. On average no more than 3% of all the pottery excavated at Operation III came from a platform fill. Platforms are relevant as a depositional category only in some levels of the A-Sequence. However, in these levels their contribution was more visible (levels A11, A6 and A5; Fig. 13.6). The observation that their fills contained pottery sherds makes them relevant: this material may be residual and pre-date the levels in which the platforms were constructed. The excavations show that platforms were made of different types of soil, which apparently included soil dug from the site itself. The platform fills yielded not a single complete pottery vessel. So far there is no evidence for deliberate caching of pottery containers in any of the platforms. Of all the context types, the Standard Ware BMI is lowest for platforms (24 g), while the average radius preserved for Standard Ware rims ranks as the lowest of all contextual categories (45^o, or 13%). The analysis of the faunal material, too, attested to strong fragmentation of bones recovered from platforms (Russell 2010, 92). In short, the pottery recovered from platforms fills is very fragmented and it almost certainly represents tertiary material.

Almost all of the pottery recovered from platform fills was Standard Ware, but those from the upper A-levels also contained some Grey-Black Ware and Fine Mineral Tempered Ware. In contrast, the platforms excavated in levels A11 and A10 contained nothing more than a few Early Mineral Ware sherds (A11: n = 2; A10: n = 1). As these must have been slightly older than the levels to which the platform constructions are attributed they may somewhat bias the composition of the pottery assemblages from levels A12 to A10 (Chapter 11.4). For level A10 this bias would have had a minimal impact, but the sample for levels A12–A11 are so small as to make even two sherds a measurable distortion. A platform from level A9 contained two Early Mineral Ware sherds that must have been much older than level A9 itself, probably stemming from levels A12–A11.

Pits are present in every level excavated in the A and B Sequences. Overall, they contributed about 9 % to the pottery counts (Fig. 13.5). However, as with other context types the importance of pits as a contributing factor varied through time (Fig. 13.6). Occasionally they yielded complete pottery containers, but less often than floors or interior room contexts. No more than 0.1% of all the material recovered from pits was complete; *vice-versa* about 8% of all complete pottery vessels came from a pit. Some of the more intact pottery containers deposited in pits may have been put there purposely for a variety of reasons; the more fragmented items may have been contained in the soil with which the pit was filled. Once filled in, the pottery contained in the pit fragmented less severely than in open area contexts. The Standard Ware BMI is high (75 g). The radius of Standard Ware rims in pits ranks between those of open areas and rooms (54° or 15 %).

The overall contribution made by ovens is fairly low (2%, Fig. 13.5). Interestingly, through time the relevance of this context type, too, varied strongly. In the earliest levels ovens seem to have played no role at all. No sherds were recovered from ovens in level A12–A8 and level A6, while levels A7 and A5 yielded almost no sherds from ovens ($n = 2$ and $n = 3$, respectively). Ovens apparently did not yet figure as a space for the deposition of pottery. It is only from level A4 on that pottery recovered from ovens forms a regular component of the pottery assemblage. In some of the upper levels, ovens became an important source for pottery, especially in the B-levels. The ovens from level B8 all yielded pottery. Almost all of the excavated ceramics in level B7 came from ovens and much of the ceramics in level B5 came from ovens. On average this pottery is fairly fragmented, and the average BMI measures 37 g (total sherd count), just below the value for room fills. The average radius ranks between those from open areas and rooms (53° or 15 %). The excavations yielded just a single complete pot from an oven in level B8. This was a small red-slipped Standard Ware bowl that showed a white-black burnt interior suggestive of intense heat. Its uses may have involved containing burning ashes or other hot materials coming from the oven. The vessel may have been left inside the oven afterwards.

13.4. Fragmentation and deposition in Operations IV–V

This section shall briefly explore the depositional context and spatial distributions of pottery containers in Operations IV and V. The excavations reported several complete, *in situ* pottery objects coming from these areas. On closer inspection, the analytical definition of a 'complete' pottery vessel poses the same challenges as in Operation III. Using the radius of the rim as a proxy for ceramic fragmentation, a pattern emerges that is essentially the same as for Operation III (Fig. 13.9). A clear three-fold distinction is apparent. At the 'complete' end of the spectrum is a small group of vessels that have their orifice preserved entirely (360°, or 100%). This group consists exclusively of objects described as 'complete' and was formally registered as 'pottery objects'. A second group of 'large fragments' are characterised by a radius ranging between ca. 180° and 300° (between 50% and 83% preserved). Finally, the bulk of rim sherds display a radius (much) less than 180° (less than 50% of the rim present); these may be called 'fragments'.

This classification does not inform us as to *why* artefacts ended up at the locations from which they were excavated. There is no intrinsic reason to assume that either complete vessels or large fragments were simply abandoned at their exact location of use. Yet it seems reasonable to assume that they were discarded not too far from where they were used in the past. Had this been

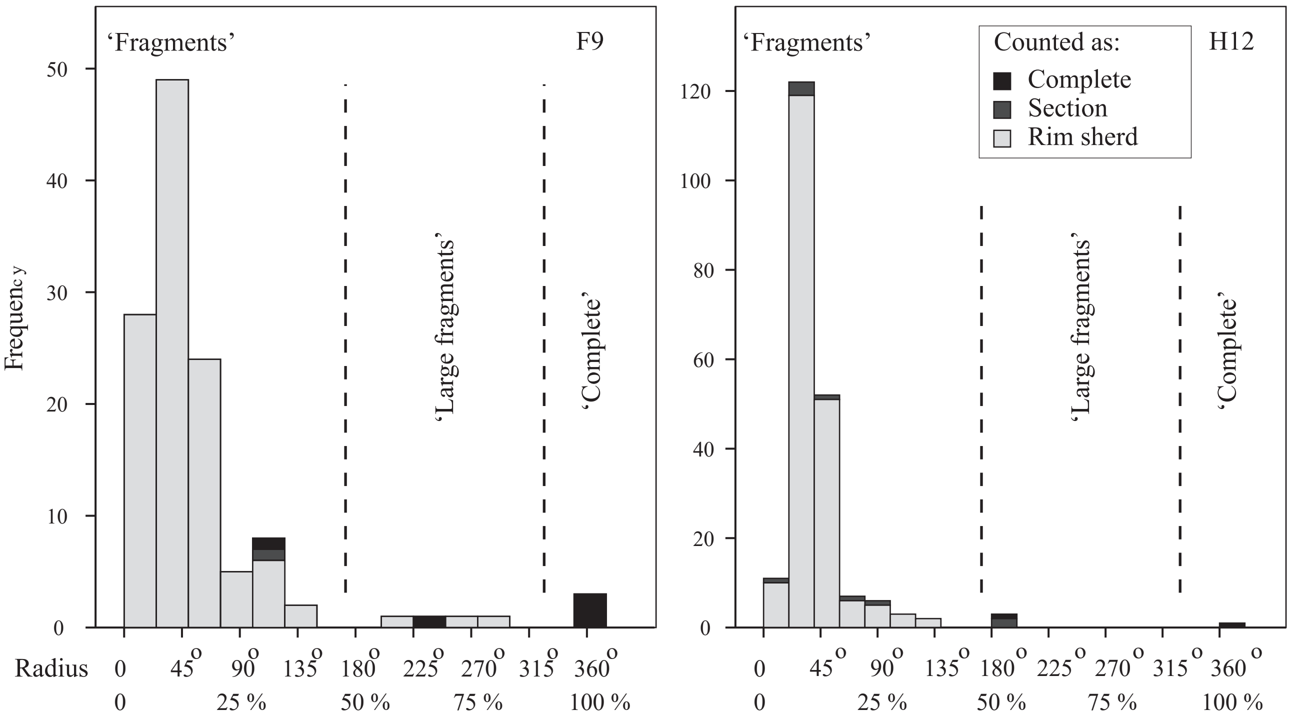


Fig. 13.9 Tell Sabi Abyad, Operations IV and V. Distribution of the rim radius, distinguishing between items counted as 'complete', 'section' (holding both a rim and a base) and 'rim sherd'. The radius suggests a three-fold categorisation, provisionally termed 'Fragments', 'Large fragments', and 'Completes'.

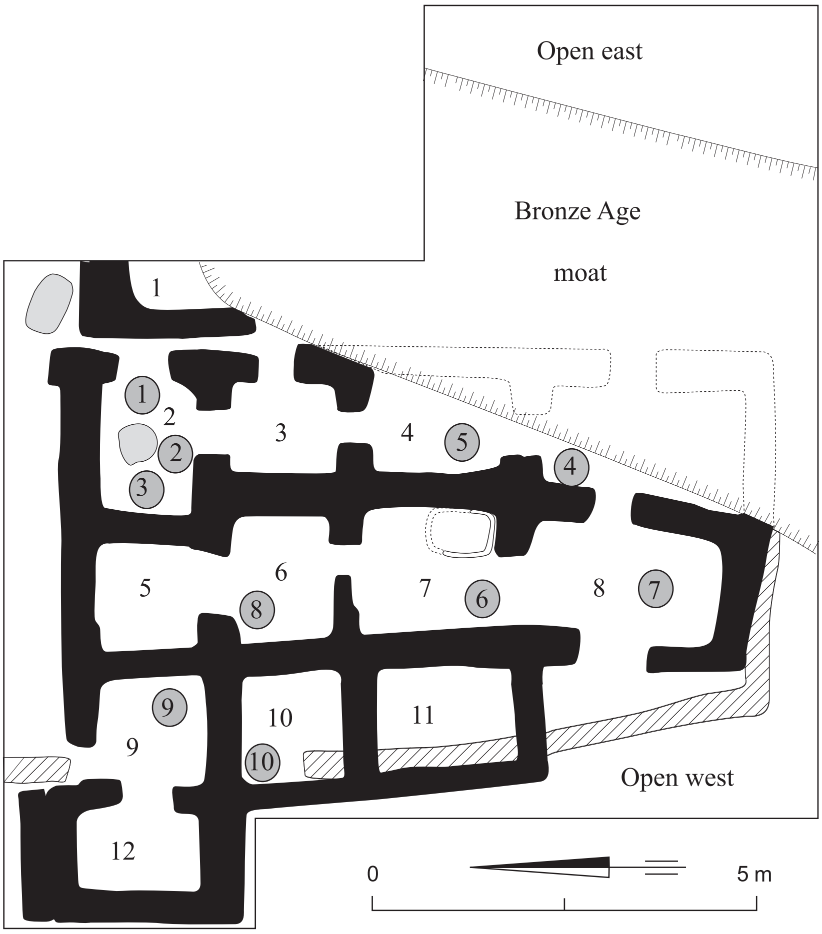


Fig. 13.10 Tell Sabi Abyad, Operation IV. 'Pottery plan' of Building I (trench F9), showing the distributions of complete vessels and large fragments (encircled). For quantified descriptions of room contents and individual pottery containers see Table 13.1.

the case, their subsequent relocation by humans, animals, and the natural processes of tell formation would have resulted in notably increased levels of fragmentation. In other words, they would have ended up in the category of 'fragments'. Therefore, the two categories of 'completes' and 'large fragments' are both tentatively presented here as potential *in situ* finds.

Similar to intact pottery containers, however, even quite fragmented sherds were sometimes adopted for some secondary purpose and abandoned at, or close to, their location of use. Examples from Tell Sabi Abyad include: body sherds used as palettes or scrapers, lower parts of Standard Ware jars reused as ovens, or sherds deposited purposely inside buildings for ritual purposes (Akkermans *et al.* 2012; Nieuwenhuyse 2007). The fragmentation statistics by themselves will not clarify such actions, which can only be accomplished by a close and contextualised reading of the excavated ceramics. For Operation V a number of the lower parts of vessels were interpreted as possible *in situ* finds on the basis of their depositional context. Firmly dug into the floors of buildings, they were apparently used as stationary containers at these locations.

Thus, we arrive at what we may provisionally call the 'pottery plans' for Operations IV and V, which show the spatial distributions of the pottery finds from these two excavations (Figs. 13.10 and 13.11). The complete vessels are described separately (Tables 13.1 and 13.2). Apart from the complete pottery containers and large fragments, the total amounts of sherds recovered from the rooms and open spaces, pottery densities, and the amounts of intrusive Halaf Fine Ware (HFW) and Late Bronze Age (LBA) are listed.

Clearly, these two buildings do not represent 'Pompeii-like' conditions with all objects left intact at their final locations of use (Verhoeven 1999). Rooms, courtyards, and ovens across Operations IV and V were littered with broken, fragmented and incomplete pottery, amongst which a few handful of completes and larger fragments were interspersed. Almost two-thousand pottery items were recorded from Operation IV Building I alone; nearly a thousand from the various constructions in Operation V. Some of the rooms clearly produced much more sherds from their fills than others, attesting to different post-abandonment uses of the spaces. At first sight, in absolute numbers, open areas would seem to contain more pottery than interior spaces. However, translated into densities, a different picture emerges. The average densities of interior spaces (ca. 139 sherds/m^3 for both areas) are far above those from the adjacent open areas

Table 13.1 Tell Sabi Abyad, Operation IV. Pottery quantities by numbered room (upper) and descriptions of complete vessels and large fragments (lower)

Space	*Total sherds*	*Densities sherds/m³*	*Intrusive LBA/HFW*	*No. of completes*	*No. of large fragments*	*Fig. 13.10:*
Room 1	322	785.4	5 (1.5%)	–	–	
Room 2	239	179.7	1 (0.4%)	3	–	1, 2, 3
Room 3	289	309.4	3 (1.0%)	–	–	
Room 4	159	123.8	6 (3.8%)	1	1	4,5
Room 5	26	25.9	0	–	–	
Room 6	60	50.9	2 (3.4%)	–	1	8
Room 7	148	122.2	0	–	1	6
Room 8	317	171.7	0	–	1	7
Room 9	22	17.9	0	–	1	9
Room 10	74	78.6	4 (5.4%)	–	1	10
Room 11	58	54.2	0	–	–	
Room 12	150	165	15 (10.0%)	–	–	
Total Building I	1.864	139.6	36 (1.9%)	4 (0.2%)	6 (0.3%)	
Open area west	105	101.0	16 (15.2%)	–	–	
Open area east	476	–	127 (26.6%)	–	–	

Fig. 13.10:	*ID*	*Ware*	*Type*	*Radius°*	*Diameter (cm)*	*Volume (litres)*	*Illustration*
1	P02-16	SW	Vertical pot	360	17	4.9	Fig. 12.4; Pl. 12.2:6
2	P02-26	SW	Hole mouth pot	360	19	6.5l	Fig. 12.4; Pl. 12.2:2
3	P02-208	GBW	S-shaped pot	360	12	6.5l	Fig. 12.4; Pl. 12.3:8
4	P02-133	SW	Convex-sided bowl	360	9.5	0.5l	Fig. 12.4; Pl. 12.1:6
5	F9 34-52:4	SW	Vertical pot	270	27	–	–
6	F9 21-30:1	GBW	S-shaped pot	>100	8	2.2	Pl. 12.3:9
7	F9 24-33:12	SW	Convex-sided bowl	280	20	–	–
8	P02-166	SW	Hole mouth pot	225	22.5	23.8l	Fig. 12.4; Pl. 12.2:1
9	P02-183	SW	Hole mouth pot	360°?	Uncertain	–	–
10	F9 44-88:7	SW	Convex-sided bowl	200	8	0.1	Pl. 12.1:8

For locations: see Fig. 13.10 (not all items were sufficiently complete to allow the reconstruction of the capacity. No density estimate available for 'open area east')

(Fig. 13.10, Fig. 13.11). Abandoned rooms were often reused as collectors of refuse (Verhoeven 1999).

Throughout these rooms and courtyards are scatters of Late Bronze Age material and Halaf Fine Ware, but the distribution of this intrusive material is rather uneven. In Operation IV the two open areas adjacent to the building contained significant proportions of intrusions, as did room 12 of this building (Table 13.1). In Operation V, the fill of room 1 in particular was heavily contaminated by activities from above (Table 13.2); this room contained more LBA than Neolithic material! Anything prehistoric recovered from this room should be treated with a healthy dose of suspicion.

Yet, the figures clearly point to conditions favourable to the preservation of pottery containers deposited inside buildings. Sherd densities show that on average more pottery was deposited inside buildings than outside, even if values fluctuate wildly from room to room. In both areas the excavated rooms yielded relatively high proportions of complete shapes and large fragments. They represent about 0.5% of the pottery recovered from the fills of Building I in Operation IV, and about 0.3% of the material from Operation V. This might not come across as very impressive, but it ranks significantly higher than the values for Operation III in general, where on average the archaeological depositions contained no more than about 0.1% of complete vessels. The figures from the buildings of Operations IV and V correspond quite closely to those from, specifically, room contexts in Operation III (about 0.3%). The average rim radius preserved of the pottery varies from room to room but in general it is much higher than what is common for most depositional contexts in Operation III. For Operation IV Building I the average radius of Standard Ware rims measures 61°; for the various rooms in Operation V it is 62° (17% and 18% of the rim preserved, respectively). These values are close to those measured for room fills, bins, and floor depositions in Operation III.

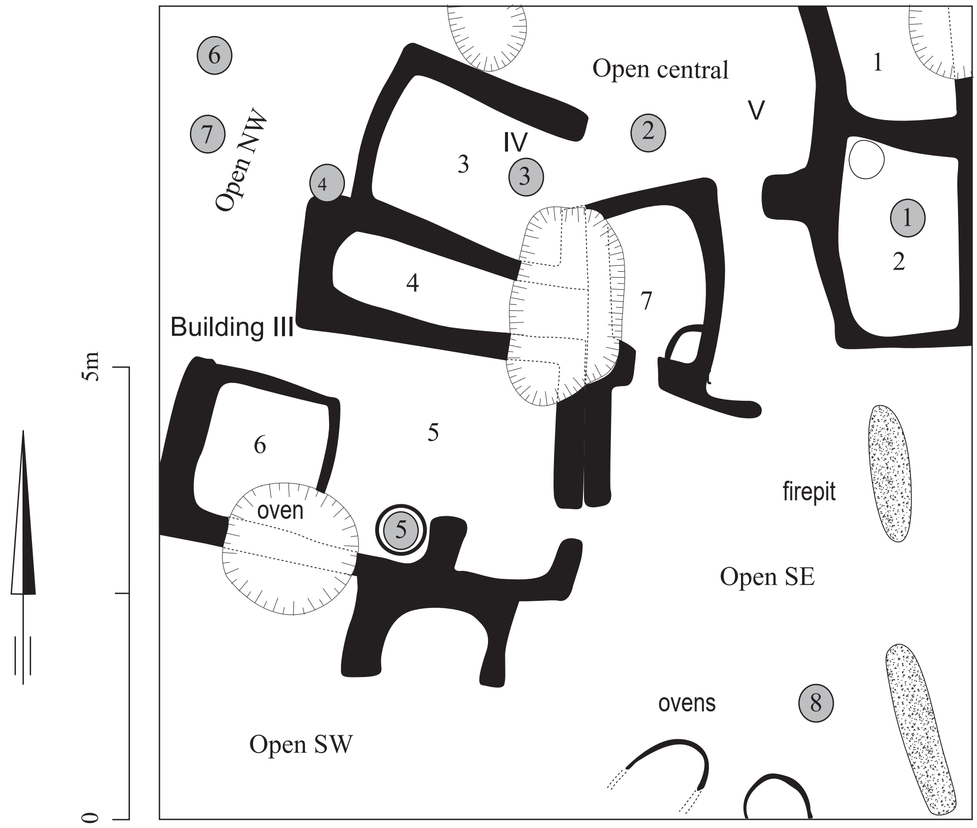


Fig. 13.11 Tell Sabi Abyad, Operation V. 'Pottery plan' of the buildings of trench H12, showing the distributions of complete vessels and large fragments (encircled). For quantified descriptions of room contents and individual pottery containers see Table 13.2.

So, if we accept that the depositions of large fragments and complete pots are related to activities conducted either at those locations or at least close by, what might the distributions tell us? A full assessment should await the future investigation of other artefacts and features (e.g. hearths, fireplaces, bins, silos), but we may offer some preliminary observations. The buildings were constructed at a time the use of pottery had already been firmly integrated into society, long after its initial adoption. Pottery containers were involved in a wide range of activities conducted in and around the house. These included the full spectrum for which the Late Neolithic has become so well known, including a package of crafts, food preparation and consumption, and storage.

The material from Building I in Operation IV suggests that activities involving Grey-Black Ware and Fine Mineral Tempered Ware were carried out inside the house. The building yielded two closed S-shaped cooking pots from rooms 2 and 7, both accessible through doorways (Fig. 3.10, items 3 and 6, respectively). One pot was plain but the other carried a (so far) unique pattern-burnished decoration, perhaps symbolically attesting to the social importance of displaying the preparation of food in pots (Fig. 12.8, 9). The Fine Mineral-Tempered Ware pot from room 2 was found directly adjacent to a hearth, which may well have been its location of use.

In Operation V the spatial signal of food preparation involving pottery containers is less immediately visible. These Pre-Halaf period buildings were constructed when FMTW/GBW were gradually replaced by Dark-Faced Burnished Ware and Mineral Coarse Ware as cooking wares. A small number of DFBW and MCW sherds were recovered both from outdoor and indoor spaces, but without any concentration or apparent contextual association. In Operation I, concentrations of DFBW were sometimes found outside buildings in the Pre-Halaf period, suggesting that the use of this pottery was outside (Nieuwenhuyse 2007). No corresponding concentrations can so far be pointed out in Operation V. Did cooking food not take place in and around the Operation V buildings?

In Operation V several Standard Ware jars can be associated with the buildings, pointing to the dry storage of grains, pulses, or other goods. Interestingly, the contextual evidence suggests that they were all intended to be used as fixed, stationary items, effectively becoming part of the house itself. In room 2, the lower part of a medium-sized jar was found placed next to a bin (Fig. 3.11, item no. 1). Its upper half had been truncated by the Assyrians when they levelled the site. This room would have been difficult to access as no door or opening was found. Once put inside, this heavy container would not have been intended to be moved about or taken out on a regular basis.[5] In room 3, a medium-sized jar with a volume of 6,5 litres was placed on the floor close to the entrance. Its lower part was firmly embedded on all sides by lumps of plaster (Fig. 13.11, item no. 3). This may have

Table 13.2 Tell Sabi Abyad, Operation IV. Pottery quantities by numbered room (upper) and descriptions of complete vessels and large fragments (lower)

Space	*Total sherds*	*Densities sherds/m³*	*Intrusive LBA/HFW*	*No. of completes*	*No of large fragments*	*Fig. 13.11:*
Room 1	169	266.1	92 (54.4%)	–	–	
Room 2	270	197.5	83 (30.1%)	1 (0.4 %)	–	1
Room 3	224	197.9	11 (4.9%)	–	1 (0.5 %)	3
Room 4	54	77.2	8 (14.8%)	–	–	
Room 5	73	63.5	0	1 (1.4 %)	–	5
Room 6	12	38	0	–	–	
Toom 7	68	69.5	0	–	–	
Total Building	870	138.6	194 (22.3%)	2 (0.2 %)	1 (0.1 %)	
Open area central	317	91.5	57 (18.0%)	1 (0.3 %)	–	2
Open area NW	538	125.8	20 (3.7%)	3 (0.6 %)	–	4, 6, 7
Open area SW	397	59.5	16 (4.0%)	–	–	
Open area SE	206	9.1	3 (1.5%)	1 (0.5 %)	–	8

Fig. 13.10:	*ID*	*Ware*	*Type*	*Radius*	*Diameter (cm)*	*Volume (litres)*	*Illustration*
1	H12 63-224:1	SW	Jar	360°	13.5	–	–
2	P01-84	SW	Husking tray	>180°	Oval	14.6 l	Pl. 12.7: 1
3	P01-54	SW	Jar	190°	11.5	6.5 l	Fig. 6.4; Pl. 12.9: 1.
4	P01-129	SW	Re-used jar	360°	Base: 9	7.9 l	–
5	H12 114	SW	Reused jar	360°	35	24.7 l	–
6	H12 64-198:2	SW	Husking tray	>180°	Oval	–	Pl. 12.8: 3
7	P01-53	SW	Husking tray	180°	Oval	–	–
8	P01-79	SW	Vertical carinated bowl	180°	Oval	–	–

For locations: see Fig. 13.11 (not all items were sufficiently complete to allow the reconstruction of the capacity. No density estimate available for 'open area east')

been done to stabilise the container, or equally to reduce its porosity (Plate 28.1). The vessel itself had also been plastered (Fig. 6.3; Fig. 12.14, 1). Next to the vessel a Standard Ware rim fragment carrying a large plaster repair was found (Chapter 8); this plastered sherd seems to have been adopted as part of the plaster package within which the pot was embedded (Fig. 12.14, 2). Finally, a medium-sized jar was recovered from a pit dug in a corner against the outer wall face of rooms 3 and 4 (Fig. 13.11, item no. 4). The upper part (i.e. the opening of the jar) would have stuck out above the ground (Fig. 13.12).

In Operation IV, Building I was occupied at a time when voluminous storage jars were not yet being produced. Instead of these, the excavations identified several hole-mouth pots of sometimes considerable size and capacity placed inside the house. These were functionally equivalent to the later collared vessels, attesting to the importance of storage in Building I. In total three such hole-mouth pots were excavated, all in different rooms (Fig. 3.10, items no. 2, 8, and 9). They could contain between 6,5 and 24 litres. All of these rooms had doorways and were accessible. In room 2, accessible from two sides, a hole-mouth pot was associated with other vessel types including a Grey-Black Ware cooking pot and a vertical pot with loop handles. The hole-mouth pots from Operation IV all seem to have been placed directly on floors rather than in pits or with plaster coverings.

The relevance of activities other than food preparation and storage are hinted at by the pottery finds, but we are presently hard-pressed to identify the precise functional uses of pottery types, even of those that were fairly common. For instance, spatially associated with cooking and with storage, the two vertical pots from Building I remain enigmatic. Their uses must have involved activities carried out inside the house, but we do not (yet) know what these may have been. They may have held specific substances for shorter periods, possibly in anticipation of, or as part of the scheduling of, food preparation or craft activities. Several bowls were found in the building. These may have been multifunctional with uses in the realms of food preparation, consumption, and/or display.

In Operation V, the deposition of no less than four husking trays may shed some light onto their use. Perhaps significant is that they all came from outdoor areas, close to the buildings but not inside of them. A large husking tray was found upside-down laying on the courtyard between various spaces (Fig. 3.11, item no. 2). It is possible that this reflects a secondary use of this object

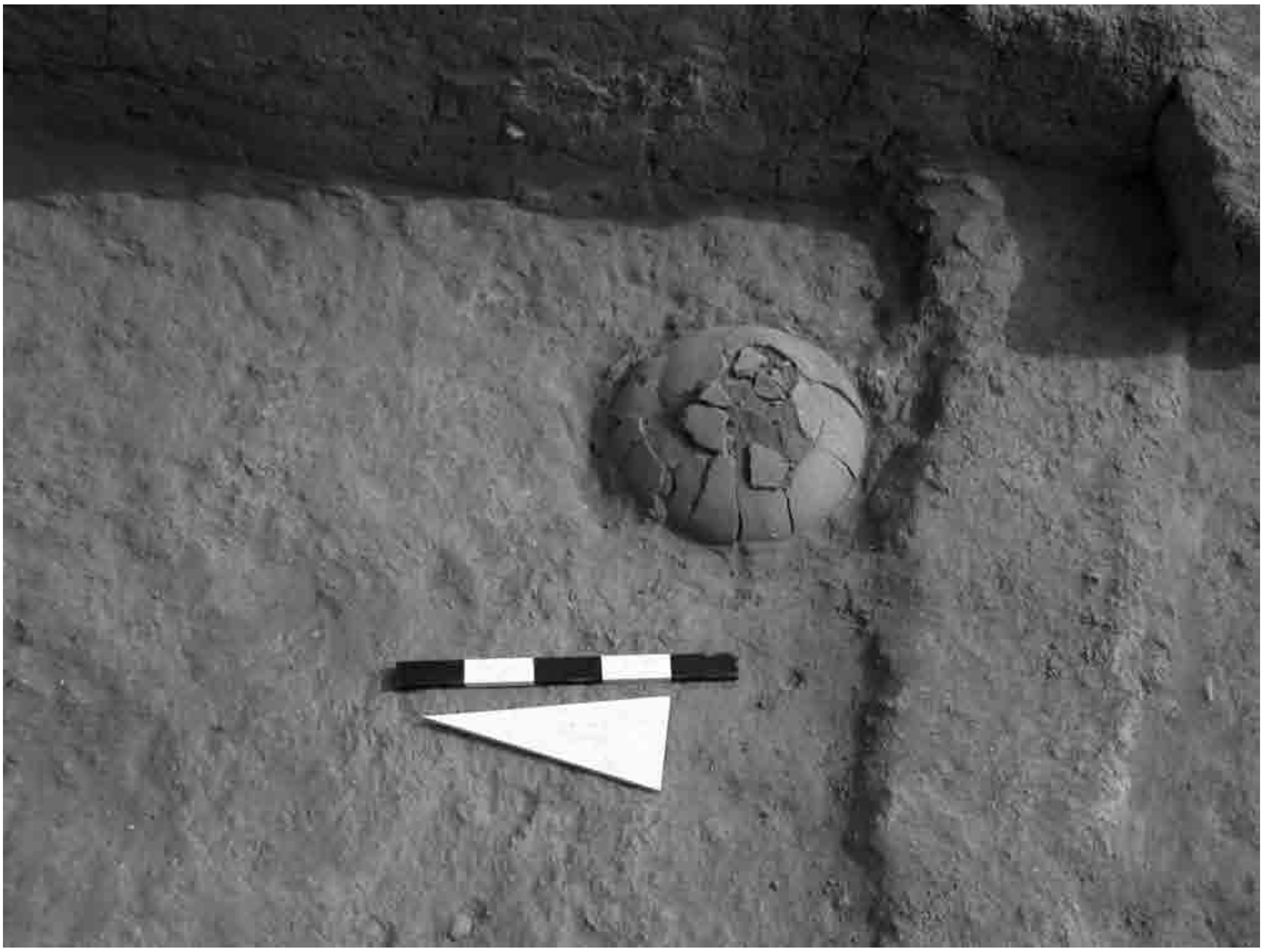


Fig. 13.12 Tell Sabi Abyad, Operation V. Standard Ware medium-sized jar P01-129 dug into a pit against the outer face of a building (Fig. 13.11, item 4) (image Tell Sabi Abyad Project).

as a platform rather than as a container. The primary use certainly will have been with its bottom down. The precise functions of these enigmatic but very characteristic objects remains to be elucidated, although processing grains, making bread, and processing dairy products have been suggested (Chapter 4). Perhaps relevant is the spatial association with ashy layers, fire pits, and small ad-hoc fireplaces in the outside courtyards.

Finally, Operation V provided a good example of the re-use of coarse Standard Ware pottery. The lower part of a large storage jar had been severed from its upper parts, after which it was buried in a pit inside room 5, in a corner between two walls (Fig. 3.11, item no. 5, Pl. 28.2). This adds to the growing list of examples at Tell Sabi Abyad of re-using large, coarse Standard Ware containers as parts of ovens, as containers for human burials, or as stationary bins. The interior was plastered, presumably to reduce porosity, suggesting that the containment of liquid substances was amongst its uses. It cannot be ascertained whether the plaster had been applied before the vessel was cut in halves, or after it had been embedded in the house (the corresponding walls of the house were not plastered). In its new location it functioned as a durable, non-porous, stationary bin with a capacity of ca. 25 litres. This old pottery container had been made part of the very body of the house.

Notes

1 A third provenance for Late Bronze Age bricks appears to have been the field surrounding the settlement. In contrast to bricks made of archaeological soil, which appears in grey, ashy colors, bricks made of natural soil are reddish and do not contain archaeological materials. The excavations did not distinguish between individual bricks.

2 The pottery recovered from the Late Bronze Age moat includes 14% Late Bronze Age sherds. Another 13% are Halaf Fine Ware sherds. The remaining three-quarters of the fill dates to the Early Pottery Neolithic.

3 The difference is significant at the .01 level.

4 These fairly small differences are statistically significant.

5 This vessel was too fragmented to permit the reconstruction of its volume.

Chapter 14

Ceramics from the cemeteries

Jo-Hannah Plug and Olivier Nieuwenhuyse

14.1. Introduction

A special depositional context for pottery containers at Operation III was the Late Neolithic cemeteries located on the northwestern parts of the mound. As items buried in a closed, ritual context, pottery selected as grave goods represent the only unequivocal depositions of intact pottery vessels identified so far at Tell Sabi Abyad (Akkermans 2008; Plug *et al.* 2014). But the ceramic vessels contained in the burials are important for reasons other than constructing pottery typologies. The presence of pottery vessels in some of the graves forms a consistent pattern. Their incorporation in burial rites in the later 7th millennium set the beginning of a cultural practice that was to endure for thousands of years. The use of pottery both as grave goods and as containers for the body is widely attested in the Hassuna, Samarra, and Halaf periods, and it continued throughout, and far beyond, the Ubaid period in Upper Mesopotamia (Akkermans 1989c; Campbell 1992; Campbell and Green, eds., 1995; Hijara 1978; Hole 1989; Tekin 2013; Tsuneki 2013). Yet, although thousands of later prehistoric burials containing pottery vessels have been recovered by archaeologists, published records of the material itself often remain rather sketchy. If the burial goods are discussed at all, often this amounts to little more than merely mentioning the presence of pots and other grave goods (but see Tekin 2013; Tsuneki 2013).

The study of the cemeteries and their grave goods forms part of a broader investigation of burial practices at Late Neolithic Tell Sabi Abyad. A detailed discussion would lead much beyond the scope of this chapter (Akkermans 2008; Plug *et al.* 2014). Focussing more narrowly on the pottery, this chapter aims to address the following questions: What types of pottery container were deemed suitable to be given with the dead? What were the typological, stylistic and functional properties of pottery vessels selected for burial? How does the presence of pottery relate to aspects of identity such as age or gender? In short, which cultural practices involving ceramic vessels can be identified mediating between the world of the living and the realm of the dead? Grasping these issues is a vital first step towards understanding the ritual roles of ceramic containers, the role of funerary culture in the negotiation of social identities, and Late Neolithic notions of the afterlife.

14.2. Cemeteries at Tell Sabi Abyad

Until the start of the 2004 campaign only a handful of graves had been found at Tell Sabi Abyad. These graves almost exclusively held the remains of children; notably, adults were usually missing (Akkermans 2008, 2013b, 40; Otte *et al.* 2014). Starting with the 2004 campaign and until the last campaign of work in 2009, a total of 192 graves of men, women and children were excavated in Operation III. Located on the northeastern slope of the highest point of the mound, these graves were dug over a period of several centuries. The cemeteries seem to have spread out at times and concentrated at others, slowly shifting northeastwards along with the overall growth of the mound. However, they always more or less formed a band along the northeast slope of the highest point of the site.

Most of the graves appear to have been dug either into open areas or in decaying abandoned architecture. So far no graves in Operation III can be associated with buildings *during* their use (Plug *et al.* 2014). Most interestingly, only in a very few cases we may unequivocally state that grave pits disturbed one another. The graves were always more or less evenly spread instead, sometimes quite obviously taking each other's location into account. This hints at the possibility that burials were physically marked on the surface, although the nature of such 'grave markers' remains entirely speculative.

Table 14.1 Tell Sabi Abyad, Operation III. Absolute dates of the cemeteries, showing numbers of graves, numbers of graves with goods, numbers of graves containing pottery and total numbers of pottery of cemeteries included in the pilot study. Burials not included in the pilot study have not been attributed to a specific period and are here considered as 'Not dated' (after Plug et al. *2014)*

Cemetery	*Cal BC*	*Period*	*No. burials*	*With goods*	*With pots*	*Total pots*
Not dated			43	14	2 (5 %)	4
End of burials	5865–5790	Early Halaf (C-Seq.)	–	–	–	–
Cemetery 1	5895–5805	Early Halaf (C-Seq.)	20	10 (50%)	1 (5%)	1
Cemetery 2	No dates	Early Halaf (C-Seq.)	5	1 (20%)	–	–
Cemetery 3	6000–5900	B-C Seq. transition	39	20 (51%)	9 (23%)	16
Cemetery 4	6090–5985	Transitional (B-Seq.)	25	16 (64%)	4 (16%)	6
Cemetery 5	6145–6070	Transitional (B-Seq.)	12	9 (75%)	1 (8%)	1
Cemetery 6	6235–6145	Pre-Halaf (B-Seq.)	11	8 (73%)	6 (55%)	8
Cemetery 7	6380–6225	Early Pottery Neolithic to Pre-Halaf (A-Seq.)	37	21 (51%)	3 (8%)	5
Start of burials	6405–6345	Early Pottery Neolithic (A-Seq.)	–	–	–	–

In line with common practice for Late Neolithic burials across Upper Mesopotamia, the graves almost all consisted of simple, unlined pits, usually between 0.5 m and 1 m deep. The deceased were usually interred in a crouched position, lying on their side. Single, primary burials were the most common. However, multiple and secondary burials also occur, as do primary burials in deviant positions (Akkermans 2013b, 41). Certain bodily positions stand out as extraordinary. For example, a remarkable group, most intriguingly, shows signs of burning *inside* the chest cavity. The bones in this region were articulated and sometimes small pieces of charcoal were still present. Most likely burning embers had been inserted though the abdomen into the chest (Radix 2009; Vos 2012).

Detailed stratigraphic analysis (Plug *et al.* 2014) allowed for the secure placement of 149 of the total of 192 graves into the chronology of Operation III. Seven stratigraphically and chronologically distinct phases of funerary use were distinguished, which have been termed Cemeteries 1–7, with calibrated time ranges from the later Early Pottery Neolithic into the Early Halaf (Table 14.1). The examination of the stratigraphic contexts and the corresponding radiocarbon data of the individual graves showed that the northeast slope of the mound was used more or less continuously as a burial ground. So far no convincing episodes of disuse of the area for mortuary purposes can be recognised.

14.3. Depositions of pottery

Those containers that were found mostly intact we shall consider to be *grave goods*, in the strictly formal sense of (*intact*) objects purposely placed in proximity of the body to accompany the dead. Two additional categories of ceramic objects discussed in this chapter include pottery that was adopted as a container for holding the body itself (see below) and fragmented pottery sherds that were found in close proximity to the body and presumably used as tools or ritualised objects (see below). The latter two categories shall be briefly discussed separately. Finally, the fill of the burial pits also included fragmented pottery sherds lacking any spatial association with the body; these will not be discussed further here.

Grave goods were recovered from slightly more than half of the graves in Operation III (99 out of 192 graves, or 52%). A remarkable diversity is attested. Those that have survived in the archaeological record include objects made of flint, obsidian, various other types of stone, bone, shell, pottery, and unfired clay. In addition to pottery containers, they include items of personal ornamentation, various types of tools and containers made in materials other than ceramic. But in general pottery figured quite frequently. Complete pottery vessels were recovered from as many as 27 graves (about 15% of the burials). They yielded a total of 41 intact ceramic vessels.

In the field, since they were intact, pottery vessels we consider as grave goods were all formally registered as 'objects' (Chapter 3). This included a single item of which only half of the vessel orifice had been preserved: a Standard Ware small jar from burial BN08-8 (P08-21). A large part of its rim was missing, resulting in a preserved rim radius of only 180^{o} (50% of the rim preserved), but otherwise the vessel was quite complete. In this case the vessel was rather brittle and fragile; sherds may easily have been lost when the grave was excavated. Some of the other vessels, too, have a few chips missing from the rim, which may represent damage from past use or the effects of excavation. But on the whole the radius of the rims measures a near-perfect 360^{o}, or 100% of the rim preserved (Fig. 4.2). In stark contrast to the mass of fragmented pottery recovered from virtually all other depositional contexts at Tell Sabi Abyad, then, most of the grave goods rank as 'complete' (compare Fig. 14.2 with Fig. 13.8 and Fig. 13.9).

While this may present good news for museum curators, it is significant that apparently these containers were given with the dead *intact*. None of the burial vessels in Operation III was purposely smashed as part of its ritual deposition; they were all carefully placed with the body

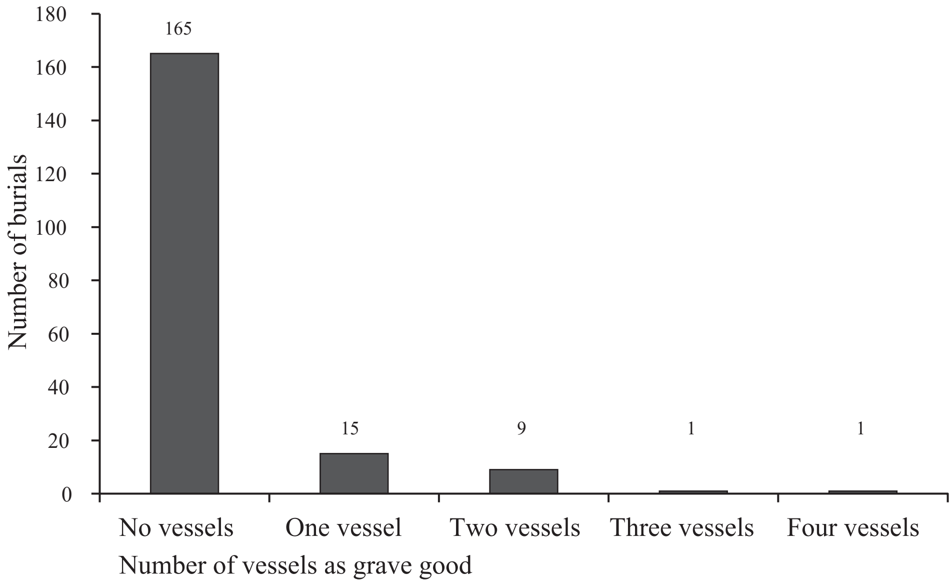


Fig. 14.1 Tell Sabi Abyad, Operation III.The cemetery. Numbers of pots in burials.

instead. Furthermore, the minimal damage suggests that items selected for burial were not very old. Not a single grave pot carried a repair (Chapter 8). Although many of the pots show faint scratches and some discoloration, quite possibly caused by their long sojourn underground, we cannot identify worn-out items, battered after prolonged heavy use. Had their prior use been sufficiently intense as to make them less functional for everyday activities, we would expect more wear and tear. We would expect the rims to show damage, which should have resulted in a somewhat lower preserved radius. The pots appear to have been fully functional in terms of their physical performance properties when they were selected for burial.

In Operation III, pottery vessels in a grave are mostly found as singular items (*n* = 15, 58% of all burials with pots) (Fig. 14.1). Less often we find two vessels (*n* = 9, 39% of all pot burials) (e.g. Fig. 14.3). More than two pots coming together in a single grave was exceptional. One unique burial (BN09-40), containing the remains of a woman in her early 20s, yielded four vessels, three from the vicinity of the pelvis and the fourth placed behind the head (Pl. 29). One of the vessels had its orifice covered by a sherd, presumably to protect its contents. This remarkable burial was special in other aspects, too. It was one of the few burials with evidence of scorching in the thoracic cavity. In addition to the four pottery items, it included a small stone bowl, a needle, two beads, and a labret recovered *in situ* from the frontal jaw of the deceased. The only other case of the placement of more than two pots in a grave was a burial of a 5–7-year-old child, buried with three vessels (BN08-43). One was placed between the head and the shoulder, another directly in front of the face and a third in front of the body.

Even though there do not appear to have been very strict rules guiding the placement of pottery, it was far from random. Pottery containers were usually laid down in upright position, standing on the base with the orifice

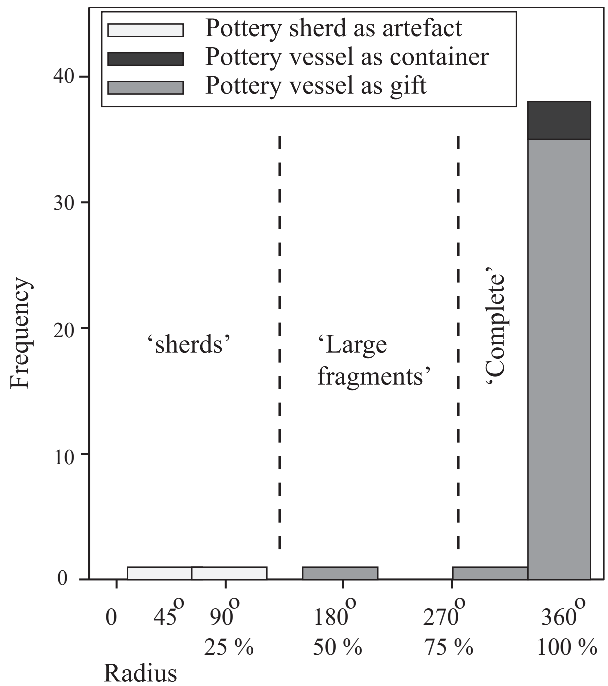


Fig. 14.2 Tell Sabi Abyad, Operation III.The cemetery. Distribution of the rim radius of pottery containers recovered from the burials, distinguishing between ceramic items interpreted as 'gifts', 'containers' and 'artefacts'. Note that for most 'artefacts' no radius could be measured.

up. This position would have supported a practical role as receptacles for holding goods. Occasionally they are found in upside down position or a diagonal, tilted orientation (*n* = 8, or 20% of all burial pots). In some of these cases it seems possible that the vessel was in fact deposited standing upright but subsided when the pit was filled. In most of these cases, however, we are confident that people purposely deposited the pot upside down (e.g. Pl. 30.1). Here the practical function as containers may have been

Fig. 14.3 Tell Sabi Abyad, Operation III. Burial of child with burial goods (BN09-12, Cemetery 3). These two pots (P09-27 and P09-28, for the latter see Fig. 4.75: 5) contained animal bones (image Tell Sabi Abyad Project).

irrelevant, and a richer set of possibilities should be considered. Pots placed upside-down may have functioned as containers in a purely symbolic sense, they may represent containers emptied during the burial rite, or perhaps they were purposely placed in a way that negated their practical use as food containers. Below we shall discuss examples of pottery used to cover the body, as 'lids'. Speculating, vessels placed upside down may have been 'lidding' something too, which may have been either the body, food, or perhaps immaterial entities such as ghosts or spirits.

Moreover, pottery vessels were not deposited just anywhere in the pit. Always placed in close proximity to the body, they show a marked preference for two specific bodily associations: near the head or the face, or near the lower body (close to the pelvis, or feet). These bodily positions appear in descending order: most often the pots were placed close to the head (45%), followed by the lower body (36%) (Fig. 14.5). Pots placed in other positions comprise the remaining 19%. The association of burial pots with the head or face had already been witnessed in Operation I (Akkermans *et al.*, eds., 2014; Nieuwenhuyse 2007) and clearly represents a recurrent feature of the Late Neolithic burial ritual. So far we fail to detect any clear time trend. Although the lower body location seems to have been more popular in cemeteries 7 and 3, the general order of preference may have been relatively constant throughout the period of use of the cemeteries.

Further, the position of the vessel relative to the body shows a marked relationship with the *type* of vessel. Vessels placed at the head of the individual are almost entirely made up of bowls (89%), while near the lower body we find a more equal distribution of bowls and jars. Bowls were therefore much more often recovered from close to the head (57% of all bowls) than from any other bodily position. Even if we separate burials holding multiple pottery vessels, the relationship holds: when multiple bowls were interred they were mostly placed by the head; if a bowl and a jar were deposited, the bowl usually went to the head and the jar to the lower body.

Possibly the importance of pottery as a grave good fluctuated through time, although we emphasise that the sample remains small (Fig. 14.4). Whereas in Cemetery 7 complete vessels are found in about 8% of the graves, this rose to over 55% in subsequent Cemetery 6. During the following period the numbers decreased sharply down to 8% (Cemetery 5), then rose again somewhat during cemeteries 4 and 3(16% and 23%), then dropped again to 5% in Cemetery 1. Accepting the small sample for what it is, the presence of pottery as gifts seems to have co-varied with the presence of grave goods in general (Fig. 14.4). Episodes during which many of the burials were provided with gifts also characterise themselves by more frequent depositions of pottery. However, this pattern is certainly not exclusive; Cemetery 5 yielded a high number of burial goods that included a very low

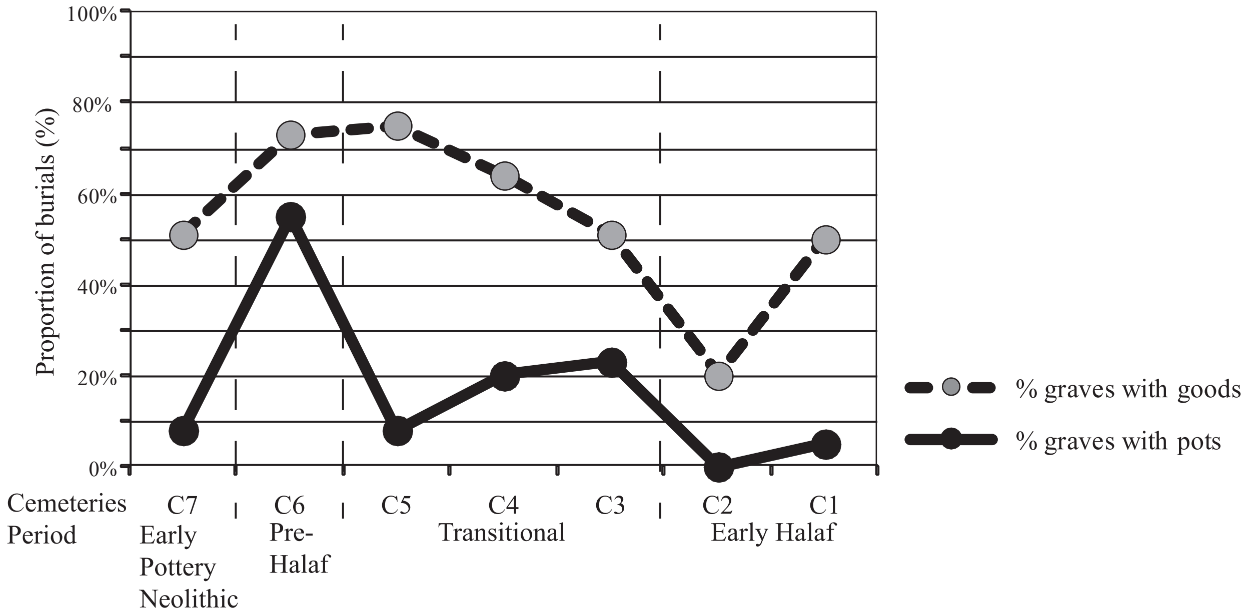


Fig. 14.4 Tell Sabi Abyad, Operation III. Proportions of human burials with grave goods (dotted) and with pottery as grave good (solid).

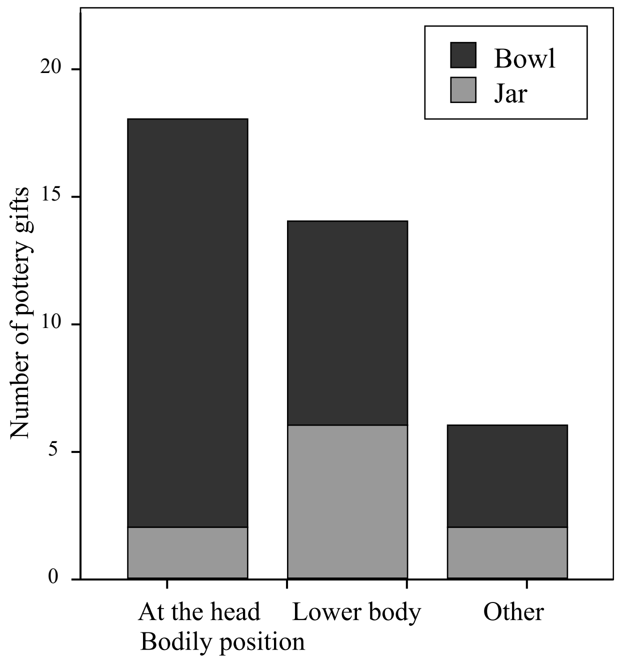


Fig. 14.5 Tell Sabi Abyad, Operation III. Numbers of bodily associations of pottery burial gifts, distinguishing between bowls and jars.

proportion of pottery. We should perhaps look at these figures as suggesting not a very rigidly-set funeral rite but rather a *performance*, where difference ritual experts might draw on the same metaphors but with different emphases at different times (Campbell *et al.* 2014; Pollock 2011).

14.4. Selecting pots for burial

While the deposition of pottery containers in burials may have focused on selecting intact vessels that in principle would have been perfectly functional in everyday life, this does not mean that the burial assemblage perfectly matches the ceramic assemblage in currency in the broader village at times when the burials rituals were enacted. Subtle selective mechanisms were at work. Their effects can be identified in at least three domains: first, the suitability of specific wares; second, the proportions of plain and decorated vessels; and finally a marked preference for vessels of a selected range of types, more to the point of a very limited range of *sizes*.

The large majority of the burial gifts were Standard Ware (83% of all burial pots) (Table 14.2). In addition just five Standard Fine Ware vessels were recovered, four of them in fact coming from the same burial (BN09-40, Cemetery 3). As well, Cemetery 3 yielded a single Fine Mineral Tempered Ware vessel from burial BN08-66. At face value the strong preference for Standard Ware might be thought to reflect accurately the character of the ceramic assemblage in the later 7th and early 6th millennium BC, which after all consisted mainly of coarse, plain pottery. Indeed, for burials attributed to the Pre-Halaf and Transitional periods the proportions of Standard Ware follow those from domestic contexts closely. However, it is recalled that four out of five Standard Fine Ware vessels came from a single, exceptional burial. This ware was not evenly distributed through the burial record. Furthermore, from the later Early Pottery Neolithic onwards the assemblage *did* include a suite of other wares and certainly by the Halaf period Standard Ware no longer constituted the primary ware. These other categories appear to be absent from the burial assemblage.

For instance, non-local Dark-Faced Burnished Ware makes up a good proportion of the Pre-Halaf to Transitional period ceramic assemblages, yet it is entirely lacking so far from the burial contexts. Orange Fine Ware, another non-local ware, was not selected. Significantly, just two of the 37 burials dated to the Transitional Period contained

Table 14.2 Tell Sabi Abyad, Operation III. The cemetery. The distribution of ceramic wares by cemetery

	Unclear	*Fine Mineral Tempered Ware*	*Standard Ware*	*Standard Fine Ware*	*Total*
Cemetery 1 (Early Halaf)	–	–	1	–	1
Cemetery 3 (Transitional)	–	1	10	5	16
Cemetery 4 (Transitional)	–	–	6	–	6
Cemetery 5 (Transitional)	–	–	1	–	1
Cemetery 6 (Pre-Halaf)	1	–	7	–	8
Cemetery 7 (Early PN)	–	–	5	–	5
Not dated	–	–	4	–	4
Total	1	1	34	5	41

Table 14.3 Tell Sabi Abyad, Operation III. The cemetery. The proportions of plain and decorated vessels by cemetery

	Unclear		*Plain %*		*Painted*		*Incised*		*Slipped*		*Total*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Cemetery 1 (Early Halaf)	–	–	1	100	–	–	–	–	–	–	1	100
Cemetery 3 (Transitional)	–	–	10	63	5	31	1	6	–	–	16	100
Cemetery 4 (Transitional)	–	–	6	100	–	–	–	–	–	–	6	100
Cemetery 5 (Transitional)	–	–	1	100	–	–	–	–	–	–	1	100
Cemetery 6 (Pre-Halaf)	1	14	6	75	–	–	–	–	1	13	8	100
Cemetery 7 (Early PN)	–	–	5	100	–	–	–	–	–	–	5	100
Not dated	–	–	4	100		–	–	–	–	–	4	100
Total	1	2	33	80	5	12	1	2	1	2	41	100

Standard Fine Ware, even if this ceramic category was in the ascendance in this period. By the Early Halaf the majority of the ceramic assemblage in fact consisted of painted Fine Ware, yet, curiously, the only burial pot ascribed to this period was a plain Standard Ware vessel. Not a single burial contained a Mineral Coarse Ware vessel. Evidently the limited numbers of pottery vessels recovered from the cemeteries caution against drawing strong conclusions, but it appears that, for burial, people preferentially selected locally-made, coarsely-made and relatively inconspicuous Standard Ware.

By selecting Standard Ware, moreover, people perhaps deemed stylistically inconspicuous pottery containers to be the most suitable. The large majority were in fact plain (80% of all burial pots) (Table 14.3). The five Standard Fine Ware vessels already mentioned represent the only examples of painted burial pots. In addition there was one Standard Ware vessel carrying incisions and another one carrying a red slip. Again, at first sight this would reflect the 'relentlessly plain' character of the ceramic assemblage in general. However, the Standard Ware from the later Early Pottery Neolithic, Pre-Halaf and Transitional periods was in fact often decorated. Decorated vessels comprise between 5% and 16 % of the Standard Ware (in terms of EVR) in the Pre-Halaf period (Chapter 4; Nieuwenhuyse 2007). We have already remarked on the exceptional character of the single burial containing the four painted Standard Fine Ware vessels; this burial may not be wholly representative for the burial practices on the whole. Certainly for the Early Halaf, had the burial assemblage been an accurate reflection of ceramic containers in everyday use, we would have expected a painted vessel in the grave attributed to the Early Halaf phase.

The pottery recovered from the burials at first sight shows a remarkable typological variability (Table 14.4). At least 12 different pottery types have been distinguished, following the fine-tuned typological categorisation procedures discussed elsewhere (Chapter 4). However, the large majority classify as 'bowls' (over 65% of all burial pots), and many different types of bowl in fact represent variations on a common theme. The most common are Convex-sided bowls, characterised by simple contours lacking sharp angularities. A few bowls with a carinated contour were recovered from cemeteries 6 to 3, while a Standard Fine Ware short-collared bowl came from cemetery 3. These shapes are all typical for their periods. In addition to bowls, about one-quarter are small jars, while three 'miniature' bowls were found as well.

More to the point, a major selective mechanism appears to have been the *size* of the pottery gifts. In general, burial pots were small (Fig. 14.8). The measurements for the rim diameters spread around an average of 11 cm, which ranks well below the average of Standard Ware in general (Chapter 4). This includes one exceptionally large bowl with a rim diameter of 27 cm. If this statistical 'outlier' is excluded, the vessels range between 3,5 cm and 22 cm in diameter (Fig. 14.6: A). The average height of the burial pots is no more than about 10 cm; none of them stood more than eighteen centimetres tall (Fig. 14.6: B).

Table 14.4 Tell Sabi Abyad, Operation III. The cemetery. Pottery types by cemetery

	Cemetery						*Not dated*	*Total*
	7	*6*	*5*	*4*	*3*	*1*		
Everted convex-sided bowl	–	–	–	1	–	–	–	1
Vertical convex-sided bowl	1	5	–	1	4	–	1	12
Closed convex-sided bowl	2	1	–	–	1	–	1	5
Oval convex-sided bowls	–	–	–	–	1	–	1	2
Everted straight-sided bowl	–	–	–	–	1	–	–	1
Everted carinated bowl	–	1	1	1	–	–	–	3
Low, carinated bowl	–	–	–	–	1	–	–	1
Vertical S-shaped bowl	–	–	–	–	2	–	–	1
S-shaped goblet	–	–	–	–	–	–	1	1
Low-collared bowl	–	–	–	–	1	–	–	1
Small jar	1	1	–	2	4	1	–	9
Miniature	1	–	–	1	1	–	–	3
Total	5	8	1	6	16	1	4	41

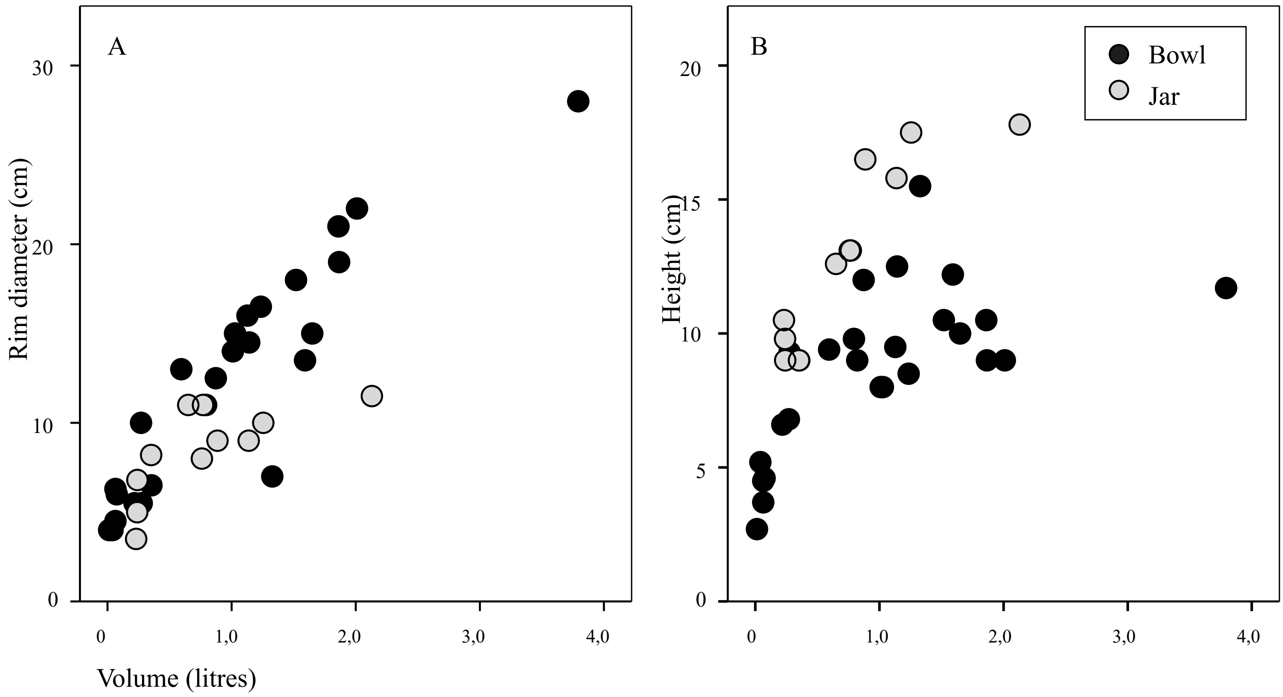


Fig. 14.6 Tell Sabi Abyad, Operation III. The cemeteries. Correlating volume capacity (litres) with vessel height (A) and with rim diameter (B), distinguishing between open shapes ('bowls') and closed shapes ('jars').

The jars in this corpus are all classified as *small* jars; three items were formally considered to be 'miniatures' (Table 14.4).

The limited size in effect reflects the restricted *volume* capacities for the burial vessels. Vessel diameter and height together affect capacity (Fig. 14.6: A–B). The bowls and jars selected for burial were rather similar in their low capacities; both groups rank as rather non-voluminous (Fig. 14.7: A). Within this rather limited band width, measured capacities range from as less than 0.01 litres to slightly less than 4 litres; the average capacity of the burial pots is slightly less than 1 litre (0.93 litre).[1]

This compares with the lower volume ranges of Standard Ware in general and with the volume estimates more typically associated with Fine Ware containers (Chapter 4). The volume distribution is reasonably continuous (Fig. 14.7: A). Perhaps for the bowls one could distinguish between 'very small' (volume less than 0.5 litres), 'small' (carrying 0.5–2.5 litres) and a single 'medium sized' bowl capable of holding almost 4 litres.

This variability in the sizes of the individual vessels ignores the circumstance that in many burials more than a single vessel were placed with the body, which may increase considerably the total container volume made

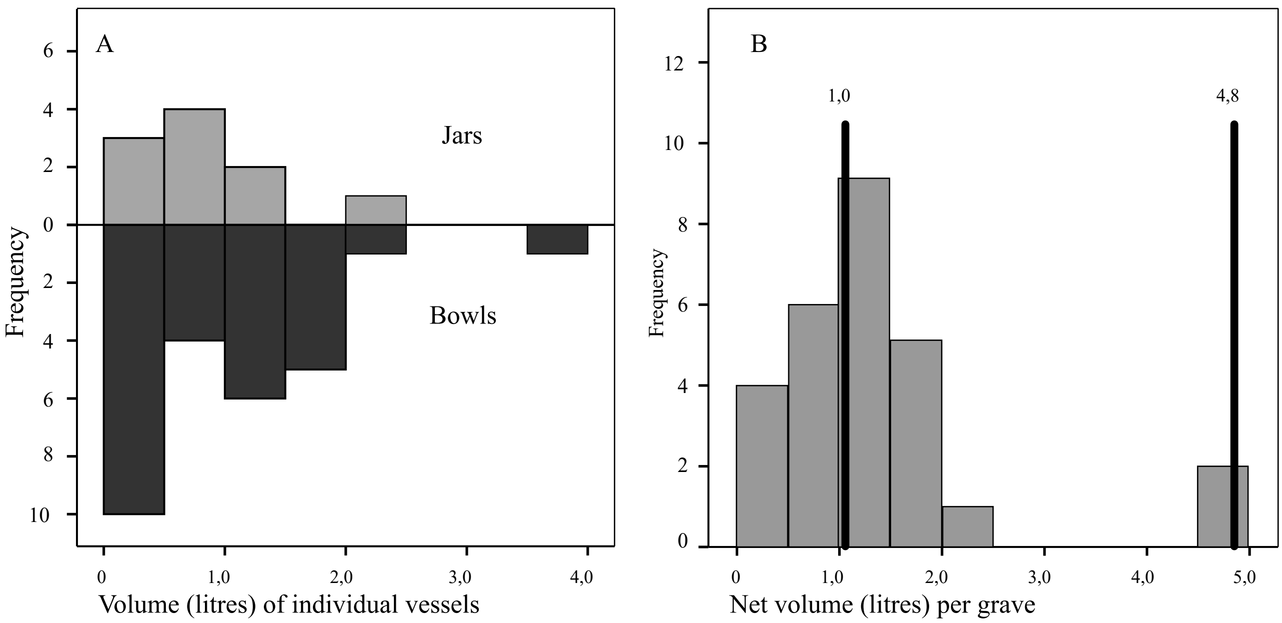


Fig. 14.7 Tell Sabi Abyad, Operation III. The cemeteries. Volume capacity (litres) for burial pots given with the dead. A. Estimates for individual vessels, distinguishing between open shapes ('bowls') and closed shapes ('jars'). B. Estimates for total container volume per burial, with vertical bars indicating average volumes within the two sub groups.

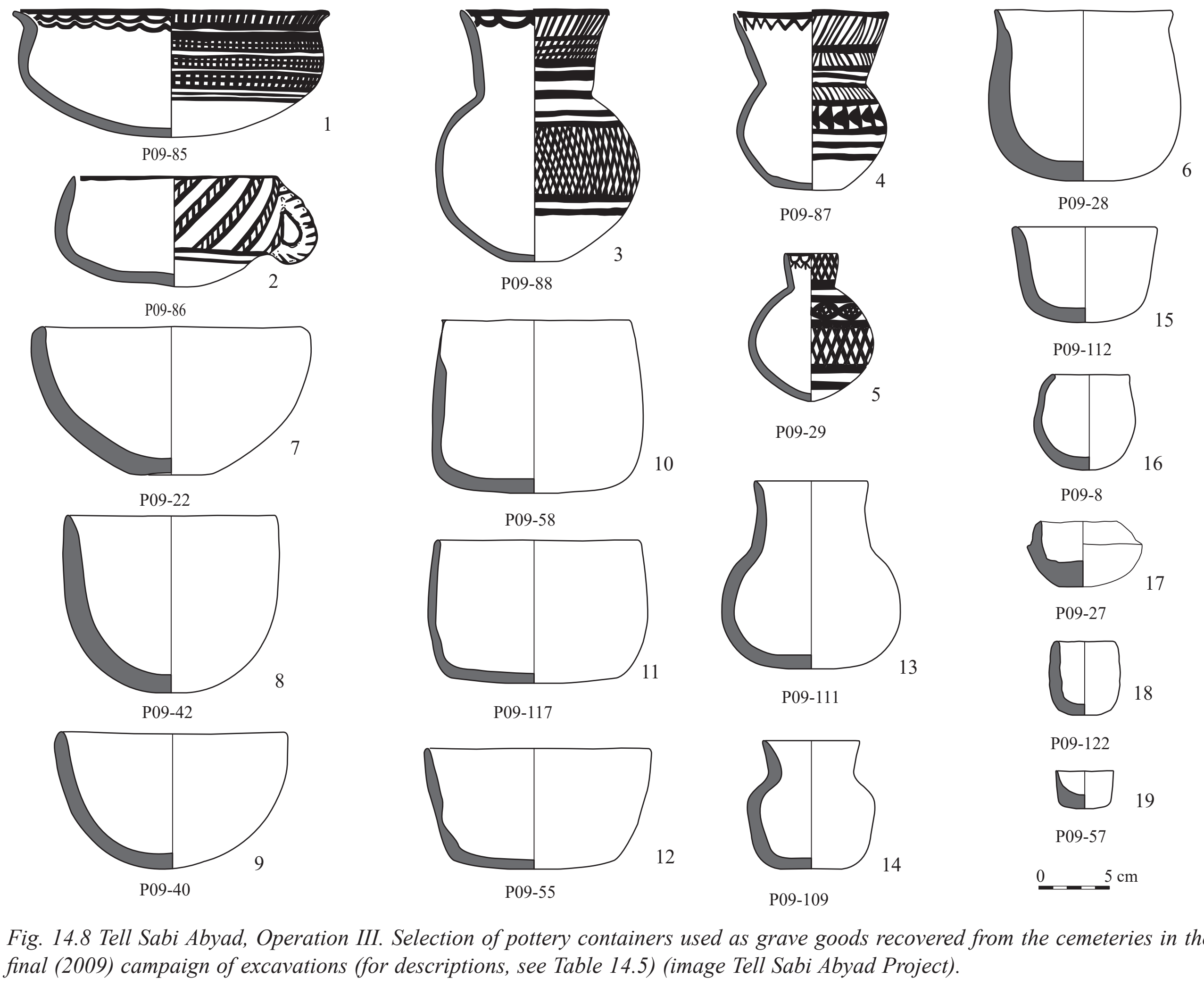


Fig. 14.8 Tell Sabi Abyad, Operation III. Selection of pottery containers used as grave goods recovered from the cemeteries in the final (2009) campaign of excavations (for descriptions, see Table 14.5) (image Tell Sabi Abyad Project).

available to the deceased. In Figure 14.7: B we plotted the accumulated container volumes per burial. This suggests a two-fold distinction. On the one hand, we find the majority of pot-holding burials in which all pottery containers put together contained less than about 2 litres. The average volume in this sub category is 1.01 litres. On the other hand there we find a much more limited sub category of burials containing 4–5 litres, with an average net volume of 4.80 litres. In the present sample just two of the burials belong to this group. This includes the already-mentioned exceptionally-rich burial BN09-40. The second 'large volume' burial BN08-60, too, was exceptional, as it was one of the 'burnt heart' graves with a relatively rich inventory including animal bone, bracelets on both wrists made of in total 94 carnelian beads, in addition to pottery.

14.5. Containers for burial

In addition to pottery vessels placed with the dead, they were also occasionally adopted as containers for holding the body. The excavations in Operation III yielded three examples of burials in which pottery vessels were used as receptacles for the deceased, in a sense 'containing' the body. One burial employed two separate large vessel fragments to make a container holding the body. The vessels in this category were all plain Standard Ware. However, containers in this category differ from those given as grave goods due to their larger volume. In contrast to the burial goods, which mainly consisted of bowls or small goblets, this category includes large, re-used storage jars. Additionally, a pedestal-base bowl was used as a 'lid' to cover the body or to close off the burial pit. Finally, what distinguishes burials in this group from the usual type of burial is the very young age of the individuals given this treatment.

One such is the burial of a foetus of 28–36 weeks pregnancy (BN07-60, Cemetery 4) (Fig. 14.9). The small body was placed, together with a bead, in a convex-sided bowl with a diameter of 23 cm and a capacity of 4.9 litres (vessel P07-48). Four Standard Ware sherds covered the small body. The interior of the vessel had received an 0.8 cm thick plaster coating. Interestingly, while Standard Ware vessels were frequently plastered at Tell Sabi Abyad, the practice was already slowly fading out during the Transitional Period to which Cemetery 4 dated (Chapter 6). Possibly people took an 'old' ceramic container for this burial. Alternatively they may have selected an item from among the rare plastered containers still available, or they purposely plastered this container as a special preparation to its ritualised use.

Another container-burial represents an interesting example of re-using a large, broken Standard Ware jar for ritual purposes (Fig. 14.10). Elsewhere at Tell Sabi Abyad large Standard Ware jars have been documented in a secondary role as ovens (Nieuwenhuyse 2007). There are interesting conceptual linkages to be made between the presumed utilitarian role of these objects as bulk storage containers facilitating subsistence and their adapted usages as 'containers' for activities involving heat, fire and ashes or for transporting the dead body to the afterlife (Akkermans *et al.* 2012; Verhoeven 2013). This specific individual represents a one-year-old infant, found in a contorted position with signs of inflammation within the skull. The infant was placed in and under the large fragments of the vessel, which themselves were placed within an oven. Together with the infant's body, within the vessel, two beads were found. An animal's horn core was placed on top of the vessel.[2] On the oven's floor various animal bones[3] and a Unio Tigridis shell were found, as well as the skull of a second, 12-year-old individual. This burial context was found in the close vicinity of additional child burials with large amounts of animal bones.

The final example concerns a plain Standard Ware convex-sided bowl with a pedestal base (object P07-53), placed on top of the body of a two-year-old child. With a diameter of 20 cm and a capacity of 1.6 litres, the vessel fits well with the category of the small, plain Standard Ware vessels given with the dead as grave goods (see above). However, in this case the vessel was placed upside down on the body, for which reason we prefer to interpret it as a lid. If it contained food, drink or other substances used during the enactment of the burial, its final function appears to have been that of a cover for the body (Fig. 14.11). Below we shall discus other examples of pottery vessels, or fragments thereof, used as a cover. The child, which was wearing a necklace, appears to have known periods of malnourishment or other stress during its short life, as evidenced by the presence of various hypoplasia's of the teeth.

Fig. 14.9 Tell Sabi Abyad, Operation III. Burial of a foetus in a plain, plastered Standard Ware bowl (vessel P07-48, BN07-60, Cemetery 4, ca. 6090–5985 cal BC). The body was covered with four Standard Ware sherds (not shown) (image Tell Sabi Abyad Project).

Fig. 14.10 Tell Sabi Abyad, Operation III. Burial of a child in a broken large Standard Ware jar (P09-71/72), together with animal bones and a human skull placed close to the container (BN09-33, Cemetery 7) (image Tell Sabi Abyad Project).

Fig. 14.11 Tell Sabi Abyad, Operation III. Pottery object P07-53, here shown in a vertical, upright position but placed in upside down position on the body (BN07-54, Cemetery 4, photographed in the Tell Sabi Abyad dig house) (image Tell Sabi Abyad Project).

14.6. Sherds as ritual artefacts

A final group of pottery 'objects' to be discussed comprises isolated, fragmented sherds that were recovered from the burials in close spatial association with the body. It is emphasised that in many cases their interpretation as items purposely involved in the burial ritual remains tentative. Evidently, the soil that filled the pits contained pottery sherds as tertiary material. However, in a number of instances (n = 29) the physical association with the body was sufficiently strong to suggest that the sherd in fact represented an *ad-hoc* 'object' recovered from an *in situ* position. In most cases the exact functional use of the sherds is not apparent, but their intentional deposition in the burials makes them relevant.

This touches on a thorny methodological issue. Whereas a small number of sherds were already identified by supervisors in the field as special 'objects' – and as a result have been individually drawn, measured, and determined – many sherds from the same burial contexts did not receive this treatment. According to established routines for artefact recording, 'sherds' without a rim-to-base profile or decoration fell outside of the formal category of 'objects' (Chapter 3). This routine introduced an unfortunate bias by excluding a group of burial items that, though not falling within the conventional image of a burial gift, might have indeed had a symbolic or functional relevance within prehistoric mortuary practices. In Late Neolithic ritual practices in general, death, fragmentation and fire are often semantically linked (Akkermans *et al.* 2012; Croucher 2012, 281; Verhoeven 2002, 2013). Thus, whereas in the field a mere handful of sherds (n = 6) were documented as 'special', the presence of several additional potential instances of purposeful deposition of sherds in graves can only be recognised *post-hoc* on the basis of photos or field reports. These cases remain entirely

Fig. 14.12 Tell Sabi Abyad, Operation III. Pottery object P09-34 (Fig. 4.74: 5), a sherd used as a receptacle for some embers, placed near the body of a young woman (BN09-35, Cemetery 7) (image Tell Sabi Abyad Project).

conjectural. Due to these limitations, we shall refrain from an extensive listing of the items, limiting the discussion to pointing out some of the more obvious examples.

Perhaps significantly, most of the well-documented examples of the deliberate inclusion of sherds within burial contexts would seem to come from a rather late stage in the cemetery sequence. Whereas one documented example came from the final stages of the Early Pottery Neolithic (Cemetery 7), most came from the Transitional to Early Halaf periods (cemeteries 5–1). At first sight this might be thought to fit a broader pattern. In general, practices of reusing pottery sherds for purposes other than those of the original container, of reshaping pottery vessels into new shapes or repairing them when they broke, seem to have started in the final stages of the Early Pottery Neolithic, becoming more pronounced during the Pre-Halaf period (Chapter 8). The adoption of sherds as objects in burial practices may therefore attest to wider conceptual changes with regard to using and reusing pottery vessels. However, if we bring the various cases tentatively identified after the fieldwork into the equation, this pattern would vanish: the field records suggest four additional cases in Cemetery 7 and several more for the earliest stages of the Pre-Halaf.[4] All we can presently say is that from the later Early Pottery Neolithic to the Early Halaf period people sometimes took fragmented sherds to use them in burial practices. Conjecturally, they may have deliberately broken vessels to create sherds to use in a burial.

In some instances we have a fairly clear idea of the functional uses of sherds found within the graves. Sometimes they were used as small receptacles. One example concerns a plain Standard Ware sherd recovered from burial BN08-23, Cemetery 5. This sherd was found inside, or directly underneath, the chest of a 38–42-year-old man. This individual had undergone the 'burnt heart' ritual, and the sherd was used as a container for holding the burning embers. Furthermore a sling missile was place behind the head of the deceased. Another burial also included the use of a sherd as a receptacle for the placement of embers within the burial context. In burial BN09-35 a sherd containing embers was placed near the pelvis of a 21–34-year-old female (Fig. 14.12). The woman was buried wearing a necklace, while additionally various animal bones were found in association with the body.

In other cases sherds appear to have been used as lids. One good example comes from burial BN09-40, the already-mentioned woman with four painted Standard Fine Ware vessels (Pl. 29). On the orifice of one of these

Fig. 14.13 Tell Sabi Abyad, Operation III. A sherd used to shelter the remains of a foetus (BN08-05, Cemetery 1) (image Tell Sabi Abyad Project).

vessels, small jar P09-88 (Fig. 4.125, 4), a sherd was placed, presumably to protect, or restrain, the vessel's contents. The sherd was of a size and shape that it fitted the orifice well. Another example comes from the burial of a foetus (BN07-60, Fig. 14.9), which was interred in a complete pottery vessel that was covered with four standard ware sherds. Yet another is seen in grave BN09-48, the burial of an infant burial with a small jar which's orifice was covered with a sherd (Pl. 30.2). The grave also included a pierced labret and an obsidian knife. Obviously, these examples beg the question if plain, inconspicuous sherds were also used as lids in non-burial contexts. If they were, this would be difficult to demonstrate with certainty.

Possibly a conceptual link may be drawn between those sherds and the intact vessels placed upside-down in a number of burials. Not only vessels were 'lidded' using sherds, also bodies appear to have been covered with these items. Both complete pots and fragments may have been placed sometimes to cover the body or, speculating, to prevent something from 'escaping'. Within several burials sherds were used either as a partial cover or a base for the body. For example, grave BN08-05 contains the remains of a foetus sheltered by a large potsherd (Fig. 14.13). Within BN05-10 a four-year-old child and an 15–20-year-old individual were placed on an underground of sherds of pottery and white ware (Fig. 14.14). A pottery bowl and a piece of obsidian were lying below the hips of the older individual, and an awl was placed close to her or his legs. Finally, a pottery sherd was placed on the child, who was buried wearing a necklace, partially covering the body. Interestingly, both the interior of the bowl and the walls of the burial pit showed signs of ash and scorching, as if both vessel and pit had received some treatment with fire prior to the placement of the two deceased. Speculating, might the bowl have been used to carry the embers meant for scorching the burial pit?

Interestingly, sherds are occasionally associated with fragmented parts of humans and animals. Various contexts in the cemeteries attest to the secondary burial of humans, sherds and animals. An example of this concerns two

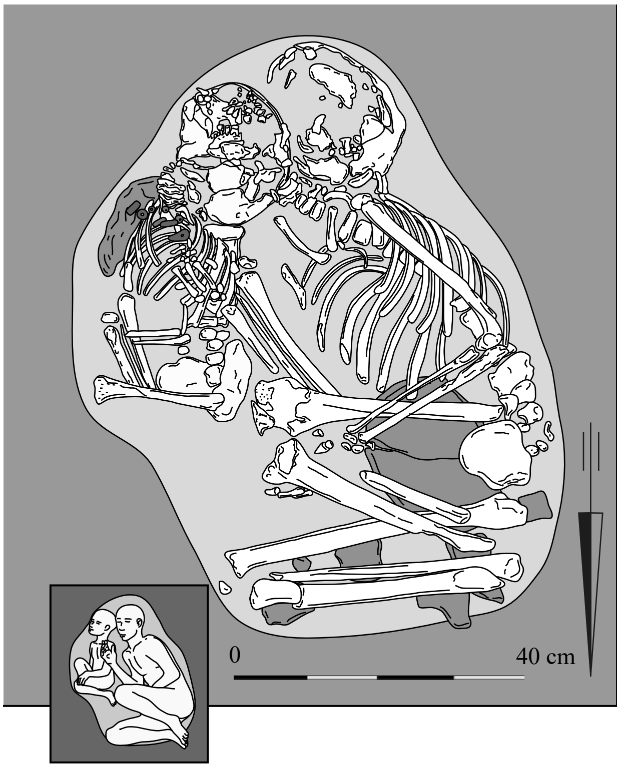


Fig. 14.14 Tell Sabi Abyad, Operation III. A vessel (P05-42, Fig. 4.71: 3) and sherds placed below the remains of two individuals: a four-year old and a 15–20-year old (BN05-10, Cemetery 4) (image Mikko Kriek; Tell Sabi Abyad Project).

painted Halaf Fine Ware sherds which were found in the only secondary burial context from Cemetery 1 (BN08-44, Fig. 14.15). This context held a femur and a hip bone of an adult human, a piece of gypsum and a number of animal bones, including the vertebrae of a cow and a sheep's horn core. In this specific context, fragmentation of bodies of humans and animals and breakage of ceramics may be semantically linked. An example of the use of sherds in a symbolic way stems from Operation II, where a number of sherds were placed in a neat semi-circle around the remains of a 15- to 20-year-old woman inside a purposely-burnt building (BN04-05, Fig. 14.16). The woman was found holding half of a mace head, and a fragment of yellow ochre was placed underneath her head together with a large mammal bone. In addition to this burial, the burnt fill of the building contained hundreds of artefacts including pottery, most of it broken (Akkermans *et al.* 2012).

14.7. Pottery and identity after death

In all likelihood, various conceptions of identity existed in the Late Neolithic, and burial practices related to their material expression in manifold, complex ways (Croucher 2012). The inclusion of pottery containers was but one, minor element within a diverse set of practices (Table 14.5). For present purposes, as a first step towards a fuller contextualisation and interpretation, we will briefly discuss a number of tangible traits associating ceramic

Fig. 14.15 Tell Sabi Abyad, Operation III. Two Halaf Fine Ware sherds (P08-76, Fig. 4.126: 5) placed with fragmented human and animal bones (BN08-44, Cemetery 1) (image Tell Sabi Abyad Project).

Fig. 14.16 Tell Sabi Abyad, Operation II (northeast part of the mound). Four sherds placed in a semi-circle around the body of a young woman (BN04-05) (after Akkermans et al. *2012) (image Tell Sabi Abyad Project).*

vessels with sex, age and burial treatment. This yields some interesting, if confused, patterns that may offer guidelines to exploring the expression of identity in the Late Neolithic.

As to age, although pottery gifts are found within the graves of individuals in all age groups, they occur more frequently with certain age categories than with others. Whereas 20% of the adults (n = 79) were buried with complete vessels, only 4% of the adolescents (n =25), 17% of the children (n =41) and 7% of the infants (n = 41) were buried with pottery vessels as grave gifts. This sheds a different light on the burials recovered previously from Operation I, in which pottery vessels exclusively were found in association with infants (Akkermans *et al.*, eds., 2014). In Operation III the cemeteries represent a more balanced age profile, suggesting that on the whole pottery depositions in the Late Neolithic burials at Tell Sabi Abyad were deemed somewhat more appropriate with grown-ups, and to a slightly lesser extent children, than with adolescent individuals and infants.

With regard to gender, pottery vessels are present with both sexes of the adult population, but some discrimination is seen between bodies biologically identified as male and female. While 24% of the males (n =33) were buried with pottery vessels, only 14% of the females (n =43) were. However, in contrast, the highest *numbers* of pottery vessels within a single burial context, as well as the largest total *volume* in litres are found with women. We may also note a gendered divergence of the location of pots *within* graves, cross-cutting age-based distinctions. Whereas seven pots in males' graves were placed near the head and only three near the lower body, the reverse is seen for women: we find only three vessels near the head and as many as nine near the lower body. Within the age groups of infants and children a preference for vessels near the head (n = 10) or the waist (n = 4) is observed. Only one child had a vessel near the lower body. The single adolescent buried with a pottery vessel, the double burial of a 15–20-year-old individual and a four-year-old child (BN05-10; Fig. 14.14), shows a pottery vessel placed underneath the hips of the older individual.

Interestingly, the few *decorated* vessels associate exclusively with bodies identified as physically being female (n = 3) as well as a child. In Operation I, decorated pottery vessels were also found with infants (Akkermans *et al.*, eds., 2014). Though the small sample size must be kept in mind, this association of women, children and infants with decorative pottery is echoed in the distribution of items of personal adornment. The emphasis placed on personal ornamentation in the funerary sphere at Tell Sabi Abyad suggests this was a key realm in which identity was expressed through material culture. These items of adornment, among the most common grave goods, are quite often found in relation to women, infants, and children, and only in two cases with men (Plug 2014). This holds potential for the interpretation of gender in the Late Neolithic (Croucher 2013; Forest 2013). Potentially, a male identity was disassociated with certain burial goods.

As we already saw, the deposition of pottery vessels correlates with the deposition of other materials. Thus, items of adornment are found in a slightly higher frequency within burial contexts with pottery than in those without. Though items of personal adornment are quite frequently found in general (in ca. 20% of the graves), they associate even more strongly with burials containing pottery (33%). A similar association is found with animal bones, which occur in 19% of the graves in general but in 26% of those containing pottery vessels. However, the most prevalent object type of grave good accompanying pottery is simply more pottery. All together 41% of the graves with pottery contain more than one item. In terms of identity expression, a continuum may emerge between burials with fewer goods and those having more goods, without so far any sharp categorisations becoming apparent.

Intriguing patterns with regard to the funerary ritual involving pottery begin to emerge in the treatment of the body. Interestingly, 40% of the so-called 'burnt heart' graves contained complete pottery vessels, twice as often as with adults in general. As mentioned earlier, this ritual involved the insertion of burning embers into the chest cavity of the deceased, usually being adults, males and females in equal numbers. Further distinguishing this bodily treatment, graves in this category hold the largest total volumes in litres, as well as one of just two burials holding more than two vessels. In fact, the 'burnt heart' burials are often among the 'richest' graves in their respective cemeteries.In sum, as part of a broader set of ritual depositions, pottery vessels may have served to differentiate between social identities that were, for reasons still to be elucidated, also reflected in the bodily treatment after death.

14.8. Concluding remarks

The pottery vessels present in the sequence of cemeteries in Operation III offer ample opportunity for investigating the roles of ceramics beyond daily use. Patterns present in the material characteristics of these items as well as their contextual information allow us to form an image of the ritual roles of ceramic containers within the funerary sphere. Various cultural and spiritual values affected the selection of these objects, relating to aspects of identity such as gender, age, and, possibly, cultural affiliation. Whatever the specific meanings, they can be seen as materialisations of internalised social bonds, and of interactions between the late Neolithic inhabitants of the site and their dead. As we have seen, a diverse range of functions of pottery vessels and parts thereof are recognised in the burial record. This included the practical use of vessels as utilitarian containers for foodstuffs or of sherds as lids or covers for the body, but also the symbolic use of sherds as part of the burial rite or as ritualised objects, and the selective placement of the vessels in specific relationships to the human body.

In broad functional terms, the complete pottery vessels recovered would almost all classify as 'serving' pottery,

Table 14.5 Tell Sabi Abyad, Operation III. Descriptions of pottery containers deposited as grave good

Object	*Catalogue*	*Burial*	*Cemetery*	*Level*	*Period*	*Bodily position*	*Ware*	*Type*	*Diam. (cm)/vol. (l)*
P05-42	Pl. 4.8:3	BN05-10	4	B4/B6	Pre-Halaf	Underneath body	Standard Ware	Everted convex-sided bowl	Oval
P05-52	–	BN05-12	3	C9	Transitional to Early Halaf	Behind head	Standard Ware	Closed convex-sided bowl	11/0.8
P07-57	–	BN07-91	Unclear			In front of head/body	Standard Ware	S-shaped goblet	5.5/0.3
P07-59	–	BN07-91	Unclear			In front of head/body	Standard Ware	Vertical convex-sided bowl	15/1.1
P08-20	–	BN08-8	Unclear			In front of head	Standard Ware	S-shaped goblet	5/0.2
P08-21	Pl. 4.32:6	BN08-8	Unclear			On feet	Standard Ware	Small jar	9/1.1
P08-24	Pl. 4.11:6	BN08-11	3	C9	Transitional to Early Halaf	In front of head	Standard Ware	Everted straight-sided bowl	13/ 0.6
P08-40	Pl. 4.32:10	BN08-35	1	C4/C5		In pit	Standard Ware	Small jar	11/0.8
P08-70	Pl. 4.32:3	BN08-43	3	C9	Transitional to Early Halaf	In front of body	Standard Ware	Small jar	8.2/0.4
P08-70X	–	BN08-43	3	C9	Transitional to Early Halaf	On the head	Standard Ware	Vertical S-shaped bowl	ca. 10 unclear
P08-71	Pl. 4.9:17	BN08-43	3	C9	Transitional to Early Halaf	In front of head	Standard Ware	Miniature	4.5/0.1
P08-73	–	BN08-40	5	B7	Pre-Halaf	In front of head	Standard Ware	Everted carinated bowl	21/1.9
P08-84	Pl. 4.32:5	BN08-60	6	B8/B9	Pre-Halaf	On pelvis	Standard Ware	Small jar	9 /0.9
P08-85	Pl. 4.44:3	BN08-60	6	B8/B9	Pre-Halaf	On feet/pelvis	Standard Ware	Everted carinated bowl	28/3.8
P08-87	Pl. 4.3:5	BN08-63	7	A1/A2	Early Pottery Neolithic to Pre-Halaf	On pelvis	Standard Ware	Vertical convex-sided bowl	19/1.9
P08-89	–	BN08-53	3	C9	Transitional to Early Halaf	Below pelvis	Standard Ware	Everted convex-sided bowl	Oval/0.8
P08-91	Pl. 4.54:14	BN08-66	3	C9	Transitional to Early Halaf	In front of head	Fine Mineral Tempered Ware	Everted straight-sided carinated bowl	6/0.1
P09-109	Pl. 4.32:4	BN09-48	4	B4/B6	Transitional	Near head	Standard Ware	Small jar	7/0.2
P09-111	Pl. 4.32:11	BN09-56	4	B4/B6	Transitional	Above head	Standard Ware	Small jar	8/0.8
P09-112	–	BN09-56	4	B4/B6	Transitional	On the side	Standard Ware	Everted carinated bowl	10/0.3
P09-117	Pl. 5.4:7	BN09-51	6	B8/B9	Pre-Halaf	In front of body	Standard Ware	Vertical convex-sided bowl	15/1.7
P09-122	Pl. 4.9:7	BN09-60	7	A1/A2	Early Pottery Neolithic to Pre-Halaf	Behind head	Standard Ware	Miniature	4/0.1
P09-123	Pl. 4.32:2	BN09-60	7	A1/A2	Early Pottery Neolithic to Pre-Halaf	On feet	Standard Ware	Small jar	11.5 /2.1
P09-22	Pl. 4.3:4	BN09-06	3	C9	Transitional to Early Halaf	On feet	Standard Ware	Vertical convex-sided bowl	18/1.5
P09-27	–	BN09-12	3	C9	Transitional to Early Halaf	In front of head	Standard Ware	Vertical convex-sided bowl	6/0.1
P09-28	Pl. 4.12:5	BN09-12	3	C9	Transitional to Early Halaf	In front of body	Standard Ware	Vertical S-shaped bowl	12.5/0.9
P09-29	Pl. 4.62:6	BN09-13	3	C9	Transitional to Early Halaf	Near pelvis	Standard Fine Ware	Small jar	3.5/0.2
P09-30	–	BN09-14	6	B8/B9	Pre-Halaf	Behind the back	Standard Ware	Small jar	Unknown
P09-31	–	BN09-14	6	B8/B9	Pre-Halaf	In front of head	Standard Ware	Closed convex-sided bowl	7/1.3

P09-40	–	BN09-25	6	B8/B9	Pre-Halaf	Behind head	Standard Ware	Vertical convex-sided bowl	16/1.1
P09-42	Pl. 4.5:7	BN09-26	6	B8/B9	Pre-Halaf	In front of head	Standard Ware	Vertical convex-sided bowl	14.5/1.1
P09-55	Pl. 4.1:8	BN09-31	4	B4/B6	Transitional	In front of head	Standard Ware	Everted convex-sided bowl	16.5/1.2
P09-57	Pl. 4.9:8	BN09-32	4	B4/B6	Transitional	In front of head	Standard Ware	Miniature	4/ 0.1
P09-58	Pl. 4.4:6	BN09-32	4	B4/B6	Transitional	Above head	Standard Ware	Vertical convex-sided bowl	13.5/1.6
P09-8	–	BN09-15	7	A1/A2	Early Pottery Neolithic to Pre-Halaf	Near feet	Standard Ware	Closed convex-sided bowl	5.5/0.2
P09-85	Pl. 4.6: 13	BN09-40	3	C9	Transitional to Early Halaf	On feet	Standard Fine Ware	Short-collared bowl	22/2.0
P09-86	Pl. 4.61:11	BN09-40	3	C9	Transitional to Early Halaf	Behind upper back	Standard Fine Ware	Closed convex-sided bowl	14/1.0
P09-87	Pl. 4.62:5	BN09-40	3	C9	Transitional to Early Halaf	Near pelvis	Standard Fine Ware	Small jar	11/ 0.7
P09-88	Pl. 4.62:4	BN09-40	3	C9	Transitional to Early Halaf	Near pelvis	Standard Fine Ware	Small jar	10/1.3
P09-9	–	BN09-15	7	A1/A2	Early Pottery Neolithic to Pre-Halaf	On feet	Standard Ware	Closed convex-sided bowl	6.5/ 0.4
P09-90	Pl. 4.12:14	BN09-46	6	B8/B9	Pre-Halaf	Near arm	Standard Ware	S-shaped goblet	5/0.2

meant to hold, display and consume food and drink, or more precious substances such as perfumes, balms or cosmetics. The vessels all qualify as ‘small’, yet a degree of variability within this limited band width is noticeable, suggesting that vessels held a diverse range of substances when they entered the graves. Evidently, although in some of the vessels direct evidence suggestive of food and drink were found, in the form of animal bones, we cannot be certain that *all* pottery vessels held anything at the moment of burial. It is equally possible that the pots were buried empty, for example representing items needed in an afterlife, or acting as a symbolisation of food, identities or ideas. At least a portion of the items found in the cemeteries must be seen in this light, given their up-side down deposition. However, the upright position usually arranged for these items, the presence of animal bones within a few of them, as well as the occasional use of sherd lids, strongly favour the view that many contained some kind of substance.

Assuming that these items did indeed hold foodstuffs, an obvious explanation for their presence would be to provide the deceased with food for an afterlife. The usual small size and limited volume of the vessels facilitate amounts of food and drink fit to a single individual, the deceased. The preferential placement of vessels – mainly bowls – near the head, face, and mouth may symbolically refer to ideas of consumption by the deceased. This would suggest that food or drink were deemed of importance in the hereafter, as possibly also emphasised by the presence of animal bones within many graves at Tell Sabi Abyad. Yet such provisioning was perhaps not seen as essential, as many graves are lacking evidence for the deposition of foodstuffs. Alternatively, of course, burials without pots or animal bones may have held food given with the dead not surviving in the archeological record,e.g. meat, bread, herbs, and spices, drink placed in containers made of perishable material or simply sprinkled over the body.

Equally, the pottery vessels and their supposed contents may reflect the funeral ceremony rather than ideas concerning the afterlife. It is quite possible that the containers were not intended to be used by the deceased in the life hereafter or during his/her journey to the afterlife, but by the *living*, the participants in the ritual. The pots placed in the graves quite possibly represent the remains of banqueting, the ritualised consumption of food and drink by those burying the deceased individual. This interpretation may seem plausible given the importance of banqueting, often involving pottery containers, in funerary rituals in later, historical periods in the ancient Near East. Thus, the Late Neolithic burials may represent an early manifestation of ritual practices that were to form an enduring element in the great Mesopotamian ‘stream of tradition’ (Cohen 2005; Oppenheim 1977).

However, if pottery containers merely would have represented the remains of feasting on the behalf of the individual’s descendants, one would perhaps expect a more random distribution of vessels in the pit, less exclusively associated with the deceased’s head or mouth.

Nor would this tally with placing most vessels in upright position. Alternatively therefore, the containers could equally well have represented the remains of a final meal shared between deceased and descendants. Obviously, these possibilities are far from mutually exclusive.

If such scenarios make sense, the small size and limited volume of most vessels, plus the small numbers of vessels involved, would suggest an emphasis on 'private' rituals, conducted on the scale of one or two individuals, three at the most. As such, this might reflect broader trends towards a 'privatisation' of ritual that characterised the Late Neolithic (Verhoeven 2002). Interestingly, in selecting pottery vessels for burial a preference for non-conspicuous, locally produced wares is apparent. A few remarkable exceptions notwithstanding, most burials emphasised local, 'traditional', or 'domestic' commensality as far as the included pottery is concerned. Thus, the burial rituals may stand in contrast to more 'public' types of commensal display ('feasting') involving the exuberant decorated serving vessels introduced during the Pre-Halaf to Early Halaf periods (Nieuwenhuyse 2007). In this perspective, the occasional burials containing larger volumes of pottery vessels or larger total volume contents could point to a different composition of the participant group.

Apart from feeding the dead and feasting, pottery vessels given with the dead will have facilitated the performance of identity, communicating values deemed relevant by the descendants. Some intriguing emerging trends associate pottery vessels with specific groups of people, but it is emphasised that much further study is necessary to fully comprehend these patterns. Firstly, it appears that depositions of pottery vessels in general were especially appropriate for adults and children, and less for infants and adolescents. Secondly,whereas the items occur slightly more often in graves of males, both larger volumes and larger numbers of vessels are associated with females. Finally, whereas the association of, specifically, *bowls* with the head-mouth region is more strongly associated with males and children, the placement of a more diverse range of shapes including jars near the lower body, hips and pelvis more characterised females. Does this differential placement signify different relations with ceramic vessels and/or food based on gender and age? Might a position near the head, face or mouth refer to ideas of consumption in contrast to an association with carrying, cooking and feeding for those items placed near the hip? If so, was providing and nurturing associated with a 'female' gender positions, while childern and male inviduals were those to be fed? We should remain cautious not to extrapolate too easily modern gender stereotypes into the past. The grave goods, including pottery, reflect a rich diversity of social and cosmological ideas which are hard to grasp by us today.

Perhaps relevant is the two-fold categorisation in total volume content. Tentatively, two broad volume categories of buried containers can be discerned: those holding on average about one litre and those holding about five litres. Various interpretations may be proposed. For example, the inclusion of larger numbers and volumes might indicate a degree of social ranking. High-volume pottery sets associate with individuals that received a elaborate burial treatment, as with the so-called 'burnt heart' burials and graves containing larger quantities of grave goods. However, the recognition of elites in late Neolithic society in general remains highly problematic (Akkermans 1993; Akkermans and Schwartz 2003; Campbell and Fletcher 2013). At Tell Sabi Abyad, increasing numbers and total volumes of pottery associate with women and with adult age, which might be interpreted as a reflection of the status positions these individuals held within society. The relationships, moreover, are far from exclusive. Apart from prestige and social competition, the incorporation of larger quantities of food, drink, and artefacts in general may have been a materialisation of a range of social values, some of which may not have pertained to the deceased him/herself. For example, the lavish use of burial goods perhaps signalled the ability of a larger social unit to provide in abundance for its members, thus reflecting the competency of the collective rather than that of the individual (Hallam *et al.* 1999, 9).

The limited emphasis on selecting decorated containers is of note. One might expect a stronger representation of stylistically expressive pottery types including complex shapes or types carrying complex decoration or even special iconographic configurations (e.g. Hijara 1978). Such items are typically associated with the communication and performance of identities within this time period. However, stylistically elaborated types appear to be somewhat underrepresented; four out of a total of five painted burial vessels came from a single burial. Obviously, a limited emphasis on decorated containers does not mean identities were not being communicated. A preference for local, plain pottery may have emphasised the household and local identity, rather than the wider regional identities represented in the lavishly decorated Fine Ware.

Although few other Late Neolithic cemeteries have so far been documented, it seems clear that the patterns observed at Tell Sabi Abyad transcended the local. Most conspicuously, the inclusion of pottery within burial contexts by itself formed part of a supra-regional trend. Having said this, considerable variation is apparent among the few late seventh to early sixth millennium cemeteries presently known in Upper Mesopotamia. For instance, at Tell el-Kerkh over one-third of the primary burials contained grave goods, including personal ornaments, stamp seals, bone tools and animal bones, and intact pottery vessels (Tsuneki 2013). However, pots within burial contexts are rare, occurring within less than 5% of the Kerkh graves. The use of sherds as burial cover is likewise rare, but nonetheless witnessed at this site. A burial practice not seen at Tell Sabi Abyad is the use of urns for holding cremated human remains (Tsuneki, pers. comm.). At contemporary Hakemi Use, too, about one third of the deceased were buried with grave goods, which included beads, stone objects and pottery vessels.

As at Tell Sabi Abyad, the majority of the Hakemi Use burial vessels were small, non-voluminous Standard Ware vessels. Two exceptions are an Orange Fine Ware and a Hassuna Painted Ware vessel (Tekin 2013). Of all Hakemi Use age groups, infants most often received pottery vessels, whereas the richest graves containing pottery vessels concern those of two adult females, both interred with multiple items of personal adornment (Erdal 2013).

In short, in the selection of pots as burial goods the Late Neolithic community of Tell Sabi Abyad adhered to more widely understood notions regarding human burial, but also to local ideas and customs concerning the treatment of the dead. Whereas the use of simple, small pottery vessels as burial items can be seen as a wider regional trend, the association with particular groups of individuals appears to have been driven by more localised value systems. In the mortuary customs we see a juxtaposition of communal – both supra-regional and local – and individualising notions in the treatment of the dead. It becomes clear that the Late Neolithic notions of the afterlife, and the relevance of ceramic containers within burial contexts at Tell Sabi Abyad, were built up of various, overlapping cultural practices and meanings relating to wide-ranging relations engaged in by the late Neolithic inhabitants, including the regional, communal and personal.

Notes

1 This includes the exceptionally large bowl already referred to. If this item would be omitted, the average volume drops to 0.85 litre.

2 The species could not be identified.

3 The bones were those of sheep/goats as well as unidentified medium-sized mammals, and included ribs, vertebrae, pelvises, scapulae, a phalange, a tarsal bone, and an unidentified long bone.

4 Twenty-three additional cases of re-used sherds in the burials were tentatively identified post-hoc on the basis of photos and field reports. The totals add up to cemetery 7: 5; cemetery 6: 2; cemetery 5: 7; cemetery 4: 6; cemetery 3: 4; cemetery 2: 0, cemetery 1: 3 cases, and undated: 2.

Chapter 15

Tracing pottery use through lipid residue analysis

Mélanie Roffet-Salque, Richard P. Evershed and Anna Russell

15.1. Introduction

It is now accepted that organic residues are widely preserved in archaeological pottery and can provide information on both the use of vessels and wider economic activities, particularly those relating to the procurement of animal products. In relation to this, pottery from Tell Sabi Abyad contributed to an extensive investigation, involving more than 2200 vessels from 25 Neolithic sites in the Near East and southeastern Europe, in which organic residues were used to document the early evolution of milk use by prehistoric farmers (Evershed *et al.* 2008). The investigation included nearly 300 vessels from Tell Sabi Abyad. Herein, we present the detailed results of the organic residue analyses of these same vessels. The results are interpreted in the context of the functional uses of the pottery, dietary habits and culinary practices, and, specifically, the introduction of secondary products into the Late Neolithic economy (Sherratt 1981, 1983). The latter are compared to interpretations of animal exploitation and herd management based on faunal analyses at the site. We also begin to investigate the factors contributing to the preservation of prehistoric residues, attempting to move towards contextualizing and interpreting their socio-economic context, and making comparisons with the Neolithic in other regions, *viz*. northwestern Anatolia (Thissen *et al.* 2010; Türkekul-Bıyık 2009; Türkekul-Bıyık and Özbal 2008), Central Anatolia (Copley *et al.* 2006; Evershed *et al.* 2008; Pitter *et al.* 2013), western Iran (Gregg 2010) and the southern Levant (Gregg *et al.* 2009).

To summarize our findings, the overall recovery rate of lipids in sherds is relatively low (14% of the sherds investigated in this study yielded detectable lipids) and the mean lipid concentration for sherds containing lipids is ca. 82 $\mu g\ g^{-1}$. These results are typical of sites from this period and the general region (southern Mediterranean and Near East). Our interpretations indicate the use of specific ceramic categories of vessel for "cooking" while clear evidence of the extensive heating of vessels is deduced from the presence of ketones, formed from the condensation of fatty acids, in some vessels. Strong differences in recovery rates possibly reflect differences in use between different pottery types. In particular the Dark Faced Burnished Ware (DFBW) contained the highest frequency of residues (no less than 46% yielded detectable lipids). Degraded animal fats were detectable, as evidenced by the presence of $C_{16:0}$ and $C_{18:0}$ fatty acids (with $C_{18:0}$ in high abundance) and in few cases tri-, di- and monoacylglycerols. The presence of abundant carcass fats is consistent with interpretations based on faunal assemblage of extensive meat exploitation. Finally, four vessels dated to 6400 to 5900 cal BC yielded animal fats identified as originating from milk products.[1]

15.2. Pottery selection and methods

A total of 287 sherds were investigated in this study. Almost half of the ceramic assemblage studied came from Operation II (n = 133), while the rest came from Operations I, III and IV (Table 15.1.A). Operation II is thus over-represented *vis à vis* other excavated parts, but overall the samples are spatially well distributed across the site. However, while the sampling attempted to cover the various periods equally, because the stratigraphic analyses and absolute dating became available only after the sampling, this led to uneven representation of specific periods (see below). The sherds were not selected taking specific pottery forms into account or targeting specific pottery types (Thissen *et al.* 2010) and were mostly body sherds (Table 15.1), which could not generally be attributed to a specific vessel type. Only 4.5% of the assemblage samples were rim sherds. The selected sherds included jars, bowls, hole mouth pots and a few Standard Ware husking tray fragments.

Table 15.1 Tell Sabi Abyad. Summary of organic residue analyses in: A. Excavation areas of the site. B. Pottery wares. C. Archaeological periods

	Potsherds analysed					Residues detected	
	Unknown	*Base*	*Body*	*Rim*	*Total*	*n*	*%*
A. *Operation*							
I	9	2	20	10	41	11	27
II	0	8	124	1	133	25	19
III	0	32	28	1	61	3	5
IV	0	15	36	1	52	2	4
Total	9	57	208	13	287	41	14
B. *Ware*							
- (no information)	2	0	0	0	2	0	0
Dark-Faced Burnished Ware	5	0	19	4	28	13	46
Fine Mineral Tempered Ware	0	5	20	0	25	1	4
Grey-Black Ware	0	3	17	1	21	2	9
Mineral Coarse Ware	1	1	23	0	25	6	24
Orange Fine Ware	0	0	5	0	5	2	40
Standard Fine Ware	1	1	83	2	87	14	16
Standard Ware	0	47	41	6	94	3	3
Total	9	57	208	13	287	41	14
C. *Period*							
Topsoil	0	2	0	0	2	0	0
Transitional	8	10	143	11	172	34	20
Pre-Halaf	1	0	3	0	4	2	50
Early Pottery Neolithic/Pre-Halaf	0	3	4	0	7	0	0
Early Pottery Neolithic	0	42	58	2	102	5	5
Total	9	57	208	13	287	41	14

The sampling included seven distinct wares (Table 15.1.B). The majority of the samples were coarse, plant-tempered *Standard Ware* (SW, n = 94) and fine, painted *Standard Fine Ware* (SFW, n = 87). Also represented were *Dark-Faced Burnished Ware* (DFBW, n = 28), *Fine Mineral Tempered Ware* (FMTW, n = 25), *Grey-Black Ware* (GBW, n = 21) and *Mineral Coarse Ware* (MCW, n = 25).[2] Finally, five sherds of *Orange Fine Ware* (OFW) were included. Unfortunately, two sherds came without adequate description. All together almost the entire spectrum of wares that comprise the total ceramic assemblage during the Early Pottery Neolithic through Pre-Halaf to Transitional Period was represented.

In view of the long inhabitation sequence of Tell Sabi Abyad, two periods are well-represented: The Transitional Period (n = 172) and the Early Pottery Neolithic (n = 102). The Early Pottery Neolithic samples mainly come from the final stages of that period. Most come from Operation III, levels A2 (n = 21) or from mixed level A2/A3 contexts (n = 12). The oldest samples are thirteen sherds from Operation III, level A4, dated to 6455–6390 cal BC. The Pre-Halaf period is severely underrepresented with only four samples (Table 15.1.C). Two sherds came from topsoil contexts and seven were from a mixed Early Pottery Neolithic–Pre-Halaf context. To summarise, this study documents the later stages of the Early Pottery Neolithic to the Transitional Period, from ca. 6400 to ca. 5900 cal BC.

Lipid analyses of potsherds were performed using our established protocol (Copley *et al.* 2003; Dudd and Evershed 1998; Evershed *et al.* 2008) and presented in detail in Nieuwenhuyse *et al.* 2015. Briefly, ca. 2 g samples were taken and their surfaces cleaned using a modelling drill to remove any exogenous lipids (e.g. soil or finger lipids due to handling). The samples were then ground to a fine powder, and the lipids extracted with a mixture of chloroform and methanol (2:1 *v/v*). Aliquots of the extracts were analysed by high temperature-gas chromatography (HTGC) and gas chromatography-mass spectrometry (GC-MS). Extracts identified as animal fats were analysed by GC-combustion-isotope ratio mass spectrometry (GC-C-IRMS) to determine the carbon isotopic composition ($\delta^{13}C$ values) of palmitic ($C_{16:0}$) and stearic ($C_{18:0}$) acids. These analyses allow non-ruminant and ruminant fats, and carcass and dairy fats to be distinguished (Dudd and Evershed 1998; Copley *et al.* 2003).

15.3. General assessment of the organic residues

Of the 287 sherds submitted to solvent extraction, 41 were shown by HTGC to contain detectable lipids that could be confidently interpreted to be of archaeological origin (see Table 15.4). Compared to northwestern Europe this recovery rate (14%) is low but considering that no targeted sampling was adopted, the figure is comparable with other Mediterranean Neolithic sites. For example, at Çatalhöyük initial investigations revealed lipids in 18% of the sherds, rising to 36% with targeted sampling of cooking vessels (Copley *et al.* 2006; Pitter *et al.* 2013). Additionally, Late Neolithic pottery sherds from Barcın Höyük in northwestern Turkey showed 24% of sherds to contain detectable lipid residues (Thissen et al. 2010, 166).

The lipid profiles from the Tell Sabi Abyad sherds showed a remarkable constancy being dominated by free fatty acids, sometimes as the sole components (Fig. 15.1.A), in other cases accompanied by low abundances of monoacylglycerols, diacylglycerols and triacylglycerols (Fig. 15.1.B–C). A third class of lipids seen in 9 sherds contains a range of mid-chain ketones eluting in the retention time range of the internal standard (Fig. 15.1.B–C). The presence of the aforementioned classes of lipid is typical of degraded animal fats particularly on account of the high abundance of the $C_{18:0}$ fatty acid (Evershed *et al.* 2002; Evershed 2008). The low abundance of $C_{18:1}$ fatty acid, the main fatty acid in fresh animal fats, is consistent with the sensitivity of such compounds to oxidative loss during vessel use and burial; indeed, the low abundance of unsaturated fatty acids provides an important quality control criterion in confirming the indigeneity of archaeological animal fat residues. The odd-carbon numbered ketones ranging from C_{31} to C_{35} are a diagnostic group of compounds forming by heating fats above ca. 300^{o} C (Evershed *et al.* 1995; Raven *et al.* 1997; Evershed 2008). The presence of mid-chain ketones is a common feature of Neolithic pottery in Europe, the Near East and Eurasia and points to the importance of processed animal products in a variety of dietary and quasi-industrial roles in the Neolithic life. No biomarkers characteristic of plant material have been detected in any of the sherds. However, low concentrations of lipids in plants compared to animal products can preclude the identification of plant material when mixed with animal products.

The added internal standard allows quantification of the lipid recoveries from the pottery from Tell Sabi Abyad (Table 15.4, Fig. 15.2). The concentrations range from none detected in the vast majority of vessels to 580µg g^{-1}, although the latter is exceptional for this assemblage. The average in sherds containing significant concentration of lipids (> 5µg g^{-1}) is 82µg g^{-1}. These concentration of lipids concentrations and rates of recovery of lipids are typical for the wider region (cf. Çatalhöyük in Central Anatolia). The lipid concentrations will be discussed in more detail in relation to different wares and pottery type in the section below.

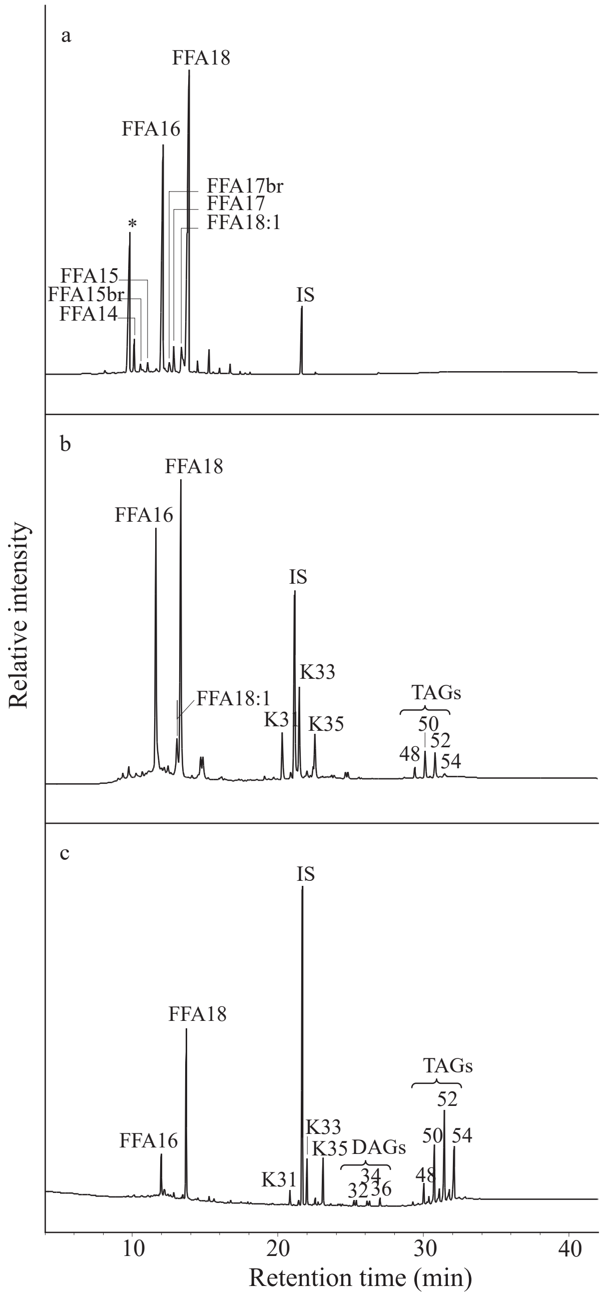


*Fig. 15.1 Partial gas chromatograms of TLEs from pottery typical of (A) a degraded ruminant animal fat (SAB2) and (B)/(C) well preserved animal fat (SAB252 and SAB55, respectively). Key: FFA N:i, free fatty acids with N carbon atoms and i unsaturation; br, branched; K, mid-chain ketones with 31, 33 and 35 carbon atoms; MAG, monoacylglycerols; DAG, diacylglycerols; TAG, triacylglycerols, with M, acyl carbon number; IS, internal standard (*n*-tetratriacontane); * plasticiser (after Nieuwenhuyse et al. 2015, fig. 6).*

15.4. Distribution of lipid concentrations

The sherds containing detectable lipids are far from equally distributed across the site. The percentage of lipid residues is highest in Operation I (27%), followed by Operation II (19%). Operations III and IV produced significantly lower recovery rates (respectively, 5% and 4%; Table 15.1.A; Operations I/II and III/IV, one-sample χ^2 test, $p<0.001$).

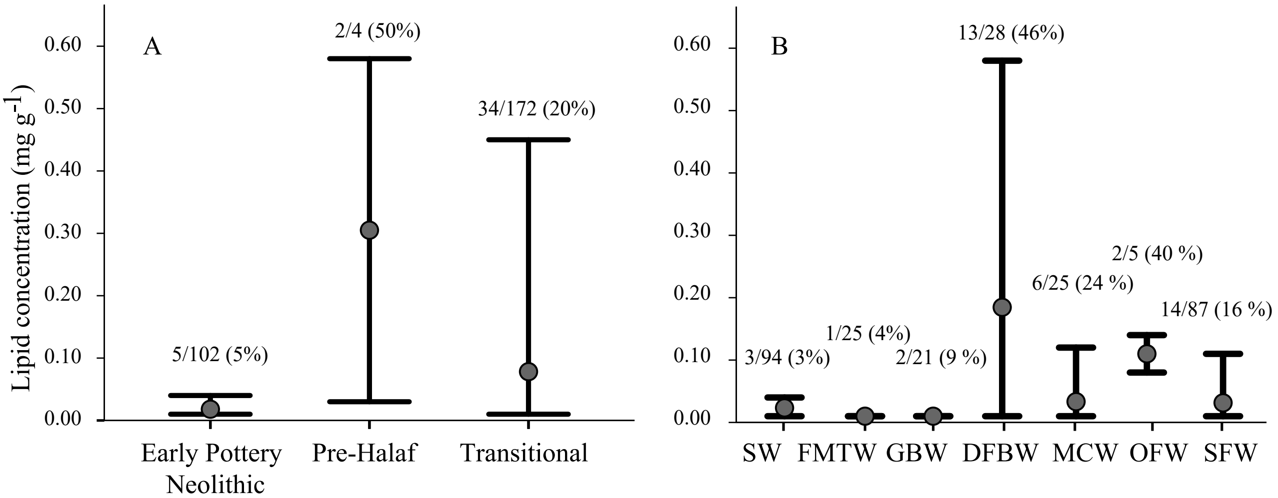


Fig. 15.2 Lipid concentrations (mg.g^{-1}), numbers of residues detected/total number of sherds analysed and recovery rates by (A) archaeological period and (B) pottery type (ware) (after Nieuwenhuyse et al. *2015, fig. 7).*

Table 15.2 Tell Sabi Abyad. Detectable residue types by ceramic ware

	Ware							
	DFBW	*FMTW*	*GBW*	*MCW*	*OFW*	*SFW*	*SW*	*Total*
Unidentified	0	1	1	1	0	7	1	11
Non-ruminant	3	0	0	1	0	1	1	6
Ruminant carcass	8	0	0	4	2	3	1	18
Ruminant dairy	2	0	1	0	0	1	0	4
Mixture ruminant fats?	0	0	0	0	0	2	0	2
Total	13	1	2	6	2	14	3	41

The nature of the depositional setting likely plays a role in the preservation of lipids. For example, the sherds from Operation I and II were recovered from layers excavated below a thick horizon of later deposition. In contrast, the sherds from Operation III and, in particular, Operation IV were recovered from depositions lying closer to the surface of the mound, probably contributing to lower lipid recovery rates. However, these Operations exposed different archaeological periods which may be more important in explaining the differences in lipid recovery rates from the sherds (Table 15.1.B). Most significant was the higher recovery rate of ca. 20% in body sherds from the Transitional period from Operations I and II, ($n = 143$) compared to the Early Pottery Neolithic, exposed in Operations III and IV, where only 5% yielded detectable lipids (3 residues extracted from 58 sherds; one-sample χ^2 test, $p<0.05$). These differences in lipid concentrations are shown in Fig. 15.2.A.

While the age of the pottery might be the most obvious influence on lipid preservation, the major factor affecting lipid concentrations appears to be the type of pottery investigated, more specifically the ware type (Table 15.1.C, Table 15.2, Fig. 15.2.B). Around 46% of all DFBW sherds (13/28 sherds) produced significant lipid residues, with high lipid concentrations also being highest in this ware type (Fig. 15.2.B). These findings corroborate the interpretations from earlier work that this pottery type was used for cooking. This is further supported by the detection of ketones in two of the 28 DFBW sherds studied indicating that these sherds were heated above ca. 300 °C during their lifetime of use. Rim sherds and body sherds yield a higher detection rate than bases (one-sample χ^2 test, $p<0.05$; Charters *et al.* 1993).

Above average lipid concentrations for the assemblage were detected in a high proportion (24%, 6/25 sherds) of the sherds of the other main cooking ware, MCW (Fig. 15.2.B). These findings appear to confirm the influence of pottery use, in this case cooking, on the absorption of lipids. The recovery rate of lipids from MCW sherds is comparable to that of DFBW (one-sample χ^2 test, $p>0.05$). In contrast, the two mineral-tempered wares typical for the Early Pottery Neolithic, GBW and FMTW, exhibited appreciably lower recovery rates at <10% and 4%, respectively (DFBW/MCW and GBW/FMTW, one-sample χ^2 test, $p<0.01$).

Only 3% (3/94 sherds) of coarse plant-tempered SW sherds yielded detectable lipids (Fig. 15.2.B). This recovery rate is very similar to what was observed at Çatalhöyük, where lipid concentrations in organic-tempered wares were much lower than in mineral-tempered wares (Pitter *et al.* 2013, 198). The low recovery rate in SW sherds corroborates the hypothesis that this pottery type was

Table 15.3 Tell Sabi Abyad. Results of the lipid residue analyses by fragment type

	None detected		Residues detected		Total
	No.	%	No.	%	
-(no information)	4	44	5	56	9
Base	55	97	2	3	57
Body	177	85	31	15	208
Rim	10	77	3	23	13
Total	246	86	41	14	287

occasionally used as 'ad hoc' cooking ware, in spite of disadvantageous performance properties (Le Mière and Picon 1991, 1998). The only three SW sherds yielding detectable lipids all came from the final stages of the Early Pottery Neolithic, the same period that also yielded detectable residues in two FMTW and GBW sherds. The presence of lipid residues in those Early Pottery Neolithic sherds suggest that people apparently already cooked with pottery containers, but perhaps not yet as often as they would during the Transitional stage. Interestingly, the two painted serving wares from the Transitional period, SFW and OFW, also produced a relatively high recovery rate of 17% (16/92 sherds in total). Petrographic studies have demonstrated that the fine and compact SFW does not transfer heat efficiently and that SFW pots would break if used as cooking vessels (Nieuwenhuyse 2007). Hence, the presence of lipid residues in those SFW sherds suggests a cold liquid contact (serving or storing) rather that than a hot organic liquid processing (cooking).

15.5. Lipid residues versus archaeozoological record

The stable carbon isotope compositions ($\delta^{13}C$ values) of the predominant fatty acids ($C_{16:0}$ and $C_{18:0}$) of residues identified as animal fats and extracted from pottery vessels were determined to allow classification to commodity group (e.g. non-ruminant fat, ruminant adipose fat, and ruminant dairy fat). The $\delta^{13}C$ values were compared to a global modern reference animal fat database assembled from animals from Africa (Dunne *et al.* 2012), the UK (Copley *et al.* 2003; animals raised on a pure C_3 diet), Kazakhstan (Outram *et al.* 2009), Switzerland (Spangenberg *et al.* 2006), and the Near East (Gregg *et al.* 2009). The $\Delta^{13}C$ (= $\delta^{13}C_{18:0}$–$\delta^{13}C_{16:0}$) value was used to suppress the influence of varying abundances of C_3/C_4 plants in the animals' diets and aridity effects (Copley *et al.* 2003; Dunne *et al.* 2012). The $\delta^{13}C$ values recorded for the $C_{16:0}$ fatty acid (–27.2 to –22.1‰) are more depleted by >4‰ than those from ruminant animal fats raised on a pure C_3 diet (–31.2 to –27.8‰) pointing to a significant C_4 and/or aridity influence on the diets of the animals (Fig. 15.3).

Table 15.4 and Fig. 15.3 summarise the animal fat classifications based on the $\delta^{13}C$ values, revealing the dominance of ruminant animal fats, with ruminant carcass

Table 15.4 Tell Sabi Abyad. Pottery samples with detectable lipid residues

Lab No.	Operation	Provenance	Level	Period	cal BC	Ware	Shape	Lipids ($mg\ g^{-1}$)	Lipids detected	$\delta^{13}C16:0$ (‰)	$\delta^{13}C18:0$ (‰)	$\Delta^{13}C$ (‰)	Commodity identified
SAB1	I	T14(144)125:31	6/7a	Transitional	6000–5900	DFBW	Rim	0.04	FA	–24.4	–26.8	–2.4	Ruminant carcass
SAB2	I	T12 (46) 96:8	LB/6	Transitional	6000–5900	DFBW	Body	0.18	FA	–24.8	–29.2	–4.4	Ruminant dairy
SAB6	I	R12(114)219:2	8	Pre-Halaf	6225–6000	DFBW	Body	0.58	FA, TAG(tr)	–27.2	–29.1	–1.9	Ruminant carcass
SAB9	I	Q13 (139) 375:1	6	Transitional	6000–5900	OFW	Body	0.08	FA	–25.9	–29.0	–3.1	Ruminant carcass
SAB11	I	S14 (108) 299:1	6	Transitional	6000–5900	OFW	Body	0.14	FA	–25.8	–28.4	–2.6	Ruminant carcass
SAB21	I	R12 (94)156:100	8	Pre-Halaf	6225–6000	DFBW	-	0.03	FA	–26.4	–27.1	–0.7	Ruminant carcass
SAB27	I	R13 (146) 353:100	6/7b	Transitional	6000–5900	DFBW	-	0.31	FA, MAG, DAG, TAG	–26.6	–28.1	–1.5	Ruminant carcass
SAB28	I	R13 (169) 373:100	6/7b	Transitional	6000–5900	DFBW	-	0.04	FA	–26.3	–27.7	–1.4	Ruminant carcass
SAB29	I	R13 (146) 353:101	6/7b	Transitional	6000–5900	DFBW	-	0.01	FA, K(tr)	–26.4	–27.8	–1.4	Ruminant carcass
SAB31	I	R13 (204) 494:1	6	Transitional	6000–5900	DFBW	Body	0.02	FA	–23.4	–26.5	–3.1	Ruminant carcass
SAB35	I	Q13 (139) 380:6	6	Transitional	6000–5900	MCW	-	0.01	FA(tr), K, TAG(tr)	–25.5	–27.3	–1.8	Ruminant carcass
SAB54	II	V6 (41) 106:1	3/4	Transitional	6000–5900	MCW	Body	0.01	FA(tr), TAG(tr)				
SAB55	II	V6 (35) 100:3	?	Transitional	6000–5900	MCW	Body	0.02	FA(tr), K(tr), TAG(tr)	–25.0	–27.0	–2.0	Ruminant carcass

SAB56	II	V6 (49) 153:1	3/4	Transitional	6000–5900	MCW	Body	0.03	FA(tr), TAG	–22.1	–25.3	–3.2	Ruminant carcass
SAB57	II	V6 (52) 119:2	3/4	Transitional	6000–5900	SFW	Body	0.01	FA(tr)				
SAB62	II	V6 (35) 91:1	?	Transitional	6000–5900	DFBW	Body	0.40	FA	–25.5	–24.4	1.1	Non-ruminant
SAB63	II	V6 (57) 127:1	3/4	Transitional	6000–5900	MCW	Body	0.12	FA	–26.4	–27.1	–0.7	Ruminant carcass
SAB65	II	V6 (49) 153:2	3/4	Transitional	6000–5900	DFBW	Rim	0.01	FA(tr), K(tr), TAG(tr)	–22.5	–24.5	–2.0	Ruminant carcass
SAB94	II	V6 (21) 59:4	4	Transitional	6000–5900	DFBW	Body	0.29	FA	–25.9	–27.6	–1.6	Ruminant carcass
SAB112	II	V6 (19) 55:2	4	Transitional	6000–5900	SFW	Body	0.11	FA	–26.4	–29.8	–3.4	Ruminant dairy?
SAB113	II	V6 (21) 59:9	4	Transitional	6000–5900	SFW	Body	0.01	FA	–26.0	–28.4	–2.3	Ruminant carcass
SAB122	II	V6 (34) 72:9	4	Transitional	6000–5900	SFW	Body	0.04	FA	–25.4	–28.8	–3.5	Ruminant dairy?
SAB127	II	V6 (28) 69:1	4?	Transitional	6000–5900	MCW	Body	0.01	FA(tr), TAG(tr)	–22.7	–24.7	–2.0	Ruminant carcass
SAB154	II	V6 (7) 20:7	4	Transitional	6000–5900	SFW	Body	0.02	FA	–24.7	–25.2	–0.5	Ruminant carcass
SAB158	III	G3 (19) 89:1	A4	Early Pottery Neolithic	6455–6390	SW	Rim	0.02	FA, TAG(tr)	–25.1	–27.0	–2.0	Ruminant carcass
SAB173	II	V6 (23) 48:1	4	Transitional	6000–5900	DFBW	Body	0.45	FA, TAG(tr)	–24.8	–28.6	–3.9	Ruminant dairy
SAB175	II	V6 (18) 47:6	4	Transitional	6000–5900	SFW	Body	0.08	FA				
SAB189	II	V6 (18) 42:4	3	Transitional	6000–5900	SFW	Body	0.01	FA(tr)				
SAB190	II	V6 (23) 48:4	4	Transitional	6000–5900	DFBW	Body	0.04	FA	–26.0	–26.2	–0.2	Non-ruminant
SAB193	III	G3 (17) 107:2	A2/A3	Early Pottery Neolithic	6395–6330	SW	Body	0.01	FA				
SAB209	II	V6 (4) 10:6	3	Transitional	6000–5900	SFW	Body	0.04	FA	–24.8	–27.2	–2.4	Ruminant carcass
SAB214	II	V6 (10) 17:8	4	Transitional	6000–5900	SFW	Body	0.02	FA	–27.1	–31.4	–4.3	Ruminant dairy
SAB219	II	V6 (4) 10:8	3	Transitional	6000–5900	SFW	Body	0.01	FA(tr)				
SAB220	II	V6 (21) 59:5	4	Transitional	6000–5900	GBW	Base	0.01	FA(tr)				
SAB221	II	V6 (7) 16:8	4	Transitional	6000–5900	SFW	Body	0.01	FA(tr)				
SAB223	II	V6 (8) 18:16	4	Transitional	6000–5900	SFW	Body	0.01	FA(tr)				
SAB225	II	V6 (8) 18:17	4	Transitional	6000–5900	SFW	Body	0.01	FA	–24.2	–27.1	–2.9	Ruminant carcass
SAB229	II	V6 (3) 14:7	3	Transitional	6000–5900	SFW	Body	0.06	FA(tr)				
SAB252	III	G3 (17) 51:1	A2/A3	Early Pottery Neolithic	6395–6330	SW	Base	0.04	FA, K, TAG(tr)	–24.5	–23.4	1.1	Non-ruminant
SAB263	IV	E9 (11) 32:14	–	Early Pottery Neolithic	6400–6330	GBW	Body	0.01	FA(tr), K(tr), TAG(tr)	–25.9	–31.9	–6.0	Ruminant dairy
SAB270	IV	E9 (15) 44:7	–	Early Pottery Neolithic	6400–6330	EFW	Body	0.01	FA(tr), K(tr), TAG(tr)				

Key: FA fatty acids, MAG monoacylglycerols, DAG diacylglycerols, TAG triacylglycerols, K ketones, (tr) traces.

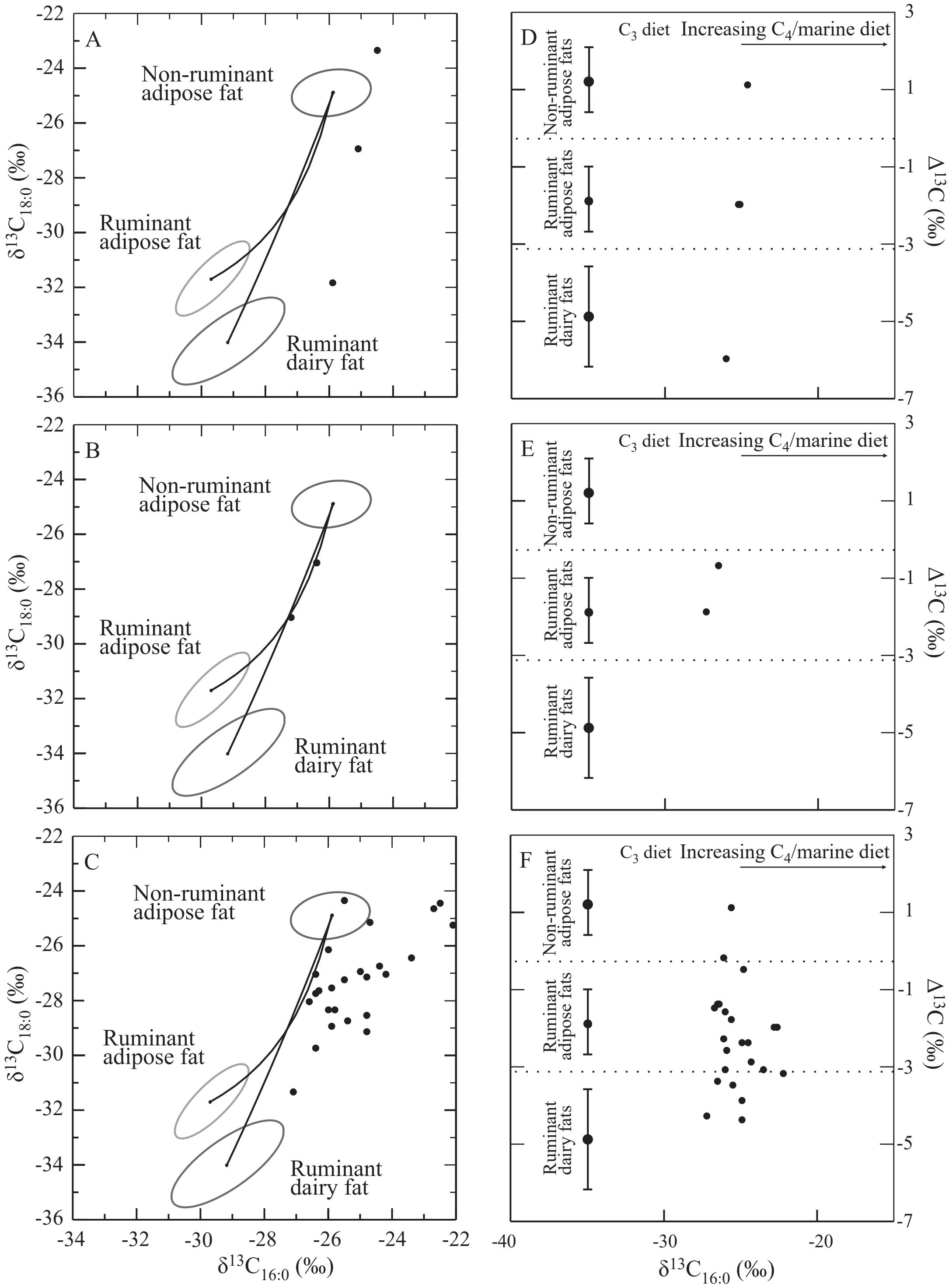


Fig. 15.3 $\delta^{13}C$ values for the C_{16}:0 and C_{18}:0 fatty acids prepared from animal fat residues extracted from sherds from (A) the Early Pottery Neolithic, (B) Pre-Halaf and (C) Transitional periods. The three fields correspond to the P = 0.684 confidence ellipses for animals raised on a strict C_3 diet in Britain (Copley et al. 2003). Each data points represent an individual vessel. The analytical error (± 0.3 ‰) is approximately the size of the points on the graph. (D)-(F) $\Delta^{13}C$ values from the same potsherds. Ranges show the mean ±1 s.d. for a global database comprising modern reference animal fats from United Kingdom (animals raised on a pure C_3 diet), Africa, Kazakhstan, Switzerland and the Near East (Dunne et al.*, 2012) (image Melanie Roffet-Salque).*

fats being by far the most abundant class of lipid residue, accounting for 20 of the 41 residues detected. Four of the degraded fats were dairy fat residues with two others lying on the borderline of the carcass and dairy fat ranges, which may indicate they are mixture (Table 15.2). Hence, ca. 10% of all the animal fat residues detected were determined to be dairy fats. Two of these dairy fats were attested in DFBW (samples SAB2 and SAB173) and one in GBW (sample SAB263) – pottery wares suitable for cooking (Le Mière and Nieuwenhuyse 1996, 129; Nieuwenhuyse 2007, 129–130). In these heavy-duty vessels dairy products were apparently processed involving heat. But the analyses also yielded one example of a SFW sherd yielding ruminant dairy lipid residue (sample SAB214) suggesting that this fragile vessel was used for storing/serving dairy products. The earliest evidence for milk at Tell Sabi Abyad comes from a GBW body sherd recovered from Operation IV and dating to the final stages of the Early Pottery Neolithic, ca. 6400–6330 cal BC. The DFBW sherds from the Transitional Period are dated to ca. 6000–5900 cal BC. Presently these constitute the earliest evidence for milk use attested in Upper Mesopotamia, possibly in the Middle East as a whole.

These findings are consistent with the work carried out by Vigne and Helmer (2007) pointing at even earlier evidence for dairying practices based upon slaughtering profiles. In fact, ovicaprids were used for a mixed milk and meat production in the Middle East already during the Late and the Early PPNB (8th millennium BC). Only few kill-off patterns for cattle are available in the Near East for the Middle and Late PPNB, but they also suggest that cattle were exploited for milk at the time. Archaeozoological studies are indeed a powerful means of unravelling herding practices and milk exploitation at archaeological sites. They allow the contextualisation of the foodstuffs present as lipid residues in sherds and, as lipid residue analyses are not species-specific, a tentative identification of animal species represented in the residues.

The faunal analyses at Tell Sabi Abyad cover a timespan from ca. 6900 to ca. 5900 cal BC, from the Initial Pottery Neolithic into the Early Halaf period (Cavallo 2000, Russell 2010). The faunal investigations suggest continuous, gradual shifts in animal exploitation over the 7th and early 6th millennia. These sequential changes have been grouped into eight 'animal exploitation phases' (AEP), each phase characterised by a specific species composition and exploitation pattern (Russell 2010, 239–240, 274). Sherds analysed in this study were sampled from the AEP IV to VII (Fig. 15.4), allowing investigations of the shift in the exploitation of ovicaprids (domestic sheep and goats) and the domestication of cattle.

Ovicaprids dominated the faunal assemblage throughout. Both postcranial fusion and mandibular tooth wear show rather similar mortality profiles for each animal exploitation phase, yet with subtle changes through time. AEP I to IV show a culling age of approximately 2 years of age with very few animals over 3 years of age present. By AEP V–VI in the Pre-Halaf period, the main culling age shifts by one year to around three years of age with more animals living up to four years of age and older. In AEP VII–VIII, the Transitional and Early Halaf periods, this trend continues with even more animals living over four years of age. These mortality profiles suggest that in the oldest levels ovicaprid husbandry was geared primarily towards meat production, with the majority of animals being culled at the prime meat age of two years and only a small number of breeding stock maintained. Through time this shifted to a mixed economy of both meat and secondary product production.

The archaeozoological studies from Tell Sabi Abyad then suggest a move from primarily meat to meat plus milk and fibre production during AEP V at around 6,225 cal BC, synchronizing well with the first lipid residues in the pottery. In the Pre-Halaf period levels (Operation III levels A1–B4, AEP V–VI), faunal analyses points to an increased emphasis on the production of milk. The lamb (or kid) would have been kept during the lactation period and some females culled because of decreased milk yield or lamb production at two to four years of age. Apart from dairy products the hair or fleeces of ovicaprids appear to have become more important as the numbers of older animals in the faunal assemblage increased as well. The emphasis on wool is also suggested by the synchronous introduction of spindle whorls in the Pre-Halaf period (Rooijakkers 2012). In the Early Halaf period (AEP VIII) the faunal signal for intensified secondary product production becomes even more pronounced with milk and fleece production perhaps taking priority over meat production in sheep and goats.

Bos remains were found in all levels, cattle being the second most common species in the levels contemporaneous with the sherds where lipid residue analyses were carried out (AEP IV–VII). The sequence documents a long-term process of gradually-increasing control over aurochs, starting in AEP IV and eventually resulting in the complete domestication of this animal in AEP V (Russell 2010). In the Initial Pottery Neolithic and Early Pottery Neolithic (AEP I–III) the mortality profiles do not reflect that of a wild and hunted population but rather a culturally controlled or proto-domestic cattle population. Herd security and meat production seem to have been the main foci of *Bos* husbandry. This form of animal management continued through AEP IV–V but by this time the animals can be considered fully domestic. Meat production becomes more intensive by AEP VI, so as in Transitional (AEP VII) and Early Halaf (AEP VIII) periods. Cattle at Tell Sabi Abyad, then, appear to have been kept primarily for their meat. There is no evidence of their use for traction.

Thus, faunal analyses suggest that ovicaprids were the milk producers during the final stages of the Early Pottery Neolithic, during which milk fats are first attested at Tell Sabi Abyad, through the Pre-Halaf-Transitional into the Early Halaf period. The role of cattle remains less clear. In the time period concerned domestic cattle appear to have been primarily exploited for meat at Tell Sabi Abyad but the occasional use of their milk cannot be ruled out. A total disregard of this valuable resource would be contrary to what would be expected, particularly when considering the importance of this animal in Halaf iconography.

15.6. Concluding remarks

The lipid residue analyses presented herein further emphasise the importance and the feasibility of studying lipid residues extracted from pottery sherds from the Late

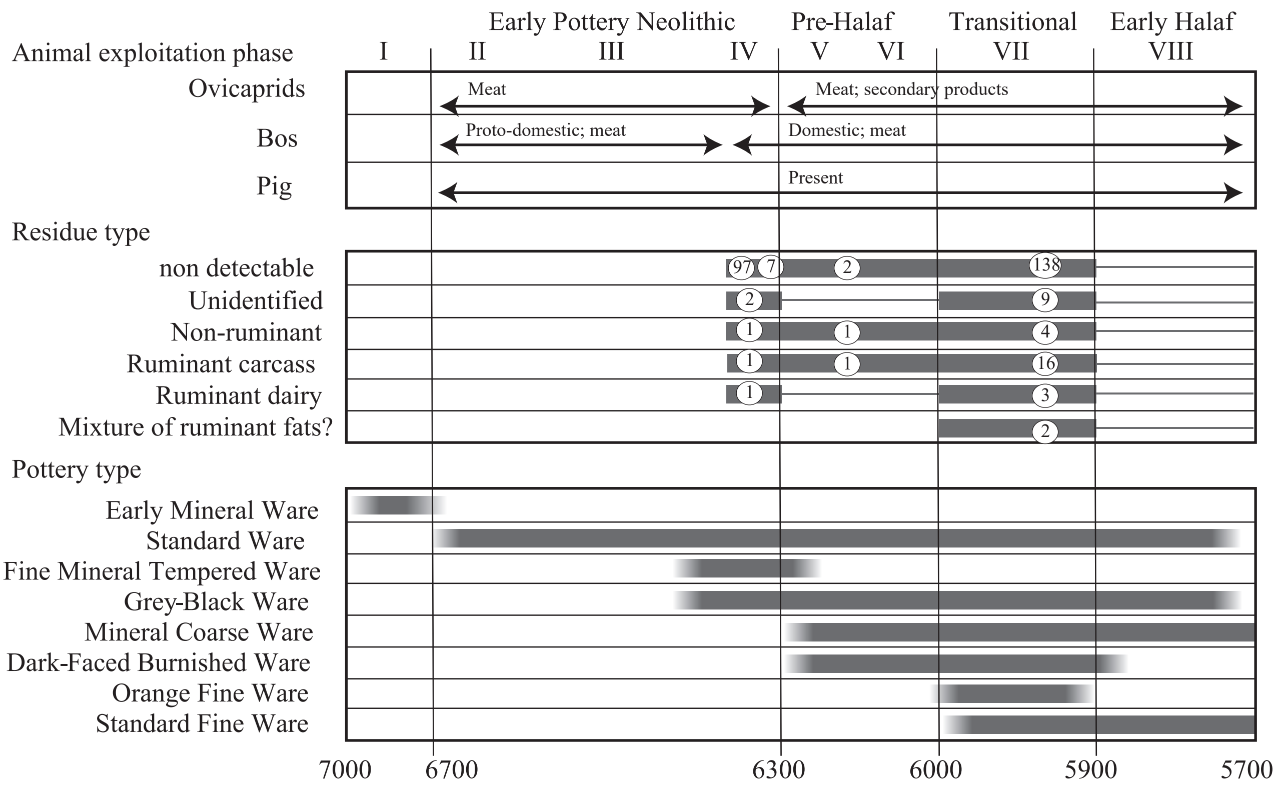


Fig. 15.4 Synchronising presence/absence of pottery types (wares; lower), organic residue results (centre) and main trends in the exploitation of ovicaprids and cattle (upper) (after Nieuwenhuyse et al. *2015, fig. 9).*

Neolithic in Upper Mesopotamia (Evershed *et al.* 2008). The results obtained provide a valuable perspective on the practical uses of Late Neolithic ceramic containers in Upper Mesopotamia. Traditionally pottery use is modelled on the basis of the shape, size, and performance properties of the containers; the investigation of lipid residues allows us to move one important step further, scrutinising how vessels were actually used. Thus, this study supports earlier interpretations of Mineral Coarse Ware, Fine Mineral Tempered Ware, Grey-Black Ware and in particular Dark-Faced Burnished Ware as 'cooking' wares. The DFBW especially gave an unequivocal signal that the vessels were used frequently subjected to direct heating. Together with the unique performance properties of this ceramic type this shows that DFBW was the preferred 'cooking' ware during the period investigated in this study.

In contrast, the recovery rates from the coarsely-made, plant-tempered Standard Ware that constituted the bulk of the ceramic assemblage were far lower (3%). Usage of this early pottery remain unresolved. Storing or serving cold liquid lipid rich foods would likely have resulted in increased recovery rates, and thus dry goods storage is a more likely function. Cooking was in this case not the primary activity in which this ware category was involved. In contrast to Çatalhöyük in Central Anatolia, no 'clay balls' that might have been used for indirect boiling (Copley *et al.* 2006) have so far been attested at Tell Sabi Abyad or at any other Late Neolithic site in Upper Mesopotamia. If we put this into a broader perspective, it appears that in this region cooking foodstuffs in ceramic pots did not play any significant role prior to the final stages of the Early Pottery Neolithic. A sustained shift to cooked food, then, was *not* synchronous with the first adoption of pottery, which in Upper Mesopotamia took place already between ca. 7000–6700 cal BC (Nieuwenhuyse *et al.* 2010). Only from ca. 6400–6300 cal BC onwards can cooking foods and beverages in pottery vessels unequivocally be documented as part of Late Neolithic culinary practices. This was a profound cultural change that must have had far-reaching socio-economic repercussions, which so far have been barely investigated.

The lipid residues extracted from sherds from Tell Sabi Abyad are among the oldest currently known in the ancient Near East, together with those from Çatalhöyük in Central Anatolia (Copley *et al.* 2006; Evershed *et al.* 2008; Pitter *et al.* 2013). They predate by several centuries those from Tell el-Kerkh dated to the Early Halaf period (Shimoyama and Ichikawa 2000) and they are considerably earlier that the ones from Late Neolithic al-Basatîn in the Wadi Ziqlab in northern Jordan (Gregg *et al.* 2009). Thus, they provide a unique insight into the late 7th millennium BC animal exploitation in the region. This study has thus brought forward evidence for the consumption of milk in the centuries immediately preceding the Halaf period and during the Early Halaf period. This is evidenced some 80 years after Max Mallowan introduced the term 'cream bowl' for the characteristic carinated collared bowls from the Halaf period based on ethnographic examples when observing his workmen drinking milk from carinated metal plates (Mallowan and Rose 1935). Complementary studies of age-at-death of animals at the site and construction of kill-off patterns demonstrate that the exploitation of ovicaprids for meat during the Early Pottery period shifted towards a mixed exploitation for meat and milk from the Pre-Halaf period. Cattle however seem to have been kept primarily for meat.

Evidently, while the residue evidence by itself is rather consistent with archaeozoological studies performed on the Tell Sabi Abyad assemblages, the overall signal of early dairy production in the Upper Mesopotamian Late Neolithic remains rather weak. In this study only four sherds gave unequivocal evidence of ruminant dairy lipids. Although the number of sherds containing dairy fat residues is low they do point to early secondary product exploitation. However, the small size of the current assemblage means caution should be exercised in its contextualisation and interpretation. Further samples from a broader range of time periods are required to strengthen, confirm or refute the patterns that begin to emerge. Notwithstanding this, if the different strands of evidence are brought together – pottery use, material culture, village layout, animal exploitation and dairy residues – they suggest far-reaching social and economic changes transforming Upper Mesopotamian societies at the end of the seventh millennium.

Notes

1 The residue study formed part of the Leverhulme Trust project (F/00182/T) *The Emergence of Early Farming Practices of the Fertile Crescent and the Balkans* led by Evershed, Sherratt and Payne. Pottery selection was undertaken Dr Jenifer Coolidge and laboratory analyses by Drs Mark Copley and Rob Berstan. NERC is thanked for mass spectrometry facilities (GR3/2951, GR3/3758 and FG6/36101). This chapter was previously published as Nieuwenhuyse *et al.* 2015.

2 In a previous publication (Nieuwenhuyse *et al.* 2015) the category of Fine Mineral Tempered Ware was termed 'Early Fine Ware'. The name was changed subsequently for consistency with provenance studies (Chapter 9) and to allow comparisons with other sites.

Chapter 16

Into the Pottery Neolithic at Tell Sabi Abyad

Olivier Nieuwenhuyse

16.1. Introduction

This book has looked in some detail at the early ceramic developments from a single, well-researched Upper Mesopotamian site, Tell Sabi Abyad. This final chapter aims to return to some of the issues presented in the opening chapter, bringing together the various strands of evidence presented in the previous chapters. The first section discusses themes related to the earliest appearance of ceramics at the site. As the emergence of pottery in Western Asia has already been discussed in depth elsewhere recently (Tsuneki *et al.*, eds., 2017), I shall limit the discussion to some remarks concerning the adoption of pottery at, specifically, Tell Sabi Abyad (section 16.2). Obviously, the question of when, how, and why pottery was first adopted remains a research theme of the utmost importance. However, as we saw, in its initial stages pottery containers remained somewhat of an oddity. The significant, transformative integration of this new artefactual category in daily life occurred only much later, in piecemeal fashion. Along this trajectory, shifting associations between containers made of pottery and those made from a suite of other, alternative 'soft' materials provide insights into the changing role of ceramics at Tell Sabi Abyad. This fundamental transformation of the material constitution of Neolithic societies will be the topic of a separate discussion (section 16.3). Subsequent discussions will focus on three fields of activity in which pottery containers came to be deployed in the course of the 7th millennium at Tell Sabi Abyad: storage (section 16.4), cooking (section 16.5), and constructing social identities (section 16.6).

16.2. The coming of pottery

The excavations on the mound of Tell Sabi Abyad I offer a valuable case study for exploring the earliest horizon of sustained pottery production in Upper Mesopotamia. In Operation III, levels A12–A10 are those that yielded the characteristic early ceramics. These differ strongly from the pottery from subsequent levels in almost every aspect (Chapter 4.4.3). Occasionally, Early Mineral Ware (EMW) sherds turn up in much later levels, but in these cases they have been interpreted as residual (Chapter 11.3). The distinctiveness of the ceramic assemblage in levels A12–A10 led us to propose a different terminology for this earliest phase, the *Initial Pottery Neolithic*.

Tell Sabi Abyad is far from the only site where closely comparable early ceramic assemblages have now been documented (Chapter 9; Fig. 9.1). Nor is the mound of Tell Sabi Abyad I the only Initial Pottery Neolithic site within the cluster of sites forming Khirbet Sabi Abyad. Excavations at the two adjacent mounds of Tell Sabi Abyad II and III have shown that these, too, were occupied at this stage (Fig. 2.3). This is important to note, as it allows us to reconstruct with a fair degree of precision when Neolithic communities in this part of the Balikh Valley first adopted pottery. The excavations at Tell Sabi Abyad I itself have not documented a local transition from Pre-Pottery to Pottery Neolithic; the oldest strata excavated so far in Operation III, at the base of a narrow sounding, already contain (some) pottery. However, by integrating the stratigraphies available for all three sites, and by incorporating Tell Sabi Abyad within the broader Upper Mesopotamian chronological framework, we may place the start of the Initial Pottery Neolithic at the site at ca. 7000 cal BC. It lasted for a period of about three centuries from ca. 7000 to ca. 6700 cal BC (Campbell 2017; Nieuwenhuyse *et al.* 2010).

The properties of the early pottery containers from Tell Sabi Abyad are dramatically different from what previous research had led us to expect (Van As *et al.* 2005). Earlier views had concluded that the coarsely-made, plant-tempered ware, such as that recovered from later levels at the site, represented a likely candidate for the 'earliest' pottery in the broader region. The supposedly 'primitive' character of this later material fit well with contemporary interpretations viewing it as representing a stage of 'experimenting', preceding the full proliferation of ceramics. Early pottery production was therefore sometimes seen as an outgrowth of other, pre-existing container technologies that employed 'natural', organic materials such as leather or basketry (Chapter 10). In contrast, no cross linkages with basketry are apparent at all with the Early Mineral Ware. Nor, for that matter, do the data support a linkage with containers made of plaster, so-called White Ware, the other oft-cited candidate for a 'stepping stone' leading to the invention of pottery. In fact, both non-ceramic container categories *do* show intriguing connections with pottery, but only with the plant-tempered Standard ware from much later stages, many centuries after the first adoption of pottery in the Balikh (see below).

Associations may instead be drawn with the category of vessels made of stone (Adams 1983; Bernbeck 2017; Le Mière 2017). Stone vessels were made and used long before people adopted pottery. The EMW, densely tempered with crushed basalt, in a sense 'incorporated' stone in its very body. The properties of form, size, and the general surface appearance of containers in stone vessels and EMW show intriguing similarities. For instance, the curious style of painting and slipping that characterises Early Mineral Ware created blurred lines with diffuse edges (Pl. 11); this matches the ways in which Neolithic craft-persons often used natural colours and textures of stone to create multi-coloured containers (Fig. 1.3; Nieuwenhuyse and Campbell 2017). Of course, not all EMW was painted or slipped. Amongst the unpainted examples, many show a dark surface colour that would have been unsuitable for painted decoration. Le Mière, Özbaşaran and Picon, however, draw attention to the similarities between these dark-coloured varieties and pre-existing stone bowl traditions that used dark-coloured stone types as a raw material (Le Mière *et al.* 2017). In their play with colours and contrasts, stone and pottery could both be said to be 'visually conspicuous'. The addition of painted or slipped decoration to pottery containers may resemble a 'skeuomorphic echo' (after Sherratt 2002) from precursors in stone. The two categories resembled one another from a tactile perspective as well. Stone and pottery are both 'hard' materials. Their surface textures would have felt very similar, as EMW containers were carefully smoothed or burnished. The strong mineral temper typical of the EMW ensured that containers made of pottery would have weighed about the same as their stone contemporaries.

Finally, if the density estimates are to be trusted (Chapter 11.2), at Tell Sabi Abyad the two categories occurred in very comparable, and equally limited quantities during the Initial Pottery Neolithic. They began to diverge only *after* this period: while coarsely-made, plant-tempered containers flourished during the Early Pottery Neolithic, EMW disappeared and stone vessels went into a slow decline. During the Initial Pottery Neolithic, density estimates suggest that less than two sherds of either pottery or stone were present per cubic metre. Strong fragmentation prevented the calculation of Estimated Vessel Equivalents, but the low densities may reflect a situation of perhaps one or two items per household, perhaps even less. In sum, it would be too far-fetched to speculate on stone vessel technology as a direct precursor for pottery, but these converging lines suggest that in the Initial Pottery Neolithic, containers of pottery and stone had a closely comparable 'seat in life' (Bernbeck 2017). If we place the adoption of pottery in the broader framework of flourishing 'soft ware' technologies during the later PPNB, the EMW containers may perhaps be seen as a successful emulation of the properties and effects of stone.

But in contrast to bowls of stone, which presumably were mostly produced at Tell Sabi Abyad itself (Akkermans *et al.* 2006), the earliest pottery containers reached the site from elsewhere. It should be emphasised that the sample submitted to provenance analysis remains small and that statistical treatment of its outcomes results in probabilities, not certainties (Chapter 9). Having said this, the provenance analysis provides a wholly unexpected twist to the discussion of early ceramics in Upper Mesopotamia. Not only can a close match between two specific locations be convincingly suggested, but that such a close match can be suggested at all remains exceptional in the history of provenancing Near Eastern prehistoric ceramics. *None* of the (few) EMW vessels provenanced so far appears to have been made locally at Tell Sabi Abyad. Apparently, when the community inhabiting Tell Sabi Abyad decided to adopt bowls made of pottery, they did so by engaging networks of exchange that ultimately connected them with communities to the east, namely their neighbours in the headwaters of the Khabur River. Specifically, *all* samples studied so far appear to have derived from a single location, which matches the site of Tell Seker al-Aheimar.

Further study should seek to situate these mobile containers of the Initial Pottery Neolithic within the broader picture of Neolithic exchange. Interestingly, the direction of exchange overlaps with, but does not mirror those attested for other non-local materials at the site, including obsidian and raw copper from Anatolia (Akkermans *et al.* 2006; Verhoeven 2000b), and bitumen from northern Iraq (Connan *et al.* 2004). As to the early ceramics, the limited size and weight of the EMW containers would have made them eminently suitable for transportation across considerable distances. Between Tell Sabi Abyad and Tell Seker al-Aheimar, Neolithic traders had to cover some 120 km as the crow flies. An average adult person could have made the journey on foot in an estimated 7 days, or about 2 weeks including the return journey, if carrying no more than 15 kg (Ahmad 2014). Pottery apparently travelled this route in small quantities but consistently over several generations.

One valuable outcome of the present study, then, is that it allows us to move away from over-generalising theory regarding the emergence of pottery as a monolithic craft, towards a more nuanced, more perplexing, but ultimately more realistic image of local processes of innovation, resistance and emulation in Upper Mesopotamia. Perhaps counterintuitively given the enormous importance attached to pottery in archaeological thinking, and in spite of the wide availability of necessary expertise with making containers in various soft ware technologies long before the coming of pottery, ceramics were *not* adopted overnight, simultaneously, across the Upper Mesopotamian steppes and Taurus foothills. When sustained production eventually began, the new craft appears to have spread step by step, taking village after village.

Early Mineral Ware was not 'invented' at the site of Tell Sabi Abyad, but its ultimate origin may not have been at Seker al-Aheimar either. At Seker al-Aheimar, more heterogeneity is documented for the clay fabrics and attendant chemical signatures, suggesting a mixture of both locally and non-locally produced EMW (Chapter 9). It was the locally-made 'Seker' variety of EMW that found its way to Tell Sabi Abyad. Interestingly, the EMW recovered from Tell Sabi Abyad superficially resembles the early pottery of Sumaki Höyük situated further north on the Tigris, but the provenance analysis rules out that site as a likely source. Anticipating further provenance studies, the picture that emerges of ceramic exchange as a factor contributing to the spread of pottery containers appears to be regionally diverse and sensitive to the mechanisms of small-scale, local networks.

Issues of local receptivity, selective adoption, and partial rejection almost certainly played a role in the spread of pottery containers through the Balikh Valley during the Initial Pottery Neolithic and subsequently (Nieuwenhuyse 2017a; Nieuwenhuyse and Akkermans in press). Intensive and systematic surveys in this Valley have yielded a detailed picture of Neolithic settlement patterns (Akkermans 1993; Wilkinson 1996). A major obstacle remains the identification of the Initial Pottery Neolithic horizon in surface collections since, as we now know, the diagnostic evidence consists of fragile, low-fired sherds present only in minute quantities. The Initial Pottery Neolithic has so far been identified at only four sites in the Valley, all of them from excavated material. In addition to the three mounds of Tell Sabi Abyad I, II and III, this includes Tell Damishliya (Akkermans 1993, 138–203). All four sites attest to occupation during both the Pre-Pottery Neolithic and the Early Pottery Neolithic. It is very likely therefore that in addition to these, at least some of the other Neolithic sites that yielded evidence for both PPNB and EPN inhabitation would yield evidence for the IPN upon excavation. In the Valley, a total of nine additional sites match this criterion (Pl. 31).

Following these considerations, if one were to take the absence-presence of ceramic indicators as a direct reflection of human populations following the classic culture-history paradigm, the evidence would suggest flourishing PPNB settlements, followed by a curious 'abandonment' of almost the entire Valley during the Initial Pottery Neolithic (ca. 7000–6700 cal BC), followed by a partial return during the Early Pottery Neolithic. As well, whereas in the Pre-Pottery Neolithic period villages were dispersed throughout the entire Valley, settlement apparently 'contracted' to the northern parts of the Valley in the 7th millennium. Most Pottery Neolithic sites are located north of the present-day 220 mm average precipitation isohyet, suggesting that climatic factors affected demographic fluctuations and settlement preferences.

But if the partial adoption of pottery containers is accepted as a likely factor, then different narratives begin to unfold. One alternative, speculative, scenario could be the following. For reasons still to be elucidated, only those communities inhabiting the central part of the Valley, namely the fertile plains surrounding the modern village of Hammam et-Turkman, gained access to non-local, exotic EMW containers. Whereas practices involving ceramic containers did not spread much further at this stage, increasing familiarity with these new practices stimulated local receptivity. This made it possible for the new craft to gradually spread across the Valley in the centuries following the Initial Pottery Neolithic (Pl. 31). But ceramics did not reach each and every village. Villages in the southern part of the Valley in particular appear to have preferred instead to maintain their aceramic life-ways for centuries. Significantly, much farther to the south on the Syrian Euphrates, the inhabitants of the Neolithic village of Tell Bouqras persisted for many centuries without pottery containers, adopting the craft only during the Pre-Halaf stage (Akkermans *et al.* 1983; Le Mière 1986).

Much past and current debate focuses on the potential uses and functions of these early ceramics (Balossi 2017; Cruells *et al.* 2017; Le Mière 2009, 2017; Le Mière and Picon 2003; Odaka 2017; Tsuneki 2017). As we have seen, storage and cooking have often been suggested in the literature as the twin functions primarily stimulating the adoption of pottery in the ancient Near East (Chapter 1). This association rested mainly on theoretical grounds, supported by generalisations derived from the study of (pre-)modern non-western societies, and from observations on ceramic forms and functions from much later and better-known stages in the Pottery Neolithic. As Brown already warned (1989), however, reasons for adopting pottery in its initial stages may be very different from those the craft would acquire in subsequent stages. Now that data on early ceramic complexes in Upper Mesopotamia are accumulating from the field, ideas on early uses of pottery are shifting. As yet, no consensus amongst scholars is apparent (Nieuwenhuyse and Campbell 2017). Here we shall offer some contributions to this debate based on the EMW from Tell Sabi Abyad.

Regarding the argument for storage, as several investigators have already remarked, this role can be safely excluded. Just as at all other Initial Pottery

Neolithic sites recently investigated in other parts of Upper Mesopotamia, at Tell Sabi Abyad the earliest vessels were simply too small, too open and too limited in quantity to be serious facilitators of storage of any kind. Storage practices involving pottery containers would evolve slowly in the course of the 7th millennium, long after the disappearance of EMW (see below). As to cooking, however, the emerging picture is considerably more challenging. In the present study the residue analysis did not include any samples of EMW, but several lines of argument suggest that the earliest pottery vessels at Tell Sabi Abyad were indeed used for cooking. The strong basalt temper, even wall thickness, and the lack of angularities in the vessel profiles would have been beneficial in reducing the risk of breakage by thermal shock; the occasional appendages also resemble those often associated with cooking vessels. Miyake (2017) suggests that in the Pottery Neolithic people shifted from preparing their food in fire pits to preparing it in pottery vessels. Although the exact timing and synchronicity of these innovations remains to be further elucidated, his suggestion opens the way to investigating how container innovations, cooking technologies, and the spatial lay out of villages were inter-related.

But even if cooking can be convincingly thought of as one of the 'functions' of the early pottery, it does not seem to have been its *only* function, nor does 'cooking' at this stage seem to have involved a whole-sale dietary revolution. As Cruells, Faura and Molist (2017) observe, the early mineral-tempered pots may have resisted thermal shock with some success but they were at the same time fragile and very susceptible to mechanical stresses. Odaka (2017) and Le Mière (2017) both point out that if cooking was the main catalyst instigating the adoption of pottery, the new ceramic-culinary tradition reflected in the EMW would have endured. Instead, not long after the start of pottery production, the community at Tell Sabi Abyad abandoned the EMW entirely and for several centuries shifted to an exclusive production of coarse, porous Standard Ware containers, which were wholly unsuitable for cooking (see below). Certainly, many of the EMW sherds at Tell Sabi Abyad do show soothing and possible interior residue, but this use-trace evidence for cooking may not be replicated at each early Pottery Neolithic site (Cruells *et al.* 2017). Some communities may have used the new craft for cooking whereas others perhaps adopted it for entirely different purposes. Finally, even if EMW vessels were occasionally used for cooking, the exceptionally low quantities with which they occurred argue against a whole-sale transformation of food preparation techniques and commensal practices at the onset of the Pottery Neolithic.

Portability seems to have been a major use-related property (Odaka 2017). The EMW containers were intended to be exchanged, to circulate from one household to another, from one village to the next. As exotic, visually conspicuous, but rare items they may well have been 'prestige items'. However, we should be careful at this stage in using this term as we remain very poorly informed on the socio-political constitution of final PPNB and Initial Pottery Neolithic groups. We simply do not know for certain if vying for prestige played any role at all in these societies or, if it did, how this was expressed materially. Their exclusivity in any case suggests that they were associated with special, not everyday activities. Special events could have been those that were restricted to specific, perhaps ritually scheduled times in the year, associated with particular feasts or involving interactions with specific social groups from outside the household. They may well have involved special types of food or drink, or familiar foodstuffs prepared in special, innovative ways. Perhaps the safest provisional conclusion to be drawn at this stage is that the EMW containers may have had several functions (Balossi 2017; Odaka 2017). Takahiro Odaka (2017, 67) calls them 'multi-functional portable containers', or for the sake of simplicity, 'MFPC's'.

16.3. The slow development of a mass product

The growth of pottery as a craft can be conceptualised from various perspectives. Here we shall reflect on the emergence of the potter's craft as a process *quantitatively*. At Tell Sabi Abyad the starting and end points of the process in chronological terms were the Initial Pottery Neolithic (ca. 7000–6700 cal BC), characterised by almost no pottery containers at all, and the Pre-Halaf phase (ca. 6300–6000 cal BC), characterised by overwhelming quantities of pottery sherds recovered from virtually every excavated context. The approximate half millennium in between, dubbed the Early Pottery Neolithic, is the time frame within which this very fundamental transformation came about. Intriguingly, *qualitatively*, shifting associations can be drawn along this trajectory between containers made from ceramic and those in other 'soft' materials such as stone, clay, basketry, and plaster.

Distilling workable estimates for sherd densities proved challenging at Tell Sabi Abyad (Chapter 11.2), and the resulting figures should not be trusted in any absolute sense. Rather, they should usefully be seen as relative to the site itself, as reflecting long-term trends of the availability of pottery containers at the site. At Tell Sabi Abyad, ceramic densities increased by a factor 30 from less than 2 sherds/m^3 in the Initial Pottery Neolithic to about 60 sherds/m^3 at the end of the Early Pottery Neolithic (Chapter 11.2; Fig. 11.5). However, the present study suggests that at Tell Sabi Abyad this process was not linear. Although rigid conclusions should not be based on the specific density measures presented in this book, the quantitative availability of pottery containers in the 7th millennium appears to have increased in jumps and bumps (Fig. 11.6). Specific 'bumps' may tentatively be correlated with changes in the composition of the ceramic assemblages, ceramic-technological innovations, and changes in the uses of pottery containers.

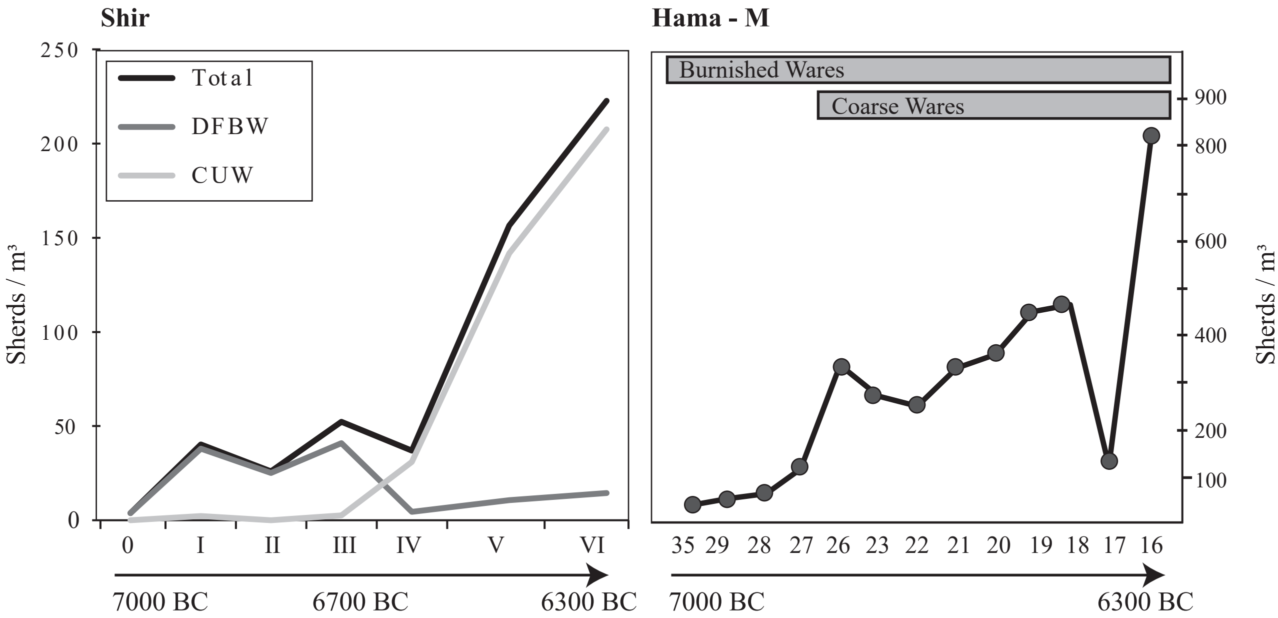


Fig. 16.1 Increasing ceramic sherd densities associated with the introduction of (plant-tempered) Coarse Ware in the Northern Levant (compare with Fig. 11.5). Left: Shir; right: Hama period M (after Nieuwenhuyse in press, d; Thuesen 1988, fig. 9).

A first phase was the period represented at Tell Sabi Abyad by levels A12–A10, termed the Initial Pottery Neolithic. Sherd densities remained relatively stable throughout this phase. Put differently, the availability of pottery containers was very low throughout this stage, but at this low level it remained remarkably constant. The scarcity of ceramic materials and its extreme fragmentation both contributed to a fuzzy boundary between 'Pre-Pottery' Neolithic and 'Pottery Neolithic'. In contrast, the early phase of the Early Pottery Neolithic (levels A9–A7), saw the first sustained rise in the availability of pottery containers. This would constitute a second phase, dated ca. 6700–6500 cal BC. At Tell Sabi Abyad this acceleration in the availability of pottery containers coincides with, and may be entirely attributed to the introduction and subsequent rapid development of Standard Ware. In levels A9–A7 the ceramic assemblage included just one ware, the coarsely-made, plant-tempered Standard Ware, which was made and used in increasing numbers.

Intriguingly, this pattern may be structurally replicated at other early 7th millennium sites in Upper Mesopotamia. Even if quantified density estimates remain to be calculated, relevant contexts include: Mezraa Teleilat phase II, Akarçay Tepe phase II, Salat Yani Camı phase 2, Tell Halula Ceramic Phase 2, and Seker al-Aheimar Proto-Hassuna phase (see Chapter 1). Interestingly, density measures at some sites in the Northern Levant show a structurally very comparable pattern (Fig. 16.1). At Shir, the initial phases of the Pottery Neolithic were characterised exclusively by low densities of mineral-tempered, burnished wares (known as 'Dark-Faced Burnished Ware'). This was followed by rapidly increasing densities of ceramic assemblages progressively dominated by coarsely-made, unburnished ceramics that were tempered with plant materials (Nieuwenhuyse 2009a, in press, b, in press, d; Thuesen 1988). The exact synchronising of these sequences remains problematic, but available radiocarbon records suggest that this important shift occurred in the early half of the 7th millennium across this large region.[1]

Focusing here on Tell Sabi Abyad, the provenance study strongly suggests that the Standard Ware was made locally at the site (Chapter 9). More specifically, levels A9–A7 represent the first period when the inhabitants of Neolithic Tell Sabi Abyad themselves began to produce pottery. In a sense, the local 'Pottery Neolithic' began in earnest by level A9. However, explaining the gradual encroachment of ceramic containers into daily life remains a challenge. The Standard Ware from levels A9–A7 was a far cry from the very sophisticated, diversified, multi-purpose, and plant-tempered ware documented half a millennium later at the end of the Early Pottery Neolithic. At the start of the Early Pottery Neolithic, early versions of Standard Ware often contained minimal quantities of non-plastic inclusions, sometimes resulting in fissures and notably poor bonding between coils. Potters seem to have been only dimly concerned with the differential workability and the forming-drying properties of clays prepared in diverse ways (Chapter 4.2.3.2). Many vessels were poorly shaped, and the larger number of the vessels were fired in short firing intervals and at low firing temperatures. In sum, as far as ceramic-technological expertise is concerned, early Standard Ware was simply not very good pottery.

In stark contrast compared to the earlier EMW, cooking would have been difficult with these containers; when placed over a fire the vessels would crack. Storage, too, would have been difficult; the limited volumes and the lack of a collar were two factors mitigating against these containers being adopted for any significant storage. Of course, any container can be closed with a lid even in the absence of a collar. Lids may have consisted of organic materials that were not preserved. Simple pottery sherds could have been re-used without being identified as such by the archaeologist unless found *in situ*. It might even be suggested that the frequently present loop handles did not function so much to improve grip but to facilitate closure: in theory people could cover the vessel opening with a cloth as a make-shift lid and secure this tightly with cords wrapped through the handles. However, typical for the vertical loop handles is their positioning high on the vessel wall, usually protruding above the rim. They would have stood in the way rather awkwardly, had closure of the vertical pots in this way been important.

In terms of morphology, diversity was minimal in levels A9–A7. Characteristic were simple shapes with convex walls; vessels uniformly were of a limited size. The most common vessel type was a low, vertical 'bucket' with loop handles on either side of the rim. Oval 'trays' or collared vessels ('jars') did not yet exist. The restricted height of pottery containers at this stage reflects an equally restricted container capacity; measurements suggest volumes of less than 5 litres (average 1.4 litre). Shapes and sizes were not very dissimilar from those of the preceding Early Mineral Ware. But the two categories were certainly not the same in terms of performance properties. Gone were the earlier experiments with painted and slipped decoration; the early Standard Ware was no longer 'visually conspicuous' at all. Produced locally at Tell Sabi Abyad, ceramic containers no longer played any role in connecting communities over larger distances. The overwhelming monotony and limited diversity of pottery containers at this stage suggests that they had a specific, limited role.

The early Standard Ware containers at Tell Sabi Abyad therefore cannot be seen just as local emulations of the earlier Early Mineral Ware with locally available raw materials and rudimentary beginners' expertise. They were not simply local attempts to reproduce the advanced exotic items that for reasons unexplained could no longer be counted on as available. Rather, pottery containers appear to have gained a different 'seat in life' at this stage. Notwithstanding their rather poor appearance to our modern eyes, the increasing sherd densities unequivocally suggest that to the inhabitants of Tell Sabi Abyad these early Standard Ware containers were a valuable addition to an existing material repertoire. Therefore, this phase represented a crucial one in the development of pottery containers, as it paved the way for the remarkable diversification that would characterise subsequent stages of the Early Pottery Neolithic. This is not to call for a teleological, functionalist perspective. The inhabitants of levels A9–A7, obviously, were not marching purposely towards the intricate social embeddedness of advanced ceramic containers that characterised the later 7th millennium. They would have been unaware of these later developments, which represented unintended consequences of decisions made for wholly different reasons.

Fig. 16.2 Tell Sabi Abyad, Operation III. A Late Neolithic alternative to pottery. Unfired clay container (P03-543; from a level A4 room fill) (photo Tell Sabi Abyad project).

The properties of the early Standard Ware containers may provide clues to their 'seat in life'. Significantly, in general form, shape and size they resemble to some degree the much older unfired clay containers, such as those recovered from Mureybet on the Syrian Euphrates or Ganj Dareh in the Iranian Zagros (Le Mière and Picon 1998; Schmidt 1968, 1976, 1990). At Tell Sabi Abyad itself, unfired clay containers were excavated from several 7th millennium contexts in Operation III. Many of them were large, immobile fixtures; these bins, basins, or silos formed an integral part of the house, while other vessels were intentionally made as smaller, movable portables (e.g. Fig. 16.2). The introduction of Standard Ware and related ceramic industries across Upper Mesopotamia perhaps represented the materialisation of the insight that the traditional, pre-existing, small-sized, portable containers made of clay could be improved with a simple firing. Most prosaically, after firing they consisted of harder and more durable material that could withstand mechanical stresses much better. The fired-clay variety could be moved about, filled, emptied, and refilled with some frequency and for some time.

At Tell Sabi Abyad, the frequent application of appendages, especially the almost iconic vertical loop handle, suggests that these fired clay containers were indeed intended to be moved about. Movement could be achieved by gripping the containers by their appendages, but people could also conveniently use a stick to turn the vessel or push it around. But it seems unlikely that the containers were intended to be moved around very much; their action radius may have been fairly restricted. If spatial distributions from later stages at the site may be extrapolated to the earlier levels (Chapter 13.4), these vessels served primarily in and around the house. They would have been employed on the floors. In theory the loop handles would facilitate suspension, but in practice this would have been impractical. The weight of these containers, and the often poor bonding between base and wall or indeed between the appendages and the vessel, might easily lead to complications. People would have wanted to avoid spilling valuable contents caused by pottery vessels smashing on the floor making a mess of everything.

We do not know *what* was contained in them, but their properties do suggest that *containment* was certainly among their uses. This is of course already reflected in their very form. They would have been practical for the short-term storage of dry goods or fatty substances. This finds support in the residue analyses suggesting that dry goods were contained in these vessels (Chapter 15). In addition, the Standard Ware was occasionally plastered already in these early levels (Chapter 6). Burnishing was very frequent in levels A9–A7, but diminished in subsequent levels (Chapter 4.2.3.2). These activities would have contributed to a reduction of the porosity of the vessel wall, and their frequent application suggests that such a reduction was of concern. Plastered vessels would even be able to hold liquids for some time. If filled with water this would eventually seep through the vessel wall, but the evaporation and subsequent cooling of the exterior surface might have been considered an asset: the vertical pots would have been excellent water coolers. Might they have been the equivalent of modern refrigerators?

In levels A9–A7 the coarse ceramic containers may have been little more than more durably made clay containers, but over time their availability opened up new possibilities, fostering new demands for pottery containers. This may have stimulated technological innovation and experiments with new uses for pottery. As suggested by the density measurements, demand rose very slowly in the course of the 7th millennium (levels A6–A4). This would constitute a third phase, with absolute dates between ca. 6500–6400 cal BC. As we have seen, the density measures for this stage are conflicting and perhaps should not be taken too rigidly (Chapter 11.2). They could either be taken to indicate that the increase of pottery containers slowed down or that its availability remained relatively steady. If sustained by further studies this would be interesting, as during this stage the ceramic assemblage shows a series of crucial innovations.

In this phase the development of large, holemouth pots, occasionally furnished with a cordon, points to the increasing importance of pottery for storage (see below). Gradual but important changes in Standard Ware technology made it possible for potters to shape taller, more voluminous and, inevitably, much more heavy vessel types. Introduced by level A4, Fine Mineral-Tempered Ware and Grey-Black Ware both appear to have functioned as 'cooking wares', attesting to important changes in diet, food preparation and commensality (see below). Small numbers of red-slipped Fine Mineral-Tempered Ware represent the return of decorated pottery containers after an absence of about three centuries (see below). Collectively, these innovations show that pottery containers gained a much more diverse set of roles by the later 7th millennium.

Intriguingly, it is only at this belated stage that convincing relationships can be identified between the operational chains of pottery and basketry. For the earlier stages, superficial resemblances in container form may be suggested, but no unequivocal technological cross-overs can be pointed out from baskets to pots. From levels A6–A3, however, several examples were found of pots shaped around a coiled basket or while standing on coiled basketry (Chapter 10). Far from indicating the 'primitive' beginnings of pottery, these cross-overs between the crafts of basketry and potting occurred in a dynamic context of increasing quantitative and qualitative diversification of pottery production, as well as an expanding array of pottery-related practices, several centuries *after* the first adoption of pottery. Far from being the 'cause' for making coarse Standard Ware, the incorporation of basketry into the *chaîne opératoire* of ceramic containers appears to have been a result of its already successful development, as one element of an enriched productive repertoire.

Finally, at the end of the Early Pottery Neolithic and into the Pre-Halaf period (levels A3–A1), densities rose steeply. Especially the final parts of the Early Pottery Neolithic show the highest increase rates of the Operation III ceramic sequence. At Tell Sabi Abyad the conspicuous 'spike' in pottery sherd densities in level A1 remains curious. It could be attributed to either a defect in our calculations, to a true rise in the availability of ceramic vessels, or to the effects of tell formation (Chapter 11.2). In any case, this relatively brief period (ca. 6400–6300 cal BC), may constitute a final, separate stage as far as the emergence of pottery is concerned. The range of practices in which pottery containers became involved diversified even further, as reflected in: the emergence of the jar and husking trays as distinct types, the introduction of new cooking wares, the appearance of non-local Dark-Faced Burnished Ware, and innovative traditions of decorating ceramics. At this stage the integration of pottery vessels into Neolithic life appears to have reached its apogee. People almost certainly were consciously aware of the circumstance that numbers of pottery vessels available in the village were increasing. A new, discursive attitude to broken vessels is attested in the appearance of pottery containers repaired or reshaped (Chapter 8). Levels A3–A1 attest to the full spectrum of pottery-related fields for which the Late Neolithic in the ancient Near East has become so well known. Three of these realms shall now be briefly explored: storage, cooking, and the negotiation of social identity.

16.4. A concern with storage

In this study, the adoption of pottery containers for storage emerges as one of the keys for understanding ceramic development in the 7th millennium in Upper Mesopotamia. However, as has become clear, this specific use of pottery developed very gradually over the course of the later Neolithic. The concretion of sustained practices involving storage with ceramic containers was a complex, multi-angled process that unfolded over several centuries. The data emerging from Tell Sabi Abyad allow us to reconstruct this process in broad outlines. First, we may chart the rise and fall of formal vessel types associated with storage, especially the pottery jar and the holemouth pot. Second, we may focus selectively on those properties that made these types such good facilitators for storage, in particular the presence of a collar, increased size and bulk volume. Third, we may draw alternative, storage-potential-enhancing strategies into the discussion, for example, the practices of plastering, burnishing, and furnishing vessels with a cordon. Finally, we will look at the crucial ceramic-technological innovation that made these developments possible, namely the development of coarse plant-tempered ceramics.

The formal presence of pottery jars and holemouth pots as distinct vessel types for storage is more than merely a useful culture-historical index; in Near Eastern prehistoric archaeology these types are associated with advanced Neolithic surplus economies and social organisations of increasing complexity (Chapter 1). But when did these types first appear in the archaeological record? Technically speaking, 'jars' are defined by the presence of a distinct collar. At Tell Sabi Abyad collars were typically concave, connected with the body by means of a rather indistinct shoulder, and just a few centimetres tall. Distinct necks worthy of the name first appeared in the category of Standard Ware (Chapter 4.2.4.7). As a formal type, Standard Ware jars first appeared in very small numbers by level A3, becoming gradually more common by level A2. By level A1 they comprised almost one-quarter of all Standard Ware types. Holemouth types began somewhat earlier; the several sub-varieties distinguished in the formal typological analysis first appeared by level A5 (Table 4.17). However, throughout the later A-Sequence holemouth pots comprised only a very small fraction of all Standard Ware types (Chapter 4.2.4.6). Depending on how much weight one places on the comparatively rare occurrences of formal storage types during levels A5–A3, a meaningful quantity of bulk storage types can be demonstrated only from level A2 onwards. Especially by level A1 (ca. 6335–6225 cal BC), the 'jar' rather abruptly became a very common element of the ceramic assemblage. So, any methodological emphasis on formal typologies would contribute to the impression of a cultural punctuation as far as storage practices are concerned.

A more diffuse image emerges as we move away from formal typologies, which places the seemingly abrupt 'break through' of pottery jars in level A1 into a broader perspective. Significantly, the neck was not invented in one moment; low collars with gradual, indistinct shoulders are in fact found already very early on in the A-Sequence, associated exclusively with Standard Ware. But throughout levels A8–A5 these comprised a minute fraction of all Standard Ware (less than one percent). In many of these early cases it is even doubtful if they constitute a purposeful attempt to shape a collar or resulted unintentionally from the rough, irregular shaping that is characteristic for these early levels. This insignificant proportion began to increase only somewhat by levels A4 and A3. Collared vessels became quite common by level A2 (Fig. 4.22). Thus, it appears that the spread of collared vessels coincided with or preceded the development of the jar as a formally distinct vessel type, suggesting a slow, long-term evolution from low, non-distinct collars to distinct necks. In sum, at Tell Sabi Abyad the neck evolved into a distinctive property of ceramic containers during levels A2–A1 (ca. 6385–6330 to 6335–6225 cal BC), having firm and clear roots in less distinct predecessors.

In tandem with this development in formal shape, pottery containers grew in size, especially in terms of height and volume. The strongest diversification in size is seen with the Standard Ware. Most formally, distinctively *large* Standard Ware types (e.g. Large convex-sided bowls, Large holemouth pots, Large jars), all appeared for the first time in the later stages of the A-Sequence. They are occasionally found already in levels A5–A3, but most examples come from level A1 and subsequent periods (Table 4.17). If we move away from these formal types towards a consideration of individual proxies of vessel size, Standard Ware shapes did not gain much in terms of rim diameter through time, although vessel height and weight certainly increased (Chapter 4.2.4.1). The average values for these properties increased, but more significant was the expanded *range* of height and weight values; some vessel types became much taller and much heavier by the later A-Sequence. This expansion in size is already notable during levels A5–A3, when some vessels reached over 50 litres (average 3.2 litres). It reached a climax by levels A2–A1 when some vessels were able to hold over 70 litres (average 6.7 litres) (Fig. 4.29). The synchronicity with the gradual developments in vessel shape is striking and argues for a causal connection: as over time potters created containers of increasing capacity, they gradually adapted the shape of these containers to make them more efficient for closure.

In addition to adapting the shapes and sizes, the inhabitants of Late Neolithic Tell Sabi Abyad knew other ways to enhance the performance properties of pottery containers destined for storage. One obvious way to reduce the porosity of the container was by plastering its internal surface. Plastering technology had been available for many centuries before the sustained production of ceramics began. However, at Tell Sabi Abyad no pots were plastered during the Initial Pottery Neolithic (levels A12–A10). Apparently, reducing the porosity of the small open vessels typical for this stage was not (yet) deemed to be very important. The practice of plastering pottery vessels began soon after the introduction of Standard Ware and through time it would become associated almost exclusively with this category (Chapter 6). At Tell Sabi Abyad, plastering pottery vessels may have become increasingly common over time, becoming especially salient during levels A5–B8 (Chapter 6.2), concomitant with the increasing emphasis on adopting Standard Ware for storage already observed in the vessel typology.

The plaster appears to have been gypsum-based, which was easy to apply and sometimes used to sculpt thick layers and reworked rims (Chapter 6). One magnificent example of a plastered tall holemouth pot from level A1 had a thick reworked rim that functioned as a ledge to hold a gypsum stone as a lid (Pl. 7). The properties of those ceramic containers selected for plastering imply a functional relationship between plasters and storage. The plastered vessels were typologically quite diverse, and even included a few husking trays (Fig. 6.6). But plastered and non-plastered vessels differed in size; plastered containers on average had somewhat thicker walls, indicative of larger vessel size, and they were about twice as tall and much more voluminous (Chapter 6.3; Fig. 6.4).

The increased frequency of plastered pottery vessels was but one element in what appears to have been an overlapping relationship between the technologies for pottery and plaster in the later A-levels. The density measures at Tell Sabi Abyad suggest that White Ware containers followed a trajectory quite similar to that of pottery, suggestive of gradually increasing quantities during the 7th millennium (Fig. 11.7). Containers made in the two categories to some extent show overlapping repertoires of shape (Fig. 1.3). Both White Ware containers and plastered pottery vessels emphasised the containment of bulk volumes. There were intriguing technological cross-overs too. Both materials needed to be prepared with non-plastic ingredients prior to shaping; for making White Ware people even occasionally recycled crushed pottery sherds as a coarse 'temper'. White Ware containers were sometimes shaped using a pottery vessel as a support, and during the later A-levels both categories occasionally used basketry as a mould (Nilhamn and Koek 2013, 292–295). Similar to pottery, White Ware containers were occasionally shaped by coiling (Nilhamn and Koek 2013, fig. 25.3). Containers in both categories, finally, offered surfaces suitable for painted decoration (Nilhamn 2017).

Relevant for the present discussion is the temporal context of these relationships. White Ware has often been assumed to be a direct predecessor of pottery, even a crucial 'stepping stone' leading to its adoption (Chapter 1). As the data from Tell Sabi Abyad suggest, however, the relationship between pots and plaster evolved over time. It became the most intense only several centuries *after* the adoption of pottery, when pottery gradually took on new roles, which made plastering the pottery more pertinent than previously. The properties of plastered pottery containers suggest that the stronger emphasis on storage and closure of Standard Ware vessels in the later A-levels was one factor stimulating the intensified relationship between these two technologies.

As archaeological textbooks would suggest, burnishing the vessel wall would have been an additional strategy available to the potters to reduce the porosity of the porous containers. By compacting and aligning the micro-particles while the clay is still soft a thin surface layer is formed that somewhat diminishes the permeability of the vessel wall (Rice 1987, 232, 473). So, our team expected the practice of burnishing to co-vary with other indicators for an increased emphasis on storage and closure. We expected more burnishing in the later stages of the A-Sequence. As we have seen (Chapter 4.2.3.2), the ceramic sequence at Tell Sabi Abyad exhibits a more complex pattern. Burnishing was the most frequent in the early stages of Standard Ware production when storage was not (yet) strongly suggested by the properties of this ware (levels A10–A8), and it gradually disappeared over time. By the time coarse Standard Ware containers were making a real impact on storage practices (levels A3 and A2), they were no longer burnished.

Moreover, at the early stages of Standard Ware production, the burnishing was typically done very patchily; any effects on reducing permeability would have been negligible. This suggests that this surface finishing treatment had functions other than enhancing the storage potential of early Standard Ware containers. The practice was inherited from the preceding Initial Pottery Neolithic, when the Early Mineral Ware was frequently burnished. In the early stages of the Early Pottery Neolithic it may have been accepted as part of the local potters' 'specific knowledge': technological know-how that may or may not have been consciously expressed but which formed part of the collective social representation of what it meant to make 'good pottery' (Lemonnier 1992, 5–6; 1993). In the Early Pottery Neolithic, it may also have functioned as a pragmatic way of smoothing the (at this stage) still very irregularly shaped vessels. Burnishing tools may have been employed as an alternative to, or an extension of, the human hand to force the rough vessel surface to assume a more even texture.

Burnishing Standard Ware returned full force in the Pre-Halaf period. But at this stage it was employed very differently than centuries earlier. At this stage the burnishing was typically done with great care, resulting in a very smooth, somewhat glossy texture (Chapter 4.2.3.2). This study suggests three potential explanations, far from mutually exclusive, for the renewed popularity of burnishing: first, its role in facilitating the application of slips and paints; second, its role in differentiating between sub-categories of Standard Ware; third, the need to reduce vessel permeability for, specifically, a sub-category of serving vessels.

As to the first factor, the study identified a strong association between burnishing and the introduction of slips and painted decoration in the later A-Sequence. This may well have had a technological background. As the Late Neolithic potters surely were aware, slips and the underlying clay body may shrink differentially resulting in a poor adherence of the slips and paints. Burnishing the surface before applying the decoration improves adhesion (Rice 1987, 150). To some extent this may explain the popularity of burnishing in the Pre-Halaf period, when

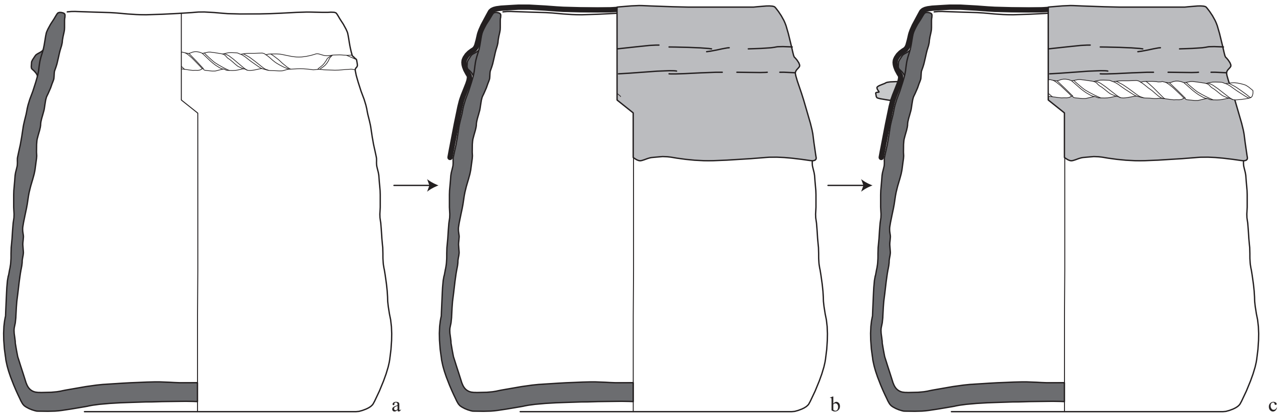


Fig. 16.3 Tell Sabi Abyad. An alternative to the neck. Model for closing a neck-less vessel applied with a cordon (a) by covering it with a cloth (b) and securing this tightly with a cord (c).

slipped and painted Standard Ware became important. Previously, from level A4 onwards, slipping and painting had already been applied to Fine Mineral-Tempered Ware, characterised even more strongly by careful burnishing (Chapter 4.4.5).

As to the second factor, in the later A-Sequence and especially the Pre-Halaf period (the B-Sequence), regular associations between the properties of clay preparation, vessel size, decoration, and surface treatment came together to establish a subtle but clear categorisation between 'finer' and 'coarser' varieties of Standard Ware (Chapter 4). Burnishing was included in these associations as a surface enhancing treatment that differentiated between relatively thin-walled, more frequently decorated vessels of smaller size. Burnishing acted as an element of visual style by making pots glossy, giving them a smooth, even texture. Burnishing in the Pre-Halaf period became part of the 'painted pottery revolution' (see below). Finally, the regular association between burnishing and open vessel shapes of smaller sizes suggests that burnishing in the Pre-Halaf period was not associated with enhancing the long-term bulk storage capacities of pottery container. Rather, it facilitated the short-term 'storage' of liquid substances in open containers made to serve and display food and drink and in closed pots used for cooking (see below).

Finally, any discussion of 7th millennium storage practices should consider the so-called cordons (Chapter 4.2.4.2). These enigmatic appendages may not have functioned simply to facilitate easy grip, nor do they seem to have been representational in the same way as the appliqué decoration during the Pre-Halaf stage (see below). At Tell Sabi Abyad cordons occur only with Standard Ware: in other words, they were associated exclusively with the ceramic category for which bulk storage would become important. Furthermore, they were temporally very restricted, occurring in levels A5–A1, and especially in levels A5 and A4. Absent entirely from the early stages of the Early Pottery Neolithic, cordons emerged precisely when Standard Ware slowly moved towards incorporating storage in its functional repertoire. Significantly, they disappeared for good at the end of the A-Sequence, precisely when Standard Ware vessels had developed necks. These factors suggest that cordons were precursors to the real necks. Moreover, they were far from randomly spread across the range of Standard Ware shapes; instead we find them associated particularly with closed shapes and with vessels of larger size.

How might this have worked in practice? To close a cordon-applied container (Fig. 16.3.a), one would cover it with a piece of cloth or textile, making sure it extended well down below the vessel edge, covering the cordon (Fig. 16.3.b). Then one would secure the cover with a piece of rope, fastening it with a knot below the cordon (Fig. 16.3.c). Not coincidentally, many cordons were made to resemble twisted rope, suggesting their intended use visually. Excellent comparisons come from Shir in the Northern Levant, contemporary with the later A-Sequence of Tell Sabi Abyad (Nieuwenhuyse in press, b, d). Interestingly, similar associations between cordons and large, closed storage vessels are found much farther away at the Chalcolithic site of Tall Hujayrat al-Ghuzlan in the 'Aqaba region of southern Jordan (Kerner 2009).

Finally, as Gordon Childe already cogently observed (1936; see Chapter 1), the production of coarse vessels of increasing size, wall thickness, and weight necessitated adjustments in the ceramic technology and associated ceramic expertise. A major challenge was to prevent the pots from sagging and cracking during shaping and drying. We saw an increasing use of coarse organic materials for temper, gradually becoming more common especially from levels A6–A5 onwards. This may be seen as strategic, minimising the increased risk of failure as vessels gained in size. Adding coarse plant fibres to the clay fabric offered several advantages. It improved the adhesion of coils, increased the strength of the vessel wall during the shaping while the clay was still wet, and it countered the risks of cracks during drying (Petrova 2012; Skibo *et al.* 1989). By level A4 (ca. 6455– 6390 cal BC), coarse organic tempering had become the norm (Chapter 4.2.3.1). At Tell Sabi Abyad the development of coarse plant tempers and of pottery containers for long-term bulk storage went hand in hand. The coarsely-made, plant-tempered, and relentlessly plain storage jars from the later 7th millennium may seem rather 'primitive' to us today, as reflected in the pejorative label 'Coarse Ware', but to the communities who produced these containers they were cutting-edge technology.

Apart from instigating changes in tempering strategies, the increased (average) weight of pottery containers would have brought about at least one further change in the *chaîne opératoire*: measures to ensure that vessels could be lifted after shaping. Analysis of the basal parts of the Standard Ware vessels has shown that potters used several strategies for starting the base (Chapter 4.2.3.2; Figs. 4.6 and 4.7). The adoption of coiled basketry as a support for shaping the base is attested halfway during the A-Sequence (Chapter 10). Although no exact measurements are available for the often-fragmented sherd material, available data suggest that many basketry-impressed bases belonged to relatively larger, heavier vessels. The occurrence of basketry impressions synchronises well with the evidence for increased size, volume, and weight of Standard Ware containers. The increased weight meant that pots might stick to the surface after the shaping. Adding a level of basketry between the pot and the surface meant it could be moved about during the shaping if necessary and lifted up when finished.

16.5. Cooking with pots

As with storage, the story of cooking with pots at Tell Sabi Abyad emerges as a complex one, with a decidedly non-linear character. Pots suitable for cooking certainly were available at the site, but they do not appear to have been continuously present throughout the sequence, and at different stages in the sequence different types of cooking pots are found. Future studies should relate the changing availabilities of cooking wares to shifts in commensality, the exploitation of specific plants and animals, or the spatial organisation of cooking practices at the site; this report limits the discussion to the containers themselves. Wares suitable for cooking on a direct fire include Early Mineral Ware, Fine Mineral Tempered Ware and Grey-Black Ware, Dark-Faced Burnished Ware and, finally, Mineral Coarse Ware (Chapter 4). Their changing presence (Chapter 11) suggests profound changes in the role of 'cooking-with-pots' over the 7th millennium.

A first, distinctive phase was the Initial Pottery Neolithic (levels A16–A10, ca. 7000–6700 cal BC). Cooking food and/or drink likely was one of the intended uses of the Early Mineral Ware. This is suggested by its distinctive ceramic technology highly conducive to withstanding thermal shock, the range of shapes and appendages, and by the macroscopic observations of soot and possible residue. In these characteristics, the EMW from Tell Sabi Abyad is matched closely by contemporary mineral-tempered wares from Upper Mesopotamia (Le Mière 2017; Miyake 2017; Tsuneki 2017). However, as has already been observed, this pottery was found only in very small quantities, indicating very limited quantities of pots in daily use. Characteristic, too, was the limited capacity of the average EMW vessel. Finally, the EMW disappeared almost entirely after ca. 6700 cal BC. These various strands of evidence suggest that the community inhabiting Tell Sabi Abyad did not experience a whole-sale culinary revolution during the Initial Pottery Neolithic, or if they did they seem to have resisted its material expression.

Marie le Mière has suggested that EMW disappeared exactly *because* Neolithic communities in northern Syria did not (at this stage) adopt pottery for sustained household cookery. In a complex argument, Le Mière argues that the advanced ceramic technology that created EMW cannot have been typical for the very earliest manifestations of sustained ceramic production: it was simply too advanced (Le Mière 2017). However, as the continuous sequences crossing the PPNB-PN threshold from several Upper Mesopotamian sites no longer leave much room for an 'experimental' stage in this region, it must be sought elsewhere. Wherever the hypothetical locus of origin was located, the local communities presumably *did* adopt pottery for their everyday food preparation.[2] When eventually these innovative containers travelled to the steppes of Upper Mesopotamia as precious, exotic exchange items, they entered into entirely new practices for which they had not originally been developed, and in which everyday food preparation played only a minor role. Elsewhere, Nieuwenhuyse and Campbell (2017) coined the term 'displaced cooking pots' to describe this perspective. At Tell Sabi Abyad and other Upper Mesopotamian sites at this stage, pot-cooked food may have been less about nourishment in the physical sense than about the maintenance of social relationships. When, for reasons still to be elucidated, the availability of this new type of container discontinued, the new food-preparation strategy it potentially represented simply disappeared (Le Mière 2017).

Significantly, in the subsequent levels A9–A6 at Tell Sabi Abyad (virtually) no mineral-tempered pottery containers are found. The porous, coarsely-made, plant-tempered ceramics that fully dominate these levels would be rather inadequate for usage above a fire or for holding liquid substances (e.g. soups or stews) for a prolonged period of time. This suggests that during these levels (ca. 6700–6500 cal BC), food was not prepared by processing it over a fire in pottery containers. Importantly, no ceramic 'cooking balls' have so far been attested at the site as a potential tool to facilitate indirect cooking (Atalay 2005; Atalay and Hastorf 2005; Thissen *et al.* 2010). For several centuries the community at Tell Sabi Abyad apparently continued to use time-honoured, 'traditional' ways of preparing food without pottery containers (e.g. grilling, roasting, pit boiling, and parching).

This phase corresponds at Tell Sabi Abyad with what Russel has termed 'animal exploitation phase' II (Russell 2010, 239–240). This phase is characterised by a strong increase of wild animals, in particular large game, and a reduced emphasis on domesticated sheep, goat, and pigs. Animal husbandry was firmly focused on meat production with little evidence for the exploitation of secondary products. While it is as yet unclear how this subtle shift in which species were raised and hunted would translate into changes in food preparation strategies, the correspondence between ceramic and faunal change does suggest that broader modifications in subsistence played a role in the very conspicuous changes observed in the pottery. Future work should establish whether this correspondence holds for other, contemporaneous sites as well, and hence if it represents a larger Upper Mesopotamian pattern or, alternatively, was a local phenomenon peculiar to Tell Sabi Abyad.

It is only during the second half of the 7th millennium, several centuries after the first sustained adoption of pottery, that we can identify increased receptivity towards the sustained adoption of pot-cooked food. In levels A5–A2 (ca. 6500–6350 cal BC), two ceramic groups in particular stand out: Fine Mineral Tempered Ware and the fine mineral-tempered variety of Grey-Black Ware (Fig. 16.6). Both share a unique (at the time) constellation of properties that qualify them as 'cooking ware': a fabric tempered with well-sorted crushed calcite ideal for mitigating thermal shock, thin walls without angularities to transfer heat quickly, burnished surfaces to reduce porosity, and frequently present lugs for easy handling (Chapter 4). The residue analyses show that these vessels were indeed used for cooking (Chapter 15). In stark contrast to the earlier situation during the Initial Pottery Neolithic, cooking with pots was sustained in this period and it continued for good: throughout the Halaf and Ubaid periods a small proportion of the ceramic assemblages would invariably consist of some form of specialised cooking ware.

This suggests very profound changes in the emphasis on which specific species of plants and animals were exploited, the ways in which these were processed, and the broader set of commensality practices in which food preparation played a part. However, we remain at the very beginning of understanding the cultural changes that transformed later 7th millennium societies in Upper Mesopotamia (Akkermans *et al.* 2006; Akkermans and Schwartz 2003). At Tell Sabi Abyad, the later part of the A-Sequence was above all characterised by an increased materiality, in which ceramic containers as a whole became increasingly important for an expanding array of tasks. This is not just seen in the increasing sherd densities, but also in the increasingly heterogeneous range of vessel shapes and sizes as well as a more elaborate *chaîne opératoire* for making pottery containers (Chapter 4). As the community at Tell Sabi Abyad became increasingly entangled (Hodder 2011) in living with pots, and as pottery containers became increasingly common, this may have opened up new possibilities for innovation and cultural experimentation that would have been inconceivable several centuries earlier. These experiments may have included adopting pots for preparing new types of (cooked) food.

Turning to the Central Anatolian context specifically, Atalay and Hastorf (2005) have suggested that the primary reason for the Neolithic community at Çatalhöyük to adopt cooking pots was that this made food preparation much more time efficient. By moving from indirect cooking-with-pots (using 'cooking balls') to direct cooking, clever Central Anatolian cooks saved precious time, which they vigorously reinvested in intensified ritual (Hodder 2011, 151–156). It would be difficult to extrapolate this scenario to Tell Sabi Abyad, or to any Upper Mesopotamian Late Neolithic site. Upper Mesopotamian communities did not use 'cooking balls' and left little evidence for the kind of time-consuming, architecturally-focused rituals known at Çatalhöyük such as the extraordinary wall paintings and elaborate sculptures.

From the perspective of animal exploitation, the introduction of cooking wares in levels A5–A2 at Tell Sabi Abyad corresponds to the animal exploitation phases III and IV (Russell 2010, 240). Phase III showed an even stronger reliance on wild resources than before, but it was followed by a significant reduction of the proportion of wild meat by phase IV (=level A2) (Russell 2010, 240). This does not readily synchronise with changes in the quantities of cooking vessels. But if we do not take these periodisations too rigidly, the introduction and gradual spread of specialised cooking wares can be argued to be roughly contemporary with the final stages of domestication of cattle (Fig. 15.4). Russell (2010) has reconstructed a long process of increasing cultural control over wild populations of aurochs, in full swing already by levels A12–A10, and leading to morphological domestication by the end of the A-Sequence (Russell 2010, 247). By level A2 (=Animal Exploitation Phase IV), both the proportions of cattle in the faunal assemblage and the estimated size of the herds increased considerably (Russell 2010, 257). At Tell Sabi Abyad these animals seem to have been kept primarily for their meat (Russell 2010, 248). The residue analyses suggest that ruminant carcasses were being processed with the new types of pottery containers (Chapter 15). So, it appears possible to suggest that the adoption of specialised cooking pots responded to the need to cook new types of food that involved domesticated cattle.

In addition to (potentially) processing domesticated cattle, the study suggests that the new cooking pots were adopted for processing dairy products, perhaps beginning a short time after they were first introduced. The pilot study of Late Neolithic residue yielded some of the world's earliest evidence for dairy processing (Chapter 15). The positive attestations of ruminant dairy fats in this period are, admittedly, tantalizingly scarce so far, and if seen in isolation they would hardly qualify for a culinary 'revolution' (n = 4: one from the final stage of the Early Pottery Neolithic; three from the Transitional Period; plus two additional possible candidates from the Transitional Period) (Fig. 16.4). The signal is clear, however, and it corresponds to the ceramic evidence. Dairy processing requires efficient heating, for which mineral-tempered,

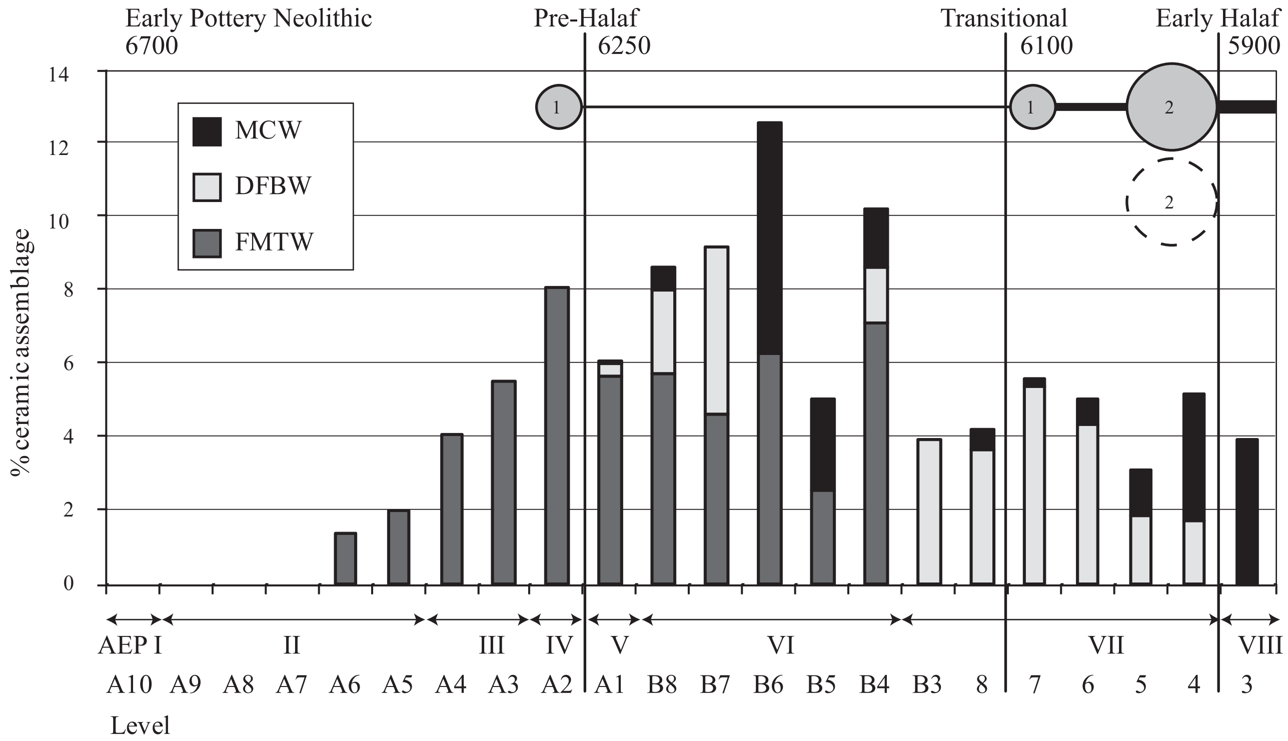


Fig. 16.4 Tell Sabi Abyad, Operation III (levels A10–B3) and Operation I (levels 8–3). The proportion in the ceramic assemblage of cooking wares by level and Animal Exploitation Phase (AEP) and the evidence for ruminant dairy residues. MCW: Mineral Coarse Ware; DFBW: Dark-Faced Burnished Ware; FMTW: Fine Mineral Tempered Ware (after Evershed et al. *2008; Nieuwenhuyse 2013a, in press, a; Nieuwenhuyse* et al. *2015; cf. Fig. 15.4).*

thin-walled and burnished pottery containers would be perfectly suitable (Cavanagh 2007).

In Upper Mesopotamia the availability of containers facilitating the efficient processing of dairy products would have been one crucial factor contributing to the establishment in the later 7th millennium of semi-pastoralist economies (Akkermans and Duistermaat 1999; Akkermans and Verhoeven 1995; Verhoeven 1999). These relied extensively on an intensified exploitation of secondary products (Cavallo 2000; Rooijakkers 2012; Russell 2010). The introduction of cooking pots at Tell Sabi Abyad thus emerges as part of a much broader package of change that became more apparent by level A1. After Sherratt (1981, 1983, 2002), many elements of this narrative may be referred to by the phrase 'secondary products revolution'. Originally Andrew Sherratt had placed the first intensified exploitation of secondary products in southern Mesopotamia in the later 4th millennium (Sherratt 1981), but its roots may now be traced to the later 7th millennium in Upper Mesopotamia (Nieuwenhuyse 2013a; Nieuwenhuyse *et al.* 2015; Russell 2010).

Several authors have suggested that the intensified exploitation of secondary products, and the attendant adoption of cooking pots, were an adaptive response to the hardships imposed by the 8.2 ka abrupt climate change (Bar Yosef 2001, 2006; Clare *et al.* 2008; Staubwasser and Weiss 2006; Weiss 2000; Weninger *et al.* 2006). In this argument, the new emphasis on the exploitation of secondary products made the most of an arid steppe landscape that became less suitable for rain-fed agriculture (Mottram 2016). However, it is important to stress that the different elements making up the package of change in the later 7th millennium followed their own rhythms and were certainly not all simultaneous. Crucially, they did not (all) coincide very well with the climate event (Nieuwenhuyse *et al.* 2016). As we saw, the introduction of cooking pots can be traced back to several centuries *before* the start of the 8.2 ka event, to levels A5/A4 or even earlier (Fig. 16.4). It would probably overstretch the synchronicity argument by turning it around, implying that by adopting pot-cooked food the inhabitants of Tell Sabi Abyad caused the 8.2 ka event to happen.

Nonetheless, even if the adoption of cooking pots *per se* did not synchronise with an abrupt climatic event, the 8.2 ka event seems to have coincided relatively well with an important shift in the *types* of cooking ware. So-called Dark-Faced Burnished Ware was introduced at the end of the A-Sequence, soon followed by Mineral Coarse Ware (Fig. 16.4). Their introduction was adopted as one of the formal arguments for separating the Early Pottery Neolithic from the Pre-Halaf stage terminologically at Tell Sabi Abyad (Chapter 11). The earlier Fine Mineral Tempered Ware and Grey-Black Ware did not (immediately) disappear, but they became numerically less present. The frequent reshaping of jars into hole mouth forms that were more amenable to preparing food over a fire attests to the local importance of DFBW (Chapter 4.7).

This was superior cooking pottery; some of the fatty residues detected at Tell Sabi Abyad in fact came from DFBW cooking pots (Chapter 15).

In contrast to the earlier FMTW and GBW, the DFBW was not locally produced but reached the site through networks of exchange, even if the precise provenance remains to be discovered. The shift to non-local DFBW therefore forms part of an important shift in (supra-) local affiliation. During the Pre-Halaf period the community at Tell Sabi Abyad began to identify itself with practices and identities beyond the level of the local village. This shift is most conspicuously identifiable in the rising importance of decorated pottery (see below). As with intensified secondary products, investments in supra-local networks would have had offered a crucial safety network to an increasingly mobile, semi-nomadic society confronted with unprecedented drought during the 8.2 ka climate event (Mottram 2016). Yet this is not necessarily to argue that the climate event mono-causally primed the spread of DFBW; the event may have spurred-on developments that were already well under way for reasons of a different kind (Nieuwenhuyse *et al.* 2016).

16.6. A 'painted pottery revolution' delayed

The continuous sequence available at Tell Sabi Abyad allows us to follow the shifting emphasis on stylistically elaborated pottery containers over more than a millennium, from the earliest ceramics attested at the site during the Initial Pottery Neolithic into the Halaf period (Pl. 32). The role of decorated pottery over the long term was complex and dynamic. Rather than following a neat upward trend towards progressively more amounts of decorated ceramics and increasing stylistic complexity, the pattern is erratic. Long stages of the sequence were characterised by the complete absence of decorated pottery. This runs counter to earlier expectations and the simplified understanding we previously had of the evolution of the 7th millennium pottery of Northern Syria. As becomes clear, the 'painted pottery revolution' (Nieuwenhuyse 2007, 2009b) was much delayed; it was not the self-evident, 'logical' outcome of the adoption of pottery at the start of the 7th millennium.

In the ceramic sequence in Operation III, four episodes in particular stand out as far as changes in the role of decorated ceramics are concerned: 1) The end of the Initial Pottery Neolithic and the start of the Early Pottery Neolithic (levels A10–A9); 2) Halfway through the Early Pottery Neolithic (levels A5–A4); 3) The transition from the Early Pottery Neolithic to the Pre-Halaf (levels A2–A1) and 4) The start of the Transitional (Proto-Halaf) Period (level B4). Certainly, a degree of circularity is involved in these phasings because the chronological terminologies are themselves partly based on changes in the decorated pottery (Chapter 11.5). Nonetheless, each of these episodes in fact corresponds to a complex picture of ceramic change and innovation that goes well beyond decoration (Fig. 11.10).

The earliest pottery attested at the site, the so-called Early Mineral Ware, was occasionally decorated. The two methods used for decorating the basalt-tempered containers included slipping and painting. However, we saw that a fairly diffuse boundary separated these applications, and that the 'motifs' usually did not have sharply articulated contours. The 'motifs' may not have functioned as such, or as distinct elements in a discursive 'design grammar'. This study so far cannot identify anything remotely comparable to the playful emulation in painted motifs and design configurations designs that characterised the much later Halaf pottery. In outward appearance and texture these small, open containers may have emulated the colourful stone vessels from the same period. These items were visually conspicuous but did not occur in very great numbers, as suggested by the very low frequencies and sherd densities (Chapter 11), another property they shared with containers made of stone.

Interestingly, the practice of decorating pots seems to have been introduced only at the *very end* of the Initial Pottery Neolithic, in level A10; soon after this, Early Mineral Ware as a group disappeared from the scene for good. As the EMW reached the site through exchange, its disappearance perhaps suggests that the exchange networks that connected Tell Sabi Abyad with groups in the Khabur had broken down, stopping the flow of goods. At this time (level A9), local production of pottery began with coarsely made Standard Ware. Curiously, this pottery was left almost entirely undecorated. From level A9 into A4, when small numbers of slipped or painted Fine Mineral Tempered Ware vessels made their first appearance, the proportions of decorated ceramics were virtually nil. Between ca. 6650 and ca. 6470 cal BC the community inhabiting Tell Sabi Abyad increasingly made use of pottery containers, but these were all kept relentlessly plain.

The very low levels of decorated pottery characterise the Early Pottery Neolithic stage not only at Tell Sabi Abyad. Perhaps more than anything else this is the defining property of 7th millennium ceramic assemblages across Upper Mesopotamia (Chapter 11.6). The simplest explanation would be that potters did not (yet) have the necessary expertise to decorate a pot. At Tell Sabi Abyad there had been no local production of (decorated) ceramics in the earlier Initial Pottery Neolithic stage. Therefore, once local production took off by level A9, local potters might not have had the required specific knowledge for painting or slipping (Lemonnier 1992, 5–6; 1993). From a purely technological point of view, the very coarse, unsophisticated surface textures of the earliest Standard Ware containers would not have been especially inviting for the application of slips and paints.

However, the find of rare decorated Standard Ware items scattered through levels A9–A4 suggests that decorated pottery was in fact not entirely unknown, and that potters knew very well how to execute decorated designs. Further, the apparently contemporary shift to similar kinds of plain ceramics across Upper Mesopotamian argues against a generalised lack of technological expertise as a driving force. At least at some of these sites (e.g. Seker al-Aheimar), the production of plant-tempered ceramics developed locally from earlier traditions of making mineral-tempered, occasionally decorated ceramics (Chapter 9). Additional explanations for the rejection of painted decoration should therefore explore social or symbolic reasons.

Hodder (2011) and Bernbeck (2010) have both argued for the existence of social inhibitions against the application of pottery decoration in the Neolithic period, offering inspiring models for comparison with Tell Sabi Abyad. Adopting a symbolic-structuralist position with regard to the conspicuous lack of decorated ceramics at Çatalhöyük, Hodder argues that pottery decoration was suppressed because it was 'unfitting' within the local, Central Anatolian symbolic framework. He points out that pots at Çatalhöyük were primarily used to process domesticated sheep and goat products (Hodder 2011, 154). Both the pottery containers and the specific animals processed in them were associated with domestic production, and played a marginal role in the site's complex ritual life that emphasised non-domestic identities. Associated as they were with non-ritualised animals, Hodder argues, it was only 'fitting' that the pots in which their fats were processed were similarly not decorated. Rather, 'decoration' concentrated on wild animals and their iconography in elaborately sculpted or painted buildings.

Fitting as this scenario may be for Central Anatolia region, it would be difficult to transpose to Tell Sabi Abyad. First, the plain Standard Ware vessels that dominated levels A9–A4 were not cooking pots. Further, soon after cooking pots had emerged by levels A6/A5 in the form of Grey Black Ware and Fine Mineral Tempered Ware, items in this use category were the ones occasionally decorated (Fig. 16.5). As well, as suggested above, the introduction of these new types of cooking wares corresponded with the final stages of cattle domestication. In contrast to Çatalhöyük, at Tell Sabi Abyad the decorated cooking pots emerging by level A4 may therefore have been involved in the processing of cattle products. Finally, in Upper Mesopotamia as a whole the introduction of cooking vessels failed to have ritually elaborated architecture as a follow up. For Tell Sabi Abyad, and for Upper Mesopotamia more broadly, then, alternative models more sensitive to the local context are called for.

Wrestling with explaining the notable stylistic monotony and lack of change of the Neolithic ceramics from Tol-e Baši (Khor Basin, Iran), Bernbeck (2010, 137) suggested that innovation and change in material culture in this pre-modern (pre-capitalist) society were not necessarily seen as positive. As Bernbeck argued, the adoption of decorated ceramics and permitting conspicuous ceramic change inherently carry the potential for competition and conflict. Neolithic groups at Tol-e Baši may have perceived such change as a threat to the coherence of the group, something they actively suppressed in response. In this view, decorating a pottery vessel came to be prohibited by taboos (Bernbeck 2010, 137).

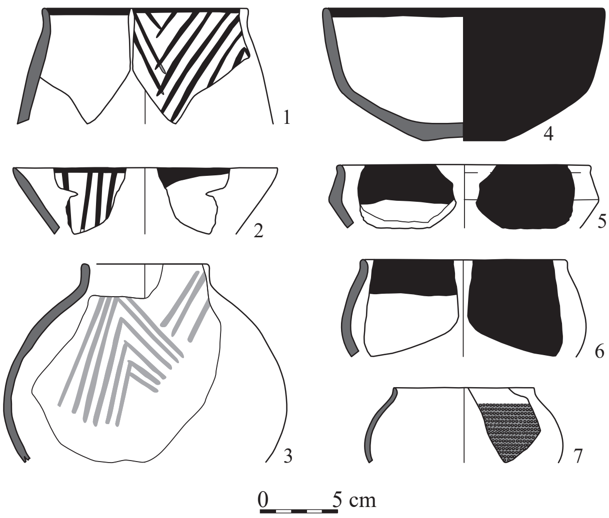


Fig. 16.5 Tell Sabi Abyad. Decorated cooking/serving vessels during the later Early Pottery Neolithic. Painted Fine Mineral Tempered Ware (nos. 1–2); Pattern-burnished Grey Black Ware (no. 3); red-slipped Fine Mineral Tempered Ware (nos 4–6); red-slipped and impressed Fine Mineral Tempered Ware (no. 7).

Following this line of reasoning, decorated ceramics were rejected at Tell Sabi Abyad because of ideological constraints. If so, the re-emergence of decorated ceramic styles in the later 7th millennium represented more than merely ceramic-technological innovation: it signalled a radical change in world view and social organisation. There is much to support this perspective, considering the profound reorganisation of subsistence and social organisation that appears to have characterised the turn to the 6th millennium across Upper Mesopotamia (Akkermans 1993; Akkermans and Verhoeven 1995; Akkermans and Duistermaat 1999; Nieuwenhuyse 2007, in press, a). One obstacle to further developing this perspective is our frustratingly poor grasp of the constitution of Neolithic societies in the early to middle 7th millennium, which renders any speculation on ideological restrictions premature. There's excellent scope for future studies situating the relentlessly plain pottery of the era in its proper social, economic and ideological contexts - once data become available.

In any case, at Tell Sabi Abyad it is in level A4 that we may identify the first emergence of sustained practices of decorating pottery containers. Interestingly, this was not within the category of Standard Ware in which we had initially expected it, but in the groups of Grey-Black Ware (its fine mineral-tempered variety) and Fine Mineral Tempered Ware (Fig. 16.5). These wares had been introduced already in levels A6/A5, slightly before they were starting to be decorated. The most common way to decorate these vessels was by giving it a red slip. The smooth, compact surface of these new wares was especially conducive to the application of decorative technologies using pigments. Unique *Einzelgänger* include a slipped-and-impressed FMTW goblet, a FMTW pot painted with zig-zags and a GBW pot showing the same motif in pattern-burnishing (Fig. 16.5).

Significant is the diversity of uses these vessels served. They appear to have been cooking vessels, as is suggested by their performance properties. This functional use was confirmed by the residue study (Chapter 15). At the same time, they likely served as containers for serving food and drink, as suggested by the frequent open shapes and small capacities (Chapter 4.4.4.). The occasional decoration suggests that they also played a role in the arena of social display. This multifunctionality quite distinguishes this pottery from the complex, more differentiated styles that emerged subsequently during the Pre-Halaf and Transitional periods. Decorative style did not (yet) act to differentiate between pots suitable for different aspects of commensality, cooking, serving or display. As serving-display vessels, moreover, the FMTW and GBW were far less stylistically elaborate than subsequent painted styles. They were not made to stand out as unique; the more elaborate examples shown in Fig. 16.5: 1–3, 7 remain, well, *Einzelgänger*. Decorated ceramics in levels A4-A2 do not (yet) appear to have played a role in social emulation through the medium of plain and painted pottery, as has been argued for the Halaf period (Nieuwenhuyse 2007). Decorated pottery containers certainly existed in these levels but it remained in very limited quantities (Fig. 16.6).

Their spatial-contextual associations, too, may have differed from those of subsequent decorated pottery styles. Meant to be seen (Hole 2013) and reaching out to much larger audiences that included non-local observers, painted Halaf serving vessels were presumably often used in public, open spaces, and outdoors contexts (Nieuwenhuyse 2007, 2013a, in press, c; Pollock 2013). In apparent contrast, and accepting the evidence for what it is, in Operation IV two intact GBW pots were found inside a building in close association with a hearth and an installation that may have served for processing food stuffs (Chapter 13.4). Decorated ceramics at this stage perhaps facilitated domestic activities involving the preparation and presentation of pot-cooked food.

The role of stylistically elaborated ceramics changed profoundly at the end of the Early Pottery Neolithic period. By levels A2/A1 a whole range of new decorative techniques were introduced. They included red slipping, white slipping, painting, incising and impressing, appliqué, and various combinations of these techniques (Chapter 4.2.5). Some of these had existed previously, applied to the Fine Mineral Tempered Ware (Fig. 16.5), but most were new to Tell Sabi Abyad. In a dramatic departure from a long tradition of making relentlessly plain coarse ceramics, for the first time these new styles were applied to the bulk category of plant-tempered Standard Ware. This move was associated with a slow but perceptible rise in the proportions of decorated pottery during the Pre-Halaf stage (Chapter 4.2.5.1; Fig. 16.6). In this regard, the Pre-Halaf phase forms the immediate precursor to subsequent developments during the Transitional Period at Tell Sabi Abyad.

However, perhaps the key feature of the Pre-Halaf phase as far as decorated Standard Ware ceramics are concerned was not its typology. As first observed by Marie Le Mière (1986, 2000), what distinguished this phase more than anything else were structured associations of properties of the pottery that established diffuse categorisations between plain and decorated ceramics, and between different *kinds* of decorated ceramics (section 4.2.5.1). These served to distinguish larger, more voluminous, closed shapes associated with coarser fabrics from smaller, open shapes more often made with finer plant-tempered fabrics. The two categories were characterised by different decorative technologies, design structures, and motifs. Thus, slipping and painting were applied more often to open vessels, whereas impressing and incising and appliqué were more suitable to voluminous, closed vessels. As different vessel

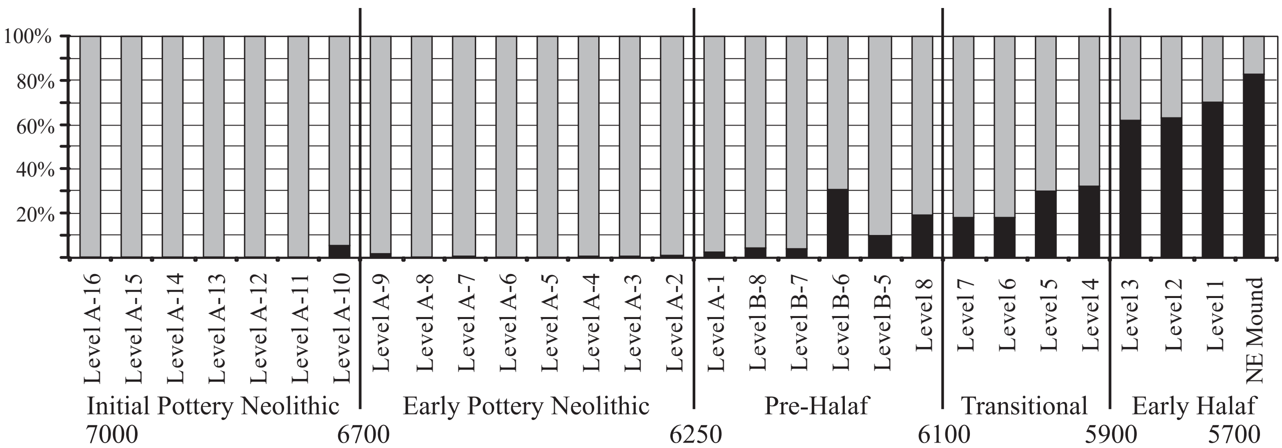


Fig. 16.6 Tell Sabi Abyad. The changing proportion of decorated pottery. Data from Operation III (levels A16–B5), Operation I (levels 8–1) and Operation II (NE Mound) (after Nieuwenhuyse 2007, 2013; Nieuwenhuyse et al. *2016). The numbers of decorated Fine Mineral Tempered Ware in levels A4 to A2 are too low to show up in this graph as a proportion of the ceramic assemblage as a whole (less than 1%).*

types were involved with different functional activities, pottery styles became instrumental in differentiating social practices in the Pre-Halaf period. These associations, a hall mark of the Pre-Halaf ceramic complex (Le Mière 2001; Le Mière and Nieuwenhuyse 1996), can now be dated fairly accurately. At Tell Sabi Abyad they arose by levels A2 and were firmly in place by level A1 (ca. 6335–6225 cal BC).

Developments during the Pre-Halaf phase laid the direct foundations of the so-called 'painted pottery revolution' (Nieuwenhuyse 2007), which occurred during the Transitional Period between the Pre-Halaf and the Early Halaf. Defined by the introduction and rapid spread of Fine Ware ceramics (e.g. Standard Fine Ware, Orange Fine Ware and Fine Painted Ware), and an associated decline of Standard Ware, the ceramic assemblage changed beyond recognition (Akkermans 1989, 1993; Le Mière and Nieuwenhuyse 1996). This stage saw a dramatic spur in decorated ceramics, which jumped from about 20% of the assemblage at the start of the Transitional stage to about 80% or more during the Early Halaf (Fig. 16.6). What is more, all earlier approaches to decorating pottery vessels were abandoned in the favour of just one technology, painting (Nieuwenhuyse 2007, 2009b). The excavations in Operation III have provided a valuable independent sequence that is complementary to the one previously documented in Operation I. In Operation III the start of the Transitional Period was by level B4.

Studies have identified two broad trends characterising the development of the painted pottery from the Pre-Halaf into the Early Halaf that may help to place the remarkable rise of painted Fine Ware into perspective. First, Late Neolithic communities developed a suite of innovative technologies that over time had the effect of maximising dark–light contrasts between the painted decoration and the surface background (Nieuwenhuyse 2017c). The climax was the development of technologies for making dark-painted motifs over a light-coloured background (Le Mière *et al.* 2017; Nieuwenhuyse *et al.* 2001; Noll 1991; Všianský and Mateiciucová 2017). This became a defining element of the Standard Fine Ware and the subsequent Early Halaf Fine Ware, and probably spurred its popularity (Nieuwenhuyse 2007). Second, they exploited the unique potential of painting to elaborate the complexity of the underlying design structures. Over time they multiplied the numbers of motif bands painted on a single vessel, and came up with increasingly complex ways of separating these bands with horizontal and vertical lines, as shown in highly schematised fashion in Plate 32.

Stylistic elaboration did not stop after the Early Halaf. Our team was fortunate to record some painted Halaf Fine Ware from the Middle-Late Halaf period, although no stratigraphic continuity could so far be demonstrated at the site (section 4.11). Some examples deserve the epithets 'Superb works of art', 'difficult to parallel elsewhere' (Campbell 1992, 184; Mallowan and Cruikshank-Rose 1935, 106) without second thought. It is stressed that the starting point for the rise of the Halaf pottery tradition was the constellation of innovations around 6250 cal BC; the work at Tell Sabi Abyad and other 7th millennium sites provides a uniquely documented window on this profound transformation.

16.7. Prospects for further research

In spite of all the work done over the past decades, the archaeology of 7th millennium Upper Mesopotamia remains almost virgin territory, a strange new world. This book has done little more than to scratch the proverbial tip of the iceberg. Moreover, it selectively prioritised a single class of material, pottery, from a single site. This was deliberate; by making the large, complex body of excavated ceramics from Tell Sabi Abyad available to other scholars our team hopes to stimulate much further discussion, to bring other 7th millennium sites to publication, and to support initiatives for innovative research. This is all the more important given the dark skies that have clouded the lands of Upper Mesopotamia today, transforming the archaeology of the ancient Near East so profoundly and destructively.

A rich hunting ground lies ahead in contextualising the ceramic developments in the contexts of subsistence, ritual, social organisation, and long-term changes in the environment. Site-based or regional sequences need to be brought together in order to understand cultural change at a local level, teasing out what was essentially local and what was shared over larger regions. Such localised 'micro-histories' may then feed back into well-informed generalised models of cultural change in the later Neolithic (Bernbeck and Nieuwenhuyse 2013, 29–31).

To push forward, future studies could adopt a more holistic perspective on prehistoric materials. As this book and many others have argued, early pottery containers flourished in an environment that equally included containers made of unfired clay, shell, plaster, basketry, stone, bitumen, even architecture. This report has identified various intriguing 'hybrids' of pottery and alternative materials and it offered some tentative explanations. These diverse categories of containers occupied different niches in the social mesh but they all changed during the 7th millennium. To understand any one of them, so one might argue, one should bring them all into the equation (Nieuwenhuyse and Campbell 2017). In short, future work should seek to interpret the changes observed by contextualising material studies within the rich archaeological evidence now becoming available for the 7th millennium.

Vice-versa, it may be worth emphasising that containers made of pottery did not simply *reflect* underlying broader socio-economic currents. They were not merely a passive, empty canvas upon which Late Neolithic peoples sought to project their agencies and symbolic life worlds. From the adoption of cooking pots to the development of bulk storage jars, innovations in pottery containers in the 7th millennium were transformative in their own right (Boivin 2008). There's considerable scope for future studies to place container developments in dialogue with changing spatial arrangements within Late Neolithic villages, new modes of exploiting specific plants and animals, and even changes in human DNA as humans adapted to radically changed material environments. Pots and people evolved together in the Upper Mesopotamian Late Neolithic.

Such issues matter profoundly to us today living in the globalised 21st century AD. All of us still depend on (ceramic) containers (Klose 2009). Scholars have traced back the roots of this dependency to the age of the Phoenicians or the world's first cities in the later 4th millennium (Klose 2009; Mumford 1961), but arguably, it represents yet another Late Neolithic innovation. By fully integrating pottery into their societies, the distant ancestors of today's Upper Mesopotamians gain credit for reshaping the world for ever.

Notes

1 But the pattern is certainly not replicated at all Northern Levantine sites. For example, in the Rouj basin, DFBW increased (Odaka 2017).

2 Le Mière 2017 suggests it may have been immediately to the north in the Taurus mountain range.

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