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Temple places

Excavating cultural sustainability in prehistoric Malta

By Caroline Malone, Reuben Grima, Rowan McLaughlin, Eóin W. Parkinson, Simon Stoddart & Nicholas Vella



Volume 2 of Fragility and Sustainability – Studies on Early Malta, the ERC-funded *FRAGSUS Project*

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With contributions by
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Dedication – in memoriam
John Davies Evans David Hilary Trump

Malta may be small in scale but it has had a rich and important archaeological past which has been explored and enjoyed by many past scholars. A visit to the Archaeology Museums of Malta and Gozo testifies to a long history of collecting, scholarship and passion dating back to the early to mid-nineteenth century. It is a heritage that is beloved by Malta and its visitors alike.

The editors of this volume wish to pay tribute to two remarkable 'visitors' to Malta, each of whom, in their own way, made great contributions to our present appreciation of the islands' ancient past and supported our early researches, teams and ideas. Now we want to record our debt as some of the continuing scholars of Maltese prehistory, since we cannot imagine where we could have begun our current quest to take the story onwards and deeper without their prior work.

On behalf of the whole *FRAGSUS* team, we wish to dedicate this volume to their enduring memory.

Professor John Davies Evans (OBE) (1925–2011) arrived in Malta in 1952 from Cambridge to commence the task of organizing the war-damaged museum collections in preparation for a synthesis of Maltese prehistory. His task was enormous, and involved a new assessment of the pottery and material culture sequence of Maltese prehistory. He prepared his now classic study *The Prehistoric Antiquities of the Maltese Islands*, published in 1971, which has remained the primary compendium of reference to this day. Together with carefully targeted excavations, John Evans set in train the many questions that inspired not only David Trump, his successor, to explore and challenge the complex story of Malta's prehistoric past, but also ourselves over the last 35 years. John noted important aspects of sequence, material connectivity and, of course, the temples. These he recorded and described in such detail that his work remains vitally important today.

David Hilary Trump (OM) (1931–2016) succeeded John Evans, having already experienced Maltese prehistory in the field with him, and became the Curator of the Museum of Archaeology for five years until 1963. In that short time, he too made an enormous impression on the understanding of prehistoric Malta. His work at Skorba (as we discuss in Chapter 7) was inspired and informed, and it too set the direction for the future explorations of prehistory in the islands. David Trump maintained his interest in Malta throughout his career, leading regular study tours to the island and latterly, with ourselves, undertaking the sustained programme of fieldwork at the Xagħra Brochtorff Circle (1987–9). He wrote numerous books and papers on Malta's prehistory, popular and academic; and his contribution has been widely acknowledged through museum displays, the award of the Order of Merit of Malta and an Honorary Degree from the University of Malta for which he felt hugely honoured. But back in the United Kingdom, from whence both these scholars came, there has been less mention of their work on Malta. Evans moved eastwards to Crete in his research interests, and has been identified mainly with that work; whilst Trump, a retiring and extremely modest individual, did not promote his achievements on Malta during his teaching years at Cambridge, which was arguably too theoretical to fully appreciate his remarkable contribution.



Figure 0.1. *David Trump and John Evans together at the Deya Conference, Mallorca* (c. *1983) (reproduced with permission of Judith Conway, niece of John Evans).*

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All archaeological excavations described in this volume were carried out using standard methods, in accordance with the policies of the SCH, in particular the guidance given in the document *Operating Procedures and Standards for Archaeology Services – February 2013*. Permits to enable excavation, survey, sampling and study were granted through the SCH and we are especially grateful to Anthony Pace and Nathaniel Cutajar for their unstinting efforts to ensure fieldwork was enabled.

Taċ-Ċawla

The Taċ-Ċawla excavations were directed by Prof. Caroline Malone, and the crew consisted primarily of students and staff from UoC, UM and QUB, supervised by Stephen Armstrong, Jeremy Bennett and Conor McAdams, with additional supervision from Dr Simon Stoddart, Dr Sara Boyle and Dr Emily Murray. We are also very grateful for Dr George Azzopardi who sought out accommodation for the project, assisted on site, and with his colleagues in HM enabled access to space for storage, environmental sampling and finds processing in Rabat. John Cremona and his colleagues in the Ministry for Gozo also played an important role in enabling site clearance and facilities at Taċ-Ċawla, and in securing the site following our work, with the long-promised surrounding wall. We also acknowledge a great number of local Gozitan businesses, hardware stockists, JCB drivers and cafe and restaurant owners, who supported our work in so many ways.

Santa Verna

The Santa Verna excavations were directed by Prof. Caroline Malone, assisted by Dr Simon Stoddart and Dr Rowan McLaughlin. The crew consisted primarily of a number of students and staff from UoC, QUB and UM, supervised by Stephen Armstrong, Jeremy Bennett, Dr Catriona Brogan and Eóin Parkinson. Dr Evan Hill wet-sieved the soil samples using flotation and the site was sampled for soil micromorphology and geochemistry by Prof. Charles French, Dr Sean Taylor and Conor McAdams. During the excavation, our understanding of the extant megalithic structure was improved by the superb plan produced by Stephen Ashley. Tiomoid Foley conducted a condition survey of the megalithic remains, the results of which were incorporated into an MSc project. Rupert Barker made a short film of the excavations – *A Day on a Dig* (https://youtu.be/cGNOGpq746I). Digital laser scanning was undertaken by John Meneely. Individuals whose efforts are warmly acknowledged include Stephen Armstrong, Dr Catriona Brogan, Dr Bela Dimova, Dr Paola Filippucci, Dr Reuben Grima, Laura James, Lottie Stoddart and Dr Sean Taylor, who supervised trenches, organized field assistants and gave logistical support to the running of the project. At Santa Verna, we particularly thank Dr George Azzopardi (HM) for his invaluable logistical

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Ġgantija

The Ġgantija excavations in 2015 were directed by Prof. Charles French, Dr Simon Stoddart, Dr Sean Taylor and David Redhouse, assisted by Stephen Armstrong, Jeremy Bennett, Dr Catriona Brogan, Conor McAdams, Aran McMahon, Eóin Parkinson, Jacob Pockney and Mariele Valci. Flotation of soil samples was undertaken by Dr Evan Hill. Digital laser scanning was undertaken by John Meneely. The field researchers comprised the geophysical survey team in 2014 under the supervision of David Redhouse and Dr Alistair Ruffell with assistance from Jeremy Bennett. Dr Sara Boyle and Jeremy Bennett undertook initial survey of the WC section area in 2014.

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Kordin III

The excavations were directed jointly by Prof. Caroline Malone and Prof. Nicholas Vella, assisted by Dr Reuben Grima, Dr Rowan McLaughlin, Ella Samut-Tagliaferro and Dr Simon Stoddart. The crew consisted mainly of students from UM, who participated as part of their annual training excavation. They were supervised by Jeremy Bennett, Dr Catriona Brogan, Rebecca Farrugia, Dr Reuben Grima, Tore Lumsdalen and Eóin Parkinson. Flotation of soil samples was undertaken by Dr Evan Hill. Digital laser scanning was undertaken by John Meneely and Jeremy Bennett. We also acknowledge the kind assistance of Fondazzjoni Wirt Artna, the Malta Heritage Trust, who granted access to the site.

Skorba

The excavations were directed by Prof. Caroline Malone and Dr Rowan McLaughlin, who were assisted by Stephen Armstrong, Jeremy Bennett, Dr Catriona Brogan, Emma Hannah and Eóin Parkinson. OSL profiling and geoarchaeological sampling was performed by Prof. Charles French, Dr Timothy Kinnaird (University of St Andrews), Dr Simon Stoddart and Dr Sean Taylor. The site was laser scanned by Jeremy Bennett. We thank HM for enabling access to the site and Dr Josef Caruana and Katya Stroud for supporting the work.

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Permits and access

The *FRAGSUS* team is very grateful to the heritage bodies of Malta, namely HM and the SCH and their officers, who enabled access to sites and provided the permissions and opportunities to study the buried archaeology. It cannot be over-emphasized just how privileged the *Project* has been in having access to excavate and examine the exceptional sites of prehistoric Malta. Not only is the entire category 'Maltese Temple' protected, but most sites are also inscribed within the UNESCO World Heritage Site listing for Malta. Some readers may wonder why very small trenches and sondages were permitted at all, whilst others may query the value of small investigations. This volume presents a range of scales of study from the small to the large across prehistoric sites and assesses the value of particular data sets that have been collected. Together with Volume 1, which examines the wider landscapes and environments of early Malta, and Volume 3, which examines the bones and lives of the ancient individuals, this volume fills the middle ground – the sites themselves, and we thank all our collaborators and volunteers in this venture. In particular, we thank the willing site assistants, volunteers, surveyors, cooks and illustrators who gave their time and energy to the archaeological work, and we list them below:

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Foreword

Joseph Magro Conti

Consider, 5000 years ago you are on one of the smallest islands in the Mediterranean, which has no water sources, dependent on brief winter rain showers, shallow soil patches, with only stone, clay and salt as natural resources, perhaps a few trees and shrubs. How would you live in such environment? This second volume of the *FRAGSUS Project* (2013–18) provides readers with fresh information achieved through high quality scientific research on palaeoenvironmental analysis, radiocarbon dating, human and faunal bone studies as well as on ceramics, lithics, domestic contexts and monuments, fully addressing five main questions targeted by the project. The support of the European Research Council has been transformative in making this new knowledge about Maltese prehistory more understandable and accessible, as a reader will discover throughout this and the other two volumes.

The coming of *FRAGSUS* was a long journey. Twenty-seven years passed since I first met the main protagonists of this project, Prof. Caroline Malone and Dr Simon Stoddart. They left a long-lasting positive impression on me. I was an archaeology undergraduate at the University of Malta in 1993, under the academic guidance of Prof. Anthony Bonanno, with colleagues Nicholas Vella (now Professor, and former Head of the Archaeology Department at the University of Malta) and Dr Anthony Pace (my predecessor as Superintendent of Cultural Heritage). I was on my first archaeological research excavation by an Anglo-Maltese mission at the unique Neolithic mass burial site of the Xagħra Brochtorff Circle in Malta's sister island of Gozo. A couple of decades later I had the opportunity to participate on other research digs in Malta with Malone-Stoddart, this time as part of *FRAGSUS* at Kordin III Neolithic temples in Malta, a site about which I had long endeavoured to raise awareness for its better understanding and management.

The Temple Period is renowned for the monumental megalithic structures (presumed temples) and the associated underground mass burial places, which offer an aura about the Neolithic mindset, belief system, organisation, ritual and physical capabilities in engineering and art. But what should be further intriguing to the reader is another aspect of human life – how the early people lived? What evidence is there for this aspect from the Temple Period? Previously, such questions were largely without much evidence except sporadic discoveries of typical deposits and material culture, but which were very lacking in data to advance site prediction and environmental data collection. The very few huts so far discovered and interpreted as domestic were ephemeral and thus prone to unrecorded destruction during building construction. I was pleased to contribute my knowledge of domestic sites to the publication of the Gozo study in 2009, and delighted to write this Foreword. This work records the next stages of discovery of the inhabitation record of the Maltese islands, most notably at Taċ-Ċawla, a site preserved from development by the action of the Superintendence.

In the past fifty years, the Maltese Islands have undergone successive building booms, each significantly endangering Malta's historic environment. In my quest as an applied archaeologist/heritage manager for over two decades at the Planning Authority and for the past two years as Superintendent of Cultural Heritage, I have endeavoured to collaborate with disparate stakeholders to save or mitigate impacts on the fragile remains of the past, and to raise awareness. The findings from *FRAGSUS* will be an especially useful source of information for policy makers, heritage managers, regulatory agencies and conservation scientists in their quest to preserve and understand Malta's past. The study enables them to make informed decisions about future human impacts on the archaeological heritage, mainly caused by



Figure 0.2. *Joseph Magro Conti at Kordin.*

building development on the small island environment and its island society and economy.

This volume is a seminal interdisciplinary study, not only for Maltese prehistory but also a milestone in world prehistory more generally. As prehistory pre-dates the invention of writing, the approach of *FRAGSUS*'s research agenda turns archaeo-environmental data into 'words' by digging deep into the embryonic matrix of garden soils on which the temples builders sustained themselves. The project can now explain queries about this sustainability, a theme that is still relevant to modern generations. With the use of multidisciplinary and multinational teams of specialists, the study placed innovative scientific approaches at the fore, and addressed silent aspects that go beyond the traditional art-historical basics of Grand Traditions. The investigations into the core essence of life five millennia ago belong to new scientific approaches.

The *FRAGSUS Project* has addressed lacunae and used unconventional approaches in theory and method to obtain robust scientifically-backed results that have filled in significant gaps in the research agenda of Maltese prehistory and beyond. Equally, the results have surely raised many questions for future research agendas. I look forward to further collaboration, and I am eager to see more collaborative projects between Maltese veterans and upcoming academics and our overseas colleagues.

Joseph Magro Conti
Superintendent of Cultural Heritage, Malta
September 2020

Chapter 1

Archaeological studies of Maltese prehistory for the *FRAGSUS Project* 2013–18

Caroline Malone, Simon Stoddart,
Rowan McLaughlin & Nicholas Vella

1.1. Introduction

The *FRAGSUS Project* ('Fragility and Sustainability in small island environments: adaptation, cultural change and collapse in prehistory') was devised to explore issues of prehistoric island sustainability set against the background of environmental change and instability. The Project set out with four explicit objectives. These aimed to establish the factors that led to the growth, sustainability and apparent demise of the Neolithic Temple Culture civilization of Malta. The scenario set by previous research (Malone & Stoddart 2013; Trump 1976) identified that the collapse of this long-lived civilization was caused perhaps by isolation and a deteriorating unstable ecosystem amongst other possible factors. The objectives designed to explore the socio-economic changes that took place were to:

1) Reconstruct the past environment to investigate the environmental context of and human impact on ancient Malta. This would be achieved through an assessment of vegetation and landscape stability before, during and after the establishment, maintenance and collapse of the Neolithic civilization; and gathering data for comparisons with the later protohistoric and historical periods.
2) Improve the existing chronological framework by developing a reliable, precise and accurate time frame that would integrate events and trends determined from environmental, landscape and human-archaeological records. The chronology was to be achieved through the implementation of Accelerator Mass Spectrometry (AMS) radiocarbon, isotopic and Optically Stimulated Luminescence (OSL) dating methods (tephra analysis was undertaken in order to enable cross-dating with the AMS-dated pollen sequence, within which sparse tephra shards were found). The resulting determinations would give precision to the already unusually detailed artefactual framework, and all results would then be assessed using a Bayesian approach.
3) Establish the population history of early Malta by applying multi-disciplinary approaches to the study of the ancient population using previously excavated human remains from Xagħra. These remains were to be sampled to establish population structure, chronology, diet, stress, activity, disease, taphonomy and external origins.
4) Reconstruct the settlement, subsistence and landscape history of early Malta through study of the changing socio-economic patterns of early settlement, landuse and resource exploitation in prehistory. This would be combined with understanding the impact of deforestation, soil erosion and climate instability on early farming societies by sampling 'time capsules' of settlement and palaeoeconomic activity.

These four themes underpin the work of *FRAGSUS*, and the outcomes are recorded in three monographs of which this is the second. The first volume deals with the first two objectives, namely the environmental aspects and the chronology associated with soil, cores, pollen and climate. The third volume deals with the third objective, the human population and its physical remains, making reference to the other objects. Finally, this volume deals with the fourth objective, in particular settlement and archaeological evidence, but is closely linked throughout with the other objectives.

A principal goal for the *FRAGSUS Project* has been to detect and sample environmental data, which when combined with archaeological evidence, can inform on the impact of human activity on the natural environment. In the Maltese context we specifically wanted to identify how humans managed to cope when the natural world began to fail their needs, a failure that appears to have occurred at intervals over the long time frame of

later prehistory. The *FRAGSUS Project* was designed to explore and record this long human sequence, one that had defined cultural identity throughout its evolution, and that had human subjects at its heart. By incorporating many datasets, the goal was to establish theories and interpretations about how we, the human species, both controlled, and were controlled by the natural environment we chose to exploit. The outcomes are recorded in three *FRAGSUS* volumes, of which this is the second (see also French *et al.* 2020; Stoddart *et al.* in press).

In Volume 1, we discuss at length the importance of islands as units for study. In this volume we focus on the archaeology and ecological aspects of islands. An island represents a conveniently circumscribed landscape of a known size, surrounded by water, and thus remote from larger landmasses and their biological and cultural stimuli. From the seminal ecological studies of Charles Darwin (Jones 2009) and Alfred Wallace (1892) in the nineteenth century, to the rich theoretical literature on biogeography and equilibrium theory in islands first initiated by MacArthur and Wilson (1963, 1967), an entire sub-discipline of island studies has developed. The studies range from Simberloff's equilibrium theory (1974), the ecology models of Gorman (1979), the ecological anthropology of Vayda & Rappaport (1963) to current ideas of evolution and equilibrium (Lomolino *et al.* 2010), and colonization (Cox *et al*. 2016). Generally, the bulk of research has been focused on non-human subjects, with issues of extinctions and conservation foremost. But nevertheless, a number of important theories and models from these island studies are relevant to archaeology.

1.1.1. Island studies

In the *FRAGSUS Project* we have sought to examine the particular impact made by humans on an environment and its natural resources in the prehistoric island context, and in this case, the archipelago of Malta and Gozo. There have been a number of useful studies on island colonization patterns and case studies of the Mediterranean and the Caribbean in particular, that extract some key ideas from the ecological models and apply them to the anthropic context. Evans (1973) was amongst the first to present the 'island' as the laboratory case study of an ancient society, and in particular in the Mediterranean context. Cherry (1981, 1990) further demonstrated the more quantitative outcomes of these ideas. Such work has generated a succession of useful, relevant studies and some focus specifically on Malta (Broodbank 2013; Dawson 2014; Kirsch 1986, 1996; Kolb 2005; Malone 1997–8; Patton 1996; Rainbird 2007; Renfrew 1973; Stoddart 1997–8). Collectively, these have worked to develop theory and demonstrate the archaeological relevance of the application of island ecology models. As time has progressed, increasingly detailed complementary information has been added, especially chronology. Now with fifty years or so of growing ^{14}C dating estimations, the tempo of island colonization, consolidation and desertion can be interrogated and the archaeological record better understood. We can now present an understanding of chronology as human time, rather than speculate about when and which groups of humans arrived on particular islands. This scientifically determined chronology, combined with traditional culture sequence studies allows discussion of when distinctive socio-cultural evidence appeared and disappeared in the sequence of social and environmental evolution. When Cherry (1981, 1990, 2004) was estimating island colonization patterns in the Mediterranean, far fewer, uncalibrated dates were available. Whilst he and Patton (1996) identified the sixth millennium BC as the first major episode of Mediterranean colonization associated with the spread of farming, there was little chance then to break the key 'sixth' millennium down into detailed episodes that might enable us to trace the dynamics of what was an extended process across the Mediterranean and Europe. Dawson, in a number of papers (Dawson 2004–6, 2008, 2010, 2014), identified Malta and Gozo as an archipelago likely to have been colonized just once, on the basis of data available. This notion was largely supported by Trump (1995–6) who had pioneered understanding of Malta's Neolithic. Even though there were insufficient date estimations available during his studies, he did speculate about possible breaks in the sequence of settlement and cultural evolution. But, without detailed chronology, the momentary episodes of cultural activity are impossible to pin down in a time sequence extending over millennia, often without much apparent cultural change. Accurate time measurement is also fundamental in measuring the relationship of human activity against episodes of environmental change and climate fluctuation.

1.1.2. Chronology and new scientific studies

The growing field of palaeoecology, combined with increased knowledge of past climates and catastrophic events demands chronological precision that can tally with human timescales. Increasingly accurate chronologies measure the small fluctuations of change and currently we are fortunate to have AMS dating that enables individual lifetimes to be identified, not simply great swathes of 'time'. Indeed, the increasing accuracy allows current archaeo-environmental studies to identify distinct events in the past, signalled by data that demonstrate downturns, climaxes, catastrophes (Baillie 1999). These events are not always clear cut or easy to distinguish, but nevertheless had an impact on the natural environment and, in turn, the world in

which prehistoric communities lived. *FRAGSUS*'s work has, therefore, focused on trying to identify trends in the environmental and economic data for early Malta that may highlight instances of variation in the past and be investigated to address the research questions below (§1.5).

Shortcomings of all previous work on the prehistory of Malta (and indeed, in much of the southern Mediterranean) have been the lack of coordinated scientific fieldwork and data collection. All too often, 'research' has been content to simply identify sites and pottery, with little broader work on 'landscape' and 'monuments'. All too rarely have soils and the environment been considered as archaeological components, other than in the general sense of a covering over buried sites. Never had a soil history been undertaken of Malta that investigated the changing nature of soil over time (Volume 1). Geographers had undertaken some excellent work in preparation for independence (Bowen-Jones *et al.* 1961) and observed a much more accessible and visible landscape than is possible today. That work, however, was centred on the present and not aimed at environmental reconstruction. Consequently, environmental work was not attempted until the Xagħra Brochtorff Circle study of the late 1980s and early 1990s. Yet, that site had limited potential for soil study, as it was a particular cave environment. Samples from buried cave soils found no pollen preserved, whilst the funerary context was, by definition, some distance from the sites of the living. Instead, landsnails became the main focus of environmental study as they were well preserved (Schembri *et al*. 2009, 19–22). The question of landscape reconstruction, nevertheless remained. Over the next two decades, one member of the original Xagħra team (Hunt) continued in the quest to obtain suitable environmental material. He obtained meaningful pollen samples, but considerations of cost and experience limited the scope of their sampling and dating (Hunt 2015; Hunt & Vella 2004–5). The initial history of vegetation change was indicative (Carroll *et al.* 2012; Fenech 2007; Hunt *et al.* 1995), but inconclusive, with substantial gaps in the sequence for Malta at the crucial time of later prehistory. Similarly, other environmental work over the decades had not investigated animal bone and the settlement and economy of prehistoric Malta in early sites in detail (Fiorentino *et al*. 2012; Stoddart *et al*. 2009a).

The rise and florescence of the extraordinary Maltese Temple Culture lies at the centre of prehistoric study in Malta. But it could not be explained in socio-economic terms with any level of reliability. Consequently, predictions of population levels and density in prehistory remained speculative (Stoddart & Malone 2015). Neither was it possible to measure changes in socioeconomic conditions in prehistory without better data and a more extensive chronology. Thus, without a deeper understanding of the environmental or economic base, Malta's Neolithic World Heritage Sites remained 'mysterious' and sometimes liable to excessive interpretation based more on a fantasy goddess culture than on archaeological facts.

In the absence of new scientific study, useful work took place over the last two decades that advanced knowledge and interest in phenomenological and landscape approaches to the monuments (Barrowclough & Malone 2007; Grima 2004, 2005, 2007; Malone & Stoddart 2009; Pace 2000, 2004a, 2004b, 2004c; Skeates 2010; Stoddart & Malone 2010, 2013; Tilley 2004,). There was, nevertheless, a solid case for new research on the environment which the ERC assessors generously recognized. We consider their trust to have been well founded.

1.1.3. Island criteria

Small islands can make excellent subjects against which to challenge ideas about social resilience and isolation. But they also have drawbacks for archaeological study because of limited sample scope, lack of comparators

Table 1.1. *Research potential for island study and Malta.*

Characteristics	The Malta opportunities
1. A relatively isolated island group of small size (*i.e*. less than 500 km^2)	Malta has a maximum size of 316 km^2, and is over 80 km from Sicily
2. Surviving settlement, ceremonial and funerary sites of prehistoric date available for sampling and gathering chronological and environmental materials	Numerous ceremonial megalithic sites (temples), knowledge of tombs, hypogea and some settlements. The extensive Xagħra Brochtorff Circle population
3. Environmental data (pollen, soil, human/animal/plant remains) to reconstruct vegetation, soils, climate and dietary/climatic isotopic information	Coastal valley inlets and valleys with deep sedimentation and good soil formations. Preservation of environmental materials in limestone environment and within prehistoric site stratigraphies
4. Samples of ancient human, animal and molluscan remains to enable dietary, isotopic and genetic investigation	Huge human remains archive (Xagħra) that has been partly studied and dated. The potential to sample new animal bone and plant rich deposits on habitation sites
5. A distinctive, dynamic and dated archaeological sequence of human activity and material culture	A rich ceramic and artefact tradition from a reasonably dated sequence, with preliminary typological and material study in place
6. Access to sites, museum collections and opportunities for collaborative research	Well established collaboration between Malta and the Cambridge-Belfast teams since 1987

and eroded environments with sparse potential to yield suitable materials. In the case of Malta and Gozo, the positive island characteristics we identified for study are listed in Table 1.1.

1.2. Background to *FRAGSUS* as an archaeological project

The richness of Maltese prehistoric archaeology has attracted a range of key figures who have explored its unusual qualities. Before the twentieth century, Maltese antiquities were a curiosity noted by travellers and administrators, but this work lacked much coherent scholarship. Later nineteenth century scholars sought to identify and protect sites (e.g. Antonio Annetto Caruana; Fig. 1.15) and a significant number were described and partly published (although these were always interpreted as Punic in date). It was only from the first decade of the twentieth century that the outstanding partnership of Themistocles Zammit (an established scientist and archaeologist; Fig. 1.15) and Thomas Ashby (a stratigraphic excavator whose skills were honed on the Roman monuments of Caerwent; Fig. 1.15), projected the riches of prehistoric Malta onto the world stage. This followed the detailed published study of the German scholar Albert Mayr (Mayr 1901; Fig. 1.15), who likewise had recognized the extraordinary prehistory of the Maltese Temple culture. Ashby contributed to knowledge of Santa Verna, Kordin, Mnajdra and Ħaġar Qim (Ashby *et al.* 1913). While independently and more dramatically, the work of Zammit led to the completion of work at Ħal Saflieni and the discovery of Tarxien (Zammit 1930), collectively demonstrated the creativity of the inhabitants of the Maltese Islands from an antiquity that had not previously been accepted. Together with scholars and excavators Napoleon Tagliaferro (Fig. 1.15) and Giuseppe Despott, Zammit also developed a powerful understanding of the structure and diversity of the elaborate material culture that came from the impressive monuments he examined. Above all, he realized the importance of reconstructions *in situ*, coupled with rapid publication and dissemination of information in written and museological form. A less well-known figure until recently is Luigi Maria Ugolini (Ugolini 1934; Pessina & Vella 2005) who was one of the first scholars to appreciate the significance of these earlier discoveries. He stresssed their importance, over and above the Roman-inspired wisdom of the time (Ceschi 1939). His work (Ugolini 1934) was amongst the first to try to interpret the discoveries in terms of the living people who created the monuments. As a synthesis, it is probably fair to state that these pioneers developed a broad understanding of the major monuments, most notably of the so-called temples, but also of the underground burial chambers of Ħal Saflieni. However, other potential questions (principally those concerned with landscapes, environment and subsistence) were still under-investigated.

After WWII, two archaeologists, John Evans and David Trump (Fig. 1.15), built on the achievements of these pioneers. John Evans, like many significant figures of his generation honed his forensic skills at Bletchley Park (WWII intelligence) and applied them through his training in Archaeology and Anthropology at Cambridge to the early archaeology of the Mediterranean. In 1952, he was appointed by a committee headed by the Royal University of Malta to systematize the unpublished and outstanding discoveries of the pioneers in a survey of the state of knowledge of the Maltese islands. He combined this systematization with a series of surgical strikes on key monuments to attempt a chronological resolution to the rich material culture. Evans focused on sites where stratigraphy was clearly preserved by the sealed packed limestone (*torba*) floors, and where uncontrovertible sequence could be extracted. In the tradition of Zammit, he also developed an early synthesis of these results (Evans 1953, 1956, 1959). Even if publication of the full dataset took time (Evans 1971), this delay allowed for the inclusion of new and significant information, notably from David Trump's work (see below). At the same time, Evans paralleled the footsteps of Ugolini by developing an interpretative framework, albeit in a rather different direction and tradition; he both posited the ideas of island archaeology (Evans 1973a; 1977) and considered the role of key actors, such as the 'priest' in some of the monuments that he was synthesizing (Evans 1973b). David Trump accompanied Evans on his exploratory fieldwork and, following his appointment as Curator of the Museum of Archaeology in 1958, developed the subtleties of the prehistoric timetable much further. Most significantly, he excavated the site of Skorba, uncovering new phases in the Maltese sequence, named by him after the same site, and provided the radiocarbon dates that, at last, were available to archaeologists to accompany this material (Trump 1961; 1966). The results were that the chronology was no longer relative, but increasingly precise, even if based on remarkably few samples. Trump was also instrumental with Charles Zammit, the museum director and the son of Themistocles, in displaying these achievements in the newly established National Museum of Archaeology in the centre of Valletta. In fact, David Trump developed a natural, albeit idiosyncratic, talent and strong following in the popularization of the importance of the Maltese islands in prehistory (Trump 1972; 2002; 2010). The reward was a celebration of his achievements by the Maltese nation to a level never recognized in his country

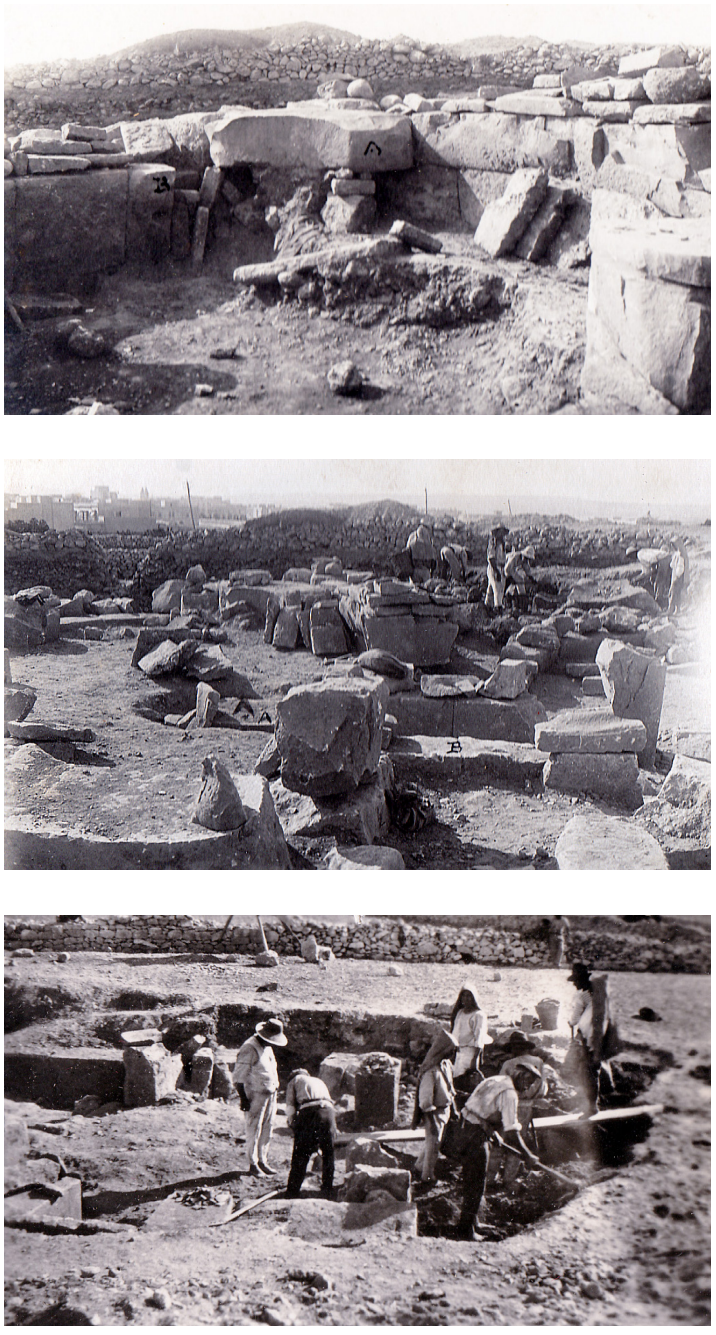


Figure 1.1. *Early excavation images of Tarxien in 1915 during the superficial clearance of masonry and deposit (Zammit) courtesy of the National Museum of Archaeology, Malta.*

of birth – an honorary degree from the University of Malta and the Order of Merit of Malta.

Two further figures are connected to the *FRAGSUS Project*. Colin Renfrew (1973) advanced the implications of the new radiocarbon dates that had been produced largely by David Trump, but also supplemented by himself. He highlighted the broader setting of calibration, and thus firmly established the claim that these monuments were the oldest free-standing stone monuments in the world. This is a claim that still stands today for roofed stone monuments, in spite of the relatively recent discovery of the much older, but open air, stone monuments of Gobekli Tëpe (Schmidt 2007). At the same time, Renfrew took their theoretical understanding forward by proposing theories of societies and their territories in an island setting, and

how they might have developed over time (Renfrew 1973; Renfrew & Level 1979). Anthony Bonanno, the long-standing head of the Department of Classics and Archaeology that he founded at the University of Malta, also made his own very real contribution to the debate. He synthesized the available information (Bonanno 1986a) and, with Colin Renfrew, jointly proposed an Anglo-Maltese collaboration during a seminal conference that he organized in 1985 (Bonanno 1986b).

1.3. The Cambridge Gozo Project 1987–95

The collaboration that followed (1987–95) between the Universities of Malta and Cambridge and the then Museums Department took stock of the current state of knowledge based on Anthony Bonanno's 1986 synthesis. It was clear that study of the so-called 'temples', mainly on the island of Malta, had dominated previous research. Questions of death, domestic life, economy, the human and physical landscape had been under-researched. The Cambridge Gozo project under the direction of Anthony Bonanno, Tancred Gouder, David Trump, Caroline Malone and Simon Stoddart sought to investigate these remaining gaps. A single phase Temple Period settlement structure at Għajnsielem on Gozo was investigated in the first 1987 season (Malone *et al.* 1988, 2009, Ch 4.). The Xagħra Brochtorff Circle was researched over all seven field seasons, and a field survey was undertaken in those moments when the great investment of work on the Circle permitted. The most successful feature of the project was a deeper understanding of Maltese death ritual (Malone *et al.* 2009). Some major strides were made towards appreciating principal changes in settlement distributions between the ceramic phases of Għar Dalam to Baħrija in the central part of Gozo through a systematic site and off-site landscape survey (Boyle 2013, 2014; Malone *et al.* 2009; Volume 1, Chapter 6). Some new data were gleaned as proxies for domestic life and several likely settlement sites were located, although the one excavated Għajnsielem Road structure was largely devoid of refuse (Malone *et al.* 1988, 2009). Very few advances were made in understanding the changes in the physical and natural landscape. Several specialist scholars, however, were invited and they attempted to identify the means to extract knowledge from a challenging environment at a time before many of the current methods used in the current project became available. The most successful work came indirectly from the study of land snails from the Xagħra Brochtorff Circle (Schembri *et al.* 2009). The scientific goals of the Cambridge Gozo Project (1987–95) were significant on a number of fronts. In particular, it achieved knowledge of prehistoric funerary ritual and an initial study of the prehistoric population, and accompanying animal remains. Inadequate funding meant that the osteological study was preliminary. Nevertheless, that work revolutionized approaches to the bioanthropology of the prehistoric population. It represented only the second discovery of a Temple Period funerary complex (rather than individual tombs) in Malta, and the only example of a fully recorded burial assemblage. Chronological progress included a suite of AMS radiocarbon dates on human bone, which fixed the episodes of burial for the first time. Other major achievements included the systematic study of molluscan evidence in environmental reconstruction, the identification of hard stone sources from outside Malta, and preliminary work on diet and the exploitation of animals. The post-excavation research (between 1996 and 2009) also identified a number of directions for future research. In particular, we (Malone *et al*. 2009, 383–4) specified the need for: more scientific analysis of the human remains; a better understanding of diet, disease and changing life patterns; more AMS dating; and the application of (the then) new and promising aDNA methods on the enormous assemblage of human bones (*c*. 220,000 individual parts). As with many burial sites, it is vital to establish the composition of the buried community, both social and biological; aDNA can offer new insights into the latter and by implication the former. In conjunction with excavated materials, we also suggested that sedimentological and environmental research might interrogate the question of climatic downturns to address an overriding question, 'why did the Temple Culture collapse and disappear'? The work of the late Frank Carroll at Huddersfield University (Carroll 2007; Carroll *et al.* 2012) showed that these methods were viable in the Maltese contexts.

In the years immediately following the 2009 publication, while other fieldwork was developed in Etruria, these various issues became a discussion point for some of us (especially Hunt and Malone in the palaeoecology labs of Queen's University Belfast – QUB, colleagues in the Universities of Malta and Cambridge – UM and UoC, and the newly established bodies of Heritage Malta – HM – and the Superintendence of Cultural Heritage – SCH), to develop a project that was resolutely designed to solve these remaining questions, and extend research activity towards Malta as well as the smaller island of Gozo. Pollen, soils and sediment thus became central concerns for the new project together with investigation of food, subsistence and domestic life in prehistoric times. It was also realized that the chronology of the Maltese islands, although established in its broad outlines, was based on all too few samples, too much on pottery, and, where available,







Figure 1.2. *Xagħra Brochtorff Circle excavations from 1987–94 (Malone and Stoddart, the Cambridge Gozo Project).*



Figure 1.3. *The Cambridge Gozo Survey 1987–95, recording landscape features and surface scatters: Duncan Brown (above), Barry Kemp and Duncan Brown (below). (Simon Stoddart).*

had used older methodologies that paid less attention to socio-economic and environmental evidence. If the understanding of the tempo of island life from prehistory to more recent times was to be established, it was considered vital to invest heavily in cutting edge chronometric techniques that included AMS as well as OSL dating. It was evident that only a major, very well-funded, project could apply the necessary levels of interdisciplinary scientific analysis to test these questions, and potentially make an advance in understanding. A period of collaborative discussion in 2011–12 led to the application, headed by Malone, for funding from the European Research Council, and *'FRAGSUS'* as a project was developed. The application was submitted in April 2012, and the team were notified in November 2012 of its success, enabling the five-year programme of research to commence on 1 May 2013. A large team was assembled comprising nineteen scholars (see Acknowledgements), spread between Britain and Malta, and initially from QUB, UoC, UM, HM and the SCH. Later some colleagues moved to the Universities of Plymouth and Liverpool John Moores. In addition, new research staff attached to the main partner institutions were engaged to undertake specific sub-programmes of specialist work, and over the years a number of post-graduate students also joined the project to undertake Ph.D. and Masters dissertations based around the project's work.

1.4. The *FRAGSUS Project* 2013–18

The *FRAGSUS Project* attempts to address the many issues identified above in the broader framework of resilience theory within a restricted island community. It necessarily draws on the work of our predecessors, Zammit, Ugolini, Evans, Trump and Renfrew, who had in their various ways laid the foundations for this continuing study. The *FRAGSUS Project* was born out of the combination of previous archaeological fieldwork undertaken between 1987–94 (the Cambridge Gozo Project – excavations at the Xagħra Brochtorff Circle), and the complementary studies in environmental change (Carroll *et al.* 2012; Fenech 2007; Hunt & Schembri 1999; Schembri *et al.* 2009) coupled with the many questions that still remained to be addressed. New studies demanded the investment of modern scientific infrastructure and expensive specialist analyses, and *FRAGSUS* could never have been achieved without the availability of substantial funds from the European Research Council, provided through the award of an Advanced Researchers Grant. We are very grateful for the support provided and trust that this, and its partner volumes, provide a suitable acknowledgement as well as justification for an investment that has implications for understanding both the past and the present (see Volume 1 Conclusions and this volume).

1.4.1. Archaeological concerns in Maltese prehistory and the FRAGSUS Project

The summary above highlights the main strands of intellectual development of the project. This section adds detail to some archaeological themes that are central to the *FRAGSUS* study, which we aim to address through the field research undertaken during the project.

1.4.2. Time and artefacts

From Zammit onwards, the megalithic structures and the remarkable 'art' and artefacts of the Neolithic 'Temple' culture provoked an ongoing interest in Mediterranean prehistory and the relationship between that area and the better known west European megalithic sites (Piggott 1965; Daniel 1963). By the mid-twentieth century, it was generally agreed that the cultures of Malta were of Neolithic and 'Copper' Age date, but beyond that notion, chronology was vague. The synthesis and record of the prehistory of Malta by Evans in the mid-1950s represented the first stage of a full evaluation of the material culture and sites of Malta's prehistory. That project was a major step forward in organizing the cultural sequence and assigning the rich archaeological assemblages stored in the National Museum of Archaeology to separate phases. Evans' small exploratory excavations were designed to demonstrate the chronological-archaeological sequence, and he presented his ideas in a number of publications that remain relevant today (Evans 1953, 1956, 1971). In 1958, David Trump, from his position as curator of the Museum, followed in Evans' path and organized further excavations to test the archaeological sequence, which spanned from the earlier Neolithic to the Bronze Age. Now armed with the powerful new tool of radiocarbon dating, Trump obtained a modest selection of samples tied to ceramic types that collectively demonstrated the very long archaeological occupation of Malta. The key site of Skorba Temple (Mġarr) formed the core of the dating programme, but it was supplemented by key-hole excavations at Santa Verna, Kordin III, Ġgantija, Tarxien and Ħaġar Qim that extracted distinctive ceramics often in defined stratigraphic layers. Linked to the few dated pottery levels, Trump was able to assert a new and unexpectedly ancient sequence. The achievement of the work was published in 1966 (Trump 1966), and its impact was deftly identified by Colin Renfrew in a chapter in *Before Civilization* (1973). There, Renfrew argued for the independent development of the Maltese island culture and their early dates, long before later Mycenean or Egyptian influence, which had, hitherto, been the chronological reference point in the Mediterranean and west European Megalith debate.

The Skorba sequence revolutionized both theoretical thinking and chronological understanding. It was, therefore, unfortunate that after the declaration of the independence of Malta in 1964, international collaboration or any ongoing scientific research in prehistoric archaeology all but ceased for many years. For over two decades, the sequence and the interpretations proposed by Evans and Trump were unchallenged, with no new fieldwork of significance being reported. In that time, theoretical studies filled the gap; for example, the modelling proposed by Renfrew that tested ideas on territories (Renfrew & Level 1979), or work that attempted to integrate and synthesize Maltese sites with other megalith building societies (Joussaume 1985). The period also saw the rise of Mother Goddess studies and other weird, wonderful and entirely unsupported proposals to interpret the Temple Culture (Gimbutas 1991). The need to provide counter evidence for these theories of a Greater Balkan Civilization, also drove the demand for new field research forward. The most recent studies (Tas-Silġ – Bonanno & Vella 2015; Cazzella & Recchia 2012; the Cambridge Gozo Project – Malone *et al.* 2009, and work by the emerging government agencies HM/SCH – Grima 2011; Pace 2000) have been constrained by the legacy of an earlier history of rather rigid material culture designations and typological systems. Given the effectiveness of Evans' and Trump's work in describing the archaeological sequence in material terms, almost

no attempt has been made to revise the system. In contrast, later periods have benefitted from work that necessarily takes account of broader Mediterranean systems (Anastasi 2013, 2016; Bonanno 2005; Quinn & Vella 2014; Sagona 2002), whilst the ceramic chronology of prehistoric Malta has largely remained a silo in its own insular world. In this volume, we assemble a large new collection of excavated material and subject it to detailed analysis (Chapter 10) with the intention of clarifying the present scheme and shaping it into one that is current and linked to a new chronology and science.

1.4.3. Architecture

The *FRAGSUS Project* also addresses the issue of temple architectural development. This theme commenced, in some respects, with the work of David Trump, who sought to identify an evolutionary scheme for the structural development of Maltese temples (Trump 1972; 2000, 2002). The opportunity to excavate beneath and around early temple structures has enabled us to examine architectural development in a limited way. In particular, the work at Santa Verna (Chapter 4 this volume) provides an important insight into early temple development supported by detailed dating. Likewise, the exploration at Kordin III (Chapter 6 this volume) has revealed details of construction at another early site. Architecture, however, is only dealt with briefly here, and forms the subject, we hope, of future studies.

1.5. Five research questions

The *Project*, as summarized above, was devised to tackle the all of outstanding issues highlighted above by posing five specific questions that attacked the central problem of the end of the Maltese Temple Culture. These interlinked questions focused on the fragility and resilience of island life. As is so often the case in such an intensive project, not only have many questions been answered, but the answers demonstrate enormous complexity and themselves raise new questions. A central feature of the project was to bring to bear multiple techniques in addressing the same questions, thus strengthening the validity of many of the conclusions.

1. *What was the impact of human settlement on Malta, and how rapid was the process of deforestation, erosion and degradation? When did technical mechanisms to manage the environment develop – such as terracing, water and food storage? Were such mechanisms in place before or after the Temple Culture collapsed?*

Enormous advances have been made by interlinking proxy samples from seven new pollen locations (with a corresponding sevenfold increase in catchment) and six new archaeological stratigraphies. As both this and Volume 1 show, a highly complex and fragile turbiditic landscape has been uncovered. Questions about early terracing, water and food storage have been less effectively addressed and remain issues to be solved by the next generation of archaeologists.

2. *How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this? Were the monumental temples instrumental in the process of sustaining cultural life?*

For the answer to this question, we necessarily draw on the information provided by Zammit, Evans and Trump. It was these scholars who investigated the temples when they were best preserved. However, the *FRAGSUS Project* has supplemented this work by investigating parts of four temples (Ġgantija, Santa Verna, Skorba and Kordin III). In addition, the evidence from the settlement area of Taċ-Ċawla, despite being a complex multi-period site, has permitted the elucidation of some of the essential differences between the communal activities of the temples and the smaller scale activities of the living sites.

3. *What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable? Were there failures in the food supply? What impact did diet, disease and stress have on the population?*

A three-pronged approach has been delivered successfully, drawing on the refuse of the living, the remains of the dead and palynological evidence. The settlement site of Taċ-Ċawla has, for the first time, delivered a series of refuse samples that give a measured development of the food resources (carbonized seed and bone) from the Maltese islands. These can now be compared with the evidence from the bodily remains of their near neighbours and contemporaries interred in the Xagħra Brochtorff Circle. The latter have provided samples for both isotopic and dental analyses, which have revealed invaluable information on dietary trends in the fourth and third millennia BC (see Volume 3). The presence of livestock and domesticated plants, while shifting in locational focus, were shown to be uninterrupted from their inception at the beginning of the sixth millennium BC until their major decline in the final stages of the Temple Period.

4. *What was the size and nature of the early Maltese population and what role had demographic connectivity (immigration) in maintaining island sustainability?*

Our insights into the changing demography of the Maltese islands remain indirect. The Cambridge Gozo survey (undertaken in the late 80s and early 90s, but presented in these volumes) has given some sense of the relative and changing density of a small part of the landscape. The pollen record has provided an important idea of the impact of these populations on the islands at a date even earlier than the settlement record. aDNA, isotopes and the physical anthropology have given different degrees of understanding of the connectivity of humans with the outside world and their genetic variation. These can be measured against the import and circulation of non-organic materials, as well as crops, trees, animals and other resources. A deeper understanding of demography remains a substantial challenge, and one that future generations can continue to tackle.

5. Was there social, economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically? Was there a hiatus between the Temple Culture and later Bronze Age settlers? Can a hiatus be identified during the earlier settlement of Malta, between c. *5000 and 3800* BC*?*

A number of proxies have been combined to investigate the situation at the end of the Temple Period: pollen, sediments, human remains and the distribution of radiocarbon dates. These do support the evidence for important changes at about 2340 BC, but similar analyses have also detected a similar downturn in the fifth millennium BC, which extended over a longer period. The focus on dating has revealed a long and apparently culturally empty episode between the Skorba Neolithic and the Zebbug. The definition and narrowing of these windows of change is one of the exciting results of the current work, and presents stimulating prospects for further analysis by future generations of archaeologists.

These questions were designed to provoke interdisciplinary approaches that employed fieldwork, fresh data collection, various analyses and a range of new scientific approaches. Some questions were simple, provoked and supported by the outcomes of previous study, and they had superficially obvious answers. Yet, when tackled through new and demanding methodologies, these same questions invariably opened doors to entirely new territories. Other questions were more speculative and designed to test new methodologies such as isotopic science and aDNA. It was the intention of the project to explore and tackle the unknown, to take risks and move the fields of study forward. As the reviewers of the grant application commented, the *Project* aspirations were admirable, but although many might not fully succeed, the journey was worthwhile in itself. It was thus that the team set out in May 2013 to start a demanding programme of research into past climate, landscapes, people and their cultures and to explore what enabled or hindered human sustainability in small islands in the past. Our focus was the Maltese islands, of which we had previous knowledge, but that were also chosen because their size and scale presented opportunities to examine the 'rise and fall' of a distinct civilization. In other parts of the Mediterranean or Aegean, it might have proven harder to distinguish such distinctiveness, but Malta – with its remarkable 'Temple' Culture – presented the greatest potential to test our questions. Malta was also chosen because of the long-standing collaborative relationship between the team members extending over decades, and our shared sense of affinity with a remarkable ancient people whose world we had begun to observe at ever closer quarters.

The outcome of the *FRAGSUS* research was always envisaged as being complex, incomplete and difficult to interpret. Nevertheless, the goal has been to go beyond simply gathering data about time, plants, soils, pots and people. We aimed to model aspects of how the ancient communities of Malta lived and died, how they organized their existence on a small and crowded island, and how they managed to maintain apparently placid social relations between the islands and their communities. One intriguing aspect of the Temple Culture and its remarkable architecture is that is appears to have emerged as a response to the local conditions of intense competition. The team have long debated the problem of how to interpret the temple evolution and its role in society, just as preceding scholars have for the last century and more. Now, with the benefit of detailed time control, set against a much deeper understanding of economic variability and the physical impact of that productivity on the human skeleton, we can begin to see how the early Maltese coped with their world (see Volume 3). At times it was a productive place, whilst at others, life probably hung in the balance between dry seasons, disease and economic failure. The temples seem to have been the places where the action of daily, seasonal and ceremonial life took place, but just what were the 'temples' in the minds of their makers? We have found evidence for ceremonial activity, fires, pots, animal bones, grinding feasting, grain processing, storage, display, sacrifice, theatre and aesthetics. The structures were large enough to live in, but evidence is not apparent that anyone did inhabit these places. This question of the function of the temples will be revisited in the Conclusions, Chapter 13.

1.6. The field research programme, 2014–16: the selection of sites for excavation and sampling and the goals for each site

The *FRAGSUS* research programme in archaeology was enabled by close collaboration between the team members, in particular those working in HM and the SCH, who were able to identify suitable and accessible sites for analysis. Although Malta is extraordinarily rich in prehistoric sites, most of them are inaccessible for excavation for one reason or another. Some are public 'heritage' sites, others are on private land, and there is a clear understanding that disturbance of sites should be avoided unless there are overwhelming reasons to intervene. Research archaeology has to make a strong case, and *FRAGSUS* was able to do this, since it brought new, and rather urgent opportunities to undertake diagnostic work that had potential to improve understanding and conservation. Most of the 'Temple' sites are inscribed as World Heritage Sites on the UNESCO list, and protected by national legislation. But that protection is only as good as planning, environmental pressures and erosion allow. The protective legislation covering Heritage and Antiquities has been greatly enhanced in recent years, and there is a general discouragement of any excavation or intervention that could cause damage or destruction. The team is therefore very grateful to the SCH and to HM (the two agencies responsible for protection of archaeological sites in Malta), for allowing and enabling *FRAGSUS* to work on the sites reported on in this volume. Two sites formed quite large excavation trenches (Taċ-Ċawla and Santa Verna) and both had the advantage of earlier archaeological work, with the *FRAGSUS* trenches comprising in part, interventions in areas of earlier backfill. The other sites were examined by small sondages (Skorba, Ġgantija), with larger slot trenches at Kordin III and two rock-cut silos at In-Nuffara. These excavations were precisely located, on the instruction of the authorities, and could not be expanded, regardless of the emerging deposits found. Future opportunities may arise for other scholars to expand these small sondages to explore and interpret the often limited evidence that was uncovered.

Over recent years, efforts have been made by HM to research the management and stone erosion of the monuments (Cassar *et al.* 2018; Grima 2011; Stroud 2003, 2004–5, 2007; Zammit & Mallia 2008). The issue, however, of the eroding surrounding landscape had not been included in this work, although it is the subject of several other conservation and heritage programmes (Gigli *et al.* 2012). Areas of bare rock caused by erosion of covering soil and vegetation are encountered while visiting any one of the 'temple' sites, and this erosion is seen across the entire landscape. As Volume 1 describes, the erosion process has been ongoing for millennia, and was exacerbated by human activity, agricultural regimes, heavy rainfall and the very nature of the landscape itself. Short of covering over entire sites, there is little chance of preserving them in an intact form. Although conservation issues were prominent in

Table 1.2. *Timetable of fieldwork.*

Taċ-Ċawla	2014	March–July	Neolithic settlement open area excavation Post-excavation processing and recording of material culture Environmental sample processing
Ġgantija	2014 2015	May–July March–April	Survey and recording of WC Section Excavation of sample sondages and large trench over ramp area
In-Nuffara	2014 2015	May March–April	Digital survey of plateau Silo Excavation Environmental sample processing
Santa Verna	2014 2015	March–April April–May	Digital and surface survey Large trench excavation of Temple site Environmental sample processing
Kordin III	2015	June–July	Trench excavation of Temple site Post-excavation environmental processing and recording of material culture
Skorba	2016	March–April	Sondage excavation of Temple site Environmental sample processing Lithic survey and analysis
In-Nuffara, Santa Verna	2015	June–July	Post-excavation processing and recording of material culture
Santa Verna, Ġgantija, Kordin III, In-Nuffara	2016	June	Post-excavation processing and recording of material culture
Taċ-Ċawla, Ġgantija	2017	June	Post-excavation processing/recording of material culture

the selection of sites studied by *FRAGSUS*, they were not the only concerns. As the research questions above specify, the goals were to obtain samples from periods of prehistory that might inform on particular aspects of the environment, the economy, the diet, and the general lifestyle and development of prehistoric communities. Such samples needed to be of sufficient quantity and quality and be subjected to rigorous quantitative and scientific scrutiny. They mostly had to be freshly obtained through new excavation and coring, since little suitable sampling had been done in the past. Samples needed intact stratigraphic levels in reliable and meaningful locations containing undisturbed deposits. Careful prior research identified likely spots for sample collection. Only reconnaissance and subsequent investigation could reveal the detail of time and environment, and given the level of previous intervention and erosion, such places are difficult to locate or even recognize. When found, they offered spectacular windows (e.g. Santa Verna and Skorba) into the hidden. This was a parallel experience to that encountered by the same team in much larger island contexts such Sicily (Malone & Stoddart 2000), where pockets of deposition could be readily accessed. The *Project* was correspondingly ambitious regarding the number of sites it investigated, and only pursued those deemed to have appropriate intact windows into the past that covered the necessarily extensive time range. The chosen sites, described below, had particular attributes capable of contributing new knowledge that could justify intervention in the UNESCO World Heritage Sites and the expenditure of time and resources required.

By the end of the *Project*, the excavations resulted in one settlement zone around a probable water hole (Taċ-Ċawla), four temple sites (Ġgantija and Kordin III, where only one phase was examined; and Santa Verna and Skorba, which had deeper stratigraphies) and a Bronze Age settlement (In-Nuffara). Already collected samples were analysed from a further two prehistoric sites (Xagħra Brochtorff Circle and Tarxien) and one medieval site (Mdina). The sites of Taċ-Ċawla, Santa Verna and Skorba provided the most chronologically wide-ranging information; whereas Taċ-Ċawla, Santa Verna and Kordin III provided the most spatially informative data over the area of a single site.

The programme of work engaged substantial field teams at Taċ-Ċawla, Santa Verna and Kordin III. The main personnel at each of these sites were recruited from Queen's University Belfast, the University of Cambridge and the University of Malta respectively (see Acknowledgements for staff list).

The choice of site was designed to map on the *FRAGSUS* questions by contributing to understanding of the:

1a. Impact of human settlement on Malta
1b. Rate of deforestation, erosion, degradation
1c. Technical management of environment

2a. Socio-economic sustainability
2b. Role of temples in sustaining cultural-economic life

3a. Nature of agriculture
3b. Failure of agriculture
3c. Impact of diet, disease and stress on population

4a. Size and nature of the prehistoric population
4b. Role of demographic connectivity in maintaining sustainable life

5a. Socio-economic failure at the end of the Temple Culture
5b. Evidence for a hiatus between the Temple Culture and the Bronze Age, or at other times

As Table 1.3 shows, the sites each spanned slightly different time ranges, enabling the project to sample materials covering almost 5000 years which could address the five main questions and their sub-questions. (This table and the questions is revisited in the Conclusions, Chapter 14). Linking all of these questions and sites is the programme of AMS radiocarbon dating that was applied to all suitable material from the excavations. Table 1.3 also includes the previously excavated Xagħra Brochtorff Circle, the remains from which form the focus of Volume 3, and the manner by which those materials contribute to the *FRAGSUS* questions.

A number of other sites were considered for investigation, but were not included on the grounds of time, scope, access and uncertainty of their contribution to the *FRAGSUS* questions. These sites, nevertheless, continue to offer the potential for study by future generations of archaeologists. Ta' Marżiena (Fig. 12.1), a probable temple site with a reasonable stratigraphy, was laser scanned, but its access would have required separate negotiation with a private land-owner. The main Bronze Age fortifications of Borġ in-Nadur on Malta were scanned (Fig. 12.2) , but some work had already recently been undertaken (Tanasi & Vella 2011; 2015) and further work was logistically difficult. Xrobb l-Għaġin, a temple site on Malta that is threatened by cliff collapse, was considered too dangerous to investigate. But this site has been scanned subsequently by members of the *FRAGSUS* team using drone facilitated technology. Għar ta' Għejżu on Gozo was scanned, but had already been badly damaged and contained no deposits. The Xemxija burial chambers were scanned (Volume 3) and the skeletal remains recovered by Evans

Table 1.3. *Chronological range of* FRAGSUS *sites and their contribution to the project questions.*

	Early Neolithic	Temple Period	Bronze Age	Later contexts	Q 1			Q2		Q3			Q4		Q5	
					a	b	c	a	b	a	b	c	a	b	a	b
Taċ-Ċawla	5400–5000 BC	3700–2400 BC	2400–2300 BC	Punic, Roman	√		√	√	√	√	√	√	√	√	√	
Ġgantija		2600–2500 BC			√	√	√	√	√	√		√		√	√	
Santa Verna	5400–5100 BC	3800–3100 BC		Medieval	√	√	√	√	√	√	√	√		√		√
In-Nuffara			1100–1000 BC		√	√	√			√	√			√		
Kordin		3600–3100 BC				√		√	√	√		√		√		
Skorba	5400–4800 BC	3600–3300 BC			√	√		√	√	√	√	√		√		√
Xagħra Brochtorff Circle		3800–2350 BC	2000–1600 BC					√	√	√	√	√	√	√	√	√

are considered by Jess Thompson in Volume 3, Chapter 13. Għar Dalam was scanned, but the deposits were considered too precious for further excavation. The south temple of Ġgantija was scanned but not considered for excavation, except on its margins, where excavation was undertaken as part of the project. The current state of the Xagħra Brochtorff Circle was scanned, but permission was not received for further limited excavation and conservation assessment. Finally, the Skorba phase site of Ta' Kuljat detected through the original Cambridge Gozo survey was identified for excavation, but considered logistically too problematic because of its relative inaccessibility and private ownership.

1.6.1. Taċ-Ċawla

The site of Taċ-Ċawla (Fig. 1.4) was selected because it was the only extensive known settlement site of the Neolithic that was accessible for study. Initial assessment in the 1990s had shown that structures were present, and that quantities of pottery and artefacts had been recorded that spanned from the earlier Neolithic to the Bronze Age. The land was in government ownership and the site was readily accessible by vehicles and available for new study, and importantly, it had demonstrated deep stratigraphy over parts of the site. The site was a remarkable survival within an urban area and could also be readily protected by the constant observation of local people. Its topographic position was interesting, overlooking a valley and a small temple (Ta' Marżiena) on a nearby ridge. Excavation trenches were permitted over areas previously exposed in the 1990s, and where backfill covered known archaeological levels. The extent of the site was expanded to limits agreed with the SCH.

1.6.2. Santa Verna

Santa Verna (Fig. 1.5) was selected because it is one of the few ruined 'temple' sites that is not a World Heritage Site, is not much visited by the public, and is located on accessible and undeveloped church land. The landscape surveys undertaken in the 1980s, 1990s and in 2014 demonstrated the existence of extensive archaeological material far beyond the few visible megalithic stones. This indicated a large and important complex of archaeological potential. Trump's work in the 1960s and the earlier study by Ashby and Bradley in 1911 (Ashby *et al.* 1913) offered promising insights to a long duration of Neolithic activity on the site, mirroring the discoveries by Trump at Skorba on Malta. Its topographic position at one of the highest points of the Xagħra plateau also pointed to its importance. The excavation trenches were permitted because areas external to the temple site had produced significant densities of surface pottery, or were located in the area previously excavated in the 1900s.

1.6.3. Kordin III

Kordin III (Fig. 1.6) was selected because it too had not received inscribed World Heritage Site status (although the status is now under review), was not much visited by the public (Borg 2007) and had considerable areas within the enclosed precinct that had not been excavated in the past. Early work at the site by Ashby had been promising (Vella 2004), but no work had been undertaken at the site since the 1950s, and no absolute dating had been done at all. Its tantalizing early 'temple' phases (identified by pottery at the site and its relatively simple architecture) indicated that a key-hole investigation could advance knowledge and demonstrate the site's value, date and history. In particular, work at this site was deemed to have the potential to fill in the elusive Mġarr phase. Excavation trenches were permitted only as determined by the SCH, and did not necessarily enable exposure of the logical extents of the temple structure.

1.6.4. Skorba

The temple site of Skorba (Fig. 1.7) was selected because it was the original chronological control site for absolute dating on Malta. With the massive advances in calibration and AMS methods of dating that have since taken place, it was felt that the chronology of the site should be tested, and the entire Maltese prehistoric



Figure 1.4. *a) General view of Taċ-Ċawla in 2014, at the end of excavation, looking north-northeast; b) members of the 2014 team (McAdams, Malone, Hannah, Armstrong, Parkinson (all QUB) and Kay Mallia (UM)).*

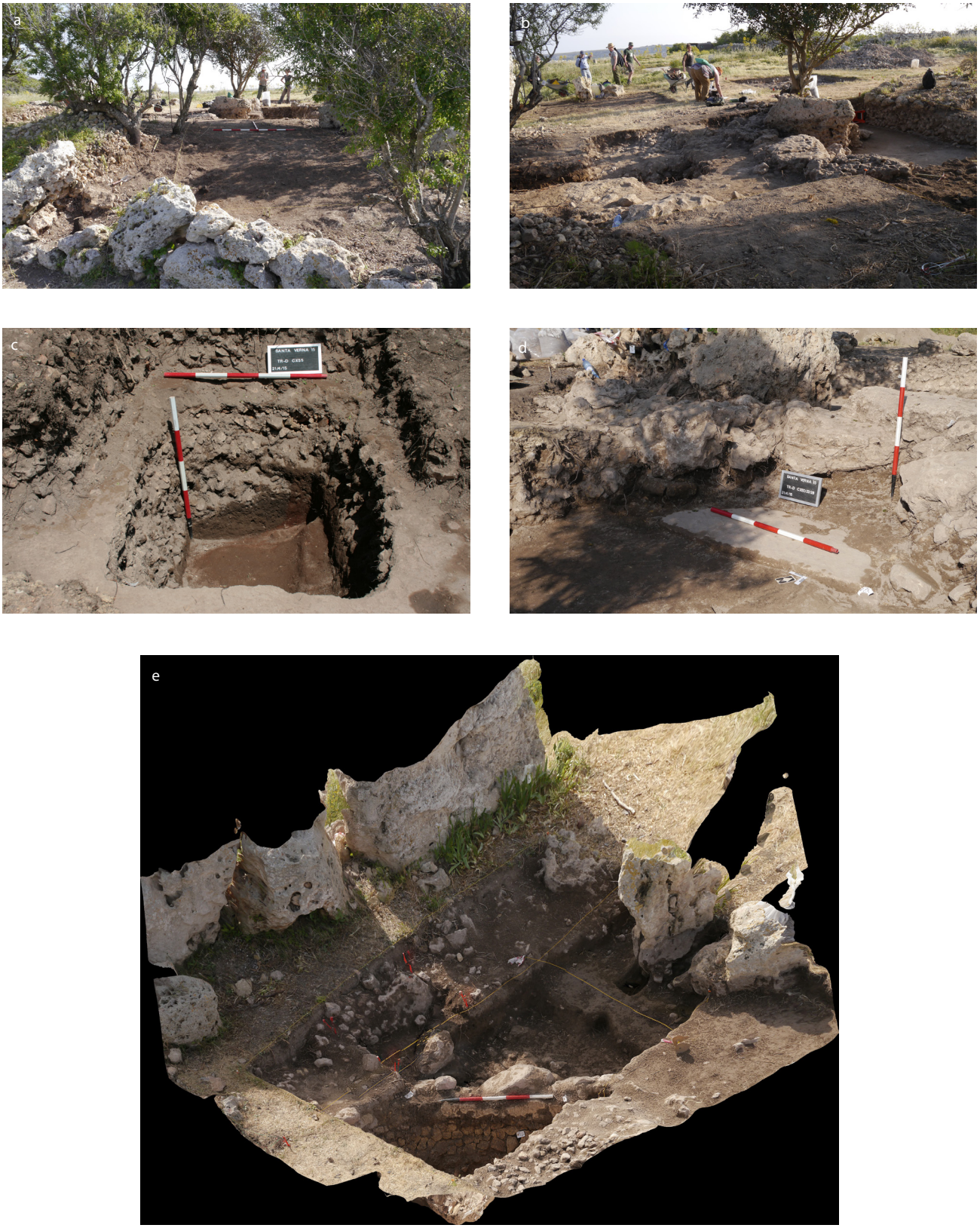


Figure 1.5. *a, b) General views of work at Santa Verna, 2015; c) Trump sondage, reopened in 2015; d) threshold slab within destroyed temple structure; e) Structure from Motion model of the south lobe of the temple under excavation.*



Figure 1.6. *General views of work at Kordin III, 2015: a) excavation in Trench 1; b) Trenches 1 and 2 under excavation; c) some of the QUB/Cambridge Kordin III team preparing for work.*



Figure 1.7. *General views of work at Skorba, 2016, and some of the team: a) the deep trench under excavation; b) the southern trench with the team at work; c) view over the 2016 trench with the enclosed Skorba temple monument beyond and the two early walls visible in the excavation trench.*

sequence calibrated accordingly. A very small trench, outside the fenced and protected World Heritage Site, was identified as the most suitable location to test the many early phases that Trump had identified in his work (1966). This work was permitted as it reopened previously studied areas and was external to the fenced area of the protected site (see Fig. 1.7). The opportunity to test three forms of chronological control were adopted. These were: ceramics from stratified deposits, AMS radiocarbon dates and a geoarchaeological OSL sequence from the same stratigraphy that promised to allow important comparison.

1.6.5. Ġgantija

The area surrounding Ġgantija (Fig. 1.8) had already shown its promise not only during excavations by Evans and Trump, but also during the 1980s surveys of the Cambridge Gozo project, which showed the presence of several ceramic phases. The detection of a faultline, a spring line and intact well-formed soils during the



Figure 1.8. *General views of work at Ġgantija, 2015: a) view of the terrace walls below Ġgantija and the site of the spring (visible at left, below palm trees); b) sondage at south end of the temple facade; c) section exposed beneath former office and WC under recording; d) commencement of excavation in 2015, temple facade in background; e) the trench at the end of investigation.*



Figure 1.9. *a) General view of In-Nuffara, 2015; b) initial exposure and excavation of the silo pits; c) Bronze Age pottery under study from the In-Nuffara silo; d) the excavation team at the completion of work at In-Nuffara; e) pot washing of the Bronze Age pottery.*

FRAGSUS Project added considerable interest to the location. Four areas were targeted for small stratigraphic sondages at the edge of the megalithic terrace-forecourt. One test hole was placed to assess the depth of the twentieth century garden forecourt and terrace of the monument when it was planned to move a decorative palm tree from the monumental garden. A second sondage was placed where intact soils had been detected by augering. The third sondage arose from additional opportunities provided by the removal of the block-built custodian's office and public conveniences, which had both been erected around 1960. This exposed an extent of stratified deposit, over a metre in depth with significant stratified levels extending below modern

material. Additional work included a geo-radar survey of the forecourt and the adjacent olive grove, where the excavation of a fourth small test trench was permitted. The interventions by *FRAGSUS* are extensively reported in Chapter 5, but it is important to note that the exposed deposits presented a serendipitous opportunity to test a number of hypotheses. These hypotheses included the age of Ġgantija, which was always supposed to be one of the 'earliest' temples because of its massive and crude stones and diagnostic pottery; the nature and age of the constructed forecourt; and the lost entrance ramp and megalithic entry to the site from downslope. Additional questions included the nature of the buried deposits, ancient soils and their contents. Permits for excavation were granted since either the trenches were in areas that had already been disturbed or reopened through management interventions, or they were particularly small (i.e. the deep sondage).

1.6.6. In-Nuffara

The selection of In-Nuffara (Fig. 1.9) the Middle Bronze Age fortified plateau site immediately south of Ġgantija, enabled the project to extend the study to the Middle and Later Bronze Age. This location was abandoned agricultural land, which was not difficult to access, provided that the bird hunting and trapping season was avoided. This work enabled assessment of environmental and economic change after the 'Temple Period', and also offered the opportunity to obtain absolute dating samples that would place those changes in a reliable chronology. No radiocarbon dates had ever been obtained for the Borġ in-Nadur phase before. As such, it was unknown when the Tarxien Cemetery phase ended or for how long the Bronze Age persisted in Malta. Such questions are valid, given the quite large number of Bronze Age sites across the islands, some of which have only come to light during the period of the *FRAGSUS Project*, such as the silos on the Citadella of Gozo that were found during conservation works. The permit was given to examine just two visible silos and their immediate surrounding area.

1.7. Additional studies

Maltese prehistory cannot be complete without a thorough and increasingly scientific assessment of its distinctive material culture. Pottery (Fig. 1.10), lithic tools and waste, stone objects such as querns and weights, personal ornaments, worked animal bone and shell occur on most prehistoric sites, and it was the aim of the *FRAGSUS Project* to integrate cultural materials with the contexts from which they came. Not only was there potential to use material culture in interpreting its function, but also of identifying and interpreting chronology, style, external interactions, and possibly notions of value, aesthetic and ritual. Previous studies (e.g. Bonanno 1986a; Grima 2007; Malone 2007, 2008; Malone *et al.* 2009; Vella 2007) have long sought to make sense of the material record of Malta. But unless this material is linked to secure archaeological contexts, such work is inevitably of less value than when the original context is fully understood. It was the aim of *FRAGSUS* to undertake detailed scientific analysis of material culture (technology, style, raw material, connectivity, chronology and function) to explore links between the environment of the sites, time and natural resources. This approach has the potential to advance understanding of how an island culture responded to changes in the wider environment. The study of interaction through sourcing materials can reflect connectivity, which in turn may reflect on a society and its cultural practices and tastes. Such studies could dominate the project, and there is much ongoing potential for far more research in the future. Yet, here material culture is but a small element of the research. Our main focus falls on ceramics and the development of the existing typological scheme and on lithics and their materials. Other artefacts are recorded and reviewed more briefly. The main goal was to improve and advance chronological understanding between absolute dating estimates and material things. Nevertheless, these monograph reports aspire to advance our knowledge, to add to the collected archives of the past, and add a small step on the long route to better understanding of ancient Malta and its changing worlds.

1.8. Environmental and economic archaeology

A principal goal of the project was to extract economic data from the excavated sites. It is almost impossible to locate reliable samples of animal bones or plant remains without breaking the surface of the ground, and thus excavation was targeted towards locations that had potential to yield economic material in stratified ancient rubbish. The ideal location would be a pit full of organic remains that painted the complete picture of Maltese economic life over millennia. Unfortunately, such contexts only occur in the Bronze Age, hence the work at In-Nuffara to extract one such sample. Earlier prehistoric sites are far more challenging, because, although there are remarkable plaster floors and sealed deposits, Temple Period people were too tidy and too clean! They removed their rubbish, swept their floors, and seem to have undertaken their food processing activities mainly off-site, with the result that samples are rarely large or very promising. What remains of carbonized seeds or broken bones tend to be eroded, gnawed, crushed and trampled, suggesting they were













Figure 1.10. *Ceramic processing and finds work: a) Parkinson and Brogan sorting pottery in the courtyard of the Auberge de Provence; b) Coyle McLung recording pottery; c) pottery processing in the Auberge de Provence; d) Bates and Armstrong undertaking flotation in Gozo; e) sieving at Santa Verna; f) Ashley drawing artefacts in the University of Malta.*

Table 1.4. *Summary table of the archaeological discoveries made by* FRAGSUS.

	Context sheets	Site photos	Site drawings	No. bulk Soil samples processed	Volume soil processed (litres)	Micromorphology samples	Special finds	Animal bones identified	Pottery sherds	Pottery weight (kg)	Finds photos	Pottery drawings	Other drawings	Radiocarbon dates
Taċ-Ċawla	306	798	107	122	1255	20	528	1430	50,679	392	2034	293	41	33
Ġgantija	40	119	10	26	292	15	10	82	6466	67	108	126	2	11
Santa Verna	122	905	50	49	863	6	161	547	21,546	185	1046	247	84	23
In-Nuffara	46	213	4	23	763	3	16	321	6000	150	152	26	0	5
Kordin	203	1696	92	124	1226	2	196	193	18,766	115	508	96	64	15
Skorba	30	205	9	27	223	3	6	*c.* 100	5859	53	180	54	13	6
Other sites														95
Totals	747	3936	263	344	4399	46	911	*c.* 2700	*c.* 110,000	962	4028	842	204	188

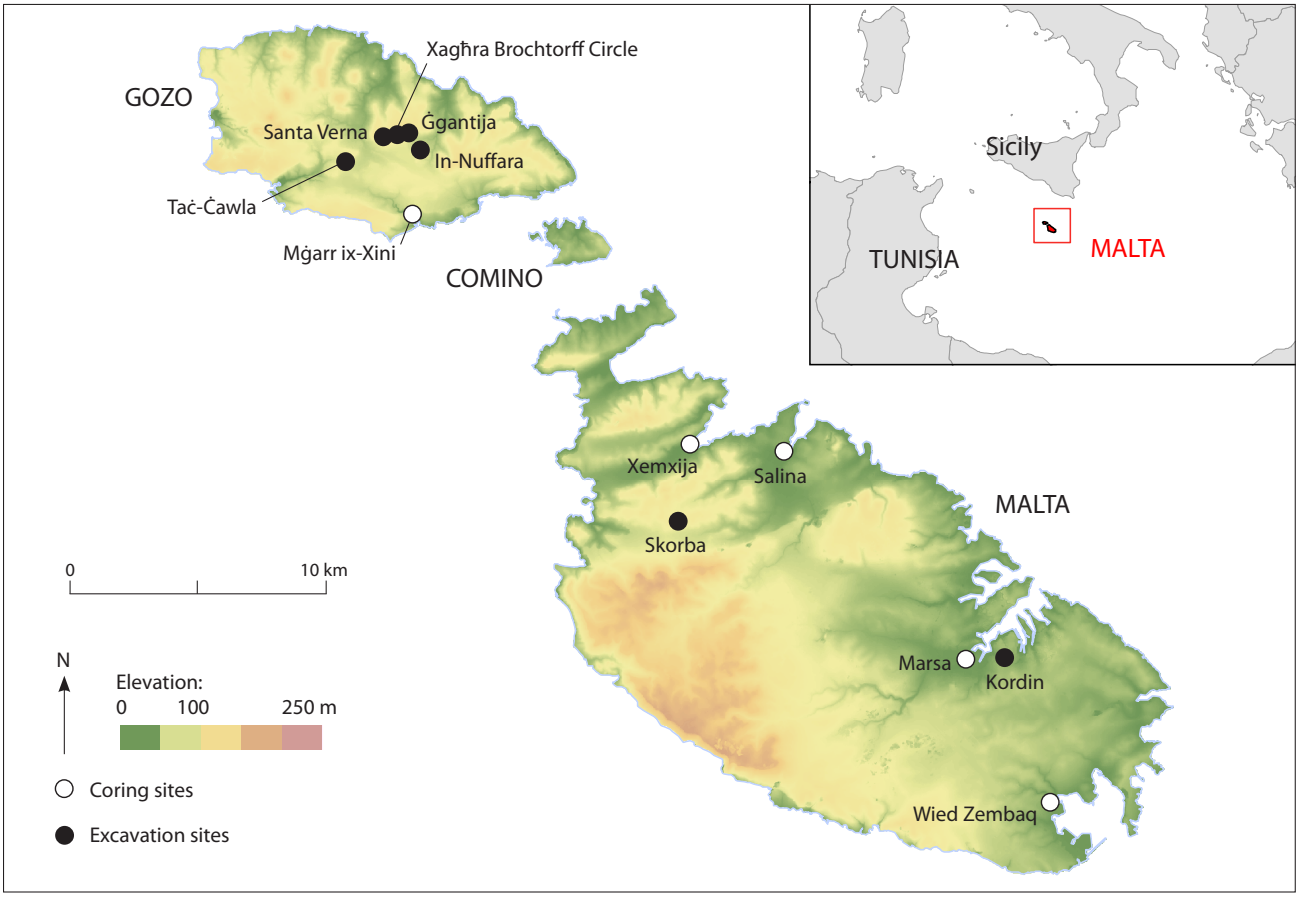


Figure 1.11. *Location map of sites investigated by the* FRAGSUS Project.

Table 1.5. *Chronological range of prehistoric and later sites in the* FRAGSUS *study as revealed by the dating campaign of the project.*

Period	Phase	Start	End
Neolithic	Pre-Skorba	6000 BC	5400 BC
	Early Neolithic	5400 BC	4600 BC
	Fifth millennium hiatus	4600 BC	3800 BC
Temple Period	Żebbuġ	3800 BC	3600 BC
	Mġarr transitionary phase	3600 BC	3400 BC
	Ġgantija	3400 BC	3200 BC
	Saflieni	3200 BC	2850 BC
	Tarxien	2850 BC	2350 BC
	Thermi	2350 BC	2100 BC
Bronze Age	Tarxien Cemetery	2350 BC	1600 BC
	Borġ in-Nadur / Baħrija	1600 BC	750 BC
Historic	Phoenician / Punic	750 BC	250 BC
	Roman / Byzantine	250 BC	AD 870
	Arab / Norman	AD 870	AD 1530
	Knights	AD 1530	AD 1798
	Modern	AD 1798	Present

probably exposed in a dusty domestic yard or rubbish heap before being finally buried in a deposit. The best means to sample such unpromising material is an effective sampling strategy that ensures sufficient diagnostic pieces are collected through a programme of systematic sediment sampling for small items, and, in the case of bone, very careful excavation. The *FRAGSUS Project* invested in such sampling, collecting a total of 4399 litres of soil from secure deposits for flotation, and retained every fragment of recognizable bone during excavation. Below, Table 1.4 records the statistics of activities, samples, photos, sherds and so on that accumulated as samples were processed during the three years of *Project* fieldwork (Fig. 1.10). Such figures are remarkable for the Maltese context, and demonstrate the intensive level of labour and dedication shown by the project participants.

1.9. Conclusions

This volume addresses many of the themes posed by the original research questions by examining each site and its particular period and past history through interdisciplinary approaches. The methodologies applied were relatively well tested, and excavation methods inevitably are standardized and rigorous with little room for much innovation. Some scientific applications and digital scanning approaches were relatively new when the project was conceived in 2012. Now, eight years later, many other opportunities have emerged that, in hindsight, may have presented different ways of analysing and thinking about the discoveries that were made, and indeed, posed different types of research

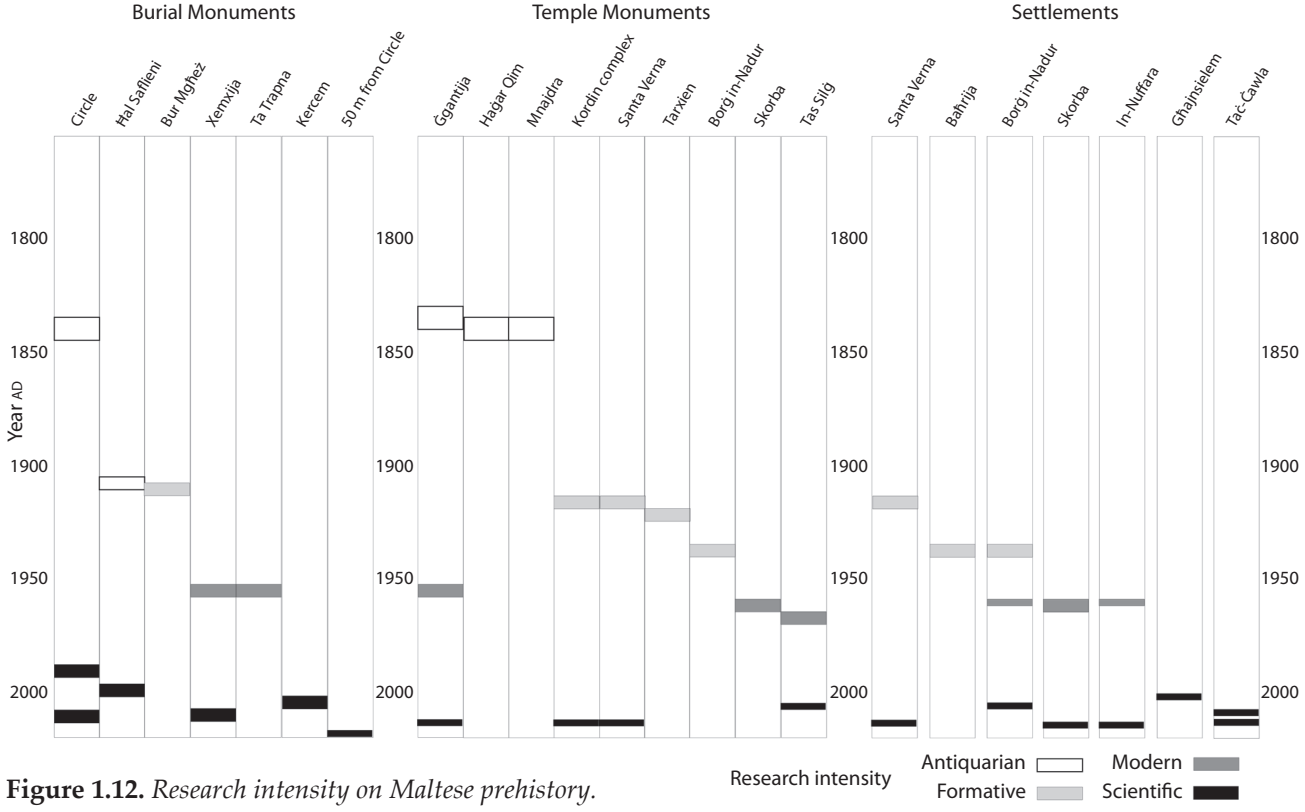


Figure 1.12. *Research intensity on Maltese prehistory.*



Figure 1.13. *Images of scholars and fieldworkers of Maltese prehistory: a) Renfrew and Malone at Ħaġar Qim in front of display, 2018; b) Bonanno and Gouder, 1994; c) visit to Ħaġar Qim, from left to right: Hunt, Keefe, Renfrew, Malone and Stoddart.*



Figure 1.14. *Research pioneers of prehistoric Malta, from top left: A.A. Caruana (University of Malta); N. Tagliaferro; A. Mayr; Father E. Magri (with permission from 'the Jesuit Delegate for Malta, Society of Jesus'; photo Daniel Cilia); T. Zammit (reproduced with permission, National Museum of Archaeology, Malta); T. Ashby (BSR Photographic Archive, BS collection, bs-0143); E.T. Peet (reproduced with permission: Griffith Institute Photograph 101.141; © Griffith Institute, University of Oxford); R.N Bradley; G. Caton-Thompson (photographed by Ramsey & Muspratt, Cambridge, 1938; © courtesy of the RAI); M. Murray (reproduced with permission, NPG London); J.D. Evans (reproduced with thanks to his family); and D.H. Trump (photo Daniel Cilia).*

questions too. Nevertheless, the collected data and wealth of ideas that have resulted from this collaborative and interdisciplinary work provide a point of reference for ongoing and future investigations into the rich prehistory of Malta. The goal – as set out in the many questions listed above – is to interrogate the nature of the world in which the Temple People lived, and the manner by which it emerged, was sustained and changed. The three volumes collectively have achieved an important exercise in cross-disciplinary research to tackle these questions. They also pay homage to the scholars who went before and who developed the understanding of cultural sequence and the many questions that emerge; and we illustrate some of the fieldworkers and scholars who have formed the study and data collection of prehistoric Malta (Figs. 1.13 & 1.14).

Chapter 2

Dating Maltese prehistory

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2.1. Introduction: chronology building in the Maltese islands

Radiocarbon dating and the prehistoric chronology of the Maltese Islands have been pivotal in the history of European prehistoric research. The importance of the islands in the first attempts to chart European prehistory in the early twentieth century has had an enduring impact on their place within modern studies on prehistoric Europe. Even within their regional setting, the well-defined chronological sequence for prehistoric Malta has been an important yardstick for chrono-cultural sequences in neighbouring Sicily and southern Italy, where the application of radiocarbon dating has been limited. Ironically, Malta's own prehistoric sequence was founded on relatively few radiocarbon dates and has received little critical re-evaluation in the five decades since it was established. A central objective of the *FRAGSUS Project* has been to establish a robust multi-proxy chronology that combines environmental landscape dating with archaeological sites and the human, animal and plant remains from those sites. The *Project*'s dating programme achieved a total of 155 new radiocarbon determinations on archaeological deposits for the Maltese Islands. This work has achieved a much more refined chronology and thus enabled a thorough reassessment of Malta's prehistory and its phasing in relation to wider events and changes.

2.1.1. Malta and megalithismus

The Maltese Islands were central to the development of the first systematic attempts to understand Europe's prehistory and chronology. These relied on diffusionist models that envisioned the spread of civilization from east to west. Early in the twentieth century, pioneering archaeologists had begun to acknowledge that the Maltese monuments were prehistoric and dated to the Neolithic (Ashby *et al.* 1913; Mayr 1908; Zammit 1910). These same archaeologists also challenged the chronological position of the diffusionist paradigm of the times and instead sought to explain Malta's individual island culture. Similarly, the chronology of the end of the Temple Period and beginning of the Bronze Age in Malta was present in the mind of Themistocles Zammit during his excavations at Tarxien (Zammit 1930; §2.3.9). As noted above (§1.2, 1.3, 2.1.2), the retrieval of dateable materials from David Trump's 1960s excavation of Skorba coincided with a moment of reflection and vigorous debate within archaeology. At the heart of this debate was the questioning of culture-historical models that had dominated the discipline since the nineteenth century (Elliot Smith 1915; Fergusson 1872; Perry 1923).

The subsequent work of Colin Renfrew (1973) challenged these traditional interpretations of European prehistory, specifically those of the origin and diffusion of megalithic monuments. Gordon Childe (1925, 1930) had employed the general notion of civilization spreading westwards and northwards. Although he included the recent Maltese discoveries in his wide scope, he was still inclined to argue for a Mycenaean origin for Europe's megalithic monuments. Renfrew, fresh from research in the early Aegean area (Renfrew 1972) and armed with scientific understanding of the relatively novel approach of radiocarbon dating, immediately identified the power and potential of the early dates emerging from Neolithic Malta. Renfrew's (1973) calibrated radiocarbon dates became a lynch pin to his argument against diffusion. Instead, the chronology supported his argument for independent innovations across the Mediterranean and west European region. The emerging absolute dates for both the Maltese Temple Culture and megaliths firmly showed them to be almost two millennia earlier than the megaliths at Mycenae. This excluded any possibility that Mycenae could have influenced the building of megaliths on Malta or, indeed, elsewhere in western Europe.

2.1.2. Malta and the Mediterranean: the development of absolute chronologies

Trump's (1966) excavations at Skorba and his application of radiocarbon dating were a watershed moment that helped refine the Maltese prehistoric sequence. The chrono-cultural sequence developed by Evans (1953, 1959) remained tied to the culture-historical model and placed emphasis on influences from the eastern Mediterranean and Aegean. A lively debate on Malta's cultural sequence ensued between Bernabò Brea (1960) and Evans (1960). This debate centred on the end of the Temple Period and whether Malta had a Neolithic culture parallel to the Sicilian Diana-Bellavista culture. These issues are still as relevant today as they were 60 years ago. The first field seasons at Skorba supported Bernabò Brea's (1960) position on the latter point, with Trump (1961) announcing the discovery of a parallel Diana ware and thus tying the Maltese Islands into a regional chronological framework. As such, one of the most important questions for the Maltese prehistoric chrono-cultural sequence is establishing the absolute dating of the Għar Dalam and Skorba phases of the pre-Temple Period early Neolithic, and their relationship to parallel traditions in Sicily and southern Italy (Chapter 10, §10.3.1, §10.4.1). Initially, Trump (1966) achieved eight conventional radiocarbon dates for Skorba, Mġarr and Tarxien phases in the first programme of dating. Later, two dates were added for the Għar Dalam layers from Skorba (Evans 1971) and a further three by Renfrew (1972) for the early Bronze Age Tarxien Cemetery phase at Tarxien. The result was a chronological framework that has remained largely intact ever since (see Malone *et al.* 2009, 1; Trump 2002). This work was fundamental in reorganizing Evans' (1959) sequence. It added new terminologies for the individual phases based on type-sites, two new phases represented by 'Grey Skorba' and 'Red Skorba' ceramics, and established the priority of the Żebbuġ phase over the Mġarr phase (see Chapter 10). Perhaps the greatest outcome of Trump's work was his identification of a break in the sequence between the Temple Period and succeeding Bronze Age between 2500–2000 BC (Trump 2002). This built on Zammit's discovery of a sterile layer between the late Neolithic Temple and Bronze Age cemetery layers at Tarxien, which had originally been interpreted by him as representing an abandonment phase (Zammit 1930; §2.3.9).

No new radiocarbon dates were added to the original suite until the Cambridge Gozo Project commenced in 1987 (§1.3; Volume 3, Chapters 1 & 3). That project focused on the dating of episodes of the emerging Temple Culture as represented in the burial site of the Xagħra Brochtorff Circle. It also added nineteen AMS radiocarbon dates (one of which was intrusive Byzantine material redistributed from the upper Northern part of the site) derived from human and animal bone to the chronological database (Malone *et al.* 2009). This initiative also produced viable determinations of stable carbon and nitrogen isotopes, adding the potential to examine diet and environment (Stoddart *et al.* 2009a). Two AMS radiocarbon dates from human bones were also acquired for the Bur Mgħeż and Ħal Saflieni Temple Period burial sites (Mifsud 1999). The publication of the Xagħra Brochtorff Circle (Malone *et al.* 2009) was significant in adding greater resolution to the Temple Period, specifically closing the gap between the end of the Temple Period and Bronze Age to approximately 2400–2000 BC (Malone *et al.* 2009). Key questions, however, still remained, namely the dating of the elusive Mġarr and Saflieni phases of the fourth millennium BC, and the resolution of Malta's pre-Temple Period early Neolithic and its initial occupation.

Since the work at Xagħra took place, an important development for the chronology of later prehistoric Malta has been the increasing identification of Thermi ware. This is a new ceramic style and associated phase positioned between the Tarxien and Tarxien Cemetery phases that holds stylistic similarities with third millennium BC Aegean wares (Lamb 1936). The presence of Thermi ware on the Maltese Islands was acknowledged throughout much of the later twentieth century (Evans 1953, 68; Malone *et al.* 2009, 238–9; Trump 1966, 46). Yet, discussions about this ceramic style have gained considerable momentum in the last decade following the analyses of the excavated materials from Tas-Silġ. These analyses have identified the occurrence of Thermi-style wares in association with Tarxien phase ceramics (Cazzella & Recchia 2012; Copat *et al.* 2012; Recchia & Cazzella 2011). The recent work at Tas-Silġ, whilst not yet accompanied by published absolute dates, has the potential to add much nuance to our understanding of the end of the Temple Period and to tackle the issue of contemporaneity or distinct phasing.

In the years since the publication of the Cambridge Gozo Project (Malone *et al.* 2009), the need for greater clarity of the phases on either side of the Temple Period has become more pressing. Equally as pressing has been a growing awareness of the need to interrogate an understanding of human time with the tempo of the changing environment. A potential linkage between the two was demonstrated through the increasing use of pollen studies and other palaeoecological approaches that highlighted phases of significant change within the prehistoric timescale (see Volume 1). With these opportunities emerging, coupled with the questions posed by *FRAGSUS*, the current programme of research focused on: establishing the early occupation of Malta; improving the dating of the succession of cultural evolution and eventual decline of the megalithic Temple Culture; and

understanding the relationship between that decline and the succeeding early Bronze Age.

2.2. Methodology

2.2.1. Sources of data

Chronology building begins at the trowel's edge. The *FRAGSUS Project* excavations were performed with the express aim of refining the cultural sequence of the Maltese islands. So, at each site, the excavation and sampling strategies that we adopted were influenced by the need to obtain good samples for radiocarbon dating and the meaningful Bayesian analysis of their results. Indeed, an entire excavation season (Chapter 7) was devoted to testing the hypothesis that the chronology uncovered at Santa Verna (Chapter 4) could be verified at another site. In Bayesian analysis of radiocarbon data, as in any form of archaeological analysis, we are constrained by what survives and the field sampling strategy that is used. Despite best efforts, this is often a matter of luck. Samples from each archaeological layer, ranging in volume from 1 to 60 litres, were subjected to flotation and wet-sieved. The resulting flots were then sorted for plant remains, charcoal and other dateable items. Although the organic content of many samples was relatively low, suitable material for AMS dating was present in virtually every soil sample. Here, we benefited from the fact that AMS dates can be obtained from very small objects such as individual cereal grains. Once identified by a specialist, charred seeds were the first preference for AMS dating, followed by small fragments of charcoal. Charcoal, although susceptible to an 'old wood effect', is a very reliable material. Animal bones, once identified as a certain species, were also used to obtain radiocarbon dates. It should be noted, however, that the failure rate of these samples was very high due to taphonomic processes and, perhaps, the nature of ancient Maltese butchery and cuisine (see Chapter 9).

In addition to dating material from sites that were excavated by the *FRAGSUS Project*, we attempted 88 new AMS radiocarbon dates from the Xagħra Brochtorff Circle, and collaborated with colleagues on the ERC-funded *Time of Their Lives* (ToTL) project to include the results of 29 successfully dated samples from ToTL in our models (Malone *et al.* 2019; Volume 3, Chapter 3). We also obtained two new AMS radiocarbon dates from seeds held in the National Museum of Archaeology from Zammit's Tarxien Cemetery deposits, and five from human tooth samples from the Xemxija tombs. In the case of Xemxija, the bones had become divorced from their original stratigraphic context. As such, the dates, although valuable in themselves (see Chapter 12, Volume 3), were not useful in refining the cultural sequence at that site.

Legacy radiocarbon data for Malta were obtained from Malone *et al.* (2009b), Malone *et al.* (2019) and Tycot (2020), and were recorded in a database. Comparative data from elsewhere in the central Mediterranean were sourced from a paper by Parkinson *et al.* (under review).

2.2.2. AMS radiocarbon dating

All radiocarbon dating work (excepting paired bone samples in the ToTL project, which was undertaken at Oxford, see above) was performed using AMS in the ^{14}Chrono Centre, Queen's University Belfast. The samples that comprised charcoal, charred seeds and human or animal bone were all from terrestrial sources and from species with a known carbon ecology. The samples were prepared as described by Reimer *et al.* (2015). No input from marine carbon sources was detected in any of the samples, so the radiocarbon ages were calibrated using the terrestrial northern hemisphere IntCal20 database (Reimer *et al.* 2020). A total of 193 samples from archaeological contexts were submitted. Of these, 36 were bone samples that failed to produce enough collagen for a reliable date, and two were modern cases of charred seeds that had intruded into prehistoric layers. Thus, the number of 'useful' archaeological dates was 155 (Table 2.1). As discussed below and in the chapters that follow, many of these were from 'residual' material that had become reworked though the stratigraphy by taphonomic processes. Nevertheless, all carry useful information about Malta's past.

Also completed as part of the *FRAGSUS Project*, but not reported here, is a sequence of 21 radiocarbon measurements taken from modern and Roman period land snail shells (Hill *et al.* forthcoming) and 121 dates from sediment cores (see McLaughlin *et al.*, Volume 1, Chapter 2).

2.2.3. Bayesian phase modelling

Bayesian analysis combines data and 'prior' hypotheses, calculating 'posterior' beliefs that are informed by both. In the context of radiocarbon dating, the data consist of the calibrated radiocarbon dates, or rather their probability distribution functions; and the 'priors' are information about their relative chronological order (identified though analyses of stratigraphy in the field) or the cultural phase they are associated with (gleaned though analysis of associated material culture). The advantages of the Bayesian approach to archaeological chronology are manifold. Of particular relevance here is that 'empty' phases, whose existence might be inferred archaeologically, but not directly associated with any dates, can be modelled and their start and end points guessed through the analysis of the patterning of data from preceding and succeeding phases.

Table 2.1. *Number of archaeological radiocarbon dates from various contexts and materials obtained by the* FRAGSUS Project.

Site	Charred seeds	Charcoal	Animal bone	Human bone	Total useful dates
Taċ-Ċawla	19	1	9 (+7 failed)		29
Santa Verna	18 (+1 modern)	2	1 (+2 failed)	1	22
Ġgantija	1	1	0 (+9 failed)		2
Xagħra Brochtorff Circle				74 (+ 14 failed)	74
In-Nuffara	4	1			5
Xemxija				5	5
Skorba	4	1	0 (+1 failed)		5
Kordin III	5 (+1 modern)	4	2 (+3 failed)		11
Tarxien	2				2
Total useful	53	10	12	80	155

For the *FRAGSUS Project*, the prior information was formally defined using OxCal 4.3 (Bronk Ramsey 2009) and used in a number of Bayesian chronological models, each of which made different assumptions about what the archaeological data *actually* mean. These models did not differ significantly when data or underlying assumptions were changed slightly, indicating that they are reasonably robust. The 'preferred model', elaborated upon below, is our best-guess at how the data can be most meaningfully represented. The chronology of each excavation site is also discussed separately in Chapters 3–8. Dates derived from Bayesian phase models are quoted here in italics at 95% probability. Further Bayesian modelling and analysis of these dates was done on a context-by-context basis where relevant, to answer specific questions about each site (see Chapters 3–8).

2.2.4. Density modelling

Much archaeological research involves counting things – animal bones, pot sherds, cereal grains and so on. Often, these counts are developed diachronically or in a time series, and are interpreted as proxies of economy or settlement intensity. The same can be done with radiocarbon dates, although this is only successful with two important provisos. First, because of their expense and norms of archaeological practice, radiocarbon samples tend to be much fewer in number than other types of find, and are not necessarily gathered without bias towards certain types of context. Therefore, any statistical approach to their distribution in time must account for this, or at least not over-interpret the results. Second, the posterior probabilities of radiocarbon ages have rather complex mathematical properties and cannot, for example, be assigned to a certain century using a point estimate (such as the weighted mean or mode, see Telford *et al.* 2004) without committing an unacceptable number of mistakes. Despite these issues, the modelling of radiocarbon data as a time series can reveal valid trends in settlement or population intensity in a defined research area. This is because the models are derived ultimately from objective scientific measurements, rather than from subjective assessment and expert interpretation, as is the case for traditional forms of archaeological typochronology. Density models, whether or not they are interpreted as population proxies, are also very useful in comparing datasets between different regions. This is because hundreds or thousands of separate radiocarbon measurements can be combined into models that allow for the identification of relative change in archaeological activity that are averaged over the myriad methodological and taphonomic constraints of individual sites, landscapes and archaeological excavations.

For this study, we used custom radiocarbon calibration and Monte Carlo simulation (*rowcal,* McLaughlin 2019) to develop radiocarbon measurements into a time series using Kernel Density Estimation (KDE). A KDE is similar to the more familiar summed probability distribution (SPD) of radiocarbon dates. Yet, rather than summing each calibrated age probability, the KDE method sums a set of Gaussian 'kernels' whose means are points in time randomly drawn from the calibrated age probabilities. In doing so, we follow the prior belief that human activity identified at one point in time is also indicative of a degree of activity before and after the thing that was dated, since all things are part of a continuum of cause and consequence. The strength of this belief is expressed by the standard deviation of the kernel, also known as the 'bandwidth' of the KDE. This can be set at a defined value (for example, 30 years, to model inter-generational change), calculated using heuristics, or optimized using a search algorithm. The uncertainty in radiocarbon determinations caused by laboratory errors and the calibration process is expressed in the KDE by 'bootstrapping' a confidence interval for the KDE. This averages thousands of individual runs of the Monte Carlo process until a stable pattern emerges that conveys the maximum amount of information.

To ensure that well-sampled sites such as the Xagħra Brochtorff Circle did not cause errant artefacts in the KDE, we used hierarchical cluster analysis to identify unique site phases, and selected only one date per phase using the algorithm provided by McLaughlin *et al.* (in press). Computer scripts for replicating the analyses presented in this chapter are available upon request.

2.3. Results[1]

2.3.1. Early Neolithic Għar Dalam and Skorba phases

The earliest identified form of material culture found on the Maltese Islands is Għar Dalam pottery. This is named after a cave in southern Malta that contained a richness of this impressed pottery type, and was identified as representative of the earliest Neolithic phase in Malta by Trump during his excavations at Skorba (Trump 1966). Unlike Trump, however, we did not encounter any strata containing only this ceramic type unmixed with later types at our own excavations at Skorba, Santa Verna (which also had a substantial early Neolithic settlement), or Taċ-Ċawla (where deposits were too mixed). Our preferred Bayesian model of the cultural sequence therefore begins at the so-called 'Skorba' phase, which we have determined began at some point between 5510 and 5240 cal. BC. For the preceding Għar Dalam phase in the late sixth millennium BC, we can turn to other lines of evidence, namely: comparison with adjacent regions in the central Mediterranean; and palaeoecological signals of agricultural disturbance that pre-date the earliest strata uncovered during our archaeological excavations (Volume 1).

The Għar Dalam pottery style (and presumably also the people who first brought it to the Maltese Islands), can be related broadly to the Stentinello wares of Sicily and Calabria, which are considered as a developed form of other early Neolithic impressed wares or 'Cardial' cultures. This cultural grouping was associated with the rapid western expansion of Neolithic agriculture from the Balkan peninsula, which, as discussed below (§2.3.13), reached Southern Italy, Sicily and Sardinia at around or slightly before 6000 BC (Natali & Forgia 2018; Volume 1, Chapter 6). By 5500 BC, the culture had reached the shores of Iberia, indicating that its spread was rapid. Indeed, it appears to have spread more rapidly than the contemporary northern expansions of the Linear Pottery culture (LBK) and related cultural groups that were also occurring over the course of the sixth millennium BC (see Bocquet-Appel *et al.* 2012). It is likely that this was because of the Mediterranean Sea itself, which enabled sea-faring agriculturists to open up new horizons for colonization and settlement more quickly than their contemporaries in continental terrestrial contexts. Given this situation, we should expect to find the earliest indicators of Neolithic settlement in Malta within a century or so of the Neolithic settlement of Southern Italy and Sicily. Our radiocarbon data from archaeological contexts in Malta are, unfortunately, not related to this phase. Interesting dates, however, are provided by palaeoenvironmental evidence gathered by our project and discussed at length by Hunt and Farrell (e.g. Volume 1, Chapter 11). Fungal spores, indicating livestock dung, and cereal pollen indicating the cultivation of wheat and barley, both occurred at around 6000 cal. BC. This date has been estimated robustly through Bayesian modelling of the accumulation rates of deposits found in sediment cores, and is consistent with the expansion of Neolithic settlement elsewhere in the central Mediterranean, as discussed below (§2.3.13; Volume 1, Chapter 6)

As for the Skorba phase, which is defined by the occurrence of monochrome pottery with a distinctive speckled fabric (§10.4), there is copious archaeological and palaeoenvironmental evidence for a significant amount of settlement, farming, land clearance, soil erosion and fire episodes occurring all over the landscape (Volume 1, Chapter 3; Marriner *et al.* 2019). Twelve dates from *FRAGSUS Project* excavations at Santa Verna and Skorba, incorporated in a Bayesian phase model, estimate the start of this phase at 5510–5240 cal. BC and its end at 4980–4690 cal. BC. We found a mixture of both Red and Grey Skorba wares in our excavations, and so we have not attempted to separate Skorba into two distinct phases.

Unrelatable to any archaeological deposit, but indicative of the overall scale of activity during this phase, is a charred cereal grain dating to 5020–4845 cal. BC (UBA-37861, 6041±34 BP) that was retrieved from the Salina Deep Core.

2.3.2. Fifth millennium hiatus

What came next is something of a mystery. At the time of writing, there are no well-dated archaeological finds from the islands between the Skorba and Żebbuġ phases, i.e. until around 3800 BC. The only radiocarbon date from our excavations that can tentatively be assigned to this phase is a piece of unidentified charcoal from Skorba, found in a later context, that dated to 4700–4500 cal. BC (UBA-35590, 5756±35 BP). The palaeoenvironmental record indicates patchy cereal cultivation and a continuation of grazing throughout the period (Volume 1, Chapter 3). As such, it is possible that rather than abandonment, the human population was reduced to small numbers; or, as some of our colleagues argue (see Volume 1), the landscape was completely reorganized. The long-term settlements of Skorba, Taċ-Ċawla and Santa Verna, however, were abandoned and not occupied again until the Żebbuġ phase. Radiocarbon

evidence from before and after this hiatus can be used to estimate its duration. An 'empty' phase is defined in our Bayesian model as one that forms part of a sequence but is not associated with any radiocarbon dates. In our preferred model this 'empty' phase begins between 4980–4690 cal. BC and ends between 4150–3640 cal. BC.

2.3.3. Żebbuġ phase

The Żebbuġ phase is very well represented in the pottery from across the islands. Yet, strata containing this material in its primary depositional contexts are few and far between. In our model, the Żebbuġ phase is dated by three radiocarbon determinations from Santa Verna, and constrained by the timing of the subsequent Mġarr phase. The earliest date, UBA-33706 (4945±87 BP) was from a charred cereal in a pit under the temple floor and likely to be from a pre-monument settlement (see Chapter 4); the modelled date for this sample is 3910–3640 cal. BC. Overlying this, a charred cereal from the foundation of the earliest Temple floor, a layer associated with Żebbuġ pottery exclusively, was dated to 3730–3640 cal. BC (UBA-31041, 4908±37 BP). This sequence, and one other determination from elsewhere on the Santa Verna site, constituted the Żebbuġ phase. In our preferred model, the phase begins at 4060–3640 cal. BC and ends at 3695–3540 cal. BC.

Several dates from *Project* excavations at Taċ-Ċawla fall within with this range, but came from contexts that also contained significant quantities of later pottery styles (see Chapter 3) and so were not included in the model of this phase. Also excluded were the dates of human bone samples from the rock-cut tomb (previously interpreted as a 'Żebbuġ' tomb) at the Xagħra Brochtorff Circle complex. These fall too late in time to be associated with the Żebbuġ cultural phase (see Chapter 3, Volume 3). All of these determinations, however, were used in the radiocarbon density model discussed below.

2.3.4. Mġarr / transitional Ġgantija phase

From the perspective of material culture, following the Żebbuġ phase, there was a degree of variation in the pottery types used at the 'temple' sites excavated by the *FRAGSUS Project*. On Gozo, layers yielding Ġgantija phase pottery (see Chapter 10) occur immediately above Żebbuġ layers. At Kordin III however there were several contexts that contained a relative wealth of the distinctive Mġarr style sherds. Three dates from the site were used in our Bayesian model of the cultural sequence. One of these dates was not associated directly with Mġarr pottery, but was sealed beneath a Ġgantija-phase floor and was broadly contemporary with the other two. The model suggests that the phase began at 3695–3540 cal. BC and ended at 3600–3200 cal. BC. Alternative models can constrain this phase better, but these rely on early Ġgantija phase material from Santa Verna. This clearly overlaps with the transitional Mġarr phase and may represent an early development of this pottery form on Gozo, which later became more widely adopted throughout the Maltese Islands.

2.3.5. Ġgantija phase

Our excavations at the megalithic complex at Kordin III (Chapter 6), where surviving extant structures date to the Ġgantija phase, and at Santa Verna (Chapter 4) where several successive Ġgantija-phase structures were examined, unearthed a wealth of Ġgantija pottery. Our excavations at the eponymous site of Ġgantija (Chapter 5) also produced significant amounts of this pottery, although none in direct association with material that could be radiocarbon dated. Therefore, seven dates from layers containing material directly associated with a fully developed Ġgantija material culture at Kordin III and Santa Verna were used to model the date of this cultural phase. The results suggest that the Ġgantija phase began at 3600–3200 cal. BC, and ended at 3080–2760 cal. BC. The relatively imprecise dating of these phase boundaries is due to the lower visibility of Mġarr and Safileni phases in our excavations. Though here we note that some individual contexts and structures at Kordin III, Santa Verna and Taċ-Ċawla are very precisely dated (Chapters 3, 4 and 6), as are the burials of this phase at the Xagħra Brochtorff Circle rock-cut tomb.

2.3.6. Saflieni phase

Much like the earlier Mġarr phase, strata definitively belonging to the Saflieni phase eluded us during fieldwork. As such, there are no radiocarbon dates associated unequivocally with this phase. The chronology of the Saflieni phase was thus estimated in the Bayesian model by defining an empty phase between Ġgantija and Tarxien. The results indicate a chronology that starts at 3080–2760 cal. BC and ends at 2850–2660 cal. BC. Early Tarxien dates from the Xagħra Brochtorff Circle are identifiable as outliers on the basis of their agreement score in the preferred Bayesian model, and can be considered part of this cultural phase, as could the dated burial from Ħal Saflieni Temple itself (Mifsud 1999). Either way, the cultural and chronological boundary between the Saflieni and Tarxien phases is not particularly distinct, as previously noted (Malone *et al.* 2009; Chapter 11).

2.3.7. Tarxien phase

The Tarxien phase is well represented in data from both the Xagħra Brochtorff Circle and *FRAGSUS Project* excavations at the site of Ġgantija. Two dates from Ġgantija, five from Taċ-Ċawla, and a random selection of 24 dates (selected for computational expedience) from the Xagħra

Brochtorff Circle were used to model the timing and duration of this phase. The results indicate the phase began at 2850–2660 cal. BC and ended at 2445–2340 cal. BC. The start of this phase is somewhat later than has been suggested previously, and in this model the phase is not of a particularly long duration. Although here, and as we note above, the origins of this phase may have been indistinct from what came previously.

2.3.8. Thermi phase

As discussed by Malone *et al.* in this volume (Chapter 10), an assemblage of early Bronze Age pottery from Taċ-Ċawla represents an intermediate phase between the Temple Period and the Bronze Age. Four radiocarbon dates from contexts (163) and (241) at Taċ-Ċawla can be associated with this cultural phase (with the caveat that none of the material from that site was particularly stratigraphically secure) and be defined as indicative of a separate phase in our Bayesian model. On the basis of their work at Tas-Silġ, Cazzella & Recchia (2012, 2015) argue persuasively that the Thermi phase occurs in the final Temple Culture levels of the Neolithic temple on the site. The dates cited appear to align closely with the AMS chronology achieved on Gozo at both the Xagħra Brochtorff Circle and at Taċ-Ċawla. The phase is represented by distinctive geometrically decorated grey-black pottery (Chapter 10; Figs. 3.33 & 3.34), not by the equally distinctive Tarxien Cemetery style of pottery that seems to occur some centuries later. In our model, the date range of this phase is from 2445–2340 cal. BC to 2475–1980 cal. BC. Significantly, this overlaps with the latest human burials that occurred at Xagħra Brochtorff Circle (Volume 3, Chapter 3), which were associated with a scatter of Thermi style pottery sherds (Trump *et al.* 2009, 239).

There is an apparent hiatus before the Tarxien Cemetery phase gets underway. Similar signals of archaeological discontinuity have emerged from several dated prehistoric sites in Malta. For instance, Taċ-Ċawla was abandoned at this time; burial at the Xagħra Brochtorff Circle complex ended (although the site was reoccupied after 1800 BC); and Tas-Silġ may have a discontinuous occupation (Cazzella & Recchia 2012, 2015).

We have, therefore, included another empty phase in our model, which we have estimated to have begun at some point between 2475 and 1980 cal. BC. This spans the well-known climate anomaly that occurred at around 2200 BC, although it is still unclear how the central Mediterranean was affected by this global event (Bini *et al.* 2019). This model re-opens the case for a phase of abandonment in Malta in the late third millennium, but not one that occurred at exactly the same time as the transition to the Bronze Age.

2.3.9. Tarxien Cemetery phase

Better dating of the Tarxien Cemetery phase has long been a priority for archaeological research in Malta, but the requisite samples are few and far between. Our project was fortunate to obtain permission to date two charred faba beans from Zammit's original excavations at Tarxien. These results have been incorporated into a phase model also including a date for the Tarxien Cemetery deposits at Xagħra Brochtorff Circle, which were obtained during earlier work (Malone *et al.* 2009).

The archaeological context of the Tarxien seeds is fascinating. These were from an irregular layer of dark, ashy soil found by Zammit in the south temple at Tarxien. The layer was approximately 30 cm thick and buried 1.2 m below the pre-excavation ground level. Aside from the seeds and other charred plant remains, the deposit contained human bones with varying degrees of cremation, axes, daggers and awls of copper, beads and other small items of jewellery, figurine fragments, smashed pottery and charred textiles (Evans 1971, 149–66). It is possible that the deposit was formed of material derived from a pyre, when human bodies were cremated together with their grave goods, although it is debatable whether the burning occurred *in situ* or not. Zammit (1930) noted traces of burning on adjacent megaliths, but this did not seem to be from fires of the intensity expected for cremation. In any case, this context has been central to many debates in Maltese archaeology ever since its discovery. Sandwiched between the cremation deposit and the floor of the temple lay a relatively sterile layer of soil. Zammit (1930) was of the impression that this layer had formed naturally, with the soil having been washed in by wind and rain, thus being indicative of a period of abandonment. Evans, however, pointed out that this layer was not present elsewhere on the site and could equally have been a floor or surface of sorts, deposited deliberately in advance of the funerary activates and covering the uneven ruins of the temple.

Two dates from these beans, one from previous work at the Xagħra Brochtorff Circle complex, and one from a cattle bone associated with Tarxien Cemetery pottery at Borġ in-Nadur (Tanasi & Tykot 2020), enable us to estimate that this phase began at 2170–1830 cal. BC and ended at 1920–1670 cal. BC.

2.3.10. Borġ in-Nadur phase

FRAGSUS Project excavations at In-Nuffara (Chapter 8) resulted in five radiocarbon dates from the basal fills of a large rock-cut pit, or 'silo'. To our knowledge, these are the first radiocarbon dates to be obtained from the classic stage of this cultural phase, which place it, as expected, around 1100–900 cal. BC. As the data for the Bronze Age are sparse, this part of our

model is poorly constrained, with large amounts of time remaining open to accommodate this phase. It is possible that the Tarxien Cemetery phase lasted until as late as 1375 cal. BC, or that it finished as early as 1920 cal. BC and another hiatus ensued. The latter scenario is the approach we have taken with our preferred model, which estimates the Borġ in-Nadur phase to have begun at some point between 1880 and 1375 cal. BC and ended at 1090–720 cal. BC. This time frame is consistent with the traditional eighth-century date for the arrival of Phoenician colonists. Two radiocarbon dates from the final Borġ in-Nadur / early Baħrija contexts at Qlejgħa tal-Baħrija and Borġ in-Nadur itself have recently been published by Tanasi & Tykot (2020). These been incorporated into our model of this phase but are equally consistent with Baħrija-like pottery representing a slightly later style than the material we found at our excavations at In-Nuffara.

2.3.11. Preferred model summary (95% confidence limits)

The overall indices of agreement of our model were A_{model}=88.3 and $A_{overall}$=85.5.

The CQL2 model specification used by OxCal is provided in Appendix A2.2. The 95% confidence intervals of the cultural phases are provided in Table 2.2 and visualized in Figure 2.1.

2.3.12. Kernel density model

Using KDE, a model of overall data density and dynamic growth is produced (Fig. 2.2). Rather than dividing prehistory into defined phases, this analysis treats the whole interval as a continuum; which, of course, is how each generation of people originally experienced it. The KDE evinces a similar 'boom-bust' dynamic of the early Neolithic, similar to what is known from elsewhere in Europe (Shennan *et al.* 2013). This analysis reveals statistically significant

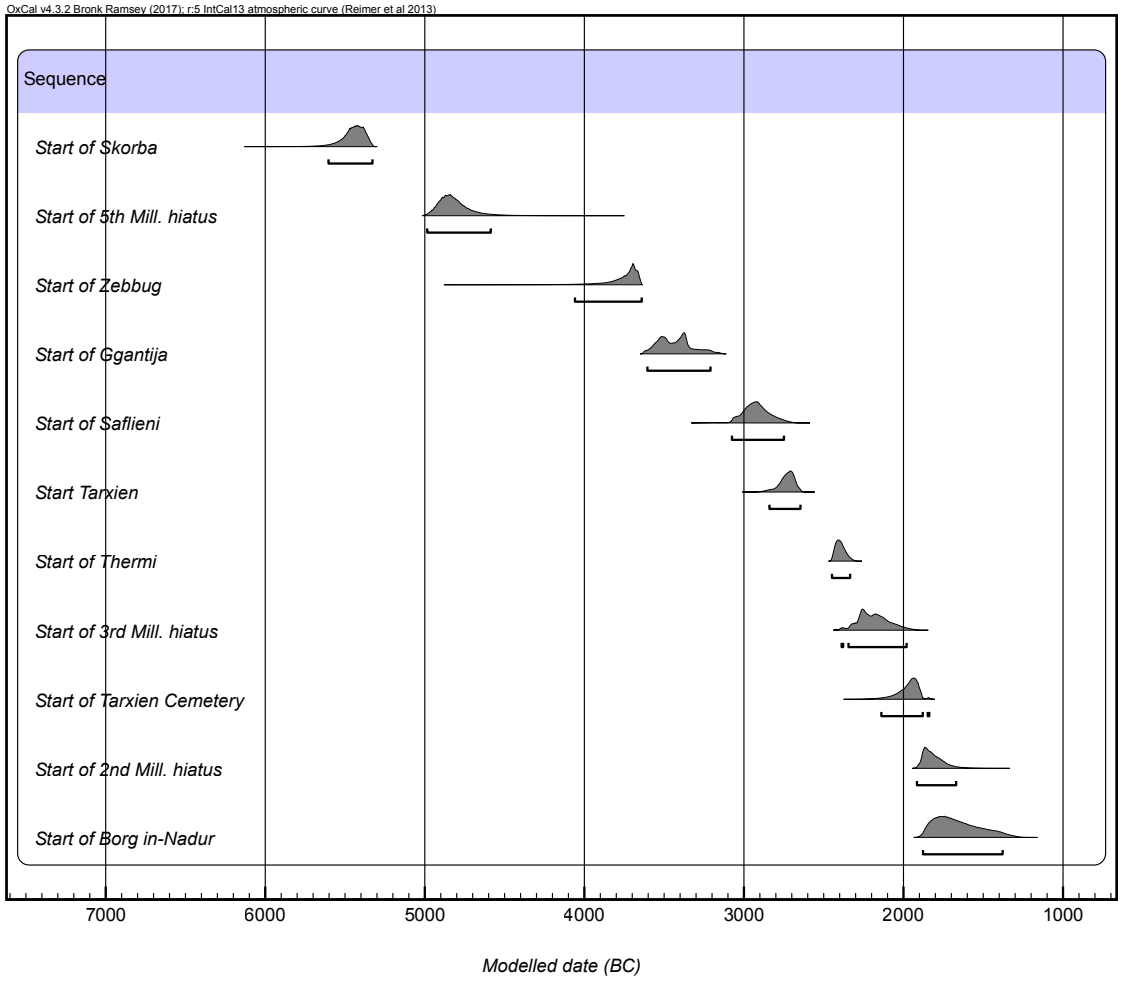


Figure 2.1. *OxCal plot of the posterior probability distribution of the boundaries between the various phases of Maltese prehistory.*

annual growth of 0.8±0.3% in the Skorba phase, and 0.6±0.2% in the Żebbuġ phase. The rate of decline at the end of the Skorba phase was −0.4±0.2% and a rather drastic −0.7±0.1% at the end of the Tarxien phase. Overall activity levels fluctuated between the Żebbuġ and Tarxien phases, with a slight downturn between 3500 and 3000 cal. BC, although this observation is not statistically significant according to the algorithm described by McLaughlin *et al.* (2021).

Another relevant use of the KDE is to compare the density of dated archaeological phases and the frequency of charcoal in sediment cores. The latter are not necessarily anthropogenic, but charcoal in sediment cores does indicate both burning and a degree of instability in the landscape (see Volume 1, Chapter 2). The comparison (Fig. 2.3) reveals two peaks in sediment charcoal, the first coinciding with the flurry

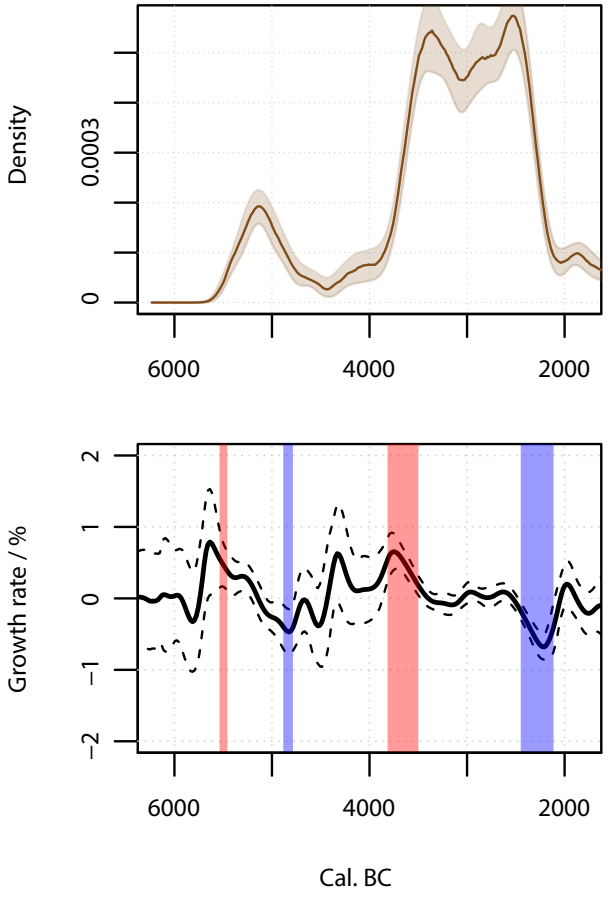


Figure 2.2. *Kernel density estimates (100-year bandwidth) for radiocarbon-dated phases of Maltese prehistoric sites. The top panel is the total density, the bottom panel is its derivative annualized growth rate, with statistically significant (at 95% confidence) phases of growth and decline highlighted.*

Table 2.2. *95% confidence intervals for the modelled dates of phase boundaries.*

	Start (cal. BC)		Duration (years)	
	Lower	Upper	Lower	Upper
Early Neolithic	5570	5340	405	853
Fifth millennium hiatus	4975	4645	712	1294
Żebbuġ	4060	3640	0	472
Mġarr	3695	3540	0	432
Ġgantija	3600	3200	0	756
Saflieni	3080	2760	0	355
Tarxien	2850	2660	240	470
Thermi	2445	2340	0	394
Third millennium hiatus	2390	1990	0	419
Tarxien Cemetery	2170	1830	0	384
Second millennium hiatus	1920	1670	0	418
Borġ in-Nadur	1675	1225	199	844
End of Borġ in-Nadur	900	660		

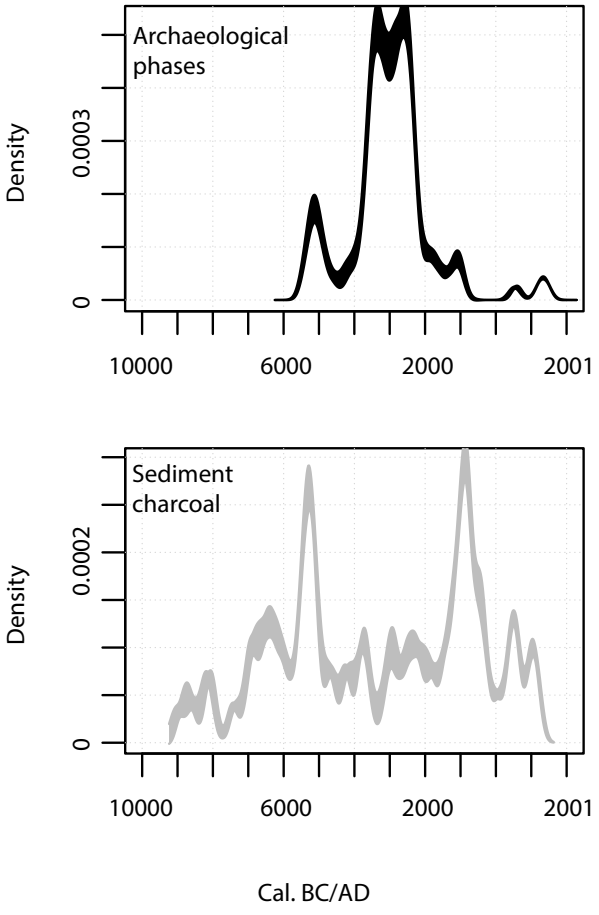


Figure 2.3. *KDE models (150-year bandwidth) of archaeological phases and the density of dated charcoal from* FRAGSUS Project *sediment cores.*

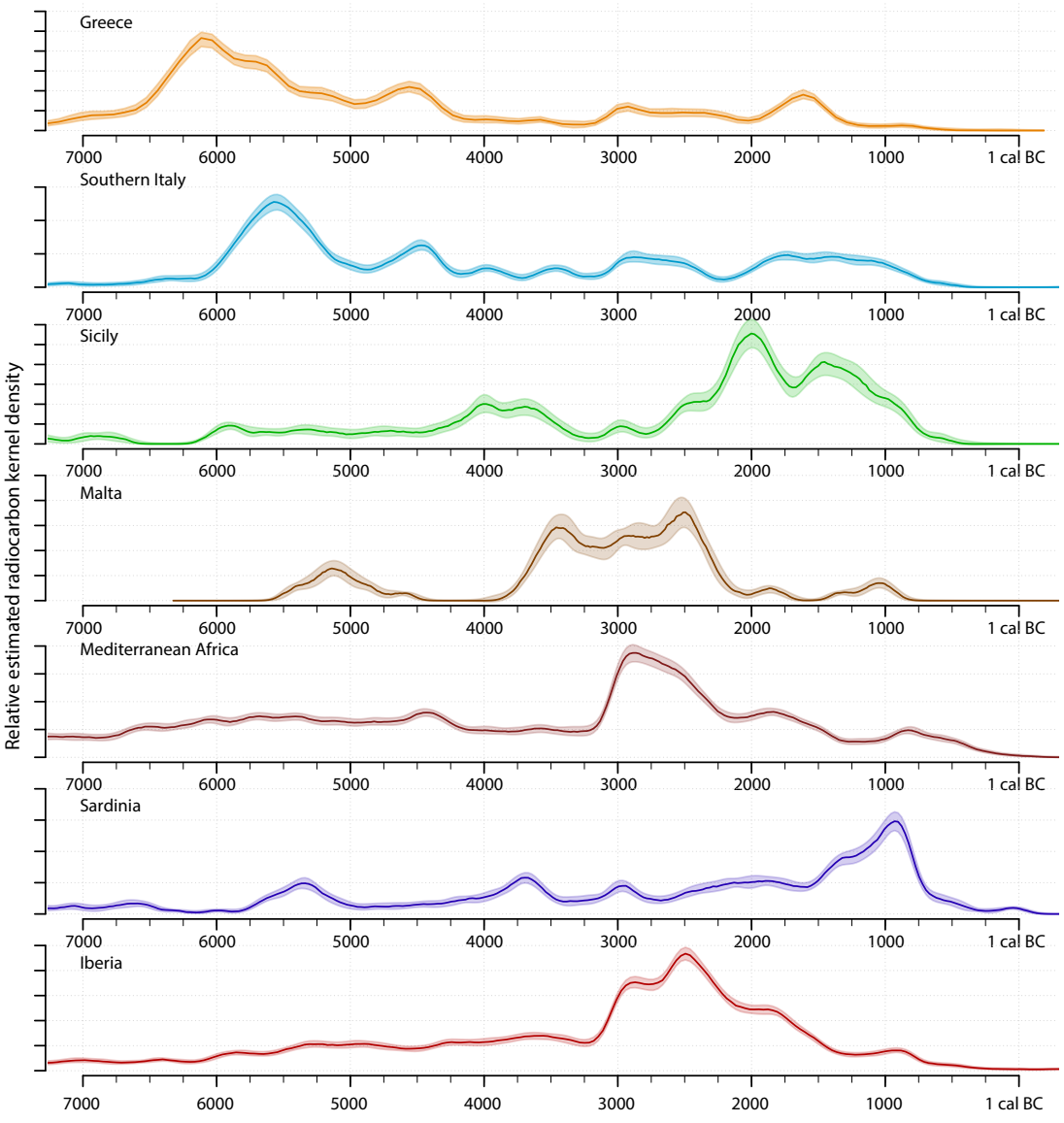


Figure 2.4. *KDEs (75-year bandwidth) of the temporal distribution of 216 radiocarbon dates from Malta compared with 6128 dates from other regions (R. McLaughlin).*

of Skorba-phase activity centred on 5200 BC; and the latter occurring at around 1000 BC, at the height of the Borġ in-Nadur phase. The Temple Period is relatively quiet, presumably because of the careful management of the landscape (McLaughlin *et al.* 2018).

2.3.13. Comparison with other regions

Using ensembles of radiocarbon dates from other Mediterranean regions (Parkinson *et al.* under review) we can compare the overall dynamics of the Maltese islands with other places. Interpretation of the results of this kind of analyses addresses factors common to the prehistoric cultures of the various regions, such as shared origins, similar patterns of cultural evolution, and economies influenced by the same changes to climate and environment. Also entangled in these data are biases of visibility and research tradition. Full consideration of these factors would require discussion, although there are some striking patterns apparent in the data at face value that require some initial comment. In Figure 2.4, KDE plots summarizing 216 dates from archaeological contexts in Malta are compared to 632 dates from Greece (Hinz *et al.* 2012), 425 from Southern Italy (Parkinson *et al.* under review), 246 from Sicily (Parkinson *et al.* under review), 1588 from North Africa (Lucarini *et al.* 2020), 257 from Sardinia

(Parkinson *et al.* under review), and 2980 from Iberia (Hinz *et al.* 2012; Kneisel *et al.* 2013).

These models clearly demonstrate that the 5100 cal. BC 'boom' in Neolithic activity in Malta is relatively late compared with those of Greece (peaking at 6200 cal. BC), Southern Italy (5700 cal. BC), Sicily (*c.* 5900 cal. BC, although this region is poorly powered with radiocarbon dates in comparison with others) and Sardinia (5300 cal. BC). The slight upturn in activity in Malta from 3000 cal. BC, reversing a decline during the Saflieni phase, is also mirrored in all of the other regions. This is especially the case in Iberia and Mediterranean Africa, which, among other developments, reflects the development of early dynastic Egypt. Following this crucial moment in world history, the acme of activity during the Tarxien phase on Malta was synchronous with a similar peak of activity in Chalcolithic Iberia, and its decline occurred during a coeval phase of rapid growth in neighbouring Early Bronze Age Sicily. The end of the Bronze Age saw the Maltese Islands incorporated into a cosmos of Phoenician growth (Broodbank & Lucarini 2020), which was unprecedented in the context of the northwest African settlement history, and strongly contrasted with declining activity throughout continental Europe around 800 cal. BC (Parkinson *et al.* under review). Assessing the significance of these observations will make for interesting multidisciplinary work in the future. The models also express the prominence of the archaeological cultures that various regions of the Mediterranean are famous for – the early Neolithic settlement of the Tavoliere in Southern Italy, the extraordinary expansion of Chalcolithic settlement and burial across Iberia and the Balearics, the temples of Malta, the *Castelluccio* funerary traditions of Sicily, the dawn of Egyptian civilization and the *nuraghi* of Sardinia. In a sense, the archaeological survival of these cultures is, in part, a result of their individual extraordinariness. Prehistory was the *longue durée* of slow cultural, economic and demographic growth, punctuated with localized phases of great intensity and cultural fluorescence, such as we find in Malta between 3800 and 2300 cal. BC.

2.4. Non-prehistoric dates

As discussed in Chapter 4, we radiocarbon dated a medieval human tooth found in backfill at Santa Verna to exclude the possibility that it was prehistoric in date. There were also medieval and modern charred seed grains from Santa Verna that had somehow worked themselves into prehistoric contexts. Similarly, a grain of modern charred rice was found buried in a prehistoric stratum at Kordin III and dated in the hope it may be ancient. A grape seed from the Marsa 2 sediment core was dated to the Phoenician period (UBA-29444, 2584±28 BP, 810–600 cal. BC).

2.5. Discussion

One priority for future work would be the archaeological dating of an Għar Dalam phase settlement. Coastal settlements of this period are now under several metres of water, which is a potential problem. Yet, Trump's excavations at Skorba and the wealth of material of this phase found at Santa Verna indicate that there is a likelihood that such deposits survive (albeit in protected places) in the Maltese landscape, and await future research.

The hiatuses have been included in our Bayesian models following a subjective assessment of the archaeological record, changes in ceramic style, and initial assessment of the chronological patterning of the dates. The results indicate that the data are consistent with this model, but it is important to note that this does not constitute independent evidence of the correctness of the model. Bayesian analysis cannot prove that a model is correct, only that it is wrong. Readers are encouraged to develop their own models of Maltese prehistory and use tools such as OxCal to explore whether our data are consistent with them.

The gap, or hiatus, between the Skorba and Żebbuġ phases will likely remain a point of debate. This is because tentative signals of continuous occupation can be read from the pollen which also suggests significant landscape reorganization and a move on to the Globigerina Limestone plateau landscape around the Grand Harbour (Volume 1, Chapter 11). The maxim 'absence of evidence is not evidence of absence' certainly applies here. The lack, however, of any identifiable ceramic culture at sites continuously occupied before and after this gap (at Skorba, Chapter 7; Santa Verna, Chapter 4; and Taċ-Ċawla, Chapter 3) must somehow be explained. The AMS dating programme has identified residual material from Skorba-phase occupation at the first two sites within Żebbuġ- and Ġgantija-phase strata. Yet, nothing from the fifth millennium BC was found at either site. Taċ-Ċawla, despite being noted for its early material in the past, produced no dates earlier than Ġgantija. This discontinuous pattern is consistent with a phase of abandonment, or at the very least a much-reduced population. This population may have been confined to settlements near the shore where they would be more likely to leave palynological traces of their existence in the sediment cores that have been studied. Other evidence for discontinuity can be inferred from the marked stylistic contrast between Skorba and Żebbuġ pottery (Chapter 10); and, indeed, in the very DNA

of the Temple Period people, whose lineage appears to have closer affinities with continental Neolithic populations than they do with 'Cardial' ones (Volume 3, Chapter 11). This suggests a second wave of colonization, separate from the initial Neolithic. From the cultural sequence we can infer this most likely occurred at the start of the Żebbuġ phase. Future archaeological, palaeoenvironmental and palaeogenomic work will have the opportunity to test this hypothesis.

The KDE models demonstrate the overall intensity of the Temple Period, and only a slight oscillation in activity over the 1500 years of its span. The growth rates of 0.6% and 0.8% derived from the KDE for both the Skorba and Żebbuġ phase expansions are consistent with natural population growth for pre-industrial agrarian societies (see Parkinson *et al.* under review). This, however, does not exclude the possibility of continuous immigration to Malta, which would have bolstered population growth still further.

As a final note, failure rates for the dating of animal bones were very high (Table 2.1), varying between 43% and 100%. As noted by McCormick (§9.4.2) animal bones from Maltese sites are highly fragmented and may have been boiled prior to being discarded. This activity, and the harsh semi-arid environment, are not conducive to the survival of collagen. We can however recommend charcoal and especially charred seeds (which unlike charcoal are always short-lived and hence have no built-in age) as reliable samples for radiocarbon dating, especially if the context from which they derive is well sealed.

Table 2.3. *Simplified cultural phases. The uncertainty still associated with the Mġarr and Saflieni phases results in a sequence open to revision and alternative versions have been proposed elsewhere in* FRAGSUS Project *publications. Compare with Tables 13.1 and 13.2, as well as with Volume 1.*

Period	Phase	Start	End
Neolithic	Għar Dalam	6000 BC	5400 BC
	Skorba	5400 BC	4800 BC
	Fifth millennium hiatus	4800 BC	3800 BC
Temple Period	Żebbuġ	3800 BC	3600 BC
	Mġarr / transitionary phase	3600 BC	3400 BC
	Ġgantija	3400 BC	3100 BC
	Saflieni	3100 BC	2800 BC
	Tarxien	2800 BC	2400 BC
Bronze Age	Thermi	2400 BC	2200 BC
	Third millennium hiatus	2200 BC	2000 BC
	Tarxien Cemetery	2000 BC	1700 BC
	Second millennium hiatus	1700 BC	1500 BC
	Borġ in-Nadur / Baħrija	1500 BC	750 BC
Historic	Phoenician / Punic	750 BC	218 BC
	Roman / Byzantine	218 BC	AD 870
	Arab / Norman	AD 870	AD 1530
	Knights	AD 1530	AD 1798
	Modern	AD 1798	Present

2.6. Conclusion

It is, perhaps, inevitable that many questions remain about the details of the cultural sequence of the Maltese Islands. Yet despite this, there can be little doubt that the *Project*'s programme of research has brought the chronology of Maltese prehistory into sharper focus, and has enabled us to provide an updated table of the sequence of chronological phases (Table 2.3). The islands now contain several of the best-dated prehistoric sites in the central Mediterranean. We stress, however, that although the various distinctive cultural phases have been highly refined, it is imperative that future work considers radiocarbon dating of materials found on sites as matter of top priority. Placing finds on an absolute timescale is the only way to make sense of them, even if they can be readily ascribed to a distinctive typochronological phase. For example, a Tarxien-phase pot may date to 2800 BC or 2400 BC, the former a time of artistic and cultural elaboration, the latter a period of acute social and environmental stress. Individual archaeological discoveries, if they are to mean anything, must be mapped onto the dynamic of the cultural and environmental context from whence they came. Also, part of this process is a wider contextualization. Through comparison with data from neighbouring regions and some further afield we can see how 'Temple Period' developments on Malta occurred against a background of similar dynamics playing out in Iberia and Egypt. This could reflect the influence of climate change, such as the end of the African Humid Period, or could indicate a shared trajectory of cultural evolution and demographic expansion. Similarly, the third millennium hiatus in settlement on Malta and Gozo can now be associated more closely with the '4.2kya event' at around 2200 BC and, importantly, not coupled with the disappearance of the Temple Culture. This paradigm of synergistic work between archaeological and palaeoecological research channels has been fundamental to the work of the *FRAGSUS Project* and we hope to have provided a research agenda that can be followed and enabled thorough ever-refined chronological understanding.

Note

1. A full list of the radiocarbon dates obtained by the project from archaeological contexts is given in Appendix A2.1.

Chapter 3

Excavations at Taċ-Ċawla, Rabat, Gozo, 2014

Caroline Malone, Rowan McLaughlin, Stephen Armstrong, Jeremy Bennett, Conor McAdams, Charles French, Simon Stoddart & Nathaniel Cutajar

3.1. Introduction

In this chapter, we present the results of archaeological excavations at the prehistoric settlement known as Taċ-Ċawla, Rabat, Gozo (site code TCC14), undertaken by the *FRAGSUS Project* from 27 March to 17 July 2014. This exercise involved sampling intact archaeological deposits for dateable environmental and economic remains, and identifying and interpreting new features found at a significant settlement site. The site had potential to tackle the fundamental research questions posed by the *FRAGSUS Project* (§1.5) and expand knowledge of early domestic settlement on Malta.

Following the completion of earlier researches (the 1987–95 Cambridge Gozo Project; Malone *et al.* 2009) the *FRAGSUS Project* was devised to focus on the scientific study of population, settlement, landscape and economy supported by a robust dating programme. The Neolithic site of Taċ-Ċawla had the potential to investigate a number of pressing questions relating to the use of landscape in Malta and Gozo in prehistoric times. In particular, it offered the opportunity to examine the nature of settlement, economy and subsistence strategies that had adapted to the resource limitations provided by the natural environment. Until recently, a paucity of settlement evidence from the Maltese islands during the Neolithic period had led to a significant lacuna in the understanding of Neolithic domestic subsistence and its economic landscape. Instead, the elaborate temple sites had been the focus of most studies on the prehistory of Malta (see Evans 1971 for general summary).

The scientific Cambridge Gozo Project study of the Xagħra Brochtorff Circle burial site (1987–94) advanced knowledge into new areas, with new findings about Malta's early history and an understanding of the Maltese population (Malone *et al.* 2009). That work was supported by a detailed absolute chronology, an understanding of the cave environment, and the role of animal remains, ceramics, lithics and artistic artefacts. The research highlighted the nature of funerary ritual at a level of detail hitherto unrecorded in Malta – the Ħal Saflieni Hypogeum having been cleared largely without record (Zammit 1912). In addition, the Cambridge Gozo Project raised questions about diet, disease and physical stress factors within that population. The Project also included landscape surveys (1987–95) that extended over the Xagħra plateau around the Xagħra Brochtorff Circle site, and sampled much of the open area through fieldwalking to capture the presence of prehistoric activity. The materials recovered were studied in detail just before and during the *FRAGSUS Project* (see Boyle 2013; Malone *et al.* 2009, Chapter 3; Volume 1, Chapters 6 & 7). They give a unique insight into the spatial density and organization of prehistoric and later settlement in Gozo. The GIS mapping undertaken by Boyle (and subsequently McLaughlin) (see Volume 1, Chapters 6 & 7) highlights the distinct patterning of relationships between soil quality, geology, slope, aspect, water availability and physical factors in the landscape with particular phases of settlement occupation. The Cambridge Gozo Survey effectively identified earlier Neolithic occupation (especially the Għar Dalam and Skorba phases) for the first time. These had been little regarded in the prehistoric landscape of Malta and Gozo, but were now identified mostly in the form of lithic and pottery scatters. These scatters occurred in various locations, often close to the later megalithic sites, which seemed to be situated to take advantage of aspect, soil and water. Other contemporary early sites (e.g. Is-Sruġ, Ta' Kuljat) occur around the plateau edges of the dramatic 'mesa' type topography of Gozo, where rock overhangs and caves may have been exploited by early settlers. The surface record of the Cambridge Gozo Survey highlighted the need to sample early Neolithic stratigraphic deposits in order to extract materials for dating, cultural identification, palaeoeconomic reconstruction, and to obtain a range of environmental indicators from this little known period.

Unfortunately, few locations identified in the Cambridge Gozo Survey provided easy access or represented definite evidence of long-term occupation. Consequently, the researchers were drawn to the site of Taċ-Ċawla, an accessible settlement site with known evidence for various prehistoric phases of use dating from the Għar Dalam phase and the Temple Period of the Neolithic.

Investigating Taċ-Ċawla was a priority for a number of reasons. Little is known about the domestic sphere of prehistoric Malta. In part, this is because of the paucity of known settlements. Yet, it is also due to the fact that no programme of research had focused on identifying domestic sites. For example, Malone *et al.* (2009, 54–5) listed only ten potential Neolithic domestic structures. The settlement theme was thus identified as a priority for the *FRAGSUS Project* since it could yield rich and important information on economic life in prehistory. Focus on settlement was also a *Project* priority since undeveloped land containing likely sites continues to be threatened by destruction and development (Boissevain & Selwyn 2004; Conrad & Cassar 2012; Short 2019). By investigating settlements the *Project* also had an opportunity to examine new forms of evidence. Whilst Maltese Neolithic Temples exemplify the architecture, culture and ritual-ceremony of prehistory, little archaeological work had been conducted to link the monumental evidence with its wider landscape or community. Settlements, however, comprise houses and rubbish, and are likely to contain the material traces of subsistence strategies and the domestic life of the culture that gave rise to the monuments. Indeed, it was understanding this relationship that formed one of the objectives of the *FRAGSUS Project*.

The ERC grant offered sufficient resources in terms of finance, research infrastructure, staffing, time and technology to enable a world-class assessment of the Taċ-Ċawla site and its buried materials. Therefore, as part of the investigations of 2014, the focus of archaeological field research was the site of Taċ-Ċawla. Some 16 weeks of continuous survey and excavation took place, aided by a team of specialist archaeologists, scientists and student assistants. A limited area was opened by machine to establish the former excavation areas, and extended to a large open area excavation, sub-sampled through selected trenches. In 1993 and 1994, a 10 m square quadrant had been investigated to the base of ploughsoil. In 1995, one edge of this quadrant was extended and excavated to bedrock in a 1–2 m wide trench. In 2014, the original quadrant was identified, cleared of topsoil and extended as shown in the plans below (see Figs. 3.3 & 3.6). Excavation completed the investigation of superficial features and extended to bedrock to obtain dating, palaeoeconomic and environmental samples from the early stratigraphy.



Figure 3.1. *Site location map.*

3.1.1. Location and physical setting

The site of Taċ-Ċawla is located on the southern fringes of Victoria-Rabat in Gozo (Fig. 3.1), on the southern edge of the Rabat Plateau that defines the built zone of the expanded urban area of central Gozo. The site is located on fairly level ground, on a layer of gently dipping Upper Coralline bedrock. This lies close to the Blue Clay layers beneath and is therefore located just above the potential spring-line. The soil cover depth reflects the dip of the underlying Coralline rock, with shallow soils in the higher eastern area and deeper well-preserved soils in the western parts. The archaeological area of Taċ-Ċawla is an expanse of land identified between the Sannat road (It Tabib Anton Tabone) and the parallel Triq Għajn Qatet. Taċ-Ċawla means 'black bird' or crow, and alternative names for the area include Tas-Salib (Grima & Azzopardi pers. comm). Formerly, this was arable land of high quality, which was used for many decades for tomato cultivation and other horticultural products. The plot was Church land (an ecclesiastical benefice) and was never intensively or mechanically cultivated until it was sold to private owners in the 1960s or 1970s. This conservative agricultural use resulted in rare pockets of well-preserved and stratified soil that contained a variety of archaeological deposits (Fig. 3.2).

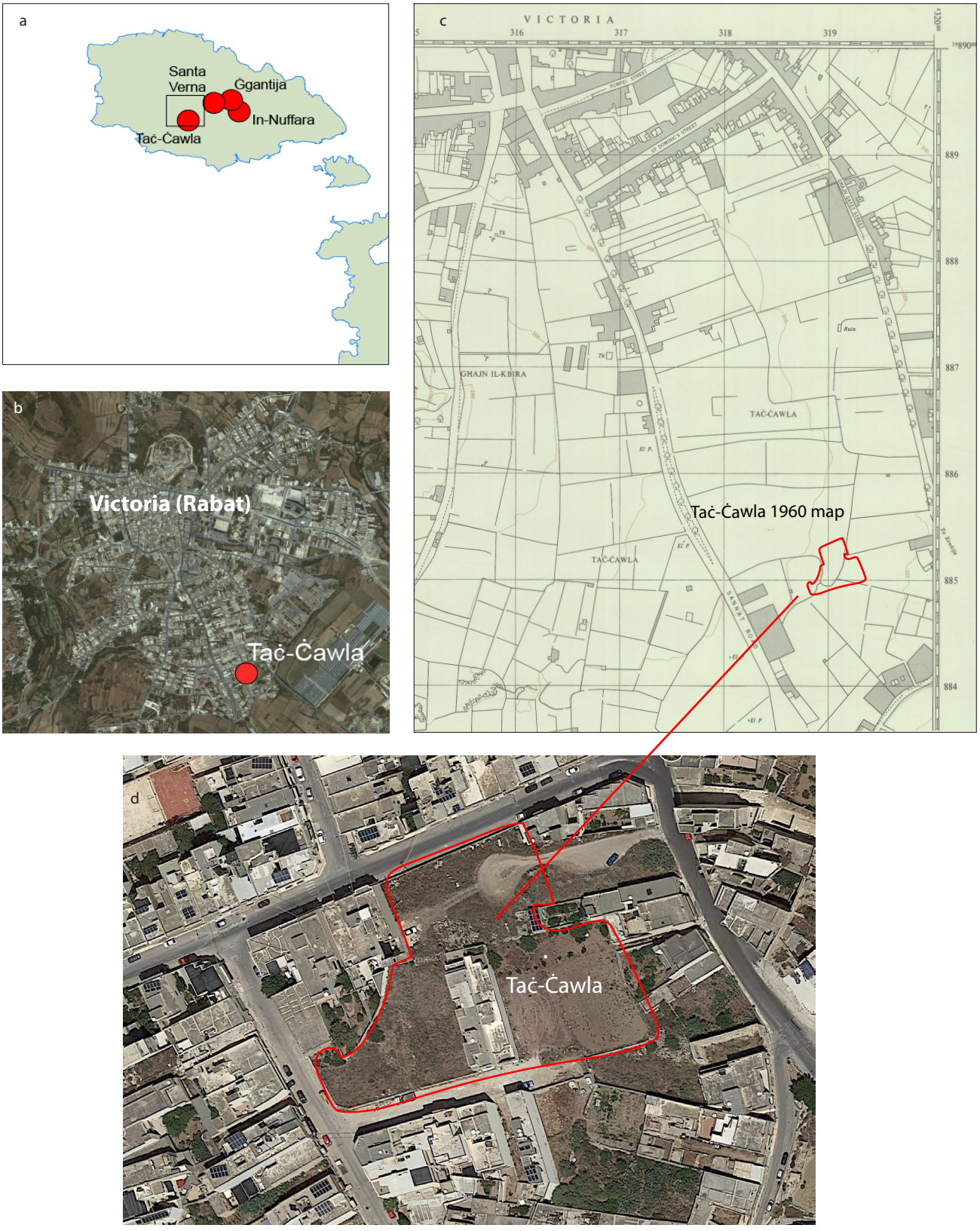


Figure 3.2. *Site location details: a) Gozo; b) Google Earth imagery showing Taċ-Ċawla, location (2020); c) 1960s map of Taċ-Ċawla, area; d) Google Earth close-up (2020).*

3.1.2. History of the site

Archaeological deposits at Taċ-Ċawla were noted in the 'Temporary Gozo Planning Scheme 10' watching briefs between the 1970s and 1990s, during episodes of urban expansion. The archaeological significance of the area was, however, first identified through surface finds of ceramics and lithics revealed in disturbed areas of cultivation and building works. In particular, map grid square 318 884 was reported in the Museum Annual Report 1960 (Fig. 3.2c). Local antiquarian, Joseph Attard Tabone FSA, and American student, Martha Molitor, maintained a watching brief during the mid-1980s; and later, Adrian Van der Blom and Veronica Veen undertook watching briefs (in association with the Museums Department) between 1991 and 1993. According to local observers, a series of megaliths had once existed within the surrounding field walls of the area, although no photographs or plans of these survive. Significantly the nearby megalithic site of Ta' Marżiena, also located on the edge of the Coralline plateau at the boundary with the clay geology, confirms that the area was favoured in the Neolithic with its good soils and available spring water. During the early 1990s, the Taċ-Ċawla area was subject to extensive urban construction as the southern fringes of Victoria-Rabat spread to the limits of the plateau, and a series of archaeological interventions were made to establish the nature of the site. These are summarized below.

3.2. The Van der Blom and Veen watching brief

From 1986 onwards, Adrian Van der Blom and Veronica Veen spent considerable time in Gozo, researching prehistory and landscape (Veen & Van der Blom 1992). Their attention was drawn to the Taċ-Ċawla area in 1991 when building work disturbed ploughsoil, revealing prehistoric pottery. In particular, the researchers noted impressed Għar Dalam and Skorba phase pottery, and focused their attention and interpretation on those particular ceramics. In doing so, they did not consider fully the stratigraphy, structures or other data, including the more common Temple Period pottery. Issued with a fieldwalking licence by the Museum Department in June 1991, the watching brief identified a number of areas within the Taċ-Ċawla zone that were disturbed by road works and public utility trenches. The work noted the visible pottery types and, in some cases, the nature of the deposits that contained the pottery. These observations were published in several newspaper articles in 1993 and 1994, which made extravagant claims about the extent and significance of the site. In 1992, one interpretation was also published in a popular format as *The First Maltese – origins, character and symbolism of the Għar Dalam Culture.* An unauthorized excavation trench was cut into deep soil close to both the cut of what later became an illegal building plot, and a developer's roadway (now known as the Triq Neolitici). There, Van der Blom claimed to have found soil depth of about 93 cm above bedrock, with Għar Dalam levels situated directly on the rock surface, and additional pottery 22 and 32 cm below the surface. He argued that these apparent levels represented distinct phases within the earlier Neolithic (Van der Blom 1992, 20), and pointed out that the ceramics were evenly distributed between fine and coarseware types. Chert and obsidian were also retrieved along with animal bone, but this material was not recorded systematically. The salvage work suggested that the concentration of Neolithic material extended over a prehistoric site of about 100 m square (1992, 26). A sketch map (Fig. 3.4b), produced subsequently, indicated the location of various trenches and surface pickups of this initial work. Unfortunately, a final report was not produced, and no scientific analyses were undertaken of the animal bone or lithics. The finds were retained by the Superintendence of Cultural Heritage (SCH), and this material awaits further analysis. Provided this material can be linked to the precise location suggested, it could yet provide additional useful information about the site and its extent.

The outcome of the public assertions and publications (many of which had not been undertaken with proper authority) led to the confiscation of much of the gathered material, and a general public interest in the area of Taċ-Ċawla. A public outcry about the building work at the site led to an initial Museum Department (MD) evaluation in 1993–4, and subsequent re-evaluation in 1995. Essentially, all building work was halted in 1992 following discussion of the site's archaeological significance. A portion of the site, the westerly extent between Triq Anici and Triq Neolitici, was later purchased by the government (Ministry of Gozo), in whose ownership it still remains as a protected site.

3.2.1. The initial evaluation 1993–4

The evaluation work of 1993–4 is summarized in detail in the unpublished interim MD 1994 report authored by Nathaniel Cutajar (Cutajar 1994). In October 1992, the MD personnel inspected the Taċ-Ċawla area in zones of undeveloped land within the general area of the site (grid 3190 8854) following the Veen and Van der Blom watching brief work. This identified the general surface scatters of prehistoric and Roman period materials, but it could not identify significant stratigraphy or archaeological features from the newly damaged construction areas. Following an episode of unauthorized building work, an archaeological investigation was undertaken in 1993 to establish the nature of the site. The programme was tasked to:

1. Investigate whether the Taċ-Ċawla fields within grid points 3190 8854 contained significant archaeological stratified remains.
2. Carry out archaeological evaluations of the nature, extent, state of preservation and date of any stratigraphic remains that were located.

An evaluation was therefore undertaken over the course of several weeks in 1993 by the MD, under the supervision of Cutajar and other museum staff. This established the existence of extensive agricultural features of Roman and later periods (Fig. 3.4). Five large shallow trenches were opened (Fig. 3.3b) to establish the extent of the prehistoric site. Documentation and recording of the trenches was undertaken, followed by detailed recording of smaller trenches in specific areas. In general, the work did not penetrate deposits to bedrock, and consequently could not investigate the buried prehistoric levels. Instead, the agricultural features were recorded (Figs. 3.3a, b), and then the trenches were largely covered over and the site was backfilled.

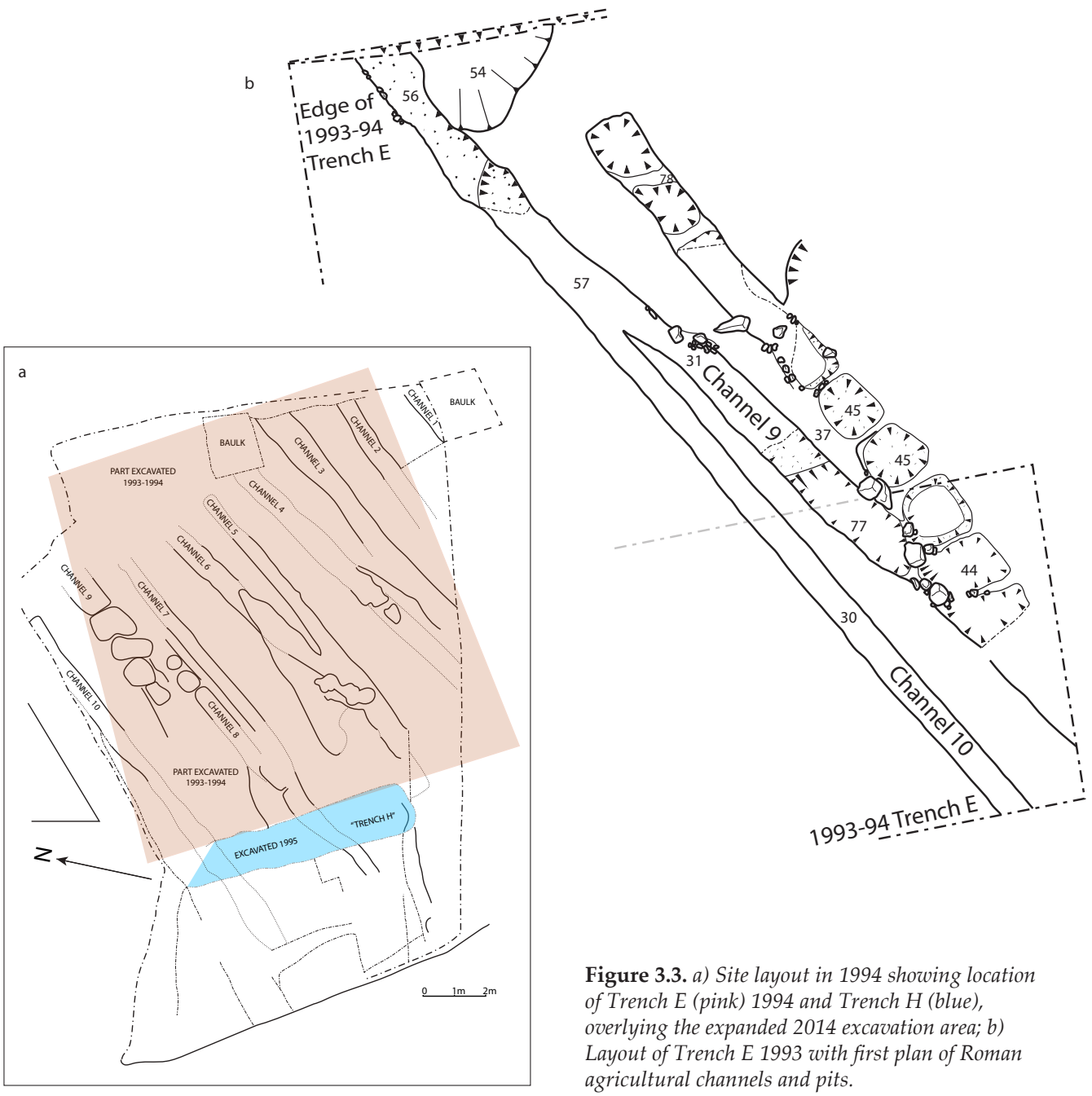


Figure 3.3. *a) Site layout in 1994 showing location of Trench E (pink) 1994 and Trench H (blue), overlying the expanded 2014 excavation area; b) Layout of Trench E 1993 with first plan of Roman agricultural channels and pits.*

3.2.2. The archaeological investigation 1993–4

Five trenches, A, B, C, D, and E were positioned across the Taċ-Ċawla Archaeological Area each measuring 10 × 10 m (Fig. 3.4b). Three of these in the western part of the area (A, D, E) were excavated extensively, and work continued on them throughout 1993. The two trenches in the eastern area (B, C) were then sampled as linear cuts across the respective areas. Excavations in the western zone were limited by landowners' objections. In total about 555 sq. m of the site was opened and examined. The whole area was cut through by the Triq Neolitici roadway, with trenches A and B on the south side of the road, and the others on the north. Another roadway, Triq Anici, formed the western edge of the area. Today the area to the south is entirely built over, whilst the areas to the north and east remain open land, with just a small built area between former trenches C and D.

The 1993 Trench A (Fig. 3.4b) was located on the south side of the area. Following the removal of ploughsoil, bedrock was encountered in the southeast corner whilst grey soil covered the western area. Excavation of the site again in 1994 removed more soil cover from the shallow northeastern part of the trench, which became deeper and more complex as the work progressed westwards. Therefore, a 5 × 10 m



Figure 3.4. *a) Location of the Taċ-Ċawla, survey scatters reported in 1960s and survey areas of 1993–4. Taċ-Ċawla, settlement is marked in red, adapted from Interim Report, Museums Department, Cutajar 1994–5); b) Sketch plan of survey areas and trial trenches. Trench E and its 1995 extension (grey) formed the focus of* FRAGSUS *investigation in 2014.*

extension was opened on the western side of the trench to examine these more promising deposits. Three main phases were noted from the base up:

Phase 1: Red earth above bedrock and filling cavities within the surface
Phase 2: Deposits of earth and stones covering the rock and red earth
Phase 3: Agricultural topsoil

Excavation of Trench B commenced in 1994. It was designed to sample the eastern zone with a linear trench 4 × 23.5 m cut north–south across the breadth of the site. The deposits were very shallow, with bedrock encountered in the northern and southern ends, whilst the central area revealed a filled depression in the rock. A sondage was cut through this and showed three phases of deposition.

Phase 1: Red earth above bedrock
Phase 2: Grey silt and packed medium-sized stones across the depression covered by a fine light brown silt at the interface with topsoil
Phase 3: Agricultural topsoil

The excavation of Trench C commenced in 1994, and measured 2.5 × 32.5 m. Like Trench B, it was designed to sample the deposits across the eastern half of the site, and also followed a north–south axis. Bedrock was encountered immediately across the length of the area, and a two-phase stratigraphy was interpreted as:

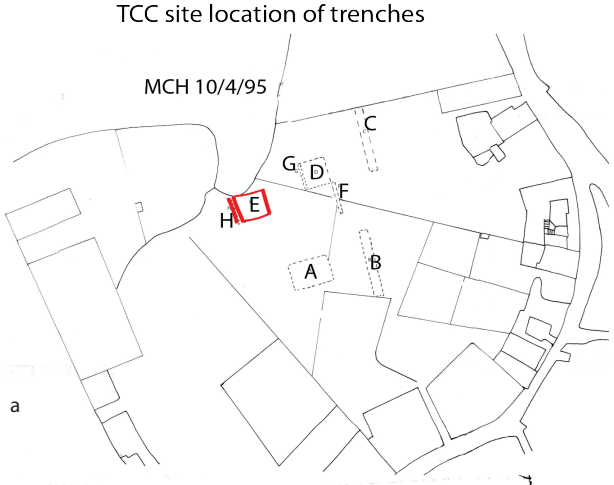
Phase 1: Red earth over bedrock and filling natural hollows
Phase 2: Overlying brown agricultural topsoil

The excavation of Trench D commenced in 1993 in the area claimed by Van der Blom to be rich in Għar Dalam pottery. On removal of the topsoil, thicker soils were revealed in a series of ditches and channels indicating agricultural use. These pre-dated the later arable farming in this area. Excavation investigated the numerous channels, which roughly aligned on a northeast–southwest axis in a regular pattern. In 1994, the southeast corner of Trench D was studied intensively to clarify the stratigraphic sequence. As in other trenches, three main phases were identified.

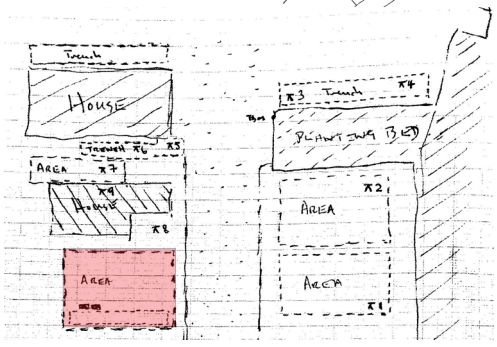
Phase 1: Silty red earth overlying bedrock with a marked slope on the upper surface dipping from east to west. Bedrock irregularities were filled with this red deposit
Phase 2i: Extensive compacted dark grey silt, upper layer level with scatter of small angular stones, and appears to be a made soil for agriculture
Phase 2ii: Agricultural ditches cut into grey silt, formed into a parallel 'U'-shaped network, some of which have hardened 'linings' of calcreted soil (interpreted as mortar)
Phase 2iii: Silty soil and small stones covering the ditches and subsoil and interpreted as the abandonment of the channel system
Phase 3: Agricultural topsoil dark brown and clayish including modern wall and disturbance

The excavation of Trench E commenced in 1993, but only reached a depth of 30 cm before work resumed in 1994. As in Trench D, the removal of topsoil revealed a complex system of agricultural ditches and channels, which also appeared to be mortar-lined (Fig. 3.3b; see also Figs. 3.47 & 3.49). The stratigraphy in this trench was deeper and more complex. Consequently, work concentrated on this trench, which was extended by 3 m westwards in an attempt to comprehend the nature of the site. Three main phases were identified:

Phase 1: Red soil on bedrock was noted at the base of the trench, but not investigated as the agricultural ditches were seen as too significant to disturb. The depth of the deposit, however, was recorded in recent building sondages
Phase 2: Similar to Trench D with four main subgroups
Phase 2i: Silty earth overlying rocks and boulders and forming a level surface. This was possibly intentional levelling to bring the sloping bedrock to a more level surface
Phase 2ii: Three features cut into silt/stone layers and largely concealed beneath later cuts. These features were linear cuts aligned north-east–southwest, and in one instance a lining of land-snails was identified. Other features included shallow sub-circular depressions, lined in hardened mortar-like material, which were also aligned on the main channel pattern. Ashy traces formed yet another feature and may have been part of a later kiln
Phase 2iii: Further channel systems obscured or cut those of earlier phases and were partly filled with rocks, stones, mortar-like substances and fills. Further kiln features included a combustion chamber and were surrounded by burnt materials, domestic materials and pottery


TCC site location of trenches
MCH 10/4/95
C
G
D
F
E
H
A
B

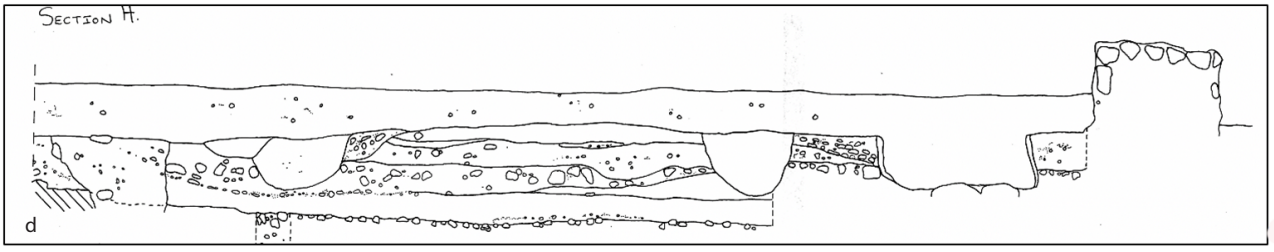
a


Trench
House
Trench
AREA
AREA
AREA

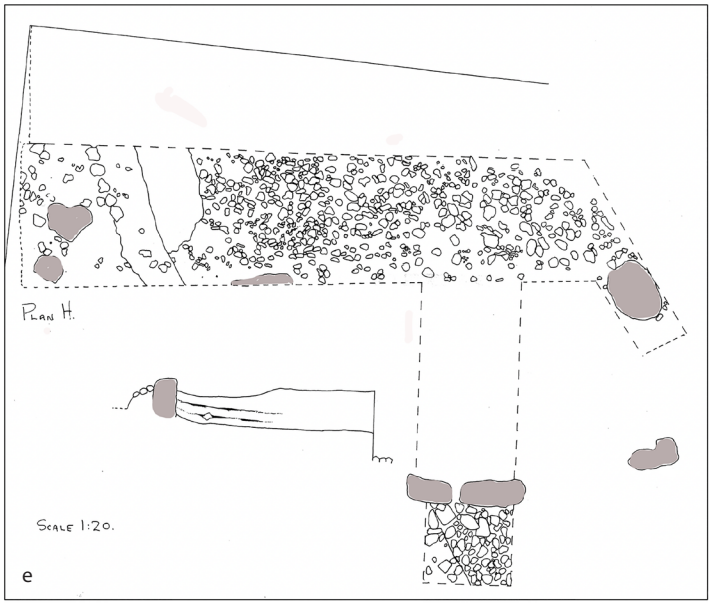
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c


SECTION H.

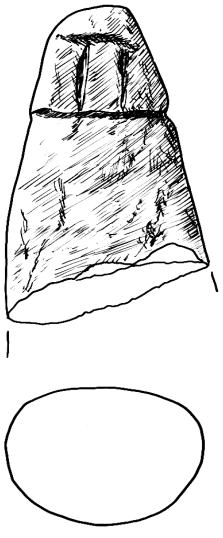
d


PLAN H.
SCALE 1:20.

e



f



Phase 2iv: The backfill silts that covered the abandoned channel system appeared to be intentionally placed deposits with small stones and brown earth. Some areas of darker earth fills covered/filled the ditches
Phase 3. Agricultural topsoil

The report provided an interpretation of the stratigraphic history of the site and suggested original red soils represented the natural soil formation. Later agricultural use of the land here was interpreted as intentional dumps that levelled the surface for more intensive agriculture. These also formed the soil base into which the complex of ditches was then cut. No scientific soil study, however, was undertaken. Nor were dating samples submitted for analysis. Instead, the stray sherds within the upper soil horizons were used to phase the site. The final phases of use were seen as part of artisan workshops and interest was paid particularly to the Medieval and Post-Medieval material in the upper levels. Neither the prehistoric nor the Roman material received much attention. The various trenches were opened across extensive areas, but rarely explored to their full depth, and thus the full sequence was not established. Within the remit of the evaluation, however, sufficient understanding of the value of the site was proved, which led to its partial conservation. This involved recommendation that the areas surrounding Trenches D and E should be maintained intact, whilst the other areas were given less value on the basis of the stratigraphic findings.

3.2.3. The Horton-Trump 1995 investigation

Following the 1993–4 work by the MD, local interventions and discussion provoked a demand for further assessment, this time by an independent team (led by Dr Mark Horton of Bristol University and Dr David Trump of Cambridge University) on the request of the Minister for Youth and the Arts, Dr Michael Refalo. The work was commissioned to establish whether the areas recommended for preservation warranted such protection, and whether other areas could be developed for housing. Assessment was made of the five separate trenches cut in 1993 and 1994, and the decision was made to investigate further the site in the area claimed by Veen and Van der Blom to have produced much of the material they had identified in 1991. Extensions were added to the previous trenches and laid out as follows: Trench D was extended on the west side by slit Trench G, and on the south side by slit Trench F. Trench E was extended on the west side by Trench H. Work commenced on 8 April, 1995 and a 1 m wide × 10 m long trench was partly cut by a mini-digger to remove the top-soil. The previous excavation trenches were still sufficiently open and visible to enable the evaluation of earlier sections to assess the stratigraphy, which had not been recorded fully during previous work. The new excavations identified a complex sequence of deposits around a stone-built structure that was associated with floors, occupation debris and domestic materials. Horton and Trump identified this complex as part of a Neolithic house, dating from the Tarxien phase (Horton 1995). They also located a single carved stone object (a simple anthropomorphic stick figure) that likely dates to the Żebbuġ phase (Fig. 3.5f). The two areas were combined in the overall interpretation, and David Trump analysed briefly the pottery from all three phases of study: the Van der Blom work, the Museum investigation and the 1995 study. On completion of the work, the area was covered and backfilled. The impact of these discoveries resulted (as noted above) in the eventual purchase of the site from the developers by the government (Ministry for Gozo), and it was set aside as an archaeological resource. The area was partially enclosed by a wall, but over the intervening years, local dumping has resulted in the aggradation of additional levels of deposit covering the archaeological stratigraphy.

3.2.4. Pottery phases Għar Dalam (c. 5500 BC)

Trench F/G produced impressed and incised Neolithic pottery associated with a hearth, three postholes and a spread of stones. Trump suggested they related to a hut floor, later damaged by disturbance and erosion. The location is likely to be close to the area identified by Veen and Van der Blom, since the location of the excavation hole was noted. Yet, contrary to the earlier assertion of 'thousands' of sherds, only 14 sherds of Għar Dalam type pottery were retrieved. Trump's interpretation contradicted the Van der Blom notion of an entire Għar Dalam village, since the very limited nature of the excavated deposits could not prove that assertion.

Figure 3.5 *(opposite). a) General trench layout 1995 (Trenches E and H in red); b) sketch of trenches in the 1995 campaign, (E/H in red); c) photograph of Trench H showing emerging megalithic stones; d) section of Trench H (MCH site notebook); e) plan of Trench H (MCH site notebook); f) carved limestone figurine from the base of Trench H.*

3.2.5. Tarxien Phase c. *2800 to 2400* BC

No mention was made by Trump of Skorba or Żebbuġ phase pottery sherds, but later Tarxien pottery was abundant. Trench G revealed ashy deposits and clay floors, whilst Trench H (Fig. 3.5d, e) included a large stone-built structure (house) of the Tarxien phase. This was formed from megalithic (or at least large) stones, and packed stratified *torba* floors measuring 70 cm thick. The plan of the structure was thought to be oval in shape and estimated to extend 11 × 9 m in size. Below some of the floors, the existence of Tarxien pottery confirmed a likely Temple Period date. Trump noted that the 'house structure' was potentially of huge significance for understanding the socio-economic profile of the Temple Period.

3.2.6. Later levels of Punic, Roman and Medieval material c. *800* BC *to* AD *1500*

Later phases were noted, as were the former rubble boundary walls that may have related to those phases of occupation.

3.2.7. Post Medieval

Trump and Horton speculated that the agricultural channels were of late date, and that some might be vine trenches dating perhaps to the eighteenth century. Overall, the work specifically noted the significance of the site for future research, and the urgent need to take it into safe keeping to preserve the deposits until such time as they could be properly investigated. Backfilling or further excavation was recommended, and the former was done, with mesh and plastic sheet laid over significant deposits before the replacement of soil over the site. Finds were delivered to the SCH, where they remain. The impact of the work was sufficient to ensure that parts of the area were purchased and preserved.

3.2.8. The 2014 excavations – methods

The records of the previous interventions were assessed with a new programme of research devised to ensure the Neolithic phases of occupation at Tać-Ċawla were investigated effectively. Given the uncertainties surrounding the underlying deposits, it was recognized that this investigation required a large-scale intervention. Permission was granted for the excavation of an extensive trench that incorporated the most promising areas and their immediate surroundings. The excavations, directed by Prof. Caroline Malone, took place between 27 March and 17 July 2014. Surrounding areas such as Trench D with its likely Għar Dalam deposits were considered for additional excavation and briefly surveyed. Yet, issues of recent soil-rubbish dumping, scalped topsoil and the limited time frame prevented investigation.

3.3. Results of the 1995 work and the 2014 work

The methodology involved standard excavation procedures, using a single context recording system, and incorporated an intensive programme of sampling, structural study and retrieval of materials. The site was fully surveyed with a Total Station, and a range of remote sensing techniques (GPR, Resistivity), to establish if features were identifiable. The remote sensing was not particularly fruitful, and open excavation proved to be the best means of understanding the heavily reworked site and its sequence. The entire site was also digitally scanned by John Meneely using a Faro scanner both during and at the end of excavation. This enabled the 3-D reconstruction of the trenches and the stone structure (Fig. 3.11b). The goal of the 2014 work was to establish the nature of the structure, the occupation history of the site and to extract a representative sample of economic and environmental material. Therefore, not all areas opened were intended to be fully excavated beyond surface recording.

The area of the site was divided into 5 × 5 m squares and the trench was broadly aligned on this grid for excavation purposes. Excavation was undertaken initially with a small mechanical digger that removed large and distinct levels of unstratified backfill from previous interventions that had been separated from undisturbed deposit by geofabric materials in 1994/95. Thereafter, all excavation was by hand, with the precise recording of individual stratigraphic units (here called contexts), which are referred to throughout the following descriptions (context number in brackets) and identified as fills, layers, structures and cuts as appropriate. The cleared site was cleaned to reveal the top of unexcavated features, which, for the most-part, were a series of parallel pits and deep channels (Fig. 3.3a) cut through older compacted deposits that contained prehistoric material. The channels (see below) effectively sliced the site deposits into narrow parallel sections of preserved archaeological deposits, and made recording of the site complex. Box trenches (see Fig. 3.6) were cut through the channels (many of which reached bedrock) to assess their depth and width. Yet, these also provided useful records of the varied deposits across the site. Sampling of all intact deposits involved soil sampling for flotation, whilst additional sieving on site ensured retrieval of small artefacts and bones.[1]

The 1993 Trench E, and the 1995 Trench H excavation areas were reopened. Excavation here comprised the 1 × 8 m long sondage (Trench H), two small side trenches and the more extensive 10 × 13 m Trench E. Trenches E and H had both cut through the centre and eastern part of what later emerged as a roughly circular stone structure. This was possibly the walls of

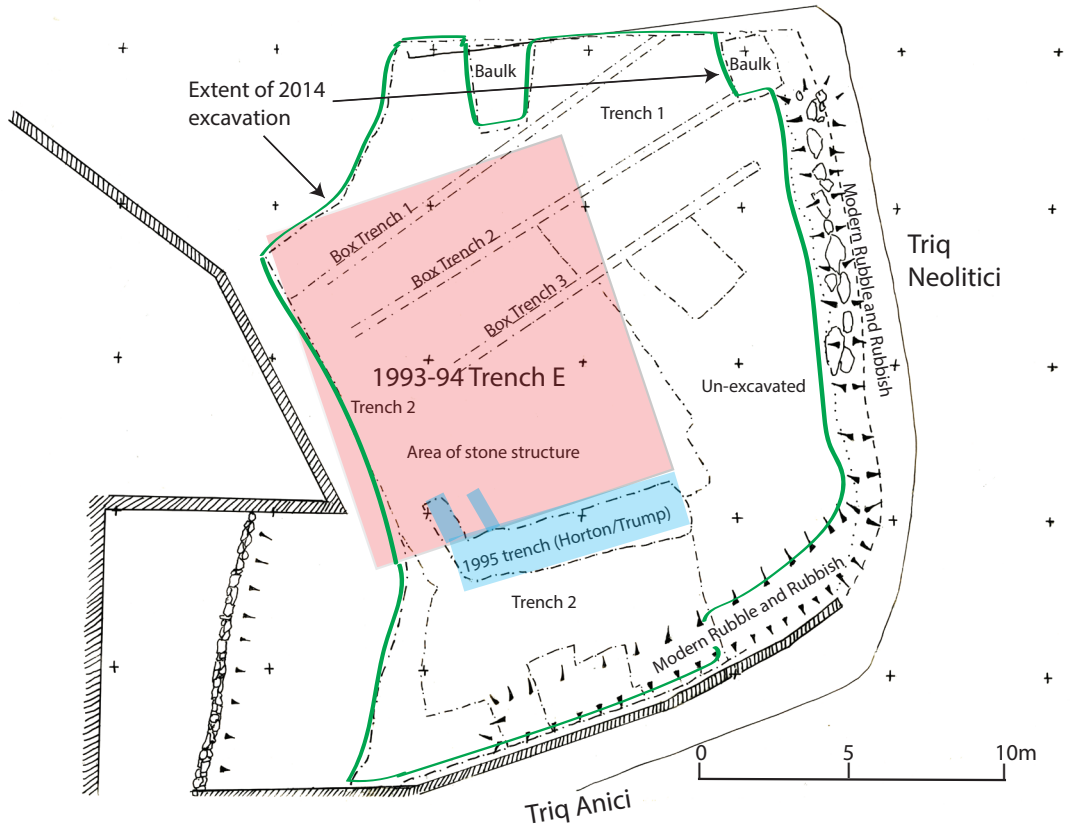


Figure 3.6. *Site layout in 2014.*

a domestic house, or another form of stone enclosure. The previous excavation areas were extended to the west and south of the 1993 and 1995 trenches, namely in small Box Trenches (hereafter BT) 4, 5 and 6 (Fig. 3.11a); and in superficial exploratory excavation, which provided stratigraphic understanding of the structure. The 1995 east- and west-facing trench sections provided a reasonable view of the stratigraphic layers of deposit, floors and the later cuts and fills. The 1995 small exploratory trenches left an unexcavated baulk, the North Baulk, defined between Channel 10 [52] on the north, and the 1995 sondage. The southern area was defined as the Main Quadrant (MQ) of the structure and was excavated on both sides of Channel 7, which cut through the area. In all, 22 m^2 of unexcavated deposit was opened and recorded to depth on either side of the 1995 trench. Initially, a much larger area between the 1995 trench and the western boundary wall was cleared by machine of overlying deposit to identify the level of preservation (Fig. 3.6). This showed that some of the area was disturbed by modern overburden, but it also enabled the identification of the wall line of the stone structure, and indicated the most promising areas for deeper investigation. New excavation included BT4, a 0.9 × 1 m box cut, abutting the line of Channel [80], which opened directly from the cutting edge to explore anomalies in the stratigraphy. The sequence was truncated by previous excavation; but it demonstrated how complex, mixed and long-lasting the use of the structure's interior was, with a sizeable Early Bronze Age (Thermi phase) assemblage found in the upper deposits. BT5 measured 1.5 × 5.5 m and exposed the northwestern corner of the excavation area, and extended west from the northern end of the 1995 sondage to the boundary wall. It was focused on the internal part of the Temple Period structure. This included two large megaliths (287), which were considered part of the return of the wall of the structure. The sondage reached, but did not excavate, a cobbled surface, Context (296), which was equivalent to (211) discussed below. A possible wall (212) was also uncovered, although this appeared more like a concentration of stones than a clearly multi-coursed wall. As in BT4, the deposits in BT5 were complex and somewhat disturbed. Yet, they nevertheless revealed the floor sequences identified in the main cutting, as well as the later semi-destruction of the stone structure and the area's reuse. BT6 extended from the southwest end

of the 1995 trench. Measuring 4.2 × 2.2 m, it explored the line of the structure wall. It was excavated initially as a small exploratory trench, and then enlarged west to the boundary wall. This area presented the deepest stratigraphy on the site, as it filled a natural limestone depression, possibly associated with a nearby spring source. This trench demonstrated clearly the succession of lower floors, as well as the alignment of the structure's wall, which was built precariously along a natural limestone edge. Detailed micromorphological analysis was undertaken of the deposits in BT6 (see Appendix Table A3.7.1). This revealed the changing water levels in the limestone depression and the nature of the deposits. The work showed that this part of the site was originally a 'waterhole' of sorts, which dried-up during the Tarxien phase and was then filled with accumulated debris from the surrounding settlement, some of which was already centuries-old. The sequence continued into a Bronze Age context (269) with dumps and unstructured deposits. The following description commences with an account of the surviving components within the stone structure, and then discusses the areas immediately around it.

3.3.1. Wall (172)

The wall of the Temple Period building discovered by Trump and Horton was revealed when superficial deposits and backfill had been removed and assigned context number (172). The dry-stone wall enclosed a large area and comprised medium-sized stones around 0.3 m in length, with occasional larger (0.55–0.8 m long) stones arranged in three to five vertical courses. The width of the wall varied between 0.4 and 0.8 cm, with some sections collapsed or displaced because of the later agricultural disturbance. The wall survived to a maximum height of about 0.9 m, with several lengths of walls only 0.4 m high (Fig. 3.7). In some areas, construction appeared to form a double line of stones with a void between. This 'sandwich' effect suggests that timber uprights may have been set within the wall thickness (Fig. 3.8a, b). The wall followed a curved plan (Fig. 3.9), with a slight concave area on the northeast edge, suggesting a possible entrance, adjacent to Context (244) and its covering Context (209) discussed below. Much of the wall was discontinuous in the northwest, where it disappeared under the northwest baulk or had been destroyed by deep agricultural channels,



Figure 3.7. *The excavated stone structures and the remnant vine channels and pits, looking west.*



Figure 3.8. *a) The double sided wall; b) Post and stake holes around outer edge of structure wall.*

road and modern construction. Traces emerged as a straighter length of wall on the southeast side of the baulk. Much of the western edge was destroyed by the construction of the road and surrounding wall. Occasional isolated stones were located on the northwest edge. The soft fill present between the stones of the wall was Context (171). This comprised the same yellowish-brown loam that was found in various shades and textures throughout the site, and it contained pottery dating to the Tarxien and earlier phase, with one small and likely intrusive Early Bronze Age sherd. Projecting from the northeast side of (172), a discontinuous linear stretch of stone wall, Structure (207), extended northeast as a single/double course of large and small stones. This wall overlay deposit (233) close to the main (172) structure. It was associated with a series of post/stake holes (223) and larger postholes outside the possible entrance (see Table 3.3, which describes these features). These features may have formed either a structural extension or an entrance into the structure. Their relationship, however, was unclear, since both sides of the wall had been disturbed by deep Roman period agricultural channels penetrating the subsoil. Wall (207) was covered by later layers (26), (147) and

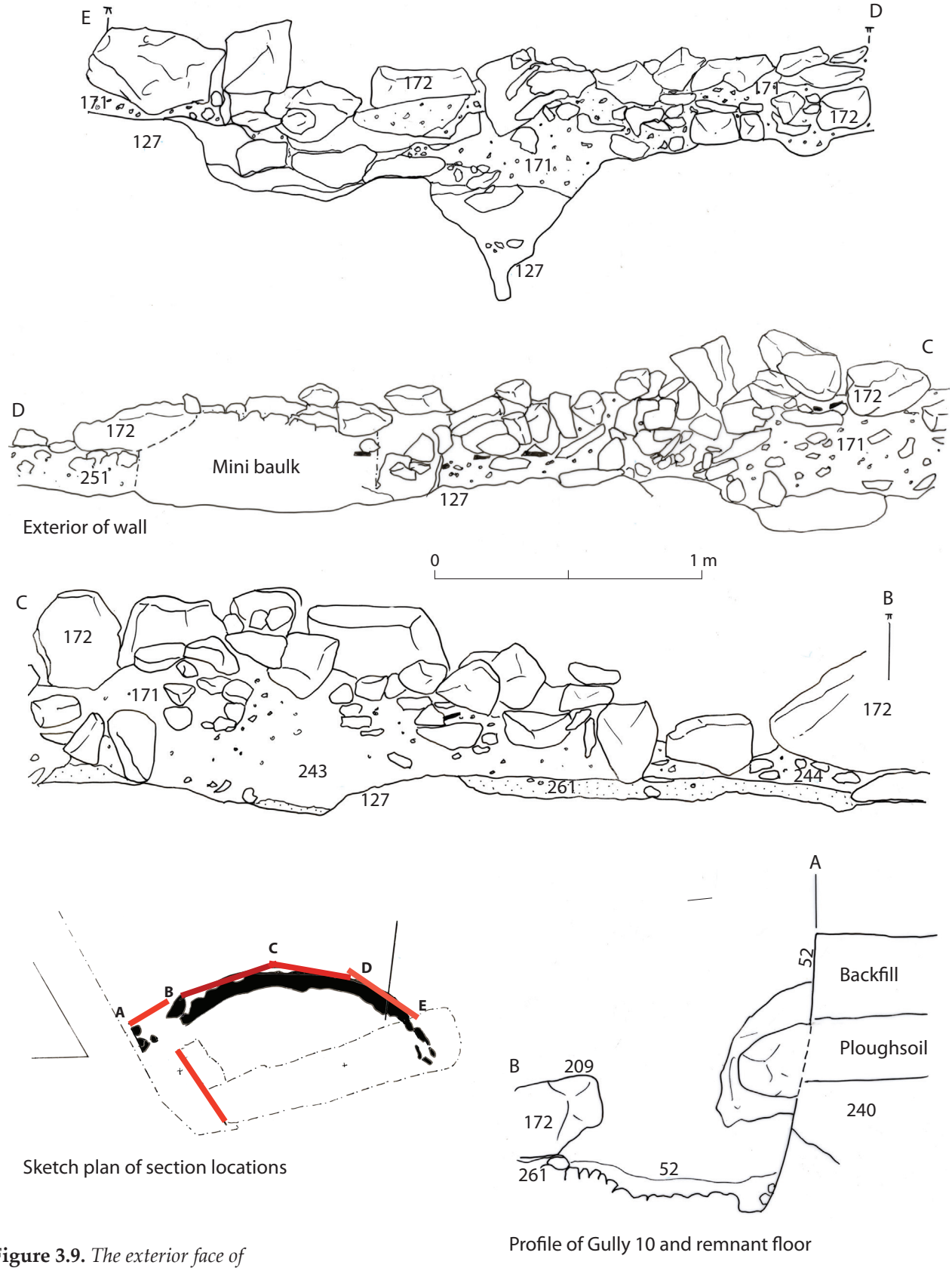


Figure 3.9. *The exterior face of the wall (172) in the eastern zone.*



Figure 3.10. *The relationship of wall (287) in BT5 to extramural and internal levels. Cobbles in Context (283) Level 4.*

(148). A wet-sieved soil sample from (207) produced five cereal grains and one pulse. The fabric of the wall was not disturbed or moved from position during the 2014 excavations, and it was carefully recovered for future conservation and reference.

Figure 3.11a shows the context numbering of the wall sections, identified as (172) on the north, southeast and east, and as (212), (183), (218) and (287) in BT5 and adjacent areas. Wall structure (212), located in BT5, comprised a rough line of stones that was covered by (87), closely bedded against the bedrock (127) and butted by a prehistoric floor (186) (Figs. 3.10 & 3.12). This floor, in turn, was bonded to a stone-rich deposit (183) of very large stones that may have also derived from the wall. The stones were close to floor Context (155) suggesting they were largely *in situ*. There was, however, an indication that part of (183) was cut bedrock. The excavators noted that it seemed to have structure to it, although it is possible that the large stones were from elsewhere. The exterior face of (183) revealed many different layers. Stones (218), also in BT5, were large rocks interpreted as redeposited wall material, dug out from Pit [234]. South of (218), Megaliths (287) comprised two substantial limestone megaliths, covered by floor (186). They were interpreted as part of the wall return, truncated by Cut [234] and moved slightly from their original sockets. The southwest portion of the wall was destroyed or buried by road and boundary wall building, but the eastern return was located as a much straighter length in BT6 (see Fig. 3.20a). This sondage showed how the wall was associated with distinct floor makeup deposits and spreads of stones (241), as well as with intact floor fragment (213) and a prehistoric dump (246). The straight run of the wall extended almost 4 m, and was placed directly above a sharply cut natural limestone edge, above what may have been a waterhole accessed via the cleaned bedrock that slopes towards a known spring to the west of the site (Fig. 3.17). The infill of the walled structure comprised looser soil fills that contained a wide mix of small pottery sherds. These date to all Neolithic periods, but there were very few Thermi (or earliest Bronze Age) sherds, and almost no material from the later Bronze Age. This ceramic evidences points to the likelihood that the wall was indeed a Late Neolithic 'Temple Period' structure, albeit one that was modified at the end of the Tarxien phase (§3.10).

3.3.2. Internal floors and features within the structure: house layers

Nine distinct floor levels, lenses and make up deposit were identified in the extant sections, of the oval structure and although these were recorded as separate contexts, because they represented isolated upstanding

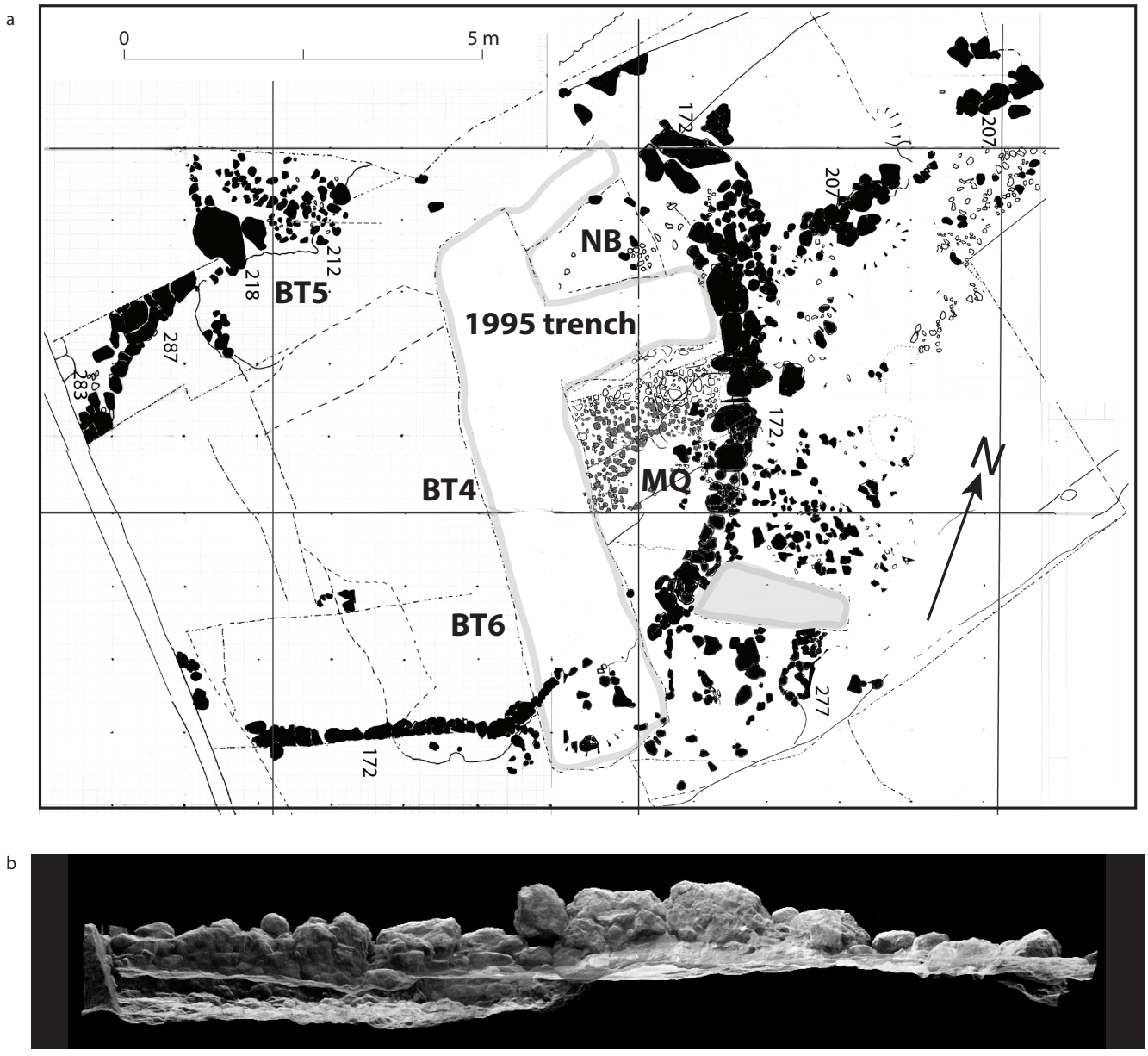


Figure 3.11. *a) Wall contexts of the Neolithic structure; b) digital scan of stone walls (John Meneely).*

remains or separate box trenches, they can be equated as similar or the same, and are described below, level by level. The interior was cut through by Channels 8, 9 and 10 (Cuts [161], [70] [52]), which exposed the floor levels, but also resulted in much disturbance of deposits in all levels. In essence, the half-circle arc of the eastern zone of the structure formed two surviving segments: the North Baulk (NB), and the Main Quadrant (MQ). Each of these was demarcated by separate contexts, whilst associated lenses and layers were broadly linked and incorporated into distinct levels. In the west, the three sondages (BT4, 5, and 6) were excavated to identify the sequence noted in the 1995 trench. These collectively provide the sequence in Table 3.1.

At the base of the sequence, bedrock assigned as Context (127) underlay the entire stone structure, on which several of the larger stones of the wall (172) were placed. Other stones were bedded into the fill sediment, mainly the lower levels of (171). Context (127) was sometimes smooth, laminated and sloping to the southwest, as at the base of BT6. Elsewhere, bedrock was pitted and fractured, and was infilled with either natural *terra rossa* soil (126) and small stones, or, in some cases, intentionally filled and levelled.



Figure 3.12. *BT5 looking southeast with wall (183) exposed, and the cobble layer within (283) overlain by floors and floor makeup deposits.*

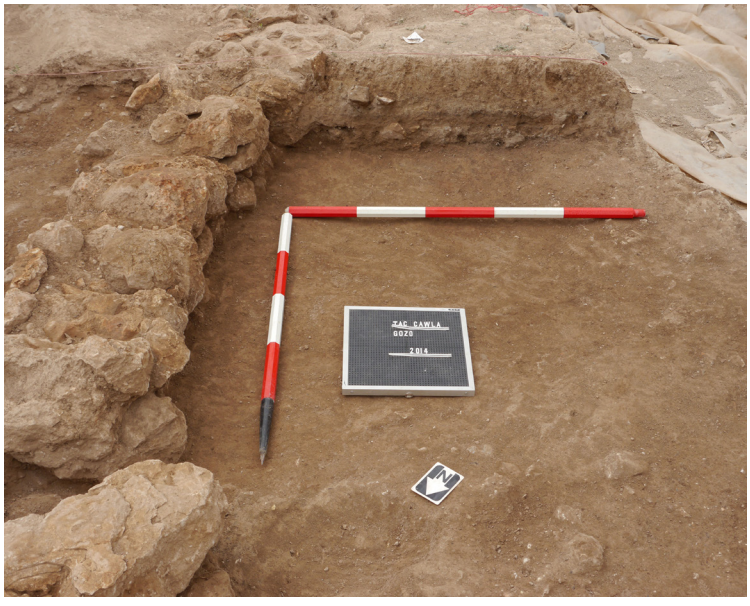


Figure 3.13. *Wall (172) in the southwest corner of BT6.*



Figure 3.14. *Recording and excavation of the North Baulk inside the structure (see also Fig. 3.27).*

Table 3.1. *Layers recorded within the stone structure, stone elements in italics.*

Floor layer related to stone structure	North Baulk	Main Quadrant	General west side	BT4 and 1995 trench	BT5	BT6	Approx. date
Topsoil backfill		1, 94, 167	1, 15, 86		1, 88, 89	1	Recent
Disturbed surface	44, 193, 213	132, 162, 199, 297	30, 84, 86, 151, 167, 226, 246	86, 96, 97	87, 101, 188, 201, 217, 226, 246	215, 216	Modern
Roman and later surfaces	168	161	168, 169, 185	168	168, 169, 185, 189, 190, 218, 221, 235, 236, 263	87, 246, 257, 258, 260	Roman and later
9 Dark greyish brown ploughsoil levels	3	240	214	201, 264	214, 227, 234, 237, 292		Roman
8 Cream brown floors	3, 154	193, 194	213	265	245	241, 246	*c.* 2400 BC (Tarxien Cemetery)
7 Dark lenses within floors of Level 6	17, 159, 160, 169, 170, 177	195	241, 245, 246	267	254, 255, 288	269	Tarxien Cemetery
6 Yellow brown floors	17, 155			155, 166, 270	186, 187, 245, 275, 292	276, 280	Tarxien / Thermi
5 Stony cobbles	7, 156	177, 196	133	279	262	281	Tarxien / Thermi
4 Stony cobbles	7, 157, 209	173, 197, 209		157	271, 289, 290	283	Tarxien / Thermi
3 Ashy grey brown	7, 158, 254	198, 202, 203		279	242, 272	286	Tarxien / Thermi
2 Foundation/structures Cobbles	*172*, *207*, 211, *244*	*172*, 200, *207*, 211			183, 212, 218, *287*, 296	299, 301	Tarxien
1 *Terra rossa*	*256*, *274*, *282*	*274*, *282*, *303*	*126*			*302*, *304*	*c.* 2700 BC (Tarxien)
Bedrock	127						

3.3.3. Level 1 deposits

The deposit at the base of the sequence was a primary *terra rossa* mineral soil (see Fig. 3.20). The contexts from within the walls included (282) (274), (256), (304) (the fill of posthole [303]) in the main quadrant, and Context (302). These deposits were similar and equivalent to the natural *terra rossa*, Context (126). In the NB, Context (256) lay immediately above bedrock (127), sandwiched below (211) in the MQ, but it was distinguished from (211) by the presence of fewer stones. Flotation produced one pulse from the sediment.

The pottery finds consisted of an assemblage of mixed prehistoric pottery mainly from the Ġgantija phase but also including a Tarxien-phase sherd, suggesting the fill was sealed early in the Tarxien phase. This chronology was confirmed by a radiocarbon date of 2890–2685 cal. BC (UBA-29836, 4182±37 BP) obtained from a pig tooth found in the layer. One chip of chert (SF507) was recorded. Within the quadrant, set into bedrock, Fill (304) was the fill of a possible posthole [303] which contained no cultural material and was *terra rossa* in colour and texture. The Cut [303] may have exploited a natural bedrock feature, and was perhaps used to hold a supporting roof timber, positioned as it was, close to the (172) wall. These features were all covered by Context (203).

In BT6, primary *terra rossa* (302) (see Fig. 3.20a, b) covered bedrock (127) and was covered by Context (301). The pottery assemblage contained sherds dating to the Ġgantija, Tarxien, Temple Period, and Żebbuġ phases. Laboratory micromorphological analysis of a block sample of this deposit revealed that it was comprised of laminated water-laid crusts, indicative of standing water, but also with vertical cracks present, representing dry periods. This microstratigraphy was interrupted with at least one episode of disturbance (see detailed geoarchaeological report in Appendix A3.7). The overlying cobble context (299) consisted of medium-sized stones interspersed with fine-grained deposits, 14 large sherds of Tarxien-phase pottery and 135 other sherds from earlier phases. These were much more fragmented than the Tarxien sherds, but still relatively intact compared to those found in other layers. The cobbles were overlain by Context (286), a firm brown earth containing frequent small-medium sized stones, animal bones and two chert artefacts. The micromorphology of this layer strongly contrasted with (301), revealing a redeposited clay mixed with a significant quantity of settlement waste, such as coprolites, shell, ceramic material and bones, some of which had been burnt (see Appendix A3.7). The pottery assemblage from this layer contained nine Tarxien phase sherds among many others from

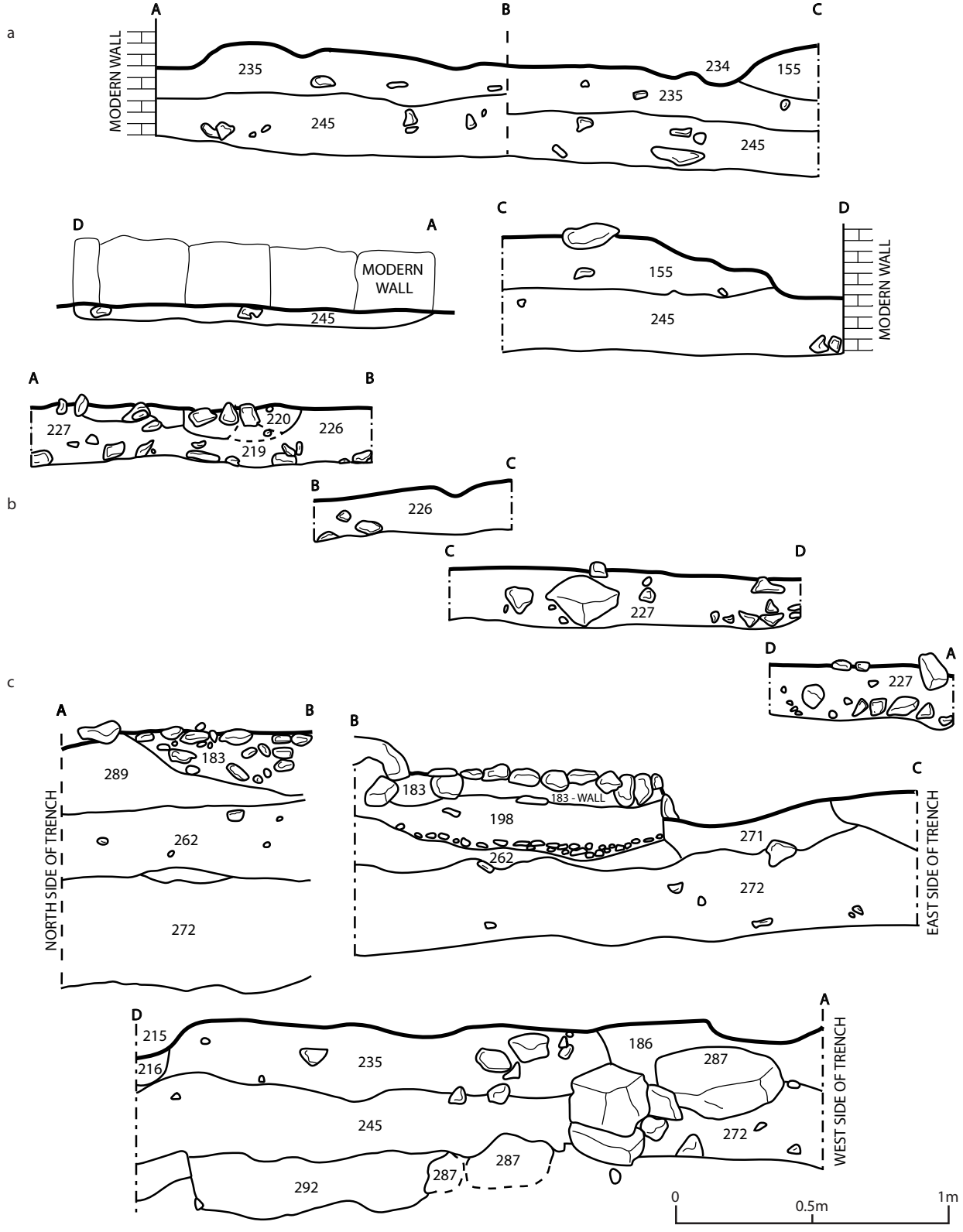


Figure 3.15. *Section drawings of intermediate cuttings in Box Trench 5, showing the floor make-up deposits within the structure.*

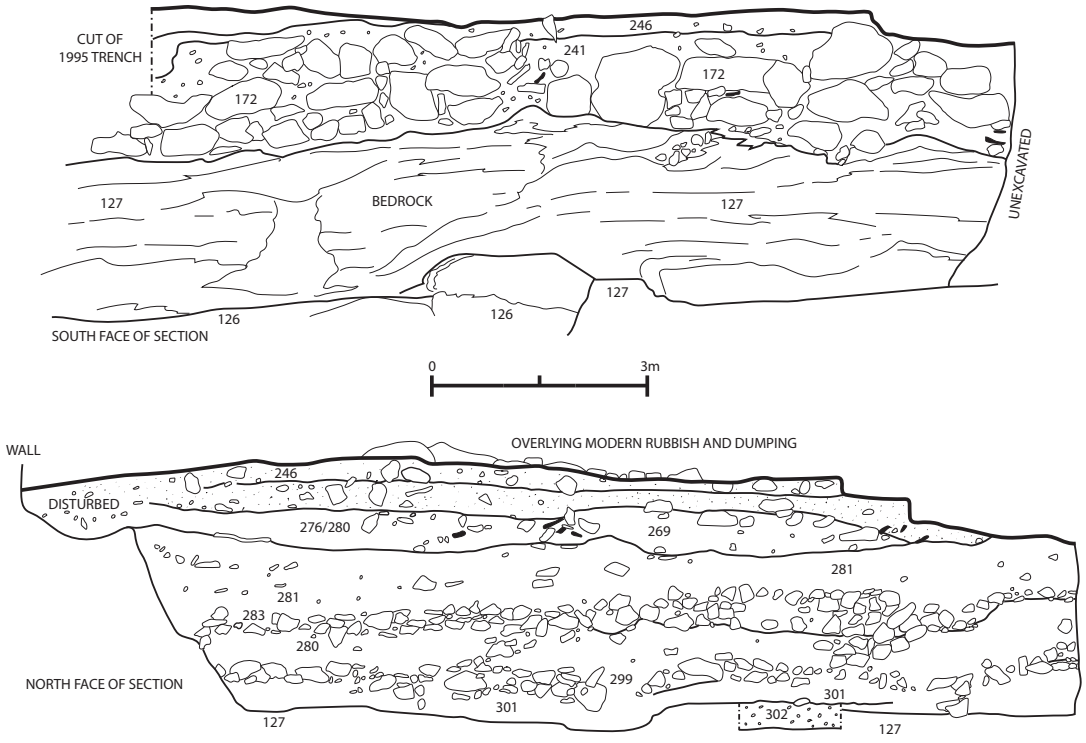


Figure 3.16. *Section drawings of Box Trench 6 and exploratory trench.*

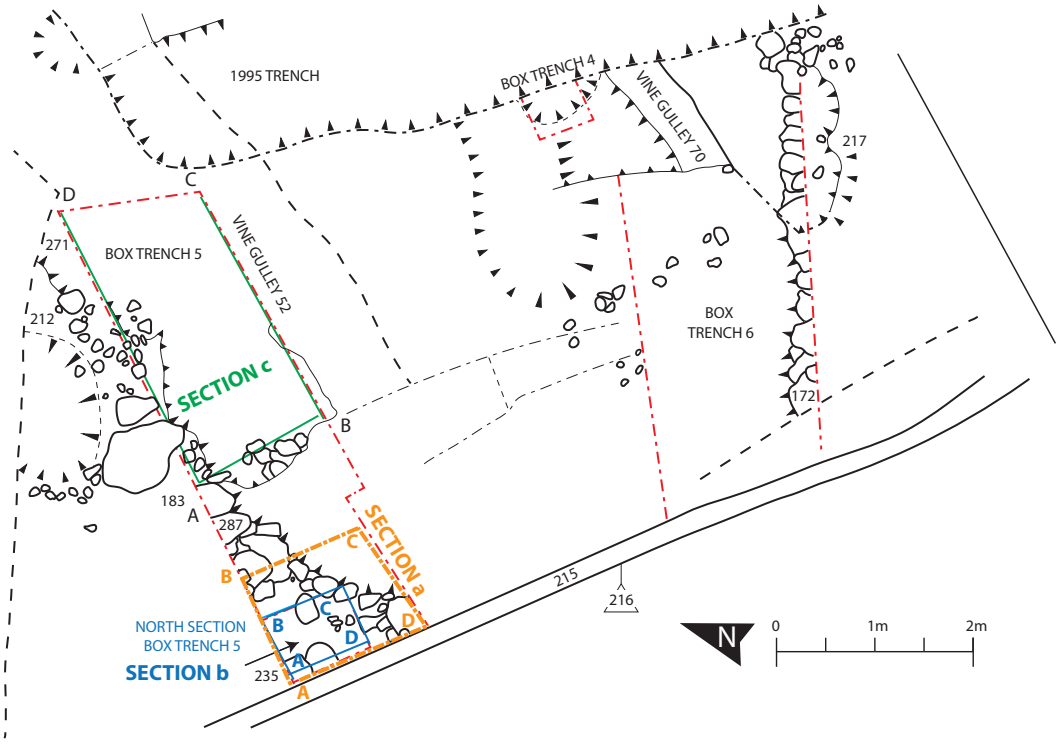


Figure 3.17. *Location of the main exploratory box trenches in the western half of the stone structure.*



Figure 3.18. *The lower cobble layers and underlying* terra rossa *filling karstic depression in BT6.*

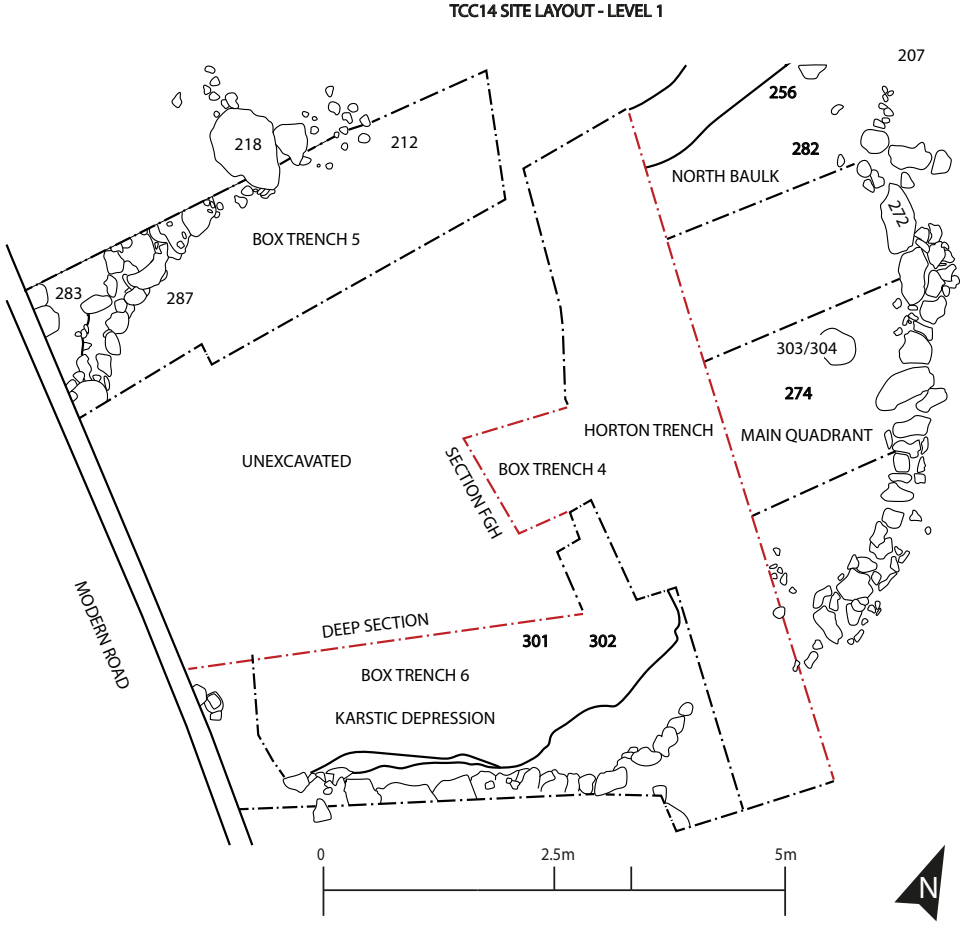


Figure 3.19. *Plan showing locations of principal contexts in Level 1.*

the Temple Period, but nothing later. The other Level 1 deposits were mostly devoid of cultural material. This was especially true of (274), which was covered by (256), a browner deposit, that yielded a wet-sieved sample containing one charred pulse.

3.3.4. Level 2 deposits

The deposits in Level 2 were broadly described as a layer of cobbles and stony floor make-up, which was considerably more stony than the underlying deposit. Context (211) in the MQ had the appearance of a stony surface forming a foundation, perhaps to level out uneven ground (see Fig. 3.21a, b). It contained Żebbuġ, Ġgantija and Tarxien-phase pottery, six small chips of obsidian from both Lipari and Pantelleria, a worked stone and seven chert flakes. Close to what would have been the east wall of the building, the deposit was seemingly cut by a posthole [303], but its fill (304) was similar to *terra rossa*. Indeed, upon excavation it was found that the underlying bedrock contained a natural (albeit steep-sided and circular) depression. Therefore, the 'posthole' was more likely to have been a slump

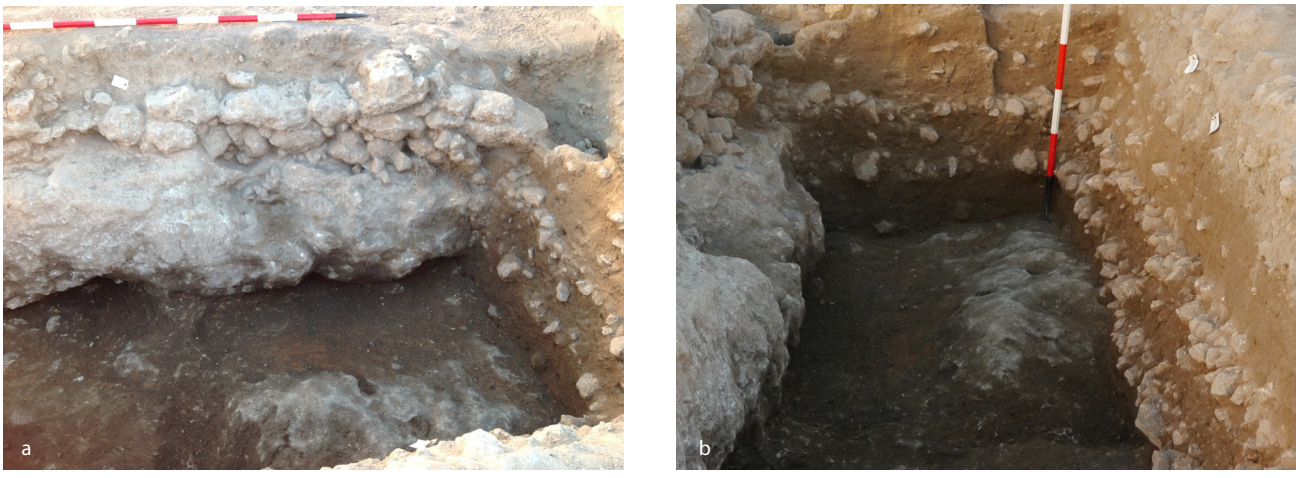


Figure 3.20. *a) Box Trench 6 with overhanging bedrock surmounted by wall (172) and revealing bedrock at base with successive floor levels (including (302) and cobble foundation layers (299), soil Context (280) and second cobble layer; b) The base layer (1) in BT6 where microstratigraphy was demonstrated (see Appendix A3.7).*



Figure 3.21. *View of the excavations in the western extent of the site (from Left to Right, BT6, BT4 and BT5).*



Figure 3.22. *a) Cobble and bedrock in Level 2 of the 'house' structure, eastern quadrant (211) with possible postholes and levelling features; b) with Level 3 deposit part removed to expose cobbles.*

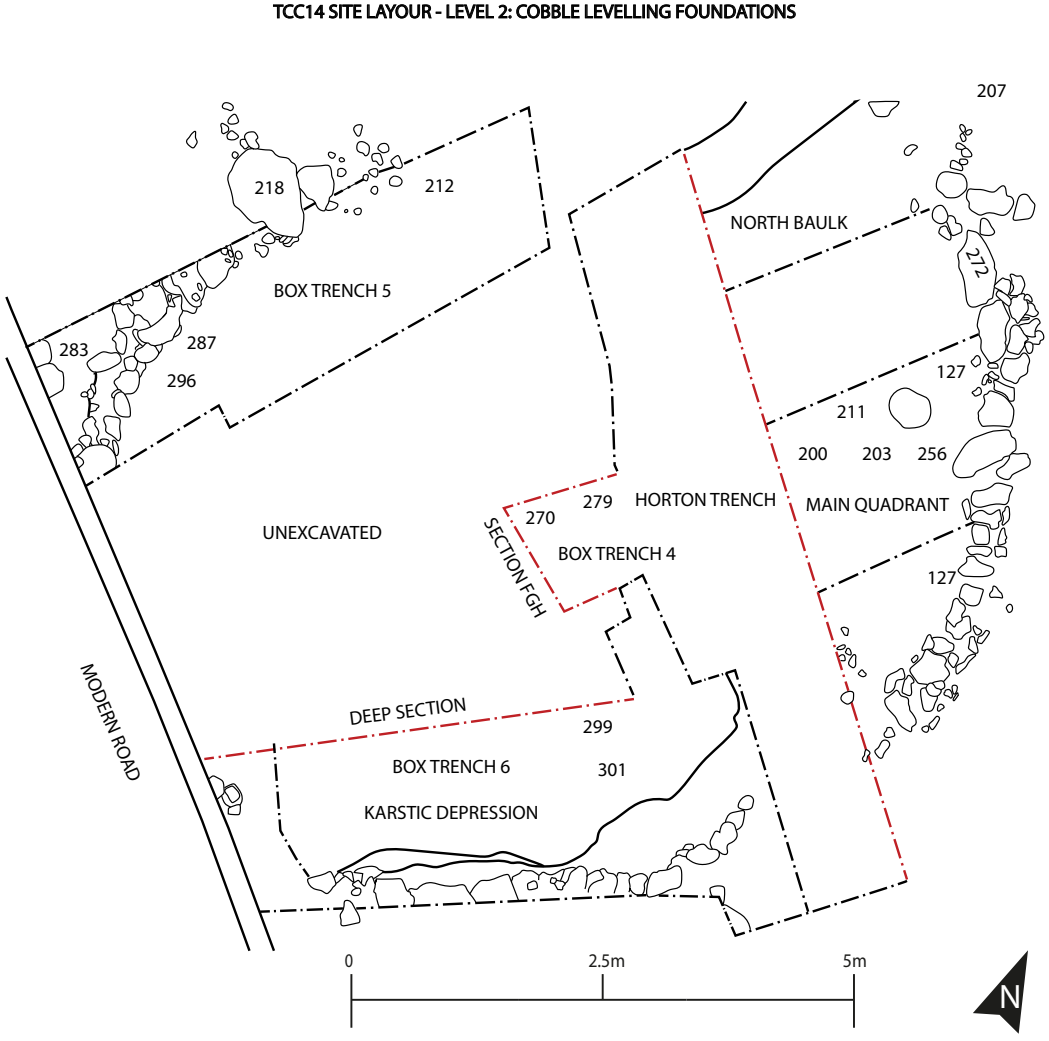


Figure 3.23. *Plan showing location of principal contexts in Level 2.*

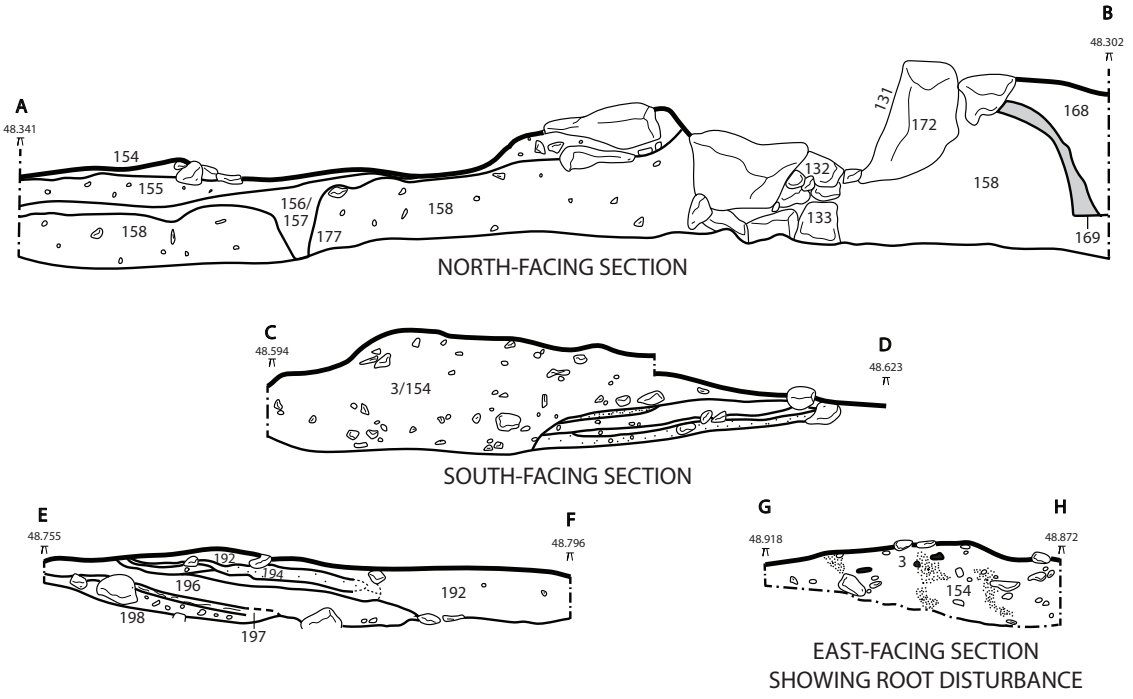


Figure 3.24. *Sections cut through the 'house' structure floors recorded on the remaining North Baulk and north side of the 1995 excavation trench.*

of deposits into this natural feature. Other surfaces in the quadrant included Context (200) which lay above (256) at the same level as (211) and (203), and formed a similar floor make-up layer, directly below (198), within the eastern side of the structure interior. This context was loose and disturbed at the top but more compact lower down. Context (200) contained shells, grits, and six lithic objects, three of obsidian (of which two were from Lipari). Context (203) formed a firm, brown (10YR 4/3), sandy loam lens with small white stone inclusions, and was covered by layer (196) and lens (202), and overlay (211). The assemblage from this lens contained pottery dating to the Roman, Ġgantija, Tarxien, Temple Period, Żebbuġ and Red Skorba phases, and four lithics. To the west, similar deposits were identified at the base of the box trenches, but these were cut by a Roman period vine channel, Cut [297] and its Fill (199). This channel, however, did not contain any Roman pottery, although some Roman sherds did make their way into Context (203) probably though the disturbances to prehistoric strata caused when [297] was dug. Structural elements and the foundation stones of the main surrounding wall were bedded into this level, and included the units described above, (172), (287), (212), (218) and (183). A similar cobble surface, Context (296), was identified in BT5, and was the lowest level explored in the trench. (296), interpreted as equivalent to (211), formed a levelling surface over bedrock. It contained stones from the wall (212); although they took the form of a concentration of unset stones, it was not clear how they were set originally. The level was associated with a stony Fill (242), which contained a mixed prehistoric pottery assemblage, including one sherd tentatively identified as Tarxien (Fig. 3.21a, b).

In BT6, Context (301) overlay bedrock (127) and (302) as a silty sandy loam that was firm, and dark brown with a few medium-sized stones (7.5YR 3/4). It supported the lower cobbled surface (299) above (Fig. 3.20a, b). The pottery assemblage from this layer contained Tarxien phase sherds and numerous lithics (16). Context (299) above formed a distinct floor foundation of medium-sized cobble stones interspersed with fine-grained deposits. This yielded 14 large sherds of Tarxien-phase pottery and 135 other sherds from earlier phases. Many of these sherds were fragmented, if still relatively intact (compared with those found in other layers) sherds of Żebbuġ phase.

3.3.5. Level 3 deposits

Level 3 overlying the stony cobble foundation layers presented a yellowish-grey ashy and friable deposit. In the NB, Context (7) was the lowest floor surface exposed in 1995. It was later equated with layers (158), (198), (202), (242), (286), and a redder deposit (265). These comprised an intermediate layer of remnant

patches of flooring and contained mixed Temple Period pottery in a highly fragmented state. Context (158) in the NB was a red/brown layer, which was compact and clayey and formed the visible base of the baulk remaining from the 1995 excavation. It contained a large quantity of small stones, which spread in an arc across the small trench, identified as part of Context (7). The floor equated with Context (198) in the quadrant area which was overlain by (203), and (198) formed a surface/layer within the east side of the structure. This surface was associated with a rising remnant surface surviving close to the wall and adhering to it. Context (198) disappeared to the west as a result of root disturbance; which, given the low level of the deposit, explained the intrusion of some quite late phase prehistoric pottery. Lens (202) formed a firm, white floor surface within the Neolithic floor, and was covered by (196) and overlay (203) (see Fig. 3.21b).

At the base of BT 5, Context (272) was a very compact, dark brown (10YR 3/3), sandy clay loam. Its inclusions were pottery, animal bone and frequent sub-angular stones (10 × 5 cm). It was located beneath (262) and (271), abutted (287) and was above Context (296). The excavators noted splintered bone and pot, and the deposit was based on a cobbled surface that may have been a floor-base. Context (272) was bagged separately towards wall (287) to avoid contamination from other disturbance. The artefacts found within (272) included pottery sherds dating to the Żebbuġ, Tarxien, Ġgantija, Għar Dalam and Red Skorba phases, and some 35 lithic objects (including 10 tiny obsidian chips). The adjacent Context (242) was a stony deposit associated with wall (212) and beneath Context (221). The pottery assemblage from this layer belonged to the Żebbuġ, Ġgantija and Red Skorba phases. The context also produced one pulse seed and one lithic.

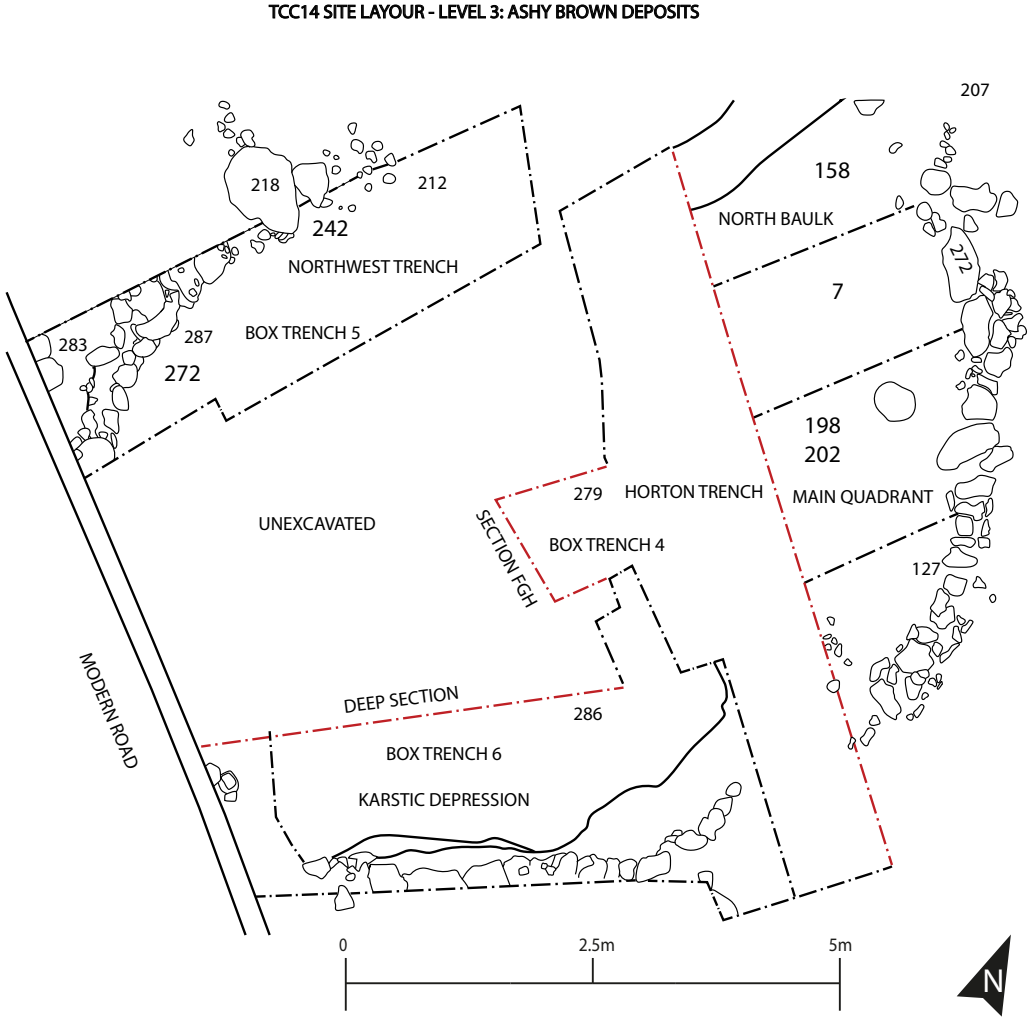


Figure 3.25. *Level 3 deposits within the 'house' structure.*



Figure 3.26. *The re-opened west baulk of the 1995 trench, showing the area of re-cuts, later examined as Box Trench 4 (beneath the board) which yielded Thermi period pottery.*



Figure 3.27. *Layers revealed in Box Trench 4.*

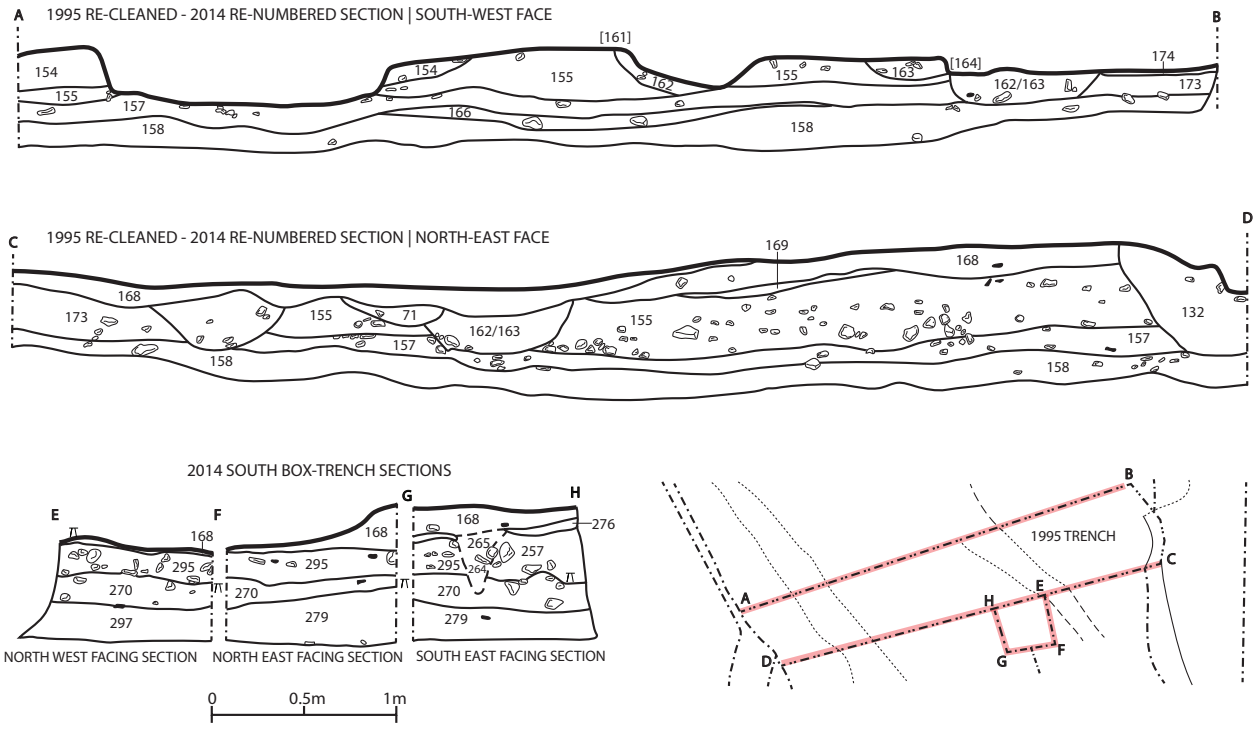


Figure 3.28. *The 1995 Horton-Trump Trench, recorded again in 2014 and re-interpreted. Note: the deposits in Box Trench 4 show the pit cuts on the southeast face which contained Thermi pottery.*

In BT6, Context (286) was a firm brown earth deposit containing frequent small-medium sized stones and animal bones. It was stratified between cobble layers (283) and (299) (see Fig. 3.20b). The micromorphology of (286) strongly contrasted with the underlying (301). It revealed a redeposited clay, mixed with a significant quantity of settlement waste such as coprolites, shell, a broken shell bead, ceramic material, three pieces of worked stone, twelve lithics (including one Lipari obsidian flake) and bones, some of which had been burnt (Appendix A3.7). The pottery assemblage from this layer contained sherds dating to the Żebbuġ and Ġgantija phases.

In BT4, Context (279) was the lowest level excavated and seemed to be equal to (198) on the east side of the 1995 trench. Context (279) formed a compact, dark greyish brown (10YR 4/3), loamy sand and contained sub-angular stones (4–7 cm). The quantity of pottery within it decreased in conjunction with an increasing depth. The pottery assemblage from this layer contained sherds dating to the Ġgantija, Tarxien, Bronze Age, and Tarxien Cemetery phases (see Figs. 3.26 & 3.27).

3.3.6. Level 4 deposits

Level 4 was a second stone cobble layer identified in all trenches. It was especially apparent in BT6, particularly where Context (173) connected across the 1995 trench section with the east side baulk. In the NB, Context (157) was a compacted, brown (10YR 4/3), sandy loam interpreted as lens and deposits in the Neolithic structure floor. Context (157) was covered by (156) and overlay (158) and (198). The adjacent Context (197) in the MQ was a firm, dark brown (10YR 3/3), clay loam covered by (178) and was extensive. A wet-sieved soil sample from it produced four cereal grains and four pulses. Context (197) also contained four lithics. The pottery assemblage from both (157) and (197) comprised mixed prehistoric fragments, with (197) containing one sherd of (presumably intrusive) Borġ in-Nadur phase pottery. Context (209) was located adjacent to floor deposits (157) and its covering Context (156). Composed of firm, brown (10YR 4/3), sandy clay loam, it formed a distinct stony area that abutted the large wall stones (172), forming a possible entrance area. It contained material no later than Tarxien phase. Finds included pot sherds, shells, animal bone and two pieces of chert.

In BT5, layers (271) and (283) were stony levels, visibly connected with the layers to the east. Context (271) was a firm dark greyish brown (10YR 4/2), sandy clay, beneath (262) and above (272). It was estimated to comprise of 20% stone, mostly sub-rounded blocks (20 × 15 cm) together with one obsidian and three chert

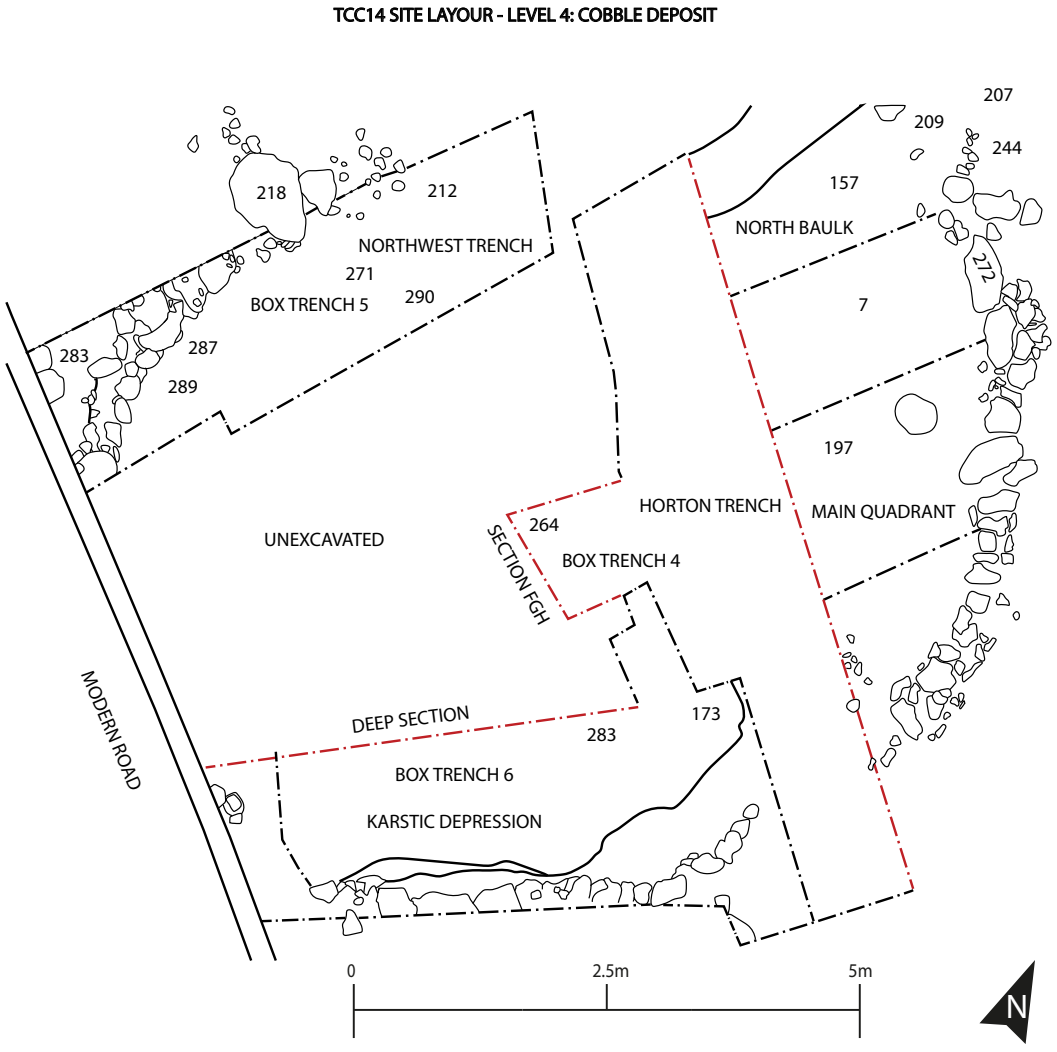


Figure 3.29. *Level 4 showing main cobble deposits.*



Figure 3.30. *View of the trenches through the eastern half of the structure.*

objects. Context (271) had a similarly mixed ceramic assemblage, including two Tarxien Cemetery phase sherds. Cut (289) was excavated as (262) (Level 5), but was later identified in section as a possible posthole cut below (262); its Fill (290) was a reddish colour and contained no cultural material.

In BT6, Context (283) formed a second cobbled surface, equivalent to (203), which was covered by (281) and overlay (286). Context (283) contained a mixture of Temple Period and Neolithic pottery, a charred barley grain and a small amount of animal bone. Context (281), above (283), comprised a mixture of stone rubble, sediment, mixed prehistoric pottery and a single chert flake.

3.3.7. Level 5 deposits

Level 5 was another stony, often cobbled, layer forming the foundation for floors above in Levels 6-7-8. In the NB, this was also recognized as the upper part of Context (7). Upon examination, however, it was subdivided as (156), and a possible dark coloured posthole Fill (177). Context (156) was not a cobble layer, but formed a firm, thin, brown lens in the NB, containing flecks of charcoal, with lenses and patches in the southern extent that equated to (196). Context (196) in the MQ, was a brown grey, compact deposit, containing an occasional dark lens (195) and a few, small-sized stones. The excavators reported that it sounded hollow when knocked. Context (196) became looser and browner in the west, towards the 1995 trench, and was equivalent to (156) in the facing section. These layers were interpreted as a compact deposit that contained dark, sooty lenses. The pottery assemblage from this layer contained Ġgantija and Żebbuġ phase material, two obsidian flakes (one identified as Lipari) and seven chert objects. Context

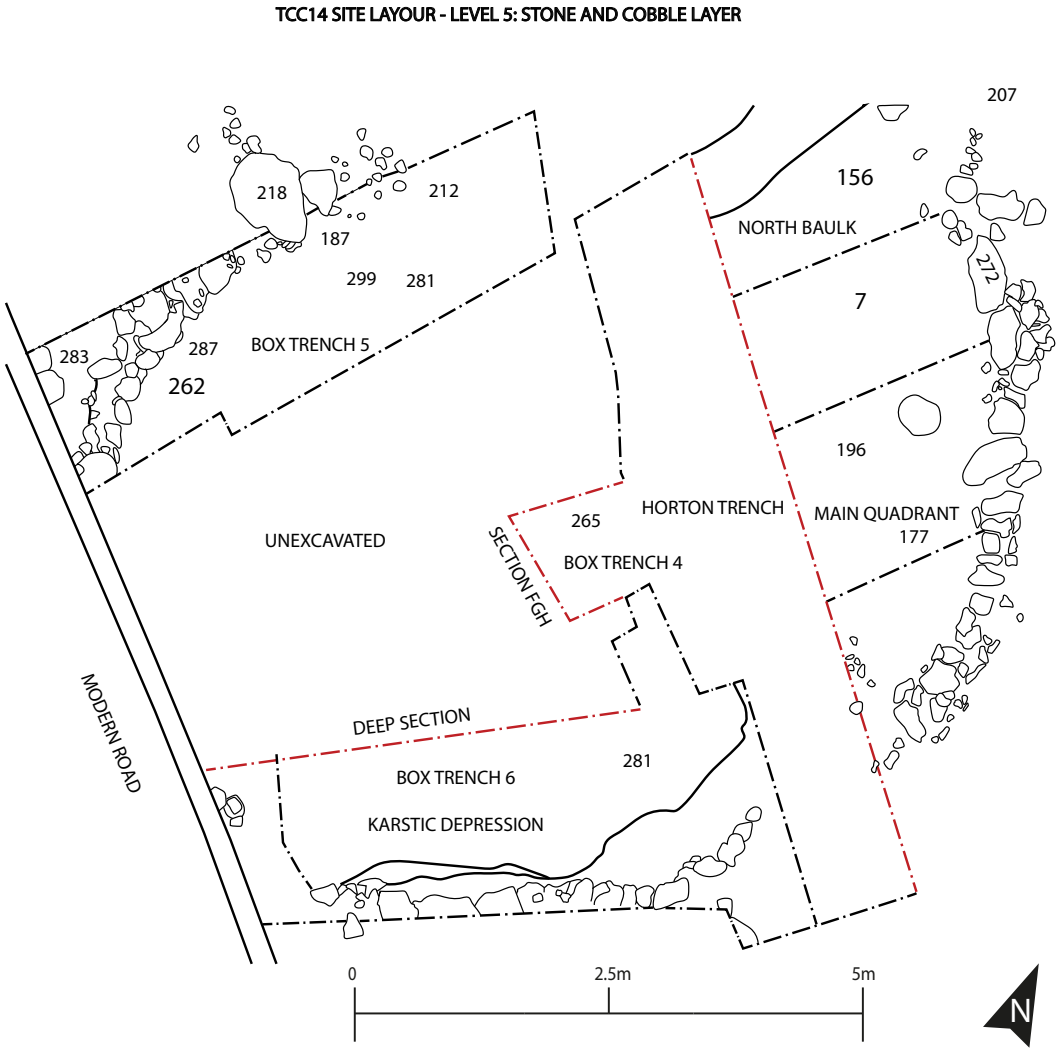


Figure 3.31. *Level 5 showing main cobble deposits.*

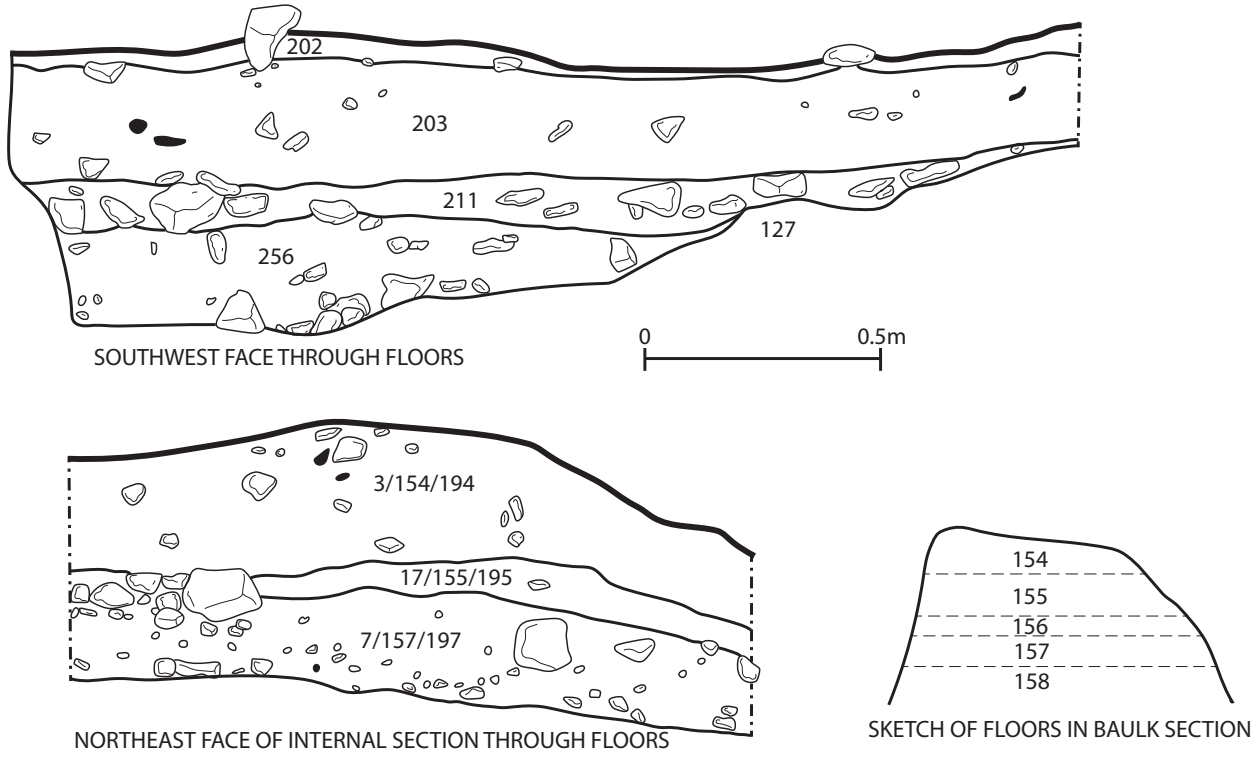


Figure 3.32. *Section record of the North Baulk in the Northeast Quadrant, left from the 1995 excavations.*

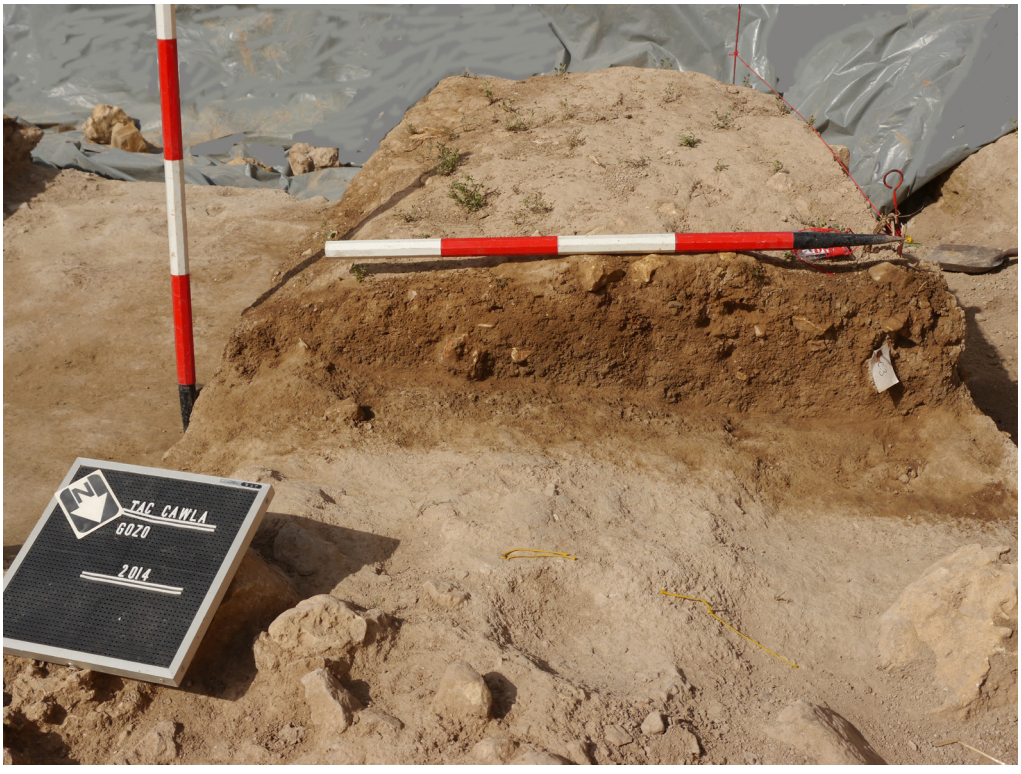


Figure 3.33. *Photograph of baulk in North West Quadrant showing the cleaned level 3 deposits.*

(196) produced three cereal grains. A potential truncated posthole cut through (156). During excavation, this showed as a Lens (177) that was sub-circular in shape and very thin in depth. Its position close to a megalith may support the interpretation of an internal post. In a small isolated area, context (177) overlay (157), and was identified as a friable, dark yellowish brown (10YR 3/4), silty clay loam, which appeared greyish-brown when dry and was devoid of finds.

In BT5, Layers (187) (162), (299) and (281) also appeared to be part of this general level of floor makeup and deposit, although the difference between these layers and those above and below was sometimes subtle. Context (262) was a compact, brown (10YR 4/3), deposit located beneath floor (186). It contained sub angular stones (15 × 10 cm) and was interpreted as a possible extension of (156) and (196) in the NB and MQ. The pottery assemblage from this layer contained sherds dating to the Ġgantija, Tarxien and Temple Period phases, as well as a small quantity of obsidian (five pieces from both Lipari and Pantelleria) and one chert artefact.

In BT6, Context (281) was a stony layer, beneath (280) and above (283), a mixture of stone rubble, sediment and mixed prehistoric pottery assemblage composed of mainly Żebbuġ and Ġgantija phase sherds and one lithic.

3.3.8. Level 6 deposits

Level 6 deposits comprised a series of yellow-white-brown floor deposits that overlay the stone and cobbled layers of Levels 4 and 5 with dark lenses. Level 6 was identified across much of the structure's interior, and provides a relative point of reference across the trenches. In the NB, Context (17) exposed in the 1995 excavation was noted to be equivalent to Level 6. This deposit was expanded to three sub-layers in the NB: Context (155); dark lenses defined as Context (166) that occurred below Floor (155) and above (157); and Lens (159). Context (155) was a firm, greyish brown (10YR 5/2), sandy clay loam that included Bronze Age pottery and three chert artefacts. Within (155), Context (166) was rich in pottery finds and interpreted as a levelling deposit. In the MQ, a dark-ephemeral lens (195) was sandwiched between (194) and (196), and was formed close to the structure's wall on the northeast side. Context (195) was a friable, dark brown (10YR 3/3), sandy loam. It contained voids indicative of root action that extended over much of the quadrant and formed a dark-powder within the harder yellow-grey and darkish soil matrix of Context (196). This context contained one obsidian and one chert artefact.

In BT5, Context (187) formed a stony floor below (186), which overlay (155) and abutted the possible wall (183). It was interpreted as a spread of stones that formed a levelling layer beneath (186). Context (187) was heavily truncated to the east, probably because of stone robbing. Context (186) was a compacted, brown (10YR 4/3), sandy clay with many ashy lenses present on the surface. This context was heavily truncated to the east and west, which probably occurred in the Bronze Age. Context (186) abutted wall (183) and was covered by rather disturbed layers (168) and (185). It produced a single cereal grain. Context (292) was at the base of the trench excavation, which was not extended to bedrock, and formed a yellow-brown clay loam. This context contained mostly Temple Period pottery, two lithics, and two sherds that most likely date to the Borġ in-Nadur phase. It abutted (287) and appeared to fill a cut against the heaped stone structure that was then covered by Context (245). Just outside the stone structure, Context (275) was a compacted, dark yellowish brown (10YR 3/4), sandy clay loam, below and abutting (262) and (97). Context (275) appeared to be part of a floor with a pottery assemblage that contained Ġgantija, Tarxien and Żebbuġ phase sherds and a single lithic.

BT4 revealed the same floor sequence as the area in the MQ (195) (155). Yet, the sequence had been disturbed in Level 6 and above by Cut [264], which cut into Context (267), and was filled by (168), (265) and (264) (see Fig. 3.27). In BT4, the exploratory excavation identified several layers and cuts. Context (270) overlay (279) in the cobble layer below, and was a sandy stone-rich deposit, which contained pottery and infrequent animal bones. These had been cut into by [264] and were sealed below (267), and the Fill (265) of Cut [264]. The pottery assemblage from this layer contained Tarxien, Bronze Age, and Thermi-style sherds. In a separate exploratory trench, Context (246) was a firm, mottled, brown (10YR 4/3), silty clay loam, flecked with occasional small red stones. It overlay (241) and was beneath layers (184), (213) and (214), and was interpreted as an occupation deposit, or prehistoric dump of material. The pottery assemblage from this context contained Tarxien and Temple Period material. Context (246) also produced a single cereal grain and two pulses, one chert and two obsidian fragments.

In BT6, a number of deposits were probably part of Level 6 and included Context (280), which was identified as a firm, dark brown (10YR 3/3), clay loam. This occurred beneath (276) and (269), and above (281). The quantity of pottery from (280) was less than that found in the overlying (276); but the layer was rich in Tarxien phase pottery and also contained one pulse. Context (276) was next in the sequence and comprised a firm, brown (10YR 4/3), silt loam, similar to contexts (203) and (157) in the MQ/NB. The pottery assemblage from this layer contained Żebbuġ, Ġgantija and Tarxien phase



Figure 3.34. *The cleaning and recording of the North Baulk (NB) and clearance of channel 10.*

sherds, as well as two that appear to date to the Bronze Age Borġ in-Nadur phase. Laboratory micro-morphological analysis revealed that the deposit was similar in composition to Context (286), but with even more coprolite mass and highly degraded faunal remains (see Appendix A3.7). A wet-sieved flotation sample of soil from (276) contained a charred lentil (*Lens* sp.), which was AMS radiocarbon dated to between 2465 and 2210 cal. BC (UBA-30423, 3858±36 BP). The faunal assemblage consisted of two cattle and two sheep/goat bones, and many other unidentifiable fragments; a cattle tooth was AMS radiocarbon dated to between 2830 and 2470 cal. BC (UBA-29835, 4032±34 BP). It is unlikely that the two radiocarbon dates from (276) derive from the same phase; they fail the χ^2 test when calibrated using the R combine function in OxCal (Bronk Ramsey, 2009). Instead, it is reasonable to interpret Context (276) as an accumulation of material brought into the site during several centuries of occupation spanning at least the Tarxien phase of the Temple Period.



Figure 3.35. *The cleaned floor (155) in Level 7 in the east of the structure exposing floor layers (156) below in Level 6.*

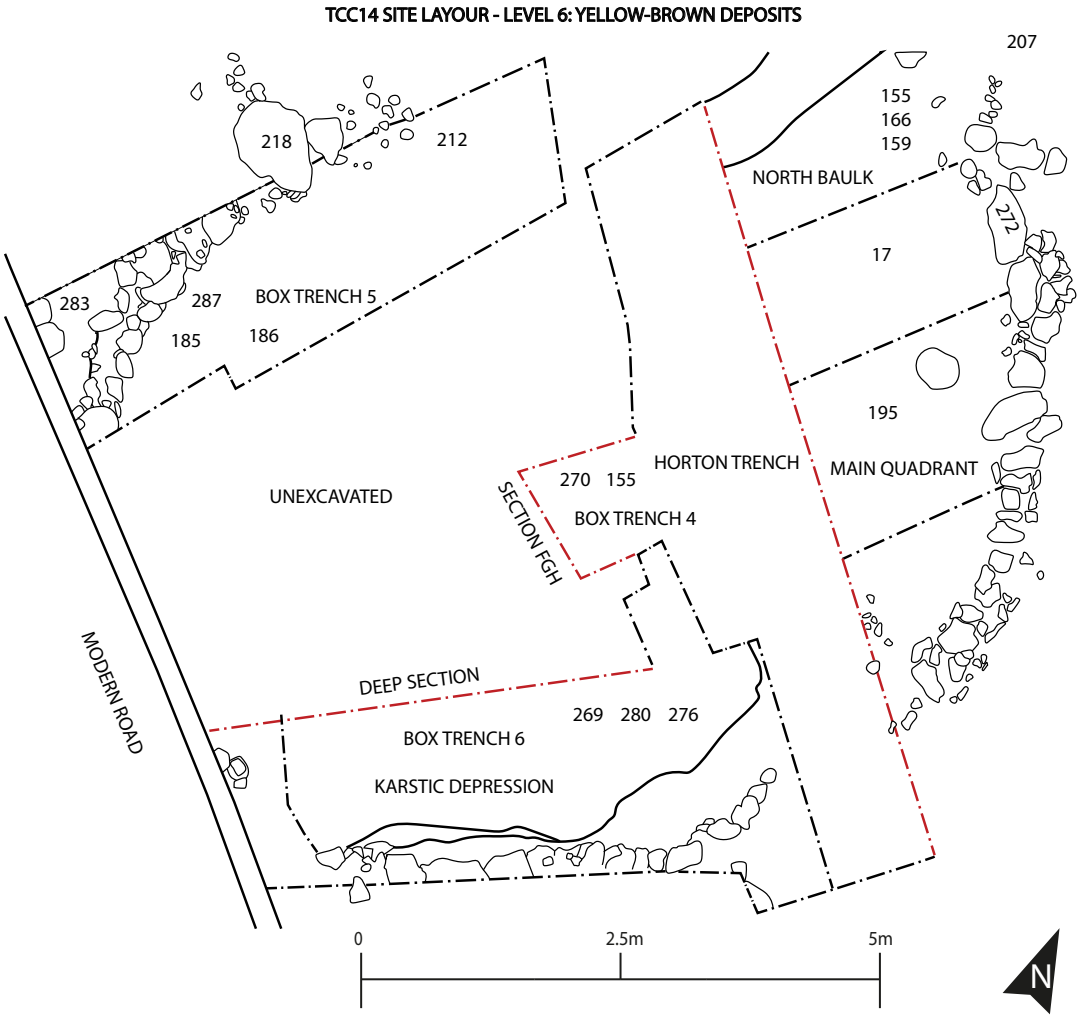


Figure 3.36. *Level 6 yellow brown deposits.*

3.3.9. Level 7 deposits

Level 7 was not stratigraphically above Level 6, but was represented by thin, sometimes ephemeral, ashy sooty layers sandwiched within or on the surface of Level 6. These were confined mostly to the eastern side of the structure. Context (17) in the NB was identified in the 1995 cut, and formed a thin lens over (7) that was interpreted as exposed ash lenses (see Fig. 3.5d). Its lower levels equated to Context (155). Finds from (155) included Bronze Age pottery and chert. Lens (159) was a dark grey/black lens of thin material within (155). The pottery assemblage from this layer contained Ġgantija and Tarxien phase sherds, and this context also produced a single cereal grain. Lens (160) was another dark grey/black thin lens of material in Level 7 within the NB. These root-disturbed occupation deposits in Levels 7/6 overlay Levels 5/4 and were sealed below Level 9. Context (170), exposed in isolated patches not visible in the western baulk long section, lay below Context (154) and above Context (155). It was a friable, dark yellowish brown (10YR 4/4), silty clay loam, and was interpreted as a layer of dump material, possibly slumping from the central part of the structure's floors. Finds from (170) included pottery and one piece of obsidian. Lens (169) was a shallow lens of dark grey material between (168) and (155).

BT5 Level 7 deposits were quite mixed and intermingled. They were recorded in section, with some layers occurring just outside the 'wall' line of the structure. Context (288) was a dark brown deposit beneath (168) (a deposit found across the west part of the site), and above (262) (Fig. 3.15c). Fill (254) was a compacted, greyish brown (10YR 5/2), silty clay fill of [234], and lay beneath (245). Cut [255] was a cut to the east of floor (186). It was covered by (168) and (169). Context (267) in BT4 above Context (270), was a friable



Figure 3.37 *(right). Cleaned floor deposits in Context (195), showing burnt residues and ashy lenses.*





Figure 3.38 *(left and above). a) Section cut through floors close to stone wall 172, with burnt lenses visible; b) detail of burnt deposits sealed by plaster floors.*

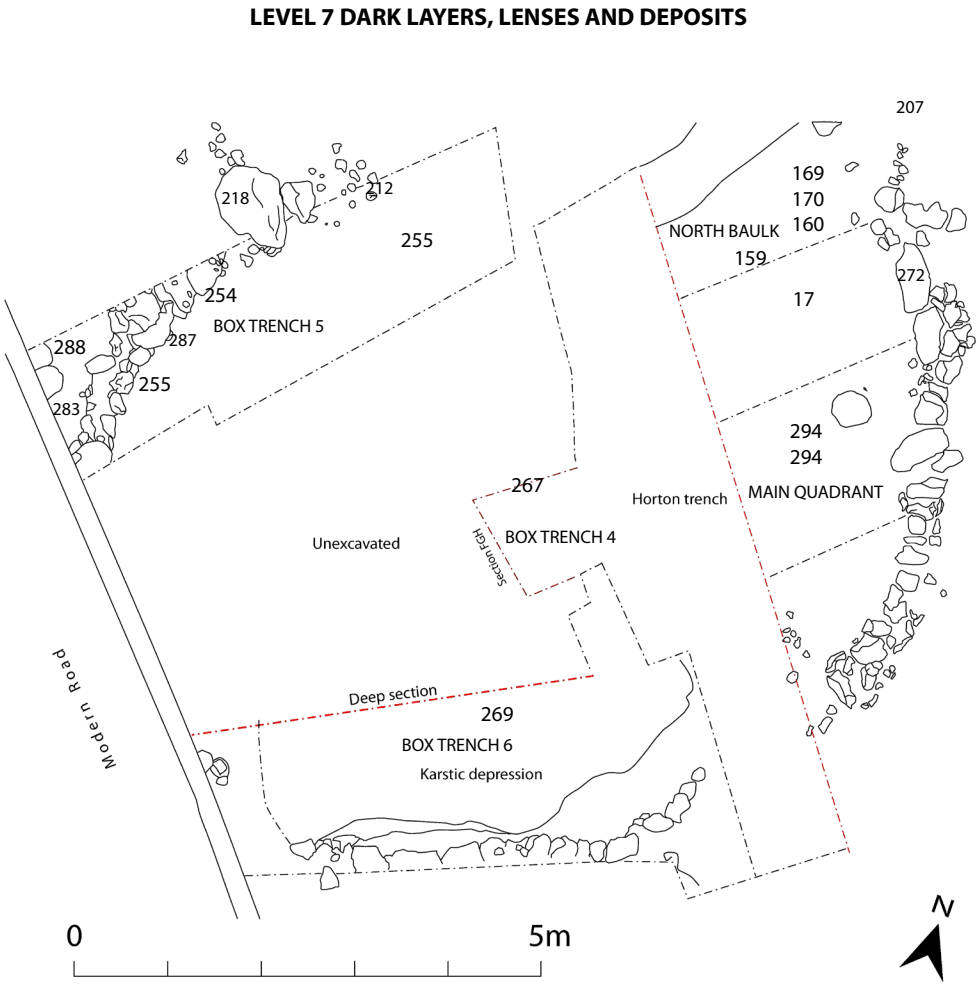


Figure 3.39. *Level 7 deposits, showing location of main dark lenses and floors.*

dark grey (5YR 4/1), ashy silt, and was covered by (168) and cut by (165). The pottery assemblage from (267) contained Temple Period phase sherds. BT4 presented disturbed deposits in Level 7-8, with a deep Cut [264] that was cut into Context (267) and slightly into (207), and was filled with Context (265) (Fig. 3.27).

In BT6, Context (269) was a firm, greyish brown (10YR 4/2), silty sand that overlay (276). This was not a structured deposit, but rather a 'dump' of material made inside the decaying stone structure. The assemblage from this context included pottery dating to the Temple Period, the end of the Temple Period/earliest Bronze Age (Thermi phase), and the Borġ in-Nadur phase of the Bronze Age. The latter were probably intrusive. Yet, the presence of pottery from so many phases suggests a considerable time-depth to the makeup of this context's constituent parts. Context (269) was covered by (241) (Fig. 3.16).

3.3.10. Level 8 deposits

Level 8 comprised levels of cream-brown deposits that may have derived from earlier plaster and beaten earth floors. This level and all those above were increasingly mixed and disturbed by later cultivation, demonstrated by Roman period pottery. Context (3) was a compact pale silty loam that appeared to be a disturbed floor deposit incorporated into plough-soil. This had already been explored in 1995, and upon further excavation it was sub-divided into several more layers in the southern part of the MQ. Context (193) formed the upper floor level, and this equated to (154) in the NB where it was stratified beneath (2). It was a friable, dark yellowish brown (10YR 4/4), sandy clay loam comprising a mixed deposit with numerous finds (pottery, four chert artefacts and bone). Several of these layers contained Bronze Age pottery, indicating a relatively late reuse, or heavy disturbance of the upper levels of the stone

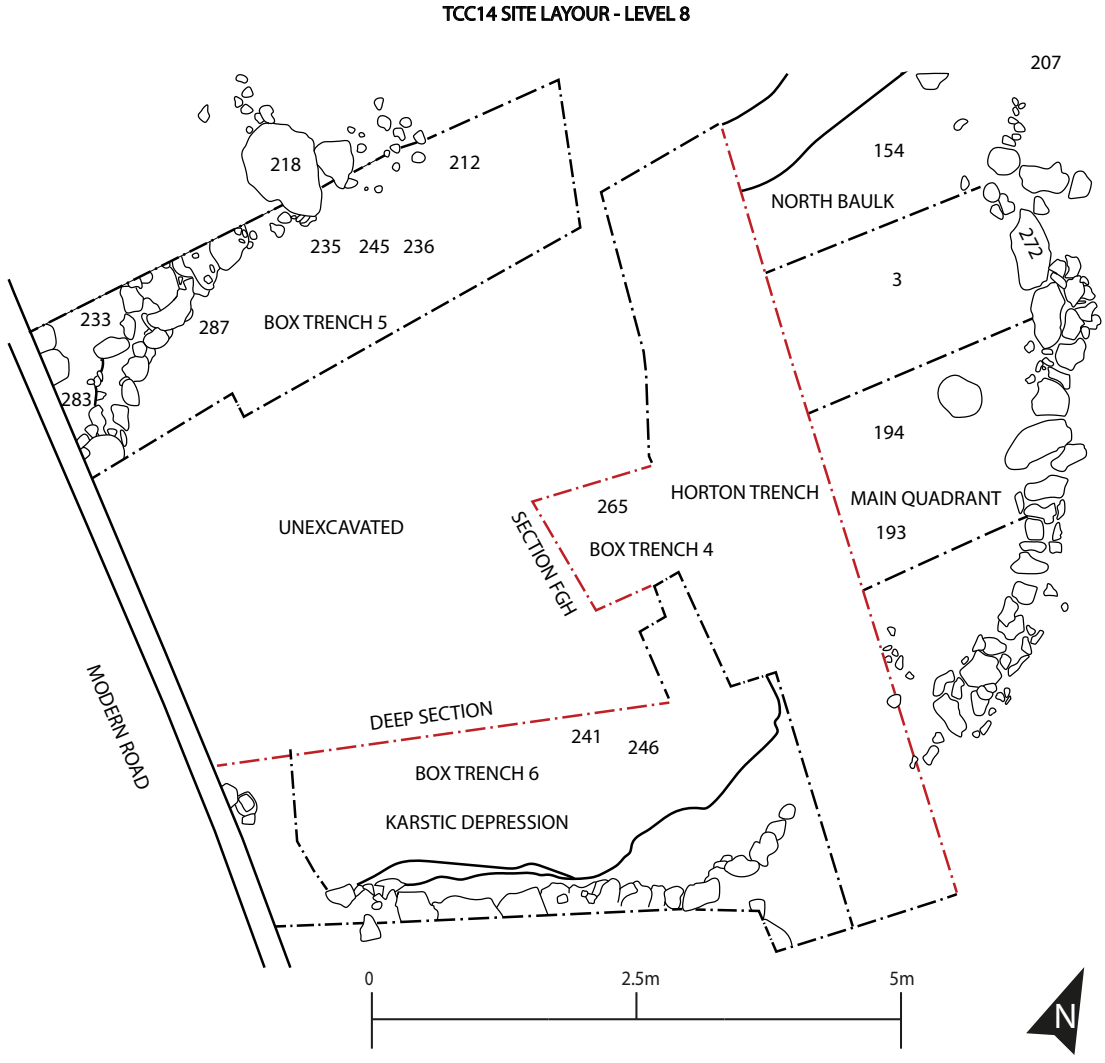


Figure 3.40. *Location of the main Level 8 deposits.*



Figure 3.41. *General view looking south of excavation beyond the 1995 trench, which has been labelled with new context identifications.*

structure into the early second millennium BC. In BT4, Context (265) was a friable, reddish brown (5YR 4/2) sandy loam, which contained pottery that appeared to date to no later than Temple Period, but must also date to the Bronze Age on the basis of its stratigraphic position. In BT5, Context (245) overlay (292) as a compact, dark brown (10YR 4/3), silty clay, beneath (235), and was possibly a lower fill of Cut [234], which can be distinguished in section (Figure 3.41) where it is cut against the stone heap of (287). The assemblage from (245) contained pottery dating to the Roman, Tarxien and Żebbuġ phases, three obsidian objects (from both Lipari and Pantelleria) and three chert objects.

Context (241) in BT6 extended unevenly over much of the trench as a compact, brown (10YR 4/3), sandy silt loam. It was interpreted as a possible trampled surface, rich in animal bone and pot sherds dating to the Early Bronze Age and Thermi phase. Above (241), Context (246) formed a firm, mottled, brown (10YR 4/3), silty clay loam, flecked with occasional small red stones, and covered by layers (184), (213) and (214). Context (246) was interpreted as an occupation deposit, or a prehistoric dump. The assemblage from this context contained pottery dating to the Tarxien, and Temple Period phases, two pieces of obsidian, a chert flake, a single cereal grain and two pulses.

3.4. Superficial levels and the Roman vine channels

The layers above Level 8, described collectively here as Level 9, comprised a dark greyish-brown ploughsoil and various modern/recent fills, but they did not represent a reliable stratigraphy. Only Layers (3) and (154) in the NB area provided a reference to other similar layers ((185), (193) (201), (214), (227), (87), (212)), which were located within and over the stone structure. Many of these deposits actually extended over and beyond the line of the buried wall, blending with the disturbed superficial levels of the site. A series of superficial layers and cuts ((267), [264], (265), [263], (189), (212), (213), (237), (218), (183), (184), [180], (181), (86), (87), (217), (221), (88), (101), (89), (148), (147), (26) and (4)) (see Appendix Table A3.1.1) overlay these deposits. A representation of the stratigraphy in this area can be found in a context sequence diagram in Tables 3.1 and 3.2. Pottery was retrieved from all layers, but lithics were scarce, comprising only 20 pieces.

3.4.1. North Baulk and Main Quadrant

The area of the NB and MQ (see Table 3.1; Figs. 3.31 & 3.39) was the best-preserved stratigraphic sequence of the site, and although they were cut at frequent points, the deposits were fairly clear. Context (193) equated to the upper part of Level 8, and was identified as Level 9. This formed a firm, creamy-brown layer that was particularly dry and firm in the upper, desiccated portion, and was described as friable, very dark greyish brown (10YR 3/2), loamy sand. Context (213) was a compacted, whitish grey deposit in area B to the west of the Horton/Trump trench. It appeared to be similar to (186), which was a *torba*-type floor, and was covered by (167) and overlay (246). Context (213) was interpreted as a small patch of flooring left intact after modern activity. It produced a single cereal grain and one pulse. In the MQ, the Roman vine trenches had disturbed the upper levels of deposit and Cut [297] may have represented the end of a channel that cut across the prehistoric wall (172) into the interior of the structure, through layers (200) and (203). This cut was filled by (199) and was interpreted as a probable Roman vine trench. Its Fill (199) penetrated multiple Neolithic layers, stopping at (198). The pottery assemblage from this fill contained mixed sherds dating to the Roman and Tarxien phases. Context (240) was a compact, grey, fine deposit covering the large stones from wall (172), butting the base of Cut [52]/Channel 10 and lying below (200). Context (240) had been cut into (Cut [19]) by the 1995 excavation. The layer was cleaned in section in preparation for drawings and interpreted as integral with the large base stones from the wall exposed beneath Cut [52]. The long-exposed channel (under polythene covering) was desiccated, which obscured the subtle layering that may once have been visible. The pottery assemblage from this layer contained sherds dating to the Ġgantija and Tarxien phases.

3.4.2. Box Trench 5

BT5 was initially excavated in three small box trenches (Fig. 3.15a, b, c). These were later combined into a single deep trench. From the base up, Context (237) was a stony spread of (221), beneath (185) to the exterior, lying west of the line of the structure wall. This area had been heavily disturbed in modern times, and only the base levels provided useful stratigraphy (Figs. 3.17 & 3.41; Table 3.1). It is recorded here, however, to inform on the samples that were gathered. Context (237) was interpreted as spoil from robbing out (212) when Cut [88] was dug. Context (185) was a firm, brown (10YR 4/3), silty clay loam above floor (186) related to these spreads. Their relationship with (168) and (87) was not entirely clear, but they were all similar dump layers dating from the Bronze Age to the Roman period. The area around the wall limits had many dump layers with similar lenses. It was very likely that Layers (185) and (87) dated from the same phase, post-dating the underlying Context (168). Finds from (185) included a chert and an obsidian flake, whilst pottery included



Figure 3.42. *View of the extramural layers, marked and labelled in Box Trench 5.*

Bronze Age and Roman material. Context (190) was equivalent to (185). Fill (189) was a firm, brown (10YR 4/3), silty clay, which filled Cut [263]. This seemed to cut around the megaliths (183) and (218), between prehistoric Context (262), which contained Bronze Age and Roman pottery. Context (184) overlay (71) and (155) as a friable, dark grey brown (10YR 4/2), silty clay loam with frequent medium to large stone inclusions. It lay below modern layers (94) and (167), but its relationship to the stone layer beneath (213) was unclear. Context (184) produced four cereal grains and three pulses, as well as Roman pottery and was interpreted as Roman in date. In turn, it overlay Fill (71) of Cut [70] with a pottery assemblage containing Temple Period pottery. Context (201) was a disturbed layer, west of wall (172) and layers (193) to (198). It was a loose brownish soil with stones and root disturbance. Context (221) was a compacted, dark yellowish brown (10YR 4/4), silty clay, which contained some loose stones located within wall (212). Context (221) was covered by (87) which had a similar matrix. This was interpreted as a Roman plough soil. Finds from (221) included pottery, charcoal and obsidian. The pottery assemblage from this layer contained Roman material.

Context (226) was a compact, dark brown deposit, covered by (184), and was similar to (246), which was deeper in the sequence. The assemblage from this layer contained Roman and Żebbuġ phase pottery and one chert object. Context (167) was a firm, brown (7.5YR 4/6), silty clay loam, and lay beneath (94). It had a similar consistency to (30), which it abutted, but contained modern materials indicating a disturbed plough-soil. Fill (235) in BT5 formed an upper fill of Cut [234] above the lower Fill (245). It was a firm, dark yellowish brown (10YR 4/4), silty clay. Context (235) was covered by layers (236) and (185) and contained five Roman pottery sherds mixed with earlier material, and two Lipari obsidian and two chert artefacts. Context (236) above was a firm, dark brown (10YR 4/3), silty clay, west of [234], beneath (185) and partly overlying (235) where it formed an ephemeral crusted surface on top of (235). Finds included some pottery. The next layers, (214), (185) and (168), were firm, brown soil 'dump' deposits or unstructured accumulations that had formed long after the structure had decayed. Large stones embedded in these BT5 deposits were assigned the context number (218). Cut [88], found when first clearing the area at a very superficial level, was circular in form, burnt on the outside and contained a grey lining (possibly clay) approximately 1 cm wide. An oxidized lip around the cut indicated this was a vessel or drum that was probably used as a kiln (see Fig. 3.79). Its Fill (89) was firm, dark yellow brown (10YR 3/4), sandy loam, and the feature was enclosed by (87) and stratified above (101). Fill (89) contained ash and charcoal, although not as much charcoal as (101). This was evidently the remains of kiln firing. Finds from (89) included chert debitage, animal bones, Roman and mixed pottery (Fig. 3.39). Context (217) was a brown soil which had a similar consistency to (30) and (87), and was covered



Figure 3.43. *View of the intermediate stage of excavation of BT6 with the emerging bedrock edge and overlying wall (172).*



Figure 3.44. *View of the excavation of the internal floors and structure wall, looking north.*

by (1) and (30). Cut [188] was a cut into earlier soils (155) and (189), and was defined by a clear orange band in browner soils and its Fill (1) was full of modern material. This was interpreted as a modern cut into earlier soils. The overlying, and extensive superficial Context (87) that occurred beneath the topsoil was a firm silty clay, dark yellowish brown (10YR 4/4), which contained small (1 cm) limestone inclusions. It had probably accumulated over time as a ploughsoil, covering Roman levels and Context (185). The mixed pottery assemblage from this layer contained sherds dating to Roman, Temple Period, Żebbuġ and Bronze Age phases. Above this deposit, Context (1) was a recent levelling topsoil/ previous excavation backfill. It was a mixed stony friable, dark yellowish brown (10YR 3/2) soil. Finds included prehistoric pottery and a wide variety of modern material such as plastic, drainpipe, glass bottles, Kodak film roll, and food wrappers, as well as eight lithic artefacts. The mixed pottery assemblage collected from this context contained sherds dating to the Roman, Ġgantija, Tarxien and Temple Period phases. Context (1) was mostly excavated by machine, and the finds were treated as coming from one layer with no differentiation between topsoil and backfill. This layer was ubiquitous across the entire excavation area.

3.4.3. Box Trench 4 and main (Horton-Trump 'H') trench

A small box trench, approximately 1 sq. m, was cut into the west side of the 1995 Horton Trench ('H') to examine an area of complex stratigraphy (Fig. 3.27).



Figure 3.45. *Internal floors and the remnant walls (172) looking south, with the North Baulk removed exposing the lenses at its base. The 1995 trench visible beyond under polythene.*



Figure 3.46. *The wall structure looking west towards BT6 and the location of BT4 and BT5 beyond.*

Above and west of the box trench, a series of deposits were explored. They included Context (227), a grey deposit beneath (214) with a similar makeup to (155) and interpreted as equivalent to (246). The pottery assemblage from this layer contained Temple Period and Żebbuġ phase sherds. Context (214) was a compact, brown (10YR 4/3), sandy clay with small stone inclusions and covered by (168). It was interpreted as a plough soil overlying the south and west of Area B to the west of the Horton/Trump trench. Context (86) was a compact, mottled deposit underneath the Horton/Trump spoil heap within the area of the Neolithic structure. It formed a crusted layer on top of (96) and (97) and was interpreted as an ephemeral crusted lens, equivalent to (168). The pottery assemblage from this layer contained Roman and Bronze Age material. The long section of the 1995 trench and BT4 traced (168) and lens (169) across much of its length, suggesting that these contexts cover a large area. Context (168) was a firm, brown (10YR 4/3), silty clay loam, probably better preserved than layers sealed by (185) and found on the southwest side of the interior of the structure. This seems to represent a truncated Roman period surface; Lens (169) was found under it in places and comprised a shallow deposit of dark grey material overlying (155). Covering these strata were equivalent Contexts (226) and (246). These were both similar in composition to the loam deposits below, but also yielded finds that included ten Roman pottery sherds and three lithics. Cut [96] was made into these layers, and was exposed under (86). It was interpreted as spoil from a previous excavation. Fill (97) was a yellowish brown (10YR 5/4), sand filling (96). At a superficial level, cutting across much of the internal structure, modern Cut [182] (the extension of Vine Channel 7, [70]) penetrated layers (71), (155), (163) and (186) and contained modern material layers (94) and (167). Machine marks are clearly visible, so it was likely machined out to create a hole for dumping. Covering this was modern soil and debris, identified as (94).

3.4.4. Box Trench 6

BT6 (Figs. 3.16 & 3.42), located in the southwest corner of the excavation, contained the deepest stratigraphy on the site, and followed the edge of a natural karst feature. The limestone edge influenced the shape of the

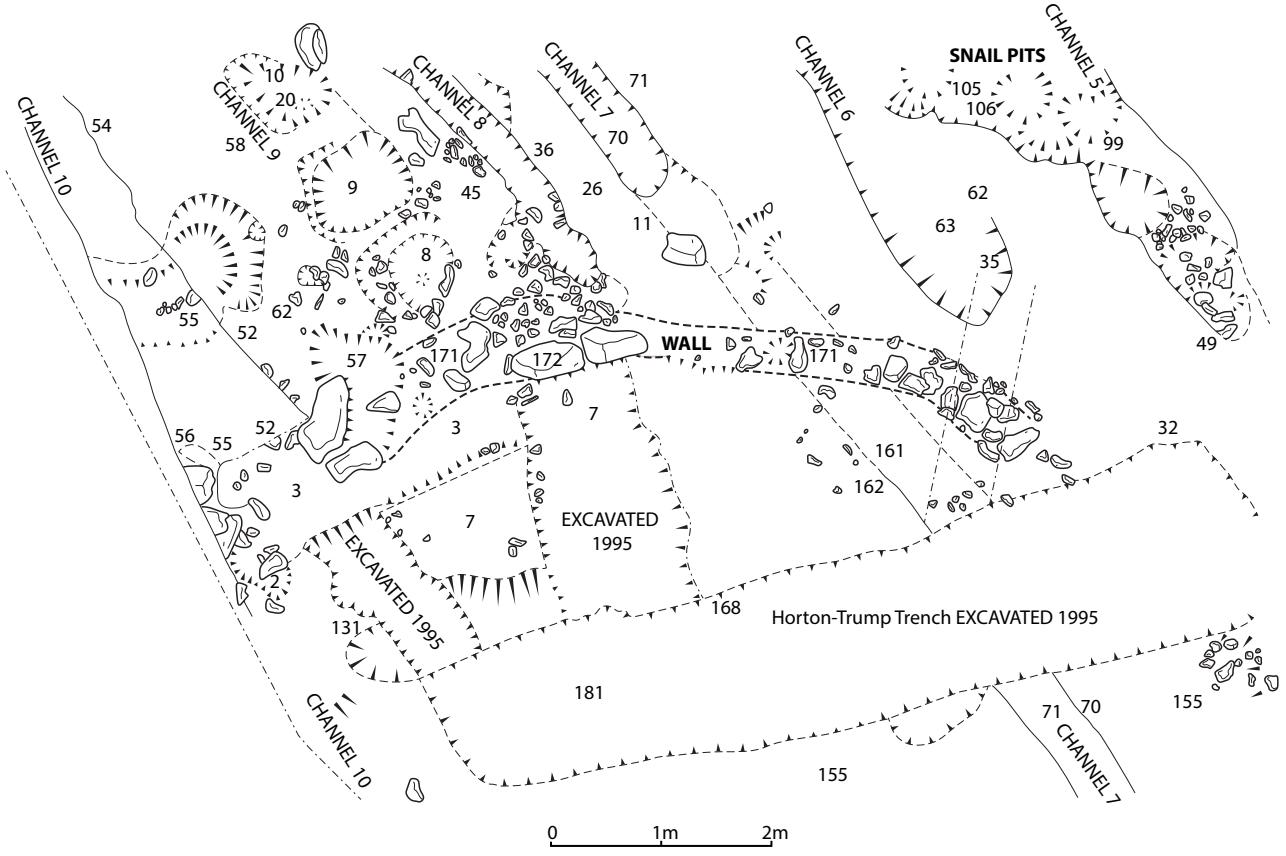


Figure 3.47. *Upper excavation levels of the area to the north of the stone structure, showing vine pits and agricultural channels.*

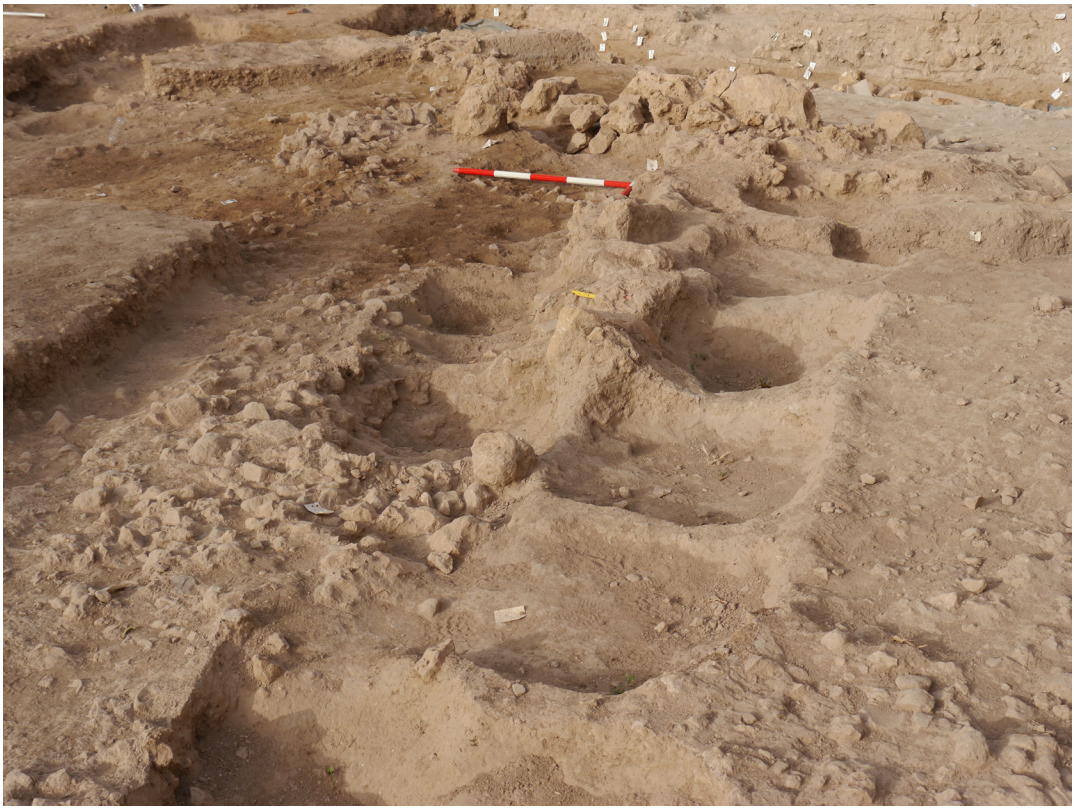


Figure 3.48. *Partially cleared vine pits, revealing remnants of the wall 207 extension preserved between the two pit rows.*



Figure 3.49. *View of the late stages of excavation looking west–southwest with (207) wall and exposed bedrock,* terra rossa *in foreground, the main structure wall mid-image and the box trenches (from L to R) BT6, BT4 and BT5.*



Figure 3.50. *Vine pits (8) and (9) during clearance showing possible postholes within the pits and the emerging stone walled structure beyond (172).*

superficial features, in particular Cut [257]. This was a rectangular, poorly defined pit, whose base sloped downwards to the west, and contained Fill (258), which was defined as a friable, dark yellowish brown (10YR 4/4), loamy sand, with frequent fragments of crushed snail shell. This context was covered by (246) described below. The top of the pit may have been undercut on its west edge and filled by (260), but the relationship between the two was unclear, and (260) may have been an unrelated fill intruding into (258). The pottery assemblage from this layer contained sherds dating to the Ġgantija phase. Another superficial deposit was Context (260), which contained a concentration of adult snail shells with friable, dark yellowish brown (10YR 4/4), loamy sand between them. It was covered by (241) and (258), and was identified as the remains of a Roman period snail midden.

Context (246) (Fig. 3.44 for location) was a firm, mottled, brown (10YR 4/3), silty clay loam, flecked with occasional small red stones, and containing two obsidian and one chert flake. It was covered by layers (184), (213) and (214) and interpreted as the highly disturbed remnants of prehistoric occupation debris. The assemblage from the context was dominated by pottery sherds from Tarxien and other Temple Period phases, and also contained obsidian and chert waste. The cut [216] of a modern (1990s) bedding trench for a block wall to the west of the site bordered the western edge of the site, and indeed, caused considerable destruction of underlying layers. It contained Fill (215), which was a very dark and friable soil, filled with modern material and covered by (1).

3.4.5. The prehistoric deposits outside the wall east of the stone structure

The zone beyond wall (172) outside the stone structure, was excavated to bedrock, with a small baulk left to record the stratigraphic depth (see Fig. 3.44). This zone was excavated in an arc stretching from the deep Channel 10/Cut [52] in the northeast, south-ward to the southern boundary of excavation defined by Channel [62]. The work clarified not only the internal deposits of the structure, but also the related extramural features that had potential to reveal aspects of the domestic settlement. The sealed deposits were systematically excavated and sampled, yielding valuable palaeoeconomic and dating information, especially of the Ġgantija phase. At the base of the deposits, which

Table 3.2. *Exrtramural deposit sequence in the main trench east of the stone structure.*

Level	Layer	Description
Level 5 Old ploughsoil layers	58, 147, 148, 174, 175	Mix of Ġgantija / Tarxien pot
Level 4 Floor base stones	4, 7, 32, 35, 74, 136, 137, 138, 139, 178, 179, 191, 192	Mix of Ġgantija / Tarxien pot
Level 3 Stones	26, 174, 175, 176, 205, 206, 208, 209, 210, 239	Radiocarbon 3300–3100 BC
Level 2 Fine brown and dark deposits	222, 228, 233, 238, 239, 243, 247, 249, 250, 266	Predominantly Ġgantija pot
Level 1 Base *terra rossa* dark red-brown soil	244, 248, 251, 252, 253, 259 261, 268, 273, 277, 278, 300, posthole cuts	Radiocarbon 3600–3300 BC
Bedrock	127	

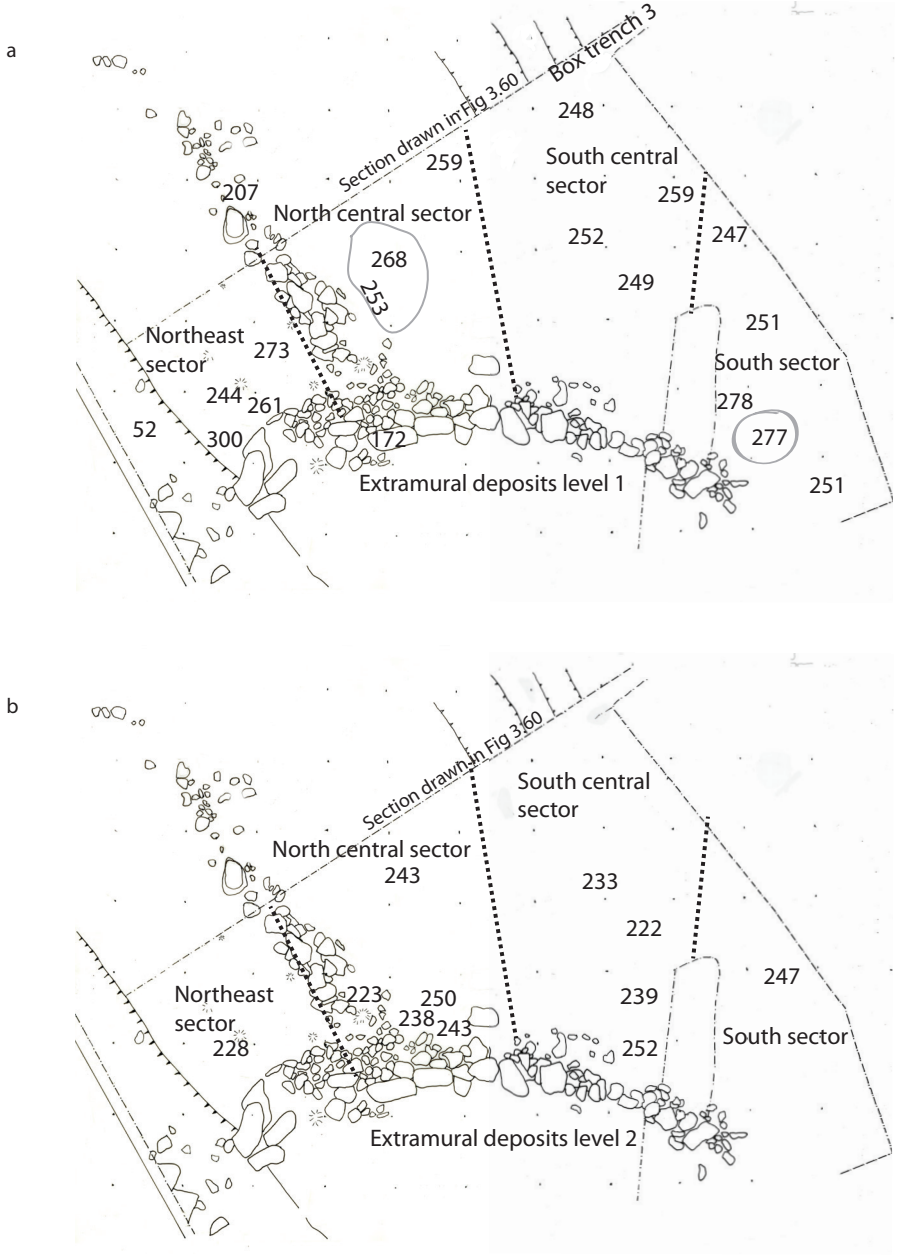


Figure 3.51. *The sequence of contexts in the extra-mural deposits in a) Level 1 and b) Level 2.*

extended as an arc around the north, east and northwest sides of the drystone wall, a series of compacted stony deposits formed a base level to depressions in the natural bedrock. These depressions were variously filled by *terra rossa* or by midden-type deposits, often with sooty lenses. The sequence is described as follows from base upwards.

The sector was defined by Wall (207) a linear stone feature extending roughly at right-angles northeast from the main prehistoric stone structure (172). It comprised six large stones and many smaller ones, in a matrix of clay loam, interspersed with sporadic finds of highly fragmented prehistoric pottery. There was a significant gap between the (172) wall edge (identified as (223)) and the first stones of (207), which suggested another 'entrance' area. When sampled and wet-sieved, the loam matrix (207) produced five cereal grains and one pulse.

3.5. The lower levels of extramural occupation

3.5.1. Summary

The area east of the stone structure was excavated and recorded in segments (sectors) that rayed out from the stone walls. Some contexts were ubiquitous across the lower levels in the zone encircling the building. Underlying all layers, bedrock (127) formed an undulating and often fractured surface, sloping towards the south of the site, with sediment increasing in depth from east to west. The layers were sometimes varied and recorded as separate contexts, but overall, it was possible to distinguish five main stratigraphic elements to the extramural deposits that commenced early in the Ġgantija phase, as shown in Table 3.2.

At the base of the sequence located directly northeast of the stone structure, the area was divided into four segments and recorded from north to south as Northeast Sector, North Central Sector, South Central Sector, and South Sector. Three sections extended from the east of the stone wall (172) to the line of BT3 (Figs. 3.56a & b, 3.59a & b, 3.60). The foundation deposits were generally similar, but designated by separate context numbers; these were: (244) in the Northeast Sector; (243) in the North Central Sector, which also included Cut [253] that contained (268); (248) and (259) in the eastern part of the South Central Sector, whilst the western area of the Sector was identified as (249)–(252); and (247) and (251), which were separated by a mini-baulk in the South Sector. Other similarly generic contexts above these base levels include (205) and (206), which were widespread layers. Both (247) and (248) contained a small number of Roman period sherds, indicating later disturbance, although the overlying strata contained only prehistoric material (Tarxien and earlier), so it is not clear what form this disturbance took. The precise find-spots of the sherds in question is not known. Yet, given that the sequence of the deposits seemed *in situ*, especially those close to and butting the building wall, it is probable that the area was disturbed through bioturbation or a cut/fill sequence localized to one area, but not leading to any persistent archaeological traces. The area had been subject to intensive Roman agricultural exploitation (probably the cultivation of vines and fruit trees) which could explain the movement of small sherds. The following description deals with each segment, recording the stratigraphic contexts from the base upwards.

3.5.2. The Northeast Sector

The Northeast Sector sequence segment lay between the western edges of excavation defined by the 1995 small trial trench and Channel [52] to the line of BT3, which defined the excavation area to the north (see Fig. 3.60), and the small wall projection from the stone structure (207) to the east. The northern edge of the wall (172) contained a distinct gap in the larger wall stones on the eastern edge of the Sector. Instead, it comprised a rough cobbled surface intermixed with soil and fragmented pottery from the Tarxien phase and earlier. This strongly suggests an entranceway of sorts, possibly with two openings, separated by four remaining large stones (although damage from later vine trenching cannot be ruled out).

The basal deposit in the Northeast Sector was Context (273), a red brown sandy clay loam. This contained a large number of prehistoric pottery sherds from the Skorba, Żebbuġ, Ġgantija and Tarxien phases, twelve chert and two obsidian artefacts, charred cereals and pulses, and the bones of cattle and sheep/goat. It also contained concentrations of stones, which in one place resembled a cobbled surface extending about 80 × 60 cm. This feature was defined as Context (300), sealed beneath Context (261) located directly outside the wall (172). Layer (273) was cut by a possible posthole [284], positioned beside the possible entrance. This may have represented a door post or some other timber post structure. Cut [284] measured 20 cm in diameter and was filled by (285), which was a reddish brown loam devoid of finds. Other postholes were suggested by natural depressions in the bedrock and base deposits. The most northeastern posthole was Cut [294], located about 1.6 m from the edge of the threshold. This was also the largest feature, measuring about 22 cm in diameter and 16 cm in depth. Posthole [294] was filled by (293), a firm reddish brown (5YR 4/4) sandy, clay loam with few stones. Smaller, but similar features were represented by Cut [289] and Fill (290), located against the north side of wall (207) against the southern edge of the Northeast Sector; and [294]/(293)

located within the cut of the Channel [52] (Vine Gully 10) at the northern edge of the Sector. These features were of a similar form, and exploited crevices and depressions in the bedrock (Figs. 3.51 & 3.54). These features form a rough rectangle, and may potentially suggest an extramural structure.

The next layer immediately outside and extending around the wall was Context (261). This was a compacted, dark reddish brown sandy clay loam, containing medium-large sized stones and significant assemblages of pottery and organic debris, very similar to what was found in (273). The layer was particularly rich in lithics, yielding some five obsidian flakes (from both Lipari and Pantelleria) and almost fifty chert pieces. Dark patches of soil mixed with charcoal were also present within the layer, and it produced three cereal grains and five pulses. The pottery assemblage included Skorba, Żebbuġ, Ġgantija sherds and some Tarxien pottery. Context (261) was covered by the extensive Context (244). This was a compact, dark reddish brown (5YR 3/3), sandy clay loam, and was stratified below (228) (139), (208) and (209), immediately outside the structure wall or entrance threshold on the northeast corner. Context (244) extended to [52] and the eastern edge of excavation, and it butted against (207) to the south and appeared to butt against wall (172). Context (244) was rich in lithic fragments, (15 chert objects), which could imply that this extramural zone was used for knapping or disposal of lithic waste. Above (244), Context (228) was a friable fine brown loam, beneath Context (208). This latter was a mixed deposit of soil and stones, containing a large number of Tarxien phase and earlier pot sherds and 13 lithics, of which two were obsidian; and (208) in turn, was sealed by spread (136), discussed below.

The area was only excavated to the start of the stony spread in the northeast (which extended for some 2 m), but it contained two distinct areas of post or stake holes cut into the deposits. The first of these comprised three postholes, and possibly a fourth, set in a line parallel to the edge of the wall/threshold (172) and about 50 cm apart from each other. The cuts [224], [230] and [232], and possibly a fourth, close to [230] (Table 3.3; Fig. 3.52), were covered by (139) and (208). The fills contained some pottery, whilst the surrounding, underlying deposit (244), was considered equivalent to layers (243), (247) and (249). Context (244) contained a rich assemblage of pottery from Żebbuġ, Ġgantija and Saflieni phases and 11 cereal grains and 17 pulses. This comparatively large botanical sample could imply that the area was a focus of food processing or storage.

Cut [224] was the most southerly of three postholes in a line running parallel to the structure wall (172), and across the possible threshold. The cut was about 20 cm in diameter and 16 cm deep, and filled by a Fill (225). The feature was sampled and sectioned. Fill

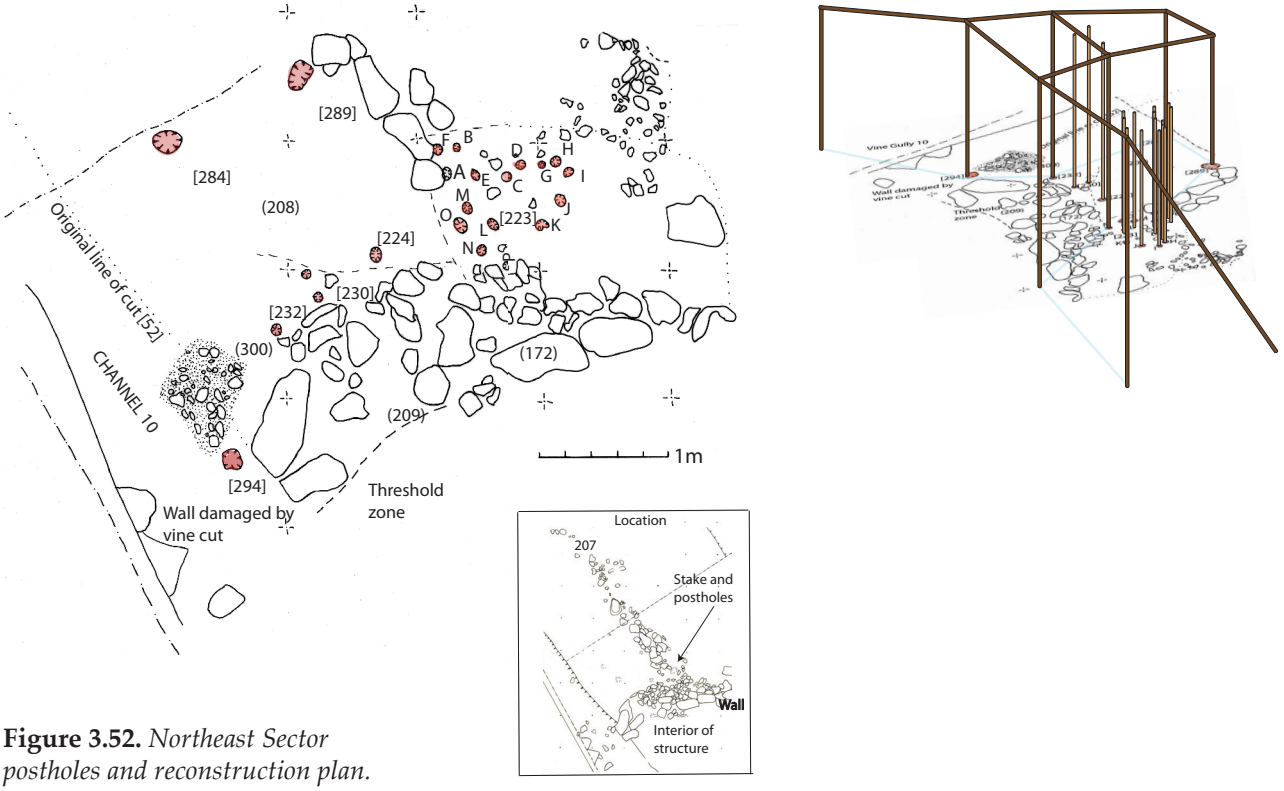


Figure 3.52. *Northeast Sector postholes and reconstruction plan.*

Table 3.3. *Post- and stake hole dimensions in layers (244) and (273).*

Cut	Fill	Diameter	Depth	Finds
[224]	(225)	20 cm	16 cm	Tarxien and unidentifiable prehistoric pot
[230]	(231)	12–13 cm	11 cm	Ġgantija and unidentifiable prehistoric pot
-	-	c.15 cm	c.10 cm	Uncertain posthole
[232]	(229)	14 cm	16 cm	No finds
[223] A – P	(208)	10 cm	5–10 cm	Numerous lithics in deposit in and over some 15 holes
				Flake / Context 208 / SF275
				Flake / 208 / 276
				Chert flake / 208 / 278
				Chert / 208 / 301
				Chert / 208 / 302
				Obsidian / 208 / 307
				Obsidian / 208 / 315b
				Chert / 208 / 317
				Cowrie shell / 208 / 318
				Cherts / 208 / 319
[294]	(293)	>20 cm	>15 cm	Żebbuġ and prehistoric pottery
[289]	(290)	>20 cm	>15 cm	No finds
[284]	(285)	20 cm	16 cm	No finds

(225) was a fine brown, friable soil with no packing, and contained virtually no finds. Cut [230], measuring 12–13 cm in diameter and 11 cm deep, also cut into (244) directly in front of threshold (209). It was filled by (231), a fine brown friable soil, again with no evident packing. Cut [232] was the most northerly posthole cut, measuring 14 cm in diameter and 16 cm deep, and filled by Fill (229) – a fine friable brown soil covered also by (139) and (208). On the boundary between the Northeast Sector and the North Central Sector (in the 'gap' between the main structure and (207)), several post-/stake hole features were also identified. These were arranged roughly in two lines, spaced about 20 cm apart, on a northeast alignment linking the main wall structure to (207). Below (208), eight, or possibly nine, shallow depressions identified as (223), and measuring between 5–10 cm in diameter and about 10 cm deep, were set at a right angle to the stone wall (172) 'threshold entrance' area. These cut into deposit (244) between them. They were designated as A, B, E, F, M, L, N and P, and were excavated and their fills sampled (see Table 3.3). Context (208) yielded a significant quantity of small finds, suggesting the area was intensively used or at least formed a domestic waste zone. Another group of seven shallow holes or hollows arranged in an arc occurred to the south of the double line of postholes, and were designated C, D, H, I, J and K. They may have formed some other element of the wall fill or threshold. The presence of these postholes indicates that wood, in addition to stone, was an important building material in the Temple Period. The specific function of these posts, however, is unclear. It is possible that the posts were part of an additional wall structure; alternatively, they could have been placed to support the roof of a building and were part of a more widespread pattern of other posts whose archaeological traces have not survived.

An extensive deposit was allocated context divisions from south to north as follows: (136), (137), (138) and (139). This deposit was confined by the Channel [52] on the west and the projecting stone wall (207) on the east, and sealed and overlay the postholes [230], [232], [224] and [244] in the zone extending northeast from the stone wall (172). The northern part of the area comprised the lower lines of vine pits (see Figs. 3.74 & 3.7), which extended between BT2–3, but not further north. In some places, it had been partially exposed in the disturbed agricultural levels in 1994. Layers (137), (138) and (139) were a firm, dark yellowish brown (10YR 3/4), silty clay loam, equivalent to the old plough-soil deposit (69). They revealed as a defined deposit extending between BT2 and BT3, and were covered by (58) between Channels 9 and 10. Finds from (137) included pottery and animal bone, whilst (138) produced an obsidian chip, a single cereal grain and two pulses. Context (139) contained fewer stones and butted against (136), which partly overlay (139) on the west. Context (139) later became the generic layer across

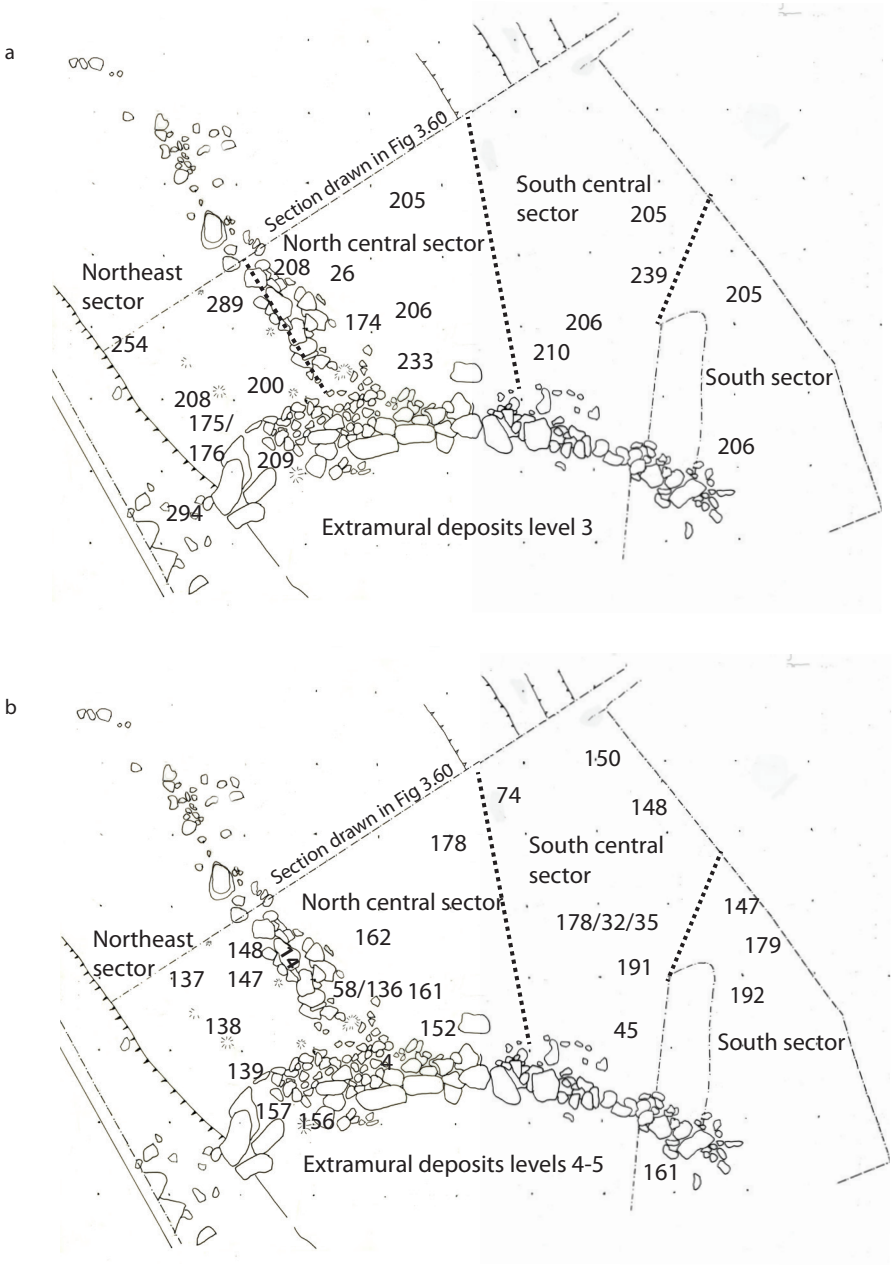


Figure 3.53. *a) Intermediate levels in the extramural area; b) upper prehistoric levels in the extramural area.*

the entire area, incorporating finds from contexts (137), (138) and (139). These included an extensive pottery assemblage totalling 1097 prehistoric sherds dating to the Skorba, Ġgantija, Żebbuġ and Tarxien phases, ten chert items and one obsidian chip. Context (139) produced two cereal grains and six pulses. Two Roman sherds hint that the layer had been disturbed, at least in places. 'Outside', the wall (139) was overlain with (174), which was revealed only in section in a limited area, but otherwise resembled the prehistoric strata below. Sealing this stratigraphy (139), (174), (208) and below (58), a stone spread (136) of medium sized sub-angular stones, perhaps derived from spoil from the vine pits, was located to the east (§3.5.3). Context (136) also sealed the stake-holes discussed below, immediately north of the Neolithic structure. The deposit had a similar consistency to (4) to the east (§3.4), and contained eight chert and one obsidian flakes. Underlying the (139) level, extending into the northeastern part of the sector, Context (153) represented a stone spread. It also formed the lowest excavated strata in the trench, leaving undisturbed deposits below. Context (153) was exposed by the removal of (137), (138), and faded out in the south, close to the Neolithic structure. Its relationship to (48) and (61) (the deposits between Channels 9 and 10) to the north, was unclear. Context (153) was interpreted

as a stony surface that was not quite cobbled, which may be the remnant foundation of flooring from a lost structure related to the stone wall (207). The overlying deposit (58) was an old plough-soil, similar to (69). Close to the stone structure (172), Context (135) was cut by Channel 10/Vine Trench [52] and was revealed in the trench section. It was equivalent to (58). Context (56) was a compacted, dark greyish brown (10YR 4/2), clay loam layer, which had been cut into by [52]. It was interpreted as an old plough soil and equivalent to (58). Context (2) was a compacted, brown (10YR 4/3), silty clay loam, identified when exposed in the section at the outset of excavation in 2014. The layer was very similar to Context (3) and may have been an old ploughsoil. The pottery assemblage from this Layer contained Ġgantija, Żebbuġ and Temple phase material.

Forming the southern boundary of the sector, Wall (207) emerged through the base deposits, and projected above the overlying disturbance of agricultural pits and Channels 9 and 10 (§3.8.2). These later structures and deposits disturbed the prehistoric levels, and inevitably, the precise relationship between the wall (207) and the deposits that had developed around it. One small trial trench was opened close to Vine Pit [8] and channel Cut [52]. This revealed Context (176), a firmly compacted dark brown deposit lying beneath (136), that contained some Ġgantija and Tarxien pottery, but no plant remains or animal bones. A small exploratory trench was also opened to identify the relationship between the stone spreads east of the structure (172). This trench revealed a sequence that commenced with (176) and was overlain by (175), further separated by a calcrete layer/lens and stones from the overlying (139) and (174) deposits. Context (174) in particular was reddish, whilst Context (175) was a paler brown clay loam. Context (174) may have been a later dump, related to the vine trench construction. This sequence is probably repeated in the other overlying vine pits, which were not fully explored.

Cut [57] was an irregular sub-circular pit, previously excavated in 1995, and measuring 90 × 120 cm with no fill remaining beneath the green mesh and (1). This feature overlay exposed bedrock against (3) on the far northern limit of excavation and covered the area between Pit [8] and channel Cut [52]. Context (173) formed a stony, compact layer of trampled material just outside the structure wall, in the possible entrance between old plough-soils (74)/ (167) and (157). Another deposit was Context (228), which was a firm, brown (10YR 4/3), deposit containing some stones. The edges of Context (228) were defined by Cut [52] and Wall (207) to the northeast of (139), and were cut, in part, by the bases of Roman and Punic pits, the junctions of which were removed in (228). The layer was not excavated northeast of the stony area. The pottery assemblage from this layer contained sherds dating to the Ġgantija, Temple Period and Red Skorba phases. Cutting through these layers, Cut [6] may have been an extension of Channel [52], which appears as a U-shaped cut, 0.6–1 m wide and 0.35 m deep in the box trench section. Cut [6] was partly lined with green mesh from the 1984 excavation, and was filled with Context (5), a firm, brown (10YR 4/3) modern backfill, and Context (2), which may have been unexcavated fill. Cut [6] formed a continuation of Cut [52] and a large vine trench that formed the northern boundary of the trench. (§3.8).



Figure 3.54. *Exposed bedrock in the area immediately outside wall (172) and confined by wall (207) by possible entrance area showing postholes [284], [294] [289] (see also Fig. 3.8).*



Figure 3.55. *Photo of postholes [223] marked by white labels looking northwest towards structure wall (172).*

3.5.3. The North Central Sector

The east–west line was defined by: the (207) wall, which formed the northern limit to the sector; the wall (172) on the east; and the baulk following the BT3 line north–south on the north edge. Several contexts extended into the South Central Sector. At the foundation level, there was *terra rossa* (126), a natural subsoil, which was somewhat contaminated with small sherds of prehistoric pottery that had made their way into the layer from the strata above. Cut into, or making use of, natural depressions in the bedrock, Cut [253] was a large oval shaped depression with dimensions 2.5 m × 2 m × 30 cm deep. This was bounded by bedrock on the south side, filled by (268) and covered by (266) and (244). Another natural depression followed the line of (172) forming a sloping channel around the exterior of the structure. This may have been utilized because of its convenient shape (see (238)). The fill of the depression extended almost from the edge of wall (172) to the baulk of BT3. Fill (268) was a friable, dark reddish grey (5YR 4/2), sandy clay loam with numerous charcoal and ash lenses that came directly down onto *terra rossa*. The fill contained large pieces of pot and bone, and several pieces of worked stone, obsidian and chert. When sectioned, a stony fill on the east side became visible. The base of the fill was uneven, and the earth was judged to have been well trampled, and was interpreted as a fine, bonfire silt layer. The pottery assemblage from this fill contained material from the Ġgantija and Żebbuġ phases. Context (268) produced 51 cereal grains and 21 pulses, the richest botanical context on the entire site. It seems likely that the depression was exploited as a fire pit, immediately outside the structures to north and west, thereby charring and preserving food and other organic materials. Three radiocarbon dates were obtained from charred cereals from the layer; a Bayesian model of the ages of these samples (Table 3.4) confirms that the deposit is Ġgantija-phase in date. The very base of the pit, which was sampled separately, represents *in situ* material from the Żebbuġ phase and earlier, deposited in the Ġgantija phase. This confirms that occupation activity occurred over a considerable length of time – at least 40 years, but more probably several centuries, as recorded in section in Figure 3.55.

Overlying (268) and (253), Context (266) extended north of the depression [253] to the baulk on the line

Table 3.4. *Radiocarbon dates from Pit 268.*

Id	14C age	±	Material	Bayesian modelled date
UBA-31713	4454	38	*Hordeum vullgarae*	Combined in OxCal 4.2 and modelled as a later phase as *3350 to 3100 cal.* BC (95.4% probability)
UBA-31714	4518	41	*Triticum* sp.	
UBA-33028	4776	35	cf. *Triticum*	Sample from very base of feature; *3640 to 3520 cal.* BC (84% probability) or *3420 to 3380 cal.* BC (12% probability)

of BT3. It formed a friable, dark reddish brown (5YR 3/2), sandy silt loam that broke into the dark sooty deposit of (268), stratified beneath. (243) merged with *terra rossa* to the south. The pottery assemblage from this layer contained sherds belonging to the Ġgantija and Żebbuġ phases. Overlying (268), across the central part of the North Central Sector, Context (243) was stratigraphically equivalent to (244) to the north. Context (243) extended westwards from wall (172), the small postholes and wall (207) to the edge of depression (238), and northwards towards the baulk, connecting many stratigraphic units described in this discussion. It was a dark reddish brown (5YR 3/2), sandy loam that contained frequent medium to large-sized cobble stones within very compact soil and occasional traces of plaster floor. The stones averaged 15–20 cm with some up to 25 cm in size. Context (243) was covered by (233), and in places it was located directly above bedrock (127), or above the depression Fill (268). It was interpreted as a cobble-like surface deposit, equivalent to (244), (247) and (249). The pottery assemblage from this layer was dominated by Ġgantija-phase sherds, with some presumably intrusive Tarxien and residual Żebbuġ sherds also present, as well as a miniature cup retrieved through sieving (Chapter 11, Fig. 11.6). Lithics were frequent in the deposit, accompanied by a stone bowl fragment (SF332), a piece of Lipari obsidian and 12 chert flakes. When sampled and wet sieved, (243) produced seven cereal grains and 21 pulses, reflecting the relative richness of the area for palaeoeconomic material.

Immediately east of the stone structure, midway between wall (207) and the mini baulk to the south, a further sequence commenced at bedrock (127) that ran parallel with the line of the vine Channel [70] . Here, there was a natural depression with defined stone edges, perhaps another fire pit, measuring *c*. 1.25 m east–west × 1.40 m north–south, sloping down towards the external wall (172). This depression was filled by Context (238), which was a friable, dark brown (10YR 3/3), sandy loam that contained sooty inclusions, and produced 11 cereal grains and three pulses. Context (238) was stratified above a red soil in the south, which had a steeply defined edge against (249) and included patches of *torba* (250) (Figs. 3.56 & 3.57). Lens (250) was a discontinuous *torba* plaster lens within (238) and was interpreted as floor material. A substantial patch of plaster extended close to the exterior of the structure wall. The extensive Context (243) was stratified above (238) and was, in turn, covered by another extensive and very stony Context (233), which covered the western part of the sector against the wall (172). Context (233) was a friable reddish-brown soil with medium sized stones, containing large pot sherds, 13 chert flakes, one obsidian chip, a terracotta figurine fragment, a rubbing stone and bone. It was covered by a stony spread (210). Context (233) was interpreted as an exterior dump layer, beneath (210) and its covering layers (205) and (206). The assemblage from (233) contained Żebbuġ, Temple Period and Ġgantija phase pottery sherds, and produced five cereal grains and four pulses. The overlying Context (210) was a collapse or dump deposit that contained more stones than (233). The deposit contained medium sized stones, loosely cemented in a single layer that was set into a

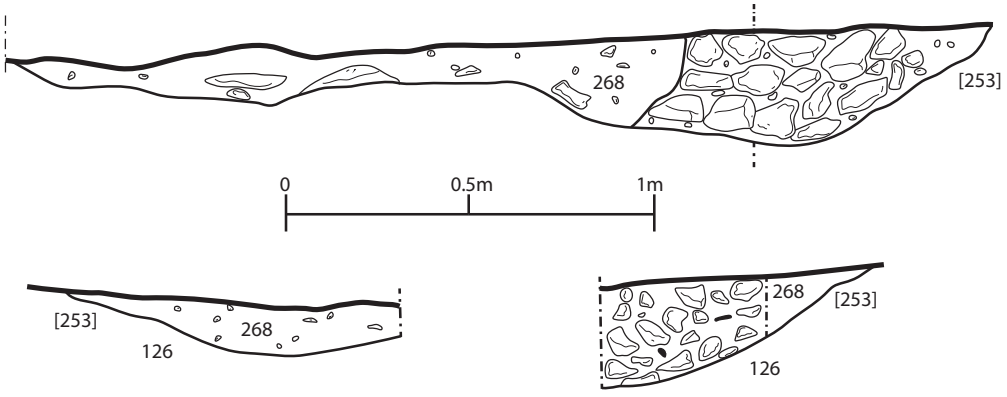


Figure 3.56. *Section of (268) showing north–south and two short quadrant sections (see location on Fig. 3.50a).*



Figure 3.57. *a) P12000584 showing the external cobble (210) dumps and displaced wall stones (see Fig. 3.52a for location).*

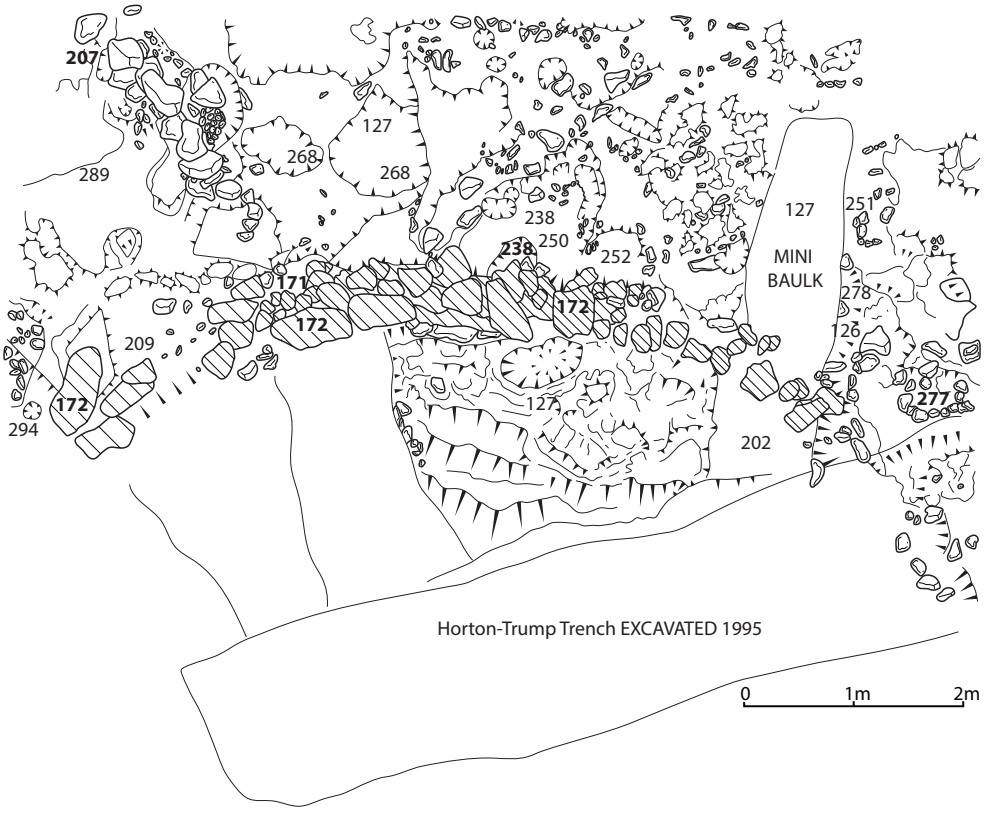


Figure 3.58. *Primary contexts around the structure walls and cleared bedrock within the Main Quadrant.*

firm, dark brown (10YR 3/3) matrix, and covered by (205) and (206) (see below). The assemblage contained a mixture of prehistoric pottery spanning the Għar Dalam, Ġgantija and Żebbuġ phases, as well as a Roman-period sherd, signalling intrusion or disturbance.

In the extreme eastern area of the trench (close to Vine Trench [62]), Context (259) was the primary grey-brown deposit north of (252) (which is dealt with below in the South Central Sector description). This deposit became redder in depth, and overlay *terra rossa* (126) and bedrock (127). The deposit was relatively sterile, quite stony and contained some grey patches. The pottery assemblage from this layer contained Ġgantija and Żebbuġ phase sherds. It was covered by (233) and (205).

3.6. Destruction layers, middens and a *torba* remnant outside the building wall

Close to structure (172), and immediately to the east (Figs. 3.64b & 3.77), the next layers were the equivalent midden contexts (206) and (205). Both (205) and (206) were firm, dark yellowish brown (10YR 3/4), silty loams containing medium to large sized stone inclusions. Context (206) lay above (210) and (222) (discussed below), beneath (178) and (179), and butted wall (172), where the deposit had become concreted to it in places, indicating that it had rested relatively undisturbed in this position for some time. Context (205) was assigned to the area east of (206) about 1.5 m distant from the structure wall, and was covered by (191) (178), (35) and (49). Despite being equivalent stratigraphically, Context (205) was excavated separately from (206).

The pottery assemblage from Contexts (205) and (206) consisted of a relatively small number of Tarxien-phase sherds mixed with hundreds of Ġgantija and Żebbuġ phase examples. The layers also contained a rich quantity of charred plant remains, shells and animal bones, twenty-eight lithics, four of obsidian (two each from Lipari and Pantelleria). Context (205) produced two pulses, whilst Context (206) yielded radiocarbon dates from a charred barley grain (UBA-30419, 4540±37 BP) and charred lentil (UBA-30418, 4524±34 BP). These combined to date the midden material to between 3350 and 3120 cal. BC, the Middle Ġgantija phase. If the two radiocarbon-dated seeds from (206) are representative of the date of the material in general, the presence of Tarxien-phase pottery in and under the midden material implies that it was not in its primary position. It does, however, illustrate quite clearly a pattern that is present, to some degree, over much of the site: Taċ-Ċawla was a place of continuous settlement for millennia, and the archaeological strata derived from material of previous phases that were subjected to constant reworking and mixing.

The edges of Context (205) were defined by Cut [70], BT3, and Cut [62]. The midden deposit extended around the exterior of (172), and was covered by Context (239), which was a very gritty, stony and compacted layer, perhaps a floor deposit or foundation. This, in turn, was covered by layers (192), a friable, brown deposit, and (191), a firmer layer of brown loam. These were covered by Context (178), which is also identified as Layers (35) and (32). It was a compacted, dark-blackish soil that seemed to be an intact prehistoric soil, and contained a wealth of lithic finds, yielding over 25 chert and nine obsidian flakes, as well as a significant quantity of pottery (1339 sherds), especially from the Temple Period. Crucially, among these often large sherds, there was one sherd of an early Bronze Age style. This sherd may have been intrusive from a higher level, but nonetheless its presence in this context signals the proximity of post-Temple Period/Early Bronze Age activity. The finds from (178) included animal bones, and one pulse.

Context (32) was equivalent to (178) and was a similar compact, black soil, beneath (31) in the west end of Trench 1. Its extent became evident on the removal of plough/topsoil, and stratigraphically it could be related to the cultural deposits close to the Horton/Trump trench. Above the black soil was a patch of *torba*, identified as Context (31). Measuring only about 1 sq. m, this consisted of pale limestone powder mixed with soil, small stones and other debris. A small assemblage of pottery including Tarxien-phase sherds was embedded within this context, but there was nothing of a later date. The 1994 excavation had reached but stopped at this level as evidenced by the fact that the *torba* was covered with textile mesh. Elsewhere in this area, at the same point in the stratigraphy, were Contexts (179) and (74), which had formed the basal part of later plough-soil. The surface stratigraphy in this part of the site consisted of Contexts (30) and (49), which were truncated by a modern feature [131] and its fills (see Appendix Table A3.1.1). These plough soils were well worked, and rich with cultural material, which in the case of (74) contained 11 lithic items, and in the case of (179), 12 artefacts.

3.6.1. The South Central Sector

The bedrock (127) rose higher in the northern and eastern parts of the site, and was, with Layer (126), covered by shallow deposits. The ground in this sector sloped down towards the stone structure and the 1995 trench. In the extreme southeast corner, the base Context (248) formed a dark reddish brown (7.5YR 4/2), sandy loam, and underlay layers (206) and (205). These, in turn, also overlay the equivalent layers (247) and (249). Context (248) contained stones, but not as many cobble layers



Figure 3.59. *Location of stone spread (178).*

as (222) and (233) in the eastern extent of the trench. It was interpreted as a cultural deposit. The pottery assemblage from this layer included Żebbuġ and Ġgantija phase material.

In the southern part of the zone, against the mini-baulk, the base Context (252) was a sterile, redder *terra rossa* deposit lying below (249). Context (252) was structurally equivalent to the large depression, (253), to the north, which was also directly outside the stone wall (172). It contained almost no finds or cultural material, but produced two cereal grains and two pulses. Overlying this was Context (249) was equivalent to (248), (247) and (244), but located closer to the structure and against the north side of the mini-baulk. Context (249) was a firm, dark brown (7.5YR 4/2), sandy loam with small to medium sized stones that abutted the structure wall (172). It was sealed beneath (243) and (206) and stony layers (222)/(239). The latter features exploited a stony outcrop that seemed to tally with a similar edge of bedrock that emerged on the west (inner) side of the structure wall, and may have defined its shape in plan. The pottery assemblage from this layer was small but contained material dating to various phases of the Temple Period. Above this, two very stony deposits occurred either side of the mini-baulk. On the north side, Context (222) formed a firm, brown (10YR 4/3) deposit, perhaps collapse from the structure, and extended north from the mini baulk *c.* 2 m and in places merged with (210).

Over these layers, a series of deposits covered the largely intact prehistoric layers (Figs. 3.67 & 3.71). These were spread around the mini-baulk towards the east and south edge of excavation, where they were increasingly disturbed by agricultural activity. Context (191) overlay (206), and was an extensive deposit of about 3 × 2 m and 0.2 m thick. It was bounded by the southeast end of the mini baulk, where the roughly equivalent deposit (192) extended east and south around the baulk. Context (191) produced a good amount of pottery and bones with the pottery assemblage containing Ġgantija, Tarxien, Żebbuġ, Saflieni and Red Skorba phase sherds. Other artefacts included a fragment of a stone bowl and three chert flakes, one of which was a fine triangular knife (SF188). Context (191) was covered



Figure 3.60. *View of the north-facing section of the mini baulk and the corresponding floors within the structure.*

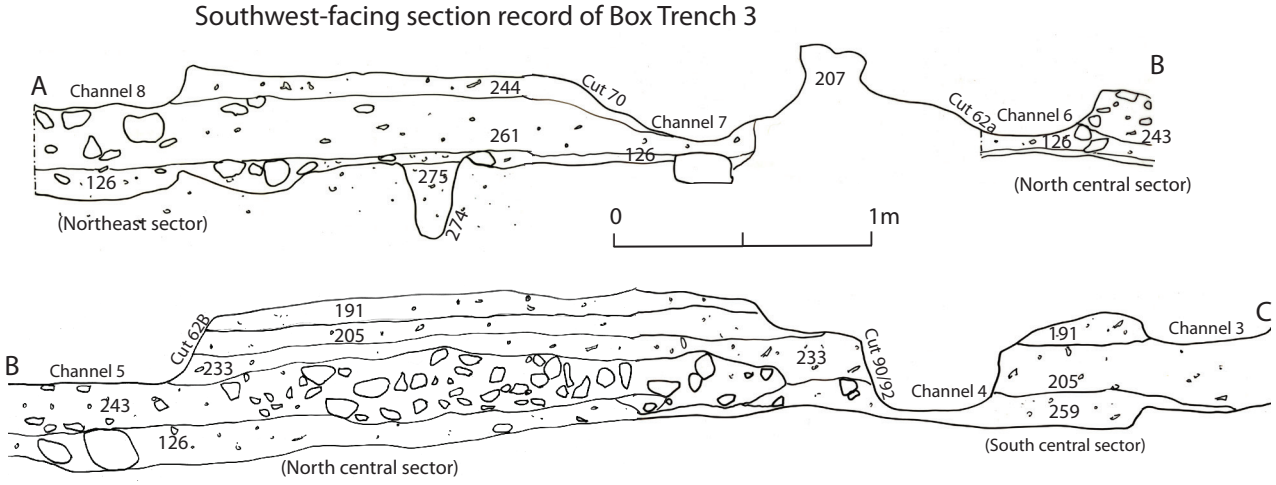




Figure 3.61. *Southwest-facing section record of Box Trench 3, forming the northeastern boundary of the area excavated to bedrock (shown in photo). The section records the profiles of the deep Roman channels (4,5,6 & 7) and the prehistoric deposits preserved between them.*

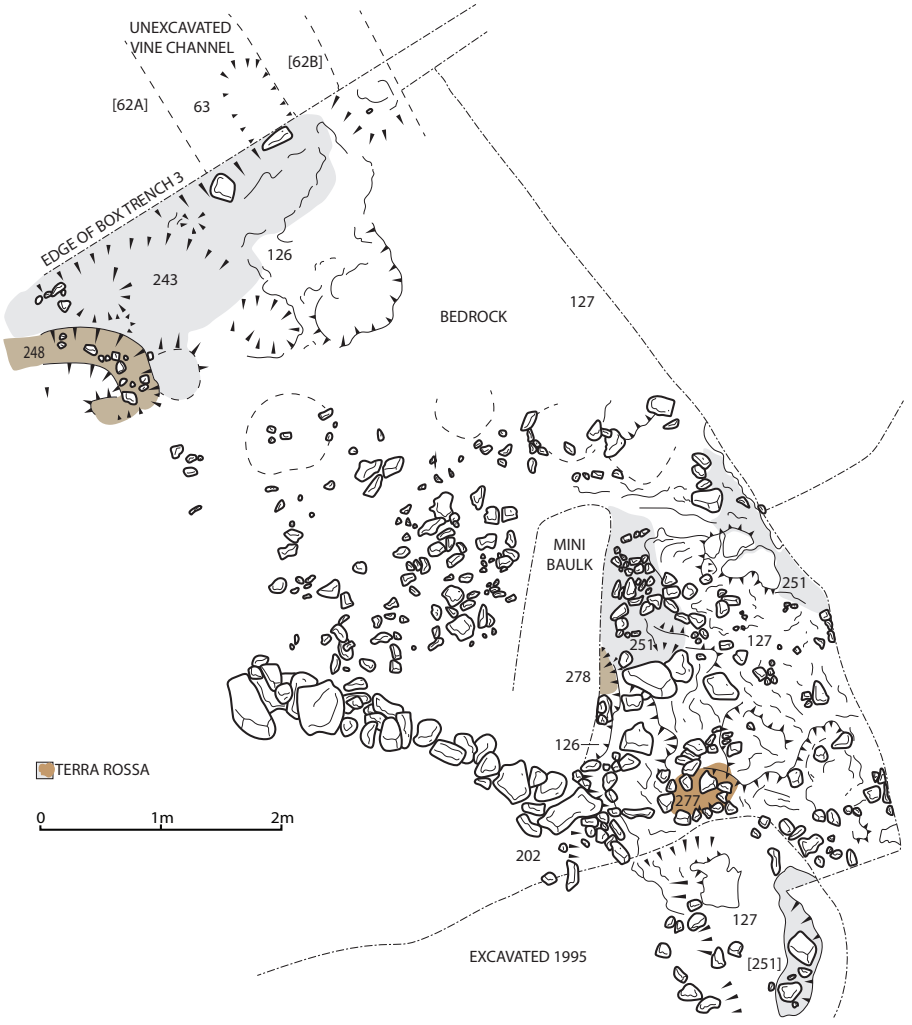


Figure 3.62.
Contexts in the southern extramural zone.



Figure 3.63.
Southern extramural zone with rock-cut and primary features.

by (178) and (179). Context (192) was a friable, brown deposit covered by (178) and the edge of (179) on the eastern end of the mini baulk. It was close to the edge of agricultural Cut [62], but was intact and undisturbed. It was also bounded by the *torba* floor (31) and relatively well sealed by layers (49) and (35).

Context (178) (see above) was a firm, dark brown (10YR 3/3), clay loam enveloping an even spread of medium-sized stones that overlay (191) and (192), and indeed an extensive area east of the structure. It was similar to, but more intact than, the overlying (179), and also bore similarities to stony deposits (74) and (4). The stones, however, did not appear to have a clear structural function. The deposit produced plentiful lithics, some 27 chert and nine obsidian pieces, of which six were from Lipari and three from Pantelleria. Context (179) lay partly above (178) and extended south of the mini-baulk to channel Cut [62]. The deposit was a firm to friable brown layer containing frequent small to medium sized stones and root inclusions. It extended east to abut Cut [62] and its Roman-period snail midden deposits. Context (179) was interpreted as a remnant plough soil. The assemblage from this layer contained Ġgantija, Tarxien and Saflieni phase pottery sherds, and a good sample of 11 chert and two obsidian flakes. Overlying (179), Context (148) was a deposit located between the agricultural cuts, and was a moderately friable, brown (7.5YR 4/4), clayey silt. It was stratified beneath (4) and (26), east of the structure, but truncated by the linear agricultural feature [36] that extended north-south from (172). South of the line of the mini baulk, Context (148) overlay (147). Finds from (148) included pottery and bone, and three chert and two obsidian pieces (both of Lipari and Pantelleria origin). It was interpreted as a disturbed prehistoric layer beneath the stone rubble Context (4), which was possibly formed by material disturbed from the wall (172). Context (148) may be earlier than the destruction of the upper levels of the prehistoric structure. Overlying this deposit, Context (150) was a firm to compacted, dark yellowish brown (10YR 4/4), silty clay. It was located beneath layers (26), (48) and (61), and cut into by [36]. Context (150) was similar to (26), but wasmore compacted and had more frequent inclusions of charcoal flecking. It also contained inclusions of small (max. 3 mm) flecks of degraded red and white stone/clay. It was interpreted as an *in situ* prehistoric layer. Finds from (150) included pottery. Context (26) overlay (150) and formed a firm, dark yellowish brown (10YR 3/4), clay loam. This context was rich in prehistoric sherds, six chert flakes and animal bone, moderate quantities of assorted small stones, and infrequent charcoal flecks. Context (26) was interpreted as a possible remnant of a clay floor or occupation layer. It contained pottery dating to the Żebbuġ, Temple Period and Ġgantija phases, and was later cut into by agricultural pits/channels [36]. Cut [161] was an agricultural feature comprising odd pits and channels that cut through these deposits, and connected with Channels [70] and [62]. It ran parallel to Cut (70) which in turn extended across and within the structure wall (172), disturbing the deposits across the floors in (193), (194), (195) and (196).

3.6.2. The South Sector

At bedrock level, the sequence commenced with natural depressions [278] in the bedrock (127) to the south of the mini baulk. These were covered by (251). These depressions were found on the south side of the structure wall, 60–70 cm from its edge. They were interpreted as potential small post sockets, perhaps associated with the external structure of the stone wall (172) and Feature (277) (Fig. 3.59). This feature comprised several medium-sized stones, which formed an arrangement around quite a deep slot into bedrock measuring about 35 × 20 cm and 20 cm deep, surrounded by large stones, extending 60 × 70 cm. These stones were cemented together with calcrete at a distance of 40–50 cm from the wall. They were interpreted as a possible external post socket for support of the structure wall. The stones were arranged in a rough circle around a depression in the bedrock; even if the relationship between the two was unclear, their location, together with the many other similarly located depressions around the structure, do suggest external posts. Context (251) overlay (278) and was a red *terra rossa*-like layer that contained cultural material, including Ġgantija phase pottery. This was sealed by Context (247), a dark brown (7.5YR 4/2) deposit that got redder with depth until it bonded with (251), and was covered by (206), (222) and (239) (see above). The make-up of (247) was similar to (69) around the perimeter of the structure wall (172), but it contained worked bone, four chert and two Lipari obsidian flakes, and was very rich in pottery and animal bone. As such, Context (247) was probably an extramural dump area equal to (243). The upper levels of the deposit included a stone spread. Context (4) was composed of small irregular-shaped stones, bonded by hard, charcoal-flecked, dark yellowish brown (10YR 4/4) clay that were revealed when the backfill plastic cover was removed at the beginning of the 2014 work. The layer was shown in a plan of the 1995 trench and was well-conserved under backfill sacking, and was therefore archaeologically intact. The layer butted two large stones that may have formed a wall. For this reason, it was interpreted as either a wall collapse or, along with contemporary Context (7), a floor surface. Context (45) overlay (4) as a firm, dark brown, loamy

clay, beneath the green mesh and was interpreted as old plough soil. Context (45) was cut by Channel [36] and Pits [42], [8], [9] and [10] (Fig. 3.61). It was contemporary with Context (58), a compacted, dark brown (10YR 4/4) clay loam with charcoal flecks. The pottery assemblage from this layer contained Tarxien and Temple Period material. The stratigraphic sequence at this part of the site continued upwards with the cuts and fills of Roman period agricultural features, already discussed in Section 3.8.

3.6.3. Summary of the stratigraphic sequence of the eastern exterior of the stone structure

In summary, the deposits around the external eastern side of the structure fall into five phases:

1. A base level, dark *terra rossa* soil
2. A brown, finer deposit
3. A stone rich layer that seems to be partly the collapse of a Ġgantija-phase structure, and perhaps a primary base for later floors or surfaces
4. A stone cobble layer dating to the Tarxien phase
5. A brown, stony and partly disturbed soil deposit suggesting an old or even ancient ploughsoil, containing both prehistoric and more recent material.

The base levels were well sealed and offer an important insight into the later Neolithic domestic archaeology of Malta. Surprisingly perhaps, they have yielded a much richer range of economic and cultural material than the levels within the structure. The discovery of the post sockets/postholes around the perimeter of the wall (172) is particularly significant, as these imply the use of timber uprights incorporated within the drystone base, and thus the felling and perhaps management of suitable trees to provide wood (Chapter 9). Previous investigations of houses have not revealed post sockets before, and the use of wood as a building method has not been considered a significant part of local techniques in prehistory (Malone *et al*. 2009, 52–6). Their discovery may be due to the timing of the excavation, which took place in a damper time of year, before the summer heat of Gozo took hold.

3.6.4. East extent of the Taċ-Ċawla site

The eastern corner of the excavation area (covering *c.* 10 m × 5–7 m) represented a shallow and relatively eroded profile, which was upslope from the deeper stratigraphy in the southwestern / western zone. This description deals with the layers and features identified during excavation, from the base upwards, and discusses the various individual sequences in the area, shown in plan in Figure 3.62.

A series of slight depressions and rocky fissures cut into bedrock (127) may have been postholes and structural features of a domestic area, possibly an extension of the occupation noted by Van der Blom in the early 1990s (§3.2; Fig. 3.63). Cut [121] was a small posthole-like feature in the bedrock (127). It was covered by (109). Another feature, Cut [129] was a roughly cut posthole dug into a semi-natural cut in the bedrock (127), which was probably enlarged to accommodate up to two posts, but could be natural. It was interpreted as a fissure/posthole in the bedrock. The cut was filled with (128) a friable, dark yellowish brown (10YR 3/4), clay loam and was covered by (120) (Fig. 3.67; Section E–F). When sectioned, Context (128) was found to have a loose, darker soil fill; and although it filled what may have been a natural fissure, the presence of several packing stones (up to 30 × 25 cm) suggested the original existence of two posts that overlay reddish brown *terra rossa* (126). Context (120), covered by (109), was an extensive *terra rossa*-like deposit in the northeast corner of the excavation. It was a firm, dark reddish brown (5YR 3/4), silty clay (see also Figs. 3.77 & 3.78). This compact layer filled deep hollows in the bedrock beneath vine channel Cuts [79] and [115], and was quite hard to excavate. The deposit contained large quantities of pottery of Ġgantija, Żebbuġ and Għar Dalam phases, many large pieces of animal bone, a large intact quern, three chert objects and two Pantellerian obsidian objects, all of which are indicative of a preserved domestic rubbish area. The deposit also produced four cereal grains, one of which (*Triticum* cf. *aestivum / durum*) was AMS radiocarbon dated to 3700–3520 cal. BC (UBA-30415, 4849±38 BP). It was interpreted as the lowest occupation layer overlaying *terra rossa* (126) and the bedrock (127).

Within layers (109) and (120), Structure (117) was evident as a burnt clay deposit, containing the remnants of a ceramic or daub oven that had collapsed and been spread over an area of 2–3 m (Fig. 3.65a). This Layer was comprised almost entirely of chunks of poorly formed, thick moulded pieces of fired corky oven clay, which incorporated burnt sooty material within its matrix (Fig. 3.65b). It was located over a natural hollow in the bedrock. Context (81) was a dark reddish brown (5YR 3/2), sandy clay loam forming a lens or patch of redder deposit mixed with the greyer (109) that otherwise filled the entire area. The pottery assemblage from this layer contained sherds dating to the Ġgantija, Żebbuġ and Għar Dalam phases, and five lithic items. A wet-sieved soil sample from (81) contained a single cereal grain and one pulse. Context (109) was a grey-reddish matrix deposit, similar to or part of (69) that extended over a large area. It was cut by Channel [79], which, on clearance, revealed large pottery fragments. Some of



Figure 3.64. *Plan of eastern and southern extent of excavation plotting parallel box trenches cut across Roman agricultural channels. Stipples area indicated traces of* torba *flooring enclosed with the red line. The area may have once been a domestic structure.*



Figure 3.65. *Excavated rock features in the southeast area of excavation, which may represent early structural elements.*



Figure 3.66. *Excavation in the southeast area in 2014.*

these fragments also appeared to be from a broken clay oven structure (Fig. 3.65c, d), which was embedded in the deposits exposed in the section on either side. A fine Lipari obsidian core (SF94) (Chapter 11, Fig. 11.13) was closely associated with the oven material and pottery spreads in (109)–(120); it was revealed in the Channel 2 cutting lodged between large pot sherds (Fig. 3.66) together with another obsidian flake, a likely grind stone (SF147) and three fragmentary stone beads. On the west side of Channel [79], (109) was bonded with (85), which although probably from the same phase of activity, was slightly less grey in colour and did not have the high density of layered pottery. Finds from (109) included many snail shells (mostly broken), and large ceramic pieces. Some of the pottery was very fine, and the assemblage represented Ġgantija and Żebbuġ phases. Context (109) produced one pulse. It was evident that the deposit was almost intact and *in situ*, and represented one of the best preserved ancient deposits on the site. The extensive Context (69) overlay (109) and indeed most of these intact and extensive prehistoric deposits (Fig. 3.69).

On the southwest section of the southeast corner of the excavation area, Context (145) filled a depression (0.7 × 0.3 × 0.3 cm) in the bedrock. This was a friable, dark reddish brown (5YR 3/2), silty clay loam found beneath (83), (84) and (130) and above *terra rossa* (126) and the bedrock (127). Finds from (145) included sparse pottery fragments (including one Borġ in-Nadur sherd) five lithics of which one was Lipari obsidian, and animal bone. The feature was interpreted as a pit.

Fill (146) was located in a rock depression, a possible feature delineated by the bedrock located on the south side of the trench, adjacent to BT2. Fill (146) consisted of a friable, dark reddish brown (5YR 3/2), silty clay loam. It was covered by layers (84) and (130) and produced a large quantity of medium and large sized pottery sherds (dating to the Tarxien, Ġgantija and Żebbuġ phases) and bones (Fig. 3.65 section A–B, 3.63 & 3.64). Context (130) covered (146) with a firm, reddish brown (5YR 4/3), silty loam that dried to a grey colour, with some red mottled inclusions. This, in turn, was covered by Context (30), an old ploughsoil. Context (130) had frequent inclusions of prehistoric pottery sherds, six lithics (one of Pantelleria obsidian), a possible figurine fragment, animal bones, charcoal and a moderate amount of sub-angular to sub-rounded stones. The layer was truncated and reduced in extent by Roman Vine Trenches [77] and [91]. It was interpreted as an *in situ* prehistoric occupation deposit, equivalent to (69). The pottery assemblage from this layer contained Ġgantija and Żebbuġ phase material. The flotation of soil samples from (130) produced two cereal grains and two pulses. Close by, another structural element, stone structure and deposit (84) (Fig. 3.79) formed a discrete line of stones about 0.3–0.4 m wide in BT2 and BT3 (Fig. 3.68. Section A–B). Context (84) was found beneath (30), where it was bonded with Context (69), and cut by Vine Trenches [82] and [75]. The grey soil matrix contained a concentration of largish stones and prehistoric pottery. With no definite edge, (84) gradually blended into adjacent Context (85) (see below). Context (144) was a grey-orange deposit, covered by (119) a firm, reddish brown (5YR 3/3), sandy clay loam, rich in pottery, two pieces of chert and animal bone. Context (144) was similar to (126), but abutted against, and contained parts of a plaster floor (118). It was also cut by the modern bedding trench [111] that defined the northern limit of excavation. The pottery assemblage from this layer contained Żebbuġ material, and nothing identifiable from any later phase, suggesting that this was an intact layer from the Żebbuġ phase (*c.* 3800–3600 BC). Context (119) overlay (144), with large quantities of pottery, an obsidian flake, a chert blade and bone. This deposit was less intact since some Ġgantija-phase sherds were present. Collectively, however, these features and fills appear to form the southwest edge of a domestic area dating to the Żebbuġ phase, which surrounded a central depression in bedrock, and included a possible arc of structural post sockets, and traces of *torba* plaster floors. These adhered in part to the bedrock or overlay compressed red soil (144). The excavation revealed several discrete patches of broken plaster, beaten earth and compressed stony deposit that suggested floor make-up layers from early domestic activity. On the extreme northeast corner, exposed in section by the baulk, Structure (123) comprised at least two flattish limestone slabs (50 × 35 × 5 cm and 35 × 25 × 7 cm) that lay against each other at the same level (Fig. 3.67, G–H). The stones lay above Context (204) a firm, brown (10YR 4/3), silty clay devoid of finds that lay above (126) and (127) (Fig. 3.69). The stones were interpreted as representing some kind of prehistoric paving area, perhaps the remnants of a floor associated with the oven described above, where (204) was a levelling deposit. The stones (123) were enveloped by Context (122), a dark greyish-brown (10YR 4/2) deposit that contained animal bones, a single piece of obsidian and pottery; some further material derived from occupation at the site during the Żebbuġ phase, although a small number of intrusive Ġgantija-phase sherds were also present.

On the north and east edges of the excavation trench, scattered *torba* plaster/clay floor remnants were present at the base of stratigraphy (Fig. 3.67 Section C–D; see also Figs. 3.77 & 3.78). At the base level, Context (125) was a compacted, creamy yellow layer, covered by a second plaster level, Context (118) which was a firm, very dark greyish brown (10YR 3/2)

silt loam, located next to the modern bedding trench [111]. The plaster floor was a thin strip about six centimetres wide. It was interpreted as a rotted daub-like deposit that occurs in patches across the trench. The pottery assemblage from this layer contained Ġgantija, Tarxien and Żebbuġ phase material. Floor deposit (128) described above was found immediately to the east.

Other possible floors/floor foundations included Context (107) a stony deposit found east of Cut [62] and visible in section below (74) (Fig. 3.67). Context (75) was an ashy, friable deposit in the southeast of BT2. It was a firm, dark brown (10YR 3/3), loamy sand with inclusions of stone, pottery and animal bone, located below (30), and surviving between agricultural cuts [92] and [82]. It was interpreted as a spread of material, possibly derived from a mud brick building that had decayed and become spread over a relatively large area. Remnants of associated floor deposits were suggested, in places, where this 'brick' material had blended with other grey deposits. The associated pottery assemblage was dominated by sherds from the Ġgantija and Żebbuġ phases, but with

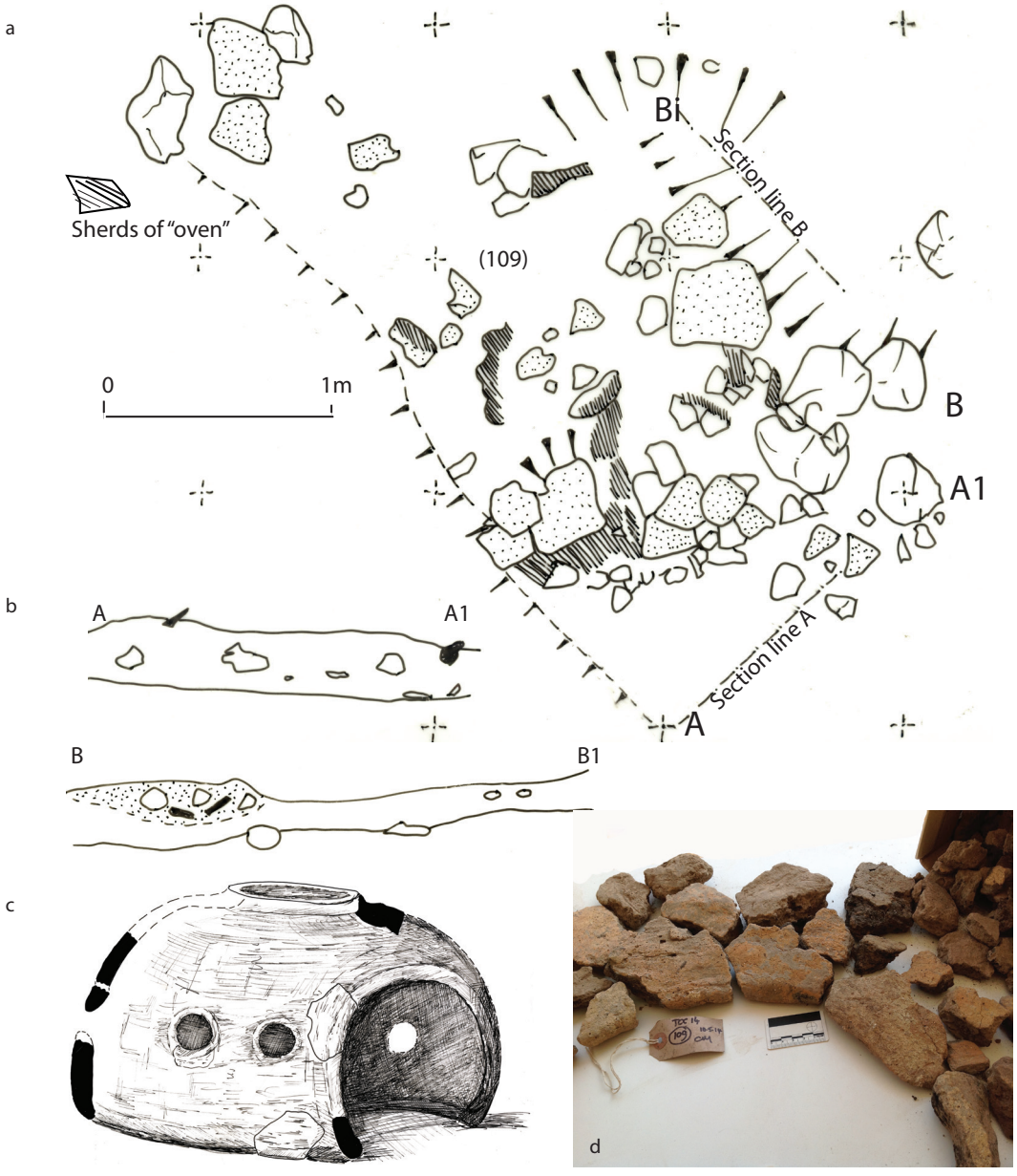


Figure 3.67. *a) Plan of context (109) with sher and stone scatter; b) section record of excavation through Context (109); c) reconstruction drawing of possible clay oven form; d) clay oven sherds.*

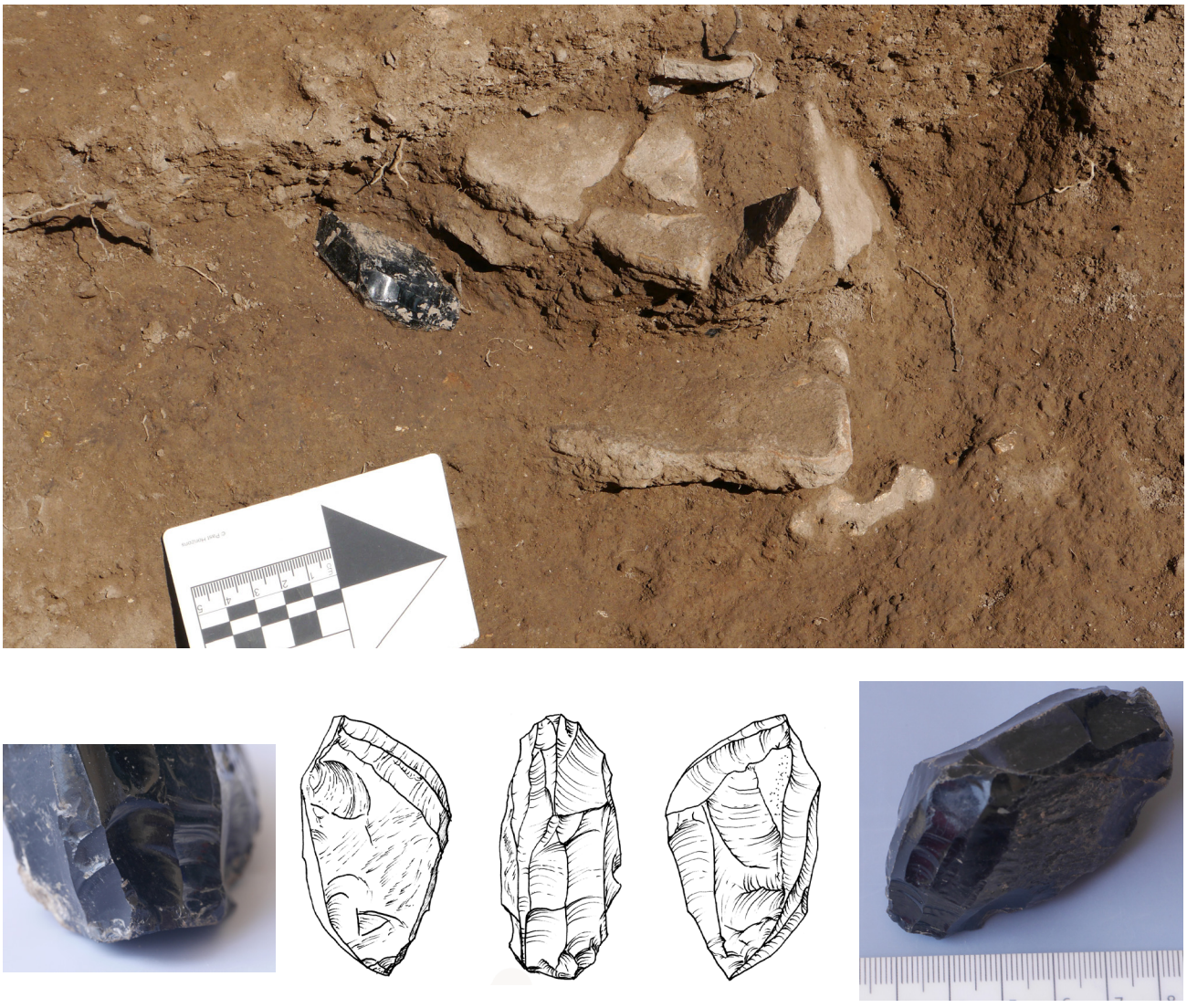


Figure 3.68. *Obsidian core and associated pottery* in situ*, detailed photographs and drawing (see Chapter 10); see Fig. 3.62 for location).*

at least two sherds from the Tarxien phase as well. A sample from (75) produced a single cereal grain and two pulses. The deposit was bounded by Cut [78], a shallow channel exposed in section in BT3, and by the vine Channel [82]/(83) discussed below. Although later than the deposits discussed above, the stratigraphic relationship between [78] and the vine channels was impossible to determine as their fills were similar.

The northwest section of the excavation trench, exposed a clear sequence of intact deposits (Fig. 3.67 A–B). These were founded upon Context (298), a dark prehistoric deposit below *torba* (152) and above bedrock (127). A similar deposit (120), discussed above, was located in the northeast corner of the trench (Fig. 3.67 G–H). The pottery assemblage from (298) contained Tarxien, Ġgantija, Żebbuġ and Grey Skorba sherds, demonstrating the long history of human occupation at this part of the site. Context (298) was overlain by Context (152), a *torba* floor remnant defined on its east and west sides by Vine Trenches [92] and [62] (Fig. 3.67 C–D), was embedded directly on parts of the uneven bedrock that lay below. Context (151), a dark silt sealed beneath layers (140) and (143), and covered by (152), contained Ġgantija and Żebbuġ phase pottery. Soil flotation from Context (151) produced nine cereal grains and eight pulses. Context (142) comprised the stone layer overlying (140), and the neighbouring grey deposit of (141). A contemporary deposit was Context (143), which was interpreted as a possible prehistoric surface associated with a structure in this area, but

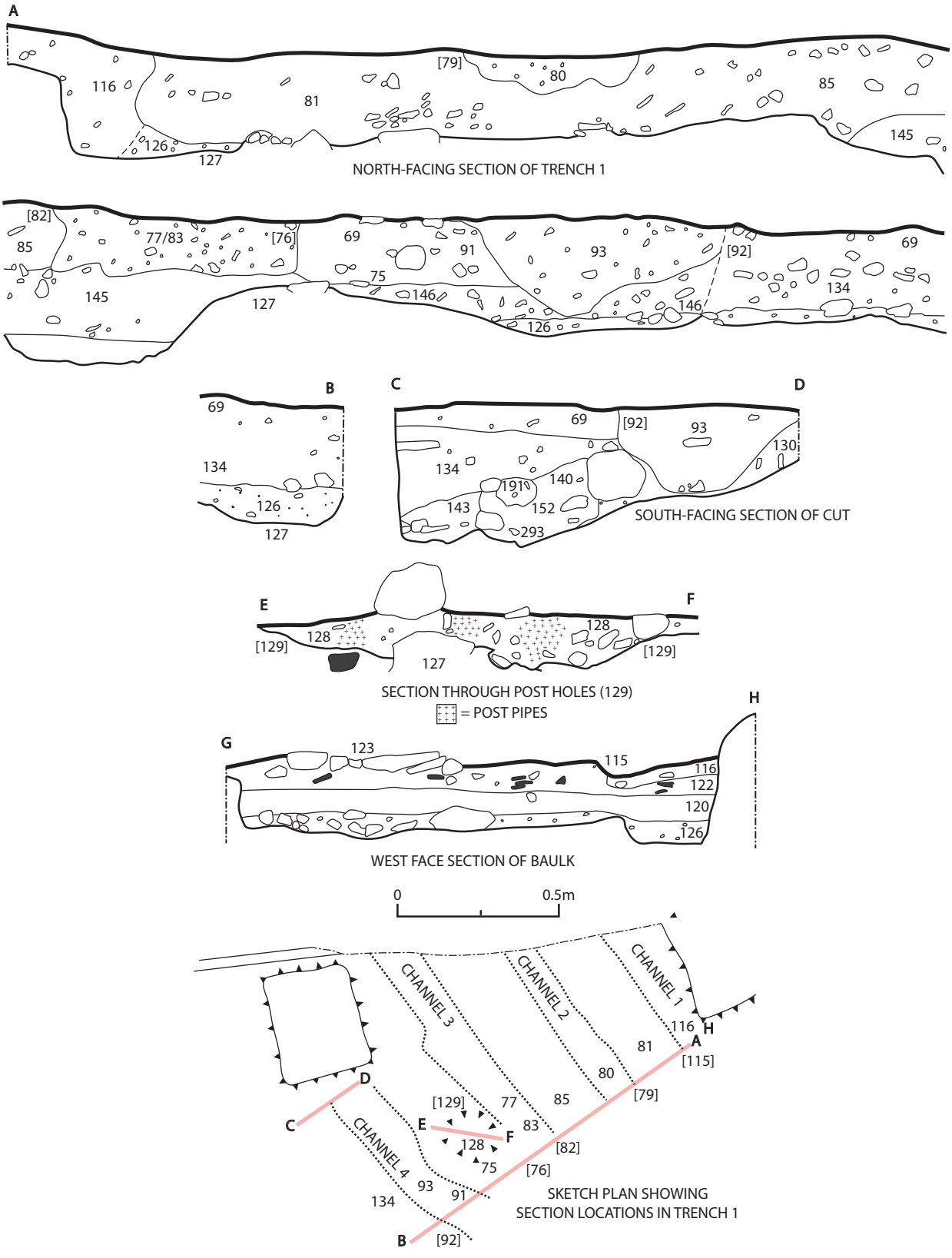


Figure 3.69. *Sections and location plan recording the stratigraphy in the southeast area of excavation.*

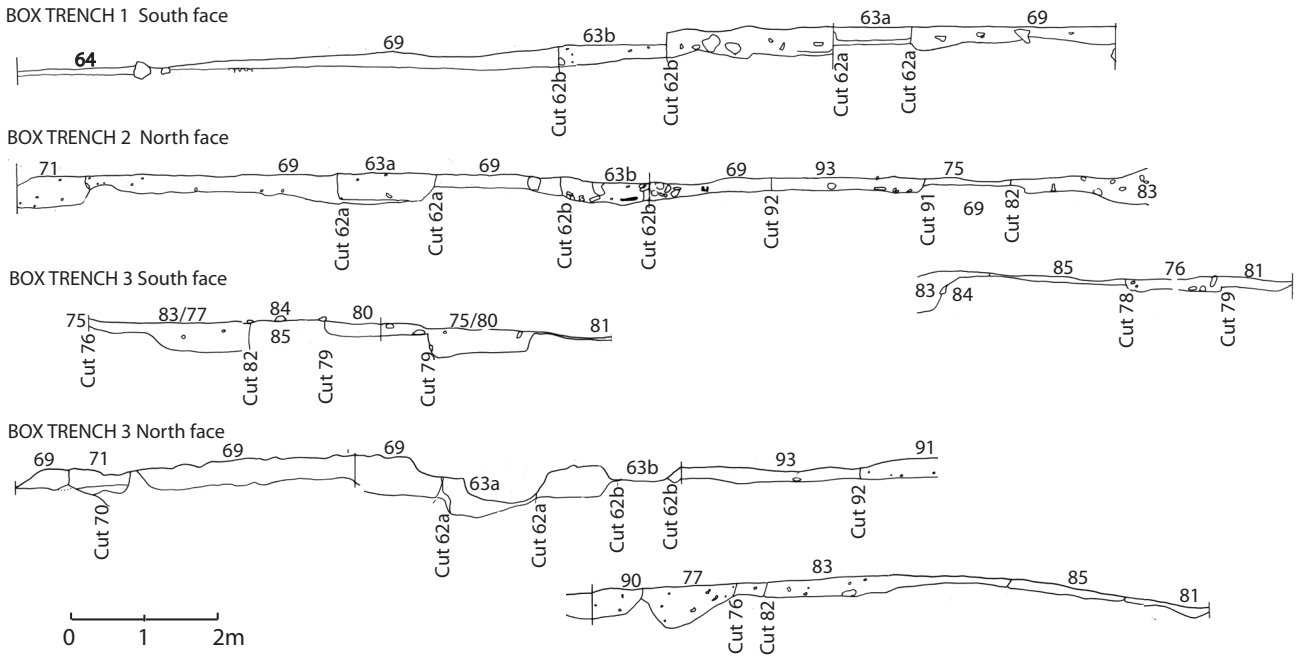


Figure 3.70. *Box Trench profiles and their numbered contexts.*



Figure 3.71. *a) Paving stones exposed at the edge of Channel 1; b)* in situ *sherd scatters in Context (120).*

now very disturbed. It was a firm, very dark brown (10YR 2/2), sandy clay loam, containing mixed Temple Period pottery. It was overlain by Context (140) – a firm, very dark brown (10YR 2/2), clay loam, rich in pottery and animal bone. Context (140) was located below stony Context (142) (Fig. 3.75, section C–D) and was cut through by modern concrete foundations on the north side. The pottery assemblage from this layer was dominated by sherds from the Tarxien and Ġgantija phases. Context (141), adjacent to and contemporary with (140), beneath (142) and above (143), was a firm, very dark greyish brown (10YR 3/2), sandy clay loam, set against the baulk in the northeast part of the site. Context (142) covered Context (134), which was a firm, dark brown (7.5YR 3/2), sandy loam that survived between vine trench Cuts [62] and [92], and was covered by (69). Like the layers below, the pottery assemblage from this layer contained examples from the Ġgantija and Tarxien phases, together with six pieces of chert, a piece of Lipari obsidian and two stone rubbers.

3.7. Ancient soils and deposits and the Roman vine channels and pits

Whilst the upper levels of the entire excavation area were cleared and cleaned of topsoil in previous campaigns, a buried soil remained, particularly in the zones preserved between the Roman channels. Context (69) was the most extensive of these deposits and formed a firm, reddish brown (5YR 4/3), silty loam, occasionally with a blotched/speckled appearance suggesting the incorporation of pieces of daub and/or *torba*. This deposit can be interpreted as a prehistoric soil into which many Roman-period agricultural channels were cut (Fig. 3.62). It was particularly rich in cultural debris, such as animal bone, pottery and burnt materials, suggesting that it was a former ploughsoil receiving settlement waste material that enveloped several rubbish pits and middens. Figures 3.63 and 3.64 show the midden deposit within which sherds and lithics were found. This layer contained 2730 sherds of pottery, with Roman, Bronze Age, Temple Period and Skorba pottery phases all represented in the assemblage. It was also rich in lithics with some 26 chert flakes and four obsidian blades and flakes (two each from Lipari and Pantelleria). Context (108), a similar, but somewhat more compact deposit, survived between cuts in Channel 4, south of BT3; this contained fewer finds. Context (124) was another similar deposit, lying immediately to the east beneath the later vine trench Fill (83) in Channel 3, south of BT3, and took the form of a firm, dark greyish brown (10YR 4/2), silt loam, which was later cut by channels, and can be considered equivalent to (85). Context (85) was a similar buried soil located between vine channel Cuts [79] and [82] extending from BT1 to BT3 and adjacent to (84). It was a firm, dark reddish brown (5YR 3/3), sandy clay loam with grey mottling. Figure 3.72 shows this soil cut through by agricultural features and the archaeological box trenches that were placed across them. As is typical of these disturbed domestic midden areas, the deposit yielded a bone tool, seven chert and two Lipari obsidian flakes and a stone rubber.

Small quantities of very early (Thermi) Bronze Age pottery were retrieved within the disturbed levels of the upper prehistoric soil. Some material was located in what appeared to be a shallow pit cut into levels above the earlier Neolithic house. This material corresponds to pre-Tarxien Cemetery and Borġ in-Nadur styles, and means that this pit presents an interesting and important dated context for material associated with the final Temple Culture (§3.10; Chapter 10). Across the site, other fragments, possibly not associated with any particular structure, were retrieved and dated to the Early, Middle and Late Bronze Age phases. No intact features were identified with this period.

3.8. The agricultural channels in the northeast area of the site

As noted in the 1990s work, the upper deposits over the entire excavation trench were crossed by linear cut agricultural features (Figs. 3.62 & 3.71). The pattern comprised nine distinct parallel channels, all of which were truncated to some extent. Ploughing and previous interventions had removed all topsoil cover, and a smooth, level surface was encountered over the site. Only the area immediately against the west wall (parallel to Triq Anici) had evidence of more intact deposits. These were not, however, formed from ploughsoil, but of pale soil dumps, floors, the kiln and other dense deposits.

The system of channels had three different forms. The earliest are likely to be the small sub-circular basins that formed a line of pits on the north side of the site, and are likely to be of late Punic form, if not date, going by similar finds in Ibiza (cf. Marlasca Martín & López Garí 2006: 97). The pits measured between 0.80 and 1.20 m in diameter and some were up to about 0.40 m deep. These individual basins probably formed holes for trees or vines (Figs. 3.73 & 3.74). There was substantial calcification of the surface of the basins. This was formed from the precipitation of lime, and appeared to be almost like mortar. Their formation, however, was considered to be a natural one, brought about by differential watering of the tree-holes.

Two further channel systems ran parallel to the basins, and cut through in places to form either deep (about 0.5 m) or very shallow (0.2 m) channel bases, where the upper levels were truncated by agriculture and previous archaeological investigation. It seems likely that the original field was laid out with lines of basin pits, and these were replaced, over time, by linear cut channels that followed approximately the same axis. Some of the channels cut through the Neolithic soil to bedrock and, given that the regular spacing of the agricultural channels was every 1.5 to 2.5 m over the site, these cut into and destroyed or disturbed the underlying prehistoric deposits. In particular, the channel features affected the eastern end of the excavation trench, where bedrock was higher, and early deposits less deep; whilst in the western end, deposits followed the dipping bedrock to a depth of about 1–1.3 m, and were better preserved. One channel [52] was especially deep on the extreme north of the trench. In total, the channel systems covered over one third of the excavated area of the site (Figs. 3.71 & 3.73) thereby limiting the sample of prehistoric deposit available for excavation.

The material found within the channel systems was of mixed date, and whilst it included quantities of prehistoric material (of a very rolled, fragmentary

Table 3.5. *Contexts containing Roman pottery.*

Contexts with Roman pottery	Identification
15	Diagnostic pottery
16	Diagnostic pottery
23	Diagnostic pottery
27	Diagnostic pottery
28	Diagnostic pottery
30	Diagnostic pottery
37	Diagnostic pottery
55	Diagnostic pottery
63	Diagnostic pottery
69	Diagnostic pottery
71	Diagnostic pottery
74	Diagnostic pottery
77	Diagnostic pottery
83	Diagnostic pottery
91	Diagnostic pottery
93	Diagnostic pottery
119	Diagnostic pottery
4	Undiagnostic pottery
8	Undiagnostic pottery
21	Undiagnostic pottery
44	Undiagnostic pottery
47	Undiagnostic pottery
84	Undiagnostic pottery
107	Undiagnostic pottery
130	Undiagnostic pottery
143	Undiagnostic pottery
145	Undiagnostic pottery
185	Undiagnostic pottery

size) the larger and probably contemporary pottery was Roman. These sherds were imported and locally made examples of ceramics, and appeared to be representative of domestic assemblages of pottery from the second to first centuries BC to the second to third centuries AD.[2] Finewares, flasks, plates and coarse-wares were all identified, but interestingly, no examples were intact or even matching, and much was already well worn and abraded. This indicates that the pottery was probably transported to the site in manuring episodes and used with household rubbish to fertilize the soil.

Whilst rock-cut channels cut in the bedrock to grow vines in areas of limited soil depth are a well-known feature of agricultural improvement in Malta since Roman times (Vella *et al.* 2018), earth cut structures as recommended by the ancient agronomists (Thurmond 2017, 90) and as encountered at Taċ-Ċawla have not been identified before. Importantly, the excavations took place in spring, whilst the soil was damp and the soil colours were clear and well demarcated. These conditions made it possible to identify each of the channel cuts from the clean, level surface of the site, once loose topsoil had been removed (Fig. 3.72). Initially the channels were tested by three small cuts (parallel box trenches) running north–south, which enabled clarification of each channel and its scale. The areas explored in 1993–4 were emptied. Yet, within those areas distinct spreads of mollusc shell had been noted, and when they were excavated in full in 2014, these proved to be the fill of three separate pits (Figs. 3.75 & 3.76a, b), cut into by the lower levels of a recut channel system. Associated ceramics were of Roman date and incorporated with the shells. So dense was the shell deposit that these were almost free of any soil matrix. The mollusc assemblage was almost entirely terrestrial snails, presumably used for food. These were sampled extensively (see Appendix A3.8) (Tables 3.5 & 3.6).

3.8.1. The Roman agricultural channel sequence and fills

The Roman channels crossed the excavated area diagonally, and are recorded as follows commencing in the northeast corner of excavation and moving southwest. Defining the northern edge of excavations, a modern machine-made foundation (for a projected house, later abandoned) was defined as Cut [111]. This bedding

Table 3.6. *Agricultural channel fills (contexts).*

	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8	Channel 9	Channel 10	Channel 11
cut	113, 116	79	76, 82,78	90, 92	62b	62a, 99, 106, 103	70, 161,	36, 11,59,	18, 13, 12, 11, 8, 9, 10, 42, 39, 25, 18, 19, 59, 46, 60,	52,	131
fill	114, 115	80	77, 83	91, 93	63b	63b 102, 95, 100, 74	71, 72 162	37	28, 44, 21, 34, 16, 40, 41, 23, 20, 22, 24, 51, 33, 27, 61, 48, 50, 19, 24,	55, 54	132

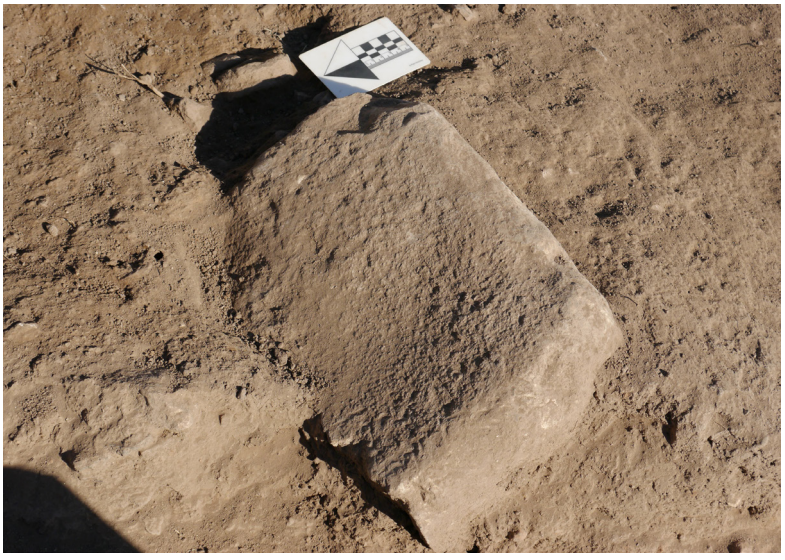


Figure 3.72. *Sandstone quern* in situ *in Context (120) between Channels 2 and 3.*

trench was filled by Contexts (110) and (112) and cut into Context (109) – the underlying prehistoric deposit. Fill (110) covered a lower concrete Fill (112) and was covered by (1). The pottery assemblage from this fill included material from the Ġgantija and Żebbuġ phases. Fill (112) was the concrete filling of the bedding trench [111].

Channel 1 was the most southerly and exposed feature in the southeast corner of the excavations. It was only partially explored and was clearly identifiable, if fairly shallow and narrow. The Cut [114]/[115] was 45 cm deep and *c*. 80 cm wide, filled by contexts (113), (116), and (30). These overlay intact prehistoric levels (109)/(120) (Fig. 3.69), (126) and (204). Channel 1 cut through stone paving (123), which had formed a surface over some well preserved and significant deposits (Figs. 3.62 & 3.69) that appeared to relate to a mainly Żebbuġ phase midden and floors. The Fill (113)/(116) was a firm, brown (10YR 4/3), clay loam, and contained moderate amounts of small-medium sized stones. It was interpreted as the fill of a Roman agricultural pit or channel on the southeast corner of the site. The pottery assemblage from this fill contained Roman and Żebbuġ phase material. Part of this channel is recorded in Figure 3.67 G–H and Figure 3.62, in the southeast corner of the trench. Fill (113)/(116) was covered by Context (74).

Channel 2, immediately to the north, was identified as Cut [79], and filled by Context (80). This was a relatively shallow straight edged narrow channel about 45 cm wide with a fairly flat base. The depth was deeper in the west (25 cm), but became shallow (10–15 cm) in the east where the bedrock was close to the surface. The Fill (80) was a compacted, dark yellowish brown (10YR 3/4), sandy clay, and overlay, in part, intact prehistoric levels (109)/(120), which extended over an area of about 2 × 2 m. The deposit contained pottery of Ġgantija, Żebbuġ and Bronze Age phases, animal bone and stone inclusions, and was easily distinguished from undisturbed soils as its browner, with carbonates present at the edges (Fig. 3.71 A–B).

Channel 3 was a wider (about 1 m), shallow, truncated channel, that ran diagonally north-north-east–south-southwest across the site, in alignment with other Roman agricultural features. It was square edged, regularly cut channel that rested on bedrock in the shallow, eastern end of excavation and became deeper (about 30 cm) as it proceeded southwest. Limey concretions were noted at the edge of the cut. The channel was initially identified as Cut [76] to the north, and [82] on the south, but these proved to be the same entity, filled by (83). The channel had been re-cut, and at its western end Pit [78] was distinguished by its ashy-silty Fill (77), which comprised elements of mixed grey redeposit of prehistoric material of pottery and five lithics. The pit may have been a later tree-hole associated with the vine trench. The Fill (83) was a compacted, dark yellowish brown (10YR 3/4), silty/sandy clay loam, and the colour and matrix varied slightly from one end of the feature to the other, with a silty clay loam at the southern extent that became a sandy clay loam in the east. Finds from (83) included ceramic and animal bone fragments. The pottery assemblage from this context contained Roman, Tarxien, Temple Period, and Bronze Age phase material (Figs. 3.62 & 3.71, Section A–B).

Channel 4 was more difficult to demarcate, and was shallow, poorly defined, over 1 m in width, and interspersed with pits and recuts. The main Cut [90]/[92] was filled by contexts (91)/(93), and these directly overlay *terra rossa* (126). In the eastern excavated areas, a series of exposed sections of bedrock and earlier levels were disturbed by the channel digging in Roman

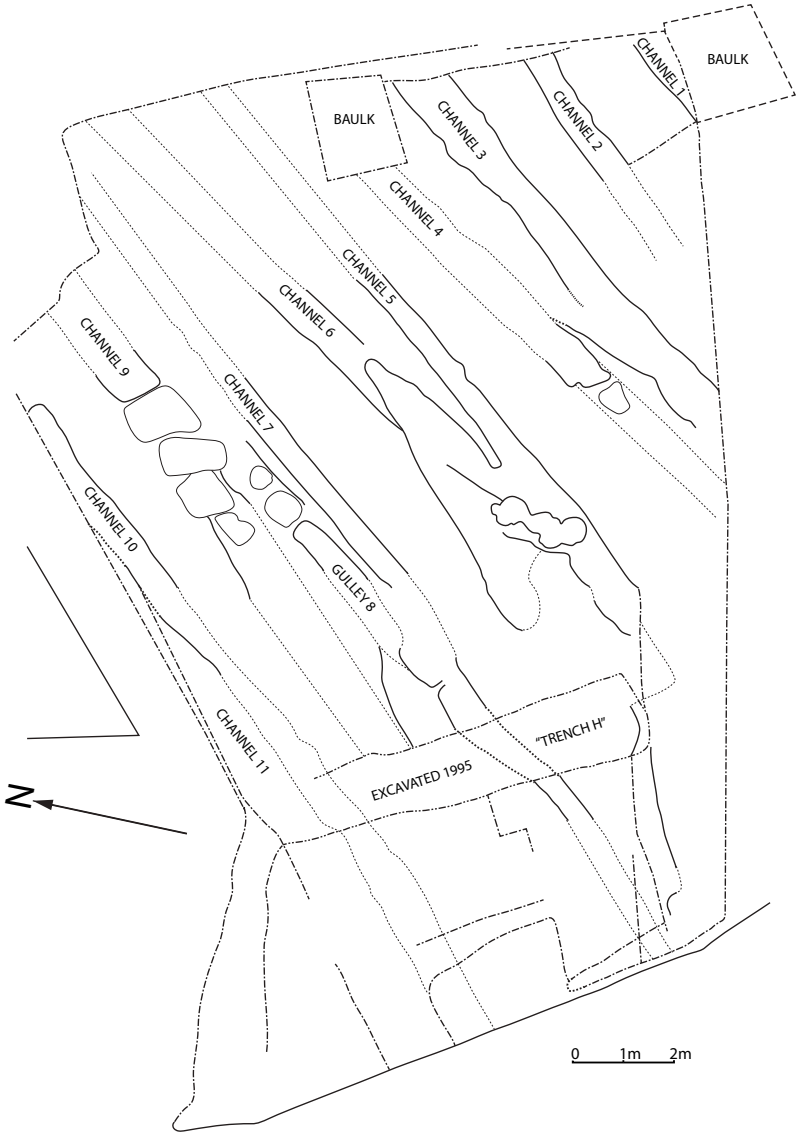


Figure 3.73. *Layout of the vine pit/channels across the excavation area (identified as gullies and trenches in the figure).*

times. There, the poorly defined channel appeared to morph into Channel 3. Indeed, parts of Channel 4 may be a natural depression. This was filled by Fill (91), which lay below (74) and above (69) in the west end, and comprised a friable, dark yellowish brown (10YR 4/4), sandy loam, which contained extremely encrusted ceramics, five chert and one obsidian flake. The pottery assemblage from this context contained Roman, Ġgantija, Tarxien, Temple Period, Żebbuġ, Bronze Age, and Tarxien Cemetery phase material. The equivalent Fill (93) was identical in the eastern end of the channel, and measured 2.4 × 0.7 × *c.* 0.35 m. It produced a large amount of pottery from the Ġgantija and Żebbuġ phases, plus burnt bone, three chert and four pieces of Lipari obsidian. Flotation produced one pulse (Figs. 3.62 & 3.67, A–B, C–D).

Channel 5 was a narrow, clearly defined trench running east–west through the full length of the excavation. Midway, the channel merged in a clear 'Y'-shaped feature with neighbouring Channel 6, which had been explored quite extensively in 1994 (Figs. 3.62 & 3.71). The cut of the two channels was identified as Cut [62B] in Channel 5 (filled by (63B)), and Cut [62A] in Channel 6 (filled by (63A)). Channel 6 was angled on a more north-northwest–south-southeast alignment than Channel 5, and it seems to have been recut, or at least deepened midway down its length, more than the southern channel, before they both merged. Cut [62] was calcreted around the flattish base, the encrustation measuring 5–8 cm thick at the boundary with the layer into which it was cut. Fill (63) had been partly cleared in a previous excavation. It was a friable, dark yellowish

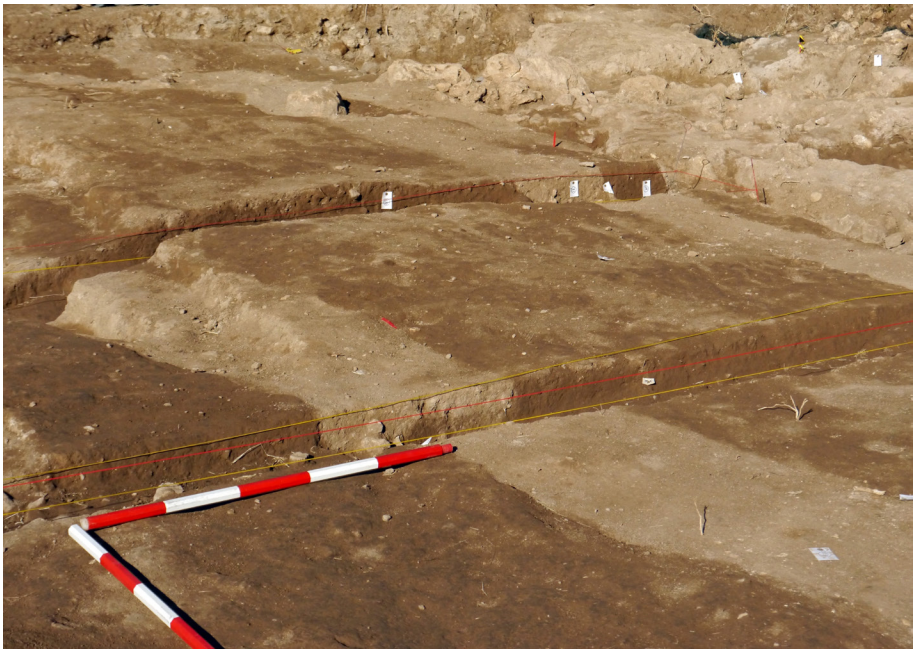


Figure 3.74. *Differential coloration (caused by relative humidity) of the agricultural channels, made visible on first cleaning, looking west.*

brown (10YR 4/4), silty clay loam with stones sized from very small to large. A deposit of snail shells found at the base of (63) was sampled separately as Soil Sample 28. Finds from (63) included ten lithic items, small pottery sherds, animal bones, and a small undated copper or bronze coin, 16 mm in diameter. Given its extent, the context was relatively poor in cultural material, and evidently very heavily reworked. The pottery assemblage from this fill contained Ġgantija, Temple Period and Żebbuġ phase material.

The merged Channel [62] cut through a succession of earlier, clearly demarcated pit fills containing rich deposits of mollusc shells, which survived at the edge of [62]. These pits, each about 0.8 m in diameter and 0.5–0.6 m deep, may have utilized earlier vine holes, or were specifically dug to bury the shell waste (Figs. 3.75 & 3.76). They were identified east to west, as: Cut [99], containing Context (95) and covered by (63) and (74); Cut [106], containing Context (102) and covered by Context (74); and Cut [103], containing Context (100), and covered by Context (74). The mollusc-rich deposits were carefully sampled and analysed fully (Appendix A3.8). Figure 3.74 shows the layout and profile of these pits. Figure 3.73a–e shows the complexity of pits and channels recorded photographically and with Structure-in-Motion software. The western part of Channel 6 merged into further cuts and disturbances as it extended south and was filled by Context (35) – a mixed deposit. Figure 3.75b shows the location of the snail-rich deposits that were sectioned and found to be evident in the sides and bases of the agricultural channel (Fig. 3.75a). Cut [99] was cut into the base and edge of Channel [62], and filled by (95). The cut was sub-circular in shape, and measured approximately 0.6 × 0.6 × 0.2 m. Its shallow depth was a consequence of its truncation by later channel re-cutting in [62]. The snail-rich Fill (95) was a friable, dark yellowish brown (10YR 3/4), sandy clay loam, and was identified as anthropogenic, due to a lack of juvenile snails or a mix of species. Cut [106] or 'Snail Pit 3' was filled by (102), another snail deposit. Cut [106] extended to a depth of 0.15 m. The Fill (102) was a dark yellowish brown (10YR 3/4), sandy clay loam densely packed with mollusc shell, filling the base of the pit. Cut [106] had been truncated first by the almost contemporary neighbouring agricultural Pit [103], and then further sliced vertically by the insertion of Channel [62]. Cut [106] clearly penetrated into Neolithic subsoil (Fig. 3.75a, b). Cut [103] was a shallow sub-circular feature found at the base of Channel [62], cut into the earlier Pit [106], and was also visible from the excavated surface, where it was observed to cut through the prehistoric soil (Fig. 3.67a, b). Cut [103] was filled by Fill (100), which was a dark yellowish brown (10YR 3/4), sandy clay loam filled with snail shells. The Pit [103], however, was insufficiently deep to contain the snails dumped within it, which had spilled over into the overlying (74) matrix. This, in turn, had spread into the surrounding matrix through past cultivation activities. The pottery assemblage from this Layer contained Żebbuġ and Saflieni phase material, and 12 lithics. A detailed molluscan study was carried out on the pit content (see Appendix A3.8). Traces of similar mollusc shell concentrations were noted on the surface



Figure 3.75. *a) 2014 Structure from Motion rendering of the excavated pits; b) initial clearance of the channels and pits with three box trenches cut across them; c) the early stages of excavation of the pits and channels, looking south; d) vine pits looking southwest.*

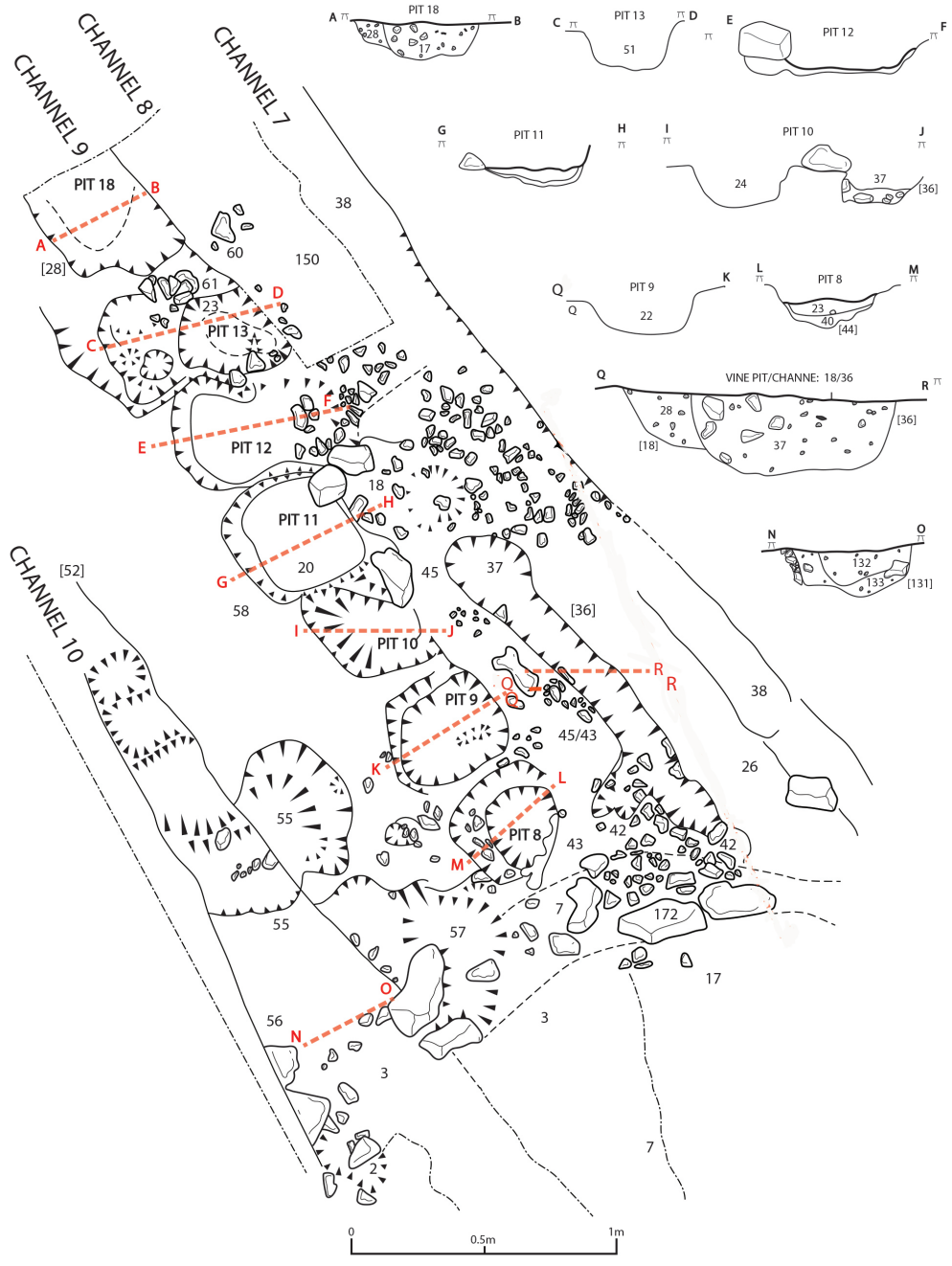


Figure 3.76. *The excavated vine pits and features in plan and profile east of the stone structure (172).*

of several areas in the site. They were not excavated, and remain to be explored in the future.

Channel 7 was angled east–west and spaced over 2 m north from Channel 6. Its Cut [70] was filled by (71). The fill was similar to that of Channels 1, 2, and 5, all of which seem to have comparable depths and widths (0.7 m wide and regular). The Fill (71) was a brown (10YR 4/3), clay loam and was covered by (30) – an extensive deposit that contained 14 lithics and other cultural material. Deposit (72) was observed slightly below (70) and (69), and was a dark brown soil. The pottery assemblage from (72) contained Roman, Temple Period and Bronze Age phase material. The channel extended westwards from the eastern limit of excavation, passing through the centre of the Neolithic stone structure, where the channel was identified as Cut [161] and filled by Fill (162) – a similar friable, brown fill. Figs. 3.7 & 3.45 capture the relationship

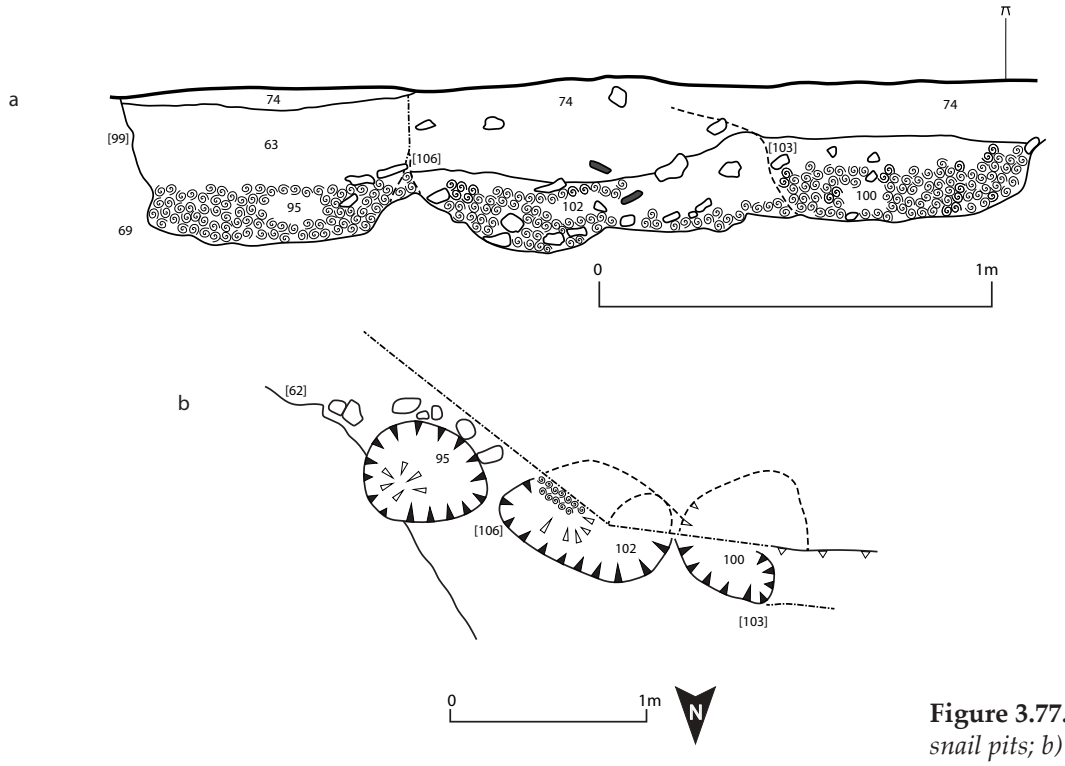


Figure 3.77. *a) Section through snail pits; b) plan of snail pits.*



Figure 3.78. *a) Clearance of channels 5–6 looking west) revealed remnant dumps of edible snail shells; b) sectioned snail pits shown as partly excavated into the base of the channels (looking northwest).*

of the channels with the Neolithic structure. Context (162) filled and covered many small circular pits that formed a continuous Channel [161]. This ran parallel to Cut [70] and extended from the wall (172) across the structure's interior, disturbing the Neolithic deposits and floors in (193), (194), (195) and (196), as well as dislodging large stones from the wall.

Channel 7 also appeared to merge with the pit alignment that formed Channel 8 (Cut [36]) as it extended west through the 1995 excavation trench.

The entire area around Channel 7 had been cleared of topsoil and partly investigated in 1993–4. The features were further identified as a calcareous base deposit (219) and Fill (220) where it appeared west of the 1995 trench; its cut and fill were evident within the section. The cut depth varied between 25–40 cm and the width between 50–60 cm, but whilst it meandered close to Cut [70], it remained some 30–40 cm to the north of it. In the western area of Channel [70], the Fill (219) formed a hard calcareous crust, and was covered by Fill (220), the upper fill. This was compacted, dark brown (10YR 4/3), sandy clay, covered by Context (167). Context (167) was a firm, brown (7.5YR 4/6), silty clay loam layered beneath (94) and above (154) and (162), with a similar consistency to (30), which it abutted. Context (167), however, contained modern materials such as plastics and bricks, and was interpreted as a modern ploughsoil.

Set close to Channel 7, Channel 8 comprised a series of individual shallow pits and amorphous depressions, apparently truncated individual vine or tree holes that might once have been part of the parallel, and possibly earlier, Channel 9 arrangement of pits (Figs. 3.47, 3.48 & 3.74). Many of these features were partially excavated but then backfilled in 1994. The alignment only appeared southwest of BT2 where the pits were collectively described as Cut [36], containing Fill (37). This Layer almost merged on the north side with a further series of shallow pits, collectively described as Channel 9 and Cut [36], which formed a linear cut/channel lined with green mesh cover (from the 1994 work) and backfill. Some of the original Fill (37) was still present in the shallow feature, which had gently sloping sides and a relatively flat to slightly concave base. Running parallel on the north side of [36] a further alignment of pits [11], [59], and Channel/Cut [42] disturbed the west edge of Channel 9 and partly cut into [36]. The edges were not well defined and because of previous truncation and excavation, the relationship with Pit [42] at the west end of the channel could not be established clearly. Yet, [36] overlay and cut into (48) and the underlying stony layer. The pits of Channel 8 contained deposit Fill (37), a friable, reddish brown (5YR 4/3), sandy clay loam that occurred in the eastern and less disturbed length of Cut [36]. This fill contained frequent sub-angular fragments of Upper Coralline Limestone (0.01–0.18 m diameter) and occasional degraded limestone flecks. The west end of the channel had been previously excavated, leaving scant traces/lenses. Finds from (37) included pottery sherds from Temple Period phases, animal bone, shells, and a human clavicle. (Fig. 3.74).

Channel 9 (Fig. 3.71 & 3.72), lying parallel to Channel 8, comprised seven shallow pits (each identified as a separate feature and cut), which were closely set and numbered from east to west as: Cut [18], a sub-rectangular form, filled by Context (28); Cut [13], a roughly circular form, filled by Context (51); Cut [12], a sub-rectangular depression, filled by Context (44); Cut [11], a squarish form filled by (34), covered by Context (16); Cut [20], an amorphous depression, filled with backfill from previous investigations; and Cut [8], a smaller sub-circular pit, filled by Context (40), which was a concreted limey coating over the soil cut. The pits are summarized in Table 3.7.

Beneath the disturbance of the pits alignment, two main deposits were identified as ancient subsoil/ploughsoil, into which most of the agricultural features had been cut (§3.7). Context (20) appeared to underlie Context (24), and the line of shallow Pits [8–13]. It was a friable, dark brown (10YR 3/4), silt loam. An ashy lens within the deposit was cut by [10]. It was interpreted as the extensive layer into which Pit [10] and other such pits were cut. Finds from (20) included prehistoric (Temple Period) pottery. Context (15), beneath Context (1), was a firm, brown (10YR 4/3), silty clay loam. It represented a plough soil into which Pits [8–13] were cut. Its composition was very similar to that of Context (64). The pottery assemblage contained Ġgantija, Tarxien, and Temple Period material. Cut [29] and Cut [14] was a linear cut at the edge of the excavation trench; exposed upon excavation of (15) and the removal of the green mesh and Context (1). Context (47) represented another ploughsoil. It was a friable, brown (10YR 4/3), silty clay loam, identified in the eastern area. Context (147) was noted to be more compacted and clayey than Context (15) above, and included more charcoal and pottery. The 1994 excavation had sealed the unexcavated layer with green mesh. The finds from (47) included Roman, Ġgantija and Temple Period pottery sherds as well as bone and obsidian.

Channel 10 was located to the north of the pit alignments of Channels 8–9, and it defined the northern limit of excavation. It formed the deepest and most prominent vine/agricultural channel on the site and cut through all archaeological deposits, sometimes to bedrock. The Cut [52] contained Fill (55), and, where exposed, was 1–2 m wide and up to 0.8 m in depth from modern topsoil levels. In places, it was lined with a calcrete Fill (54). The channel cut through and obliterated much of the northern edge of the Neolithic stone structure (172) and recurred in the northwest corner of excavation, where it was defined in plan but not excavated. Cut [52] had been partially excavated in 1995, where tangential trenches explored its relationship with the stone structure. Midway along it length, immediately north of the stone structure, a few compacted areas suggested the presence of pits, but due to later disturbance, these were not proven.

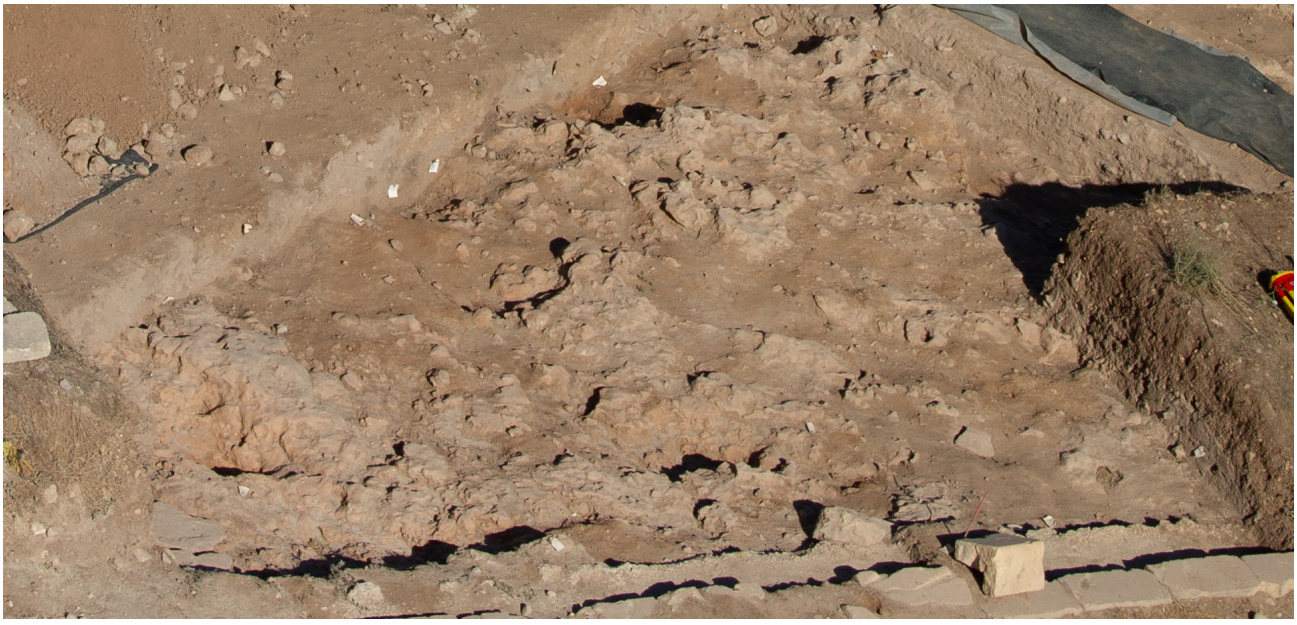


Figure 3.79. *Excavation of the shallow deposits on the east side of the site, looking northwest.*



Figure 3.80. *Bedrock features along the east baulk of the excavation, showing potential posthole and* torba *deposits.*

Table 3.7. *Vine channel fill and cut contexts.*

No′	Shape/size	calcreted	Above/Fill	Cuts into/below	finds	Excavated 1994
Cut [42]	Sub-circular, flat based, vertical sides	no	43 Friable, dark brown (10YR 4/3), sandy clay loam	36	0	yes
Cut [8]	Sub-circular	Calcrete fill (40)	[39] Possible posthole fill (40) Fill (41)	(4), Fill (23) firm, dark brown (10YR 4/3), Sandy silt loam	Scarce	yes
Cut [9]	Sub-rectangular pit with steep sloping sides and a slightly concave base,	Calcrete lining (22)			Scarce	yes
Cut [10]	Sub-circular pit	Calcrete surface, Context (24).		[25]	Prehistoric	yes
Cut [11]	Sub rectangular pit with steep side, concave base	Calcreted base (34)		Context (16)	Pot chert bone	yes
Cut [12]	Sub-circular pit steep sided	Concave calcreted base Context (44)	Cut [59] (20) (48).	Fill (21), [12]	no	yes
Cut [13]	Sub-rectangular pit with steep sides	Calcrete concaved base Context (51)	[46] (33) (27) (50)		Pot, chert, bine	partly
Cut [18]	Irregular vertical sided pit	no	(28)=(19)		Pot	yes
Cut [36]	Channel/pit [60]	Stony deposit	(61)	(48) (33) [36]		no

The main Fill (55) was a friable, dark brown (7.5YR 3/4), sandy clay loam, compacted in places. Finds included Temple Period, Żebbuġ, Roman and later pottery, obsidian, a metal nail, shells and animal bone.

Set against the western edge of the expanded excavation trench, another channel (No. 11) (Fig. 3.71) was visible. Cut [131] ran north/south along the north-west edge of the excavation trench. It cut Channel [52] and Context (55), from the west and was visible in the trench edge section where the channels cut through the wall of the Neolithic structure. Cut [131] extended into prehistoric layers and through the wall of the Neolithic



Figure 3.81. *Post-medieval kiln or burning pit, showing rubble base and circular edge.*

structure, and contained fill (132). This was a firm, dark yellowish brown (10YR 4/4), clay loam, which was identified as an agricultural soil that formed the upper fill of Cut [131], above a darker Fill (133), and was covered by (15) and (30). The pottery assemblage from this layer contained Ġgantija, Tarxien and Żebbuġ phase material. Fill (133) was a firm, very dark greyish brown (10YR 3/2), clay loam, located in the lower layers of Cut [131]. Fill (133) was noticeably darker than (132), but contained similar cultural material.

In conclusion, the recognition of the earth-cut agricultural channels forming the Punic-Roman archaeology at Taċ-Ċawla is rare in Malta, since hard impenetrable rock is encountered more frequently. These examples are thus particularly significant in terms of their formation, survival and recognition. The 2014 work followed a damp winter and spring with ideal soil conditions that revealed the ephemeral features and enabled them to be identified and recorded. (Fig. 3.72). The conditions made it possible to distinguish each of the channel cuts from the clean, level surface of the site. Following the removal of the loose topsoil, it is worth noting that the rapid drying of the surface soon obliterated the surface traces of channels with pale dust unless it was watered frequently and protected with polythene sheeting.

3.9. Recent historical remains

Recent deposits that had not previously been removed in the earlier interventions were evident in the northwest area of excavation. Evidence of a furnace (discussed above) (Fig. 3.81) was likely to have been part of light industrial activity. Some recent pottery, glass and metal was located but was not of significance and probably derived from manuring and dumping activity.

3.10. The material culture of Taċ-Ċawla

3.10.1. Ceramics

Taċ-Ċawla has been the most productive of the sites studied in the *FRAGSUS Project*, in terms of quantities of pottery and artefacts it has yielded. The total weight of pottery retrieved from the 2014 campaign is just below 400 kg, with a sherd count of 50,679 individually recorded and phased pieces. These break down further into specific types and phases, with increasing numbers present in later prehistoric phases. The Għar Dalam phase proved to be elusive and only 28 recognizable sherds were identified. This count contrasts markedly with the assertions made by the earlier watching brief studies, which may have failed to recognize different later incised and impressed pottery styles. By contrast, the Skorba pottery group is well represented, with some 844 Grey and undifferentiated Skorba, and 409 Red Skorba sherds identified. Together, these sherds weighed 14.44 kg. This represents a sizeable assemblage, and confirms the earlier Neolithic occupation of the site. The Żebbuġ ceramic phase was especially well represented: 5039 sherds were identified, weighing 59.41 kg, and this proved to be the largest assemblage of all the identifiable phases. The large size of many of the sherds, and the wide range of forms, style and sizes are especially important, since Żebbuġ phase material has not been retrieved from a settlement site before. Arguably, however, some early Temples could have been settlements, as discussed by Evans (1971). The variety of forms (Chapter 10) provides an insight into the elaborate food and storage practices that the Neolithic communities engaged in, and the assemblage demonstrates that early Malta developed a rich and diverse ceramic culture from at least 3800 BC.

The Mġarr phase is barely represented at Taċ-Ċawla, with eight sherds weighing 80 g, and evidently either the phase, or the use of that particular pottery had little impact on the area of Taċ-Ċawla excavated in 2014. The material is much more frequent on Maltese (rather than Gozitan) sites, but the phase may be short-lived, with the pottery used for very specific functions or simply having a poor survival rate. The stylistically distinct Ġgantija pottery phase yielded 5008 sherds, weighing 44.7 kg. The elusive Saflieni style (Malone *et al.* 2009, 229–31), which was potentially associated mostly with funerary sites, was barely present at Taċ-Ċawla. Only nine sherds weighing 50 g were found. In contrast, the long-lived and distinctive Tarxien pottery occurred in 1009 sherds, weighing 16.99 kg. The quantity is surprisingly low, however, given that the site clearly was expanded and much in use over the centuries that are assigned to the Tarxien phase. 'Temple Period' pottery was designated to indistinct body sherds, and of these there were many. In total, 31,959 sherds were counted, but their individual styles and phases could not be ascertained with confidence (Fig. 10.4). This general assemblage weighed 196.18 kg, almost four times more than the Żebbuġ material, but was more than twice as fragmented. The small sherds are naturally more difficult to assign to a particular phase or style, unless, as with the Skorba material, the fabric is particularly distinctive. The presence of Bronze Age material is quite marked at Taċ-Ċawla, since the material is distinctive. Earliest Bronze Age (formerly considered as Tarxien Cemetery phase) sherds of the Thermi Grey ware style amounted to 58, and weighed close to a kilogram. They represent a rare and important assemblage. Interpretation and new dating for this material appears to chime with evidence emerging from Tas-Silġ (Cazzella and Recchia 2013, 2015). Middle to Late Bronze Age Borġ

in-Nadur pottery yielded 19 sherds weighing 73 g. Roman-Punic and later pottery was relatively infrequent, even in the Roman agricultural channels. Had the original topsoil remained for careful excavation in 2014, the later Roman and post Roman phases might have been better represented in these sherd counts. As it was, the previous excavation campaigns had effectively removed the last two millennia of soil formation and replaced that with mixed and unaccountable topsoils. The materials from the original 1994–5 topsoil and agricultural channels await further study.

The phasing of the pottery is discussed in Chapter 10, which expands on the traditional identification of style, decoration and material. The effective process of recording, weighing and counting all the ceramic assemblage from the site has enabled distributions to be plotted and densities mapped. Figures 3.83–3.85 plot the relative densities for each of the main phases of pottery, highlighting the continuity of some locations throughout the life of the site, especially the western area, closest to the local water source in the later phases of occupation.

3.10.2. Lithics and artefacts

The collection of artefacts from all parts of the excavation, including the top soil and backfill was systematically undertaken (Appendix Table A3.2.1). All significant objects that were considered man-made, were identified as Small Finds, and where possible, provided with 3-D locations, individual numbers (SF) and later recorded, measured and drawn. The results of this work are extensively listed and illustrated in Chapter 11, Figures 11.12 & 11.13. The majority of material retrieved was lithics, mainly chert flakes and a smaller quantity of chips, but also a significant group of fragmentary retouched artefacts. Obsidian formed a small but significant part of the lithic assemblage, dominated by chips rather than flakes. The variation between the two main lithic materials, chert and obsidian may be a matter of identification and retrieval but it could imply that chert was worked on site, leaving large waste flakes, whilst obsidian was mostly the result of retouch that probably refreshed broken but complete artefacts. The identification of the large prismatic core from the site is particularly significant, since this would imply that some obsidian was struck and worked on the site. The distribution of lithic materials was plotted showing density plots (Figs. 3.86 & 3.87). Some possible fragments of polished stone were noted (Fig. 3.11), which imply that axes were in use, although none were found at Tać-Ċawla. Other artefacts included a number of bone tools formed from animal bone (usually sheep/goat) although these are surprisingly rare. The forms include spatulae and points (Chapter 11).

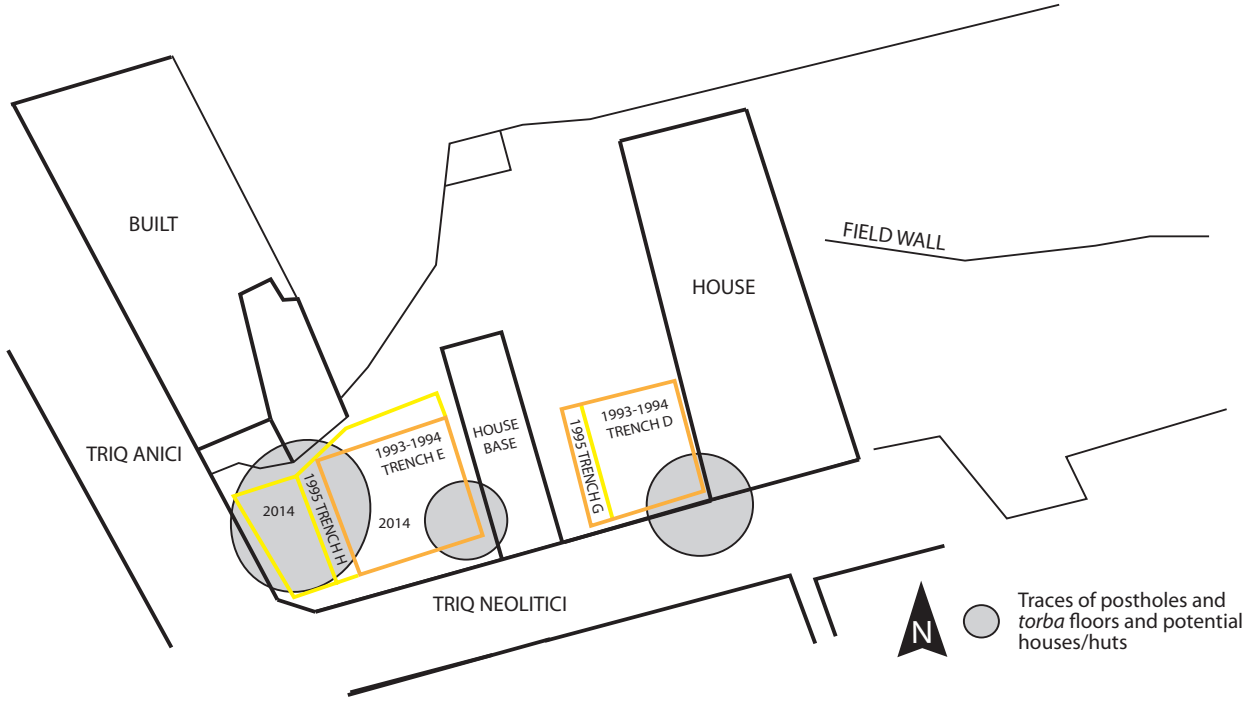


Figure 3.82. *Possible layout of the Neolithic domestic structures at Tać-Ċawla, indicated by deposits of* torba *floors. Concentrations occurred in two areas of the 2014 work and the eastern concentration was recorded in 1995 and the earlier watching briefs.*



Figure 3.83. *Tać-Ċawla, main trench early in the excavation showing the partly cleared channels, looking west.*



Figure 3.84. *The site at the close of the 2014 season, showing the deep box trenches 5 and 6 and the stone structure.*

3.11. The plant economy of Taċ-Ċawla

The programme of soil sampling and sediment flotation on the majority of 'intact' deposits at the site (169 samples, each of 10 litres = 1690 litres) (see Appendix Table A3.3.1) has produced a significant sample of domestic and wild plant remains. These are amongst the first substantial assemblages to be retrieved from Neolithic Malta (although see Fiorentino *et al.* 2012). The main deposits bearing plant remains were selected from the base levels of old trampled soil and midden-firepits, such as (268). This deposit, from a protected depression in the bedrock, in particular yielded significant remains that enabled an interpretation of a barley, wheat and pulse-based agri-horticulture. The significant quantity of burnt weed seeds may relate to the burning of animal dung, which is quite likely to have been practised, with a constantly renewable source of energy, compared with the scarce timber available (see §9.3.3 for the full report).

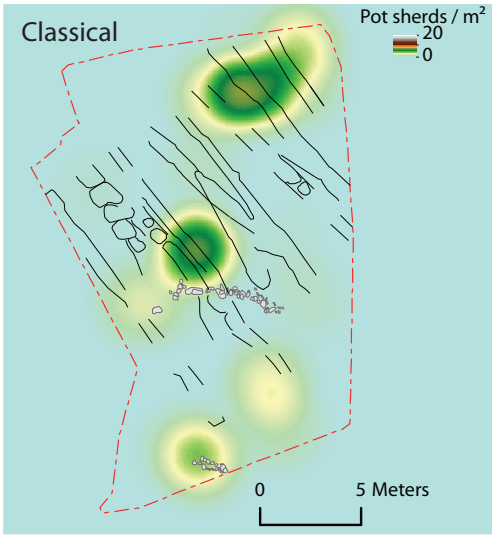
3.12 Summary

Taċ-Ċawla represents an important, if confusing, site that is important for its clearly domestic role and rich assemblage, but confusing because of its muddled and disturbed deposits of many phases. As highlighted in the study of Għajnsielem Road (Malone *et al.* 1988; 2009, 41–56) the case has been made for the rarity and importance of domestic archaeology in the otherwise monument-dominated prehistory of Neolithic Malta. Unfortunately, little has changed in the intervening years, which is why Taċ-Ċawla, located close to the earlier work at Xagħra (Gozo), was always noted as a potentially important site to investigate Neolithic settlement and economy. Other known locations of early material on Gozo, highlighted by the landscape survey (Volume 1, Chapter 6), such as Ta' Kuljat and Is-Sruġ proved to be difficult of access, under cultivation, and they remain untested ephemeral findspots. The suburban location of Taċ-Ċawla was therefore selected for the *FRAGSUS* study for a planned extensive programme of testing and sampling. The preserved and enclosed area presented various possible locations for investigation, including the more easterly parts of the site. The very thin soil remaining over that area, however, and the fairly comprehensive prior work (Cutajar 1993–4; Horton *et al.* 1995) did not suggest as much potential there as exists in the western area. To bring these various studies together, we draw on the features recorded in the previous work to suggest how the settlement might have been organized in the Neolithic.

The eastern areas on higher ground were clearly 'scalped' of their overlying soil cover through agriculture and natural soil creep downhill to the west, leaving a severely truncated soil profile. In places *terra rossa* soil was exposed on the surface along with the primary settlement refuse of Għar Dalam pottery and made up some of the material collected in the first watching briefs of the site. Holes recorded in the bedrock indicated potential postholes and it seems likely these supported structures that extended from the eastern to the western limits of the site, where similar hollows and cavities were also identified. Unfortunately, there is not yet sufficient excavation to bedrock on the rest of the site to link the various recorded cavities and enable any meaningful reconstruction of huts or buildings, even though concentrations have been mapped (Fig. 3.80). Future study may be able to do this more precisely. It is not possible from the stratigraphic remains to identify whether the posthole structures belong to the primary settlement phases of Għar Dalam and Skorba, or whether they date to the Żebbuġ and Ġgantija phases, when the area was most intensively exploited; the later phases seem more likely. Floor remains in a number of areas across the site also indicate the location of structures, and attempts by the prehistoric inhabitants to level the uneven bedrock within their living space. The irregularities were smoothed with soil/stony fill and covered with *torba* plaster, traces of which clearly mark where floors had once been located. Unfortunately, no clear form, or even connected extent, was identified, because of the disturbance caused by Roman channels, so it is not possible yet to describe the size or density of building other than the walled structure itself. This structure, however, provides much more information on size and scale. The surviving walls, albeit of low height, provide an important addition to the limited knowledge of domestic structures from prehistoric Malta. The size of about 9 m diameter of the Tarxien phase house at Taċ-Ċawla seems consistent with the Ġgantija phase structure at Għajnsielem Road. This is also similar to the 10 m diameter Skorba phase structure at Skorba. Interestingly, the later 'domestic' huts identified by Trump (1966) at Skorba seem to be of much smaller size, typically 3–4 m diameter, but the excavated remains were very partially examined, and perhaps larger and more complex buildings still remain to be identified at Skorba, and indeed under other temple complexes.

3.12.1. Conclusions and discussion

The interpretation of Taċ-Ċawla, proved to be complicated initially, because the previous interventions (Van der Blom and Veen, Horton-Trump and Cutajar) had not fully reported on the nature of the site and its materials. The watching brief episode never resulted in



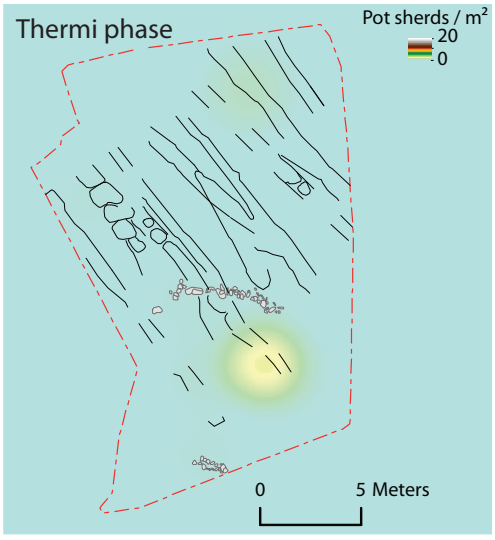
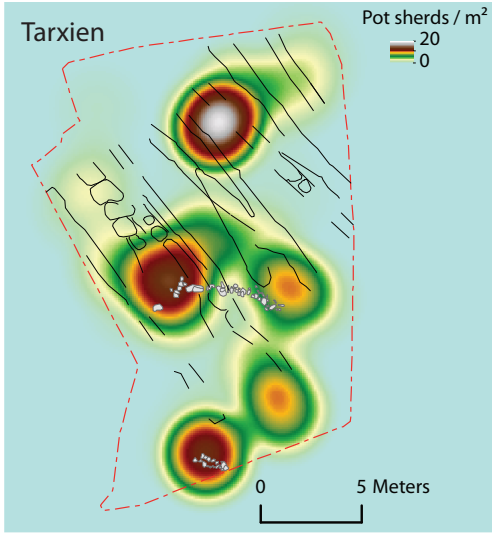


Figure 3.85. *Later phases of activity at Taċ-Ċawla shown through pottery distributions and density plots: Classical and Thermi phases.*



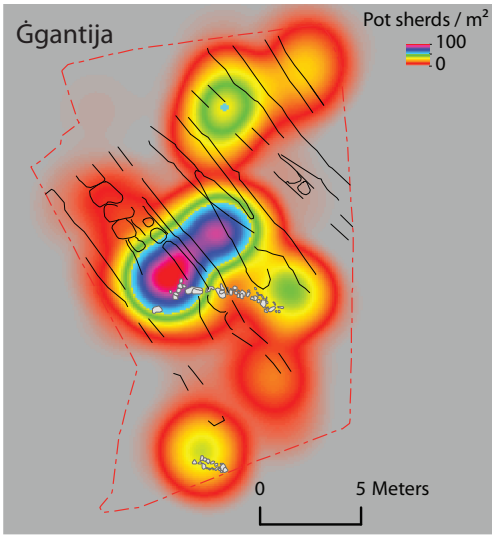
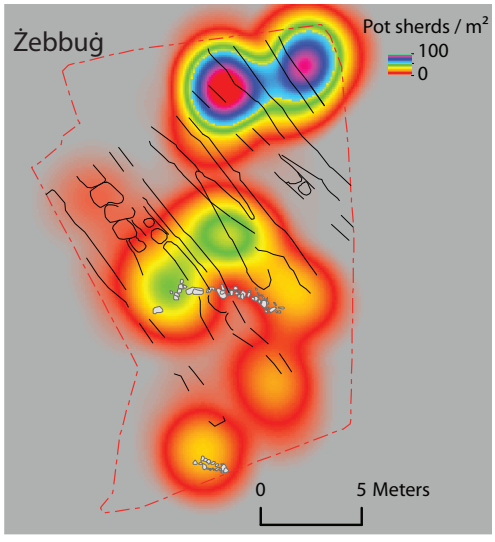


Figure 3.86. *Temple Period phases of activity at Taċ-Ċawla shown through pottery distributions and density plots: Tarxien and Ġgantija phases.*



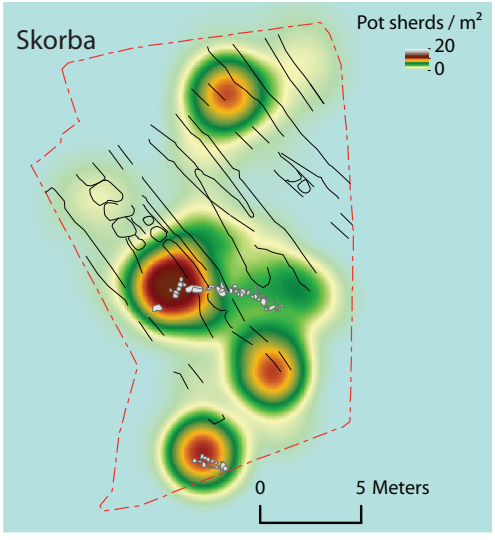


Figure 3.87. *Earlier phases of activity at Taċ-Ċawla shown through pottery distributions and density plots: Żebbuġ and Skorba phases.*

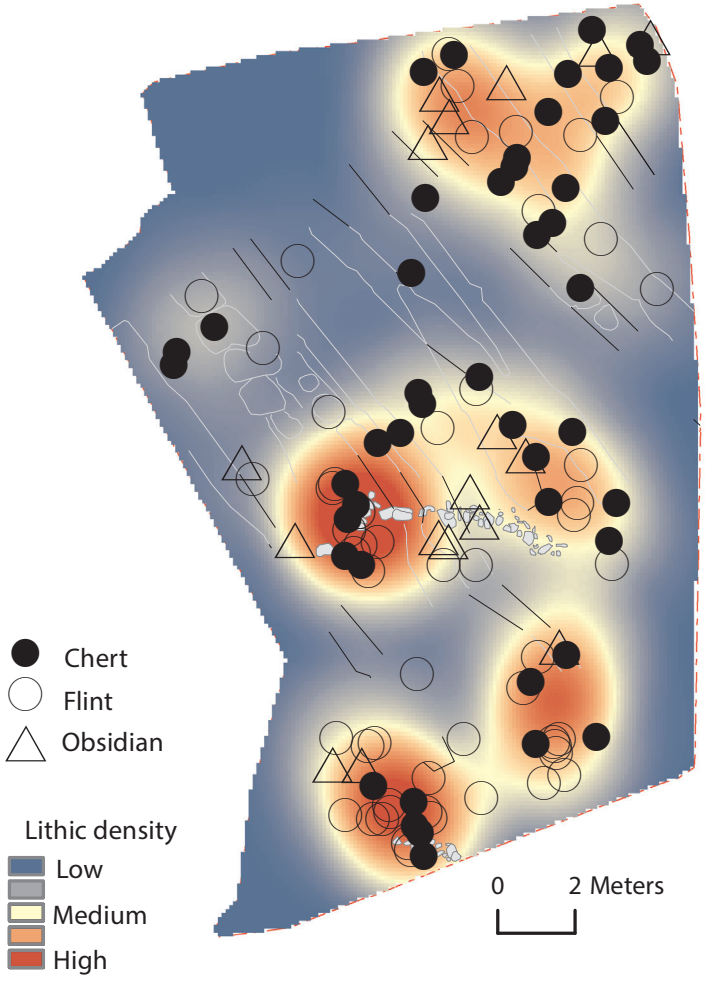


Figure 3.88. *Lithic distribution at Tać-Ċawla.*

a detailed site map, studied and published material or any scientific data. The large-scale assessment in 1994 opened large areas but inadequately excavated any area to depth. Consequently, it failed to recognize the stratigraphic relationships of Roman and Prehistoric levels or the possible concentrations of material culture in them. No scientific work was done and none of the material recovered was studied or published. The emergency intervention in 1995 by Horton and Trump did penetrate the depths of the site, all too effectively, and removed the key elements of the central part of the structure, as fate dictated. That work did produce an unpublished report and a brief assessment of pottery, but nothing has subsequently been published. Whilst it is easy to dismiss these attempts to interpret the site, in hindsight it is evident that excessively large superficial trenches or very small deep ones can actually cause information loss and prevent later work establishing linkage with previous observations. Nevertheless the 2014 work has managed, to an extent, to comprehend the past work as described above. The artefactual assemblages of those previous campaigns do now need to be assessed in line with what we have presented above, and make their way into a single coherent archive.

The 2014 excavation at Tać-Ċawla tackled many of the questions that were posed by the *FRAGSUS Project* and added very significant new data and understanding to questions relating to settlement, economy, and landscape use. Perhaps most notable is the wealth of palaeoeconomic and artefactual material recovered from the site, and the 29 radiocarbon dates. These constitute a major body of data that contributes to our understanding of the economy (Chapter 9) and chronology (Chapter 2) of the Temple period.

The AMS dating programme reveals that the majority of this material dates to the periods between 3600 and 3100 BC – the period spanning the Żebbuġ, Mġarr and Ġgantija phases of the Temple Period. This

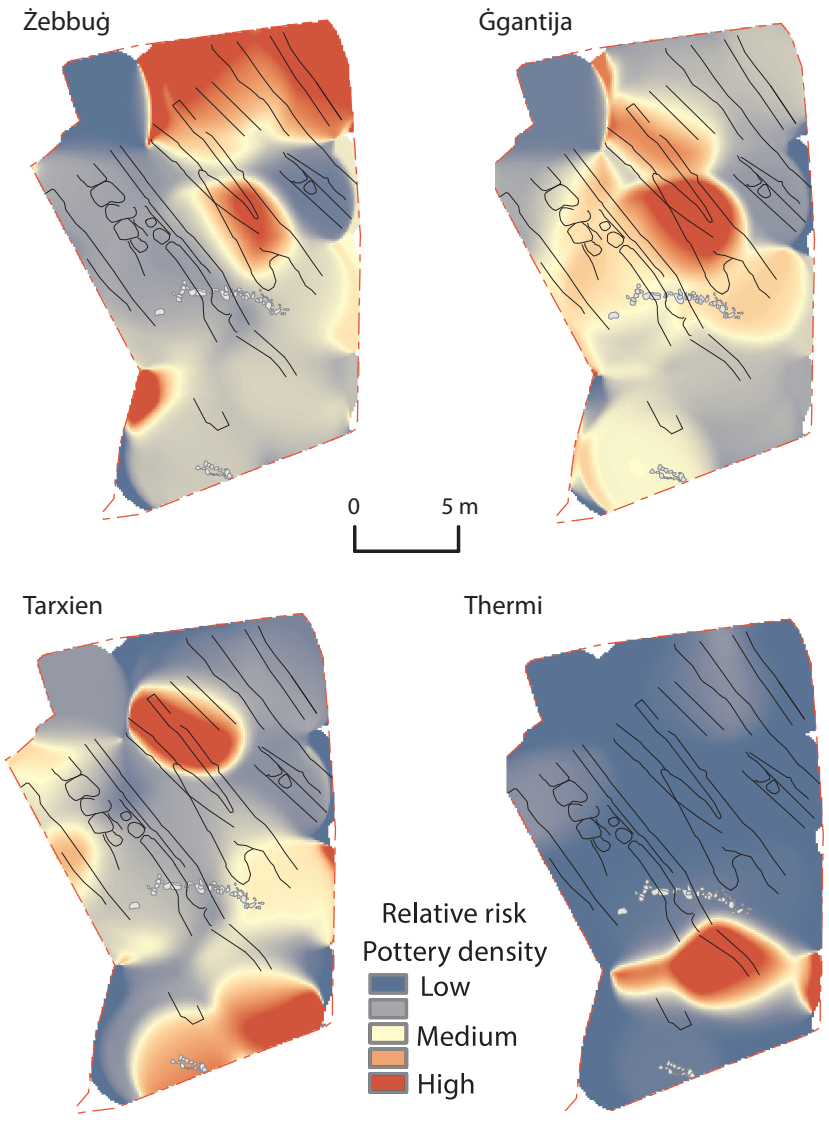


Figure 3.89. *Pottery-lithic distributions at Taċ-Ċawla as summed probability plot showing the distribution through time of material (relative risk distributions).*

tallies with the wealth of finds from the Żebbuġ and Ġgantija phases (Mġarr may not be a distinct phase on Gozo). The changing pattern of the density of pottery found on the site speaks to the continual process of reworking and reorganization that occurred. Activity in the Żebbuġ phase more likely focused in the north and east of the site, and this moved southwards and westwards, settling in the vicinity of the house structure during the Tarxien phase (Fig. 3.80). The stratigraphy of intact deposits encountered in 2014 largely dates to the Tarxien and Thermi phases. Thus although the site is clearly an important long-term settlement, it is unfortunately impossible to point to many intact strata from the early phases of the site's occupation, because of all the various processes that led to the site's formation: middening, bioturbation, reworking, redeposition, episodes of cut-and-fill, trampling, and so on. Despite these complications, the overall picture that emerges from our excavation is of a heavily truncated late Temple Period structure, with secondary occupation spanning the Thermi phase, built near a seasonal water source that eventually disappeared around 2300–2200 BC. This process of decline, increasing aridity and possible abandonment represents a microcosm of events that occurred across the islands of Malta, and as such Taċ-Ċawla has proved key to addressing some of the key questions that motivated the *FRAGSUS Project* in the first place (§1.5; Table 3.6). *Was there social-economic or environmental failure at the end of the* Temple Culture, *and what may have caused society to collapse or change so drastically?* The evidence from Taċ-Ċawla suggests a process of aridity occurred alongside the record of cultural change, but this was drawn out over several centuries. The changing cultural response to this could



Figure 3.90. *The* FRAGSUS *teams during the 2014 season: a) senior team visit to Taċ-Ċawla; b, c) excavation team; d) supervisors Armstrong, Bennett and McAdams; e) summer excavation beneath shading; f) the cleared site in April 2014.*

Table 3.8. *Taċ-Ċawla and the* FRAGSUS *questions.*

***FRAGSUS* questions**	**Taċ-Ċawla**
1a. What was the impact of human settlement on Malta?	Soil quality, water source, continuity.
1b. How rapid was the process of deforestation, erosion and degradation?	Continuity of settlement in one place where soil was rich, and water available.
1c. When did technical mechanisms to manage the environment develop – such as terracing, water and food storage?	Water hole/spring exploitation? Enlargement? Early to Late Neolithic manuring? Roman channels to improve soil fertility with midden waste and water retention for tree/vine crops.
1d. Were such mechanisms in place before or after the Temple Culture collapsed?	Yes, a thriving, sustainable settlement.
2a. How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this?	Soil management evident on good farmland. Flat social structure or hierarchy? House size? Civilized living: plaster floors, proper houses.
2b. Were the monumental temples instrumental in the process of sustaining cultural life?	Moderately large stone and wood built settlements evidently were associated with larger temple foci.
3a. What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable?	Wheat, barley, peas, beans, lentils, sheep-goat, cattle, pig. Little evidence for resourcing of wild animals or fish.
3b. Were there failures in the food supply?	Kill pattern of young animals indicates lack of fodder, focus on milk production. Abandonment of site by the Early Bronze Age implies water supply failed. Burning of dung (weed seeds) suggests lack of manuring perhaps leading to soil degradation.
3c. What impact did diet, disease and stress have on the population?	
4a. What was the size and nature of the early Maltese population?	Density and size of houses gives some sense of population, at least three structures in the area of excavation.
4b. What role did demographic connectivity (immigration) play in maintaining island sustainability?	Some imported chert and obsidian. Stock and plants originated outside Malta before their importation during the Neolithic. Thermi and other exotic pottery types indicate connectivity in later phases.
5a. Was there social-economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically?	Infilling of water hole with Tarxien phase house built over it suggests water ceased to flow and implies drought, cereal decline, stock decline.
5b. Was there a hiatus between the Temple Culture and later Bronze Age settlers?	The presence of dated Thermi material in the final Temple Period, with no evident Bronze Age thereafter, implies a hiatus in the sequence.
5c. Are other hiatuses apparent in the sequence, such as between the earlier Neolithic and the Temple Period?	Taċ-Ċawla has no dateable sequence to demonstrate an early hiatus.

equally be seen as adaptation and resilience, rather than collapse (cf. McLaughlin *et al.* 2018). *Was there a hiatus between the* Temple Culture *and later Bronze Age settlers?* The site offers significant new evidence that whilst the Thermi ware pottery style that appeared on the islands around 2400 BC was novel, its deposition nevertheless represented a continuity of settlement, albeit at a reduced scale to what had gone before, as well a degree of connectivity with the wider world (cf. Copat *et al.* 2012). Intriguingly, however, there still appears to be a gap in occupation between the Thermi and Tarxien Cemetery phases, which offers future fieldwork an opportunity to investigate further.

Notes

1 In the descriptions of contexts that follows, layers, fills and structural contexts are denoted in parentheses ( ), cut features in square brackets [ ], and surfaces in curly brackets { }.
2 Dated by Letizia Ceccarelli.

Chapter 4

Santa Verna

Rowan McLaughlin, Charles French, Eóin W. Parkinson,
Sara Boyle, Jeremy Bennett, Simon Stoddart & Caroline Malone

Ten trenches, comprising a total of area of 160 sq. m were opened at Santa Verna. The vast majority of the material excavated was topsoil, recent accumulations of stone rubble and backfill from previous excavations. The 2015 excavations were, nonetheless, successful in recovering the overall date, scale, layout and orientation of the prehistoric temple at Santa Verna. The trenches of previous excavations were identified and re-excavated, allowing the sequence of intact archaeological layers within the temple to be sampled using modern archaeological methods. This work has demonstrated that Santa Verna began as a Żebbuġ phase temple that evolved during later periods. The building was founded as a three-apsed structure around 3800 cal. BC and modified at least twice in the Żebbuġ phase. By 3300 cal. BC, in the Ġgantija phase, the building was expanded westwards, to take the form of a five-apsed megalithic building, similar in scale in orientation to the nearby temples of Ġgantija. The earlier Neolithic (pre-Temple Period) occupation was attested by an extensive Skorba/Għar Dalam phase palaeosol that was preserved under the temple. In particular, the remains of a Skorba phase structure that was destroyed during the construction of the temple walls was discovered during the 2015 excavations. Finds from the site included a hollow-based obsidian arrowhead, clay figurines, many small chert and obsidian pieces, and a total of some 23,000 sherds of pottery. The ceramics recovered date from many of the phases of Maltese prehistory, as well as Roman and medieval periods. Fragmented human remains from the site were radiocarbon dated to the thirteenth century AD.

4.1. Introduction

This chapter presents the results of archaeological surveys and excavations at the prehistoric temple[1] known as Santa Verna, Xagħra, Gozo (site code: VRN2015), undertaken by the *FRAGSUS Project*[2] team, assisted by students of the Universities of Cambridge, Malta and Queen's Belfast, from 25 March to 31 April 2015. The *FRAGSUS Project* and its focus on the changing palaeoeconomic and cultural responses to fluctuating prehistoric environments on the Maltese islands prompted the excavation, owing to the site's potential to yield intact palaeosols and inform on the chronology of the Maltese prehistoric sequence. In 2014, work on Gozo focused on the excavation of a settlement at Taċ-Ċawla, Victoria-Rabat, dating from the Żebbuġ to Tarxien Cemetery phases of Maltese prehistory (Chapter 3). Also in 2014, fieldwork at Ġgantija saw the discovery of a well-preserved humic soil under the forecourt of the megalithic structure (Chapter 5), which contrasts strongly with the eroded *terra rossa* soil found elsewhere on the Xagħra plateau (French *et al.* 2018; Volume 1). The primary goal of the 2015 excavations at Santa Verna was to test whether a similar sedimentary sequence existed under the megalithic structure at this site, and if so, to recover appropriate environmental samples and materials for scientific dating.

Santa Verna Temple was selected as a site on which to test a number of the *FRAGSUS* questions (see Table 4.4). Its relationship with other important Neolithic sites close by (Xagħra Brochtorff Circle, Ġgantija, Ta' Kuljat, Xewkija Temple) enabled the *FRAGSUS* questions 2a (concerning Neolithic community) and 2b (concerning temples) to be addressed. The very early pottery evidence and continuity into the Temple Period addressed questions 1a–d, and 3a, b and also question 5. The extent to which these questions have been answered by the fieldwork are addressed in the conclusion to the chapter below.

In addition to the upstanding Late Neolithic 'Temple Period' features, the Cambridge Gozo Survey (1987–95) had shown that the area surrounding Santa Verna had good potential for locating pre-Temple Period (Early Neolithic) Għar Dalam and Skorba phase deposits. This confirmed reports by Ashby *et al.* (1913) and



Figure 4.1. *Location map of the Maltese Islands and Santa Verna.*

Trump (1961) of early pottery and a stratified sequence. The key objective of the excavation was, therefore, the recovery of archaeobotanical material and animal bone from intact deposits of each phase, thereby contributing to a major element of the *FRAGSUS Project*'s overall goal to investigate the changing palaeoeconomies of prehistoric Malta and Gozo. In 2014, a detailed surface and ground-penetrating radar (GPR) survey was carried out to confirm the presence and location of these early phases at the site and identify potential areas for archaeological prospection. A strategic research excavation was subsequently carried out in 2015, which involved the clearance of scrub vegetation and very large amounts of Coralline rubble and backfill from previous excavation campaigns at the site. This work enabled the sampling of intact archaeological deposits for dateable environmental and economic remains (Chapter 9). In this chapter, we describe each stratigraphic unit in detail and place the data within the wider significance of Maltese prehistory. The Santa Verna excavation in 2015 was particularly successful in meeting its goals and the results presented here demonstrate the enormous potential of this site to contribute to knowledge of both the Early Neolithic settlement of the Maltese Islands and the rise of the so-called 'Temple Culture'.

4.2. The site

4.2.1. Location and physical setting

The site of Santa Verna is located at an altitude of approximately 140 m, lying in the centre of an area of horticultural ground in the southwestern edge of the Xagħra Plateau, and therefore approximately at the centre of the island of Gozo (Fig. 4.1). The ground slopes gently upwards southwest of the site, reaching the summit of the Xagħra Plateau at a distance of 40 m. The site is notable for its commanding views, both of the fertile plains below, and the seas beyond – the cliffs of Qammiegħ on Malta lie to the south, and on a clear day, Sicily and even Mount Etna are visible to the north. Archaeological remains at the surface consist of a number of megaliths, only three of which are particularly prominent, and heaps of stones, all amid an undergrowth of low trees and scrub. Together, these constitute the fragmentary remains of what can now be convincingly demonstrated to have been a megalithic temple. The name Santa Verna is derived from the site's re-use during medieval times as a chapel and cemetery dedicated to St. Verena, a third- to fourth-century saint associated with the care of the poor and lepers; she was born in Egypt, but died in Switzerland where she is particularly venerated. Santa Verna lies 950 m west of the Ġgantija temple, and 570 m west of the Xagħra Brochtorff Circle, at grid reference UTM 33S 433270m E 3989500m N (or 36.0458° N, 14.2586° E on the WGS84 datum).

The geological situation of the site is noteworthy; the Xagħra Plateau and the rocks that underlie Santa Verna are Upper Coralline Limestone, but the site is positioned approximately 160 m north of the transition with the Blue Clay formation that encompasses the plateau. The floor of the valley south of the site is composed of Globigerina Limestone – the stone favoured for building and working of more refined monuments on the Maltese islands, at a minimum distance of 380 m (French *et al*. 2018; Chapter 9; Volume 1, Chapters 1 & 5). The soils that cover the site are an intermixed complex (L-Inglin series); further afield, various carbonate soils surround the plateau (DOS 1960).

4.2.2. History of the site

The site, which was originally known as *Torri di Santa Verna*, was 'discovered' around the beginning of the twentieth century by Mr Nicola Said of the Public Works Department, Gozo, who had traced its position from an old and privately circulated document[3] (Bradley 1912, 67–8; Ashby *et al.* 1913, 105). The site had also been noted by the antiquarian Father Emmanuel Magri, who pointed out the similarities between pottery styles found in various Maltese prehistoric sites,

including those he personally found '"Santa Verna's" in Ix-Xagħra ta'Għajn Luchin' and his systematic excavations at Xewkija (Magri 1906, 5, 8; Bugeja 2008). The 2015 excavations at Santa Verna were the third formal campaign of fieldwork at the site;[4] it was first excavated by the British School at Rome in 1911 (Ashby *et al.* 1913, 105–16; McLaughlin *et al.* 2019, in press), and then by David Trump in 1961 (Trump 1966, 19; Evans 1971, 186). Trump's prescient conclusions were that the site was a small trefoil temple – perhaps a prototype of Ġgantija dug into the remains of an Early Neolithic village (Trump 1966; 2013, 195).

The site fell into obscurity following its use as a chapel in the medieval period, and it is uncertain whether the site was widely known in the interim period before its re-discovery in the early twentieth century. It is not mentioned in nineteenth-century accounts of the antiquities of Gozo, which describe nearby Ġgantija and the Xagħra Brochtorff Circle (Caruana 1882, 7–9). In a footnote in the 1911 excavation report (Ashby *et al.* 1913, 106), Ashby states that a building at the site, presumably the remains of the medieval chapel, was planned[5] by the French illustrator and travel writer Jean Houël in the fourth volume of his *Voyage Pittoresque* (Houël 1787, 78–80, Plates CCXLVII, CCL and CCLI). Unfortunately, however, this is probably not the case. Houël illustrated the nearby Ġgantija temple, which he called '*la tour des géants*' – the giants' tower – and marked its position on a map that also includes two other sites on the Xagħra plateau: '*Autre Edifice Antique*' and '*Ruines Antiques*'. One of these sites is clearly the Xagħra Brochtorff Circle, and is shown in plan (Fig. 4.2). Another site is shown on this plan but, rather confusingly, it not labelled *tour des géants* but simply *edifice b*, although it is stated elsewhere in Houël's text that this plan is of an *edifice* previously described, that is, Ġgantija. It seems that the confusion over whether *edifice b* represents Santa Verna or Ġgantija stems from Houël's labelling. Given Houël's masterful illustrations of other sites and the accurate plan of the Xagħra Brochtorff Circle (Fig. 4.2), it is puzzling that the plan of *edifice b* – if it is Ġgantija – should be so unlike any other eighteenth- or nineteenth-century depiction of the monument (Cremona

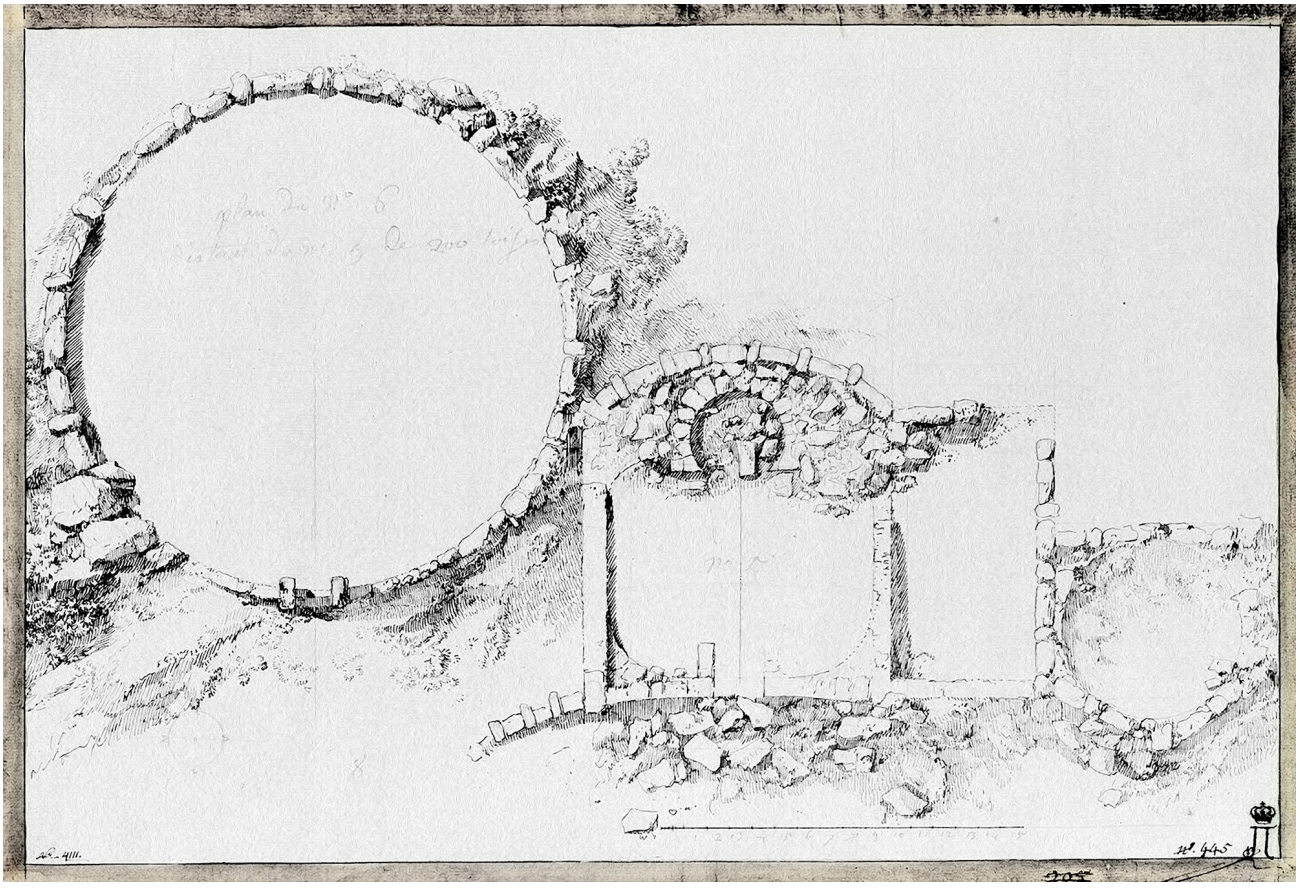
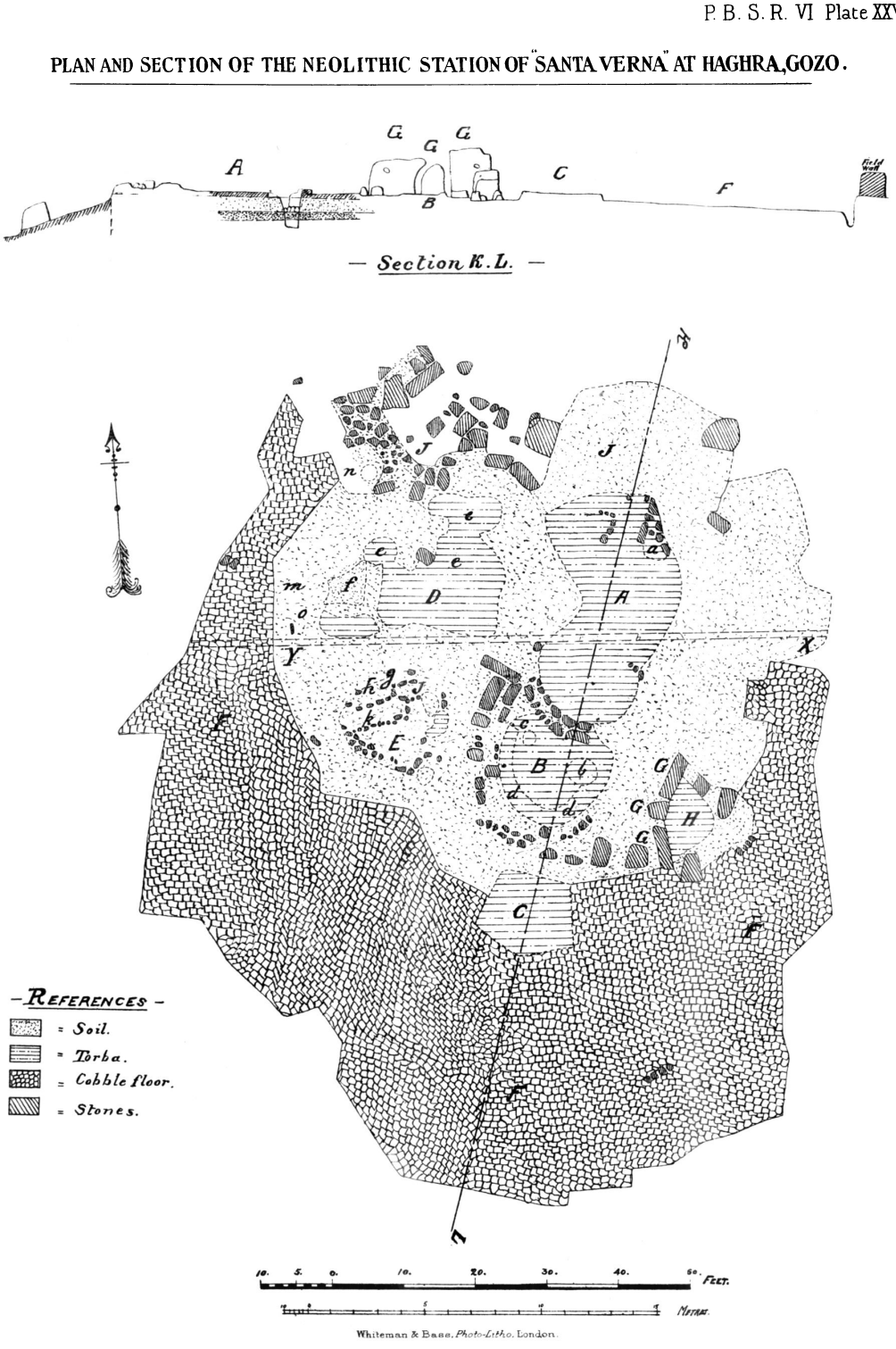


Figure 4.2. *'Plan of a Phoenician Temple': Preparatory drawing from Houël's 1789 engravings held by The State Hermitage Museum (OP-4111) (by permission).*



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Figure 4.3. *The 1911 plan of Santa Verna (Ashby* et al. *1913, Plate XXVIII).*

2013). Compounding the confusion is a plan clearly based on Houël's work printed beside a complete plan of Ġgantija and a selection of illustrations of other Maltese sites, by Clemente Busuttil in 1836 (Debono & Scicluna 2010). Evans (1971, 186) however was of the opinion that *edifice b* is Ġgantija, and pointed out that Said's discovery of Santa Verna was probably a coincidence and the result of a similar confusion.

4.2.3. The 1911 excavations

The 1911 excavation, held over two weeks in June of that year, temporarily cleared the site of loose stones, and uncovered areas of *torba* floor and numerous *in situ* stones. The work failed to resolve fully the layout of the site (Fig. 4.3). The excavations were arranged by Thomas Ashby of the British School in Rome, as part of a programme of work on various sites on Malta and Gozo and explorations of Lampedusa and Linosa (Hodges 2000, 42–4; McLaughlin *et al.* in press). Ashby became ill during the initial days of the excavation, leaving the work to be completed by Robert Bradley, who wrote the excavation report (Ashby *et al.* 1913, 105–16) and an informal account of the excavations (Bradley 1912, 67–8).

The 1911 excavations initially focused on areas surrounding the large upstanding megaliths, where a *torba* floor was discovered a short distance to their northwest (A on Fig. 4.3). The excavations proceeded southwards, uncovering two further roughly circular areas of *torba* (B and C on Fig. 4.3), separated by low walls. Similar features were found when the excavations were extended westwards (D on Fig. 4.3). Various 'hearths' and layers of 'ash' were also found on certain areas of the *torba*. Disarticulated human remains and several burial inhumations were encountered at the southwestern edge of the stone mound; the burials were of an adult male and a juvenile, with other adult burials apparent under the child (Fig. 4.4). The skeletons were assumed to be prehistoric by Bradley, however these were found to be buried in an extended supine position in an east–west orientation, and almost certainly date to a Christian Era. The burials were cut into a prehistoric midden deposit, and very likely related to the medieval chapel.

Once a significant part of the site had been cleared of stones, a long trench running through the site in an east–west orientation was opened by Bradley (Fig. 4.3; Fig. 4.4), revealing a series of successive deposits and a *torba* floors. Within this trench, three sondages were opened through the *torba* floors and other deposits (Fig. 4.4) and the stratigraphic relationship of the deposits carefully recorded and measured. This work revealed that the *torba* floors had, in fact, been built over one or two earlier floors, and each floor was supported by a layer of stones. One of the sondages revealed a layer of 'black soil' under the floor deposits; this was presumably a palaeosol dating to a time before the monument's construction. The record made of this stratigraphy was detailed and later proven to be accurate and well observed.

4.2.4. The 1961 excavations

Three test pits were dug at the site in 1961 by Trump as part of his programme of establishing the sequence and chronology of prehistoric Malta. He placed the test pits as near as was possible to the areas marked A, B and C on the 1911 plan (Fig. 4.3) in order to test the stratigraphic sequence as recorded by the 1911 work. In each of these pits, a sequence of two or three Temple Period *torba* floors were discovered, overlying layers or features from earlier pre-Temple Period Early Neolithic phases (Trump 1966, 19–20; Evans 1971, 189). On the basis of pottery seriation, Trump dated the upper floors to the Tarxien phase, currently understood to be 3100–2400 BC, and the lower floors to the Ġgantija phase, conventionally held to be 3600–3100 BC (Trump 1966, 19–20; cf. Grima *et al.* 2009, 59–60; Malone *et al.* 2009, 341–6). The Early Neolithic Għar Dalam phase layer that underlay the temple floors was, according to Trump, cut into during the Grey Skorba phase, and again during the Żebbuġ phase (Fig. 4.5).

4.2.5. The Cambridge Gozo Survey

The Cambridge Gozo Survey of 1987–95 was a moderate-scale fieldwalking exercise, undertaken with the aim of understanding the prehistoric landscape context of settlement activity across central Gozo and the areas surrounding the Xagħra Plateau and the Xagħra Brochtorff Circle, through the recovery and analysis of surface concentrations of cultural material (Boyle 2013; Malone *et al.* 2009, 41–2; Volume 1, Chapters 6 & 7). The original survey aims were to sample complete transects east–west and north–south across Gozo. Logistics (principally the scale of excavating the Xagħra Brochtorff Circle), however, limited its scope to the Xagħra Plateau, a transect between Xagħra and Ta' Kuljat, and the area surrounding Għajnsielem Road, where a prehistoric settlement was excavated in 1987 (Malone *et al.* 1988; Malone *et al.* 2009, 43–56). Material was recorded by field or terrace, which were generally small units, thereby refining the spatial resolution of the survey. The survey revealed several 'hotspots' of prehistoric activity, particularly at Ta' Kuljat, Santa Verna and the environs of Ġgantija (Trump n.d.; Boyle 2013, 165–90; Volume 1, Chapters 6 & 7).

The area surrounding Santa Verna was very rich in cultural material from all prehistoric periods. A concentration of Early Neolithic (Skorba and Għar

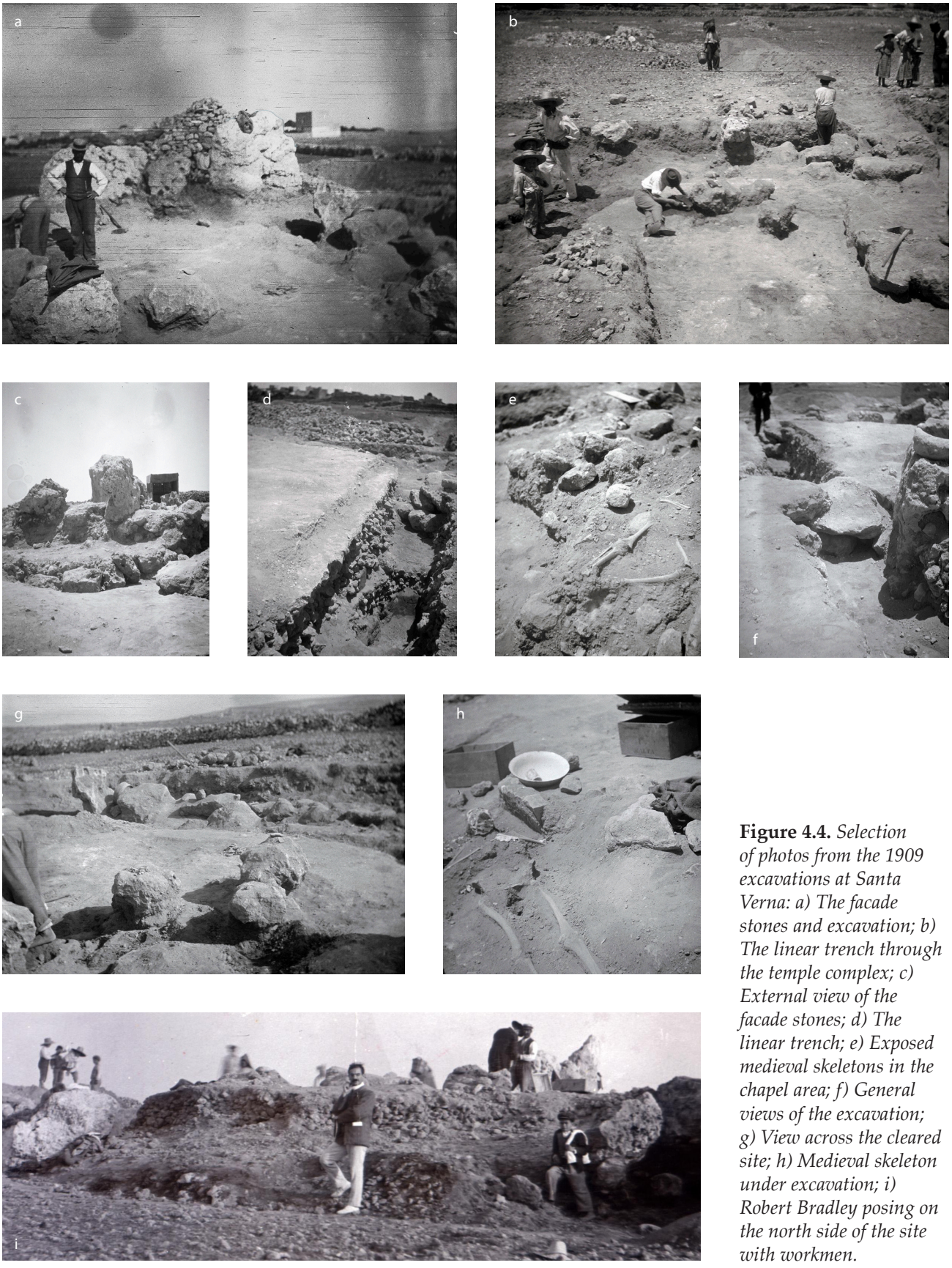


Figure 4.4. *Selection of photos from the 1909 excavations at Santa Verna: a) The facade stones and excavation; b) The linear trench through the temple complex; c) External view of the facade stones; d) The linear trench; e) Exposed medieval skeletons in the chapel area; f) General views of the excavation; g) View across the cleared site; h) Medieval skeleton under excavation; i) Robert Bradley posing on the north side of the site with workmen.*

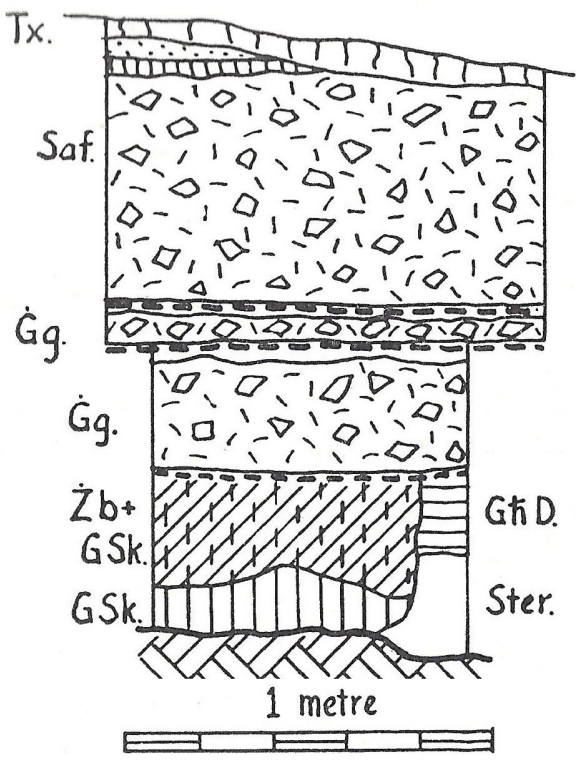


Figure 4.5. *South-facing section of the 1961 Trench 'A' (after Trump 1966, 19).*

Dalam) pottery was discovered on the south-facing slopes immediately south of the temple (Fig. 4.6). The pottery 'hotspot' concentrations in close proximity to Neolithic buried soils under the Temple, combined with Trump's 1961 stratigraphy, make Santa Verna a key site for providing a continuous and well-preserved sequence spanning the Neolithic and Temple Period (Fig. 4.7).

4.2.6. The 2014 survey

New survey work was undertaken at Santa Verna by the *FRAGSUS Project* in 2014 to assess further the potential of the site for excavation. This involved geophysical survey of the environs of the monument using GPR, and a high-resolution fieldwalking exercise that identified surface concentrations of artefacts in certain places. The survey revealed concentrations of the different phases of prehistoric pottery in the vicinity of Santa Verna (Fig. 4.8). In particular, Għar Dalam impressed pottery was found in concentrations to the northeast and northwest of the temple; Skorba ware sherds were present everywhere, but especially Grey Skorba to the west and Red Skorba to the northeast; Żebbuġ, Mġarr, Ġgantija and Tarxien and Tarxien Cemetery sherds were concentrated to the west of the temple; and Bronze Age Borġ in-Nadur sherds to the northeast (Fig. 4.9; Fig. 4.10). The GPR survey undertaken in 2014 showed several possible features on the edge of the temple site, including the transition between soil and cobbles shown on the 1911 excavation plan and a fissure in the bedrock underlying the southwestern edge of the site (Fig. 4.3, Fig. 4.11).

The GPR survey, conducted using a Mala RAMAC X3X 250MHz shielded antennae unit, consisted of 3 grids concentrated in the southern portion of the site. The largest of these grids (10 × 10 m) revealed several anomalies. The most noteworthy were a linear, shallow (*c.* 0.26 m), anomaly to the southwest and a deeper (0.57–1.90 m), rounded, anomaly in the northeastern corner of the largest grid. The former anomaly correlates with the surface path which surrounds the site and was the result of the relative influence of small topographical differences between the path and adjacent ground. The northeastern anomaly was of greatest interest as it correlated with the soil-cobble transition as shown on the 1911 excavation plan.

4.3. The 2015 excavations

4.3.1. Methodology

An excavation permit was granted by the Superintendence of Cultural Heritage (SCH) to examine Santa Verna. Work took over five weeks between 25 March and 31 April 2015. Initially soft vegetation covering the site was cut back and very large amounts of loose Coralline rubble were removed before excavation work commenced (Fig. 4.12). When this was complete, a digital 3-D model of the site was captured by John Meneely (Queen's University Belfast), using a Faro 360 laser scanner (Fig. 4.13). A Leica TS06 Total Station was aligned to the national (UTM) grid using three-point resection, and subsequently used to set-out a grid over the site. The site grid was therefore a truncated version of the national grid. Using this grid, six trenches (A–G) were staked-out and opened; the details of each trench are given separately below.[6] Of the four trenches that were initially proposed to investigate surface pottery distributions at Santa Verna, only two were opened (Trenches A and B). The 2015 excavation also located and cleared the 1911 excavation trench and sondages, which proved to be much larger than originally thought (Trench D). Following consultation with the SCH, Trench C was opened to investigate a sub-surface anomaly shown in ground-penetrating radargrams taken in 2014 (Fig. 4.11; Fig. 4.14). Following consultation with the SCH, Trench D was also extended north into pre-temple deposits (Trench D northern extension), and other keyhole investigations were performed in the temple's

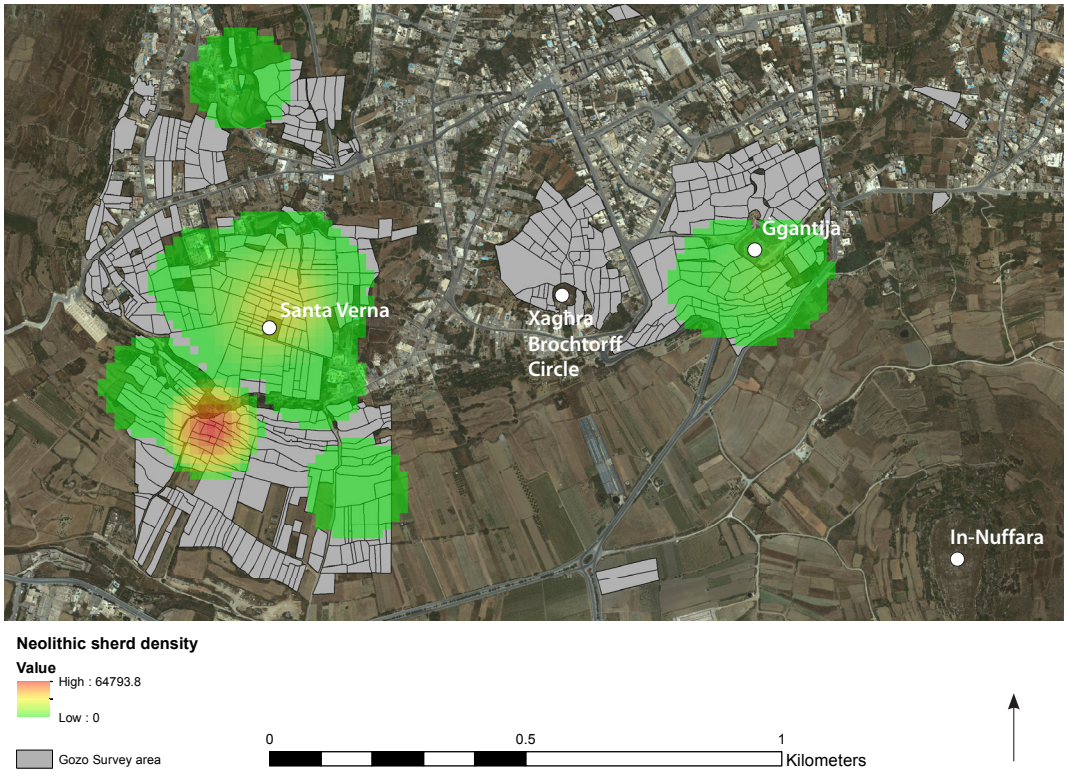


Figure 4.6. *Density of Early Neolithic (Pre-Temple Period) pottery found in the Santa Verna area during the Cambridge Gozo Survey.*



Figure 4.7. *Density of Early Temple Period pottery found in the Santa Verna area during the Cambridge Gozo Survey.*

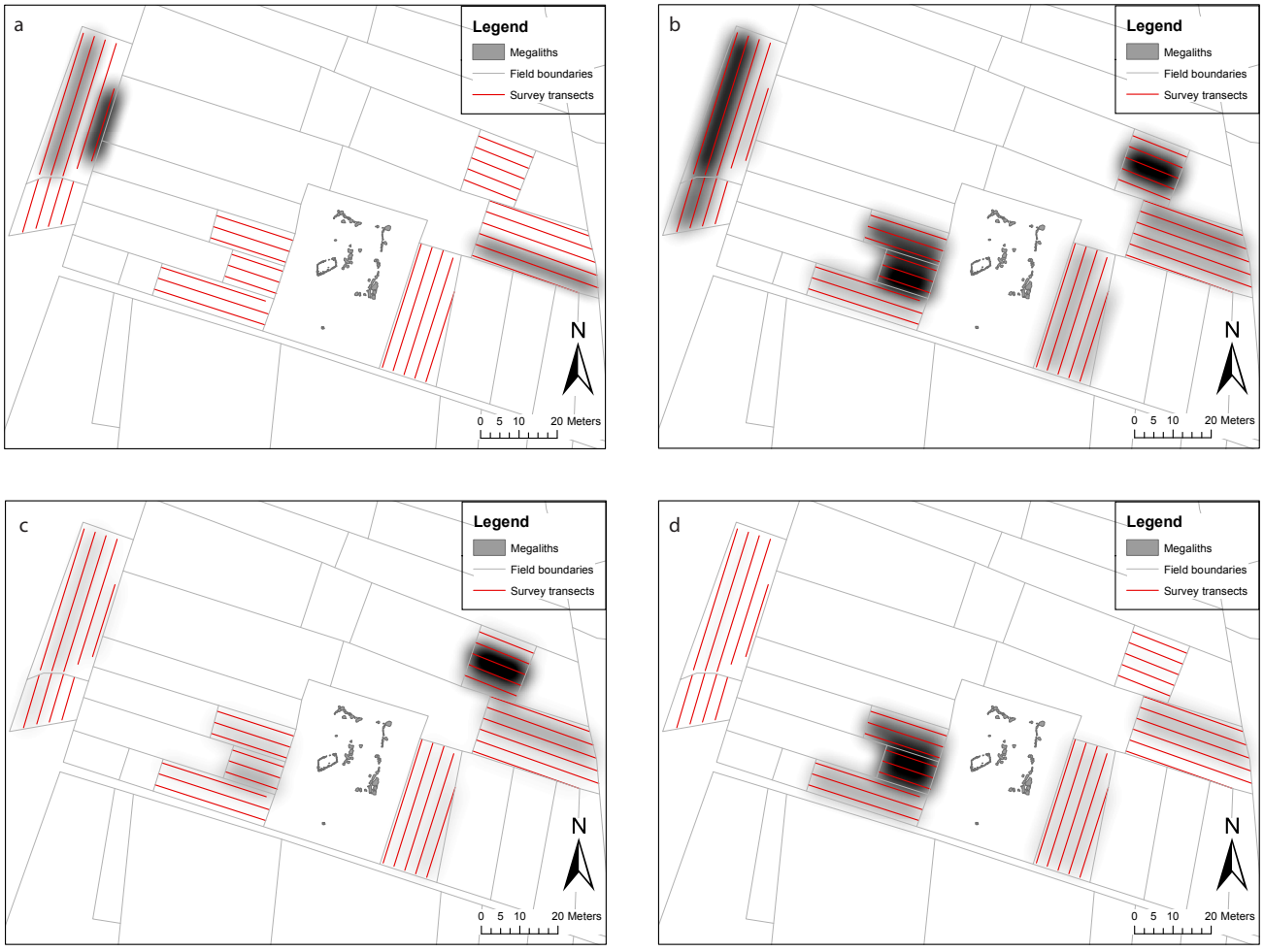


Figure 4.8. *Density of sherds recovered in 2014: a) Ghar Dalam sherd density; b) Grey Skorba sherd density; c) Red Skorba sherd density; d) prehistoric sherd density.*

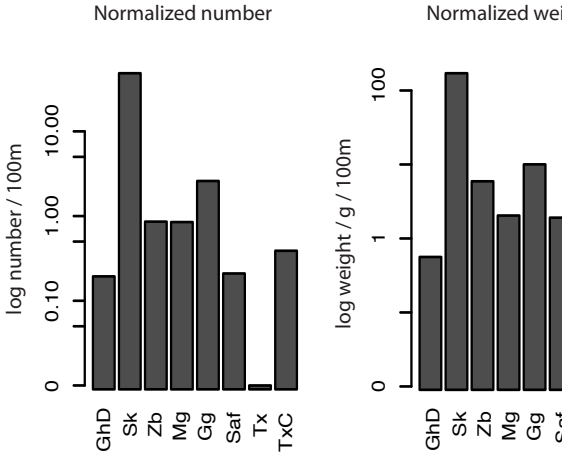


Figure 4.9. *Relative proportion of sherds recovered from north and east of Santa Verna.*

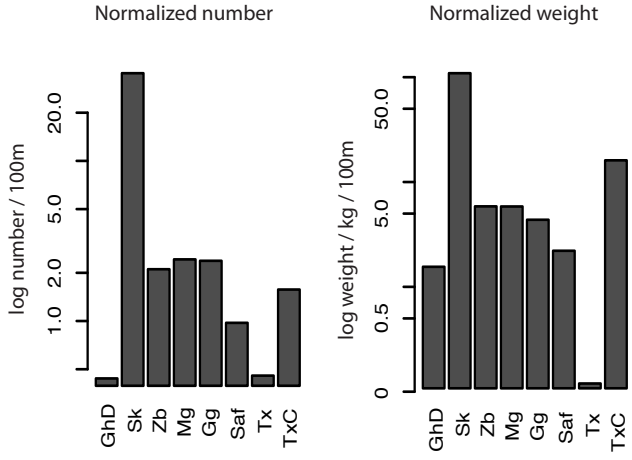


Figure 4.10. *Relative proportion of sherds recovered from west of Santa Verna.*

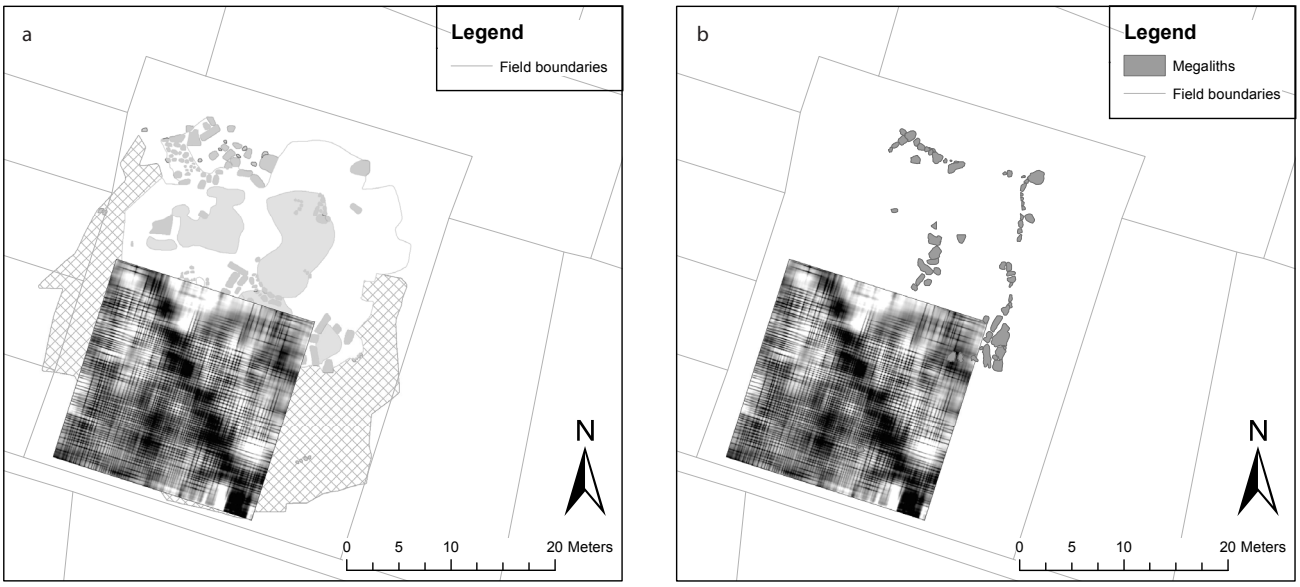


Figure 4.11. *Ground penetrating radargrams of Santa Verna, 0.26 m depth overlying (a) the 1911 excavation plan and (b) visible megaliths in 2015.*



Figure 4.12. *The Santa Verna megaliths partially enveloped with vegetation.*

periphery in order to establish the scale and internal layout of the monument (Trenches E–G). Figure 4.14 illustrates the overall layout of the site pre-excavation and the excavation trenches; a description of each trench's contents follows below.[7]

The location and level of each trench, small find, archaeological layer and sample was recorded. Each trench was planned at various stages during its excavation, with discrete features also recorded in section. Every feature and layer (i.e. archaeological context)

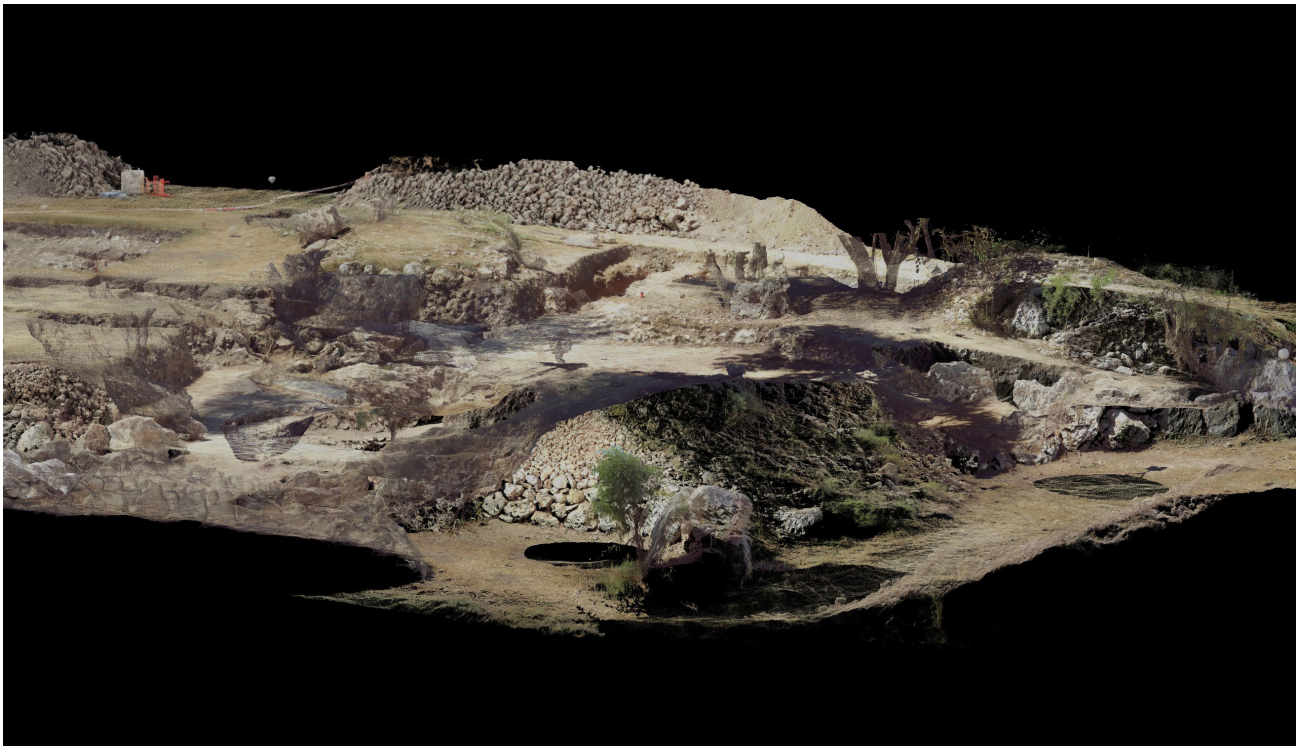


Figure 4.13. *Site scan of Santa Verna at close of excavation (John Meneely, digital scan).*

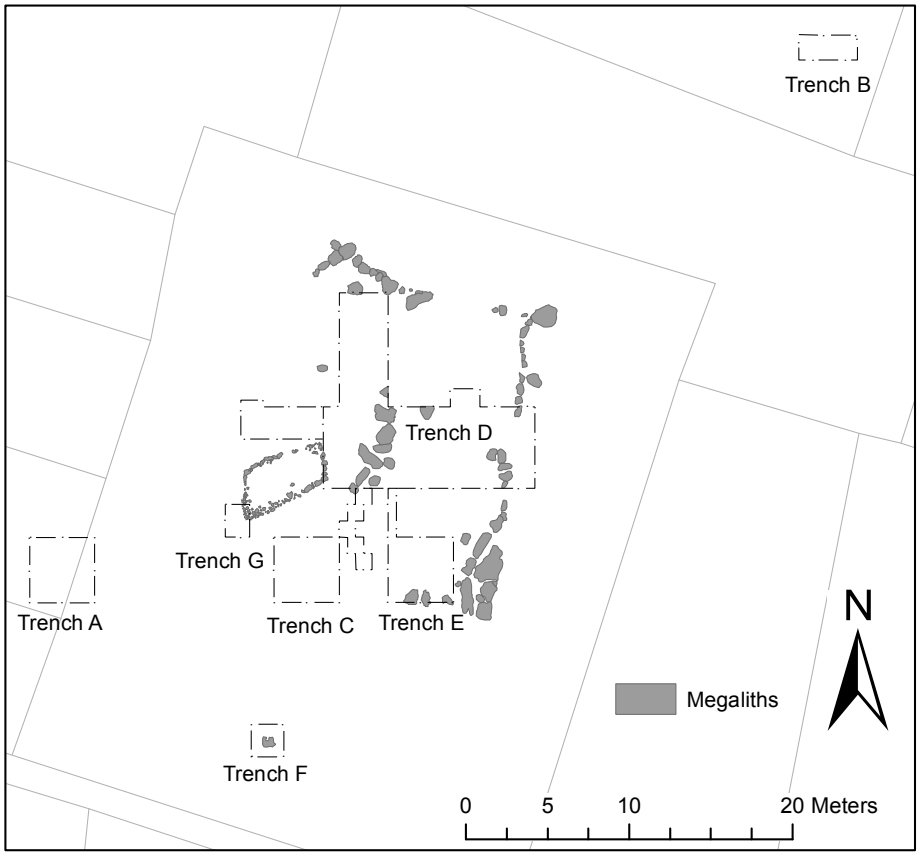


Figure 4.14. *2015 trench layout showing major megaliths.*

encountered was photographed, as were significant finds. Details about each context and environmental sample, including stratigraphic information and preliminary interpretations, were recorded on pro-forma context sheets. In addition, a diary was maintained for each trench, which recorded the progress of works at the site as they happened. Copies of this archive have been lodged with the SCH.

All excavated deposits were dry-sieved on site or sampled directly in bulk, and wet-sieved using flotation for the recovery of charcoal and other plant remains. Each bulk environmental sample was subsampled for analyses of pollen, invertebrates and other palaeoenvironmental proxy indicators. Samples were also taken for the study of soil micromorphology and geochemistry by Prof. Charles French, Dr Sean Taylor and Conor McAdams (University of Cambridge).

After the archaeological works were concluded, the site was again laser-scanned, the excavation trenches were covered with a geotextile mesh, and any exposed areas of intact archaeology were further shored-up by hand using sand bags. The trenches were then mechanically backfilled over the period 25–27 May 2015, under the supervision of the SCH.

4.3.2. Trench A (4 × 4 m)

Trench A was opened to investigate a concentration of topsoil finds from the 2014 survey (Fig. 4.14). The stratigraphy consisted of several discrete compacted patches of dark brown soil lying upon bedrock (Fig. 4.15): Contexts (14), (15) and (12). These were covered by extensive layers of dark yellowish brown fine sandy silt loam, Contexts (5), (6) and (11), which were differentiated from each other on the basis of subtle differences in colour and texture. All contexts contained mixed assemblages of prehistoric pottery and fragments of animal bones, but did not form any coherent pattern and can be interpreted as mixed layers of agricultural soil. The superficial layers of ploughsoil and topsoil were Contexts (3), (2) and (1). A ceramic 'snail' figurine, the first of four that were found over the course of the 2015 excavation, was found in the topsoil Context (1) (Fig. 4.16), and matches the description and photographs of similar artefacts that were uncovered during the 1911 excavations (Ashby *et al.* 1911). In summary, Trench A revealed that the immediate environs of the Santa Verna temple contain recent agricultural soils and traces of disturbed, prehistoric settlement evidence, but unfortunately no intact layers from the Temple Period or earlier.



Figure 4.15. *Post-excavation photo of Trench A, showing bedrock, looking west.*

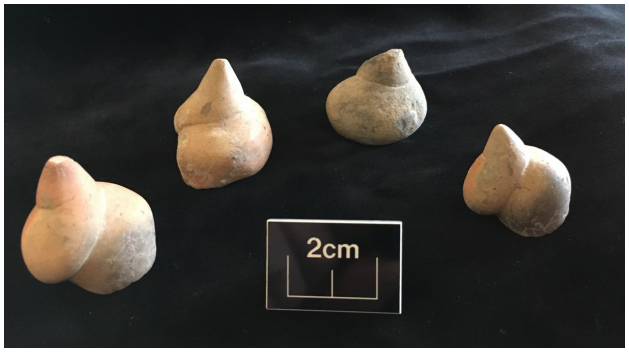


Figure 4.16. *Snail figurines from Santa Verna, 2015.*

4.3.3. Trench B (2 × 4 m)

Trench B was opened to investigate a concentration of surface pottery discovered northwest of the Santa Verna temple during survey in 2014. Originally, the aim was to locate the trench approximately 20 m east of the actual excavation, but growing crops prevented this. The trench stratigraphy was simple, consisting of a *terra rossa*, Context (10), which was relatively sterile of cultural material (Fig. 4.17). Above this, Context (9) was a large, poorly defined oval spread about 1.5 m in diameter, consisting of dark brown, silty clay loam. This layer contained 36 sherds of Għar Dalam pottery and one sherd identified tentatively as Grey Skorba. Above this lay two layers of agricultural soil, Contexts (8) and (7). Context (8) was a reddish-brown silt clay; a remnant of a disturbed buried soil. This contained a particular concentration of pottery sherds from the Għar Dalam phase including cord-impressed courseware and sherds bearing chevron impressions with white fill. Skorba phase sherds (both Red and Grey phases) and a small number of Żebbuġ phase sherds were also present. An obsidian blade (SF19, Fig. 4.18) was found in this layer. Context (7) was a sandy silt loam topsoil. In summary, although Trench B confirmed that this location indeed has a concentration of prehistoric artefacts distributed throughout its soils, no structural features, intact archaeological layers, nor palaeosols were found.

4.3.4. Trench C (4 × 4 m)

Trench C was positioned over an anomaly visible in the 2014 ground-penetrating radargrams (Fig. 4.11). The archaeological deposits in the trench consisted



Figure 4.17. *Post-excavation photo of Trench B, showing* terra rossa, *looking east.*



Figure 4.18. *Obsidian blade (SF19) from Context (8).*

of layers of soil containing mixed prehistoric pottery, but little evidence of any structural features aside from poorly defined and disturbed remnants of cobbled surfaces. A 0.5 m sondage running north–south across the trench revealed that the strata were founded on bedrock, which contained hollows and natural voids filled with dark brown loam. One of these was Context (62), which contained two struck pieces of chert and numerous sherds of painted Żebbuġ pottery. The southeast corner of the trench contained a depression in the bedrock filled with Context (74), which was a patch of mid-brown silty loam, with frequent charcoal flecks. Cut [84] was a possible posthole that was cut into bedrock, or perhaps a natural void that was artificially straightened and deepened. Its fill was Context (85), which was very similar to the parent material found above it, Context (61). This was an orange brown silt loam, with finds of bone and mixed pottery, including at least 15% Għar Dalam ware, suggesting it was a former Early Neolithic layer that was later disturbed. Above Context (85) were Contexts (46) and (38) – both layers of compacted soil, and stone spreads defined as Contexts (36) and (40). Context (38) contained patches of pounded rock, and in general these layers suggested a former ground surface, perhaps even severely eroded *torba* floor with associated cobbled surfaces. These layers were rich in pottery finds, especially from the Żebbuġ phase, but all also contained Ġgantija phase sherds, indicating significant disturbance, presumably during construction or use of the adjacent megalithic building.

There was no obvious association between the orientation of the cobbles in Trench C and the megalithic building. The interface between the cobbles (36) and soil (46) ran diagonally across the trench, but did not align with those recorded by Ashby *et al.* (1913) (Fig. 4.3). Presumably, the 1911 excavation plan was of a more superficial level that has subsequently disappeared. The stratigraphy in the trench continued with Context (32), a spread of sandy silt loam, containing a wealth of Żebbuġ phase pottery (and some Ġgantija) and a fossilized shark's tooth (SF 66). Next came a series of poorly defined patches of similar soils, Contexts (20), (18), (17) and (13), which were differentiated from each other on the basis of colour; Context (17) was by far the most extensive, covering most of the trench. Finds from (17) included bone, obsidian fragments, and mixed pottery sherds. Among these was a sherd of impressed ware with diamond-circular stamped incisions, typical of Stentinello ware (Fig. 4.19) (§10.3.1–10.3.4; Plate 10.2), thus indicating contact with Sicily or southern Calabria in the fifth millennium BC. The topsoil in Trench C and elsewhere in the vicinity of the megalithic remains, Context (13), was a dark brown fine sandy silt loam.



Figure 4.19. *Sherd of stamped pottery from (17), similar to Sicilian Stentinello ware.*

4.3.5. Trench D (13 × 5 m)

4.3.5.1. Re-excavation of the trenches of 1911 and 1961

One aim of the 2015 excavations at Santa Verna, as specified in the original excavation proposal, was the location and clearance the 1911 trenches of Ashby and Bradley. This exercise proved to be the most valuable component of the 2015 excavations, both in terms of understanding the site and its layout, and in the provision of samples for radiocarbon dating and environmental analysis. To locate the 1911 trench, the central area of the site was stripped of a layer of loose stones, rubbish and dead vegetation (defined as Context (16)), which then revealed a stone-filled depression running in an approximate east–west alignment across the site. This feature was a vestige of the main trench from the 1911 excavation (Fig. 4.3). Superficial layers were assigned the Context numbers (19), (43), (34) and (22), and were found to be rich in redeposited prehistoric pottery but also modern debris. Once the 1911 trench was cleared, two sondages dug to the sterile natural by Ashby and Bradley were located, as was a test pit dug by Trump in 1961 (Fig. 4.20). These were emptied of their backfill, revealing the preserved stratigraphy of the former excavations.

In Trump's test pit (Cut [55]), the stratigraphy consisted of sterile red soil (51), which was left unexcavated, but was sampled for analyses of its geochemistry and micromorphology. This work (French *et al.* 2018)

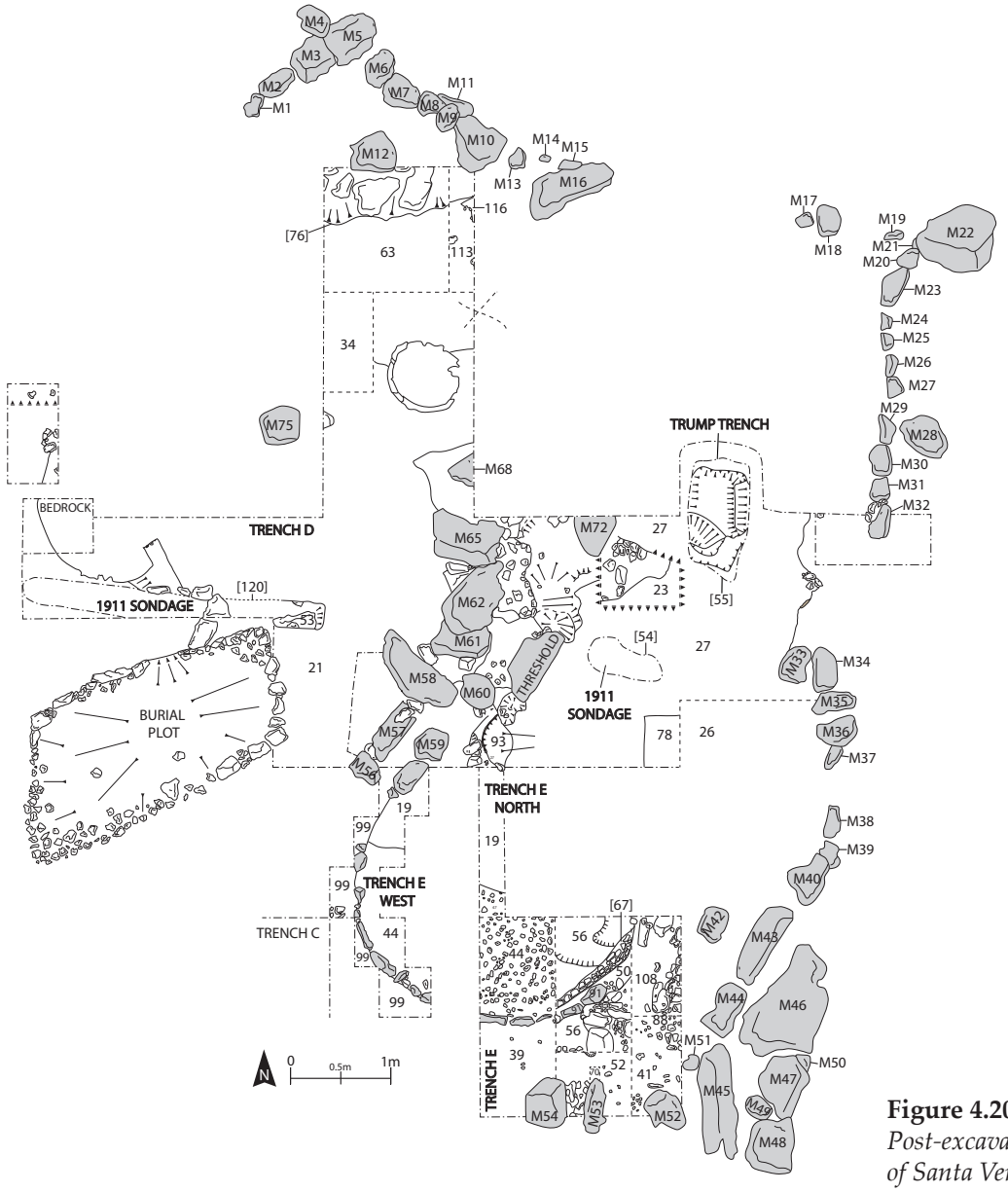


Figure 4.20.
Post-excavation plan of Santa Verna temple.

revealed that the soil was a remnant of a well-developed, clay-enriched brown Mediterranean soil, associated at one time with moist conditions and vegetation cover (Volume 1, Chapter 5). This deposit contained a cut feature [72], perhaps a large oval pit, at least 0.4 m deep, with two fills. The primary Fill (73) was a mid-brown silt loam, overlain by a similar, darker deposit, Context (71) (Fig. 4.21). Both layers contained fragments of Żebbuġ phase pottery sherds among other unidentifiable sherds. An AMS radiocarbon date of 3909 to 3642 cal. BC (UBA-33706, 4945±87 BP) was obtained from a *Triticum* sp. grain found in a soil sample from (73). Above this was an earthen floor (117) and its stone foundation (118). Context (117) contained exclusively Żebbuġ phase sherds and was a firmly compacted layer of fine-grained sediments and pounded rock, 0.1 m thick; its foundation (118) was a thin spread of medium-sized sub-angular fragments of Coralline rubble. Above this floor lay a number of later floors and their stony foundations. These were: foundation Context (115), which raised the floor by 0.4 m and supported two separate earthen floors, (114) and (102), which were similar to (117). All these layers were associated with Żebbuġ phase pottery. Above this lay Context (29), a 0.1 m-thick spread of stones; and Context (28), a particularly well-compacted and uniform *torba* floor. This floor appeared dark brown in colour, but when scraped with a trowel it temporarily adopted a light greyish hue. In places, red colouration was visible on its surface, perhaps signalling the remnant of a once widespread coating of red ochre. These layers were associated with Ġgantija phase pottery and a radiocarbon date of 3369 to 3144 cal. BC (UBA-31035, 4525±35 BP) was obtained from a charred *Pisum sativum* (pea) found in Context (29). The surface of (28) was assigned context number {27} and was covered by Context (24), another floor foundation, which comprised a rubble spread of sub-angular stones 0.1–0.2 m in diameter and 0.65 m thick. Context (24) matched Trump's (1966) description of a Saflieni phase floor foundation; and indeed, the 2015 excavations recovered one diagnostic Saflieni sherd (otherwise rare at Santa Verna) among others from earlier phases. The uppermost archaeological layer was Context (23), a poorly preserved pale yellowish-cream *torba* floor, buried approximately 0.12 m below the present ground surface and approximately 0.06–0.07 m thick. Enveloped in this deposit were numerous sherds of undiagnostic prehistoric pottery and a saddle quern fragment (Fig. 4.22).

The 1911 sondages were cuts [54] and [120]. Cut [54] measured 1.5 m by 0.75 m and was orientated roughly east–west, near the centre of the site (Fig. 4.20).

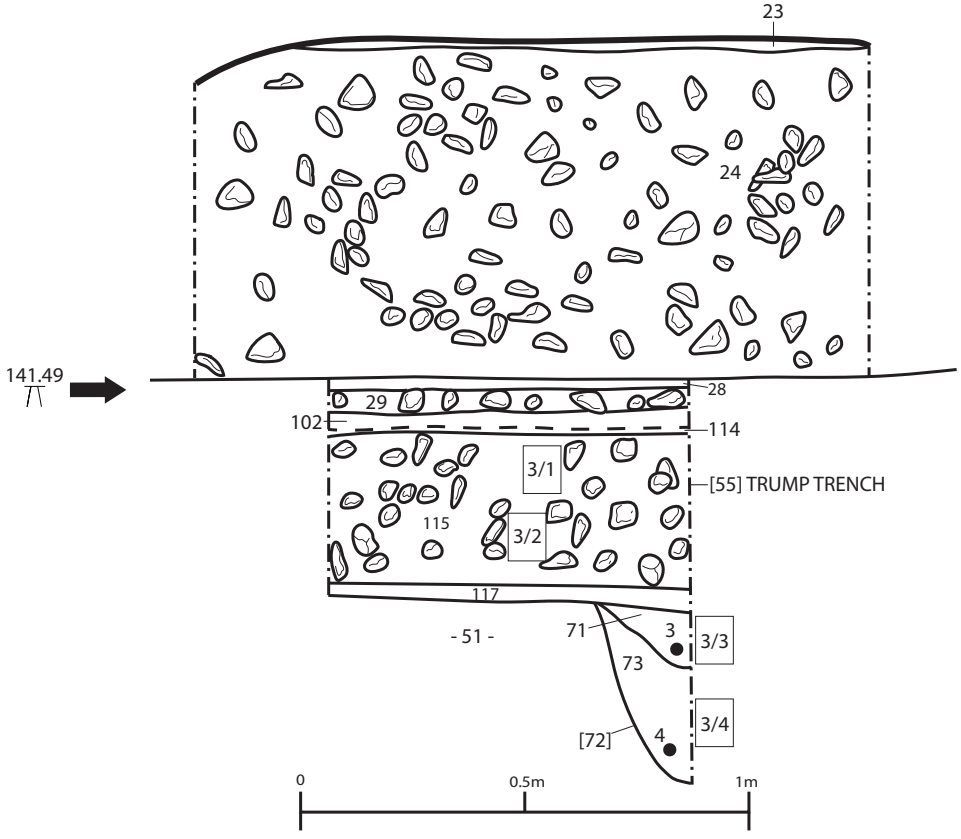


Figure 4.21. *Vertical section of Trump 1961 trench (Cut [55]) and location of micromorphology samples.*



Figure 4.22. *Saddle quern fragment embedded within* torba *floor (23). The arrow points north.*

Cut [120], discovered when Trench D was extended west (§4.3.6), lay approximately 3.5 m west of [54], was also 0.75 m wide and extended at least 5 m, beyond the western limit of excavation (Fig. 4.20). Cut [120] was also separated by the foundations of a megalithic wall that defined the inner limits of the temple. The easternmost sondage [54] revealed 0.7 m of intact stratigraphy under surface {27}. Above bedrock (56), the buried soil remnant (51) discussed above was again encountered. This was covered by Context (31), a dark orangey brown silt clay, and, in turn, by Context (30), a similar deposit of lighter colour. This was covered by floor foundation Context (29) and floor Context (28) discussed above, although in the vertical section faces of sondage [54] the depth of (29) was greater, 0.25–0.3 m in thickness. Contexts (30) and (31) did not contain any obvious cultural material, although micromorphological study revealed the layers were rich in charcoal and contained occasional fragments of pottery and animal bone, suggesting that this profile was a buried topsoil remnant (French *et al.* 2018).

4.3.5.2. Threshold stone and related contexts

Intact archaeological deposits were eventually uncovered under the backfill, over the entire extent of the trench. Most of these were left largely *in situ* and sampled rather than completely excavated. It was, however, deemed necessary to record and remove some of the more ephemeral and poorly preserved contexts. A series of stratigraphically intact layers were excavated from the centre of the site. These were not directly related to any of the temple floors, but instead presented a confusing series of mixed pockets of stones and soil. Taken together, these probably represented the remains of a wall or former structure on the temple's interior that had collapsed and become robbed away. The sequence was founded on two layers of mottled earth, Contexts (107) and (109). These were dark brown and mid-brown silt and were stratigraphically contemporary with each other. Their relationship with the rest of the site was established by the south-facing vertical section of Trench D (Fig. 4.24), wherein Context (109) is clearly earlier than megalith '72', which in turn must have been earlier than floor (28), since the edge of the floor rose to bond with the edge of the megalith. This sequence was continued by Context (103), a mid-brown compacted silty loam with mottled dark brown soil inclusions, which was clearly derived from various clumps of loose deposit that had become mixed together through time. Context (103) contained Tarxien and Saflieni pottery (Chapters 10 & 11), and was covered by Context (98), a silty loam that contained a series of medium-sized stones, Context (101). Two ceramic snail figurines were discovered within Context (98) (Fig. 4.16), as were four sherds of Borġ in-Nadur pottery (among many Temple Period sherds), thereby suggesting that the destruction of the former wall happened during the Bronze Age.

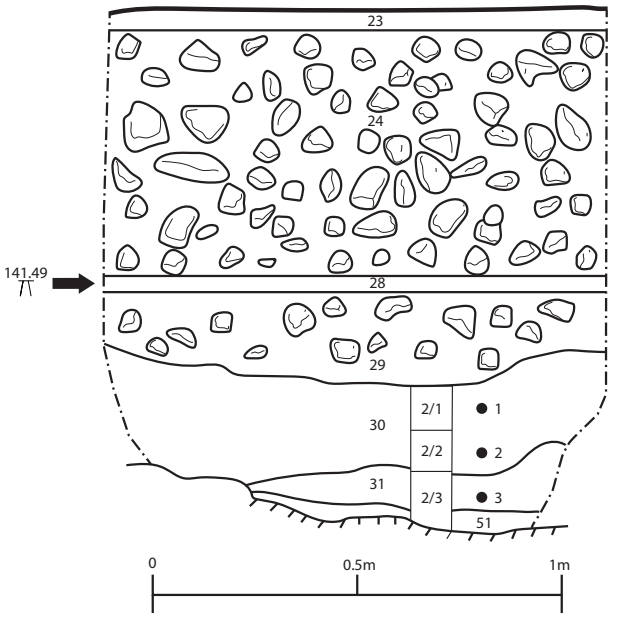


Figure 4.23. *Vertical section of 1911 sondage [54].*

A Globigerina sill or threshold stone (57) (Fig. 4.20; Fig. 4.25) was found south of the layers discussed above, immediately east of and just below the level of the large stones represented by (59) (Fig. 4.27). The threshold was a horizontally placed level T-shaped slab, 1.5 × 0.7 m, with its longest edge facing southeast. The depth of the sill was approximately 0.3 m and it was at the same stratigraphic position as surface {27}. As the excavation proceeded, it became increasingly apparent that threshold (57) was located at the centre of the site, at the juncture between the inner and outer parts of the temple structure (Fig. 4.20). West of (57), a similar surface {21} was at a slightly higher elevation. Threshold (57) therefore represented a step that would have led people from a lower floor surface up to another (a device typical of many temples, such as Ta' Ħagrat and Mnajdra). In terms of the description of the excavations, this location provides a convenient reference point from which to describe other archaeological features. Adjacent to the threshold slab there was a stone socket, context [112], filled with (111), a mottled, mixed soil.

The floor (28) and surface {27} was exposed by the 2015 excavation over an L-shaped area spanning approximately 3 × 3 m at its greatest extent. The floor was generally a level and uniform surface, except immediately north of threshold (57), where it undulated downwards, as if deformed by a great force or pressure of weight, thereby forming a pit feature [110]. Under the pit, traces of yellow, compacted crushed or pounded limestone, Context (100), were found, although this formed no clear pattern. Pit [110] itself was filled by Context (97), a mid-brown friable soil also containing stone rubble but no artefacts other than one large, unusually dense, rounded stone. It seems likely that the weight of the megalithic structure that was built here in prehistoric times caused this pit to form; the rounded stone found in the pit was likely a foundation or 'roller' stone.

South of the threshold, stone (57), there was a patch of dark brown firm soil, Context (94), to which adhered a crescent-shaped block of crushed limestone 'plaster', Context (93) (Fig. 4.20). These contexts were of a form that strongly suggested the setting for a large stone bowl or vessel, albeit one that had not survived except as a couple of curved stone fragments found in the area surrounding the threshold (Fig. 4.26). The location of this semi-circular feature within the temple, to the left upon entry, conforms to the position of stone bowls at other temple sites and hypogea in the Maltese Islands (Malone 2007; Stoddart *et al*. 1993). A crust of crushed Globigerina Limestone, assigned as Context (96), was also noted south of (57), but not excavated.

East of the threshold and partly covering surface {27} was Context (78), a laminated soil accumulation, which consisted of an admixture of fine-grained sediments, fine gravels and charcoal compressed together. This layer covered an area of at least 3.5 × 2 m, but certainly did not cover the entire extent of surface {27} and was instead associated with the space south (i.e., on the left-hand-side) of the threshold. Within this layer there were fine lenses of pale-coloured limestone dust, suggesting that Context (78) formed episodically during the use of the temple in the Ġgantija phase (3300–3000 cal. BC). At the eastern edge of floor deposit (28), a thin pale-coloured line of plaster was visible (Fig. 4.20) – this phenomenon was also noted elsewhere in the site (§4.3.6; Fig. 4.29). Beyond the eastern edge of the floor, a patch of darkened, uneven ground was uncovered under topsoil. This was Context (45), which consisted of the fill of a stone socket or some kind of wall foundation, at the edge of floor {27}. A 2.5 × 1 m sondage was excavated through this material in an attempt to resolve its edges and its relationship with the external megalithic wall (Fig. 4.20). This fill contained a concentration of prehistoric pottery near to the floor, but the edge of the feature was not found. The sondage was excavated to approximately 0.5 m depth, but no further cultural material was encountered. Fill (45) was clearly earlier than the external megalithic wall and can be interpreted as a pre-temple layer that was disturbed during the construction of the temple.

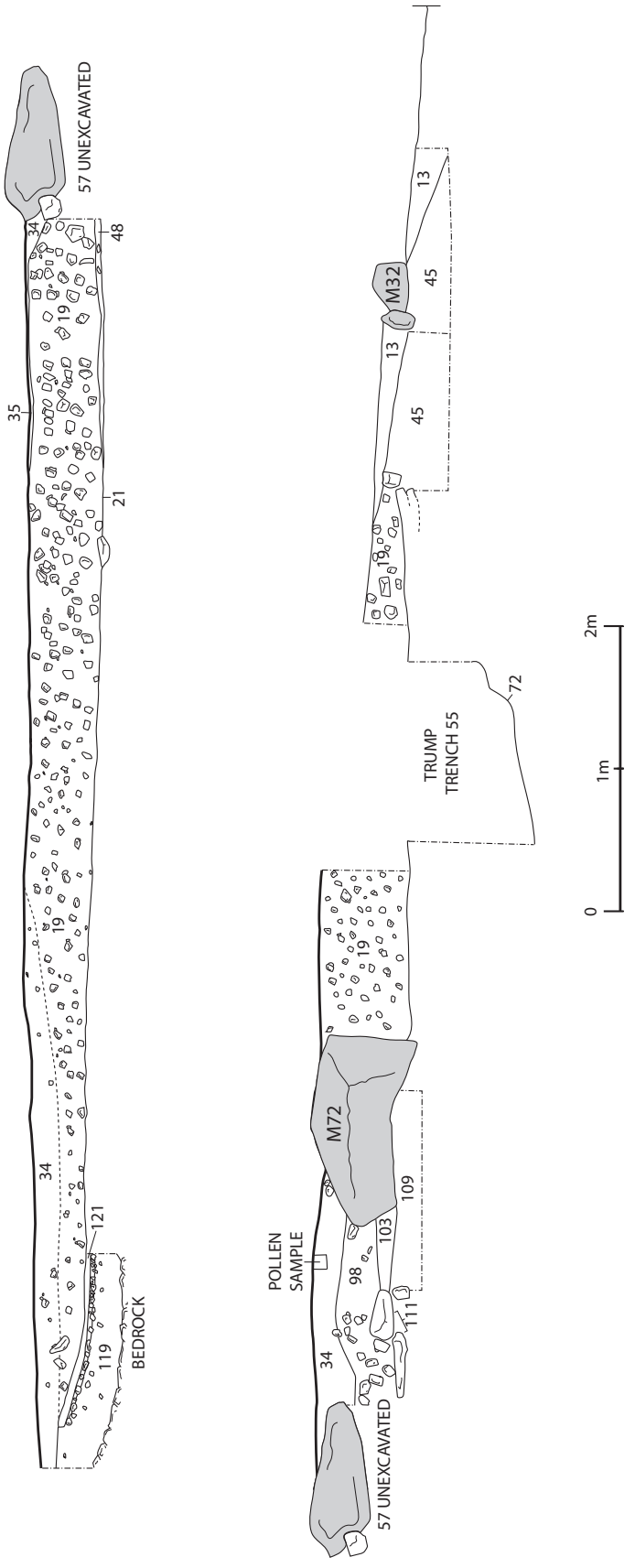


Figure 4.24. *South-facing vertical section.*



Figure 4.25. *Threshold stone (57), with Context (59) in the background.*



Figure 4.26. *Fragment of a rim of a large stone bowl from Context (58).*

4.3.5.3. Features west of the threshold

Surface {21} was located west of threshold (57), at the same position in the stratigraphy. It consisted of a large expanse of beaten earth floor deposit, Context (121), which was found throughout the western half of the trench; although this was covered in places by Context (48), a dark brown soil underlying Contexts (43) and (34). Context (95), a less extensive patch of beaten earth, filled the area between threshold (57) and stones (59). These floor deposits were all identical to (28), in terms of both appearance and composition, and were clearly very closely related in terms of phase and function; where sampled they all contained sherds of Ġgantija pottery mixed with sherds of earlier phases. Context (95) was sampled for analyses of charcoal, plant remains and invertebrates, and radiocarbon dating.

A series of large stones (59) were also encountered while removing backfill from the site. These were contained within a loose mixture of greyish brown soil and rubble, defined as Context (58). The stones seem to have been deliberately placed on top of each other, but must have been placed there relatively recently, as finds from (58) included plain window glass. The stones were photographed in their current configuration in 1911 (Fig. 4.27). It was impractical to remove them from the trench, because of their size and weight, and instead the excavation proceeded around them.

Two additional patches of possible *torba*, equivalent to (23) (§4.3.5.1; Figs. 4.21 & 4.22) were eventually found, and were assigned as Contexts (25) and its foundations (26) and (35). Context (25) was a yellowish-cream coloured deposit, irregularly shaped and 0.7 m in diameter. This was found 3 m south of (23) at a similar level, and probably represented *torba* that had



Figure 4.27. *Stones (59) as they were in 1911 (left) and 2015 (right), looking east.*

become disturbed and mixed with soil. A fragment of a rim of a Globigerina stone bowl (SF95) was found impressed onto the surface of the layer, which in turn rested on a stone foundation, Context (26), similar in composition to (19) and (43). Context (35) was a patch of yellowish-brown soil, 0.5 m in diameter, found approximately 4 m west of (23), also at a similar level.

4.3.6. Trench D western extension (5 × 2 m)

Following consultation with the SCH, it was decided to extend a 2 m wide strip from the western edge of Trench D back a further 5 m, to capture the full extent of surface {21}. Although bedrock was encountered within 0.35 m, this was covered by a pre-temple deposit, Context (119), a mid-brown silt loam. This layer contained a mixture of Għar Dalam, Skorba and Żebbuġ pottery and animal bone, and thus consisted of a mixture of settlement debris from the earlier phases of the site's history. The trench was also extended north, in a 1 × 2 m unit that captured the edge of surface {21} as it curved to the north (Fig. 4.28). Despite the fact that the southern edge of the floor had been disturbed by Cut [120] (the westernmost 1911 sondage), this extension to Trench D clearly illustrated that surface {21} and its floor (121) constituted the inner floor of a 'clover-leaf temple', of the form characteristic to the Maltese islands. At the edge of the floor, a band of pale-coloured ground limestone was found (Fig. 4.29), similar to a deposit that was documented at the eastern edge of the temple (§4.3.5.2). This phenomenon was interpreted as the vestiges of a plastering or rendering that once coated the interior walls of the temple.

4.3.7. Trench D northern extension (7 × 3 m)

Following consultation with the SCH, it was decided to extend a 3 m wide strip from the northern edge of Trench D to the extant megalithic wall at the northern edge of the temple. This exercise aimed to capture the extent of the building's floor and its relationship with the exterior wall. Surprisingly, near to the west-facing baulk of the trench, the fragmentary remains of two more *torba* floors were uncovered at the bottom in this trench. These were not excavated fully; instead they were sampled for micromorphological analysis. Floor (116) was a greenish-pink patch of *torba*, presumably the remnant of a once much more expansive floor, which had been truncated by Cut [76] described below (Fig. 4.30). Adjacent to this was a similar patch of yellow *torba* floor, Layer (122). Establishing the relationship between the two floors, and evaluating the extent of their survival, was hampered by their position immediately below the edge of the trench. When the floors were sampled, it was possible to determine that natural *terra rossa* (51) lay immediately beneath.



Figure 4.28. *The western edge surface {21} and floor (121), also showing 1911 sondage [120].*

Above these floors, there lay a series of fine-grained sediments pre-dating the temple structure. These were Context (113), a dark grey silt containing frequent sub-rounded stones, Għar Dalam, Skorba and Żebbuġ pottery, and a small quantity of bone. A charred legume (unidentifiable to species) from Context (113) was radiocarbon dated to between 5325 and 5075 cal. BC (UBA-31047, 6267±40 BP). Above this was Context (63), a 0.4 m thick layer of firmly compacted orange brown silt loam, containing Skorba, Żebbuġ and Ġgantija pottery and pieces of chert. A charred barley grain from this deposit was AMS radiocarbon dated to between 5300 and 5025 cal. BC (UBA-31037, 6193±48 BP), matching the date from the layer below and firmly establishing an Early Neolithic date for the activity associated with this part of the site. The presence, however, of Żebbuġ and Ġgantija pottery also indicates later disturbance. Context (66) was



Figure 4.29. *Detail of preserved plaster at the edge of floor (121). North is to the right.*



Figure 4.30. *Layer (116), a patch of* torba *of presumed Skorba date.*

located above the intact early deposits, and consisted of a friable band of yellow material, only 0.01 m thick, formed from pounded stone or plaster, and was only visible in the east-facing vertical section of the trench (Fig. 4.31).

The pre-Temple layers in Trench D north were disturbed by Cut [76], which appeared to represent the foundation for an internal apse wall. Cut [76] contained megaliths and Context (60), a dark greyish-brown silt loam that was rich in Temple Period pottery, but with occasional sherds of Roman pottery – implying that the temple wall was disturbed during a later period or through natural bioturbation. These sediments were covered by Context (42), which, in addition to its presence over the temple floor, could also be traced in this area. In places, (42) had been disturbed by an irregular Cut [77], which was filled with topsoil.

At the opposite, southern end of the trench, *torba* surface {21} was revealed under the backfill contexts and not excavated further. The edge of surface {21} was found approximately half-way along the northern extension of Trench D, aligned with the break of slope where the stone accumulation within the temple's interior began to fall away steeply towards the external wall (Fig. 4.20). In places, Context (42) was immediately above the *torba* floor, and took the form of a firmly

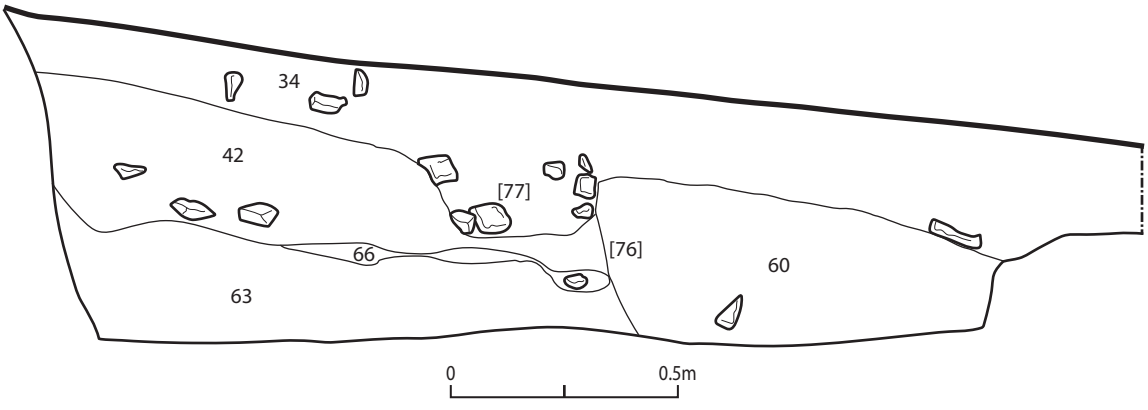


Figure 4.31. *Trench D, northeast-facing vertical section showing Cut [76] into pre-Temple deposits.*

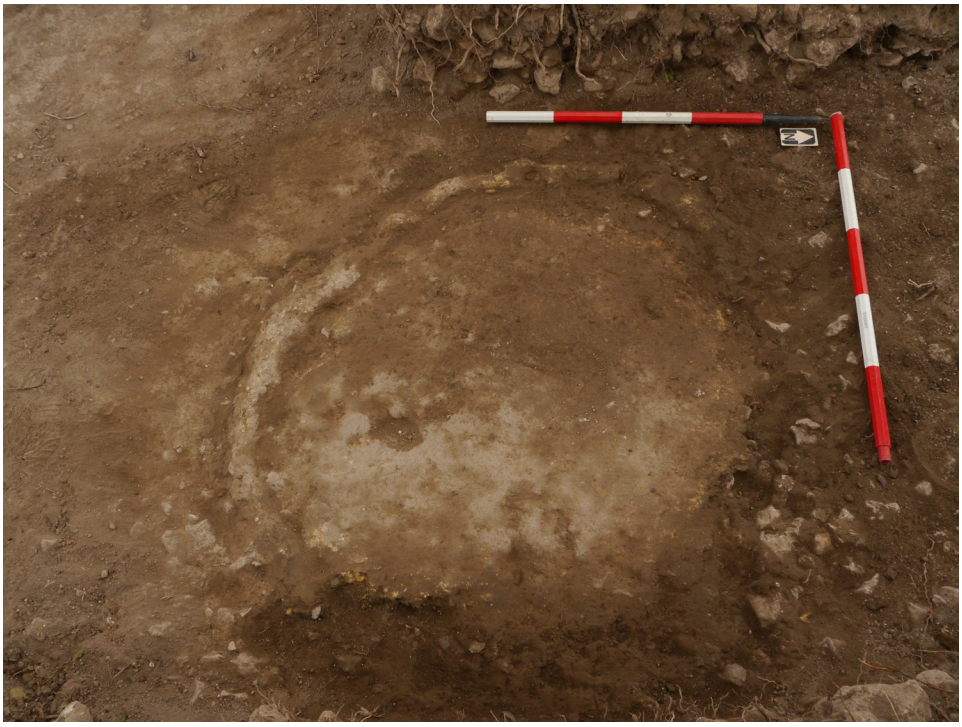


Figure 4.32. *'Fire pit' feature in surface {21}.*

compacted dark reddish-brown layer of silt loam. This was, presumably, an accumulation of material that formed when the building was abandoned, as it was also found to the north, within the remnants of the external walls. A dark, firmly compacted layer of soil and gravel, Context (104), also covered {21}. This layer, like Context (78) on surface {27}, was probably an accumulation of material that formed *in situ* during the Temple Period. The *torba* floor revealed the edges of a circular 'fire pit' feature, consisting of a raised, cream-coloured ring of *torba* that was *c.* 120 cm in diameter (Fig. 4.32). Such features have been noted in similar positions at other megalithic temples in the Maltese islands, most notably at Ġgantija, where the 'fire pit' is also situated on the right-hand side of the south temple's central corridor (Malone 2007).

4.3.8. Trench E (4 × 4 m)

Following inconclusive results from Trench C, which was positioned to characterize the subsurface archaeology in the vicinity of the monument but had revealed no stone or upstanding structural or intact floor remains, it was decided, in consultation with the SCH, to position a new trench closer to the extant megaliths. Trench E was initially a 4 m square unit, but was reduced to a 2 × 4 m sondage running north–south (Fig. 4.20) when intact archaeological deposits were encountered during the excavation. Its stratigraphy revealed a similar sequence of floors to those found in Trench D (§4.3.5). They were founded upon sterile *terra rossa*, under the equivalent buried soils (106) and (90). These were 0.1–0.2 m-thick deposits of reddish brown clay loam and contained Għar Dalam, Skorba and occasional, and presumably intrusive, Żebbuġ pottery. Three radiocarbon dates on charred cereals from this layer date it to before 5000 cal. BC (Table 4.1).

In a sondage at the centre of the trench, the stratigraphy read as follows (Fig. 4.33). Context (87), was a stone foundation for an earthen floor, 0.1 m thick and consisting of an even spread of stone rubble, and lay above (90). Foundation (87) had been encompassed by a wall, consisting of stones (91) and the intervening soil (50). This wall ran from the western edge of the trench, forming an arc northwards, tracing a form characteristic of a lobed wall of a temple apse (Fig. 4.20; Fig. 4.34).

Table 4.1. *Radiocarbon dates from Santa Verna Context (90).*

Lab ID	Date	±	Sample dated	Calibrated range (95% CI) cal. BC	
UBA-31044	6239	37	Charred Fabaceae (lentil or pea)	5309	5069
UBA-31043	6181	40	Charred *Hordeum* (cf. hulled straight) grain	5286	5003
UBA-31042	6412	44	Charred *Triticum* cf. *dicoccum* grain	5474	5320
UBA-37858	4491	43	*Olea* charcoal	3353	3082
UBA-37859	6409	38	*Ulmus* charcoal	5470	5320

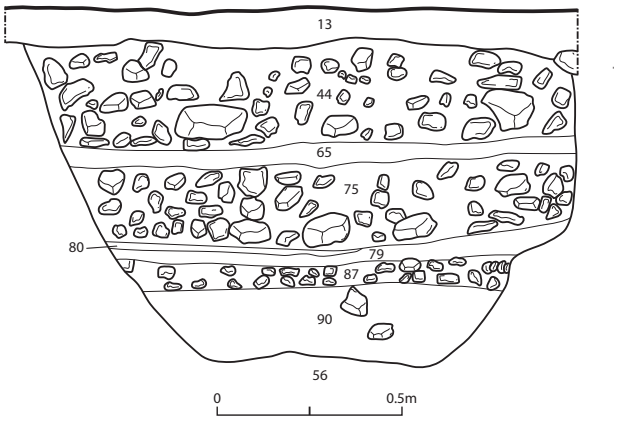


Figure 4.33. *South-facing vertical section of sondage in Trench E.*

Indeed, the same wall had been reached during the 1911 excavations, presumably at an upper level, but the excavation had not been taken further. Context (92) was an arrangement of thin polygonal shaped Globigerina Limestone 'tiles', adhered to the wall at the same level as floor foundation (87) and was placed against the inner apse wall (Fig. 4.35). The function of this remarkable structure is not clear, nor does it appear that was it ever intended to be visible, since it was covered with (87) immediately after construction. An earthen floor (79) lay above (87), and comprised a compacted blackish brown floor layer 0.1 m thick which contained Context (80), a lens of crushed Globigerina Limestone 'plaster'. Context (79) contained predominantly Żebbuġ pottery.

Context (79) was covered, in turn, by another floor foundation (75), which had a depth of 0.25 m and was similar in composition to the stone foundations of other floors at the site. Context (75) contained a mixture of pottery from the Żebbuġ and Ġgantija phases. A band of yellow rendering, presumably a kind of crushed limestone plaster, was discovered adhering to the wall (91), sandwiched between the stones and another earthen floor at a higher level. This rendering was assigned context number (67), and its preservation was probably due to the presence of the earthen floor, which although later than the plaster, must have been protecting this fragment since prehistoric times. The floor in question, Context (65), presented a firm, 'chocolate' brown floor layer 0.1 m thick that was similar in composition to floors (28) and (121) in Trench D, and contained a mixture of Żebbuġ and Ġgantija phase pottery. A spread of medium-sized stones, Context (44), was above this, and ran diagonally across the trench from the northeast to midway along the western edge of the trench. Above the stones, Context (47) was visible in the vertical sections of the trench, where it formed a thin band (0.01 m) of *torba*, implying that stones (44) were the foundation of a floor. Such was



Figure 4.34. *Mid-excavation photograph of the lobed wall (91) of the outer right temple apse running through Trench E.*



Figure 4.35. *Polygonal 'tiles', Context (92), adhered to the internal surface of the wall foundation, and the above plaster rendering, Context (67).*

the poor state of preservation of this *torba*, it had not been evident in plan during excavation.

South of wall (50) another sondage was opened, but although a number of stratified deposits were encountered, none made up coherent layers. Together, these contexts represented the remains of the outer temple wall, but it is not clear whether any of these contexts survived undisturbed since prehistory. At the base of the sondage some large stones were found, which were assigned to context number (105). These were perhaps vestiges of the temple wall or its foundation. Next came Context (89), a layer of random stone rubble, covered by (83), a firmly compacted loam that was trapped here during the collapse of the megalithic wall. Context (52) was above this and was a significant layer of blackish-brown silt loam. Finds from this layer included 689 sherds of prehistoric pottery from the Ġgantija phase and earlier, and a hollow-based Lipari obsidian arrowhead (Fig. 4.36). This was an important find, since such arrowheads are very rare in the Maltese islands; although two arrowheads (one chert, the other obsidian) were found during excavations[8] at nearby Ġgantija in 1936 (Evans 1971, 185). The layer was interpreted as a concentration of archaeological material from within the temple wall that had become 'deflated' when the wall was dismantled. A charred legume from the deposit was radiocarbon dated, but unfortunately was a modern intrusion.[9] A similar deposit, (70), was encountered in a sondage dug around an upstanding megalith (megalith 53) at the southern edge of the trench. Within (52) there was a series of discrete but spatially incoherent pockets of pale brown friable silt, Context (64), which were devoid of cultural material. These pockets of sediment presumably formed in voids left when stones were removed from the wall. Also, four large stones, Context (82), were found within (52) which had seemingly fallen from wall (50).

Above these archaeological features, a dark yellowish-brown, friable to firm soil was visible across much of the trench. This was Context (41), which also contained modern debris in its upper levels, but these became less frequent with depth; archaeological material included animal bone, prehistoric pottery and chert. Context (39) occurred at the southwest corner of the trench, and was a topsoil-like layer containing prehistoric pottery and worked chert, but also modern debris showing that the deposit was not intact. A

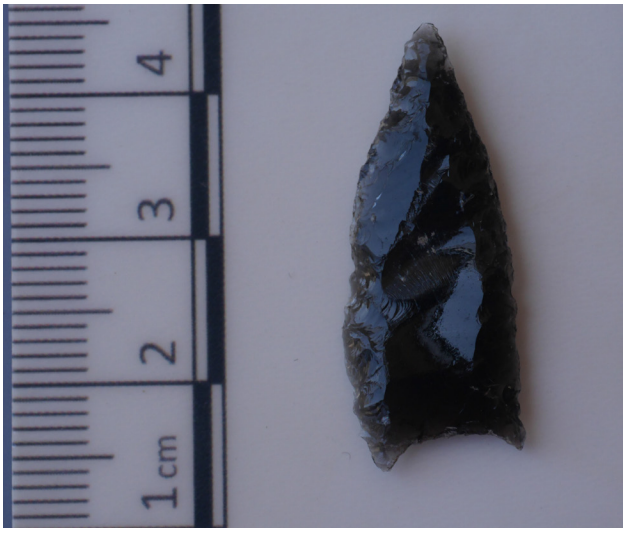


Figure 4.36. *Photograph of obsidian arrowhead from (52) (SF132).*



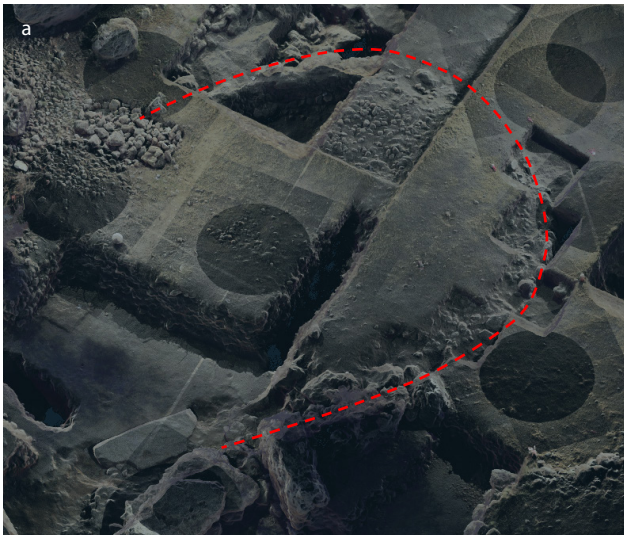
Figure 4.37. *Photograph from Bradley (1912) showing workers at Santa Verna standing next to the apse wall documented in Trench E.*

similar deposit was found at the northeast corner of the trench, where it was assigned Layer number (108). At the eastern edge of Trench E an assortment of stone was found at this level, and assigned the context number (88). Topsoil was above these layers.

4.3.9. Keyhole investigations between Trenches C, D and E

The work in Trench E revealed the inner lobe wall of a temple apse. As excavation progressed, however, it remained unclear whether this feature was present over a more widespread area. The wall had been reached by Bradley (Fig. 4.37; Fig. 4.3), so it was decided, in consultation with the SCH, to extrapolate the curving arc of stones in Trench E towards the upstanding megalith at the centre of the site (megalith 58); remove the topsoil; and ascertain whether the stones were still present. This exercise was successful in revealing the upper portion of the apse wall in its entirety (Fig. 4.38; Fig. 4.39; Fig. 4.20). Two slightly differing variants of topsoil were encountered on either side of the apse – Context (86) on the inner edge of the apse, which was identical to (13), and Context (99) on the outer edge, which was slightly more compacted and contained frequent charcoal flecks.

A 0.5 m-wide strip was dug between the southern edge of Trench D and the northern edge of Trench E, in order to test whether the stone floor foundation (44) could be followed into Trench D, and thereby relate the stratigraphy of the two trenches directly. In the event, Context (44) could only be followed northwards, under the topsoil, for a maximum of



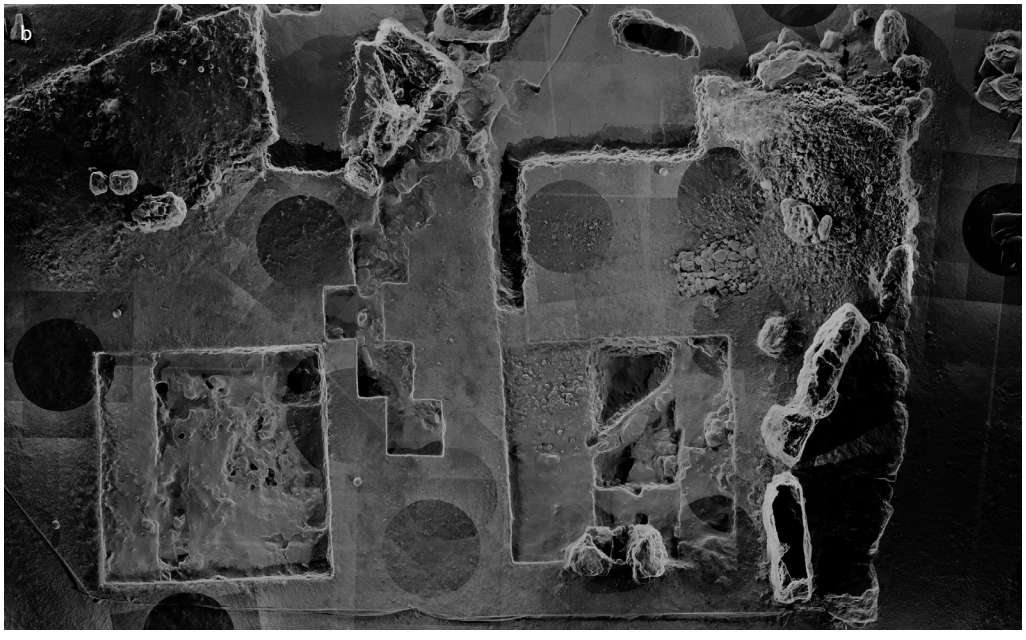


Figure 4.38. *a) Oblique view, digital scan of Santa Verna, red line depicting likely outline of apses; b) Vertical digital scan view.*



Figure 4.39. *Photograph of the keyhole investigations between Trenches C, D and E revealing the curving apse wall, and the approximate extent of Trump's trench [123] (Bottom right corner).*



Figure 4.40. *Photograph of chert objects from topsoil (13) in Trench F.*

0.8 m, before it was interrupted by rubble backfill (19). This layer was removed to natural *terra rossa*, with no intact archaeology encountered. This work revealed another archaeological trench dug by Trump in 1961, which was assigned context number Cut [123] (Fig. 4.39), and presumably represents the trench that was intended to be located near the area marked 'B' on the 1911 map. A small 0.5 × 0.5 m sondage was attempted 3 m to the south of the 1961 sondage. Yet, it became apparent that this area (between the megalithic facade and Trench D) was a heap of clearance rubble, and the sondage was abandoned as extending it any further would have involved too much disturbance.

4.3.10. Trench F (2 m × 2 m)

It was not known whether an isolated stone, megalith 55, some 15 m southwest of the main cluster of megaliths, was related to the prehistoric temple at Santa Verna. To investigate this, Trench F was opened, and 2 m square of topsoil was removed from around the stone. The topsoil contained a large number of crude chert artefacts (Fig. 4.40). This revealed Context (69), a firmly compacted layer of yellowish-brown silt loam, containing a limited assemblage of mixed prehistoric pottery, but no other structures, contexts or finds that could relate the stone to the temple.

4.3.11. Trench G (2 m × 1.5 m)

Trench G was opened to investigate the nature of two stones that could be seen protruding from the ground, near the southern edge of the cobbled area on the 1911 plan that presumably corresponds with the outer temple wall (Fig. 4.3). The trench contained Context (81), a dark orange-brown soil which, when excavated to a depth of 0.2 m, revealed two more stones similar to the ones visible on the surface. Therefore, it was apparent that the stones were indeed structural components from the temple wall. Topsoil in Trench G, although identical to (13) in terms of its composition, was uniquely rich in chert debitage, and as such was given a separate context number, (68).

4.4. Soil micromorphology and geochemistry

4.4.1. Introduction

One highlight of the 2015 excavations was the rediscovery of what can now be demonstrated to be *in situ* buried soils beneath the series of temple floors and deposits, and an associated radiocarbon chronology. This was particularly well exemplified in Trench E, and in the re-excavated sondages of the 1911 and 1961 excavations. These three trenches revealed the presence of a well preserved, *c.* 45 cm thick, palaeosol beneath the archaeological deposits associated with the temple (Volume 1 Chapter 5). Thick (*c.* 30–100 cm) stone rubble deposits were found directly on these intact buried soils, interrupted by thin earthen 'floors'. The floors ranged in thickness from *c.* 1–4 cm and were essentially composed of well sorted silt and very fine sand. Accordingly, a series of small block samples (Table 4.2) from these sequences were taken for micromorphological analysis (Appendix A4.5; Bullock *et al.* 1985; Courty *et al.* 1989; Murphy 1986; Stoops 2003; Stoops *et al.* 2010).

Table 4.2. *Sample contexts for micromorphological, physical and multi-element analyses of the floor deposits at Santa Verna*

Profile location	Morphology sample	Context number	Description
Trench E	4/1	65	Floor surfaces over palaeosol (90)
	4/2	79	
	4/4	90	
Trump Trench (Cut [55])	3/3	71	Upper pit fill
	78	78	Hard packed material with floor above
Ashby sondage (Cut [54])	28	28	Floor comprising a surface over palaeosol

4.4.2. Physical and elemental characterization

In the floor deposits at Santa Verna, pH values are very calcareous (ranging from 8.54–8.92) and the magnetic susceptibility values were generally low (Table 4.3). This probably reflects the relatively low amounts of fire-related settlement debris contained within these deposits (Allen & Macphail 1987).

In the multi-element analysis, the floors were notably all moderately to highly enhanced with calcium, phosphorus and strontium values (Table 4.3). Phosphorus values varied from 1200 to >10000 ppm, with the Trench E profile and pit fill very enhanced throughout (i.e. 4510 ppm in the pit base to 9250 ppm in the upper floor), with relatively enhanced strontium varying between 195 and 406 ppm. These elements suggest that the upper horizon of the soils and the *torba* floors were receiving substantial amounts of midden-type organic settlement waste material prior to burial (Entwistle *et al.* 1998; Wilson *et al.* 2008). Calcium values were relatively high at *c.* 18–25% except in the pit fill of Cut [55], Trump's 1961 Trench, which no doubt reflects the high micritic calcium carbonate component of the *torba* floors, as also reflected in the micromorphological results (Appendix A4.6).

4.4.3. Summary of earthen floor micromorphology

Four different earthen/*torba* floors were examined in thin section (see Appendix A4.5), all situated on well

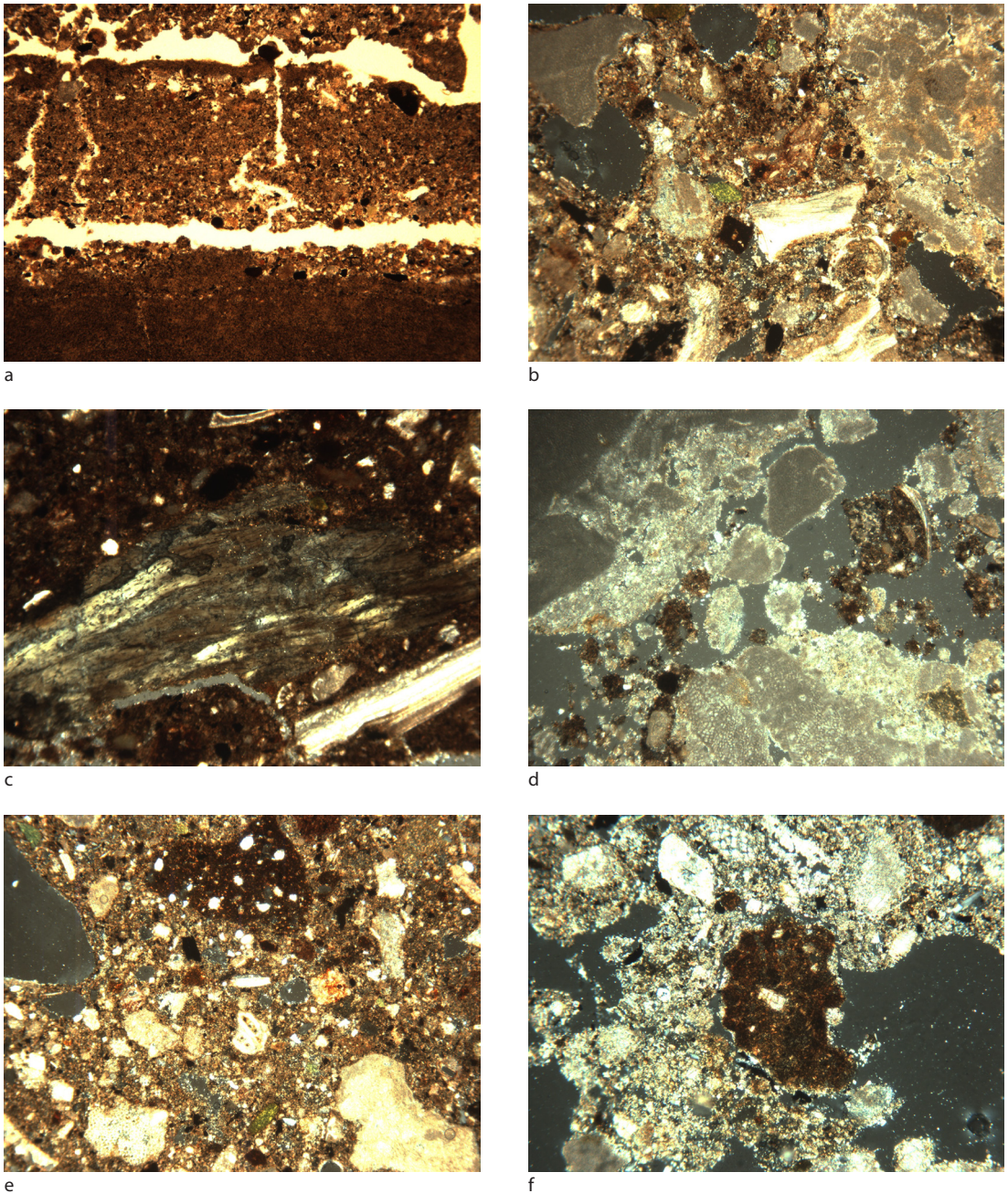


Figure 4.41. *Thin section photomicrographs from Santa Verna (see also Appendix Figs. A4.5.1 & A4.5.2): a) Photomicrograph of finely laminar silt and organic dust in pit fill, Trump Cut 55, sample 3/3, Santa Verna (frame width = 4.5 mm; plane polarized light); b) Photomicrograph of possible 'floor' composed an even mix of very fine limestone gravel and calcitic silt with abundant very fine organic punctuations and occasional bone fragments, Trench E, sample 4/4, Santa Verna (frame width = 4.5 mm; cross polarized light); c) Photomicrograph of a* 'torba *floor' composed of a dense, brown silty clay with bone inclusions, Trench E, sample 4/1, Santa Verna (frame width = 4.5 mm; cross polarized light); d) Photomicrograph of a possible 'floor' or 'mortar' composed of a fine gravel size limestone, Trench E, upper part of sample 4/2, Santa Verna (frame width = 4.5 mm; cross polarized light); e) Photomicrograph of a mixture of silty clay with 25% fine limestone gravel with a few included sub-rounded aggregates of birefringent clay and common very fine organic punctuations,* 'torba' *floor context 28, Santa Verna (frame width = 4.5 mm; cross polarized light); f) Photomicrograph of reddish brown silty clay soil aggregate in fine calcitic plaster, sample 3/1/2, Ġgantija WC Trench 1 (frame width = 4.5 mm; cross polarized light).*

Table 4.3. *pH, magnetic and selected multi-element results for archaeological contexts at the Ġgantija and Santa Verna.*

Sample	pH	MS Si/g	Ba ppm	Ca %	Cu ppm	Fe %	K %	Mg %	Mn %/ ppm	Na %	P ppm	Pb ppm	Sr ppm	Zn ppm
3/3	8.72	2.62	90	2.41	28	4.04	1.08	0.94	541	0.08	970	19	57	80
28	8.72	1.96	60	21.5	39	1.97	0.61	1.67	272	0.16	8770	6	406	121
78	8.7	2.46	70	21.2	37	2.01	0.64	1.44	258	0.21	9490	6	378	124
4/1	8.92	3.01	70	18.5	40	2.43	0.75	1.41	307	0.12	9250	9	327	133
4/2	8.84	3.02	70	20.7	42	2.03	0.7	2.81	280	0.17	8400	8	361	131
4/4	8.54	2.05	40	24.9	27	1.32	0.43	4.36	168	0.1	4510	5	326	71

preserved palaeosols. In Trench E, there were at least two earthen *torba* 'floors' present – samples 4/1 Context (65) (sample 4/1) of the Ġgantija phase; Context (79) (sample 4/2) of the Żebbuġ phase; and another in the Trump Cut [55] (Context (78) (Fig. 4.33 and Appendix Fig. A4.5.1). The former floor material in Trench E was a very dense, brown mixture of micritic silty clay with a few shell and bone fragments; the later floor material was a similar fabric but mixed with gravel size limestone. The *torba* floor in the Trump Cut 55 was composed of a mixture of fragments of a brown micritic silty clay with included fine anthropogenic debris. Finally, the floor material in the Ashby sondage (Context 28) was more like the later, coarser floor observed in Trench E.

4.4.4. Conclusions

The *torba* and earthen floor levels are very compact and homogeneous, and at the same time contain very fine fragments of included anthropogenic material, and greater or lesser amounts of fine limestone gravel. These features suggest that this floor material may have been deliberately prepared, perhaps by sieving, then spread wet on a surface, and then subject to rapid air-drying. This has resulted in some secondary precipitation of silt-sized calcium carbonates, before these surfaces were then trampled or somehow compacted *in situ*.

4.5. Discussion

4.5.1. Pre-temple features and deposits

The above discussion of soil micromorphology and the extended analysis and discussion in Chapter 5 of Volume 1 highlights a characteristic feature of megalithic structures on the island of Gozo: their association with well-developed prehistoric palaeosols – 'fossil' soils from ancient land surfaces – preserved under stones and archaeological deposits. The excavations at Santa Verna offered an opportunity to sample this palaeosol in three places, in Trench B northeast of the megaliths, and at the bottom of both the 1911 and 1961 excavation trenches (Fig. 4.20). This work revealed important new understanding of the process of soil development in the Maltese Islands during the millennia before the arrival of people (see Volume 1, Chapter 5). At Santa Verna, the presence of cultural material – pottery and lithics – in the primary horizons above these ancient soils, signals human occupation before the site became a megalithic temple, from the time of the first colonization of the Maltese Islands onwards.

4.5.1.1. The 'Għar Dalam phase', pre-*c.* 5400 cal. BC

Although residual Għar Dalam pottery was present in many parts of the site, no contexts contained Għar Dalam pottery unmixed with later styles. That said, Context (9) in Trench B had only one (possibly intrusive) Skorba phase sherd, and was overlain by mixtures of Għar Dalam and Skorba material, thus confirming Trump's (1966) seriation. Unfortunately, no suitable sample for radiocarbon dating was found in the layer. The mixed layers in Trench B, Context (8) for example, contained the best representations of Għar Dalam pottery of all (Fig. 4.42). These layers were found some distance from the temple in deposits with no clear evidence for any specific human activity other than the presence of ceramics. These soil remnants, presumably, had not been disturbed by the temple and other later activity. The presence of Għar Dalam pottery in this area was not unexpected, given the large amount of Għar Dalam material discovered nearby during the Cambridge Gozo Survey and fieldwalking in 2014 (§4.2.5, 4.2.6).

Similar concentrations of Għar Dalam pottery were uncovered in and under the temple itself, in buried palaeosols (38) and (61) in Trench C, (119) in Trench D, and (89), (90) and (106) in Trench E. In all these cases, the pottery was mixed with later styles. It is, however, tempting to speculate that the Għar Dalam pottery from the immediate vicinity of the temple signals an initiation of human settlement and reoccupation at the site that would endure for millennia. At Skorba Temple on the island of Malta, structural features associated with the Għar Dalam phase marked the beginning of a long history of use



Figure 4.42. *Għar Dalam pottery from Context (8) in Trench B.*

at the site throughout the Early Neolithic and Temple Period (Trump 1966). The 2016 excavation at Skorba, however, yielded similar results to those at Santa Verna, in that Għar Dalam pottery was found mixed with later Skorba ware (Chapter 7).

4.5.1.2 Skorba layers, 5400 to 4800 cal. BC

The 2015 excavation at Santa Verna demonstrated that, as at the type-site of Skorba, buildings constituting an Early Neolithic settlement also existed at Santa Verna long before it became a megalithic temple. In the northern extension of Trench D, a rich concentration of Skorba phase pottery sherds was found, where a build-up of various layers of soil and rubble had formed against the northern perimeter wall of the temple. In the upper levels, this was mixed with Temple Period pottery, but, with depth, the Skorba phase material became increasingly frequent. Two early *torba* floors, contexts (116) and (122) were found under these upper levels, representing a major discovery. Not only are they one of the very small number of pre-Temple Period structures known from the Maltese Islands; but given their stratigraphic association with the temple itself, they are also of great value when considering issues of chronology and continuity, both at Santa Verna and in the Maltese Islands more generally.

It seems likely that these floors (§4.3.7 and Fig. 4.30) were part of a relatively small structure. The two oval stone-based structures dating from this period found at Skorba by Trump in 1961 were large – the larger one 8.4 × 5.4 m. Yet, they did not contain hearths, *torba* floors, or many indicators of domestic activity other than pottery and animal bones, which led to the interpretation of the building as a 'shrine' (Trump 1966, 11–12). The Skorba 'shrine' was apparently a mud-brick construction, built on a foundation of low stone walls which over time collapsed, resulting in a low mound of clay intermixed with Skorba phase pottery, encompassed by the wall foundations.

At Santa Verna, only a very small area of Skorba phase *torba* was unearthed in Trench D, so it is impossible to say anything about the size, shape and orientation of the building or buildings that stood there during that phase. As was the case at Skorba

and the Għajnsielem Road house, it is likely that the pre-temple buildings were constructed mainly of 'mud brick' or *pisé*-type construction, which decayed over time, forming a mound of earth (Context (63)). The foundation for the northern wall of the Santa Verna temple was then cut into this mound, perhaps even during a deliberate destructive event. It is not clear how much of the Skorba phase strata at Santa Verna survived the construction of the temple or remained preserved under the northern wall and northeastern area of the site.

4.5.1.3. A fifth millennium BC abandonment?

Several aspects of the archaeological data obtained from Santa Verna strongly suggest activity between *c.* 4800 and 3800 cal. BC was extremely limited. No radiocarbon dates from the site fall within this time frame, despite our best attempts to date material from successive, overlying cultural layers. Indeed, the radiocarbon dates from the earliest layers associated with Żebbuġ pottery are either from around 3800 cal. BC, or in the event of the analysis, have been demonstrated to be residual material from before 4800 cal. BC. It seems plausible that remnants of the Skorba phase structures were still visible when the temple was built; centuries of weathering would have rendered the ancient, abandoned settlement unrecognizable as buildings by that time. Even so, they would have stood apart from nature and signalled the presence of human activity from an earlier phase. It is tempting to wonder whether the site was chosen as a 'temple' for this reason, a special ancient place, and that the construction of the megalithic building deliberately covered the earlier structure, imbuing the place with a ritual or sacred meaning, monumentalizing its close association with human life for all time. Equally, its elevated position and extensive view may have been the driving force for the temple construction.

4.5.1.4. Pre-temple Żebbuġ settlement and monumentalization

The Żebbuġ phase of the first phase of the so-called 'Temple Period' is not traditionally associated with the construction of megalithic buildings; instead, it is seen as a preliminary step in cultural development associated with rock-cut tombs and simple domestic structures (Evans 1959). At Skorba, Trump (1966) found remains of mud huts dating to the Żebbuġ phase but undertook only limited sampling of them. At the nearby Xagħra Brochtorff Circle, a putatively Żebbuġ phase rock-cut tomb was discovered and completely excavated (Malone *et al.* 1995; Malone *et al.* 2009), although a recent programme of radiocarbon dating suggests all the surviving burials in its contents date to the Ġgantija phase (Malone *et al.* 2019).

The Żebbuġ phase is best best-known through distinctive ceramic material, which is frequent but diffuse in the landscape, and occurs in significant quantities as residual material in excavations. The styles of the vessels, their fabric and technique of manufacture, strongly contrast with those of the Skorba phase. Early Żebbuġ pottery sherds can be recognized by their distinctive style of painted decoration, forms, fabric, size and range (Chapter 10). Painted ware from this phase has long been recognized; Peet's report on the pottery from the 1911 excavations at Santa Verna (Chapter XII in Ashby *et al.* 1913) describes and illustrates (Fig. 4.43) a unique painted ware with:

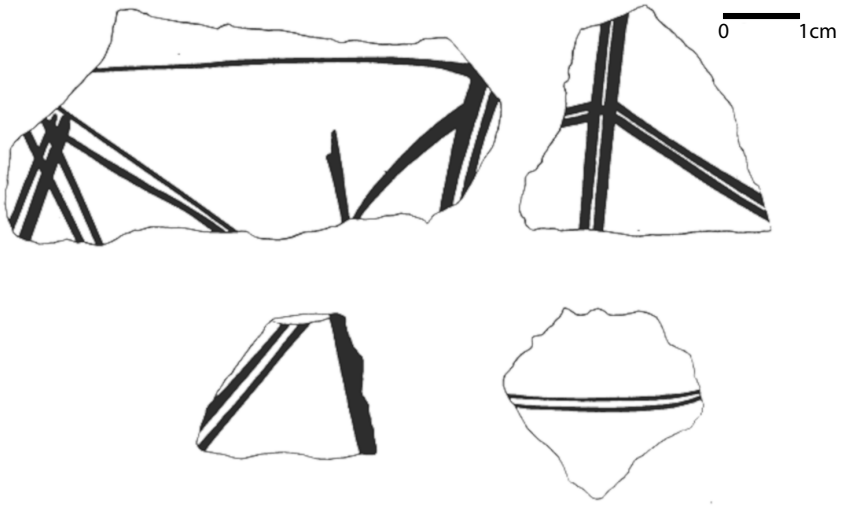


Figure 4.43. *Painted ware sherds illustrated in Ashby* et al. *(1913) that conform to typical Żebbuġ ware style.*

> … nothing in common with Sicilian or Minoan wares … rather coarse, variable in thickness. Very thick cream slip, both inside and outside the vase, smoothed but not polished of the outside, rougher on the inside. Designs in matt chocolate paint; lines straight, thin, and mostly in pairs, several sets of which pairs se to meet at various points on the body of the vase … the general scheme of the designs is not clear. (Ashby *et al*. 1913, 121–2).

Many more sherds matching this description were unearthed in 2015, especially in context (90). This was a palaeosol pre-dating the megalithic archaeology and also containing plain body sherds of possible Pellegrin type ware – an unusual highly fired coarse earthenware with a purplish-brown fabric. Residual Skorba phase pottery was also present, accompanied by residual charred plant remains (radiocarbon dated using AMS to between 5500 and 5000 cal. BC; Table 1). Beyond the Maltese Islands, Żebbuġ ware most strongly parallels Sicilian Early Copper Age San Cono-Piano Notaro ware, in terms of decoration and form (Baldacchino & Evans 1954; Leighton 1999; Malone *et al.* 2009). Imported Żebbuġ pottery has also been found in southern Sicily, showing direct evidence for contact between the Żebbuġ and San Cono-Piano Notaro cultural contexts (Barone *et al.* 2010). Other distinctive early Żebbuġ sherds also bear similarities with pottery from the Sicilian Middle Neolithic site of Trefontane; these feature finely incised cross-hatched triangles and associated wavy lines decorating the inner and outer lip sections of open-form bowls (Chapter 10). When these facts are brought together, the ceramic material appears to signal the occupation of the site by new settlers. The timing of this new phase of activity can be estimated by a radiocarbon date obtained from a charred wheat grain in Context (73), whose age can be modelled to within the range 3846 to 3660 cal. BC (Fig. 4.44; Chapter 2).

The grain and associated pottery were found within a pit, Cut [72], which was a feature first noted by Trump (1966, 19) (§4.3.5.1). Pit features are widely recognized as indicators of settlement activity. In the case of Santa Verna, the pit feature was cut into natural soil, then probably left open for some time before infilling naturally (Appendix A4.5). This activity contrasts with the stratigraphically later monument-building phase, evincing a phase of activity immediately before the site was monumentalized. A charred wheat grain found in the foundation levels of the megalithic structure has a modelled age span of 3735 to 3635 cal. BC (Fig. 4.44). This provides a framework for understanding the timing and rate of a process that transformed the site from the domestic to the monumental – the megalithic structure post-dates the initial Żebbuġ settlement by around 100 years or so. Indeed, this

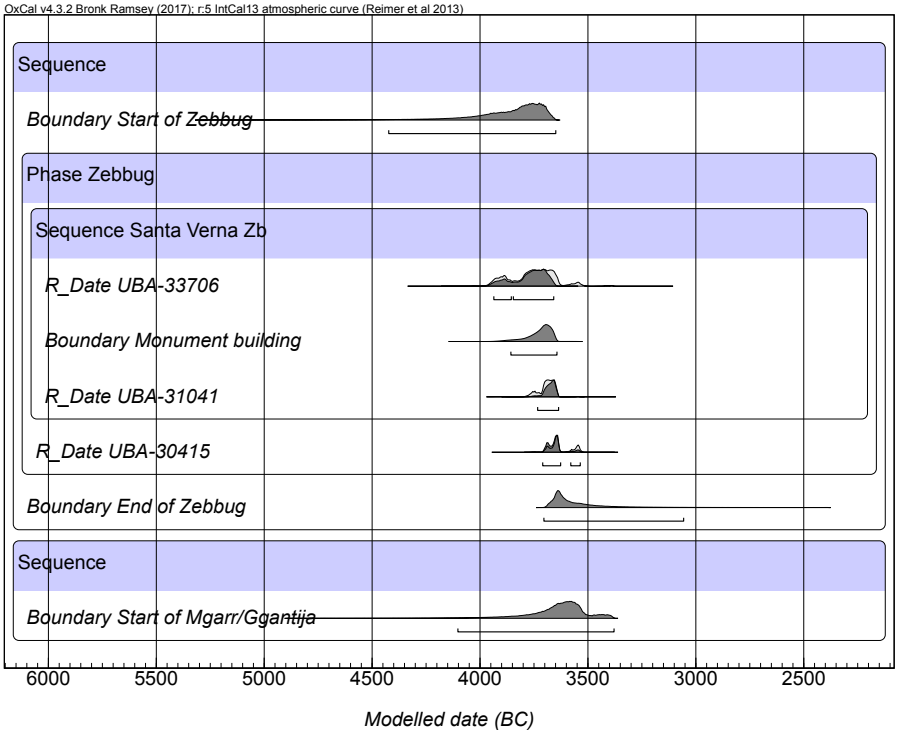


Figure 4.44. *Bayesian model multiplot for the Żebbuġ phase and construction of Santa Verna.*

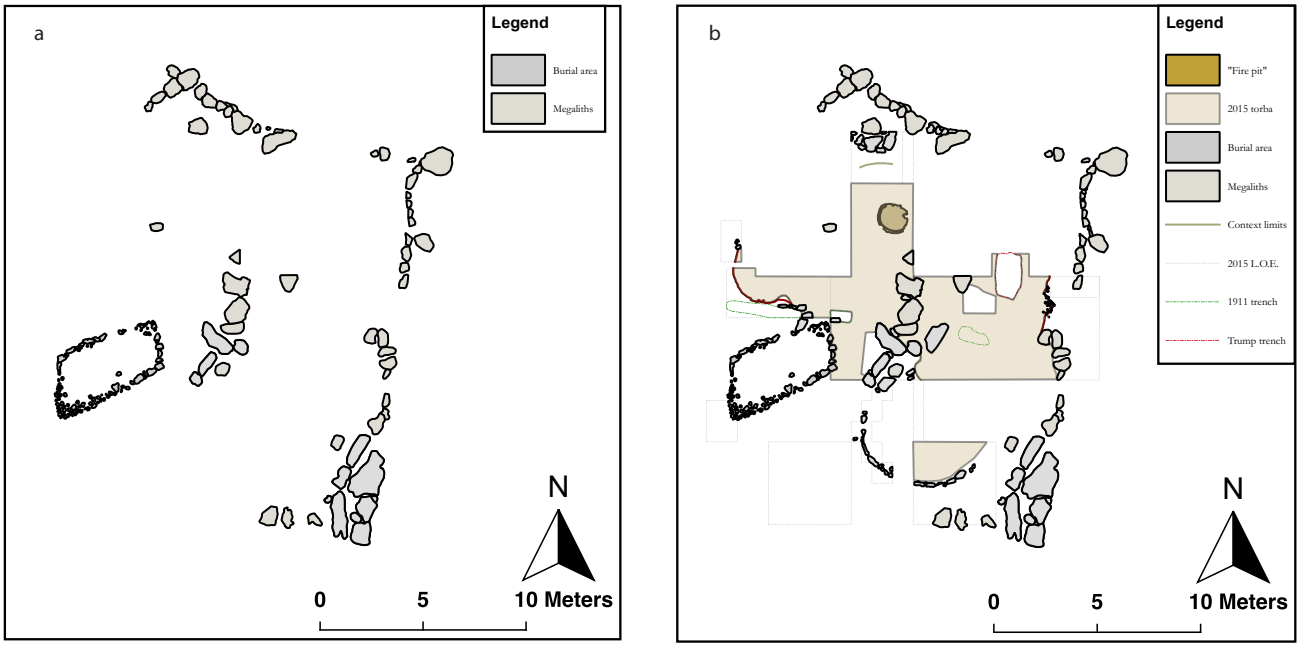


Figure 4.45. *Plan of Santa Verna showing: a) site as it was on discovery; b) 2015 excavation features alongside extant megaliths.*

aspect of the site's archaeology is perhaps the most intriguing of all, as it signals the reoccupation of an already ancient and abandoned place by new settlers, whose biological and/or cultural descendants came to establish the unparalleled tradition for building and monumentalization for which the Maltese islands are so famed in prehistory.

4.5.2. The prehistoric temple at Santa Verna

The 2015 excavations focused on a phase of the temple represented by beaten earth floors – surfaces {21} and {27}. Evidence, however, of at least three earlier phases, and one later phase was also found. It is noteworthy that each sondage revealed a slightly different series of floors and foundations, and it is therefore possible that the history of the site is even more complex, with perhaps several more phases present than those that are indicated directly by the archaeology. The 2015 fieldwork also revealed a wealth of structural features that aided in the identification of the temple layout (Fig. 4.45). It was then possible to arrange the various strata into phased categories, and extrapolating from the 1911 excavation, propose overall layouts for the site at the various points in its development.

4.5.2.1. The temple walls

The excavation and survey demonstrated that the Santa Verna megaliths, at least along the southern edge of the site, were set directly onto the ground surface. The natural topography of the site was clearly part of its design, with the temple walls and floor set into the natural slope, close to (but still 40 m distant from) the highest point of the plateau's edge ridge (Fig. 4.46). Along the northern edge of the temple, the foundation of the temple walls, Cut [76], was placed into a mound of pre-Temple Period material dating to the Early Neolithic Skorba phase; or at least an attempt was made to clear away material from previous phases of occupation at the site.

Although it is by no means certain that the configuration of the outer wall of the structure was unchanged during the various early phases of the temple's existence, there is no evidence to the contrary. When the foundations of the wall at the eastern edge of Trench D were excavated, no earlier floors were found, despite the presence of several early floors less than 2 m away, in Trump's trench. Therefore, it is likely that the various phases of the temple all respected the western edge of the outer right-hand apse. At the western edge of the temple, no early floors were noted, so it is likely that the overall layout of the western end remained unchanged throughout the site's history. Although no extant megalithic structure has survived above-ground level at the western end, nor along the southern edge, the shape of the walls can be traced using the 1911 plan, specifically the line separating the outer 'cobble floor' from the inner area, marked as 'soil' (Fig. 4.3; Fig. 4.48).

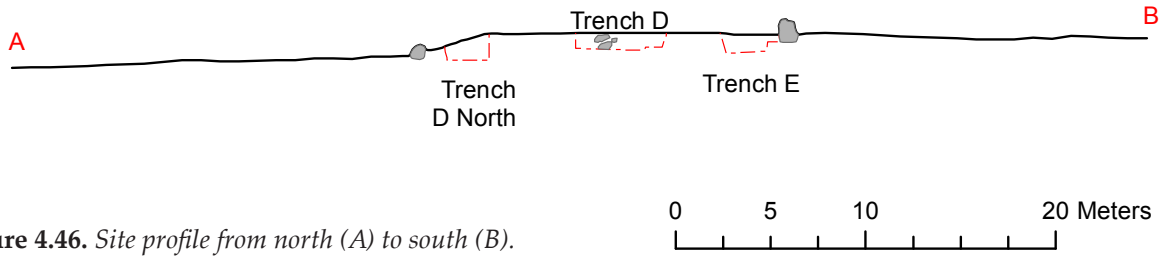


Figure 4.46. *Site profile from north (A) to south (B).*

By extrapolating from all these observations, the external boundary of the temple emerges. When constructed, and during all but its final phase as a temple, Santa Verna was a polygonal building measuring approximately 19 × 19 m, encircled (as revealed by the 1911 excavation) by a cobbled surface. The entrance faced southeast, orientated towards the midwinter sun at 122.5° with respect to true north.[10] The fabric comprised dry-stone walls of rubble and megalithic blocks – the largest surviving megaliths, M22 and M45 weigh an estimated five or six tonnes (§4.6). As discussed below, the walls encompassed a series of floors, most likely arranged in a five-apse pattern, similar to nearby Ġgantija.

In Trenches C, D and E, areas of former walling were excavated in 2015. These strata consisted of a rather confusing series of mixed deposits, containing pockets of differently coloured soil. The temple walls were, however, rich in prestige finds, such as the obsidian arrowhead from (52) and the snail figurines found in Trench D (Figs. 11.6, 11.9). The question remains open as to whether these objects were deliberately placed within the temple walls when they were erected, as a form of votive offering perhaps, or whether they were incorporated later. A similar pattern of deposition was noted at Tarxien (Zammit diary entry Book 11, 27/8/15 and Notebook 13, 22/9/15 in west end of space 'T'; and in holes within a megalith, Zammit 1930, Pl. 9.4), which indicates that many objects, alongside feasting refuse, were routinely inserted between wall sections and around the stone edges of rooms.

4.5.2.2. Żebbuġ phase Foundation deposits

Perhaps the most remarkable series of structures unearthed at Santa Verna in 2015 were the band of yellow rendering (67), and the arrangement of thin



Figure 4.47. *Working shot of tiles (92) taken at the time of their discovery.*

polygonal shaped Globigerina 'tiles', Context (92), placed flat against the inner surface of the temple apse wall at foundation level (Fig. 4.35, Fig. 4.47). The rendering, presumably, once covered the entire inner wall of the temple in order to achieve a smooth wall surface and uniform aesthetic; fragmentary evidence of similar rendered walls have been noted for other Maltese temples, most notably at Ġgantija (Caruana 2015) and Kordin III (Chapter 6). Parallels can also be drawn with the Ħal Saflieni hypogeum, and the temples at Tarxien and Mnajdra, where it is evident that careful attention was given to the creation of smoothed wall surfaces by way of skilled masonry techniques. The survival of this feature at Santa Verna was because of the presence of a later floor, which sandwiched the render between itself and the lobe wall.

The limestone 'tiles' are difficult to interpret. They have no apparent structural function, nor does it seem that they were ever intended to be visible when the temple was built, since soon after they were placed into position, around 3700 cal. BC, they were covered by the foundation of a Żebbuġ phase floor (79). Their fabric (Globigerina Limestone) is interesting – this material is preferred for building throughout the Maltese islands, and is much more suited to fine working than the Coralline Limestone found immediately around Santa Verna. Few of the structural features at Santa Verna were made from Globigerina, except notably the threshold stone (57) and the stone bowl. Instead, it seems that the tiling at Santa Verna was a deliberate act, where particular building materials probably had important symbolic agency and were imbued with social meaning in Temple Period Malta (Tilley 2004). Beyond this, we cannot even speculate as to why this material was prepared, placed and buried so deliberately and with such care.

4.5.2.3. Phase I floors (Żebbuġ phase)

The primary floors at Santa Verna were comprised of a brown gritty fabric, cemented together, and built upon a foundation of medium-sized angular stones. In Trench E, the earliest floor consisted of (79) and its foundation (87), overlain by surface (80), a thin band of crushed Globigerina. These contexts constituted a Żebbuġ phase floor of the outer left-hand apse of the temple, providing a level surface at 141.48 m ASL, which is 1 cm lower than the later central passageway (§4.5.2.6, phase IV,).

In Trench D, in the section revealed by Trump's sounding [55], the primary floor (117) and its foundation (118), which constituted a level surface at 141.11 m ASL, was 37 cm lower than the primary floor in Trench E. This floor represents the outer right-hand apse.

In one of the 1911 sondages [54], located in the passageway between the two outer apses, no such early floor was noted. Therefore, the floor of the outer right-hand (northeastern) apse was originally somewhat lower than the rest of the building, a pattern which follows the natural slope, and subsequent floors in that apse were attempts to raise this level. As noted above, typical temple layout seems to favour a stepped sequence of spaces, with the deepest recess or room at the highest level. Other temple sites on the Maltese Islands show a similar construction of space (Stoddart *et al.* 1993; Malone 2007), notably at nearby Ġgantija, where division of space within individual apses is created by changing floor levels.

4.5.2.4. Phase II floor (Żebbuġ phase)

A secondary phase of the outer right-hand apse was represented by floor (114) and its foundation (115). This raised the level of the apse floor to 141.27 m ASL, or 21 cm lower than the primary floor in Trench E, and 22 cm lower than the central passageway. Aside from one residual Skorba sherd, all the pot sherds recovered from (115) were from the Żebbuġ phase, providing a strong indication that this modification happened during the Żebbuġ phase, although precisely when is difficult to establish.

4.5.2.5. Phase III floors (Żebbuġ phase)

Floor (114) was overlain with another, similar floor, Context (102); there were also hints that this was also present at the eastern edge of the temple floor and just visible in the sondage dug there during the 2015 excavations (Fig. 4.24). This floor raised the level of the outer right-hand apse to 141.29 m ASL. Highly fragmented pottery finds from this layer contained no identifiable sherds later than Żebbuġ.

4.5.2.6. Phase IV floors (Ġgantija phase)

The 2015 excavations at Santa Verna stopped at the level of surfaces {21} and {27} (except in the sondages discussed above), which represented the surfaces of Ġgantija phase *torba* floors. Therefore, it is for this phase of the temple's history that the excavations resolved the best understanding of contemporary structure, and the only phase where it was possible to provide a full reconstruction of how the temple was configured internally, as later phases were highly fragmentary and earlier ones largely unexcavated. The floors of this phase were represented by: layers (121) (surface {21}) in the central and right-hand inner apses and in the passageway that led to threshold (57); the threshold stone itself, Context (28) (surface {27}) in the outer right-hand apse and in the entrance passageway; and probably Context (65) in the outer left-hand apse. All of these layers contained sherds from the Ġgantija phase. Context (65) was, however, not directly linked to the others stratigraphically.

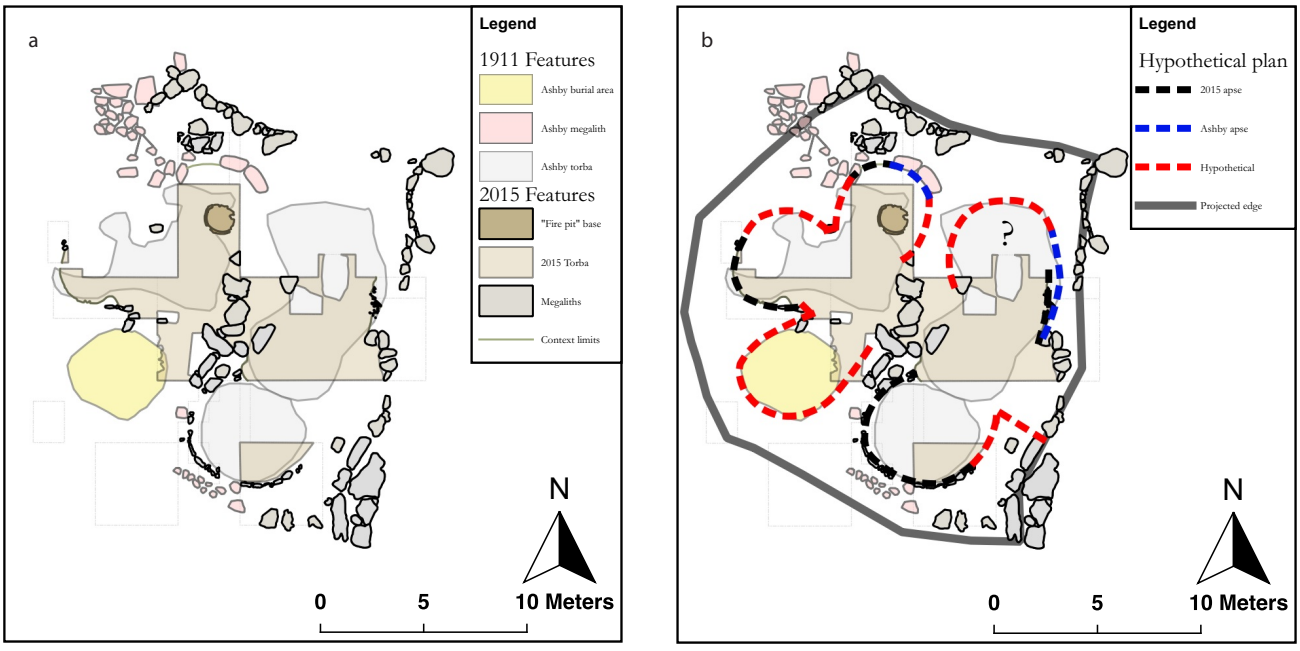


Figure 4.48. *Plan of Santa Verna showing: a) 2015 excavation features overlain on the 1911 excavation features; b) hypothetical layout of the five-apse temple at Santa Verna.*

The floors of the inner apses were laid at approximately 141.73 m ASL, whereas the central outer passage and the right-hand apse were at 141.49 m ASL – while the difference was taken up by the threshold stone which functioned as a step between the inner and outer parts of the temple. Floor (65) in the outer left-hand apse is somewhat higher, at 141.88 m ASL. Because there is no intervening floor between (65) and the primary Żebbuġ phase floor (79), it is not entirely certain that (65) belongs to this phase, although it seems likely.

Two similar radiocarbon dates on charred seeds that were embedded within one of the *torba* floors, Context (121), can be combined and modelled to estimate the earliest date that the floor was laid; between 3500 and 3350 cal. BC, which falls within a transitionary phase in Maltese prehistory, between the Żebbuġ, Mġarr and Ġgantija phases. The presence of Ġgantija pottery in associated contexts however points to the fact that the culture had become established on Gozo by the time the floors of this phase were constructed; on balance it seems likely that this did not occur until after 3450 cal. BC (Chapter 11). The dating evidence therefore signals that there was a considerable passage of time between the foundation of the temple and the placement of the Ġgantija floors – it is likely the building was already some 250 years old at this point.

In all parts of the temple we investigated, the floors were laid such that the outer 1 m of their circumference rose to meet the inner wall of the temple, so that the floor was bowl-shaped near its edge but otherwise flat and smooth, creating a similar curved profile to the Globigerina tiles in Trench E (§4.5.2.2), and recalling the aesthetics of the internal spaces of the Ħal Saflieni hypogeum. Where the *torba* floor butted extant megaliths (M58 and M72), its edges formed an upward lip, thereby demonstrating that floor was later than these megaliths. There was, however, evidence that at least one former megalith was later than the floor. A pit-like feature, Cut [110], appears to represent the location of a megalith that no longer survives, implying that the internal structure of the temple was re-arranged at some point after the floor was laid.

The outline of the floors and overall internal layout of the site could be reconstructed by interpolating between the 2015 excavation features and those recorded by Ashby *et al.* (1913) which no longer survive (Fig. 4.48b). The location of the central passage was established by the location of the threshold stone (57). The central passage was approximately 3 m long and 1.5 m wide and facilitated entry into the temple, between the outer megaliths of the temple facade (between M37 and M43), and access between the inner and outer parts of the temple. The entrance passageway opened to the southeast, and would have been illuminated brightly by the morning sun in midwinter.

The shape of the outer left-hand apse (i.e. left upon entry to the temple) was revealed clearly by the excavations in 2015. This apse was at a higher level

than the entrance passageway and was likely entered over a threshold of some kind, although any direct evidence for such structures was probably removed by previous excavation campaigns at the site. The 1911 excavations also uncovered elements of this apse wall, as well as expanses of *torba* floor, that likely related to a later phase of the site's use (Fig. 4.48a), but aided in reconstructing the internal boundaries of the temple. Opposite the outer left-hand apse, the outer right-hand apse was partly captured by Trench D, as was the western edge, which was defined by megalith M72. The northern edge of the outer right-hand apse was elusive; it could be in section in Trump's 1961 trench [55], but its extent northwards from this point remains unknown. The topography of the mound of stones covering the monument offers one clue; 3 m further and the floor would have emerged from the side of the stone heap. On Ashby *et al.*'s (1913) plan, a number of megaliths and expanses of *torba* are plotted some 1.5 m north of Trump's trench [55], and in the absence of any other indication, these seem like a natural limit for the extent of the floor (Fig. 4.48a–b).

The reconstruction of the layout of the inner apses was also aided by comparison between the 2015 and 1911 excavation records. The inner left-hand apse was not excavated in 2015, as it represented the location of the presumed medieval burials that, following the description of the 1911 excavation, seemed to be cut into a midden deposit that overlay a *torba* floor (Ashby *et al.* 1913, 110). Fragments of surviving *torba* floor deposit were planned around the burials in 1911, which also provides an indication of the overall scale and position of this apse. Although the location of the burials at Santa Verna is currently demarcated by a rectangular compound, the 1911 excavations recorded the burial area as a circular patch to the southwest of the site Figure 4.48a), the location and extent of which conforms to the position of a probable temple apse. Significantly, this suggests that the burials were placed within an area that was already defined by a megalithic wall, although no traces of this feature were uncovered.

The shape, size and orientation of the central apse can be extrapolated from the central passageway and the boundaries of the *torba* deposits recorded in the western extension of Trench D, which followed the floor of the inner central apse until it began to curve around its western lobe. Megalith M75 likely represents the corner stone between the central apse and the inner right-hand apse. Elements of the inner right-hand apse were more difficult to define with certainty, despite the fact that a large proportion of its surface area was opened in 2015. The location and curvature of Cut [75], and its associated megaliths, also relates to the location of megaliths that were planned in 1911 but no longer exist, enabling a confident identification of the inner right apse of the temple structure (Fig. 4.48a–b). The apse contained a 'fire pit', which was characterized by a rim of *torba* raised 2 cm above the level of the surrounding floor, and paler in colour (Fig. 4.32), near its northern edge. During the 1911 excavation, a very large amount of burnt material and animal bones was found in this part of the site (Ashby *et al.* 1913, 108–9).

Although the megalithic structure at Santa Verna is badly damaged and fragmentary, the floors of the temple are in an excellent state of preservation, buried only 30–80 cm below the modern ground surface. If

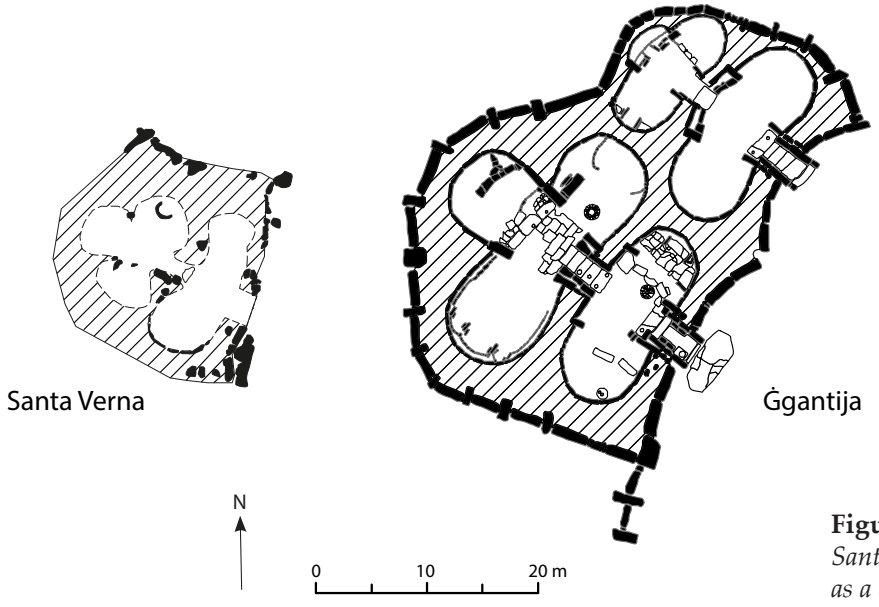


Figure 4.49. *Outline plan of the Santa Verna temple, with Ġgantija as a comparison.*

the extrapolations presented above are followed, what emerges is a remarkably well-resolved picture of a five-apsed temple (Fig. 4.48a). Indeed, in orientation, Santa Verna shares many characteristics with the south temple of Ġgantija, and is similar to the Ġgantija's north temple in overall scale (Fig. 4.49).

4.5.2.7. Phase V floors (Tarxien phase)

Later floors at Santa Verna were in a poor state of preservation compared with those of the previous phases. The floors were exposed and planned during the 1911 excavations at the site, and, during the 1961 excavations, the uppermost floors were dated to the Tarxien phase on the basis of pottery finds (Trump 1966, 19). By 2015, these floors had degraded to the state that well-preserved *torba*, matching the description of what Bradley (Ashby) and Trump had found was only found over a small area – *torba* Context (23) and its foundation (24)/(33) (§4.3.5.1). Although the foundation deposit was in essence similar to the foundation layers of earlier floors, consisting of a fill of medium-sized stones, the *torba* itself was of a very different character, since it was yellow in colour and of a plaster rather than earthen composition, albeit much more weathered. The extent of *torba* (23) generally matches the position and description of the *torba* found in 1911 in Ashby's *et al.*'s (1913) 'room' A. There, the *torba* covered an area measuring approximately 10 m north–south and 3 m east–west, over what the 2015 excavation has revealed to be the outer right-hand apse and entrance passageway. Finds of Tarxien pottery made in 2015 from the floor's foundation confirm Trump's chronology and provide a relative date for the Tarxien phase (Fig. 4.50).



Figure 4.50. *Tarxien phase sherds from (33), the foundation of the Phase V floor.*

In Trench E, this phase was represented by stone foundation (44) and slight traces of *torba* (47) – these presumably were the vestiges of Ashby *et al.*'s (1913) 'room' B, which covered an area matching exactly the apse lobe revealed by the 2015 sondage in Trench E and the keyhole investigation. The contemporaneity of floors (47) and (23), although not demonstrated directly by the stratigraphy, is suggested by their identical level at exactly 141.5 m ASL. A prehistoric date is inferred by the fact that floor (47) was superimposed directly upon those of earlier phases.

In reference to Ashby *et al.*'s (1913) plan, it seems feasible that other areas of similar *torba*, such as 'room C', and perhaps the arc of stones depicted between 'A' and 'B' also date to this phase (Fig. 4.51). No traces of these structures were found during the 2015 excavations; 'room' C was beyond the limit of excavation, and the arc of stones has now disappeared, presumably during the excavation of that part of the site in 1961. If these features did indeed date to the prehistoric period, the implication is that a rather dramatic remodelling of the southern edge temple occurred at some point, including an extension to the south of the main structure.

Bradley, writing in Ashby *et al.*'s report, described that, in room 'B', i.e. the outer right-hand apse, a sequence of two floors were present at the upper levels:

> Its upper floor is of white torba, but in this were set little flat fragments of limestone one inch across and under, forming a kind of parquet or mosaic. At present this stone work extends in the nature of a circular path (d-d) nearly around the room, the centre having probably been worn away or broken. The thickness of the upper torba is 1 ½ inch (4 cm), and below it, for a depth of from 2 to 3 inches (5–8 cm) there is hard compact soil as in A. Under this there runs a second torba, yellow and red, 1 ½ inches (4 cm.) in depth, followed by a compact soil for 2 inches (5 cm). This is set upon loose stones of fairly uniform size evidently selected for the purpose (Ashby *et al*. 1913, 108).

It seems, therefore, that the superficial floor was a unique kind of tiling set in *torba*. Other 'rooms' encountered during the 1911 excavations, in the inner part of the temple, are also likely to be part of this phase. The evidence for any of these features in the inner part of the temple in the 2015 excavations was extremely limited indeed, consisting only of a faint and disturbed patch of yellow *torba*, Context (35). Given Ashby *et al.*'s (1913, 108–9) description of a large quantity of midden

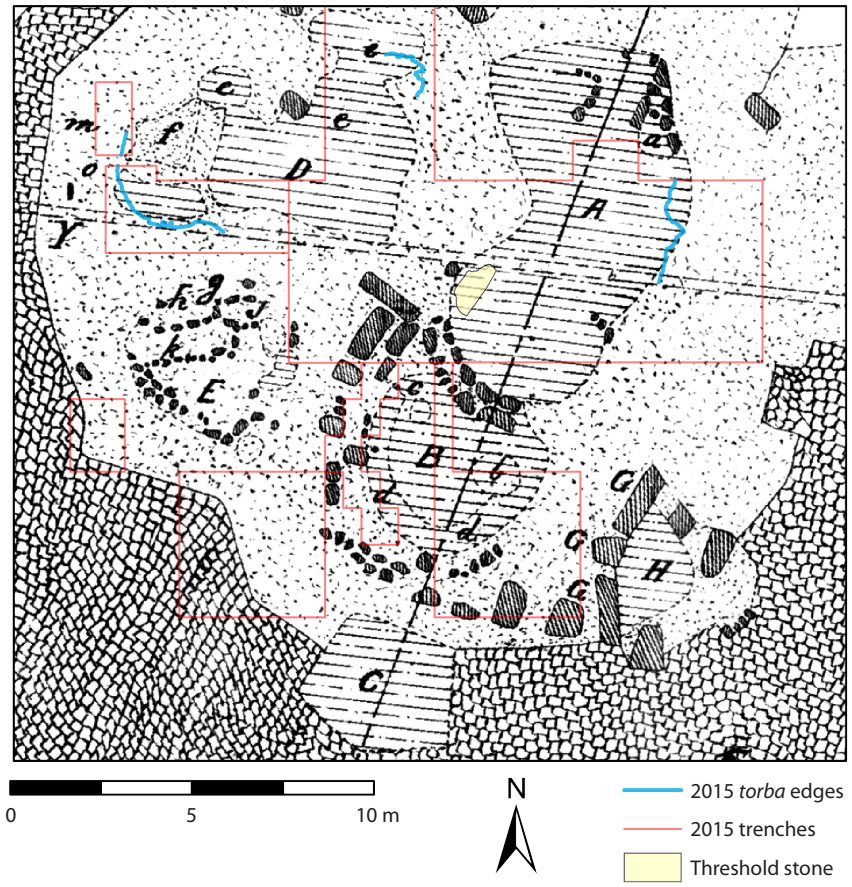


Figure 4.51. *Extract from Ashby* et al.*'s (1913) plan, overlaid with the excavation results.*

material unearthed in this area, it seems likely that the upper levels in the inner temple were completely excavated in 1911. The descriptions and photographs of the material culture found during the 1911 excavations also suggest that the most complete and frequently encountered material was Tarxien phase in date (Fig. 4.52). Aside from the context discussed above, it is, therefore, unlikely that much stratigraphically intact deposit from this phase survives at Santa Verna. That said, the removal of these layers in 1911 offered the 2015 excavations a view of the Ġgantija phase floors that lay beneath, and these have now been preserved *in situ*.

4.5.3. Destruction and collapse of the temple

One of the more puzzling aspects of the megalithic remains at Santa Verna is the absence of significant qualities of rubble and collapse from the walls of the monument. Extending the comparison between Santa Verna and Ġgantija to its logical conclusion, many thousands of tonnes of large stones must once have been heaped on the site, probably together with numerous non-structural items from within the temple. These have long since disappeared – perhaps now forming part of the many terraces and boundary walls that surround the former temple. It seems plausible that the destruction of Santa Verna, unlike most other well-known Maltese megaliths, occurred during antiquity, where agricultural activity over subsequent centuries cleared the debris from the site.

The most obvious signal of destruction and re-use found at Santa Verna in 2015 was the alignment of large stones, Context (59), which formed a low wall running diagonally across the centre of the former temple. This feature is undated – the plain window glass fragments found under the stones suggest a recent date, although these could have been pushed under the edge of *in situ* stones at a later time. Photographs held in the archives of the British School at Rome demonstrate that they were in their present form in 1911 (Fig. 4.27). Complete removal of some of the stones would be required to establish their date with a greater degree of certainty. Further direct evidence for the destruction of the temple walls was found in the form of deposits of intermixed soils positioned approximately where internal or external walls would be expected, which presumably formed within voids, but not in consistent or coherent patterns. One of these fills, Context (98), contained Middle Bronze Age Borġ in-Nadur phase pottery, supporting the view that destruction began in antiquity. It is even possible that Santa Verna was

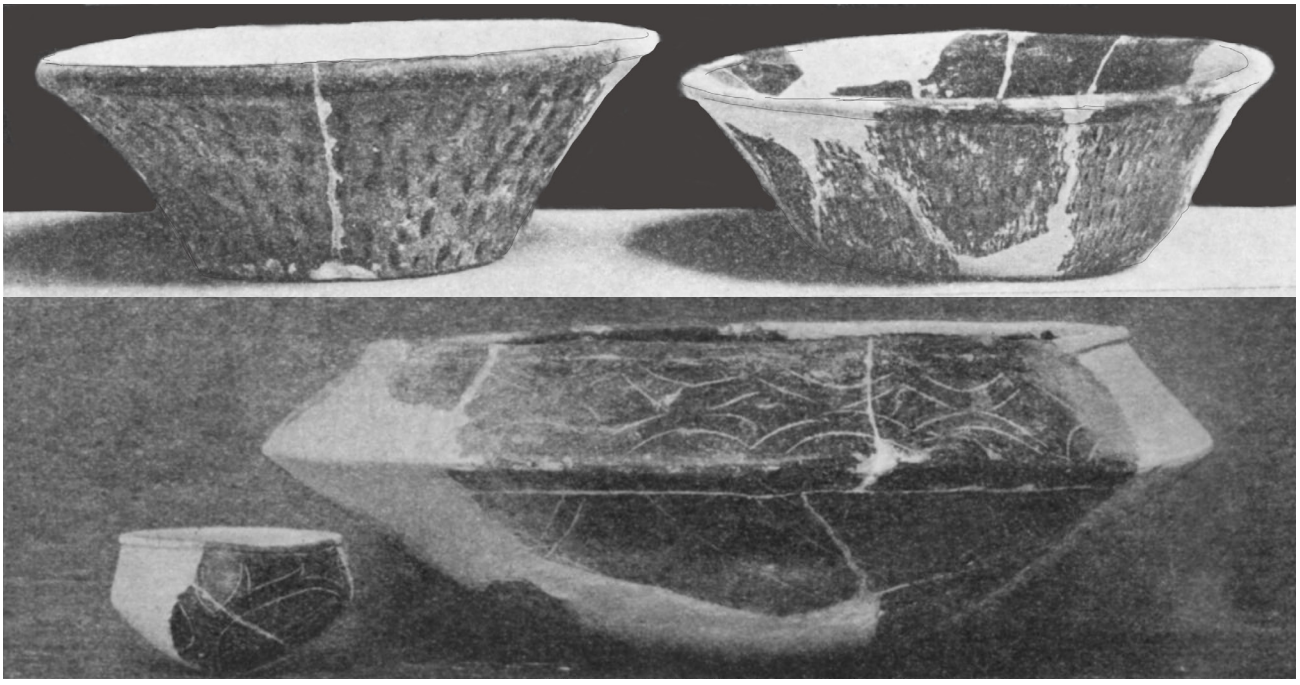


Figure 4.52. *Tarxien phase pottery from Santa Verna found in 1911 (from Ashby* et al. *1913, Figs. 23 and 24).*

abandoned during the latter part of the Tarxien phase, thereby establishing a different fate for the site, when compared better-preserved and famous structures like Ġgantija, Mnajdra and Ħaġar Qim. The nearby Xagħra Brochtorff Circle contained numerous finely worked reused Globigerina megaliths – some of which were possibly installed in their final position in the burial site during the last few generations of the Tarxien phase, after 2500 cal. BC (Volume 3 ; Malone *et al.* 2019). These included a massive stone bowl, finely pitted and red-ochre painted screen slabs and a variety of upright stones with notches and holes, as well as a 'porthole' slab. One plausible model is that these megaliths were originally architectural elements from Santa Verna, which were then moved to the Circle as part of the changing patterns of behaviour and belief during the final years of the Maltese megalithic tradition.

4.5.4. Evidence of Punic, Roman and Arab phases

The continuity of human presence at Santa Verna is demonstrated by the occurrence of later pottery styles within the topsoil and backfill contexts at the site. This material awaits specialist attention, which will aim to identify any significant spatial or temporal patterns in the assemblage. Roman pot found within packing material in the megalithic wall (Context (60)) is clearly intrusive material, but could signal Roman period destruction,[11] as part of a phase of wider landscape change and reoccupation of prehistoric sites on Gozo, such as the Roman period channels and pits at Taċ-Ċawla (Malone *et al.* 2009; see Chapter 3).

4.5.5. The medieval chapel of Santa Verna

Ecclesiastic re-use of prehistoric sites is not without precedent in Malta; at Tas-Silġ for example, Christian churches were built at various periods from the late fourth century onwards (Cagiano de Azevedo 1975). The existence of a chapel at Santa Verna is recorded in local tradition, but whatever walls once stood have now entirely vanished. It is possible that they were still partially extant when the site was excavated in 1911, as the excavation report describes 'walls' in various places, especially in the northwestern, inner part of the site. The heap of stones that covers much of the site includes, especially in the northwest corner, a number of dressed Globigerina Limestone blocks; perhaps rubble from a former wall. One large wrought Globigerina block that was recovered from backfill in Trench D featured a series of regular key marks for plaster or render on one of its faces (Fig. 4.53). The block was unlike any of the fabric known from the prehistoric temple phases, and therefore may have originated from the chapel.

The limited assemblage of human bone recovered from backfill contexts presumably dates to the site's use during medieval times (or later) as a cemetery. According to the 1911 excavation report (Ashby *et al.* 1913, 110), the male skeleton

> . . . lies for the most part on a *torba* floor, but in parts upon the underlying loose stones . . . The feet rest against a rubbish heap, which appears to have been dug into for the purpose of burial . . . it would appear, therefore, that the burials were made in the rubbish heap, which was dug into the level of the *torba*, and even through it.

This implies that the burials were cut into prehistoric deposits, and the east–west orientation of the skeletons, and their extended position, all point towards inhumation under a Christian burial rite. The burials were not disturbed during the 2015 excavations; any human remains that were found during the course of the 2015 excavations had already been disturbed. A human tooth from a relatively young adult (a left maxillary second molar) was found in backfill (19) near the northern end of Trench D, approximately 2–3 m from the burial mound. The roots of this tooth were AMS radiocarbon dated to AD 1220 to 1278 (UBA-37690, 774±26 BP). Presuming that the tooth was originally associated with the adjacent burials, this date provides strong evidence that the cemetery was in-use during the thirteenth century AD.

The thirteenth century AD was an interesting period in Gozo's past. During this time, probably in 1224, the Holy Roman Emperor Fredrick II expelled many Muslims from the Maltese Islands, and attempted to colonize the islands from Italy (Luttrell 1975, 36–40). By 1241, Gozo was home to some 203 Christian families (Luttrell 1975, 36–40). The new AMS date indicates that at least one of these families used the ruins of Santa Verna as their burial ground. Unbeknownst to them, they were rehearsing an ancient pattern, where the Santa Verna site, lying at the centre of Gozo, was chosen as a place of reverence and ritual by a new wave of immigrants staking their claim on a venerable monument to the island's long history.

It seems plausible that this medieval phase of activity at the site continued until at least the fifteenth century, given that a charred pea found in Context (87) proved to be an intrusive item dating between AD 1410 and 1460 (UBA-31040, 468±29 BP). Aside from these chance finds, no other clear archaeological signal of the Santa Verna chapel came to light during the 2015 excavations.

4.5.6. Previous excavation campaigns at the site

The 2015 excavations demonstrated that much of the site had already been cleared to the level of the Ġgantija phase floor represented by surface {21}, then subsequently backfilled. The two sondages dating to the 1911 excavation campaign, and two from 1961, were



Figure 4.53. *Working photographs showing the discovery of a Globigerina Limestone slab in backfill, perhaps a fragment of the Santa Verna chapel.*

re-excavated, thereby allowing for the sampling of the underlying stratigraphy. This approach is a useful model for gaining a maximum of information without causing significant disturbance to intact archaeological layers.

4.6. The megalithic survey

Although existing plans of Santa Verna are reasonably accurate (Ashby *et al.* 1913; Evans 1971), they show a large amount of extraneous information that makes understanding the layout of the temple difficult. To address this problem a new plan of the site was drawn, focusing on *in situ* stones that were clearly part of the temple structure. These megaliths were numbered (M1 to M75) and, for each stone, their dimensions, orientation and general condition were recorded in a database. Some observations about the stones themselves can be made using these data, particularly how the more massive members were placed at regular intervals around the temple. This placement presumably corresponds to bearing points, where much of the weight of the temple's walls and roof were concentrated (Fig. 4.54).

A close inspection of the megaliths and how they were placed with respect to each other reveals aspects of ancient building techniques. Each megalith in the temple's foundations was cantilevered against an adjacent stone on its right-hand-side, thereby transferring some of its weight sideways (Fig. 4.55). Presumably, this was done to provide a stable basis for building. A small sondage dug around the base of megalith 53 in Trench E did not reveal any specific, buried foundation deposit,[12] nor any indication of a cut feature. The temple was therefore built directly on the ground surface, with its structural integrity dependent upon how the stones loaded and supported each other. This observation also implies that the foundation courses of the temple were built in an anti-clockwise sequence, perhaps starting and finishing at the entrance.[13]

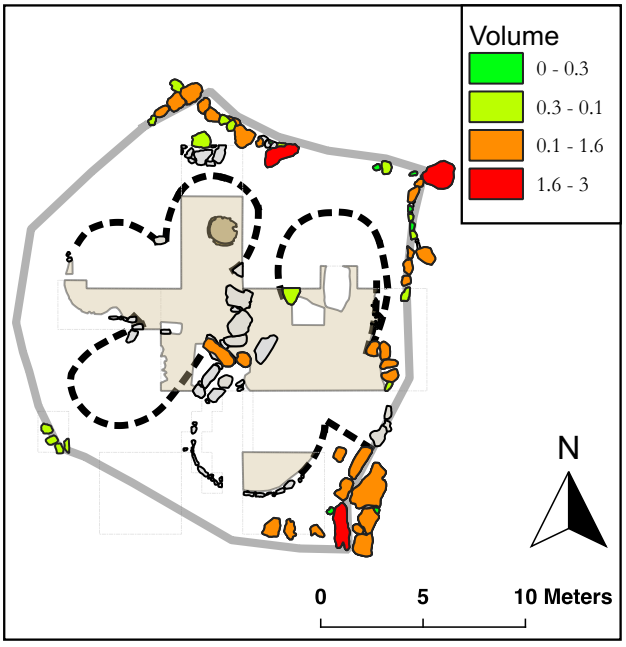


Figure 4.54. *Schematic plan showing megaliths categorized by volume in cubic metres.*

4.7. Summary and conclusions

The 2015 fieldwork at Santa Verna represented the first major excavation of pre-Temple Period and early Temple Period archaeological remains on the Maltese Islands for almost 50 years, shedding important light on the early human occupation and subsequent development of megalithic architecture on the Maltese Islands. The discovery of the sixth millennium BC Early Neolithic structure confirms Trump's (1966) model of village to ritual monumentalization, first identified by his landmark excavations at Skorba temple. This has major implications for our understanding the chronology and continuity of the Maltese prehistoric

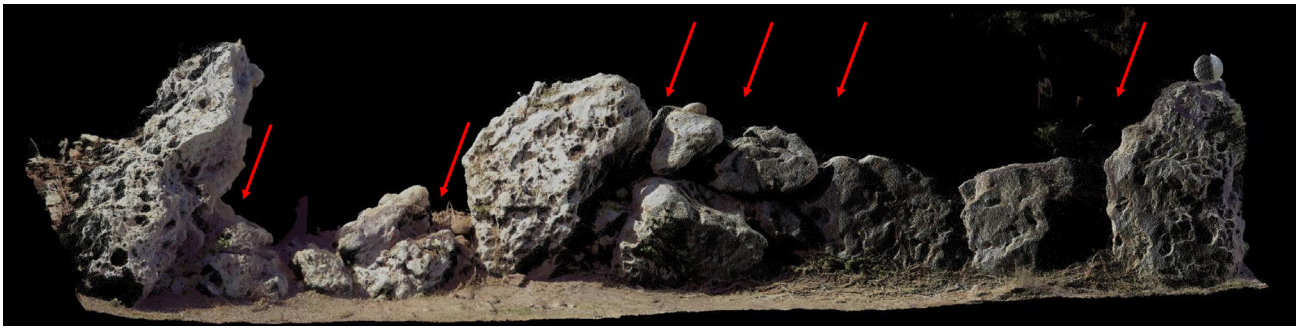


Figure 4.55. *Extract from a digital laser scan of the northern edge of the Santa Verna temple, showing how the stones were placed overlapping adjacent members.*

Table 4.4. *Santa Verna and the* FRAGSUS *questions.*

***FRAGSUS* questions**	**Santa Verna**
1a. What was the impact of human settlement on Malta?	Chronology – Santa Verna demonstrated earliest dates for Neolithic Malta. Economy – stratified and dated plant and animal remains. Neolithic hiatus demonstrated by dating. Soil change.
1b. How rapid was the process of deforestation, erosion and degradation?	Buried soils reveal landscape history. Abandonment of Santa Verna temple, *c.* 3000 BC.
1c. When did technical mechanisms to manage the environment develop – such as terracing, water and food storage?	
1d. Were such mechanisms in place before or after the Temple Culture collapsed?	Chronological sequence implies early settlement, with almost continuous use of the area over millennia.
2a. How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this?	Intensification in one place evident at Santa Verna. Elaborate architecture/investment shown by the temple structure and successive floors.
2b. Were the monumental temples instrumental in the process of sustaining cultural life?	Temple evolution from small to large, over time demonstrated at Santa Verna. Large stone pot for feasting, ample pottery remains at all periods conforms with the feasting and food models for temples.
3a. What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable?	Mixed cereals and pulses cultivated. Animal husbandry, probable milk production.
3b. Were there failures in the food supply?	This is not easy to tell at Santa Verna.
3c. What impact did diet, disease and stress have on the population?	
4a. What was the size and nature of the early Maltese population?	
4b. What role did demographic connectivity (immigration) play in maintaining island sustainability?	Imported chert and obsidian, hardstone axe present at Santa Verna. Stentinello pottery with strong Sicilian-Calabrian links at Santa Verna. Stock and plants initially imported from elsewhere.
5a. Was there social-economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically?	Soils buried under monuments reveal earlier environment exploited by first settlers. Early settlement not replaced, it seems, by later Neolithic or Bronze Age activity in that location. Water may have failed.
5b. Was there a hiatus between the Temple Culture and later Bronze Age settlers?	Yes, this is demonstrated through cultural levels, early to later Neolithic monument stages, AMS dates provide new chronology.
5c. Are other hiatuses apparent in the sequence, such as between the earlier Neolithic and the Temple Period?	Hiatus breaks are demonstrated between the earlier and later Neolithic phases at Santa Verna, with its clearly demarcated dates. A later hiatus between the Temple Period and the Bronze Age is not evident at the site.

sequence, by showing a substantial break in Trump's original sequence, that he only identified as a break in the material culture. The 2015 excavations also demonstrated the importance of returning to old excavations and excavation archives. By combining stratigraphic and spatial features which were recorded in the 1911 and 1961 excavations, the 2015 fieldwork was able to establish that Santa Verna was a large five-apsed temple structure that held several architectural and structure parallels with Ġgantija, and that the site was in use throughout the Temple Period. The extensive excavations identified at least five phases of remodelling at Santa Verna, starting with the creation of a three-apsed temple structure during the Żebbuġ phase *c.* 3700 cal. BC. Perhaps most significant, the series of 23 radiocarbon dates from Santa Verna, constituting

the largest number of radiocarbon dates retrieved from a Maltese temple, established the first onset of megalithic architecture on the Maltese Islands. When brought together, the results of the 2015 fieldwork have highlighted that the once obscure site of Santa Verna would have been a prominent and important component of a larger megalithic landscape that incorporated the Xagħra Brochtorff Circle and Ġgantija Temple, and other megalithic structures on the Xagħra plateau (cf. Grima *et al*. 2009) (Table 4.4).

Notes

1. The arguably misleading term 'temple' is used uncritically in this work report and volume title to refer to the megalithic buildings of prehistoric Malta built and used between approximately 4000 and 2400 BC.
2. *FRAGSUS*: Fragility and sustainability in restricted island environments: Adaptation, cultural change and collapse in prehistory. A collaborative programme of research between Queen's University Belfast, Heritage Malta, Cambridge University, the University of Malta and the Superintendence of Cultural Heritage, Malta. European Research Council seventh framework programme (FP7) 'Ideas' Advanced Grant: 323727. Principal Investigator: Professor Caroline Malone http://www.qub.ac.uk/sites/FRAGSUS/
3. Attard Tabone (1999) suggests that this document was a version of Padre Pelagio's late eighteenth-century study of the Gozo parishes copied by the parish priest Don Francesco Buttigieg perhaps in the 1820s; numerous other copies exist (e.g. see Evans 1971, 182–3); an original is kept in the Mdina Cathedral Archives (MCA Misc. 55, f.144v).
4. Trump's report that excavations were carried out in 1908 by Peet and Ashby (Trump 1972, 158, and subsequent editions), which is occasionally cited, is presumably mistaken; the first documented campaign was in 1911, although Ashby did visit Malta in 1907 (British School Annual Report 1913–1914: 5; Hodges 2000, 44).
5. Ugolini (1934, chapter 8) drew parallels between Houël's depiction of this building and the plan of the Anaktoron in Sicily.
6. In the descriptions of contexts that follows, layers, fills and structural contexts are denoted in parentheses ( ), cut features in square brackets [ ], and surfaces in curly brackets { }.
7. All contexts were numbered separately. In this report, layers, fills and structural contexts are denoted in parentheses ( ) whereas 'cut' contexts are denoted by square brackets [ ], and surfaces by curly brackets { }.
8. Both arrowheads from Ġgantija were found under a mound of rubble by the entrance to the north temple, in a palaeosol described as 'dark grey earth and ashes' containing 'numerous Neolithic sherds, chert and obsidian flakes, and small pieces of organic matter' (M.A.R. 1936–7, vi–x quoted in Evans 1971, 173). Other hollow-based arrowheads from the Maltese islands are a chert example from Kordin I (Ashby *et al*. 1913, 20) and an obsidian example from Tarxien (Evans 1971, 64). All these examples have much more prominent barbs than the arrowhead from Santa Verna (Evans 1971, Plate 68).
9. Fabaceae cf. *Medicago/Melilotus/Trifolium* UBA-31036, $F^{14}C=1.0596\pm0.0037$; AD 1957 or 2006–8.
10. Calculated using a straight line subtended through the centre of the temple on the UTM grid (122.053°) corrected for grid convergence (+0.435°). This is almost certainly a winter solstice sunrise alignment; see also Barratt (2018) for an extended discussion of this alignment at Ġgantija
11. As an aside, there is a local tradition that the Santa Verna temple was built by the Romans (Veen 1990, 27).
12. Under the megalith was a blackish brown silt loam, Context (70), and very similar to many of the other deposits in the trench.
13. Tiomoid Foley undertook a survey of the remaining megaliths at Santa Verna as part of his MSc. (Archaeology, QUB) and the report appears in part as Appendix A4.6.

Chapter 5

Ġgantija

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Jeremy Bennett, Eóin W. Parkinson, Rowan McLaughlin,
Simon Stoddart & Caroline Malone

5.1. Introduction

This chapter presents the results of archaeological investigations at Ġgantija temples in 2014 and 2015 conducted as part of the *FRAGSUS Project*.[1] The site had been a focus of field research in the preceding Cambridge Gozo Project and Survey, and it had demonstrated the potential to contain important data that could address the specific questions of the *FRAGSUS Project*. Ġgantija is inscribed on the World Heritage List and any proposed interventions that could disturb, destroy or damage the site are not permitted. The *Project*, however, was granted permission to explore a number of limited areas that were sufficiently exposed or peripheral to the main site, and which could contribute to knowledge. In this context, the most extensive fieldwork at Ġgantija was conducted unexpectedly as a result of the demolition of the 1950s–60s Custodian's office and WC block. These structures were placed on the eastern edge of the open terrace that forms a forecourt to the temple complex. The removal of the concrete and limestone block structures involved the exposure of substantial concrete foundations, that in turn exposed intact archaeological deposits still *in situ*. The WC trench (as it was called) formed the focus of survey and section recording in 2014, and later, excavation in 2015. Geophysical survey in the olive grove to the northeast of the site also enabled a small trench to be excavated to test anomalies. Excavations in two further locations found evidence for additional megalithic structures surrounding the southern aspect of the site, and provided important insights into the nature of the environs of the main temple structure. The work presented an important opportunity to retrieve samples for absolute dating, geoarchaeological, plant and zooarchaeological studies. Here we present details of the results of the 2014 and 2015 survey and excavations, with descriptions of the stratigraphy, structural features, the main finds, and their interpretation within the context of Temple Period Malta.

5.2. Location and physical setting of the site

The site of Ġgantija lies on the southeastern slope of the Xagħra plateau at an altitude of 127 m (Fig. 5.1), with extensive views of the Ramla Valley and the mesa plateau of In-Nuffara, the location of a fortified Bronze Age settlement (see Chapter 8). The site is dominated by the imposing remains of two adjoining megalithic 'temples' surrounded by an enclosing wall, built almost exclusively of rough Coralline Limestone blocks, some of immense size, that today are partly supported by temporary scaffolding to ensure the rather unstable structure remains in place. The concave-shaped facade of the twin temple structure is fronted by an artificial raised terrace, which appears to post-date the megalithic temples' construction (Evans 1971, 179). Ġgantija forms part of a larger prehistoric landscape that extends across the Xagħra plateau, but is now largely engulfed by the modern village of Xagħra. Ġgantija lies 390 m from the Xagħra Brochtorff Circle burial caves (Malone *et al.* 2009), and approximately 953 m from the megalithic site of Santa Verna (McLaughlin *et al.* 2019, Chapter 4, this volume). Ġgantija is located on Upper Coralline Limestone, directly above an extensive area of Blue Clay that forms the slope to the south of the temple, and in turn, above layers of Globigerina Limestone. A natural, and perpetually flowing spring line emerges from a geological fault that runs beneath the temple complex directly below the terrace of the temple forecourt, and today has a steady water supply (Ruffell *et al.* 2018). It seems likely that this location was always well supplied with water. The site today is situated in a heavily terraced area on L-Inglin soils, which belong to the Mediterranean *terra rossa* (Lang 1960). Below the temple, the soils of the Ramla valley are primarily composed of silty clay vertisols on the Blue Clay substrate, which have very low amounts of humic material (Volume 1, Chapter 5). The site is

located at grid reference UTM 33S 434635E 3988925N (or 36.047° N, 14.269° E on the WGS84 datum).

5.3. History of the site

While the first written account of Ġgantija did not appear until the seventeenth century, a rich local folklore was associated with the site. In the early twentieth century, Fr Emmanuel Magri, a local Jesuit priest and noted antiquarian, collected and collated a comprehensive record of Maltese and Gozitan folklore, detailing stories that had been handed down in oral tradition (see Vella *et al.* 2013 for a comprehensive account of the history; Fig. 1.15). Local mythology held that the colossal stones used in the construction of Ġgantija were brought to the site by a giantess called Sunsuna, who carried the enormous stones from the Ta' Ċenċ plateau, over 3 km away (Bonanno 2010). The first written account of Ġgantija appeared in Giaovanni Francesco Abela's (1647) *Della descrittione di Malta isola nel mare Siciliano: con le sue antichità, ed altre notizie*, where he suggested that the massive megalithic structures on the Maltese islands were the product of a race of giants (Abela 1647, 145). Despite the mythological



Figure 5.1. *Location map of Ġgantija.*

connections, Abela referred to the site as *El Eeyun* (the Springs), an allusion to the spring located at the base of the valley, and it was not until the late eighteenth century that the more familiar *Torre tal Sgigant* (Giants Tower) was recorded in the literature (Ciantar 1772, 341; see Stroud 2013 for a general account).

At the end of the eighteenth century, a local Maltese nobleman, Giovanni Battista Cassar Desain, drew up an innovative piece of legislation designed to protect Ġgantija and its surrounding landscape from alteration or damage (Bugeja 2011). The 1776 document allowed a local man, Paulo Buhagiar from Xagħra, to farm the surrounding lands on the provision that he was not to remove or damage any of the stones from the temple or the surrounding vicinity, thus ensuring the site's preservation. As well as protecting the site, Cassar Desain also inadvertently provided an early account of the temple and the contemporary landscape, detailing a number of features including the caves and the nearby spring. The first detailed account of Ġgantija was written by Jean Hoüel (1787), who provided a description and plan of the site in his *Voyage pittoresque des isles de Sicile, de Lipari et de Malte.* The plan, labelled 'la tour des géants' – the giant's tower – shows an overview of the Xagħra Brochtorff Circle and another monument which likely illustrates the south temple at Ġgantija (Fig. 5.2).

Ġgantija was the first of the Maltese temples to be recorded during clearance of the overlying stone collapse and deposit, when Colonel John Otto Bayer,[2] then the Lieutenant Governor of Gozo, removed stone debris from the site between about 1820 and 1822 at his own expense, before turning his attention to the Xagħra Brochtorff Circle burial close by (see Volume 3). The clearance of the monument was crude by modern archaeological standards – there were no records and only a small number of artefacts were kept, illustrations of which were published by Lacroix (1848) (Fig. 5.3). According to Captain William Smyth (1829), Col. Bayer had intended to submit a detailed description of the site, but he died suddenly in London in 1826 and his notes were never found. Later that year, however, an account of the clearance was produced by Luigi Mazzara (1827), who published a description of the clearance and a number of illustrations of the newly revealed site, under the title *Temple antediluvian des Géants*. The illustrations were widely copied by other artists and Ġgantija soon became a focal point throughout the nineteenth century for artists and Grand Tourists alike (see Vella *et al*. 2013 for examples).

One of the most prolific artists associated with Ġgantija is Charles de Brocktorff, who was commissioned by the Duke of Buckingham during the early

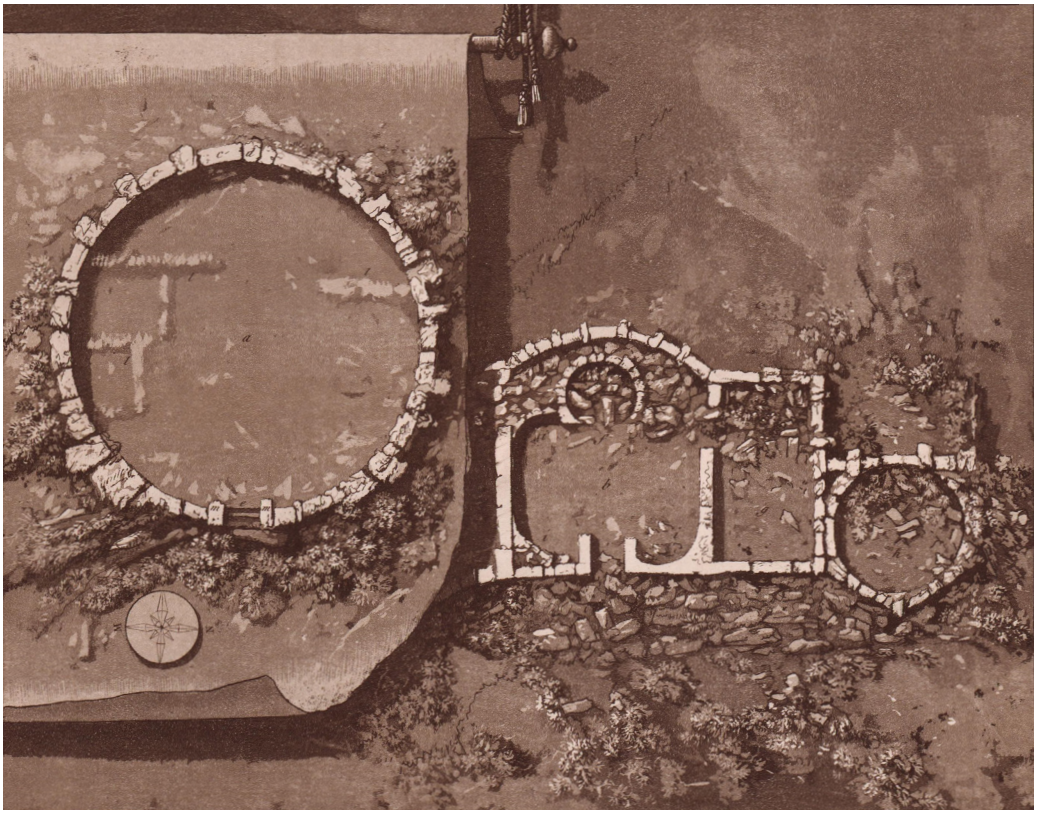


Figure 5.2 *(left). Engraving from Hoüel's (1787) engraving showing plans of the Xaghra Brochtorff Circle (left) and Ġgantija Temples (right). (Private Collection, courtesy of John Cremona).*

nineteenth century to illustrate his travel diaries (Grima 2004a). Brocktorff produced numerous detailed watercolours of Ġgantija and the nearby Circle, constituting a valuable record of Ġgantija shortly after Bayer's clearance (Grima 2004; Trump 2013). Many of the structures and features portrayed by de Brocktorff have been destroyed, eroded or buried over the succeeding years, making his drawings and inked sketches a valuable archive. While the majority of his illustrations show the main temples at Ġgantija, de Brocktorff is one of the few artists to depict the now buried trilithon structure in front of the temple (Fig. 5.4), which is of particular relevance to the 2014 and 2015 excavations. The print shows the remains of a terraced platform and sloping wall leading up to a trilithon structure, which appears to lead into the forecourt area in front of the temples. The same structure was described by Alberto La Marmora (1836, 4–5) and was also depicted in a set of engravings by Captain William Smyth (1829), who published an important



Figure 5.3 *(right). Lacroix's illustrations of the more notable artefacts kept by Bayer after his clearance of Ġgantija. (Private Collection, courtesy of John Cremona).*



Figure 5.4. *The trilithon structure and retaining wall as depicted by de Brocktorff (1820s), with the terrace wall behind the trilithon structure in the foreground (National Library of Malta).*

series of steel engravings in *Archaeologia* XXII. One of the plates shows a wider, landscape view of the Xagħra plateau as viewed from the south. In the foreground of the engraving, Ġgantija can be observed with the forecourt wall extending to the left of the image (Fig. 5.5). The exact nature of this enigmatic structure has never been resolved fully. The trilithon has generally been interpreted as an entrance-way into the temple, although it is unclear from these images if the trilithon led into the forecourt of the temples or, as one account has suggested, into an underground chamber beneath the forecourt (Trump 2013, 130).

5.3.1. Museum Department excavations

After the initial flurry of interest generated by the clearance of the temples, the site lay exposed for almost a century, during which time its condition deteriorated, especially the interior fittings that were carved from the softer Globigerina Limestone. The site was eventually appropriated by the Maltese Government in 1933 and a number of trial excavations were carried out by Museum Department of Malta, under the directorship of Sir Themistocles Zammit (Museum Annual Report, 1934). Excavations took place under the threshold of the South Temple and in the surrounding fields, alongside an investigation of the nearby cave site of Għar ta' Għejżu, located *c.* 183 m to the west of Ġgantija. The 1933 excavations uncovered megaliths that formed part of the boundary of the temple forecourt and traces of *torba* floors, and also uncovered foundation deposits under the threshold stone alongside a cache of marine shells within a ceramic bowl. Additional trenches in the fields surrounding the site yielded quantities of pottery.

Further excavations in 1936 and 1937 exposed the foundations of the outer wall of the temples, so the megaliths could be viewed in their entirety, and extensive restoration work was undertaken in the North Temple (Evans 1971; Museum Annual Report 1937). Following a hiatus during WWII, excavation

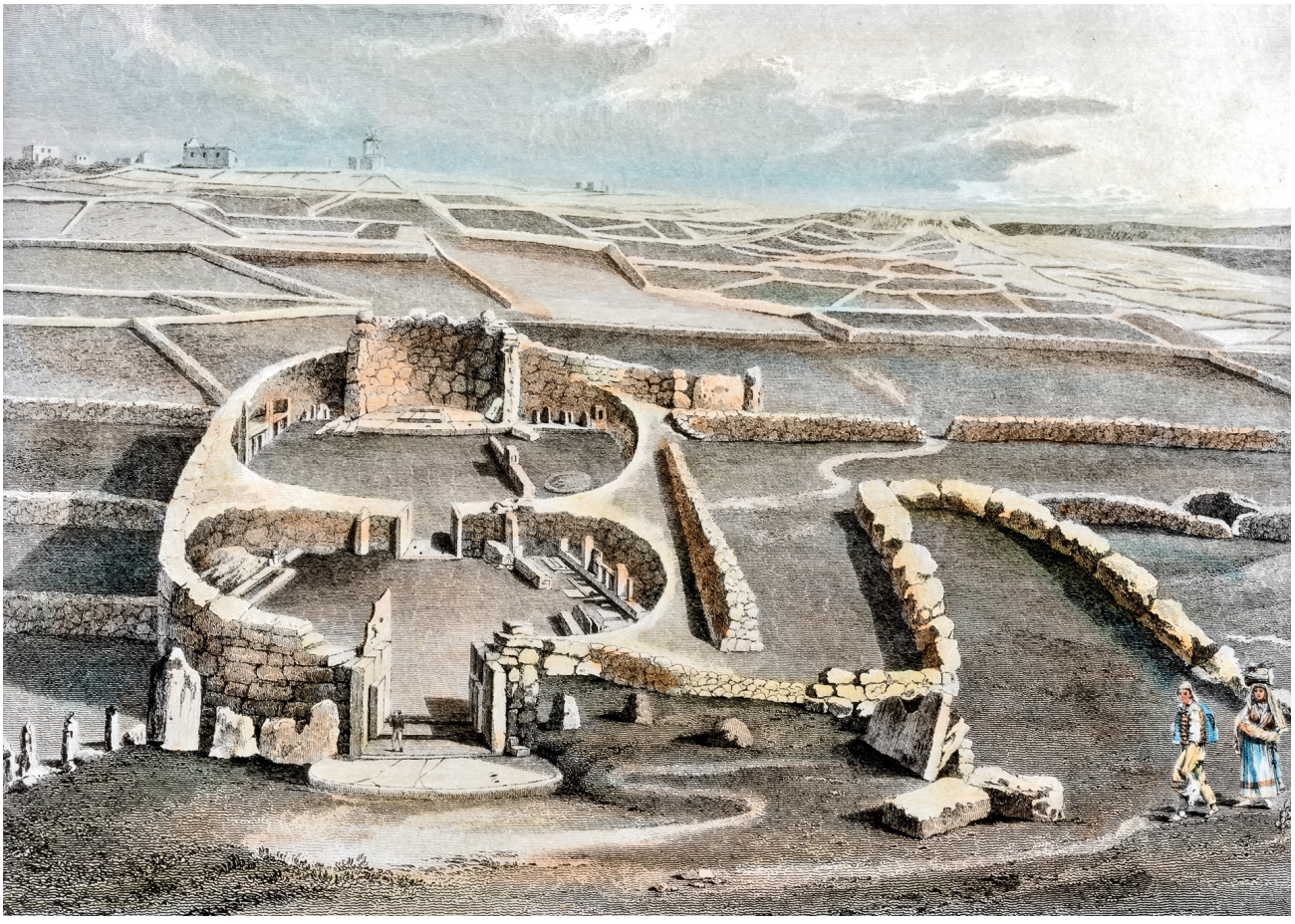


Figure 5.5. *Detail of the engraving by Smyth (1829), showing the Ġgantija temples. Ta' Kola windmill is also illustrated, top left. (John Cremona Collection, originally published by the Society of Antiquaries of London).*

work resumed under Evans in the 1950s. As with the previous campaigns, the majority of the excavations focused on the main temples, but Evans also examined the platform and retaining wall in front of the temples. Evans found that the terrace was constructed of large boulders piled on top of each other, with smaller stones placed on top and between to stabilize the structure (1954, 1971). The retaining wall was comprised of megaliths, some of which were still standing, while others appear to have collapsed or been broken. Material evidence from the earth packing found between the stones indicated that the platform and wall post-dated the original construction of the temples, as large quantities of Tarxien phase, and occasional Tarxien Cemetery phase, pottery was found (Evans 1971, 180–1). Evans (1971) also noted the presence of a thick layer of buried soil beneath the stone structure, which contained much Tarxien pottery, but did not elaborate on the significance of this deposit. Later works undertaken from 1957 to 1959 rebuilt and consolidated the western end of the terrace and added a boundary to the site, but no further excavation of the platform or the retaining wall was conducted.

5.4. 2014 survey and excavations

An extensive campaign of geophysical survey was conducted in the environs around Ġgantija between 3 and 10 April 2014, in order to identify potential areas of archaeological interest. The results identified a number of anomalies with archaeological potential. One area of interest was revealed as a result of recent measures to improve the presentation of the temple and involved the removal of the 1959-60 custodian's office and WC block from the eastern edge of the terrace in front of the temples. The removal of substantial concrete and blockwork foundations revealed a preserved section of archaeological deposits, including a buried land surface. Another area was identified in

the forecourt where one of the decorative palm trees was to be removed, and in the process likely to expose the terrace makeup deposits. An additional investigation was directed to the west side of the forecourt, in an area previously cleared of overburden where the megalithic facade wall extended to the edge of the terrace. This location had the potential to explore the terrace makeup and possible buried land-surface from the side, thus minimizing disturbance of the deposits or structures. Buried land surfaces were of particular significance for the *FRAGSUS Project* questions since they provided an important opportunity to examine any surviving palaeosols buried beneath the forecourt of the monument.

5.4.1. Methodology

The geophysical survey of Ġgantija employed ground-penetrating radar (GPR), resistivity and magnetometry to locate potential areas of archaeological interest in the area around the temple. While the GPR and resistivity results were informative, the magnetometry failed to produce any meaningful results.

Independent of the geophysical results, two small sondages were opened in the vicinity of the temple. Test Pit 1 (Trench 1/2014) was located at the base of an *in situ* megalith within the retaining facade structure to the south of the monument. Test Pit 2 (Trench 2/2014) was facilitated by landscaping work undertaken by Heritage Malta (HM). This work involved the repositioning of palm trees on the platform directly in front of the temple. On the basis of the resistivity survey, a third small trench (Trench 3/2014) was opened in the olive grove to the northeast of the monument (§5.4.2.2 for results), since the anomalies initially looked very interesting. Soil samples of individual deposits were taken and wet sieved and floated to recover environmental and dating samples. A total of 111.5 litres of soil from the 2014 excavations was sampled, floated and processed. The trenches were laid out using a Leica TS02 Total Station, re-sectioned to the national (UTM) grid using three-point section.

5.4.2. Results

5.4.2.1. Geophysical Survey Results

The use of geophysics across the Ġgantija area yielded informative results. Magnetometry survey had not yielded useful data but the GPR and resistivity surveys

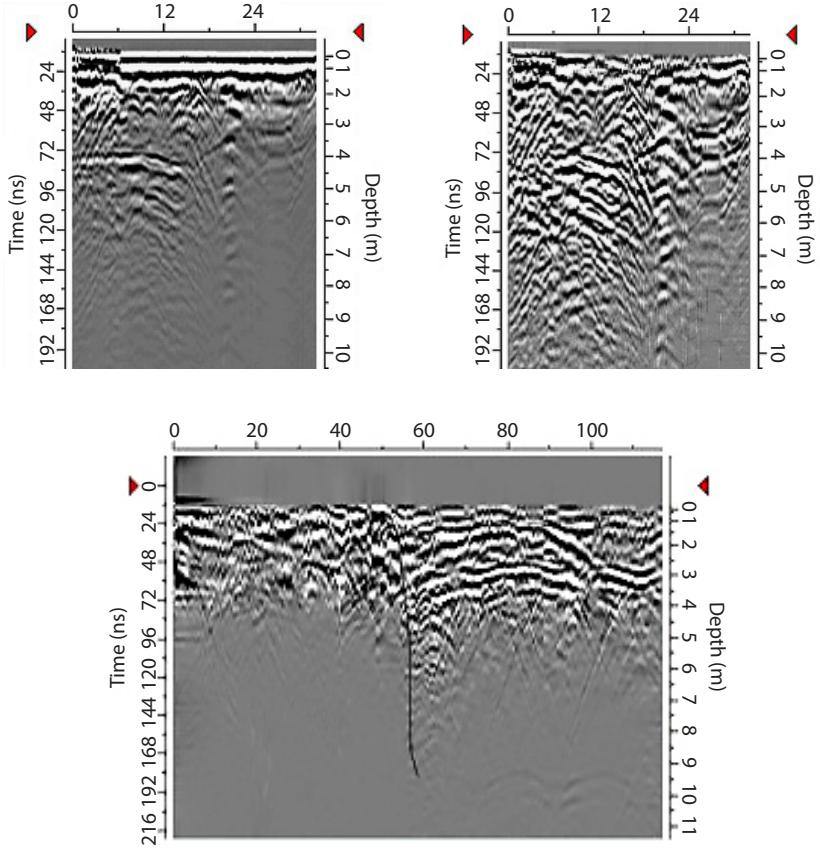


Figure 5.6. *The fault line at Ġgantija, revealed through GPR, and marked by the vertical black lines.*

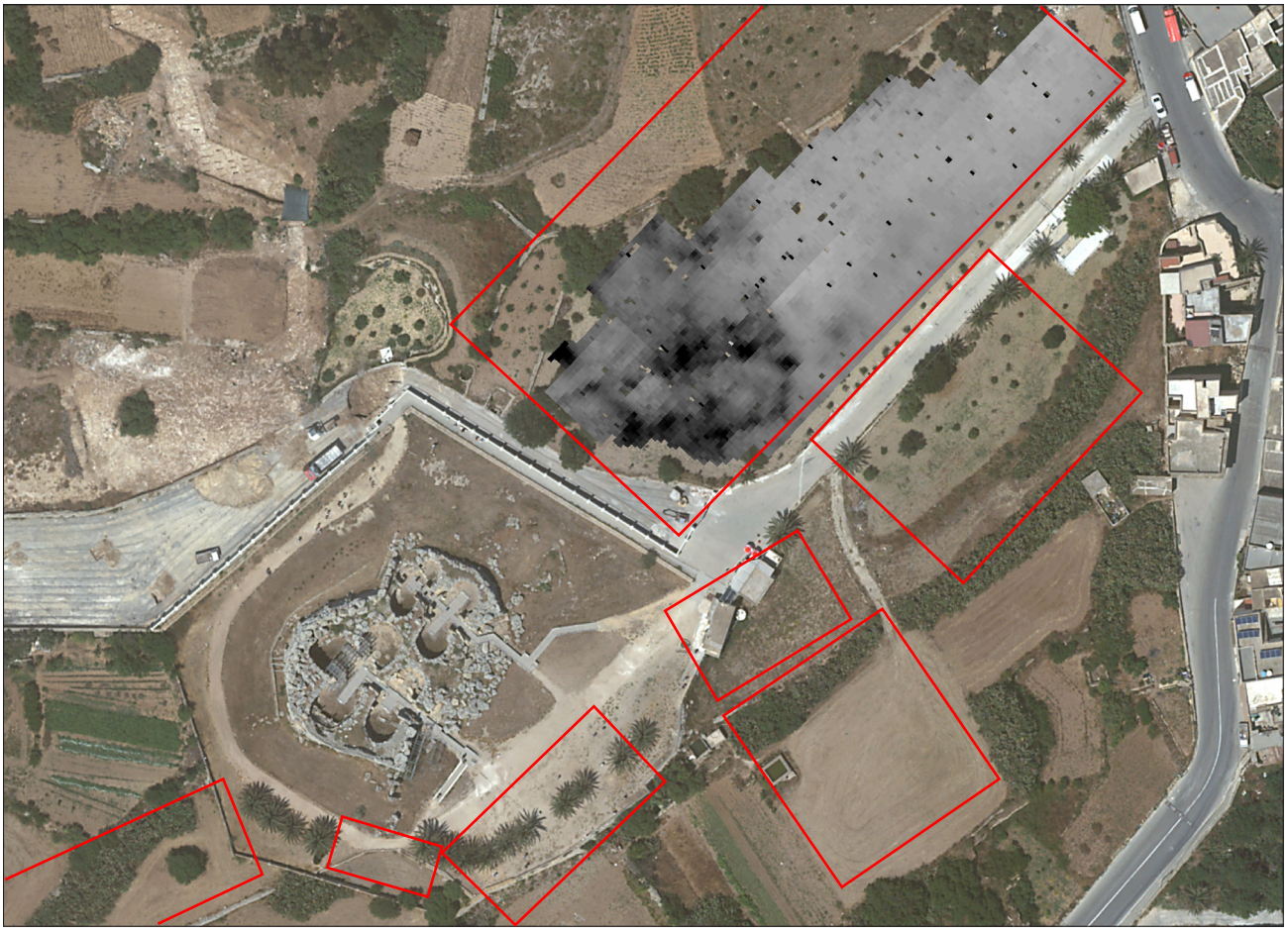


Figure 5.7. *Orthophotograph of the Ġgantija temples showing resistivity results for the 'olive grove' and the locations of other areas surveyed (annotated Google Earth image, captured in 2014).*

were important. The GPR detected an evident geological fault line located beneath Ġgantija, which can be traced across the Ramla Valley (Fig. 5.6; see Ruffell *et al.* 2018). Grima (2004a, 2005) noted the importance of landscape features in determining temple location, with many sites built close to natural springs, identified by names of springs or associated with nearby water cisterns. Toponomastic evidence suggests that the spring at Ġgantija was an integral element of the site since the district around the temple is known locally as *tal-Għejun* ('[the place] of the springs') (Grima 2005).

A total of seven areas were surveyed using resistivity in the area surrounding Ġgantija to identify potential areas for archaeological prospection (Fig. 5.7). In particular, the resistivity survey detected a large number of anomalies in the olive grove to the north of the temple and, as a result, a 2 × 8 m exploratory trench (Trench 3/2014, §5.4.2.2) was opened to incorporate as many of the anomalies as possible.

5.4.2.2. 2014 Excavations

Following hand-auger survey on the southwestern side of the temple platform, a small test-pit (approximately 0.5 × 1.5 m), Trench 1/2014, was opened on the south side of the terrace to examine the soil profile surrounding and beneath *in situ* megaliths located within the terrace wall (Figs. 5.8, 5.17 & 5.18). The sondage demonstrated two things. First, the majority of material in this sondage was related to material used to level the terrace in front of the temple, but this overlay intact palaeosols at the bottom of the trench. Second, that the facade megalithic stone post-dated the early deposits and, as shown in Figures 5.8 and 5.19, was 'suspended' in the terrace makeup deposits, set well above the buried soils. Several micromorph blocks and small bulk samples were taken of the palaeosol for geoarchaeological analysis (Appendix A5.5), and the following year (2015) the test pit was re-opened to allow profiling and sampling for OSL dating (see Volume 1, Chapter 2 & 5). A number of

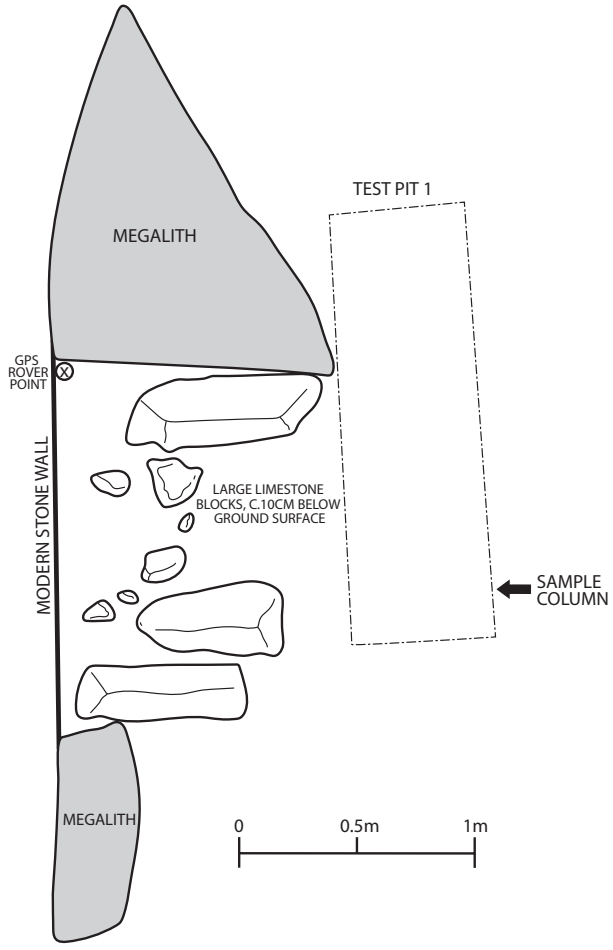


Figure 5.8. *Plan of Trench 1/2014.*

artefacts (pottery, lithics) were retrieved. (see below and Fig. 5.19a & b).

The removal of a palm tree from the terrace in front of the temple provided the *Project* with an opportunity to open a small exploratory sondage in the area previously occupied by the tree (Fig. 5.9). A 1 × 2 m trench (Trench 2/2014) was opened, but upon excavation it was found to contain the remains of a domestic dog in an area formerly laid out as flower beds. An accompanying bag was dated to the 1950-60s, demonstrating that continued excavation was unlikely to yield anything of archaeological significance, so the excavation was terminated. Nothing else of archaeological significance was found in this trench, except dry stone rubble towards the outer face of the terrace.

Trench 3/2014 was opened to investigate a large concentration of anomalies highlighted by the resistivity survey in the olive grove to the north of the temple. The topsoil, Context (2000) was composed of a very friable, brown matrix with small to medium sub-angular stones throughout and sherds of pottery and bone. It seems likely the soil was partly imported to the site to help establish the olive grove. Below the top-soil in the very northern section of the trench was a layer of firm, brown silty sand soil. This was defined as Context (2005), and interpreted as plough soil. Context (2005) was abutted by Context (2002), a very similar firm, brown sandy silt with frequent finds of pottery and bone. Context (2002) covered the rest of trench, coming down to natural bedrock in the southern section of the trench, and was interpreted as modern plough soil. A well-constructed wall composed of a skin of large, roughly shaped blocks with a rubble core, Context



Figure 5.9. *Trench 2/2014 after excavation. Pit on the far right-hand side of the photograph is the location where the remains of a domestic dog were buried.*

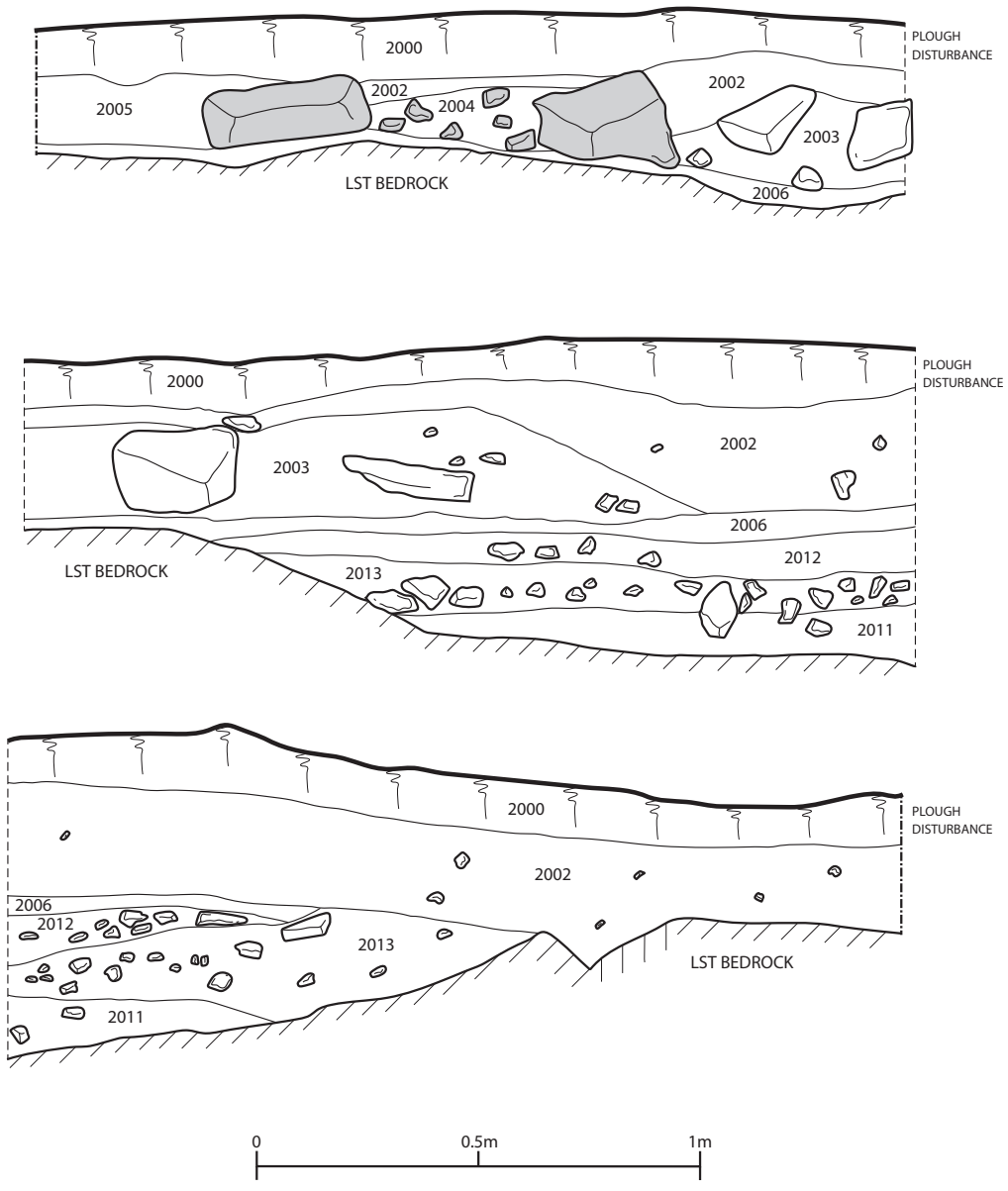


Figure 5.10. *Vertical section of Trench 3/2014 with wall blocks exposed Context (2004).*

(2004), abutted Context (2005) and lay directly below Context (2002) in the northern section of the trench (Fig. 5.10; Fig. 5.11). The wall, aligned roughly east-west, is probably a field or terrace wall of relatively recent date. A spread of stones, Context (2003), running to the south of the main wall most likely represents wall collapse. Located below the wall and stone collapse was Context (2006), a bright reddish-brown sandy silt thought to be a horizon of redeposited *terra rossa*-like soil material. Context (2006) covered (2012), which was a mixed deposit of small flat limestone blocks and a plaster-like white powder with a green slip-like surface and appeared to be the remains of a plaster floor, although the date of this feature remains unclear. The plaster floor was supported by Context (2013), which was a layer composed of a mixture of earth and sub-angular stones that was probably intended as a levelling surface for the floor above. Underneath this levelling layer was Context (2011), a firm, dark brown sandy silt that was sterile and lay over the natural bedrock. The date of Context (2011) is unclear but it was interpreted during excavation as a relatively modern deposit.

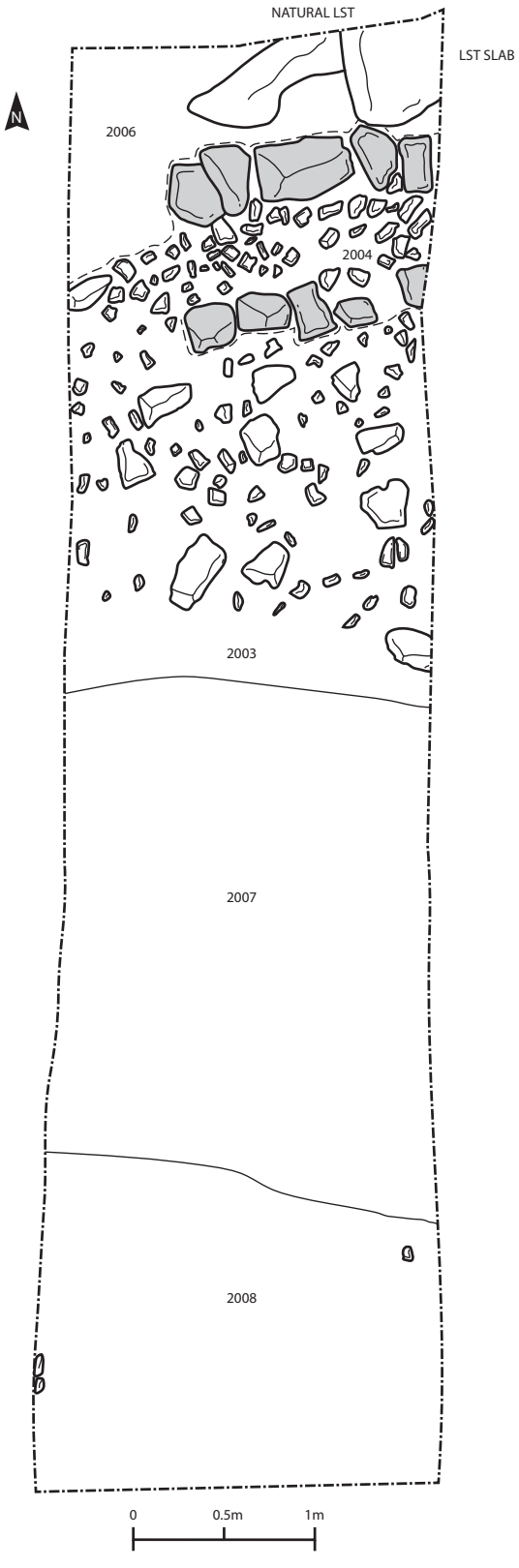


Figure 5.11. *a) Mid-excavation plan of Trench 3/2014 with wall structure, at north end of trench Context (2004).*



Figure 5.12. *Photograph of Trench 3/2014 in the olive grove, looking south. The edge of the wall, Context (2003) can be seen clearly in the bottom of the picture.*

5.4.2.3. Analysis of the southeast-facing vertical section

Between 2008 and 2015, a widespread infrastructural development of archaeological heritage sites across Malta was supported by the European Regional Development Fund and the European Social Fund (Operation Programme I – *Investing in Competitiveness for a Better Quality of Life* ERDF). At Ġgantija, this project included improvements to the visitor facilities and landscaping of the immediate area around the temple. In the immediate vicinity of the megalithic monument the most substantial alteration was the removal of the southern rooms (the former WC and site office block) and a section of the terrace retaining wall. Further away from the temple, the protective concrete pillared wall that surrounded the monument on the west, north and east sides was removed and large areas to the north of the surroundings were cleared, excavated to bedrock and remodelled as part of the Visitor Centre. Figure 5.7 shows the landscape before the recent reorganization of

the monumental space. The quite substantial concrete foundations and drains of the toilet blocks were found to have disturbed underlying deposits. The intervention exposed a southeast-facing vertical section approximately 2 m deep and 8 m wide, containing limestone megaliths, cultural deposits and a significant humic layer (Fig. 5.13).

The *FRAGSUS Project* was granted the opportunity to investigate this intervention through detailed survey and recording (by Jeremy Bennett, University of Cambridge) which ascribed provisional context numbers, recorded on a section drawing (Fig. 5.14). During the section cleaning, a quantity of Temple Period pottery sherds (Fig. 5.15) was collected from one of the culturally rich layers, Context (2012), and several layers appeared to be generally rich in ceramic artefacts. Of particular interest were the stratigraphic units in the lower-middle part of the section. Flanked by significant limestone megaliths, a *terra rossa* soil with cultural inclusions, overlay the bedrock. Each of the successive layers above the *terra rossa*, extending to the height of the buried megaliths, were varied in texture and colour and included notable cultural material. These factors meant that the area was considered sufficient for further investigation, particularly to test the relationship between these strata and the megaliths. Furthermore, given the prevailing semi-arid climatic conditions, dark/humic soils were recognized as a rarity that merited greater scrutiny.



Figure 5.13. *The southeast-facing vertical section following removal of the custodians office and WC. The overburden of topsoil can clearly be seen in the darker soil at the top of the section. The lower layers contained large stones and other cultural material, including substantial amounts of pottery.*

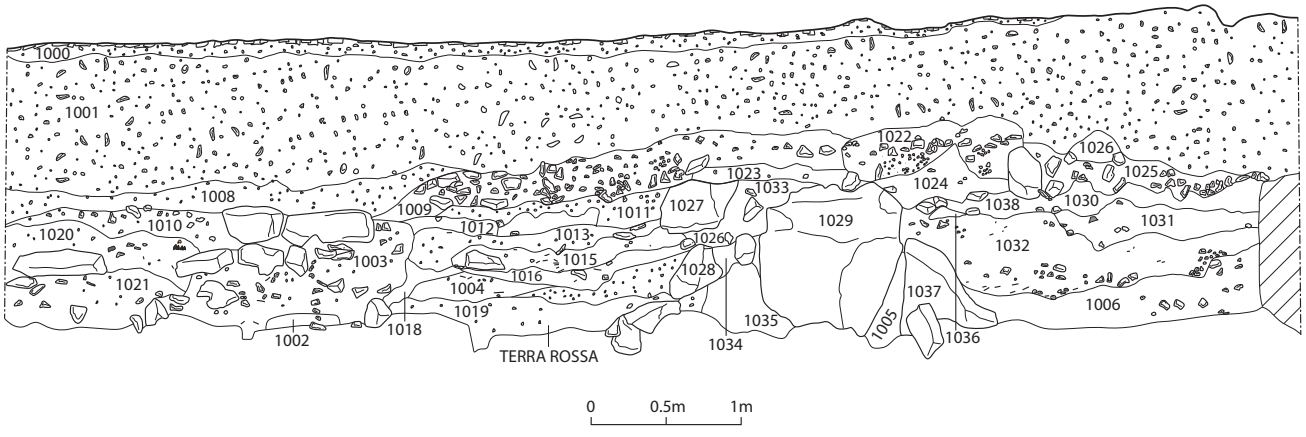


Figure 5.14. *Section drawing of the southeast-facing section showing* in situ *megaliths and stratified deposits.*



Figure 5.15. *Typical Tarxien phase sherds recovered from Context (2012) following cleaning of the southeast-facing vertical section.*

5.5. 2015 excavations

5.5.1. Excavation rationale

The 2015 excavations were designed to resolve several issues raised during the previous year's fieldwork. One of the main issues was to resolve the stratigraphic sequence of the deposits and structures revealed in the southeast-facing vertical section and to interpret and relate them to the main temple structure. The identification of well-preserved humic soils within the southeast-facing vertical section during the 2014 field season provided an important opportunity to examine undisturbed palaeosols, which are rare in Malta's eroded landscape (see Appendix A5.6).

5.5.2. Methodology

The 2015 fieldwork at Ġgantija was carried out in compliance with the policies outlined by the Superintendence of Cultural Heritage (SCH). The site was excavated entirely by hand, by, or under, the direct supervision of *FRAGSUS* personnel supervised by Prof. Charles French and Dr Sean Taylor. Before excavation began the limit of excavation was laid out using a Total Station. During the course of the excavation, bulk samples of individual contexts were taken for flotation in order to retrieve samples for radiocarbon dating. The 2015 excavations produced 175.5 litres of soil that was sampled, sieved and processed. Despite extensive soil sampling and attempts to gather dateable material from all significant contexts, only two of the 11 samples submitted for radiocarbon dating yielded successful results: a wheat grain (*Triticum*) and a piece of charcoal. The other nine faunal specimens did not have sufficiently preserved collagen for dating. Nonetheless, Trench 1 of 2014 was re-opened and the buried soil and overlying 'terrace' deposits were

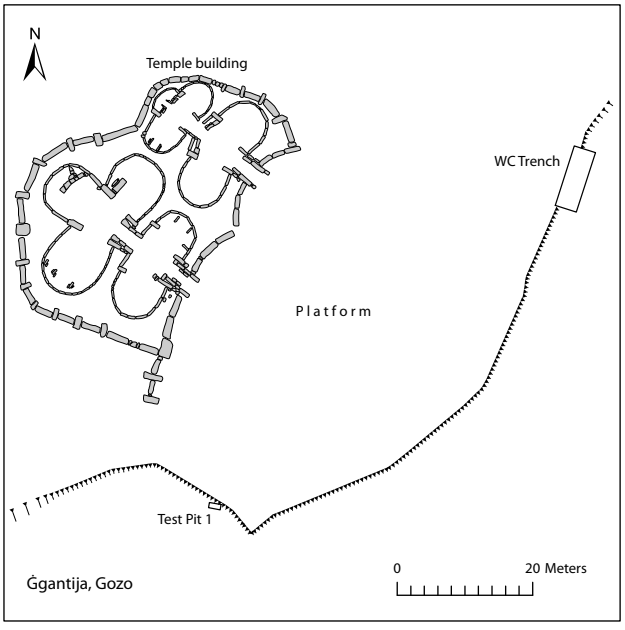


Figure 5.16. *Plan of Ġgantija showing the location of Trench 1/2014 ext. (Test Pit 1) and Trench 1/2015 (WC Trench).*

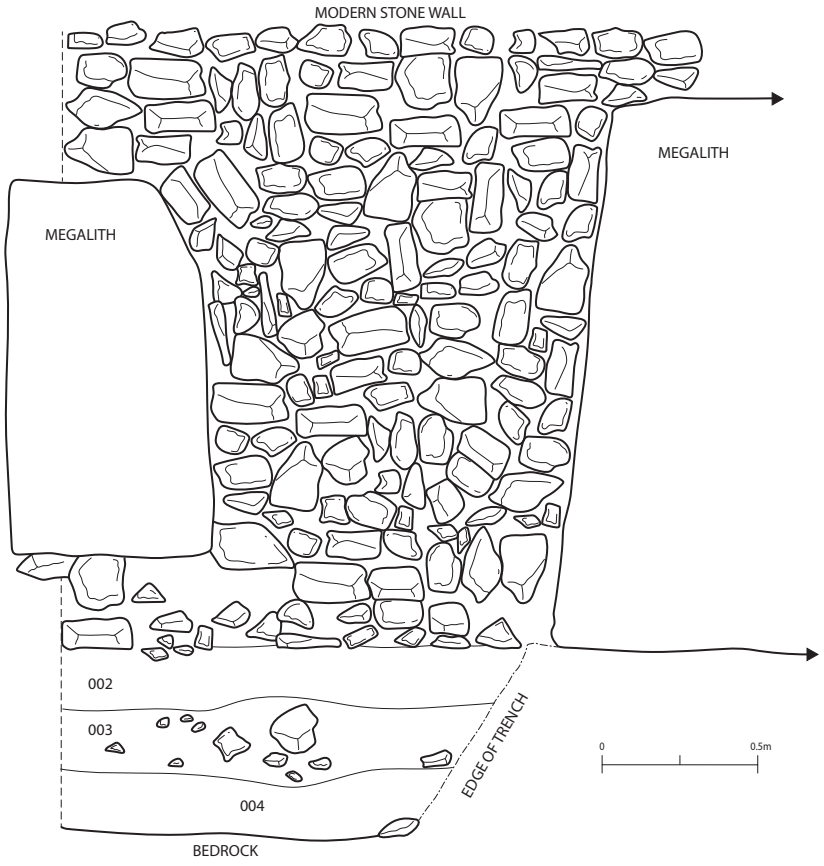


Figure 5.17. *East-facing vertical section drawing of Trench 1/2014 ext.*

successfully sampled for OSL profiling and dating (Volume 1, Chapters 2 & 5).

5.5.3. Excavation results

In 2015, the Trench 1 sondage (henceforth referred to as Trench 1/ 2014 ext.) on the southwest side of the terrace was reopened and extended. The goal was to augment the work of the previous year with a second larger trench to examine the soil and construction sequence in greater detail, and obtain OSL dates of the buried soils. A second much larger trench GGWC/15 (henceforth referred to as WC Trench 1/ 2015), was opened on the opposite, eastern side of the terrace, under the site of the WC/office block adjoining the old ticket office. This trench was opened to examine the southeast-facing vertical section that had been exposed by the removal of the boundary wall and concrete foundations the previous year (§5.4.2.3; Fig. 5.14). Figure 5.16 shows the location of the two trenches in relation to the main temple structure.

5.5.3.1. Trench 1/ 2014 ext. (Trench TR1) (2.5 × 3.5 m)
Trench 1/2014 ext. extended the test pit (Trench 1/2014), around the *in situ* megalith on the southwest edge of the terrace during the 2014 field season (Fig. 5.19). Lying on top of the bedrock was Context (004), a firm brown, silt loam, rich in cultural material. The deposit represented an *in situ* buried soil and comprised three horizons: a lower dark reddish brown fine sandy/silt loam, a middle brown silt and an upper dark brown silt loam. Both the middle and upper layers contained a mixture of Neolithic and Temple Period pottery, including Għar Dalam, Skorba, Żebbuġ, Ġgantija and Mġarr sherds – although there were many more sherds present in the upper horizon (see the detailed geoarchaeological report in Appendix A5.5). Both the middle and upper horizons contained pottery, bone, obsidian and chert, with the vast majority of pottery sherds belonging to the Żebbuġ phase (Chapter 10), but Għar Dalam, Skorba, Ġgantija, and a few sherds of Mġarr pottery were also present, suggesting that this context was deposited during the Temple Period. A pair of earlier Temple Period cups of Ġgantija form, one of which was perfectly preserved, were of special interest within this context (Figs. 5.20 & 10.16, GG10-2).

Above (004), Context (003) formed a compacted yellow/brown silty loam, with frequent limestone inclusions, measuring *c.* 10 cm in diameter. Context (003) included finds of both pottery and bone. Most of the mixed phase pottery belonged to the Żebbuġ phase,

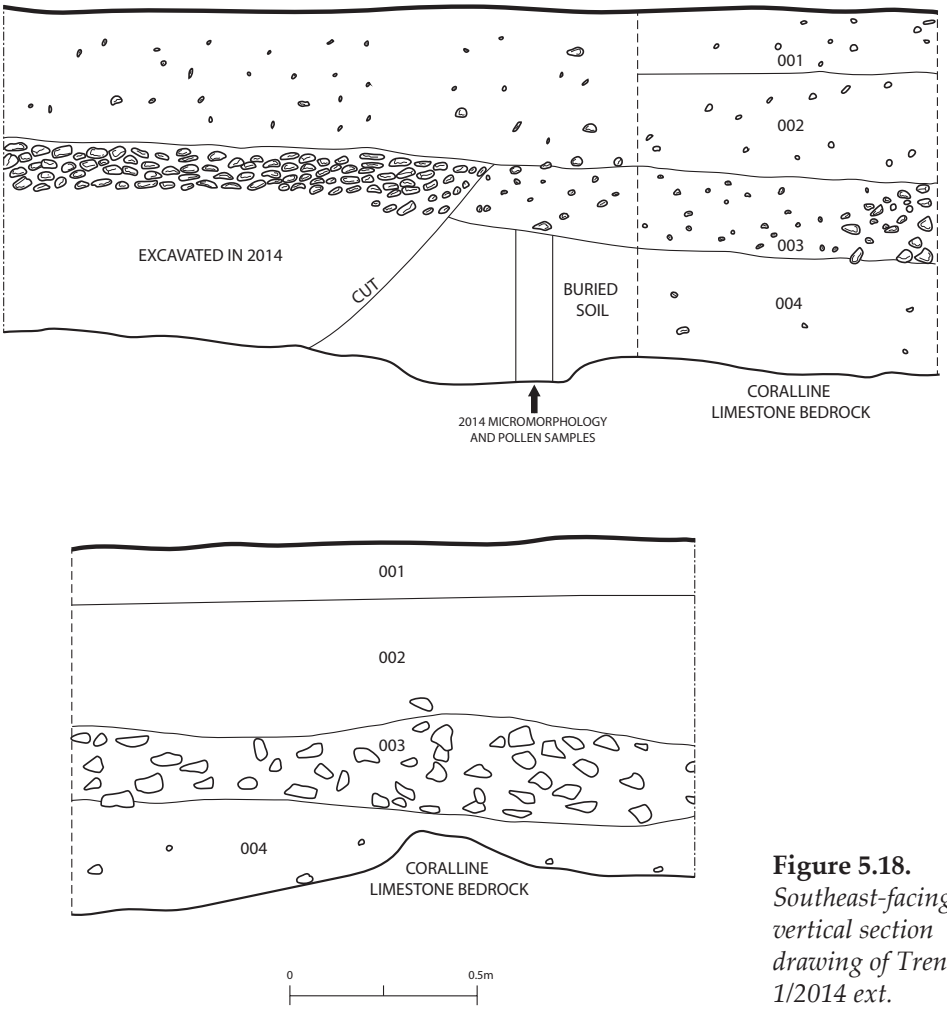


Figure 5.18. *Southeast-facing vertical section drawing of Trench 1/2014 ext.*



Figure 5.19. *Trench 1/2014 ext. post-excavation. The* in situ *megalith can be seen in the top right of the image.*



Figure 5.20. *Two Ġgantija phase cups recovered from Context (004).*

although Ġgantija and Tarxien phase sherds were also common; with Skorba phase pottery present in much smaller quantities than the other types, together with two sherds of undiagnostic burnt coarse ware. Context (003) was interpreted as terrace make-up due to the large quantities of stone found within the deposit, and was covered by Context (002), a compacted brown silty loam that contained frequent sherds of pottery. The ceramic assemblage comprised mainly Żebbuġ phase pottery, but there was also a substantial number of pre-Temple Period Skorba and Għar Dalam phase sherds, as well as a small number of Ġgantija and Mġarr phase sherds (Chapter 10). A number of later Bronze Age and Roman sherds were also recovered from Context (002). The upper-most level of the trench was covered in a layer of topsoil, Context (001), which consisted of a friable grey silt-loam with fine gravel/ stone inclusions and sub-rectangular limestone pieces. Context (001) contained a mixture of Skorba, Żebbuġ and Ġgantija type pottery, and a single sherd of Roman pottery, although no style was dominant.

5.5.3.2. Trench 1/ 2015 (Trench GGWC/2015)

Trench 1/2015 (Trench GGWC/2015) was a 4.5 × 5 m area extended from the 2014 section to examine the deposits and structures identified after the removal of the overlying office and WC block (Fig. 5.14; §5.4.2.3). Following the removal of the disturbed levels, excavations revealed a spread of apparently broken-up megaliths sloping upwards towards the temple forecourt (Fig. 5.21). A sondage was then excavated inward into the base of the stone structure (Fig. 5.22), enabling the analysis of two sections (Figs. 5.23 & 5.24). The lowest deposit from this trench was Context (1019), a dark reddish-brown silt clay loam containing pottery, bone and chert. The pottery from this layer dated predominantly from the Temple Period, but Żebbuġ, Ġgantija and Tarxien phase pottery were also well represented. A single sherd of Early Neolithic Għar Dalam pottery was also found. Above (1019) was Context (1004), a friable, dark greyish-brown silt loam, with abundant occupation material, including Tarxien phase pottery, chert and bone. Context (1004) was covered by a series of fine lenses; Contexts (1042), (1041) and (1040), and the lowest (1042) consisted of 'pea-grit' limestone and silt loam containing undiagnostic prehistoric pottery (Fig. 5.26).

A Lens (1041) of black organic silt loam and very fine charcoal overlay Context (1042) and contained bone and pottery that was broadly assigned to the Temple Period (Chapters 9 & 10). The uppermost lens, Context (1040), was a mix of yellowish clay, 'pea-grit' limestone and silt loam, with pottery fragments that appeared to have been trampled into the surface. As a result of the poor state of preservation of the pottery, this level was broadly assigned to the Temple Period; the only identifiable sherds belonged to the Tarxien phase.

Above (1040), there were two culturally rich layers, Contexts (1015) and (1016). The lower of these, Context (1016), was a dark greyish-brown silt loam, containing copious amounts of pottery. A piece of charcoal from the layer was radiocarbon dated to 2775–2570 cal. BC (4106 ± 35 BP, UBA-35589). The pottery assemblage was dominated by Tarxien phase sherds, but Żebbuġ, Ġgantija and Saflieni

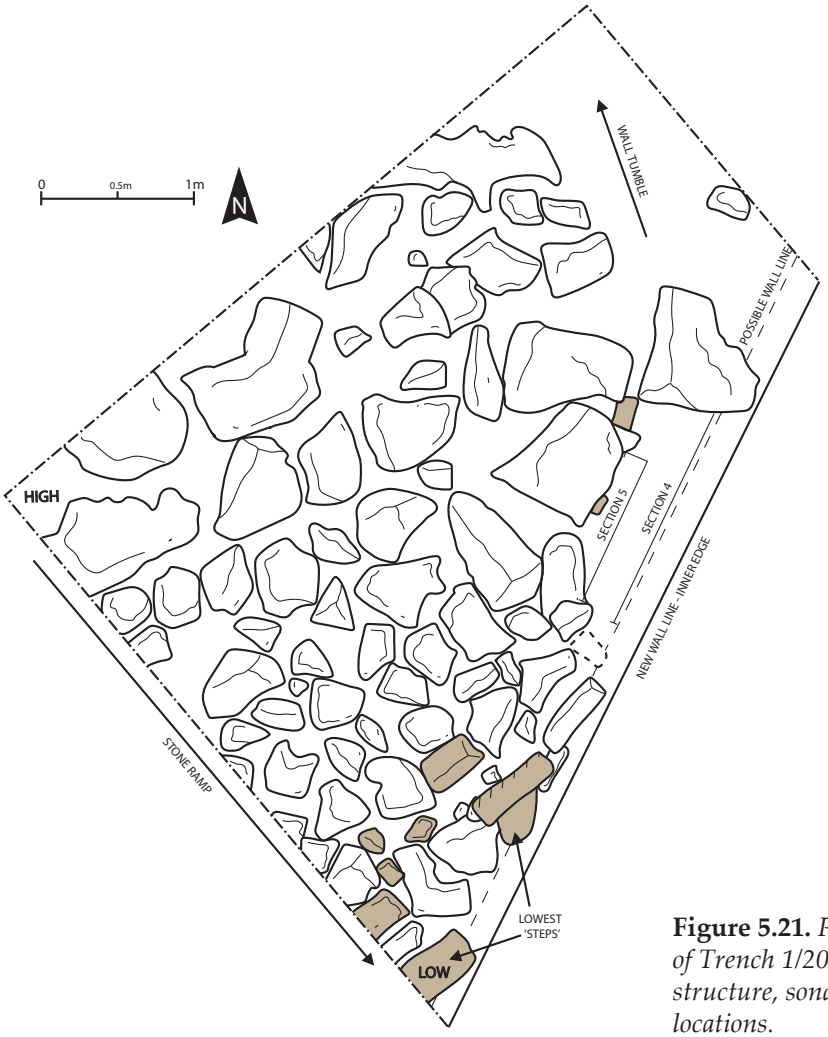


Figure 5.21. *Post-excavation plan of Trench 1/2015 showing the ramp structure, sondage and section locations.*

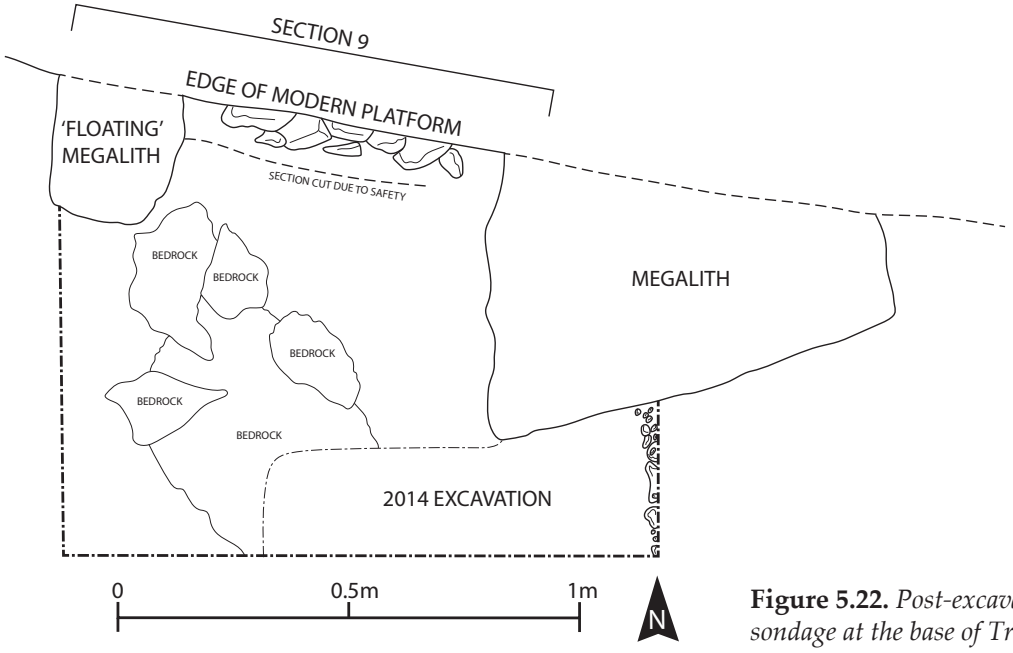


Figure 5.22. *Post-excavation plan of sondage at the base of Trench 1/2015.*

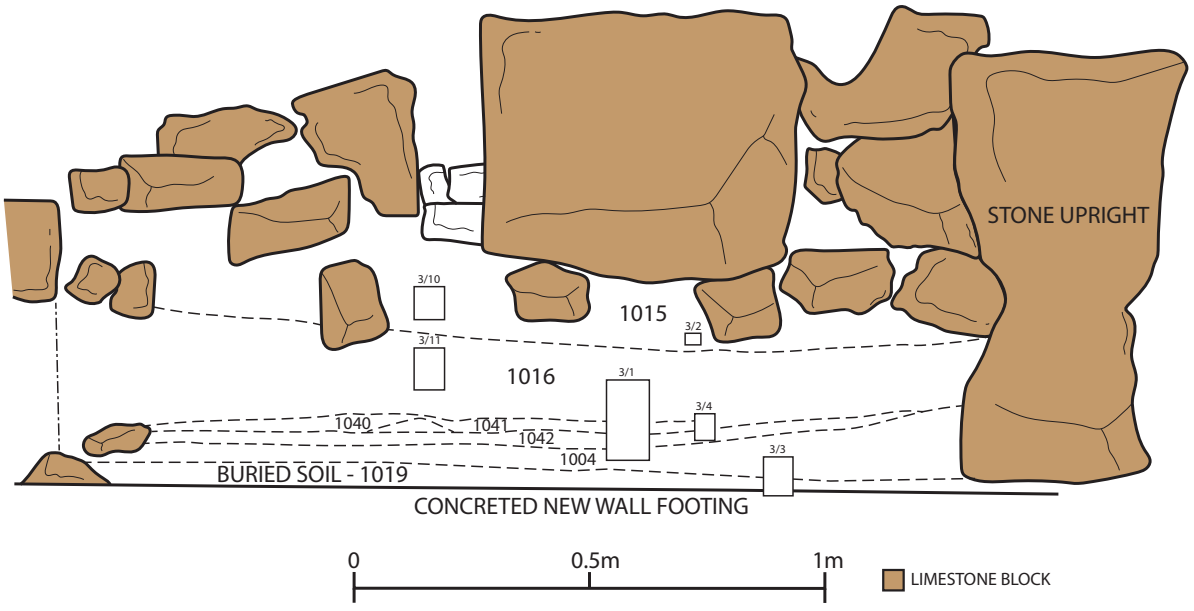


Figure 5.23. *Superficial vertical section (section 4, Fig. 5.21) of the sondage at the base of Trench 1/2015. Micromorphology samples correspond to the detailed geoarchaeological report in Appendix A5.5.*

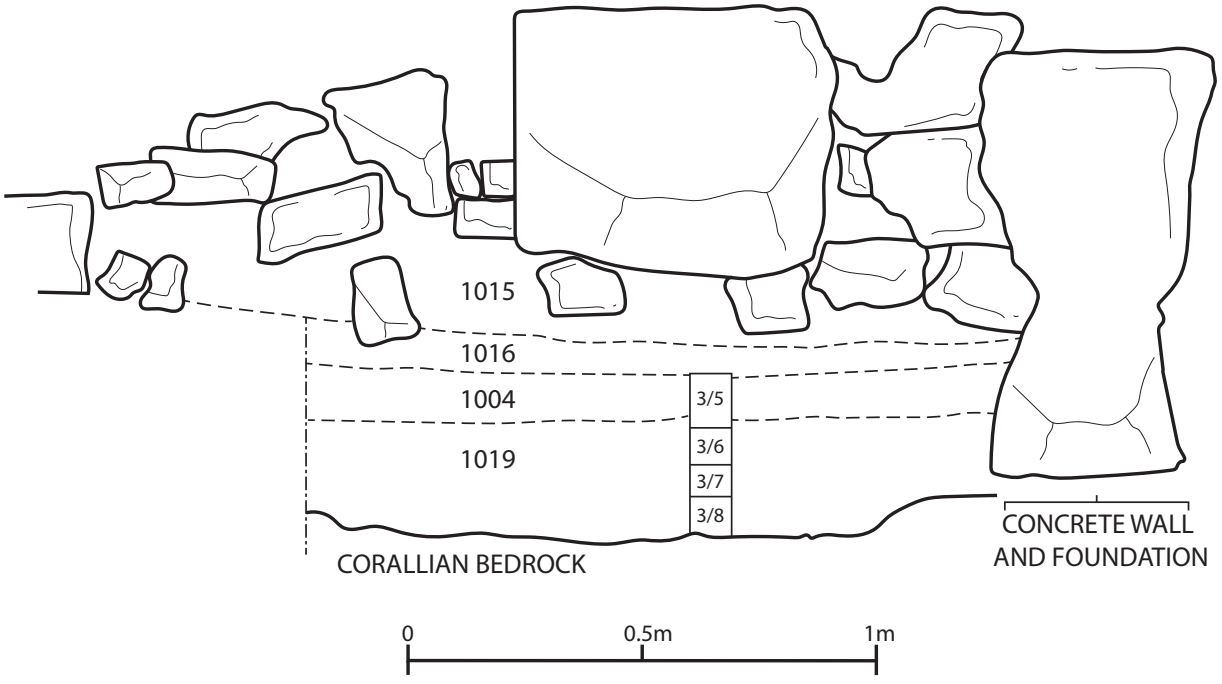


Figure 5.24. *Deep vertical section (section 5, Fig. 5.21) of the sondage at the base of Trench 1/2015. Micromorphology samples correspond to the detailed geoarchaeological report in Appendix A5.5.*

phase sherds were also present. The upper layer, Context (1015), had a large quantity of both Ġgantija and Tarxien phase sherds, as well as a few sherds of Saflieni phase pottery. Above this, a stone structure (1043) was constructed. This was composed of a row of massive vertical Coralline blocks that ran slightly down-slope, at a depth of *c.* 50 cm (Fig. 5.25). The stones were laid roughly southeast–northwest, rising towards the facade of the temple, and perhaps they represented the remains of an entrance ramp to the



Figure 5.25. *Photograph showing the excavated ramp structure. The southeast to northwest alignment of this structure can clearly be seen running through the centre of the photograph.*

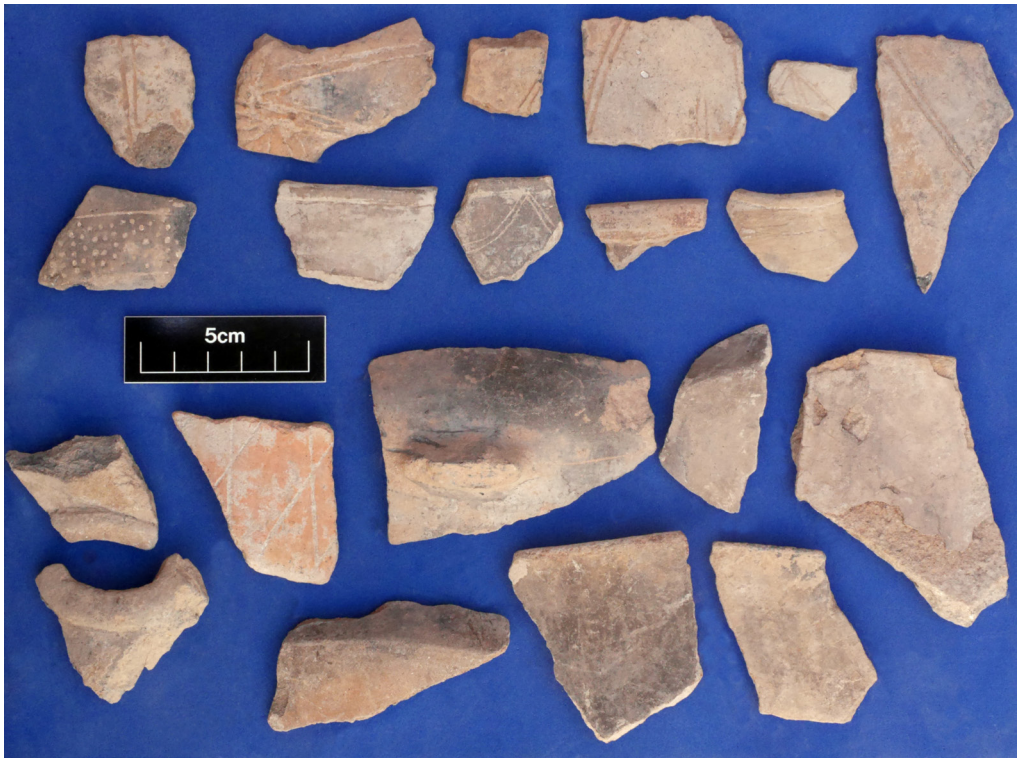


Figure. 5.26. *Pottery from Context (1002)/(1003) showing Żebbuġ, Tarxien and Saflieni phase pottery.*

forecourt area of the site from the lower terrace area below the site. The fill of the structure was made up of smaller, undressed stones. Possible wall tumble is indicated by broken stone blocks. Context (1021) overlay the stone structure on the southern side of the trench and comprised a brown silt-loam containing some pottery and bone fragments. All of the pottery from this layer dated to the Temple Period, with Żebbuġ phase pottery the most frequently occurring, although Ġgantija style pottery and one identifiable sherd of Tarxien phase pottery were also present. A radiocarbon date of 2580–2300 cal. BC (3962 ± 50 BP, UBA-33707) obtained from a grain of wheat (*triticum*) dates this layer to the late Tarxien phase (Table 5.1; Appendices A5.2–A5.4).

Contexts (1013) and (1030) were above (1021) and the stone structure (1043). Context (1021), a firm brown silt loam, covered the majority of the trench, while contexts (1030) and (1025) respectively formed the lower and upper horizons of a deposit confined to the northeast corner of the trench. Both were a dark yellow brown, firm silt-loam, although Context (1025) had more frequent inclusions of small stones than Context (1030). A firm dark greyish brown silt loam (1026), with occasional fine stones throughout, overlay both contexts (1013) and (1025). All of the pottery from this layer appears to date to the Temple Period. The majority of the sherds were either from the Tarxien or Ġgantija phase, although there were also infrequent sherds of Żebbuġ phase pottery and an undiagnostic coarse ware. Contexts (1002) and (1003) were located above Context (1026) and after further excavation they were found to be equivalent. They formed a stony dark yellow-brown layer, containing a mix of fine gravel and a large amount of pottery. The pottery sherds were largely undiagnostic, although the majority of identifiable sherds dated to the Tarxien phase (Fig. 5.26). There was also one recognizable sherd of Żebbuġ pottery and one Bronze Age sherd alongside several pieces of modern pottery. The uppermost layer of this trench was covered by topsoil, Contexts (1000) and (1001), which are now considered to be a single deposit. This deposit was a yellow-brown silt loam with a mix of fine gravels that contained a mixture of both modern and prehistoric ceramics, as well as a 1926 George V penny and a fragment of obsidian.

5.6. Discussion

5.6.1. Introduction

The two seasons of work at Ġgantija Temple have added substantially to our understanding of the environs of the monument, providing intriguing insights into the early Maltese environment and soil management practices. The work has charted aspects of the impact of Neolithic communities on the landscape of Gozo, and these findings have important implications for further studies; especially landscape studies seeking to address the possible factors influencing the siting of the Maltese temples.

5.6.2. Pre-temple features and deposits

The dynamic nature of the Maltese environment means that soil erosion is a major problem, and it is difficult to locate intact palaeosols and their important information on ancient landscapes. They are essential components in determining the impact of human activity and agriculture on the landscape. One of the major benefits of excavating a temple site, such as Ġgantija, is that the large megaliths and *torba* floors protect *in situ* palaeosols and maintain the vital humid environment for good preservation of organic materials. The 2014 and 2015 seasons successfully located intact deposits of palaeosols in two separate trenches which are reported on below (and in Volume 1 and Appendix A5.5).

The buried soil of Trench 1/2014-ext. consisted of three distinct horizons. The lowest of these represented an earlier Holocene soil that had developed on the limestone bedrock in a moister climate capable of supporting scrubby-woodland vegetation (French *et al.* 2018). OSL dating of this soil (see Volume 1, Chapter 2 and Appendix 2) strongly suggests that this was the *in situ* earlier-mid-Holocene soil that had developed in this landscape prior to the construction of the temple with a date of 8770 +/- 680 BC for the beginning of soil formation. The middle and upper horizons of Context (004) were rich in cultural material, including Neolithic and Temple Period pottery and charcoal, and are likely to represent middening activity at the site. It would appear that as the soils degraded, most likely as a result of both natural and human agency, prehistoric people began to add settlement-derived midden material thus creating an amended soil to

Table 5.1. *AMS dates from Ġgantija, 2015.*

ID	Date	±	Calibrated date (95% C.I.) cal. BC	Context	Element dated	Description
UBA-33707	3962	50	2580–2300	1021	*Triticum* grain	Megalithic ramp
UBA-35589	4106	35	2870–2500	1016	Charcoal fragment	Megalithic ramp



Figure 5.27. *Mid-excavation photograph of Trench 1/2015. The rich humic layers of palaeosols covered by a thick layer of habitation style midden material are clearly represented underneath the wall structure.*

improve its fertility (French *et al.* 2018). While the upper horizon of the midden material was replete with pottery sherds, much more diminished quantities were recovered from the middle horizon, suggesting that the soil in this horizon may have been well worked. The upper horizon gave an OSL date of the later Bronze Age at about 1140 +/- 250 BC (see Volume 1, Appendix 2). Above these horizons was a *c.* 80 cm thickness of later agricultural soil accumulation.

A similar scenario was found in Trench 1/2015 beneath the stone structure (Fig. 5.27) (Appendix Fig. A5.6.1), where the palaeosol appears to have been buried by a series of midden deposits containing small fragments of Temple Period pottery, bone and chert debitage (Appendix Tables A5.2.1 & A5.3.1). The buried soil in this trench was very similar to that found in Trench 1/ 2014-ext, although it was loamier, with a slightly higher organic content and less reddened. The buried soils in both trenches are indicative of a moister and more humid environment. It is clear that once the surface soil was opened up, most likely for agricultural purposes, it began to degrade through oxidation and calcification. The addition of the midden material demonstrates that efforts were being made during prehistory to manage the soil and improve its fertility, but the soils continued to degrade nevertheless.

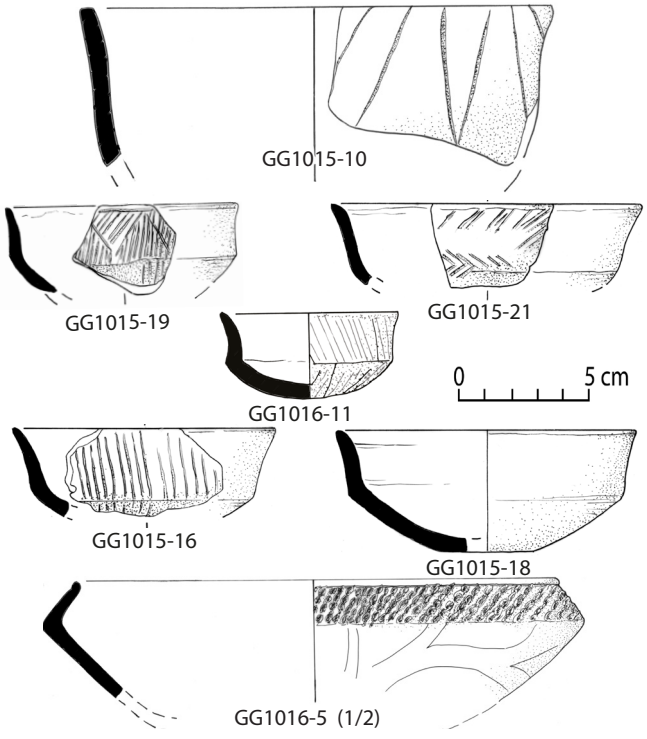


Figure 5.28. *Contexts (1015) and (1016) were ascribed to the Tarxien phase based on the pottery.*

The other contexts within Trench 1/2014 ext. were interpreted as modern terrace make-up material. Context (003), however, yielded pottery evidence that was all Temple Period or earlier, which suggests an intact prehistoric layer within the make-up. In Trench 1/2015, there were three lenses (1040, 1041 and 1042), interpreted as old land surfaces. The lowest Context (1042) had a trampled/weathered surface, whereas the charcoal deposits found in lens (1041) indicated a hearth/dump and the upper lens (1040) also seemed to represent a trampled surface. The degraded pottery remains from these contexts could not be identified definitively but, based on the fabric, they appear to date from the Temple Period. Above the lenses, layers (1015 and 1016) were considered to be midden-type deposits because of the large quantity of Temple Period pottery, animal bone and lithic material they contained. Their composition suggests that they are similar or related to the upper horizons of Context (004) in Trench 1/ 2014 ext. Examination of the ceramics from these layers indicates that they date exclusively from the Temple Period (Fig. 5.28), with Ġgantija and Tarxien phase pottery present. The discovery of midden-type material at Ġgantija confirms that occupational or ritual activities that involved the dumping of rich organic and cultural debris took place here, which is consistent with the findings from many other Maltese temple sites, including Skorba, Kordin III and Ta' Ħaġrat on Malta and Santa Verna on Gozo. The OSL dates obtained from this Trench gave an early Holocene date of 8770 +/- 680 BC for the beginning of soil formation, with final burial of the soil in the later Bronze Age by about 1140 +/- 250 BC (Volume 1, Appendix 2). These data add to the *FRAGSUS Project*'s research on the relationship between sites and natural resources. Ġgantija uniquely demonstrates the direct relationship between a spring (resulting from the geological fault) and good agricultural soil and its maintenance. The importance of the spring in a landscape that seasonally becomes semi-arid cannot be underestimated and it is likely that water also held important cosmological significance (Grima 2004a, 2005; Ruffell *et al.* 2018). The positioning of the temple adjacent to the fertile soils necessary for agriculture (French *et al.* 2018; Volume 1 Chapter 5), confirms the significance of these resources and may provide the basic 'model' for temple location across the Maltese islands, a model that in many cases cannot now be explored so effectively as at Ġgantija.

5.6.3. Stone structure

The substantial stone structure in Trench 1/2015 (WC block) was found to be built above the old land surface and its Neolithic occupation material. The large stones (aligned southeast–northwest) were cut into the archaeological deposits and the buried soils beneath (Figs. 5.25 & 5.29), and their fill comprised of smaller, undressed stones. Although many of the megaliths appear to have either collapsed or have been broken, there are a number of possible intact upright stones within the 'second row' of stones possibly relating to a retaining wall and ramp structure that once connected the lower terrace to the temple

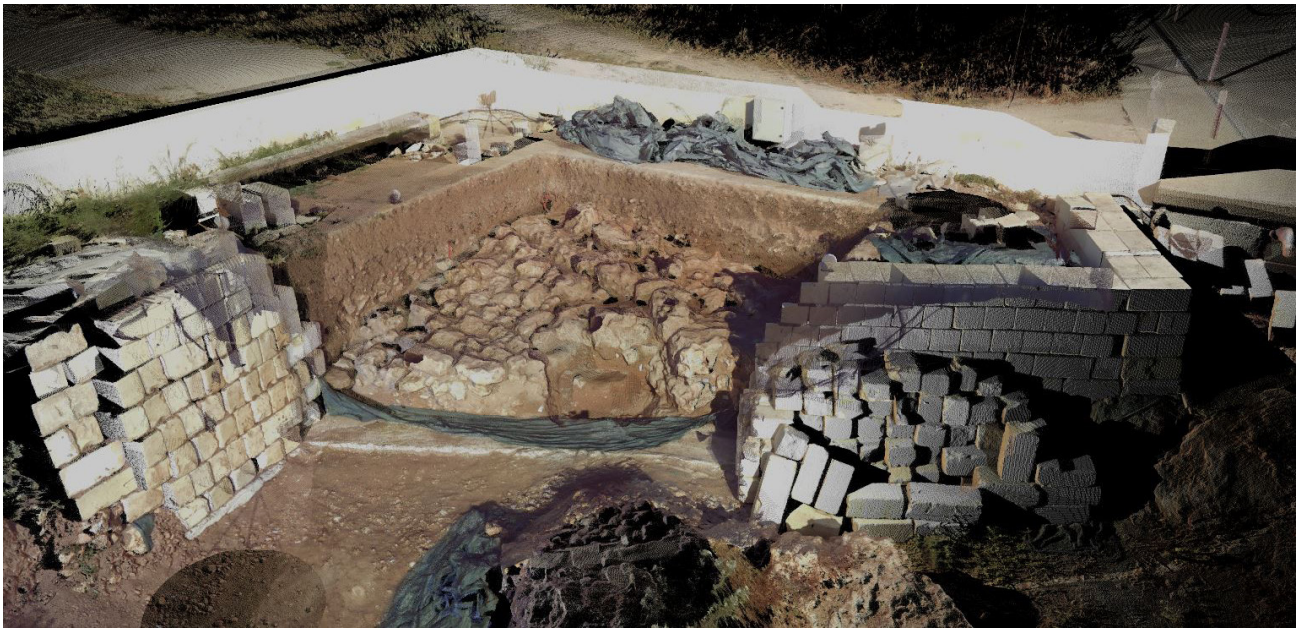


Figure 5.29. *Laser scan of Trench 1/ 2015 post-excavation, clearly showing the wall structure.*

forecourt. The remnants may be elements of the original entrance into the temple forecourt, a trilithon structure depicted by Busuttil, de Brocktorff and Smyth in the first decades of the nineteenth century (Fig. 5.4; Fig. 5.5). Although now extensively buried, the exposed retaining wall and associated structures are of large unworked blocks, and more may exist within the forecourt makeup material. Based on the pottery evidence from the midden layers below the wall, contexts (1015) and (1016), and the radiocarbon

Table 5.2. *Ġgantija and the* FRAGSUS *questions.*

***FRAGSUS* questions**	**Ġgantija**
1a. What was the impact of human settlement on Malta?	Soil manuring evident in Temple Period, and manuring activity. Site location and concentration of resources at water source. Enlargement of the temple complex (terrace) implies large population used the site.
1b. How rapid was the process of deforestation, erosion and degradation?	Buried soil – molluscs, organic data in palaeosols provide indications of clearance and degradation.
1c. When did technical mechanisms to manage the environment develop – such as terracing, water and food storage?	Spring used for water from the Early Neolithic through to the Temple Period. Terrace construction implies wider application of such structures in landscape perhaps for soil retention and cultivation.
1d. Were such mechanisms in place before or after the Temple Culture collapsed?	Likely that local resources were maximized and technologies employed in Temple Period, before 'collapse'.
2a. How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this?	The community evidently invested in soil improvements to retain fertility around Ggantija, enabling continuous settlement that was further enabled by constant water supply. Ritual elaboration and cult. Social hierarchy.
2b. Were the monumental temples instrumental in the process of sustaining cultural life?	Highly likely that Ġgantija, given its size and centrality to the landscape and agricultural resources, was a focus for cultural and economic activities.
3a. What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable?	Rather scant evidence through charcoal, but pollen evidence indicates cereals grew locally, and as suggested by soil studies, there was horticultural intensity in the Ramla Valley, where water and rich soil was available. Animal grazing, indicated by manuring/middening data.
3b. Were there failures in the food supply?	Abandonment of temple appears to take place towards end of the third millennium BC, when climate, rainfall and landscape degradation is recorded. Later Tarxien Cemetery activity attested in temple ruins suggesting new inhabitants.
3c. What impact did diet, disease and stress have on the population?	
4a. What was the size and nature of the early Maltese population?	
4b. What role did demographic connectivity (immigration) play in maintaining island sustainability?	Evidence of imported chert and obsidian implies interaction with Sicily, Lipari and elsewhere. Exotic pottery imports are evident throughout later Neolithic, Thermi, Tarxien Cemetery and Bronze Age, demonstrating connectivity. Connectivity implied by animal stock and plants
5a. Was there social-economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically?	Ġgantija structure appears fossilized in late Temple Period without changes later. However, extensive interventions may have destroyed later levels and thus evidence for continuity is lost.
5b. Was there a hiatus between the Temple Culture and later Bronze Age settlers?	Lack of substantial Bronze Age activity implies a late third millennium BC break at Ġgantija, although sporadic Tarxien Cemetery sherds and figurines have been found dating from the early second millennium BC.
5c. Are other hiatuses apparent in the sequence, such as between the earlier Neolithic and the Temple Period?	Scattered evidence of Għar Dalam and Skorba material in the stratigraphy implies earlier activity in the area but without evidence for any continuity into the Temple Period..

date of 2580–2300 cal. BC (UBA-33707: 3962 ± 50 BP) obtained from a *Triticum* grain from Context (1021), directly above the wall, it would appear that the stone structure was constructed during the Tarxien phase.

In the context of previous excavations at Ġgantija by Evans in 1954, the dating of this structure is important. Evans' (1971, 179–80) excavation at Ġgantija demonstrated that the terraced platform and its retaining wall at the front of the temple was constructed of large boulders infilled with smaller stones and earth. This was associated with Tarxien phase pottery, but also contained occasional sherds of Early Bronze Age Tarxien Cemetery ware. Beneath the boulders there was a dark deposit that contained large quantities of Tarxien phase pottery, leading Evans to conclude that the platform and retaining wall was constructed in the later Tarxien phase. The discovery of the stone ramp structure in Trench 1/2015, and the evidence that it was constructed during the Tarxien phase, further suggests that the area around Ġgantija underwent considerable remodelling and monumental embellishment towards the end of the Temple Period.

5.6.4. Modern activity

The excavations revealed that the upper contexts in both Trench 1/2014-ext and Trench 1/2015 relate to quite modern activity across much of the Ġgantija site. For example, Contexts (002) and (001) in Trench 1/2014-ext both contained Roman sherds, whilst the upper contexts of Trench 1/ 2015, Contexts (1001), (1002) and (1003) all contained modern material. During the 2014 season, Trench 2/2014 and Trench 3/2014 similarly showed relatively modern activity at the site and the modern pet dog burial in Trench 2/2014, is indicative, and likewise the linear buried structures of modern agricultural activity found in Trench 3/2014. The levelling layer and plaster floor, Contexts (2013) and (2012), of a probably recent building structure had later been covered with good agricultural soils for the olive grove. It is likely that these remains were part of the agricultural landscape related to the field boundaries and remnant buildings in use before the enclosure of the World Heritage monument.

5.7. Conclusion

The fieldwork at Ġgantija is especially notable for the retrieval of buried palaeosols during 2014 and 2015. The samples of these deposits provide very important insights into soil development processes on the island of Gozo during the mid-Holocene. The detection of a geological fault and associated spring running near to the temple structure (Ruffell *et al.* 2018) is also a major contribution, since it is the first time that the underlying structural geology of Malta has been demonstrated to influence temple location. The additional recognition of fertile soils (Volume 1, Chapter 5), confirms that temples were generally located in close proximity to the most productive areas that were vital to early agricultural societies. The least successful outcome of the fieldwork was the poor preservation of radiocarbon samples, which is perhaps unexpected, given the samples sourced at other sites in the *FRAGSUS Project.* Had more charcoal or viable bone been preserved, a more precise chronology of Ġgantija might have been forthcoming, with the possibility of linking the structural building phases of the terrace, terrace wall, ramp and entrance with the main temple. The work of retrieving more and better dating samples is a task for future fieldwork. Nonetheless, OSL dating of the soil sequence in Trench 1 and the relative dating provided by the pottery assemblages in both trenches gives an indicative chronology. Overall, the fieldwork has provided important insights into the broader structural context of the central temple buildings at Ġgantija through uncovering the possible entry ramp to the site. This feature, last documented by nineteenth-century antiquarians, and now only visible as wall collapse demonstrates the extensive character of a Neolithic temple complex, which extended far beyond its immediate walled curtilage. Such insight is important as it informs heritage managers and archaeologists on the buried potential of other megalithic complexes across Malta, as well as illuminating our broader interpretation of the megalithic complexes in their landscape.

The fieldwork at Ġgantija also tackled a number of the major *FRAGSUS* questions, as listed in Table 5.2.

Notes

1 *FRAGSUS*: Fragility and sustainability in restricted island environments: Adaptation, cultural change and collapse in prehistory. A collaborative programme of research between Queen's University Belfast, Heritage Malta, Cambridge University, the University of Malta and the Superintendence of Cultural Heritage, Malta. European Research Council seventh framework programme (FP7) 'Ideas' Advanced Grant: 323727. Principal Investigator: Prof. Caroline Malone http://www.qub.ac.uk/sites/FRAGSUS/

2 John Otto Bayer was born on 12 August 1780 at Kingston-upon-Thames and after a military career, arrived in Malta on 9 June 1815. He served as Civil Head of Gozo (Deputy Governor) between 1 May 1816 – March 1818 and again 15 Dec 1819 – to late in 1825. His activities in archaeology on Gozo seem to have taken place during his second tenure, and probably ceased in 1825, when he became ill and returned to England. He died in the Grosvenor Hotel on Bond Street, London, 4 July 1826.

Chapter 6

Kordin III

Rowan McLaughlin, Catriona Brogan, Eóin W. Parkinson, Ella Samut-Tagliaferro, Simon Stoddart, Nicholas Vella & Caroline Malone

6.1. Introduction

The following presents the results of the four-week excavation campaign at the Kordin III megalithic complex in June–July 2015 (site code: KRD2015), Paola, Malta (Fig. 6.1). The excavations were undertaken by the *FRAGSUS*[1] research team, with assistance from students from the University of Malta. The excavations at Kordin III were aimed at locating intact archaeological deposits related to the Temple Period in order to retrieve samples for radiocarbon dating, as well as palaeoenvironmental and palaeoeconomic reconstruction. Following the findings of previous excavation campaigns at Taċ-Ċawla, Santa Verna, Ġgantija and In-Nuffara, all located on Gozo, the Kordin III excavations sought to establish a relative and absolute chronology for the site and the wider Temple Period on Malta, as well as to understand the environmental and geoarchaeological setting of the Kordin III complex and consider its relationship with the lost sites of Kordin I and II (see Fig. 6.8)

6.2. The site

6.2.1. Location and physical setting

Kordin III forms part of a larger megalithic landscape that also comprised two nearby groups of prehistoric 'temple-like' monuments, known as Kordin I and II (also referred to as 'Cordin' and 'Corradino'). Both Kordin I and II were recorded and partially excavated between 1892 and 1909 (Figs. 6.2 & 6.3), but their remains have since been lost to building and development (Ashby *et al.* 1913; Caruana 1896; Evans 1971, 67). The approximate location of the two lost monuments has now been developed as an industrial estate in the 1960s (Figs. 6.4 & 6.5). Their destruction was probably contemporary with the demolition of a large fortification wall, part of which still survives today (Fig. 6.7). The Kordin sites are located on the east-facing slopes of a hill along the southern margin of the Grand Harbour of Valletta and are situated near the Tarxien temples and the hypogea at Ħal-Saflieni and a lesser known site, Santa Lucija.

Before the constraints now imposed by modern-day buildings, walls and trees, those standing at Kordin III in the past would have had extensive views from the site to the west over some 23 sq. km; a view that ranged as far as the Mellieħa Ridge, some 13 km



Figure 6.1. *Location map of Kordin III.*

away. This prominence can be demonstrated by the application of 'viewshed' analysis in a computerized GIS (Fig. 6.6; Chapter 12). Kordin III is located on disturbed soils upon Globigerina bedrock at 35.87°N, 14.50°E at an elevation of around 40 m.

6.2.2. History of the site

In 1908, a group of megalithic ruins were identified on Kordin hill close to Paola (Figs. 6.2 & 6.2). The ruins were found in a field named Ix-Xagħra ta' Cordin, located south of the road which led down into Marsa from the Military Detention Barracks. At the beginning of the twentieth century, the site was defined by a mound of earth, from which large slabs and limestone blocks stood out. Kordin South, today known as Kordin III, was first excavated in May 1909 by Thomas Ashby of the British School at Rome together with R.N. Bradley, T.E. Peet, and N. Tagliaferro (Fig. 3.6 shows images of the 1909 works). The goal of the 1909 excavation was to identify the extent of the megalithic ruins. During the first research visits, the outline of two apses and a large stone at their entrance were identified amongst the scattered remains. Site works began with soil removal in specific areas that traced the extent of stone alignments. These localized interventions later developed into the clearance of almost the entire archaeological site. Several areas revealed floor levels and fills that were excavated, some only partially, others down to bedrock. As work progressed, some areas of the remains were also reconstructed. The remains explored during the 1909 excavation were recorded and at least two site plans of the archaeological site were drawn. The cultural material was described using Tagliaferro's pottery classification and compared with other sites in Malta and Gozo, Ħal Saflieni in particular. Despite this, comparative dating of the various types of pottery proved futile. Details on this intervention were published by Ashby *et al.* (1913). In 1925, a boundary wall was constructed to close off Kordin III (Fig. 6.7) and to ensure that the curtilage of the site was protected as an ancient monument. In retrospect, the wall (instigated by Zammit) ensured the survival of the site, as the area became rapidly industrialized in the mid-twentieth century.

The site of Kordin III was subject to further archaeological excavations in 1954 in a programme of research that aimed to understand the chronological sequence of early Malta (Evans 1971, 67). A number of small trenches (Trenches A–E) were opened by John D. Evans in different locations within the Kordin III main

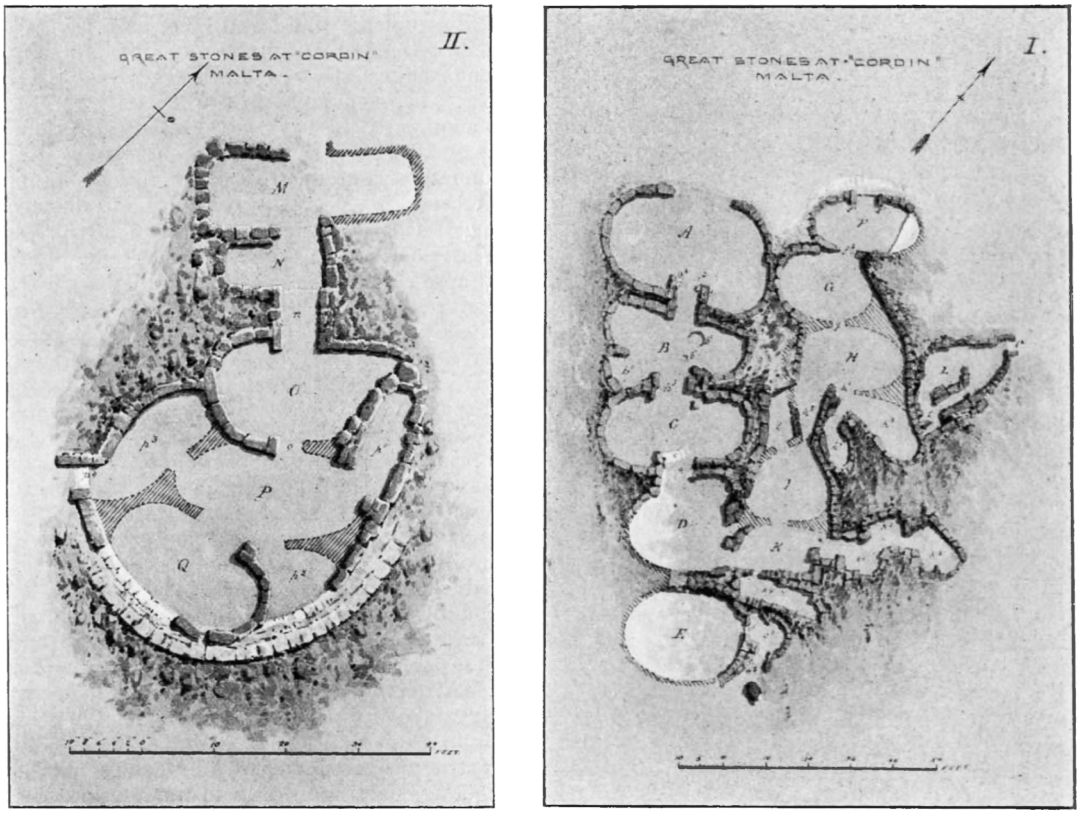
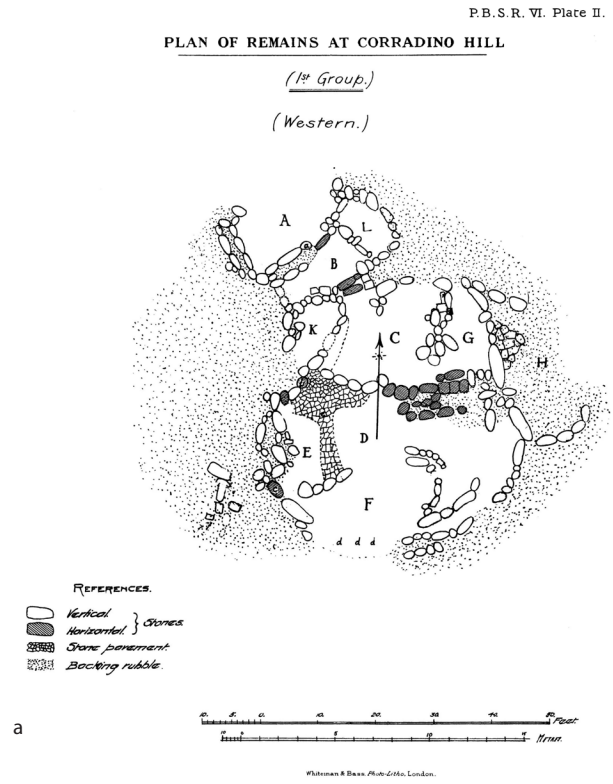


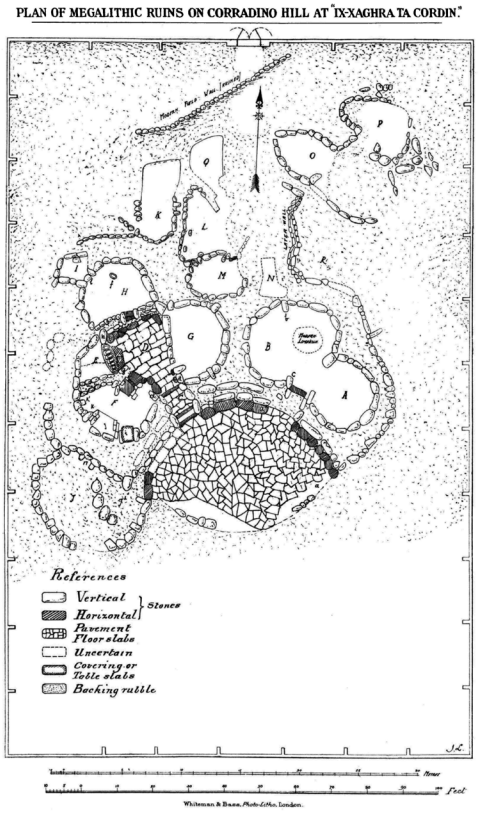
Figure 6.2. *The temples of Kordin I and Kordin II as recorded by Caruana (1896).*



a



b



c

Figure 6.3. *Ashby's plans: a) Kordin I; b) Kordin II; and c) Kordin III (Ashby* et al. *1913).*

temple complex and the smaller northern structures as illustrated in Figures 6.2 & 6.43 to test stratigraphy and chronology. The 1953 intervention was reported in Evans's 1971 publication on the Prehistoric Antiquities of the Maltese Islands. Evans included a site plan of Kordin III, adapted from Ashby *et al.*'s 1913 excavation plan (Fig. 6.10). Other records published in 1971 included a section drawing of the stratification identified within Trench C, as illustrated in Figure 6.11. Through these excavations, the intent was to date or at least phase, the monument and re-assess the pottery sequence. The results suggested that although the site contained earlier buildings, the surviving remains dated from the Ġgantija phase (*c.* 3600–3100 BC).

In 1957, restoration works at the Kordin III site were undertaken to stabilize damage incurred during WWII when the site was hit by blasts from explosive bombs, some of which also shattered the boundary wall. These events had littered the site with debris and were reported to have caused considerable damage to the megalithic ruins. During the early post-war years, more stone slabs from inside the apses and passages of Kordin III were dislodged by intruders.

Further exploratory trenches were cut by David Trump in July 1961. Trump's interventions at Kordin

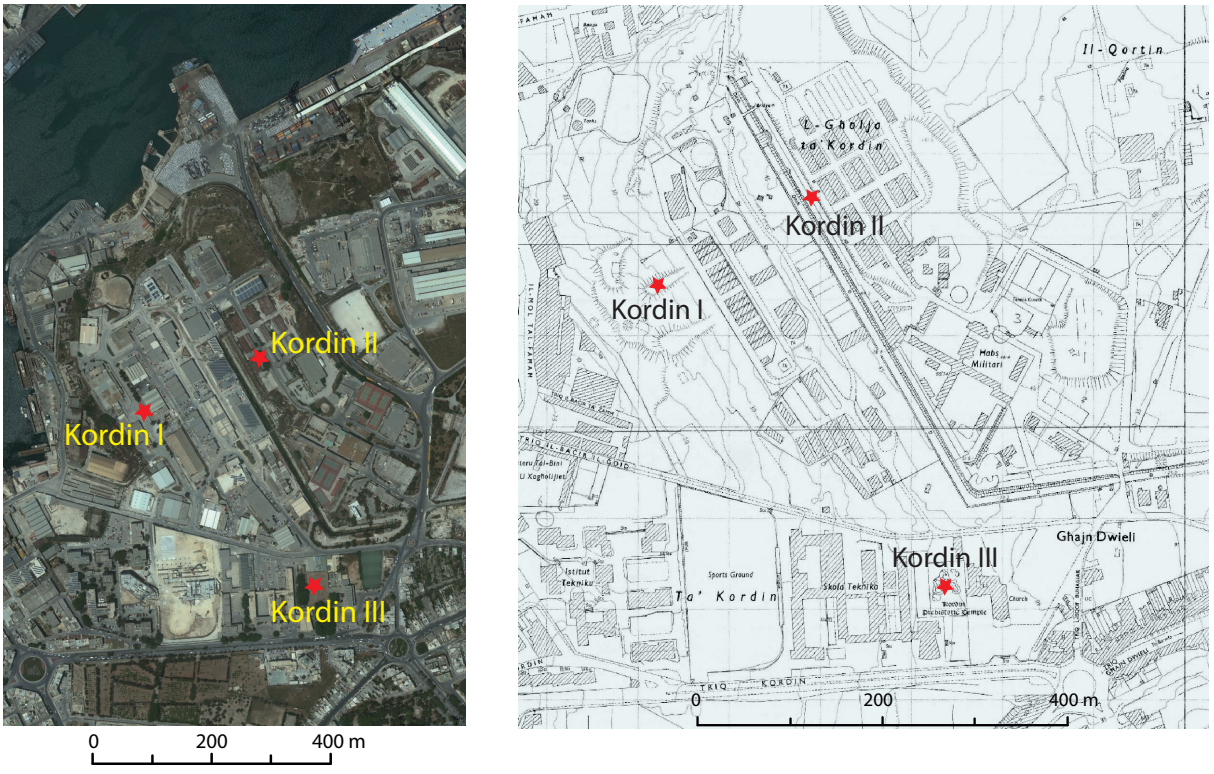
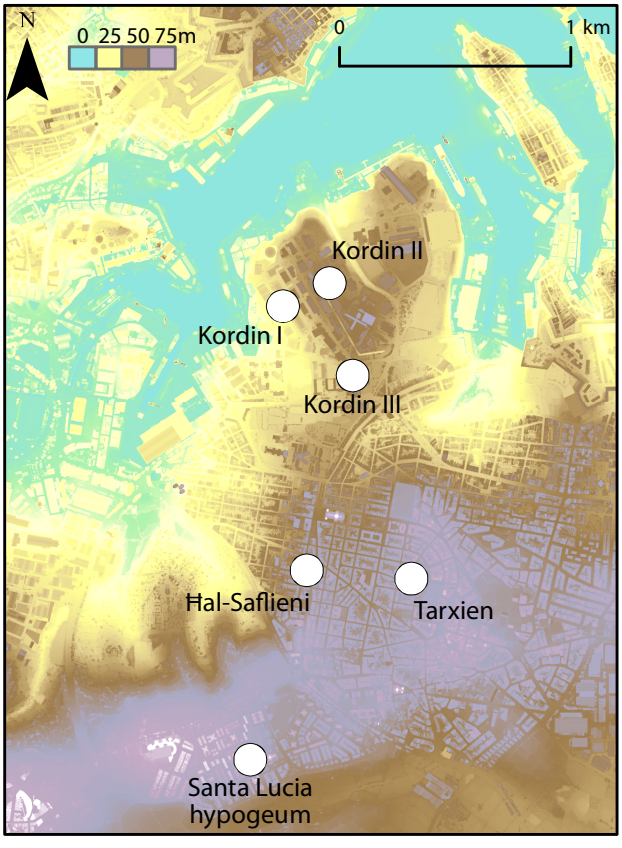


Figure 6.4. *Orthophotograph (left) and 1968 survey map showing the location of the Kordin temple complexes (by permission of the former Malta Environment and Planning Authority).*



III were associated with his second campaign at Skorba and other sites, which aimed to clarify the chronological sequence for Maltese prehistory especially after the Skorba excavations had indicated the transposition of the Żebbuġ and Mġarr phases. During this intervention, three trenches (Trench A – C) were opened as illustrated in Figure 6.11. In his field notes, held at the National Museum of Archaeology, Trump concluded that Kordin III secured the sequence of the Mġarr–Ġgantija phases.

In 1980, several prehistoric Maltese Temple sites were inscribed on the World Heritage List, but the list excluded Kordin III. From 1987 to 2016, the site was managed by a voluntary organization, Fondazzjoni Wirt Artna, whilst the other sites were cared for by the Museums Department/Heritage Malta. Between 2001 and 2004, the site was used as a case-study for the TEMPER Project led by the University of Cambridge (Borg 2007). In 2006, the Department of Classics and

Figure 6.5. *Location of prehistoric sites in the area with a shaded relief digital elevation model derived from LiDAR.*

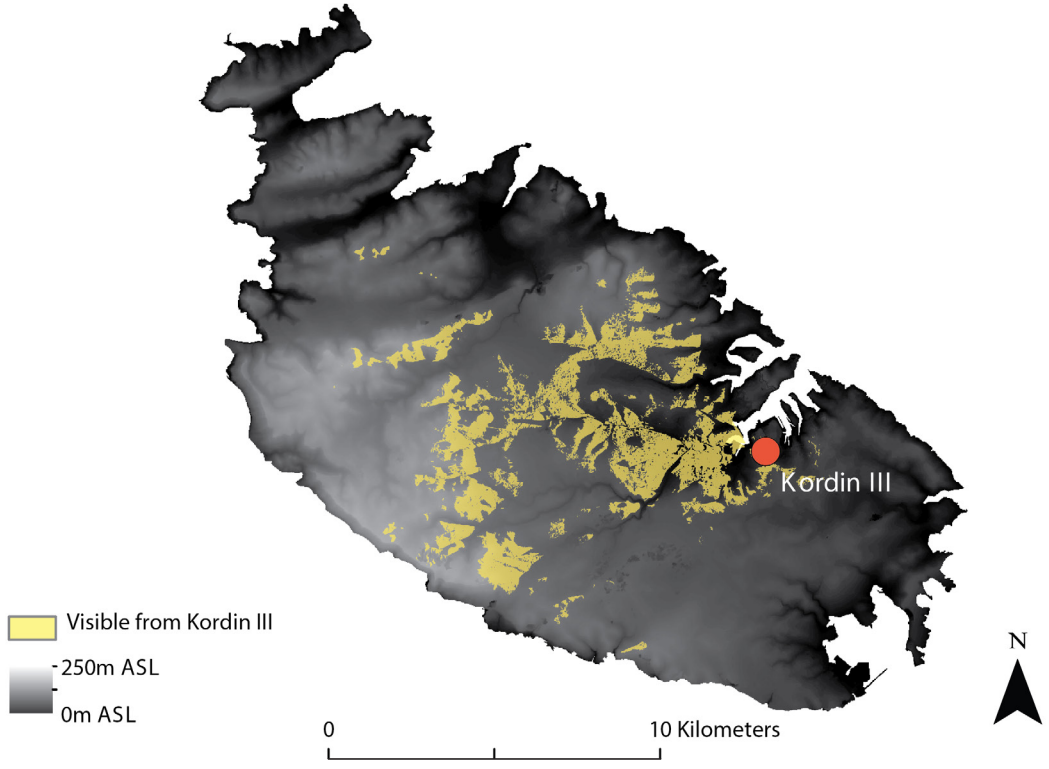


Figure 6.6. *Location map of Kordin III also indicating the ground-level viewshed calculated using a LiDAR-derived digital terrain model of Malta.*



Figure 6.7. *Image of Kordin III surrounded by the enclosing wall before the area was developed as an industrial estate (1925).*

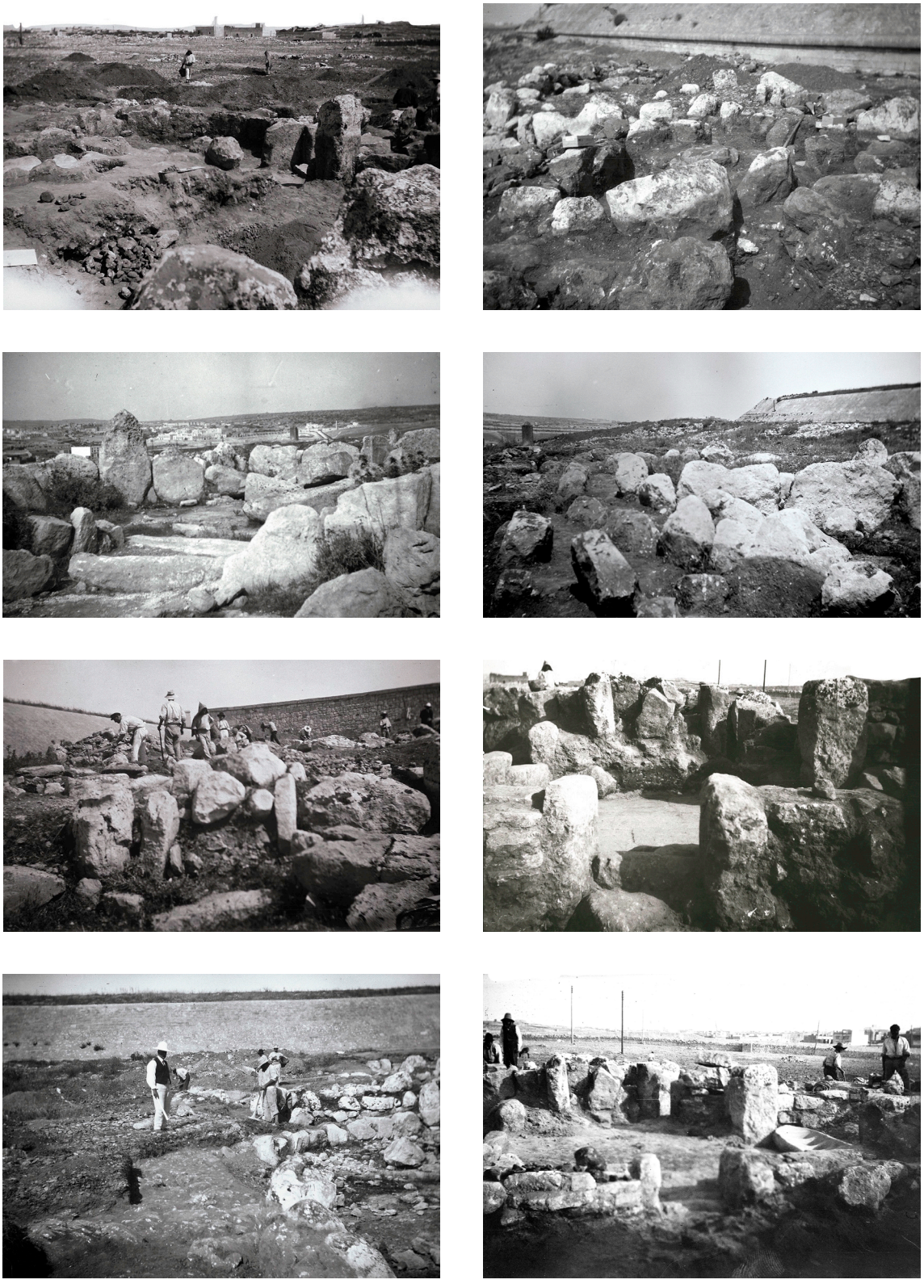


Figure 6.8. *Site photos from Ashby and Peet's 1909 excavation at the Kordin sites (Ashby Archive photographs, reproduced with permission, The British School at Rome, all rights reserved (1-XXX.075; 2-XXXVIII.023; 3-TA-XXVII.048, 4-XXX.065; 5-XXX.055; 6-XXX.087; 7-XXX.068; 8-XXX1.001).*

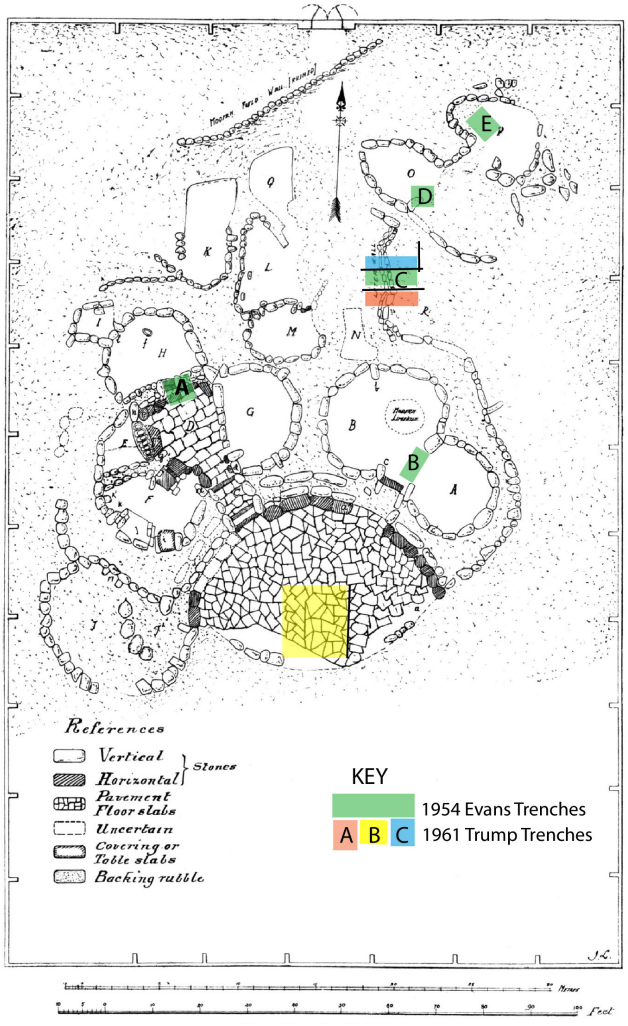


Figure 6.9. *Ashby's plan of Kordin III showing the locations of Evans' and Trump's trenches (prepared by Mevrick Spiteri for the* FRAGSUS Project*).*

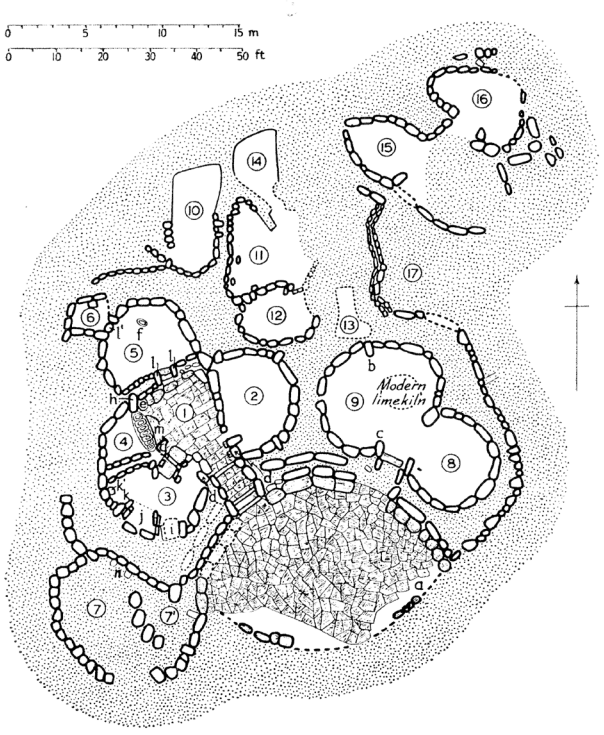


Figure 6.10. *Evans' plan of Kordin III (adapted from Ashby* et al. *1913).*

Archaeology at the University of Malta carried out a survey of the monument in the northeastern corner of the site, and recorded the trefoil-shaped structure typical of temple buildings (Fig. 6.12), as had been suggested previously by both Magro Conti (2000) and Pace (2004). Heritage Malta (HM) assumed management of the site in 2016.

6.3. Methodology and personnel

The 2015 excavation took place from 22 June to 17 July. Excavation was done entirely by hand, under the direct supervision of University of Malta and *FRAGSUS Project* personnel. The excavations were directed by Prof. Caroline Malone and Dr Nicholas Vella, assisted by Dr Reuben Grima, Dr Simon Stoddart, Dr Rowan McLaughlin and Ella Samut-Tagliaferro. The crew consisted mainly of students from the University of Malta (see acknowledgements and Fig. 6.44), supervised by Jeremy Bennett, Dr Catriona Brogan, Rebecca Farrugia, Prof. John Betts and Eóin Parkinson. In this report, levels are given in metres above sea level (ASL). In total, five areas were granted a permit for excavation from the Superintendence of Cultural Heritage (SCH), three within the confines of the walled site and two outside it to the west. These were Trench I (A, B and C), Trench II (A and B), Trench III and outside the confines of the enclosed walled temple site, Trench IV (A and B) (Fig. 6.13). The areas within the walled area incorporated shade protection (see photos) as required for June-July fieldwork. The narrow width of the trenches and their precise orientation was dictated by the excavation permit, and this arrangement did not enable complete investigation of some of the structural aspects or deposits. The trenches were sited to test a variety of external parts of the temple complex, areas that had not received much attention in the earlier campaigns and were little understood in relation to the work done by Ashby and Peet during the first major campaign of work more than a century ago (§6.2.2).

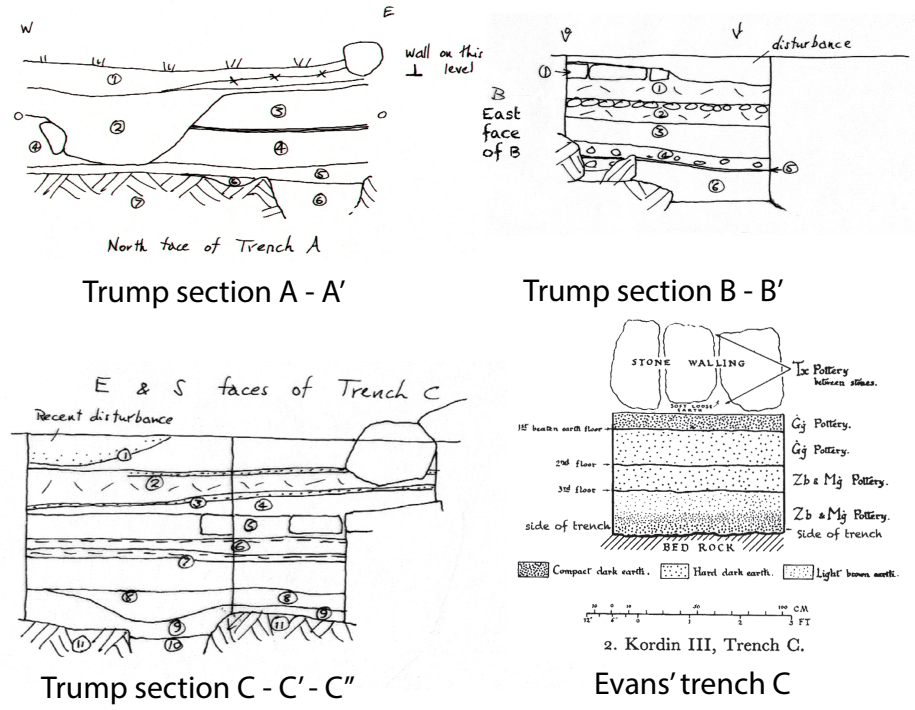


Figure 6.11. *Evans' and Trump's section and trench drawings, the location of which are shown in Figure 6.9.*

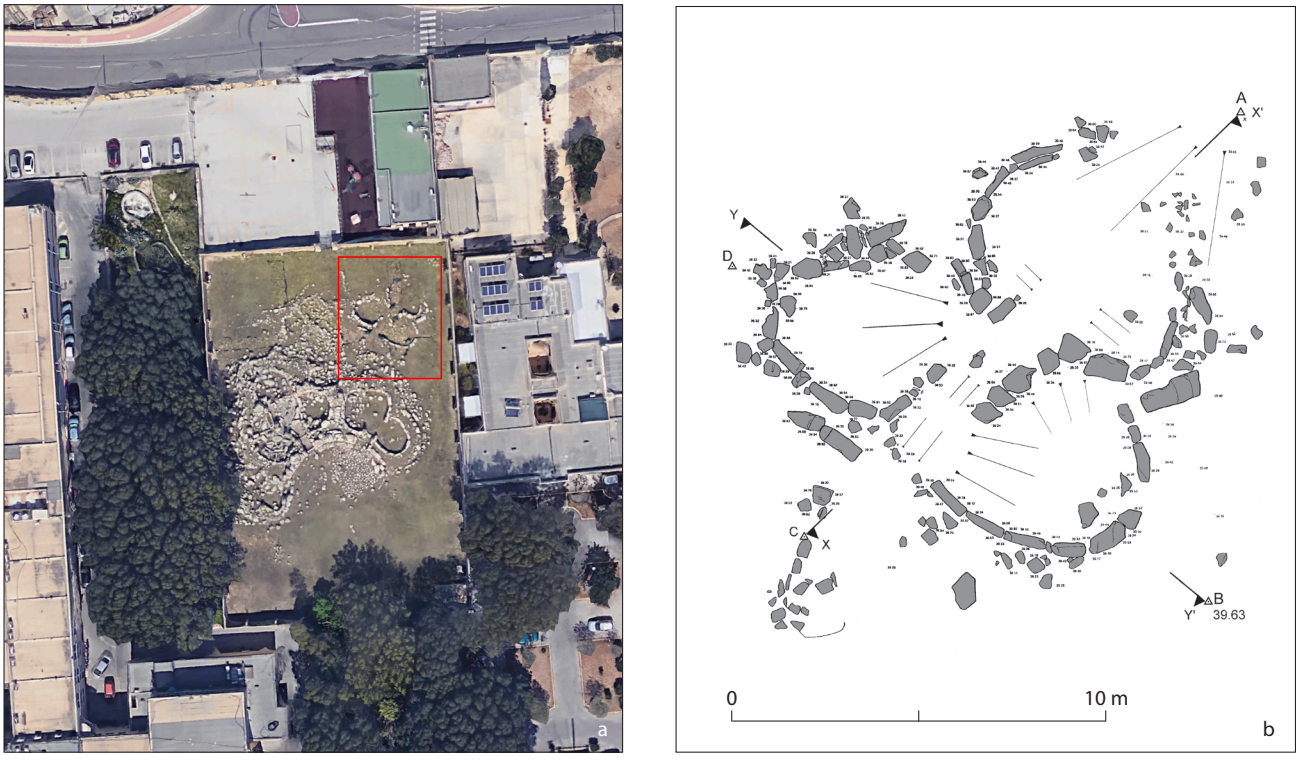


Figure 6.12. *a) Aerial view of Kordin III; b) detail showing the survey carried out in 2006 by the University of Malta.*



Figure 6.13.
Location of the 2015 trenches at Kordin III overlain on air photograph.

6.4. Results: Trench I

Trench I consisted of three 2 m-wide interconnected lengths forming a 'T' near the northeastern corner of the site, designed to investigate a small trefoil temple structure (identified as 'O' by Ashby *et al*. (1913), and 15-16 by Evans 1971). Trench IA ran east–west through the area, Trench IB ran north-south from the northern edge of Trench IA, and Trench IC ran north-south from the southern side of Trench IA (Fig. 6.14). Topsoil throughout Trench I was identified as Context (1),[2] a firmly compacted loam with a covering of grass and other weeds, from which the megalithic remains protruded. Topsoil (1) was removed by mattock and trowel to reveal a number of different underlying spreads of soil and stones, some of which were directly associated with the upstanding megaliths, and some that were clearly spreads of material deposited during relatively recent times. These are described below.

6.4.1. Trench 1A

Trench 1A investigated the area within Apse 'S' of the trefoil structure, the threshold area that led into it, and extended into an area immediately the west of the megalithic structure. Three megaliths in the western part of the trench (M16, M17 and M18) were assigned the context number (25). The southern part of the lobe wall, where it intersected with the trench, contained five megaliths (M1, M2, M3, M4 and M5) which were assigned context number (26); and three megaliths (M42, M43 and M44) at the northern edge of the wall were assigned Context (27) (Fig. 6.15).

6.4.1.1. Contexts inside 'Room S'

Investigation of the foundations of 'Room S' were undertaken in two small sondages dug to bedrock at 38.45 m ASL. A 1.25 × 0.75 m sondage was placed near the western entrance of the 'Room', and a 0.8 × 0.7 m sondage was placed against the inner lobe wall (Fig. 6.15). Both sondages contained a similar stratigraphic profile. Above bedrock in the western sondage, Context (99) formed an orange-brown silt loam layer with a distinctive dry and crumbly texture. The layer contained nine highly fragmented pieces of Skorba pottery, and nothing from the Temple Period, indicating that the layer was thus a remnant palaeosol, containing material from a much earlier phase of occupation than the overlying structure. A radiocarbon date of 3670–3380

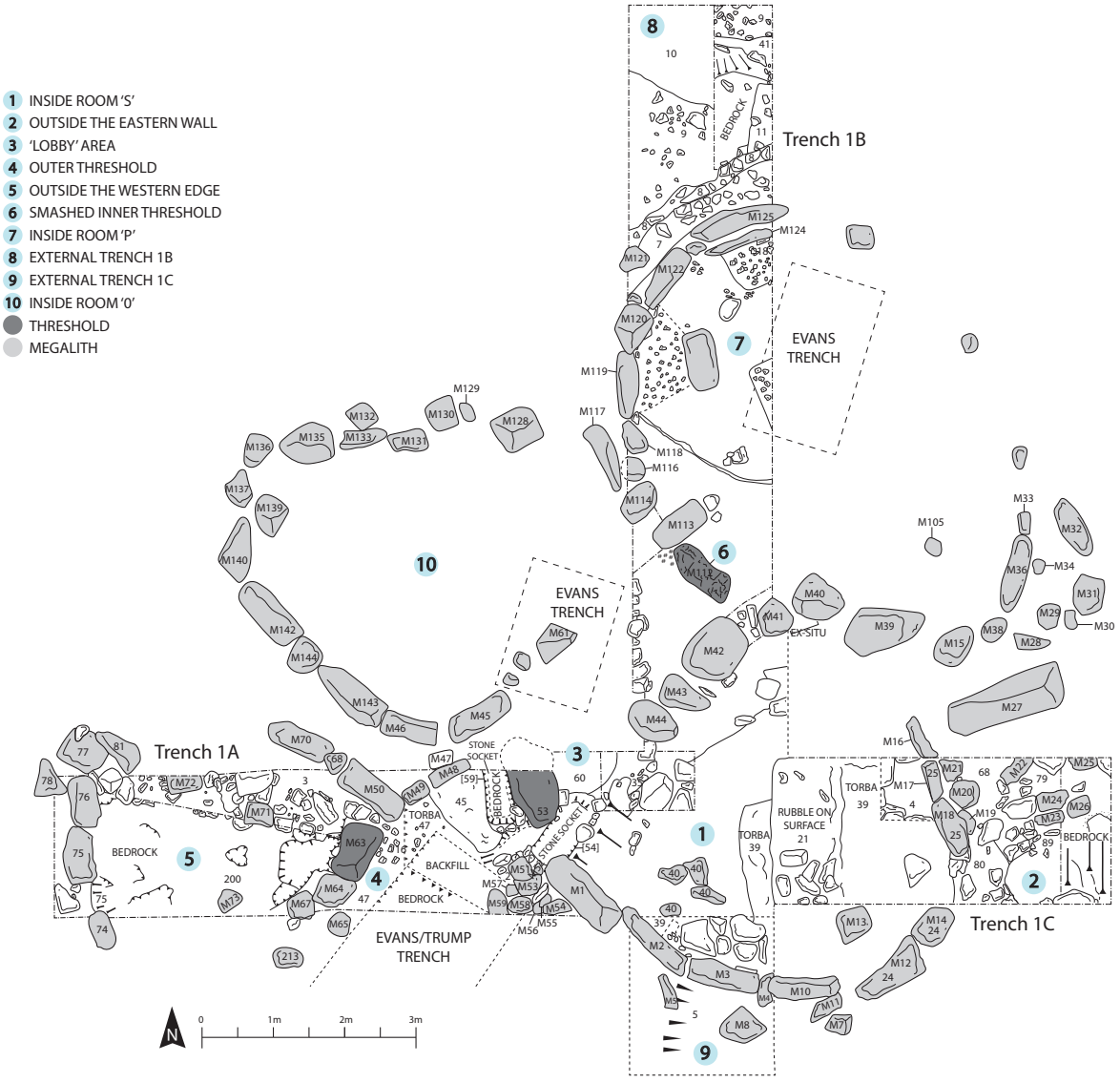


Figure 6.14. *Overview of Trench I.*

cal. BC (UBA-33019, 4803±50), however, was obtained from a sample of *Olea* cf. *europa* (olive) charcoal from Context (99). This date relates to the Mġarr phase (Fig. 6.16), and provides a lower boundary for the period of the activity and structures that lay above. A virtually identical layer, Context (91B), was exposed in the eastern sondage. Above Context (99) in the western sondage Context (96) presented a dark brown silt loam. This was interpreted as palaeosol from a pre-temple phase. Although some 52 pottery sherds were found in Context (96), few were diagnostic (the latest being one Mġarr-phase sherd). Samples from charred *Hordeum* and *Triticum* grains in the layer returned radiocarbon dates of 3510-3200 cal. BC (UBA-33018, 4614±33) and 3090-2900 cal. BC (UBA-33017, 4363± 40) respectively. Context (91) was a very similar deposit to (96), and was exposed in the eastern sondage above (91B). The layer did not contain any pottery, but a wet-sieved sample of the fill contained a charred *Triticum* grain which was radiocarbon dated to 3500-3150 cal. BC (UBA-33015, 4593±31). Taken together in a Bayesian model of two successive phases, the radiocarbon evidence obtained from these trenches indicates that the pre-temple soils dated to a phase of activity falling roughly between 3500 and 3000 BC – the Ġgantija phase (Fig. 6.16).

The equivalent Contexts (40) and (92) that lay above the remnant soils were encountered next. These formed a layer of large, flat stones arranged to form a level and flat foundation for a *torba* (ground limestone plaster surface) floor layer, much like stone paving in



Figure 6.15. *Trench 1A and 1C contexts.*

appearance. Similar stone paving is found elsewhere at Kordin III, most notably in the entrance court of the main temple. These stones were directly covered by a *torba* layer, discussed below (30/39/90) (Figs 6.14 & 6.15); this may suggest that the paving slabs found elsewhere at Kordin were also foundation deposits, and were also once covered by *torba*, which has long-since eroded away. The recurrence of a paving-stone feature is a point of contrast with other temple sites in Malta, where typically spreads of smaller stones appear to have had the same foundation purpose (e.g. Evans 1971, Plate 23). Indeed, it is interesting that elsewhere in Trench I, smooth exposures of bedrock had been used as level foundations for much of the megalithic structure, hinting that the paving slabs functioned as a synthetic bedrock, and achieved the required level for a floor. There may also be a symbolic significance, beyond the functional or mundane, that the particular construction methods had in the minds of the builders.

The *torba* covering these stones was Context (30), comprising a *torba* floor, pale grey in colour. The floor butted against megalith M64 and covered the

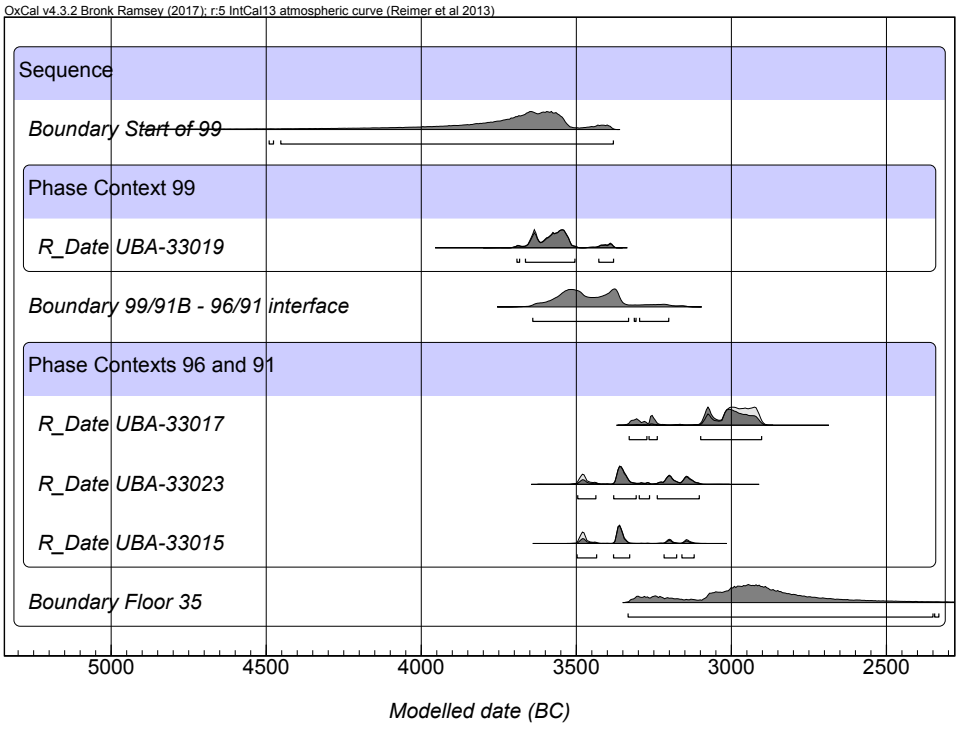


Figure 6.16. *Bayesian model of the radiocarbon dates obtained from sondages in Kordin III Trench I.*

'threshold' leading to Apse 'S' (Fig. 6.15). The layers of soil overlying different areas of the *torba* were excavated separately, and so the same layer was assigned the context numbers (39) and (90), until it became apparent that the deposits were all the same entity. The upper surface of *torba*, constituting the relatively flat floor within Apse 'S', was assigned as Surface {35}. The apse space measured some 3 m in diameter, and was encircled by the apse wall: Contexts (25), (26) and (27). The *torba* floor Surface {35} was exposed over the entirety of the trench, but was left intact, except for the two sondages discussed above. Bayesian analysis of the radiocarbon determinations sought from beneath {35} suggest that the building was constructed after 3300 cal. BC (Fig. 6.16).

A sondage was opened directly east of the lobe wall of Apse 'S' in deposits which showed signs of disturbance from a previous excavation, presumably that of Ashby in 1909. At the base of the sondage, Context (29) comprised a concentration of medium- to large-sized stones, 25–35 cm in diameter, and was interpreted as stony packing material set against the wall (25); this was left intact and not excavated further. Above this was Context (28), an accumulation of fine silt loam with large stones embedded within it. This was followed by general backfill Contexts (13) and (12), a brown to reddish-brown mottled soil, specked with broken *torba* differentiated on account of the greater frequency of large stones compared with Context (13).

Elsewhere, removal of the topsoil in the eastern area of Apse 'S' revealed deposit (23), a disturbed dark brown, gritty silt loam, possibly resulting from the collapse/ movement of the megaliths in more modern times. A similar, but less compacted, layer was found immediately below this was identified as Context (22). Overlying (22), Context (3) formed a layer of medium to large flattish stones, which appear to have been set into Context (22), with finds of mixed prehistoric pot and modern materials, including glass.

Abutting Context (23) traces of *torba* floor were identified directly below topsoil at the northern edge of Apse 'S', at the junction of trenches 1A and 1B. The *torba* fragments identified as Context (16) had become mixed within a matrix of small stones with brown soil, and stratified below Context (17). Context (17) formed a 10 cm-thick layer of firm, dark brown silty loam, devoid of cultural material, which had accumulated during some unknown period, between the prehistoric temple layers and modern times.

6.4.1.2. 'Outside' the eastern wall

The eastern end of Trench IA exposed a 2.1 m-long section through deposits 'outside' the curving apse wall of the megalithic structure. Here, a series of buried

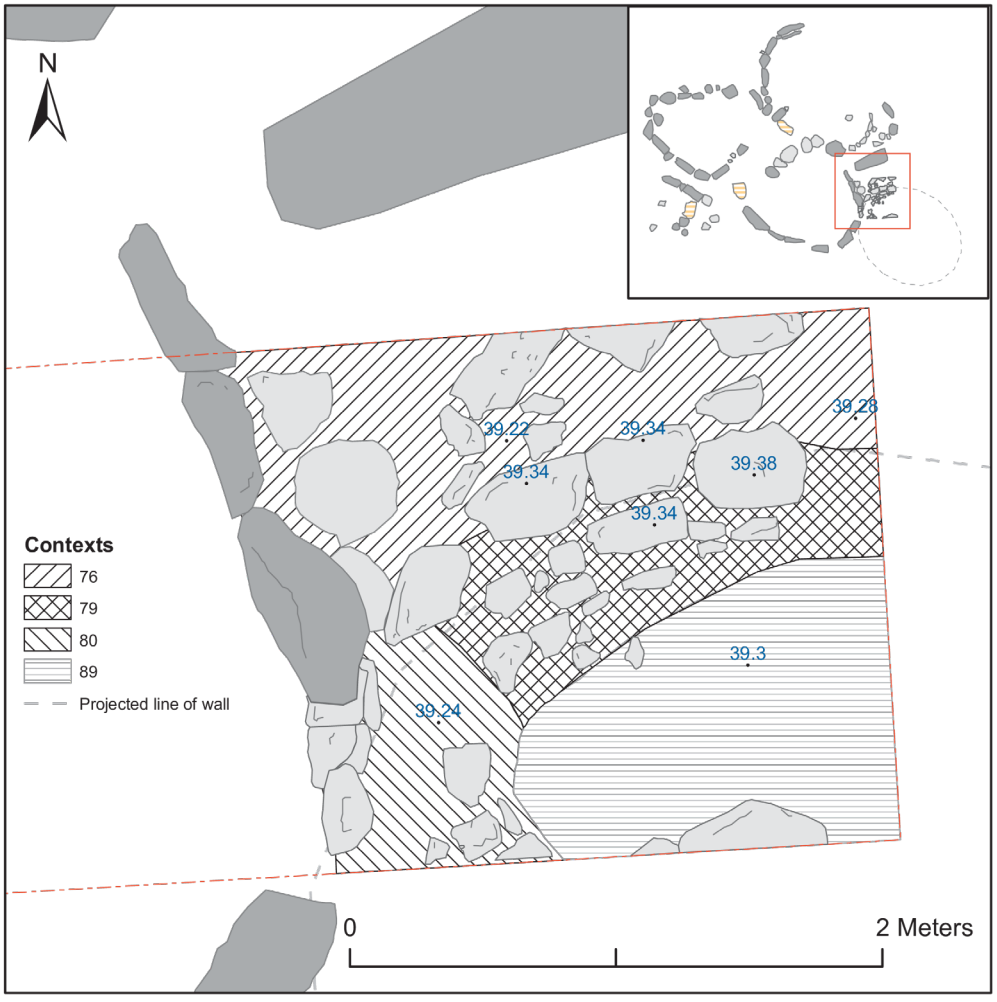


Figure 6.17. *Mid-excavation plan of eastern end of Trench I showing stones (68), associated contexts, and projected outline of apse (see also Fig. 6.35).*

soil horizons were encountered, but no clear structural features or floors were found, and the stratigraphy could not be matched directly to the layers bounded by the megalithic wall. These layers were left intact, except for a 0.7 m-wide sondage dug to bedrock at 38.54 m ASL across the easternmost end of Trench IA (Fig. 6.15). This sondage revealed Context (97) at its base, a firm brown layer of dry, crumbly earth, 0.45 m deep, which was perhaps deliberately deposited as a foundation layer. The ceramic finds consisted of highly fragmented prehistoric pottery, including at least one identifiable sherd of Ġgantija phase pottery, thereby suggesting that the floor and associated structures also date to the Ġgantija phase or later. A spread of flattish, medium sized stones, Context (68), lay above. These stones were roughly arranged in three distinct lines, and were perhaps the vestiges of a robbed-out wall (Fig. 6.15). A quern stone (SF159) was found among these stones. At



Figure 6.18. *Photograph of* torba *floor (89) and sondage in Context (97).*

the same stratigraphic position with (68) (Figs. 6.17 & 6.18) were three mixed layers of greyish soil, Contexts (76), (79) and (80), and a *torba* floor, Context (89) (Fig. 6.18). These layers contained an assemblage of mixed very highly fragmented Earlier Neolithic and Temple Period pottery. This was covered by Contexts (28) and (44) forming a greyish silty soil, as a lens within (28), each containing a small assemblage of mixed prehistoric pottery. The superficial topsoil layers were (12) and (13). The floors and walling revealed at this end of the trench suggests the megalithic buildings in this part of the site were once more complex in plan (Figs. 5.14 & 6.15). Further excavation or geophysical survey in the northeast corner of Kordin III would most probably reveal hidden structures, now buried by only a few centimetres of topsoil.

6.4.1.3. 'Outer threshold' area

Further west, Trench IA captured the line of the outer wall associated with the western apse of the building, and another threshold stone with associated megaliths. The excavation revealed a patchwork of *torba,* stones and other deposits. These were excavated to the level of the floor of the entrance to the megalithic building, which was a *torba* floor found at 39.24 m ASL and identified as Context (45). This was a firm, pale-coloured plaster layer covering an area at least 0.9 m north–south by 0.5 m east–west, somewhat disturbed at the western end and had a sharp, smooth edge at its eastern side. This was covered by Context (46), a brown silt loam containing a piece of struck obsidian debitage (SF113) and a small quantity of prehistoric pottery. In places, between Contexts (45) and (46), traces were found of another, poorly preserved *torba* floor, Context (47). A square stone socket [50], with vertical sides 0.6 m long and 0.25 m deep was set into (46). The Fill (51) of the socket was a reddish brown soil, and contained highly fragmented pottery and animal bones; it was perhaps the remains of a more widespread rubbish layer once covering this part of the site, but only preserved within the stone socket.

South of these floors and associated layers, Context (53) comprised a flattish stone, also identified as M63, with a longitudinal wide, shallow groove worked across it. This butted against the *torba* floor and was interpreted as an intact, *in situ* and inset threshold stone, or perhaps the base of a posthole, at the western side of Apse 'S'. It seems likely that stone M63 originally formed part of the entryway to apses 'O' and 'P' from the north of Apse 'S'. Next to it, Context [59] represented a stone socket measuring 0.7 × 0.3 × 0.15 m reaching bedrock. The socket was filled by a friable layer of reddish-brown fine sandy loam, Context (52), which also covered threshold M63 and partly covered Context (39), the main *torba* floor deposit in Apse 'S', described above. This layer contained a very highly fragmented mixture of prehistoric pottery. Above this was topsoil (Fig. 6.16).

The excavation trench of Evans was also rediscovered in 2015. This had been extended by Trump and was located at the southern edge of the Trench IA, which overlapped it by approximately 0.7 m. The trench was assigned cut number [82] and contained backfill (83), a brown fine silty clay loam that had seemingly been sieved in the past as it contained low pottery counts and few other coarse components.

6.4.1.4. 'Outside' the western edge of the building

The archaeological deposits uncovered west of threshold (53) were 'outside' the walls of the megalithic building and, therefore, of a somewhat different character. At the extreme western end of Trench I, a 0.5 m sondage was dug to investigate the depth of deposits and identify whether or not there were features such as floors associated with the rather random arrangement of megaliths visible on the ground surface, of which megaliths M74, M75 and M76 were the most prominent members. The sondage, however, revealed only one layer, Context (81), above bedrock. This was a relatively loose reddish-brown silt loam that measured 0.4 m thick and contained Ġgantija-phase pottery. The eastern section face of the sondage was extended into the deposits under three megaliths (M74, M75, and M76), which formed a line near the western edge of the trench. At their base there was a layer of medium-sized stones (94) enveloped within Context (95), a compacted sterile layer of clay and stone. Packing material, Contexts (86) and (87), made up of yellowish-brown silt loams with some orange mottling in the case of (86), surrounded the megaliths. A sherd of Saflieni-phase pottery was found in (86) along with 13 unidentifiable Temple Period sherds; this was the only occurrence of Saflieni pottery in a prehistoric context found during the 2015 excavations at Kordin III.

Between the three megaliths M74–M76 and the threshold stone M63, there was a sequence of midden deposits. These were disturbed near the ground surface, but intact where buried deeply (Fig. 6.19). They spanned some 3.5 m of the trench, and existed to a depth of approximately 1 m. Above bedrock, Context (71) was revealed as a dark reddish-brown silt loam that was very rich in pottery and bone, and also contained charcoal, sometimes in concentrated pockets, and fine lenses of orange-coloured silt. When seen in section, it contained a patch of darker brown soil, Context (70), that had the appearance of being the fill of a feature cut into (71) (Fig. 6.19) The pottery assemblage from these contexts was dominated by Ġgantija-phase sherds, but also included a significant number of Mġarr-style

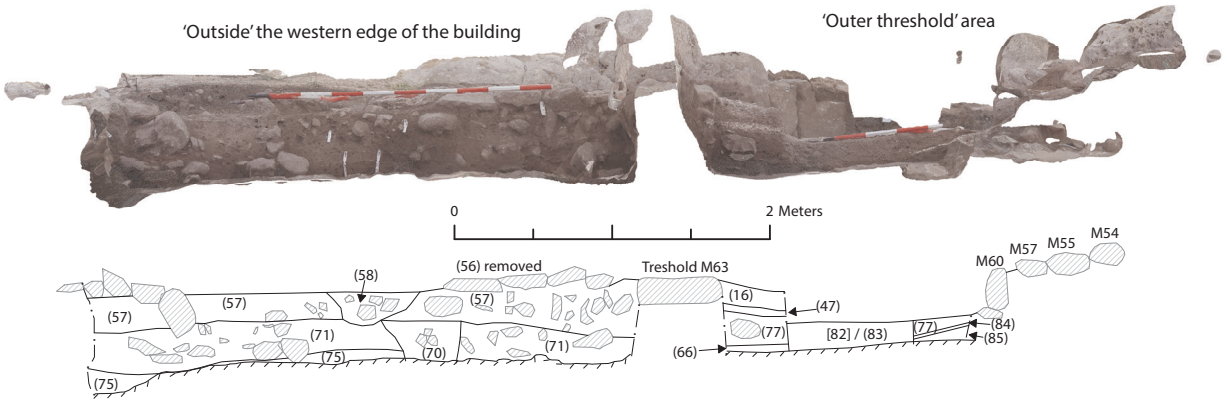


Figure 6.19. *Photographic section and section record of (70) and (71), of the western edge of the building.*

examples (Fig. 6.20). The deepest parts of deposit (71) were excavated separately as Context (75), as the matrix was somewhat firmer than the material above, and had a more pronounced pinkish hue, but was otherwise identical to (71) and indeed the boundary between the two layers was unclear (Fig. 6.19).

A layer similar to (71) was identified as Context (66), on the opposite side of megalith M63, (*i.e.* 'inside' Apse 'S'). Yet, because the excavation did not disturb megalith (71), it was not clear whether they were the same. The relative frequency of pottery sherds (e.g. Żebbuġ: Mġarr: Ġgantija), however, although similar was not identical in both contexts (Appendix A6.4). The upper part of Context (66) was excavated separately as Context (77), which was identical to the layer above except for less fragmented pottery. A *Hordeum* grain found within Context (77) dated the layer to 3630–3360 cal. BC (UBA-33016, 4684±46), confirming the Ġgantija-phase date for the deposit (Fig. 6.16). Below (66), bedrock was encountered. Taken together, however,



Figure 6.20. *Mġarr pottery from midden deposit (71).*



Figure 6.21. *Three stone discs from Context (71) (SF167).*

Contexts (71), (77) and (66), and (75) discussed above, represented a mound of midden-like material over which the megalithic structure was built. There was no natural, sterile soil in this part of the site, implying that the soil had been removed or had naturally eroded away before the midden material was deposited.

The outside edge of the megalithic wall was found to be encircled by a number of angular stones each approximately 0.25 m in length, assigned Context (72) (Fig. 6.19). Among these were two much larger stones which were assigned Context (73), and together with (72) formed a facade or revetment supporting the megalithic structure. Further west, Context (57) was a dark brown layer of fine sandy loam, containing pebbles, animal bone and a large quantity of prehistoric pottery. Above this, there was a spread of angular, wedge-shaped stones, Context (56), was enveloped in a mixed topsoil-like deposit, which also contained animal bone, much prehistoric pottery and modern debris. Within this layer there was a circular bowl-shaped modern pit, 0.4 m in diameter and 0.2 m deep, filled by Context (58), which was similar to (56) and contained struck obsidian and iron debris, that may have been fragments of ordnance derived from WWII.

6.4.1.5. Superficial contexts

A layer of stones (3) intermixed with friable loam (2) was uncovered under topsoil (1) at the western end of Trench IA (Figs. 6.14 & 6.15). Elsewhere in the trench, a friable, Context (4), a reddish-brown sandy loam, was detected. This contained a mixture of prehistoric and modern pottery sherds, glass and other debris and was clearly modern topsoil. It contained a scatter of large and medium-sized stones, Context (21), which did not form any structure or surface. These stones perhaps represented the collapse of parts of the megalithic structure during relatively recent times.

6.4.2. Trench IB

Trench IB captured the walls of the northern apse of the megalithic building which was previously designated Room 'P' by Ashby *et al.* (1911), and a passageway that led into it. The megalithic wall itself was named Context (6), and was a curvilinear alignment of five large megaliths (M119 to M115) and several other stones. One of these, megalith M122, had a small quantity of a calcareous plaster-like substance, Context (15), adhering to its southeastern vertical edge. The 'plaster' has been noted during the survey of the site in 2006, and was believed to be a remnant of internal rendering, once much more widespread over the inside walls of the apse. Another megalith, M123, had what appeared to be tool marks on the surface. Once topsoil was removed, each part of the structure was excavated separately, as described below (Fig. 6.22).

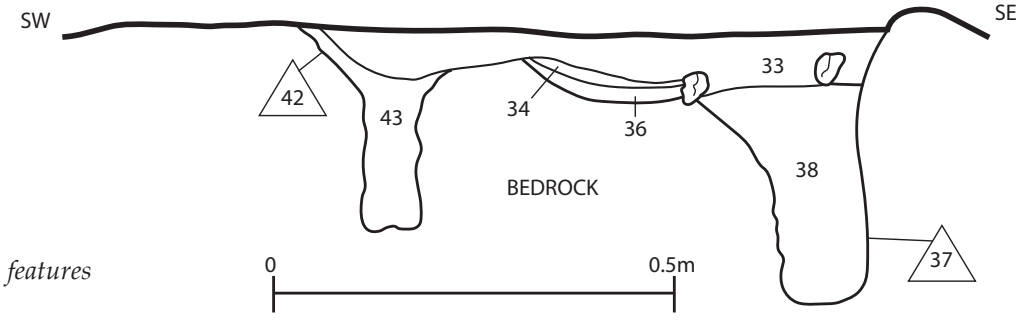


Figure 6.22. *Small features in Trench 1B.*

6.4.2.1. Inner 'smashed' threshold area (Figs. 6.14 (number 6) & 6.15)
Wall (27) formed an alignment of four megaliths in Trench I (M41–M44). This separated the main space, Apse 'P', from a rectangular passageway that became known during the excavation as the 'smashed threshold area'. This passageway originally led from the 'lobby' area into Apse 'P'. The bedrock found under this area had traces of *torba* adhering to it. In the centre of the passageway, a rather unusual threshold stone appeared to have been 'smashed' with the angular fragments left *in situ*. The apparently damaged stone measured 1 × 0.4 m, and was orientated northwest–southeast, standing proud of the bedrock by approximately 4 cm (Fig. 6.24). The surface of the stone, together with the surrounding bedrock, was Surface {69}. Covering this, Context (32) represented a jumble of large and small stones, soil and ground limestone dust within a matrix of sandy silt loam, interpreted as the collapsed remains of part of the megalithic structure, perhaps originally the roof. A large stone within this rubble was removed, and the pocket of soil found under it was sampled separately as Context (67) in order to date accurately when the collapse event may have occurred, but unfortunately no suitable sample for dating was found. A possible stone pendant (SF132) (Fig. 6.23) was found within this, together with four large sherds of Ġgantija-phase pottery. Contexts (14), (19) and (20) lay above this, all topsoil-like deposits containing prehistoric pottery but mixed with modern debris. Context (14) stopped rather abruptly along a line at right angles 1 m north of Wall (27), and hence seemed likely to signal a previous excavation trench – perhaps dating from Ashby's campaign in 1909 and was given cut number [65].



Figure 6.23. *Possible stone pendant (SF132), from Context (67).*

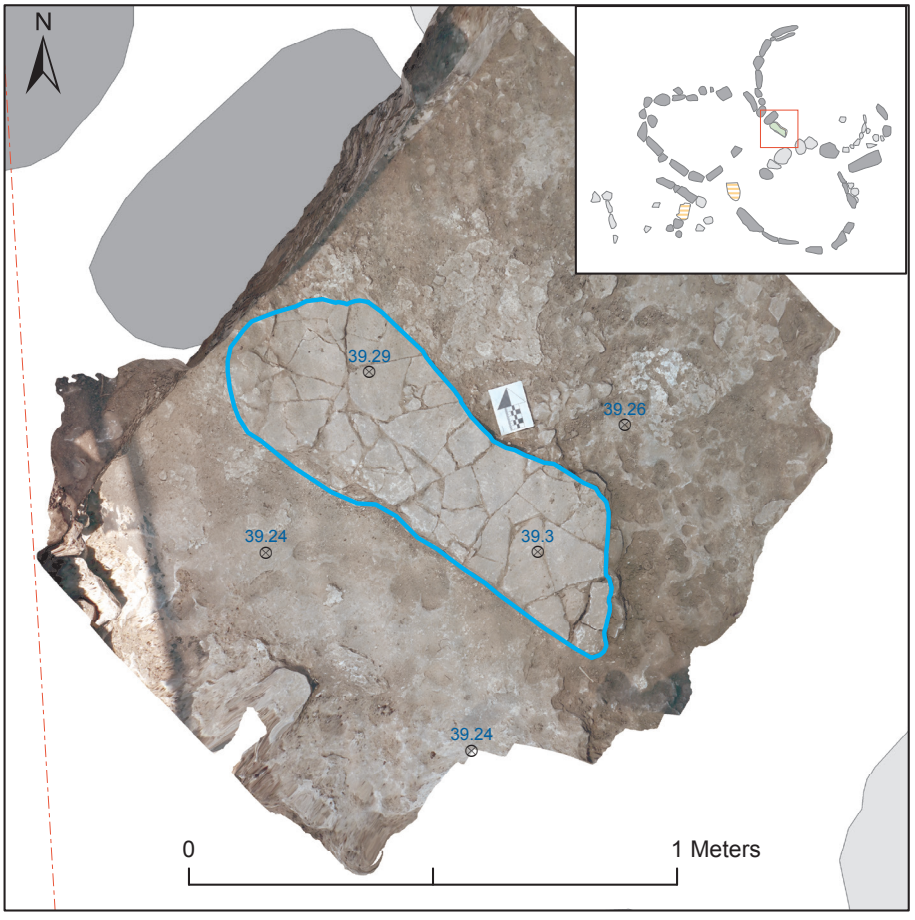


Figure 6.24. *Image of the smashed threshold stone, derived from a SfM model, with spot levels in meters ASL.*



Figure 6.25. *a) Smashed threshold stone in context; b) in detail.*

6.4.2.2. Apse 'P'

This was the northernmost identifiable structure at Kordin III, and the excavation here did not reveal any great depth of deposit. The wall of the structure was identified as Context (6). Bedrock was encountered *c.* 0.3 m below the ground surface at approximately 39.3 m ASL, over the entire span of the trench in Room 'P', except for several features, most of which were likely natural in origin, that had become filled with deposit. These included Contexts [49], a crevice, and Context (36), a spread of dry, gritty orange brown sterile silt clay found within a natural depression in the bedrock. A Layer (34) of consolidated, slightly porous brecciated limestone dust and coarse particles covered Context (36), and was perhaps the remnant of a *torba* floor. Crevice [49], which measured 0.7 m north–south and at least 0.5 m east–west, extended beyond the edge of the trench and was 0.7 m deep. Its fill Context (48), was a brown silt loam, weakly cemented against the edges of gully [49]. This contained undiagnostic prehistoric pottery, suggesting that perhaps it was not natural in origin, but had been deliberately buried to level out the site. Two possible features were cut into bedrock, [37] and [42]. Possible posthole [37] had steep, regular sides and a flat circular base 0.05 m in diameter. The opening measured 0.25 × 0.18 m, orientated north-east–southwest. The feature had sudden brakes of slope at all sides, which are characteristics of a structural feature of some kind. It was filled by (38), a mixture of brown silt, fine gravel and occasional small stones, and a few sherds of undiagnostic prehistoric pottery. An adjacent circular posthole [42] was 0.07 m in diameter, had vertical sides and an irregularly shaped but flat base. Its opening tapered outwards with curved sides, reaching a diameter of 0.15 m. Its fill, Context (43) was a mid-brown silt loam with occasional small stones and Skorba-phase pottery. It is therefore possible that both these cut features (Figs. 6.22 & 6.29) are unrelated to the temple, but instead date to an earlier phase of the site's history. These possible features were covered by Context (33), a dry, gritty mid-brown silt loam, clearly topsoil derived and much disturbed by roots and insects. The sequence was continued by Context (18) a thin layer of brown silt loam containing a very small quantity of highly fragmented and delicate prehistoric pottery, and topsoil (14).

Preserved on the inner face of the northern edge of the megalithic wall, on megalith M122, there was a remnant patch of plaster or render that presumably once covered the inside surfaces of the walls of this megalithic building. Further evidence of this material was unearthed during the 2015 excavation, as several pieces of 'plaster' were found in topsoil (14) where it butted the megalithic wall (6) (Figs. 6.14, 6.26 & 6.27).

The plaster fragments were seemingly identical in composition to the fragment still adhering to M122, Context (15), but had become dislodged from the megalithic wall and were enveloped in topsoil. The



Figure 6.26. *Photo-model of megalithic wall (6) and fragments of plaster (15).*

topsoil 'behind' the plaster, sandwiched between it and the wall, was assigned Context (24) in in the hope that cultural material might date it when it became detached. No material was identified, however, and the soil was far too contaminated with roots and living organisms to contemplate radiocarbon dating. A stray fragment of plaster in the topsoil was coloured black and red on its surface (SF15) (Fig. 6.28).

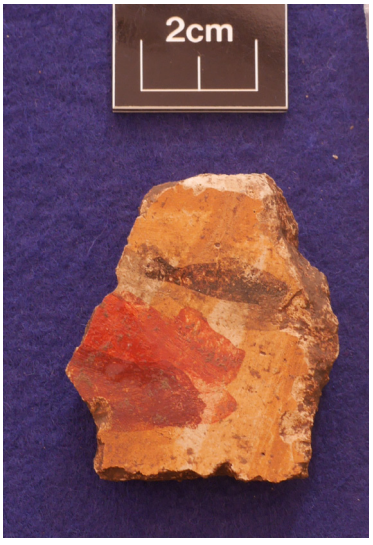


Figure 6.28. *Fragment of plaster with pigment (SF15) from topsoil in Trench IB.*

6.4.2.3. 'Outside' the northern edge of the building Trench I extended for some 3 m beyond the outer wall of apse 'P'. Between the megaliths themselves, Context (31) was a gritty gravelly silt loam with randomly distributed stone rubble, interpreted as packing material; pottery was mainly from Ġgantija-phase. A small struck chert point (SF109, Fig. 11.15) was found in the packing (Fig. 6.30). The outside of the megalithic wall

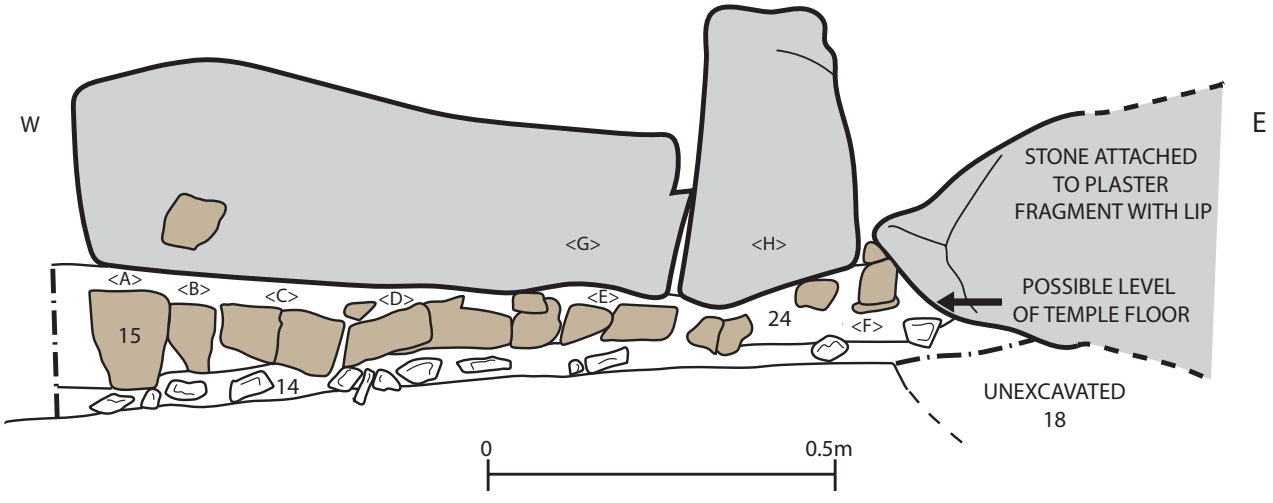


Figure 6.27. *Section drawing of plaster fragments (Context 15, coloured) in Context (14).*

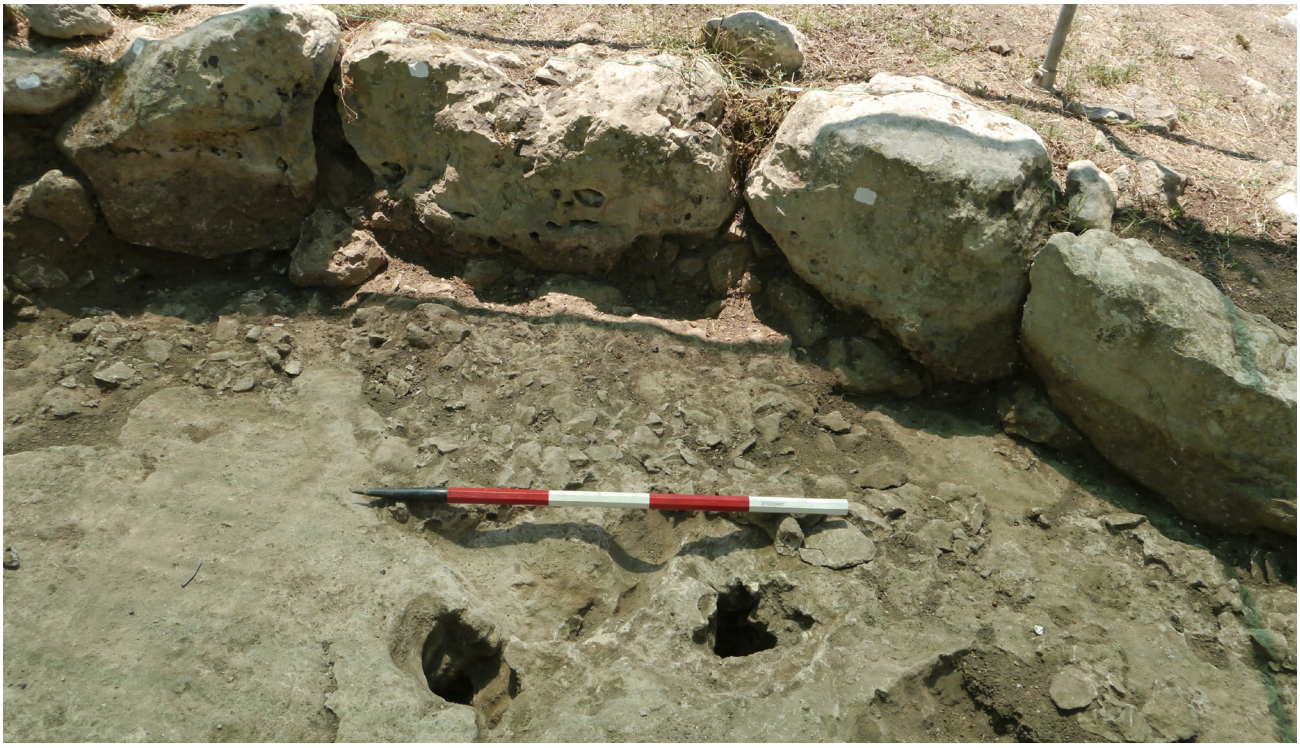


Figure 6.29. *Post-excavation photograph of [37] and [42] looking west.*

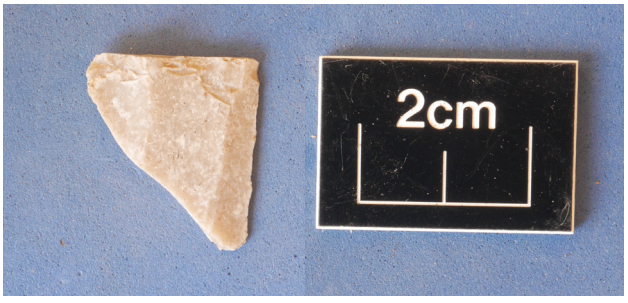


Figure 6.30. *Struck chert (SF109) from Context (31).*

was encircled by a line of stones, 0.2–0.4 m in length, Context (8). This was interpreted as a kind of revetment similar to Context (72) outside Apse 'S'. These stones were not disturbed.

Further north, under topsoil, the excavation encountered an assortment of medium-sized stones set in a matrix of compacted topsoil, Context (9). Many of the stones were firmly adhering to a thick layer of porous, almost tufaceous, lime-based deposit, presumably a natural concretion that had developed over time, sandwiched between the stones and bedrock. The concretion was identified as Context (11). These deposits were covered by topsoil, here given the Layer number (10).

6.4.3. Trench IC

The southern part of Trench I extended 1.5 m beyond the outer wall of Apse 'S' (Figs. 6.14 & 6.15). The stratigraphy was founded on Context (93), a compacted reddish-brown soil resembling a disturbed *terra rossa*, which also contained a small number of Mġarr sherds and nothing else that was diagnostic. Taken together, these deposits represent palaeosols from a time that preceded the main phase of megalithic construction at Kordin. Their possible Mġarr date is significant given the predominance of Ġgantija-phase archaeology elsewhere on the site. This was covered by Contexts (74) and (78), which were separated by Megalith M5 and another large stone at a lower level (Figs. 6.31, 6.32 & 6.33). A firm reddish-brown silt loam faced Context (74), containing unsorted stones, a large quantity of pottery (particularly Żebbuġ-phase sherds but also Mġarr and Ġgantija styles) and animal bone. This was a build-up of material and did not necessarily have any direct relationship with the megalithic building. In the centre of the trench that separated it from Context (78), there was a spread of a similar deposit, somewhat paler in colour. The only diagnostic pottery in this spread was from the Mġarr-phase (Fig. 6.34a). The topsoil in Trench IC, identified as Context (5), contained a sling stone typical of the Għar Dalam-phase (Fig. 6.34b).

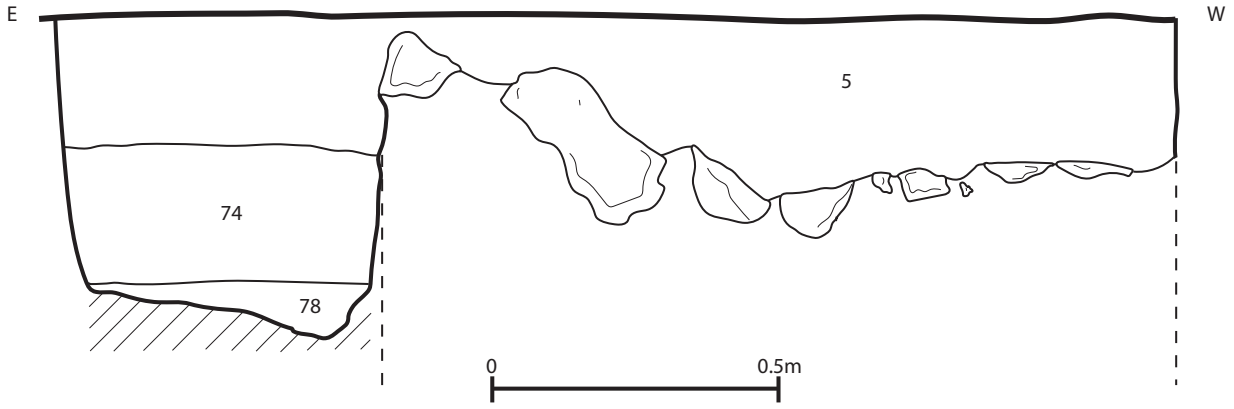


Figure 6.31. *North-facing section in Trench 1C.*

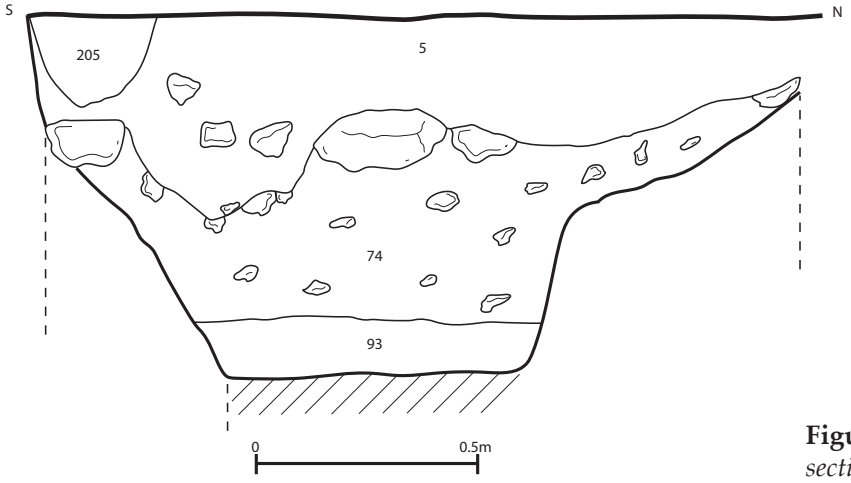


Figure 6.32. *East-facing section in Trench 1C.*

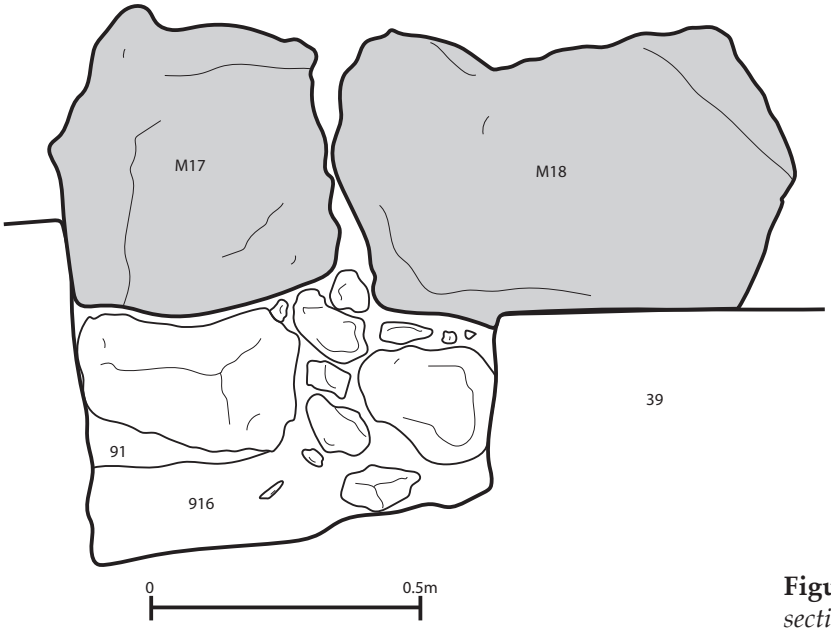


Figure 6.33. *South-facing section in Trench 1C.*

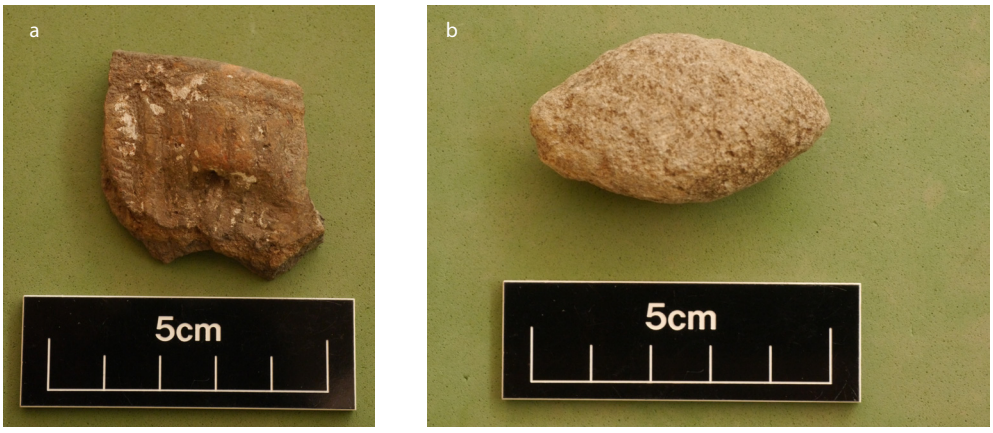


Figure 6.34. *a) Sherd of Mġarr pottery from (93); b) Slingstone from topsoil (5) in Trench IC.*



Figure 6.35. *Mid-excavation photograph of Trench IC showing (93) after removal of (78).*

6.5. Results: Trench II

Trench II consisted of two separate 2 m-wide strips; Trench IIA running north-south and Trench IIB running westwards from near the southern end of IIA (Fig. 6.36). Trench II was opened in order to investigate what appeared to be various ruined structures north of the main Kordin III temple, and it was hoped that the area had not been subject to much excavation in the past, and therefore the stratigraphy of the area would be intact.

6.5.1. Trench IIA

The layers of soil present in Trench IIA were founded on Context (144), a firm sandy loam, containing small crumbs of poorly preserved Skorba-phase pottery but also one sherd tentatively identified as Roman-period. This was covered by (135), a similar layer containing sporadic finds of mixed prehistoric pottery, including Skorba and Ġgantija-phase sherds. This was covered by (119), a firm, dark brown silt, that was relatively sterile. The sequence was continued by a series of related but distinctly coloured deposits: Context (110) at the northern end of the trench; Context (121), a band of light grey soil running across the trench; Context (112), an extensive spread of brown soil; Context (113), a roughly circular patch of orange-brown soil approximately 1 m in diameter; and Context (114), a mixture of greyish soil and stones, found along the southern edge of the trench. Context (121) proved to be the upper fill of a steep-sided trench, 0.8 m wide, whose upper fill was (111). Both of these fills contained relatively modern ceramics. It is possible that this was cut during Ashby's excavation campaign in 1909. Similarly, Context (114) was found to be the fill of a cut that spanned the width of the trench from stones (107) by a distance of 0.8 m and was 0.17 m deep. From these layers, two alignments of large stones, perhaps fragments of a destroyed megalithic building, contexts (106) and (107) were protruding along the

southern end of the trench. The stones were found to be resting within a matrix of dark brown silty sand, Context (108), which was bereft of cultural material. These assorted layers were covered by Context (102) – a sandy loam that contained modern material. The topsoil in Trench IIA, which was very similar to that found in Trench I, was identified as Context (100). A friable lens within it, Context (101), was a modern feature.

Taken together, the various layers in Trench IIA indicate that this part of the site, although once containing signals of Temple Period and Early Neolithic activity, was heavily disturbed during the twentieth century and perhaps during Roman times also.

6.5.2. Trench IIB

Trench IIB was also heavily worked and had little remaining stratigraphy. The sequence in this part of the excavation was founded on Context (145), a disturbed *terra rossa* extending to bedrock that contained some Skorba-phase pottery and a slingstone (SF131). An interesting sequence of deposits relating to a former *torba* floor was found in the centre of the trench. This consisted of a series of differently coloured floor layers, each approximately 2–3 cm thick. These were contexts (153), (152) and (151), were exposed, recorded and all were left *in situ* except for a small sample taken for the study of their micromorphology (Fig. 6.37). Context (153) was a light brown soil covered by a mottled grey/brown Context (152) in turn supporting (151), a pinkish grey *torba* floor of some kind. This sequence was covered by Context (150), a firm pinkish brown sandy silt containing three pieces of chert (SF139–141) and large sherds of undiagnostic prehistoric pottery. This was covered by Context (143), a firm deposit of brown sandy silt, containing mostly Mġarr pottery, a piece of obsidian (SF133) and a possible slingstone (SF140).



Figure 6.36. *Trench II during excavation in 2015, at different stages of work: a) Trench IIa before excavation; b) the start of excavation; c) during excavation; d) sondage in Trench II.*

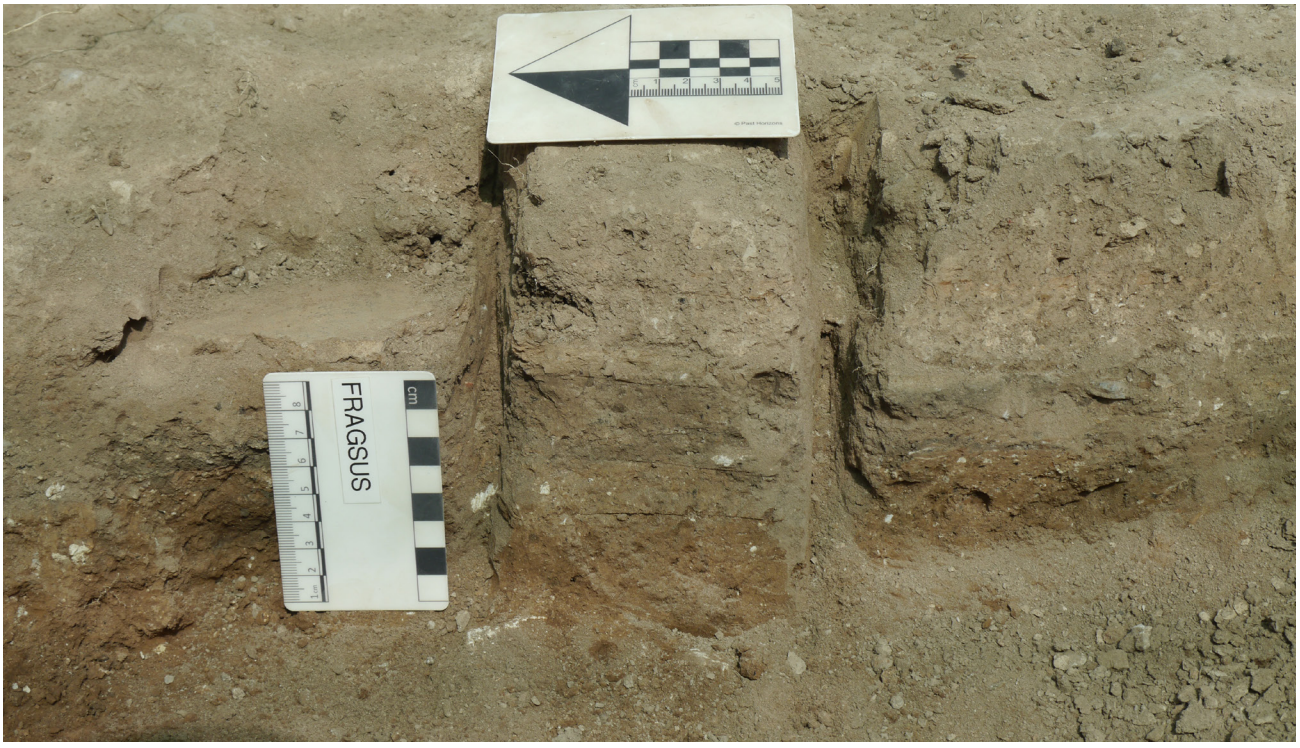


Figure 6.37. Torba *floor in Trench II (151) and related layers, prepared for micromorphological sampling block removal.*

In the centre and in the western part of the trench, the sequence was continued by disturbed layers: Context (132), a dark reddish brown soil containing prehistoric pottery mixed with modern finds; Contexts (116) and (115), which were soil accumulations with few finds, and topsoil-like Context (109).

The eastern part of the trench presented a more elaborate stratigraphy. Sondages dug into the layers above revealed that covering (145) was a similar *terra-rossa* like Context (155), which was not excavated. Cutting this was a 0.77 m-wide linear feature [160=161] containing two fills: Context (159), a group of medium-sized stones typically *c.* 0.3 m in any dimension and associated with one sherd of Skorba pottery; and Context (149), a layer of rubble containing earlier Neolithic and undiagnostic Temple Period pottery. Covering this was (147), a mixture of soil and rubble and almost pure Mġarr sherds among those that were identifiable. Two small, broken chert blades and a piece of chert (SF146–148) were also found within Context (147). Charcoal samples taken from (147) returned a date of 3630–3375 cal. BC (UBA-33020, 4741±45). Context (142), a pale grey soil diffusely covering an area 0.5 × 0.1 m, and a similar Context (136=158) were at the same level. These deposits had been disturbed by a rectangular pit [138], cut into (136) measuring 0.5 × 0.4 m orientated north-south, filled with (128), a friable dark brown silt containing plaster fragments, a large number of bones and a relatively small quantity of Temple Period pottery. It is possible this was a midden deposit or rubbish pit. At the same point in the stratigraphy, there were three Globigerina slabs, perhaps each forming part of a floor, lying flat and at various angles to each other. These were assigned Contexts (122), (123), (124) and (129). An arc of slightly smaller stones was positioned immediately westwards and was assigned context number (126). A dark brown silt (131) encompassed these stones and included one large Temple Period sherd broken into three. The sequence was continued by Context (156), a compacted pale greyish brown deposit only 2 cm thick, which was found along the southern edge of the trench. This context contained Mġarr pottery, and perhaps constituted an earth floor or what was once an open surface, with the layers above it interpreted as layer collapse and build-up of material. Context (133) covered (156) and was accompanied at a similar level by Context (148). Both of these contexts were very dark brown clayey silts, of which (133) was left unexcavated, whilst (148) contained a sling stone (SF135, see Chapter 11) and no pottery later than the Mġarr phase. A radiocarbon date of 3260–2900 cal. BC (UBA-33021, 4391±34) from a *Hordeum vulgare* grain was obtained from Context (148). This date falls within the Saflieni phase, and is therefore either from an intrusive

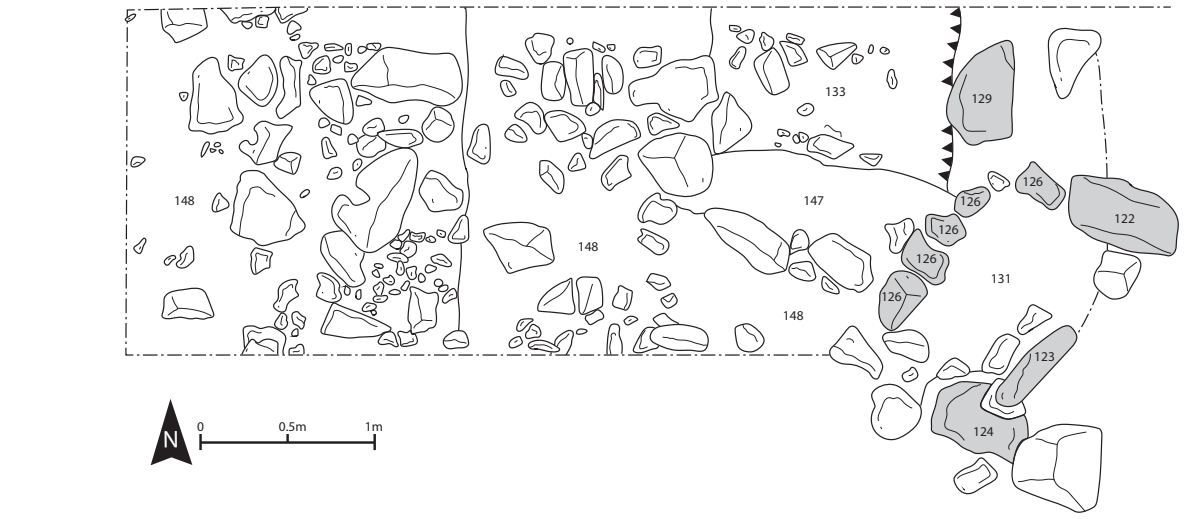






Figure 6.38. *a) Plan of Trench II (Contexts 131, 133, 147, 148); b) Trench II looking east; c) Trench II looking east with megaliths 126 exposed.*

grain, or a signal that the Mġarr phase ceramic material found in considerable density in this part of the site is disturbed and residual (Chapter 2).

The superficial deposits in the trench consisted of Context (146), a friable dark brown silt loam with plentiful stone rubble and Ġgantija pottery. Two large stones (154), measuring *c*. 0.4 m in all dimensions, were associated with this, and may be part of a collapsed structure. A stony Layer (125) covered (154) and (146). At the same point in the stratigraphy, there were dark brown silt sands (134) and (139), which were both rather stony, especially in comparison to Context (105), which covered them but was otherwise similar. Context (126) was a line of medium sized stones found at the same level that formed an arc. Several other contexts occurred at this point: Context (127), a stone rubble in a matrix of soil; Context (140), a compacted, dark brown deposit, containing rubble (141), sherds of Mġarr and Ġgantija pottery and a small, broken obsidian blade (SF127 see Chapter 11); and Context (130), a roughly circular patch of firmly compacted dark grey sandy silt, which was only 4 cm thick and therefore perhaps the remnant of an earth floor. Context (103/117) was placed above these layers, and consisted of a compact black sandy loam, very similar to topsoil, containing some stones. Finds included prehistoric pottery (mostly of the Ġgantija type) and some modern debris such as glass, and a Globigerina Limestone block, Context (104), measuring 0.72 × 0.45 × 0.33 m.

6.6. Results: Trench III

Trench III was placed to examine the stratigraphy at the southwest corner of the site, as there were no records of investigation by Evans or Trump in this locality. Contexts (220), (219), (214) and (213) were found immediately above bedrock. All were sterile and rather compacted mid-brown clay loams, presumably 'natural' palaeosols.

These were covered by: Context (215), a soil accumulation containing undiagnostic Temple Period pottery and chert; and (216), a layer of firm silt that butted against (215), which on the basis of pottery finds was probably Ġgantija in date. A modern radiocarbon date of AD 1994–1995 (UBA-33022, 1.1238±0.0037) was obtained from an *oryza* grain likely to have worked its way down into this Layer. In the northern part of the trench, the next level was Context (211), a firmly compacted yellowish brown silt loam. This was rich in prehistoric pottery, bone and chert. The pottery from this layer contained a mixture of mainly Temple Period ceramics, including two sherds of Saflieni-phase ceramics (Fig. 6.40a). Context (217), a spread of stones not associated with cultural material, was observed at the same point in the stratigraphy in the northeastern part of the trench. This was covered by dumps of stones and soil, which were assigned context numbers (208) and (212). Context (212) resembled the footing for a wall that had subsequently collapsed and had largely been robbed away. Context (210) covered these layers, taking the form of a firmly compacted yellowish-brown silt loam that contained animal bones and prehistoric pottery.

The more superficial deposits in the trench had evidence for disturbance. Contexts (207) and (209) were two very similar orange brown silt loams that were probably the same entity. They contained a significant amount of prehistoric pottery, chert debitage and struck chert pieces (Appendix A6.2), as well as







Figure 6.39. *a) View of Trench III, looking west; b) test trenches in Trench III; c) Stratigraphic sequence exposed in Trench III looking north.*



Figure 6.40. *a) Pottery from Context (211); b) Obsidian blade (SF138) from Context (312).*

modern ceramics and plastic fragments. These contexts were found on either side of a band of firmly compacted orange-brown soil, which was assigned as Context (201). This cut through the topsoil, and was thus interpreted as an old trench, presumably from Ashby's excavation. The cut was assigned context number [202] and was 0.9 m wide, running north–south. It contained a decorated clay tobacco pipe and sherds of prehistoric pottery, including many Għar Dalam-phase sherds. Contexts (203) and (221) lay above this and consisted of modern soils mixed with many small stones, as well as a large shallow sub-circular Pit [205], 0.8 m in diameter. This pit contained two contexts: the basal Fill (206) and the upper Fill (204), which upon investigation proved to contain modern ceramics and other debris, including pieces of iron. This pit is similar to Context (58) in Trench I and could indicate WWII damage. The topsoil in the trench was Context (200), a firm, rocky dark brown silt loam much disturbed by roots from nearby trees and containing chips of Globigerina Limestone. The latter had presumably been deposited by workers dressing the stones of the nearby boundary wall. The profile through the section of the trench is illustrated in Figure 6.39.

6.7. Results: Trench IV

Trench IV was, in fact, two separate small units that were positioned outside the perimeter wall to establish whether or not the site extends beyond the walled enclosure.[3] The aim was to break down the heritage definition of the site, by working outside the protected area.

6.7.1. Trench IVA

This trench contained two patches of sterile *terra rossa* found immediately above bedrock: Contexts (313) and (316). Above this lay palaeosols that were equivalent Contexts (310) and (314). Both were firm orange-brown clay slits with sherds of Early Neolithic pottery in poor condition; and Context (317), a sterile patch of darker soil, disturbed by roots. Context (309) covered these and comprised a dark brown sandy silt loam containing modern porcelain and debris. Excavation revealed that this was the fill of a cut feature [311], although the size and shape of the cut were not clear due to the limited size of the excavation unit. This was covered by Context (307) (Fig. 6.41), a layer of medium-sized stones including one with plough marks, which was perhaps a terrace build-up; and, in turn, Context (305), which was a friable, culturally sterile, dark greyish-brown sand. Next came Context (301), a firm sandy loam made up of topsoil and poorly sorted stony inclusions. When viewed in section, it was possible to make out three distinct layers in this deposit, although these were grouped together during their excavation. The context was likely associated with various phases of recent agricultural and horticultural activity in this area. Topsoil (300) overlay the whole area.

6.7.2. Trench IVB

Founded on bedrock, the sequence in this trench consisted of natural *terra rossa* (318) which was covered by (306), a firm dark yellowish brown sandy silt. This had been disturbed during relatively recent times by an amorphous Cut [315], filled with dark brown clayey



Figure 6.41. *a) View of Trench IV looking east with exposed bedrock; b) Stratigraphic sequence in Trench IV.*

sand (312) that contained modern porcelain as well as prehistoric pottery and an obsidian blade (SF138, Fig. 6.40b and Chapter 11). Overlying this was Context (304), a somewhat darker silt with relatively few stony inclusions, prehistoric pottery and a broken chert blade (SF4). This was covered by modern, made-up ground, Context (303). Surrounded by this was Context (308), a discrete pocket of bright white building waste, which was assigned a context number as it was a highly visible 'layer' in section, but not meaningful archaeologically. The topsoil was Context (302). Taken together, these layers probably represent the down slope movement of sediments from the temple site, trapped here by the contour of the underlying bedrock.

6.8. Discussion

6.8.1. Palaeosols

The presence of an earlier soil, preserved by the megalithic 'temple' at Kordin III was attested by Contexts (93), (91B), (97) and (99) in Trench I, all of which were a similar orange-brown, dry, relatively coarse-grained

deposit. This palaeosol deposit repeats the pedostratigraphic pattern uncovered by recent excavations at 'temple' sites in Gozo, specifically Santa Verna and Ġgantija (Chapters 4 and 5). Unlike at Santa Verna and Ġgantija, however, the Kordin palaeosol was disturbed during the Temple Period, with the introduction of bones and plant remains dating to 3500 to 3400 cal. BC. The addition of material probably occurred when the megalithic structure was being built. The palaeosol was also in a thinner and fragmented state, and it proved impossible to retrieve an intact sample to study its micromorphology.

6.8.2. Possible Skorba phase features

In Trench IIB, rubble layers (149) and (159), associated with Skorba pottery, were found in a linear 'cut' made in sterile deposits, but not completely excavated. Context (149) also contained some Temple Period pottery and was, therefore, not a sealed Skorba-phase layer. It is possible that some kind of earlier Neolithic structure or surface once existed here and was destroyed during the Temple Period phase of activity. Indeed, of the 117 contexts from the 2015 excavations that contained pottery of any kind, 51 contained residual Skorba-phase pottery, indicating that activity during that time was widespread over the entire site (Appendix A6.3). Though it is noted that undisturbed Skorba-phase structures at Kordin III have yet to be discovered.

6.8.3. Mġarr phase layers

Mġarr-phase activity was found in both Trench I and Trench II at Kordin. Two large structural stones associated with Mġarr-phase layers were buried below a build-up of material that had accumulated against the southern edge of Ashby's Room 'S'. The Mġarr-phase layers abutted the eastern side of the wall where the upper Context (71) contained slightly more Mġarr pottery than the lower Context (77). Without further excavation, it is difficult to ascertain the relevance of these stones and the associated Mġarr pottery. Yet, it is possible that this may have been a substantial structure, possibly even an Mġarr-phase hut similar to the one excavated by Trump (2015, 36) at Skorba; or it may even represent a more substantial Mġarr-phase temple that pre-dated the main temple and the trefoil structure.

Elsewhere on the site, Mġarr levels were also located in Trench II. These consisted of several layers that contained either purely Mġarr pottery or pottery dating to no later than the Mġarr-phase. No definitive structures were found in association with these Mġarr layers, although it possible that Context (156) may represent an Mġarr-phase earthen floor or old land surface.

6.8.4. Pre-temple Ġgantija phase layers

Evidence of pre-temple Ġgantija-phase activity is represented in the form of a thick layer of midden material, over which the later trefoil structure was built. The midden, comprised of Contexts (71), (75), (77) and (65), was made up of a thick layer of soil containing numerous sherds of pottery, dating primarily to the Ġgantija phase, as well as a large amount of animal bone and charcoal. It is difficult to provide a definitive interpretation for these deposits, although it is possible that they may represent the remnant of feasting activity at the site, before the megalithic structures were built. It would appear that the midden material was cut into on the eastern side in order to construct the trefoil structure. The animal bone assemblage contained sheep, goat, pig and cattle in the usual proportions for prehistoric sites in Malta (Chapter 9).

6.8.5. The megalithic 'temple' and its date

The evidence from the excavation indicates that the trefoil structure dates to the end of the Ġgantija phase *c.* 3000 BC. Radiocarbon dates obtained from pre-temple layers (91), (91b), (96) and (99), located under the *torba* floors of Apse 'S', provide a *terminus post quem* for the construction of the trefoil building, dating it to the Ġgantija phase or later. This is supported by the discovery of the rich Ġgantija-phase midden Context (71), (75), (77) and (65) that were found to run below Apse 'S' and finds of Ġgantija-phase pottery from within the packing material of the wall in apse 'P'.

The excavation also revealed that the trefoil structure was not built in a single phase but rather appears to have been modified and added to throughout its use. The original structure consisted of apses (or Ashby's 'Rooms') 'O', 'P' and 'S', although there are hints that there may have been a fourth apse (§6.4.1.2). Outside the eastern wall of the trefoil structure, adjoining Apse 'S', vestiges of a possible robbed-out curvilinear wall and traces of a *torba* floor were discovered. This structure was only partially excavated and, based on the current evidence, it is not possible to ascertain if it was part of the original building or a later addition.

Before the construction of the trefoil structure it would appear that the builders attempted to create a more level surface by either levelling sections of bedrock (as was discovered under apse 'P'), or by laying stone paving slabs, similar to the ones located in the forecourt area of the main temples at Kordin. This was slightly different to the composition of foundation layers found at the other Maltese temples, where smaller stones were used instead. The walls of the trefoil structure comprised double skin walls that were infilled with loose packing stones.

The apses were roughly 3 m in diameter and were floored with *torba*, which in some instances was replaced several times during the buildings' use. In apse 'P' traces of a calcareous plaster-like render (15) found adhering to M122 and a larger section that appears to have become dislodged from the wall indicate that the interior of these buildings may have been rendered and painted. Evidence of internal render has also been recovered from Ġgantija and Santa Verna, which demonstrates that this was not a feature unique to Kordin.

The excavation revealed that the trefoil structure was augmented through the addition of a 'lobby' area and an 'outer threshold' area to the west of the structure. The lobby was constructed between the outer to apses 'P' and 'S' linking them to the outer threshold area. The threshold area acted as an entrance into the trefoil structure, whose western extent was delimited by a threshold stone, separating the internal areas of the structure from this more open space.

Possible evidence of roof collapse was found in the 'lobby' area, just outside of apse 'P'. A layer of small and large stones mixed with plaster, Context (32), was found to overlie the smashed threshold stone. As (32) contained pottery no later than the Ġgantija-phase, it seems likely that the threshold stone may have been smashed in prehistory, perhaps as a result of this roof collapse or other related violent events.

6.8.6. Later activity

The 2015 excavations contributed new evidence to understanding the level of very sparse activity in post Neolithic times at Kordin III. No Bronze Age pottery sherds were identified within any of the strata – not even residual material from within topsoil contexts. Many topsoil and disturbed contexts did contain Roman and post-medieval / modern pottery, although there was no clear spatial patterning to these finds.

6.8.7. Re-arrangement of the megaliths

A comparison between Ashby *et al.*'s 1909 plan and the site as surveyed in 2015 reveals that several stones have moved. They have either appeared since 1909, or disappeared altogether (Fig. 6.42). The megaliths south of the 'smashed threshold' stone were not

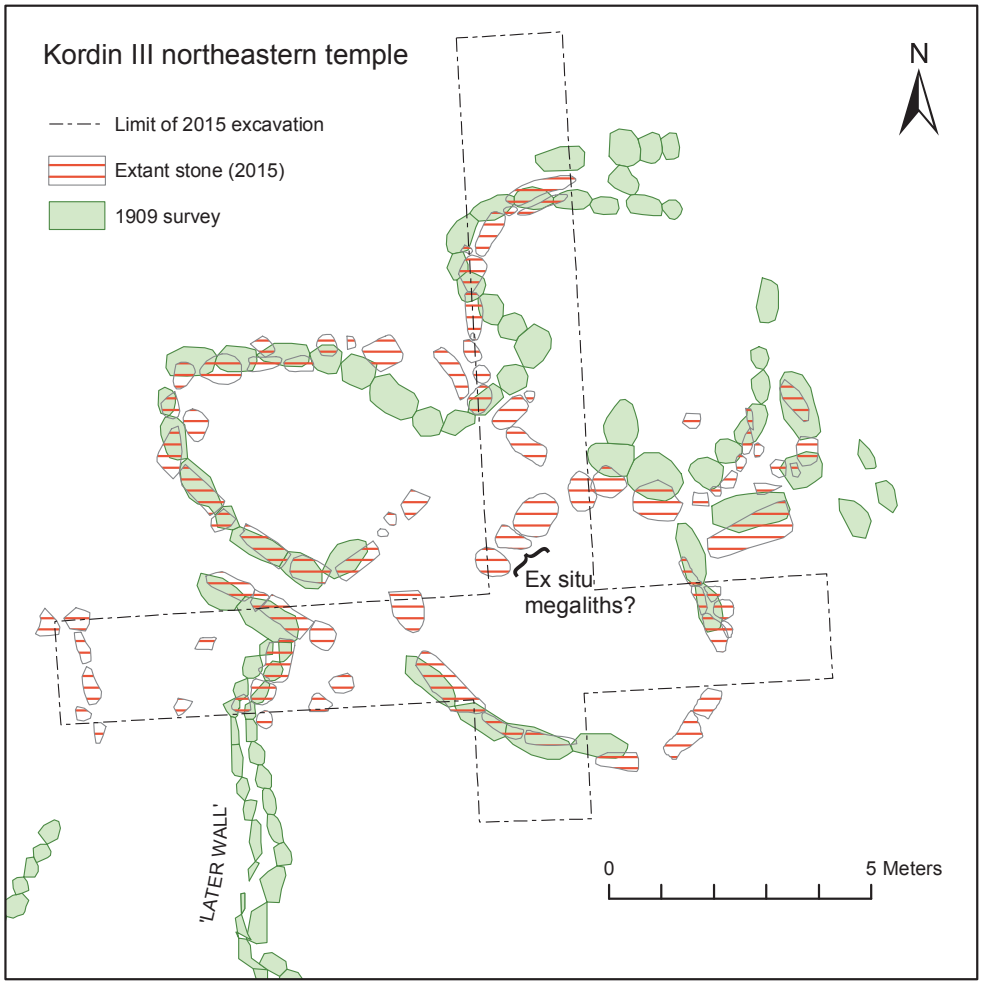


Figure 6.42. *Overlay of 2015* FRAGSUS *survey of the trefoil temple on Ashby's 1909 plan.*



Figure 6.43. *Sectioned deposit revealing the 'modern' tin cup at the base of section, under megalith.*

planned in 1909; a tin cup (Fig. 6.43) found under one of them suggests they were moved into their current position during relatively recent times. It is possible that the temple was heavily disturbed by bomb blasts during WWII, which Evans notes did displace some of the stones (Evans 1971, 67). Possible bomb damage at Kordin was recorded in both Trench I and Trench III, where circular pits containing a mixture of prehistoric and modern material including iron debris were recorded. The iron debris is likely to represent the remains of exploded ordnance. Further destruction occurred at the site when intruders gained access to the site through the compromised outer wall, which had been damaged by bomb blasts, and the intruders vandalized the site (Evans 1971, 67; MAR 1946–7, 2; MAR 1956–7, 1–2). These two events may account for the differences observed between the 1909 survey and the present layout of Kordin III.

6.9. Conclusion

Whilst it may seem trite to state that the temples of Kordin III have a long and complex history, the recurring theme from our excavation has been the examination of evidence that suggests just that. While they are battered and damaged from activity in recent centuries, the very survival of these structures in their current urban setting is remarkable. Indeed, they are especially valuable given the unfortunate fates that befell the neighbouring complexes of Kordin I and II. Kordin III is sited in a prominent place in the landscape, overlooking significant swathes of countryside as well as the Grand Harbour, one reason perhaps why the site was chosen in prehistory as a place on which to mark, build and celebrate. The extant megaliths are a palimpsest of structures dating to various points of the Mġarr and Ġgantija phases of the earlier Temple Period, and our excavations have gathered significant new data about the sequence and the economy of narrow slices of time within this. Of particular importance are the midden-like deposits found outside the western edge of the small 'temple' building in Trench 1 that were sealed by subsequent construction. The midden provides valuable data for the kind of activities that occurred at these megalithic complexes, in terms of the consumption of meat (Chapter 9) and the elaborate ceramic material culture associated with the implied feasting (Chapter 10). Importantly, the quantity of the rather rare and little known Mġarr pottery retrieved from Kordin III adds considerably to the range of forms and decoration of the style (see Chapter 10). In the case of the 2015 excavations, the retrieval of traces of feasting activities early in the Ġgantija phase, around 3400 cal. BC are important because they are early and dated. They constitute one clear example to suggest that the temple complex functioned as a place of formal ritual consumption and performance – activities that the *FRAGSUS* questions have focused on. It seems likely that such feasts and events acted to bind ancient society together, and the evidence helps us contextualize the Maltese megaliths as monuments that were integral with celebrations. We return to these themes later in this volume.

In conclusion, the 2015 work at Kordin III has effectively tackled some of the *FRAGSUS* questions, by adding considerably to knowledge of food materials in the earlier Temple Period. These data expand our discussions on the role of temple structures and on where they lie in their landscapes, and allow us to model more effectively how they were related. In hindsight, we would have liked to have sampled beneath the floors of Trench 1 more thoroughly, to explore the primary phases of building and the environment in which the early episodes took places. Such evidence is significant, since the more superficial levels that were examined all proved to be disturbed and unsuitable for the extensive environmental sampling that was conducted at the



Figure 6.44. *View of excavation before closure, showing exposed lobe walls in Trench 1.*



Figure 6.45 *Laser scan of Trench 1 after removal of shading at end of excavation (John Meneely).*



Figure 6.46. *The team at Kordin.*

Table 6.1. *Kordin III and the FRAGSUS questions.*

***FRAGSUS* questions**	**Kordin III**
1a. What was the impact of human settlement on Malta?	
1b. How rapid was the process of deforestation, erosion and degradation?	
1c. When did technical mechanisms to manage the environment develop – such as terracing, water and food storage?	
1d. Were such mechanisms in place before or after the Temple Culture collapsed?	Kordin III fell out of use before end of the Temple Period.
2a. How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this?	Kordin complex of sites on the edge of the harbour and overlooking the wide Maltese landscape had access to many resources, evidenced by occupation from at least Skorba phase. Evidence for long continuity through earlier Temple Period.
2b. Were the monumental temples instrumental in the process of sustaining cultural life?	Kordin III represents an early example of temple function with food evidence in place.
3a. What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable?	Cereals and pulses in use at site. Stock animals evidently slaughtered and eaten at site.
3b. Were there failures in the food supply?	Abandonment of site by the full Temple Period could imply that the major site, Tarxien, close by assumed the role of feasting centre in the third millennium BC. Possibly water supply failed locally.
3c. What impact did diet, disease and stress have on the population?	Feasting evidence implied at Kordin III with animals evidently eaten and disposed of within the precinct.
4a. What was the size and nature of the early Maltese population?	Small scale of Kordin III and its neighbouring monuments implies a much lower population density compared with late Temple Period times with huge temple complexes.
4b. What role did demographic connectivity (immigration) play in maintaining island sustainability?	Evidence of imported chert and obsidian. Stock and plants.
5a. Was there social-economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically?	End of the Temple Period not evidenced at Kordin, which may have been little used by that time.
5b. Was there a hiatus between the Temple Culture and later Bronze Age settlers?	No Bronze Age at the site to demonstrate this. Slight earlier Neolithic evidence beneath later Temple Period occupation could imply a break between, but this is not dated.
5c. Are other hiatuses apparent in the sequence, such as between the earlier Neolithic and the Temple Period?	The presence of earlier Neolithic activity in Għar Dalam and Skorba phases implies settlement in the sixth / early fifth millennium BC.

other sites reported on in this volume. Yet, Kordin III is a protected and extremely important site, and potentially soon to be added to the World Heritage Site list of temples in Malta. We were privileged to examine the deposits in the most expansive excavations on the site since their first study in 1908–9. (Figs. 6.44 & 6.45).

Notes

1. *FRAGSUS*: Fragility and sustainability in restricted island environments: Adaptation, cultural change and collapse in prehistory. A collaborative programme of research between Queen's University Belfast, Heritage Malta, Cambridge University, the University of Malta and the Superintendence of Cultural Heritage, Malta. European Research Council seventh framework programme (FP7) 'Ideas' Advanced Grant: 323727. Principal Investigator: Prof. Caroline Malone http://www.qub.ac.uk/sites/FRAGSUS/
2. In the descriptions of contexts that follows, layers, fills and structural contexts are denoted in parentheses ( ), cut features in square brackets [ ], and surfaces in curly brackets { }.
3. As a biographical note, this was by far the most comfortable part of the site to excavate, located securely in the shade with a good internet connection from the local technical school.

Chapter 7

Skorba

Catriona Brogan, Eóin W. Parkinson, Rowan McLaughlin, Charles French & Caroline Malone

7.1. Introduction

This chapter presents the results of an archaeological excavation at the megalithic temple site of Skorba,[1] Mġarr, Malta (Fig. 7.1), undertaken by the *FRAGSUS Project*[2] team. Skorba represents the most 'recent' large-scale temple excavation (other than the long campaign at Tas-Silġ from 1964 until the present). It was also the site that demonstrated, through the application of scientific dating, the true antiquity of the Temple Culture and its Neolithic antecedents. David Trump spent a relatively short time investigating the site before fieldwork ceased following his transfer back to Britain on the declaration of Malta's Independence in 1964. Trump's (1966) quite short report on the site was a model of detailed brevity, noting the importance of the stratigraphic relationships that tallied with pottery styles and radiocarbon dates, as well as aspects of the possible multi-period functions of the site. Subsequently, the chronology obtained from Skorba was interpreted as the yardstick of Malta's prehistory, and the culture sequence was accepted without further debate. As more chronological data has been obtained and added to the prehistoric story of the islands, particularly from the Xagħra Brochtorff Circle in the 1990s, the Skorba chronology has presented a robust demonstration of the model devised by Trump. Nevertheless, there were many gaps in the sequence, with immense periods of undated prehistory between the earliest occupants and the later Temple Period that remained untested and unfilled by new dating estimations. Skorba, therefore, was considered one of the principal locations where *FRAGSUS* should apply a programme of accurate new dating, not only to test the Skorba stratigraphic interpretations, but also to investigate the very early phases of Neolithic occupation and relate these to other sites, such as Santa Verna, Kordin III and Taċ-Ċawla (see Chapters 3, 4 and 5).

The work of the *FRAGSUS Project* in 2016 was therefore conducted with the aim of recovering plant remains and animal bones from earlier Neolithic strata (Pre-Temple Period Għar Dalam and Skorba phases) for dating and analytical purposes. The goal was to compare their speciation, isotopic content and radiocarbon age with similar samples recovered from *FRAGSUS Project* excavations elsewhere in the Maltese islands, especially our excavations at Santa Verna on Gozo in 2015 (Chapter 4), which had already provided a comparative stratified sample of the successive cultural phases of that site in 2015. The Skorba fieldwork also provided an opportunity to undertake Optically Stimulated Luminescence (OSL) dating of the stratigraphy in order to understand site formation processes and to provide an independent and comparative chronological control for the radiocarbon sequence. This parallel chronological study acknowledges the site's important role in the chronology of Maltese prehistory (Table 7.1). Here we present a description of the results of the fieldwork, including physical descriptions of the stratigraphy and the main finds; these are then interpreted within the wider context of the Neolithic central Mediterranean and Temple Period Malta.

7.2. The site

7.2.1. Location and physical setting

The site is located on the side of the Bidnija Ridge in north western Malta, near the village of Żebbiegħ in Mġarr parish. The bedrock in this locality is Upper Coralline Limestone which is covered by thin layers of largely artificial L-Ingin-series silty clay loam (Lang 1960). The site lies 114 m above sea level on rising ground partly terraced into the hillside, with a southern aspect and overlooking the L-Imselliet valley and Binġemma Ridge beyond. The site is part of a landscape that is rich in contemporary prehistoric



Figure 7.1. *Location map of Skorba.*

sites; it lies some 850 m east of the Ta' Ħaġrat temples, 3.5 km south of the Xemxija tombs, and 4 km and 5 km respectively southwest of the Tal-Qadi and Buġibba temples (Fig. 7.2). The site also lies approximately 1.5 km east of a now destroyed stone circle structure at Ta' Żammitellu (*Museums Annual Report 1919–1920*, 1920). 'Li-Skorba' was originally a local name given to the group of fields and terraces that surround the site (*Museums Annual Report 1938–1939*, 1939). The 2016 excavations were centred on coordinates 33S 0443900m E, 3975530m N (UTM grid ED1950 datum) or 35.92070 deg. N, 14.37758 deg. E (WGS84 datum).

7.2.2. History of the site

Today, the importance of Skorba is widely recognized, having been conferred UNESCO World Heritage status in 1980. Yet, up until the start of the last century the site was almost unknown. Records from the early twentieth century only document a single 4-m high Coralline Limestone 'menhir', or standing stone, at the site illustrating the extent to which the site had been buried over the millennia (Trump 1966, 2008). In 1937, survey work carried out by Captain C.G. Zammit, Curator of Archaeology at the National Museum of Malta, revealed further megalithic remains incorporated into the surrounding field walls (*Museums Annual Report 1937–1938*, 1939). Subsequent small-scale excavations at the site uncovered more buried megaliths, including a slab decorated with pitting, similar to those found at other megalithic temple sites. On the basis of the 1937 fieldwork, the site was classified as a potential temple site and the land was purchased by the government.

7.2.3. The 1961–63 campaign

In 1960, the decision was made to excavate the site fully, and between 1961 and 1963 five excavation campaigns were undertaken at Skorba under the direction of David Trump (Fig. 7.3). These excavations were hugely significant in advancing our understanding of the chronology of prehistoric Malta. This is because the undisturbed site contributed a near-complete stratified sequence of cultural material from each phase of the Early Neolithic, Temple Period and Early Bronze Age. Furthermore, Trump's campaign was the first to utilize radiocarbon dating within the Maltese islands, and was among the earliest applications of radiocarbon dating in the Mediterranean. A total of eight dates were obtained from Skorba, Tarxien and Ta' Ħaġrat, ranging from the Għar Dalam phase through to the Tarxien Cemetery

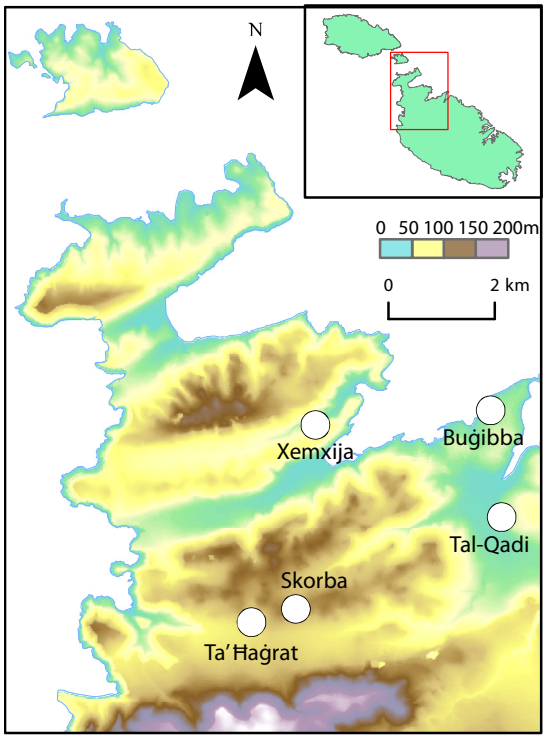


Figure 7.2. *Map of Skorba and nearby Temple Period sites within their local topography.*

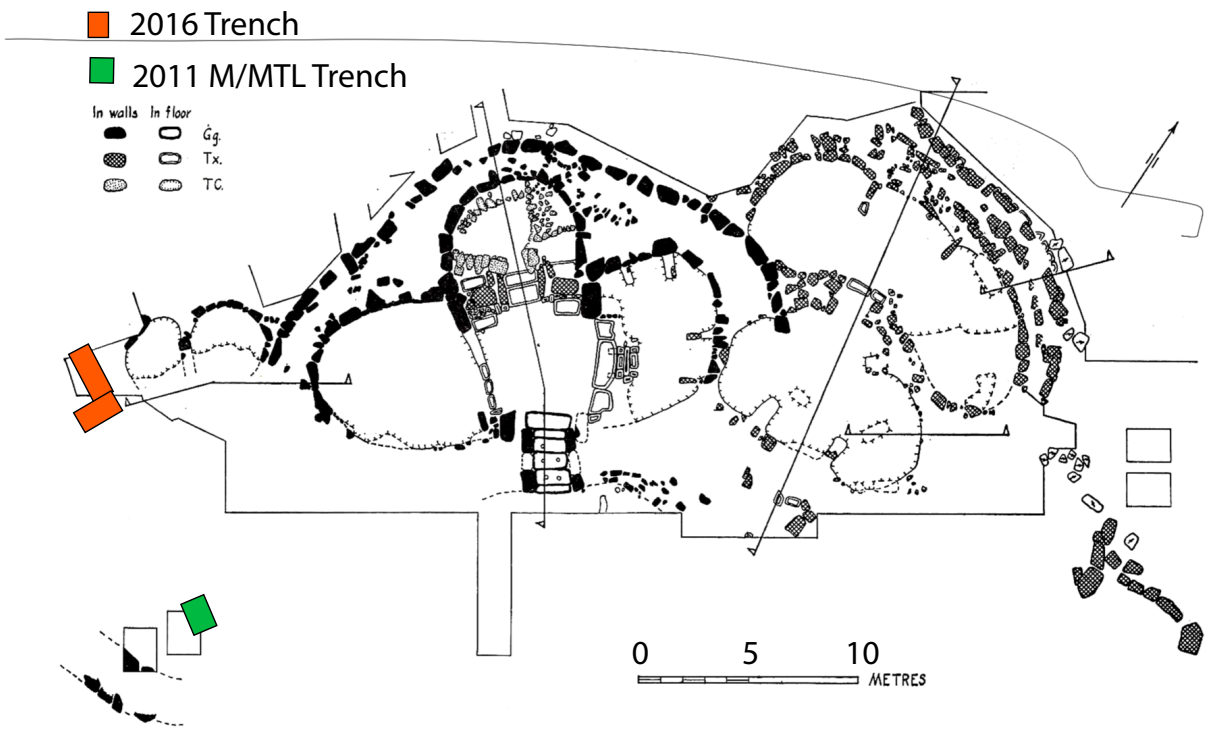


Figure 7.3. *Trump's (1966) site plan of the Skorba 1961–63 excavations. The locations of 2011 and 2016 excavation trenches are highlighted.*

phase, and this sequence categorically demonstrated their early chronology (Renfrew 1973). The 1961–3 excavations also identified a pottery-type previously unrecognized on the Maltese Islands, duly named Skorba ware, between the Għar Dalam and Żebbuġ layers that had stylistic similarities with Sicilian and south Italian Serra d'Alto and Diana-Bellavista wares (Trump 1961). The importance of Trump's excavations at Skorba for the chronology of Mediterranean prehistory was immediately apparent when the identification of Skorba ware resolved the lively debate between Bernabò Brea (1960) and Evans (1960) on the phasing of Maltese prehistory and its relationship with Sicily (Chapter 12).

Overviews of the site, its history, and accounts of the 1961–3 excavations are provided by Trump (1966, 2015), Evans (1971) and Zammit & Mallia (2008). Trump's (1966) excavations revealed a remarkably complete sequence of occupation, linked to a number of structures at the site, dating from the Għar Dalam phase through to the Tarxien phase. The earliest structures at the site were an oval hut and its enclosing wall dating to the Early Neolithic Għar Dalam phase (and was the focus of our work in 2016). The Għar Dalam phase structures were succeeded by faint traces of a slightly later wall structure that possibly dated to the Grey Skorba phase. In the eastern part of the site, a large two-roomed structure with plastered floors was uncovered and contained large quantities of later Neolithic Red Skorba pottery. Broken terracotta figurine fragments, worked animal bone and numerous goat crania were found in the northern room alongside substantial amounts of animal bone. Trump (1966) interpreted this structure as a 'shrine', rather than as a domestic structure on the basis of these finds and the irregularity of their location. The next phase of activity at the site was represented by several Żebbuġ phase huts, some with clay floors and hearths still identifiable. Evidence of Mġarr phase activity was scarce, with only a single hut-structure identified during the excavations.

The most active period at Skorba appears to have been the Ġgantija phase, which Trump (1966) identified in both settlement and ritual-temple activity. The settlement evidence was attested by the remains of two hut sites. The 'Hut of the Querns' formed a substantial mud-brick structure, located to the north of the main temple structure and this was excavated in its entirety. It is likely the hut pre-dated the temple structure as it appeared to have been deliberately destroyed in order to make way for the temple. The other hut was located in the southeastern section of the site and named the 'Hut of the Hollow'. Finds from the structure indicate that it survived into the Saflieni phase before being destroyed by a later extension to



Figure 7.4. *Trench M during its 2011 re-excavation (reproduced with permission, Maltese Temples Landscapes Project).*

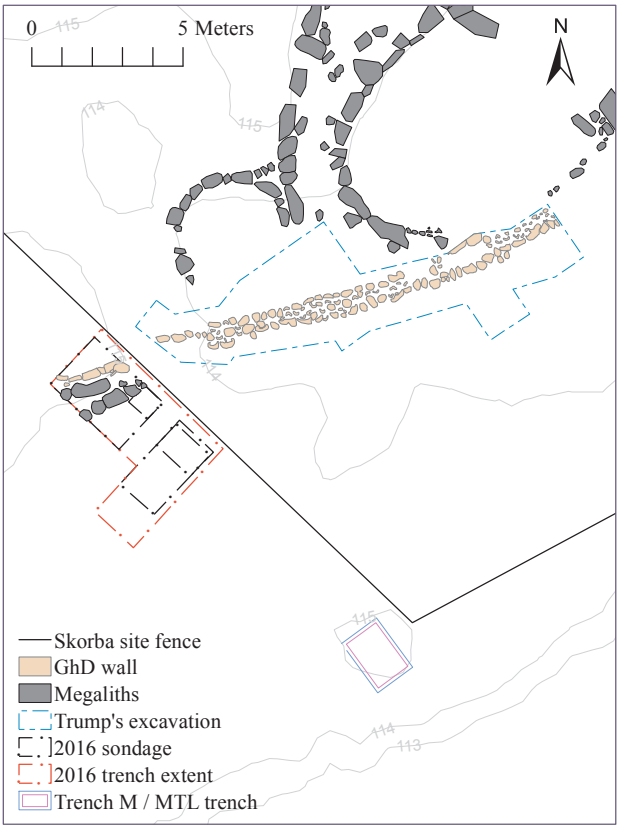
the main temple. The main phase of temple building was in the Ġgantija phase, with the construction of a simple trefoil megalithic temple plan which was constructed over the earlier Għar Dalam strata. Later, the interior of the Ġgantija structure was extensively remodelled during the Tarxien phase, and expanded with the construction of a four-apse building to the east of the main temple. In 2011, a re-excavation and enlargement of one of the 1961 trenches (Trench M: Fig. 7.4) was undertaken by the Malta Temple Landscapes Project (T. Darvill, pers. comm.).[3]

7.3. Methodology of the 2016 campaign

The 2016 excavation took place from 4 to 15 April, following a winter and spring of exceptionally dry weather in Malta, which rendered the soils dry, dusty and difficult to differentiate. Great emphasis was placed on establishing meaningful stratigraphy and robust sampling methods during the excavation. One of the key aims was the retrieval of undisturbed Early Neolithic buried soils that pre-dated the Temple Period activity of the overlying temple structure. Such buried soils were likely to be similar to those found at Santa Verna during the 2015 *FRAGSUS* spring fieldwork season (Chapter 4), and were important for providing comparison and confirmation of the local environment and chronology during the early phases of the site. The 2016 excavation trench was strategically positioned in an area where the westward course of the Għar Dalam phase wall (§7.2.3) was expected to emerge, in approximately the area of Trump's (1966) trench 'Y'. The 2016 trench was located beyond the present eastern boundary fence of the temple site, abutting a modern field wall to north (Figs. 7.5 & 7.6). Before excavation commenced, the area was obscured by the branches of a wild fig tree and heaps of stone rubble, dead vegetation and debris. The tree was growing from the southern corner of the 4 × 2 m trench that was originally proposed, so in consultation with the Superintendence of Cultural Heritage (SCH) and Heritage Malta (HM), the shape of the 2016 excavation trench was adapted so that the tree would not be significantly disturbed. A reverse 'L' shaped trench was instead placed so as to circumvent the location of the tree (Figs. 7.6 & 7.7). Once loose stones, vegetation and rubbish had been cleared, the location of the 1961 trench 'Y' was marked out using a Total Station that had been programmed with the necessary coordinates in advance. The 1961 backfill was excavated first, before intact archaeological layers were recorded *in situ* and excavated. A total of 223 litres of soil was sampled and



Figure 7.5. *Work during the autumn 1961 excavation season with position of the 2016 trench indicated.*



processed for flotation in order to retrieve samples for environmental analysis and radiocarbon dating. Of the six samples submitted for radiocarbon dating, only one faunal specimen failed.

7.4. Results

The following account of the excavations at Skorba has been divided into four sections: the northern corner (§7.4.1), the central sondage (§7.4.2), the eastern corner (§7.4.3) and the upper levels (§7.4.4). Following initial clearance, and the removal of the superficial deposits, the Temple Period wall, Context (14)/(17), was encountered. The stones of the wall were left undisturbed and the excavation continued down through the deposits on either side of the structure, forming a small exploratory area in the northern corner of the trench, as well as a small sondage to the southeast. The main trench was extended and opened to the southeast to confirm whether a similar stratigraphy extended beyond the bounds of the central sondage (Fig. 7.8).

Figure 7.6. *Location of the 2016 trench.*



Figure 7.7. *Photograph of the 2015 trench, with the enclosed WHS monument visible beyond the fence.*

7.4.1. Northern corner

The lowest layers of the trench (Figs. 7.12 & 7.13) lay above bedrock as a brown sandy silt loam, and these represented a natural *in situ* soil, much depleted in organic content. This deposit was excavated in two spits: the lower 0.3 m, Context (28), contained little cultural material, although both Għar Dalam and Skorba phase sherds were present, whereas the upper 0.2 m, Context (24) (Figs. 7.8, 7.9 & 7.10), contained a large number of Skorba phase pottery fragments and a number of shell beads (SF5) (Fig. 7.11). A radiocarbon date of 5280 to 4960 cal. BC (UBA-33710, 6158±51) was obtained from this layer from a *Hordeum* grain. OSL dates from the buried soil gave a similar date range (8780 ± 710, 8090 ± 590 and 7760 ± 560 BC) for the onset of soil formation as at Ġgantija (Volume 1, Appendix 2; Table 7.1). These two contexts abutted Context (21), which was an intact course of the quite slight remains of the Għar Dalam wall, found at approximately 113.2 m ASL. The height matched the level and the curve of the exposed Għar Dalam wall in the fenced-in excavated Skorba World Heritage Site enclosure. The new section of wall was left undisturbed *in situ* in the base of the 2016 trench (Fig. 7.6).

Context (20) lay above the Għar Dalam wall and comprised a fine-grained deposit, containing sherds of Red and Grey Skorba pottery. Another alignment of stones, Context (18), overlay Context (20) and comprised rough Coralline blocks 8–20 cm in length, loosely arranged within the fill. These stones were probably the disturbed upper courses of the Għar Dalam wall, Context (21), also found by Trump in the adjacent 1960s excavation area (Fig. 7.13b). They were probably dislodged by the construction of a structure associated with the later wall, Context (14)/(17) (Figs. 7.9, 7.13a & 7.14 show the location of the sondage in section).

7.4.2. Central sondage

A 0.35 m deep spit of friable cream-hued soil, Context (30), lay above the bedrock in the central sondage. It contained only Għar Dalam and Skorba phase pottery, accompanied by a radiocarbon date of 5006 to 4771 cal. BC (UBA-33711, 5996±46) from a *Lens* seed. Above Context (30), another 0.25 m spit, Context (26), was

similar in composition to (30) but contained Żebbuġ as well as Early Neolithic pre-Temple Period sherds. Contexts (22) and (23) overlay this layer. Context (22) formed a patch of dark, fine silt loam, 1 × 0.8 m in extent, and was contained within a 0.15 m deep depression confined to the western corner of the trench. Context (23) extended over the remaining area of the trench, and presented a cream-brown layer of silt, containing flecks of charcoal and lenses of white material, perhaps remnants of *torba* floors. Ġgantija, Mġarr and Żebbuġ pottery sherds were found in this layer. A lens of pale yellow-grey silt, Context (13), overlay these deposits, and contained mixed Temple Period pottery. This was, in fact, the only strata in the 2016 excavations to yield a Tarxien phase sherd (potentially introduced by later disturbance). Context (12) was above (13), in the eastern corner of the central sondage, and consisted of a layer of soil and stones that was rich in Temple Period pottery and lithics. The deposit was somewhat disturbed by the roots of the nearby fig tree. Context (12) was overlain by Context (3), a layer of rubble that was intermixed with a friable orange hued loam, and also by Context (10), a firm reddish-brown soil. Both of these contexts were located to the south and east of the Temple Period wall (Context (14)/(17)).

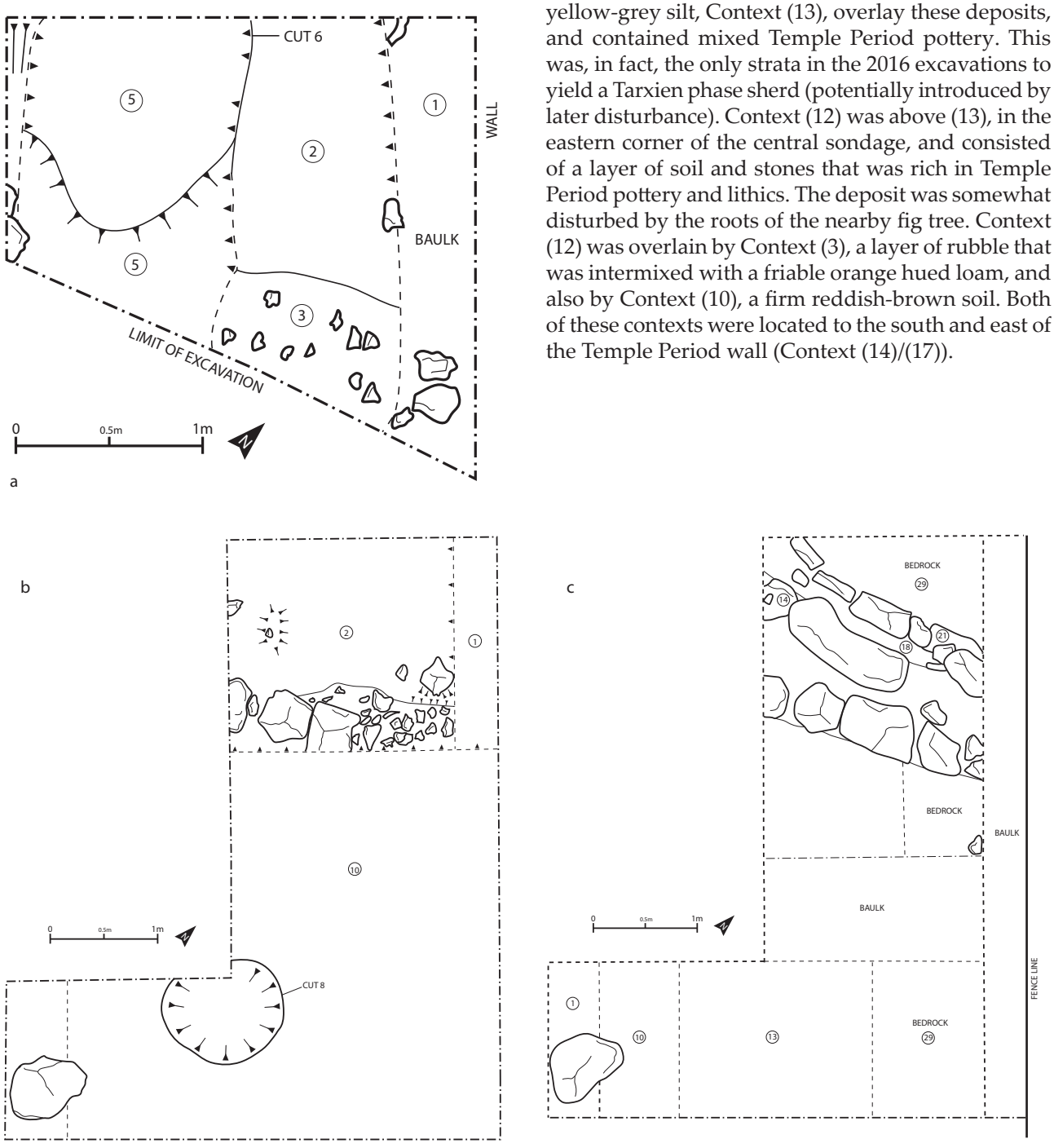


Figure 7.8. *a) Northwest end of trench – intermediate levels, Context 6 the Trump sondage cut; b) The southeast trench superficial contexts; c) Details of the Għar Dalam and the Ġgantija phase walls. The right hand section is recorded in Figure 7.9.*

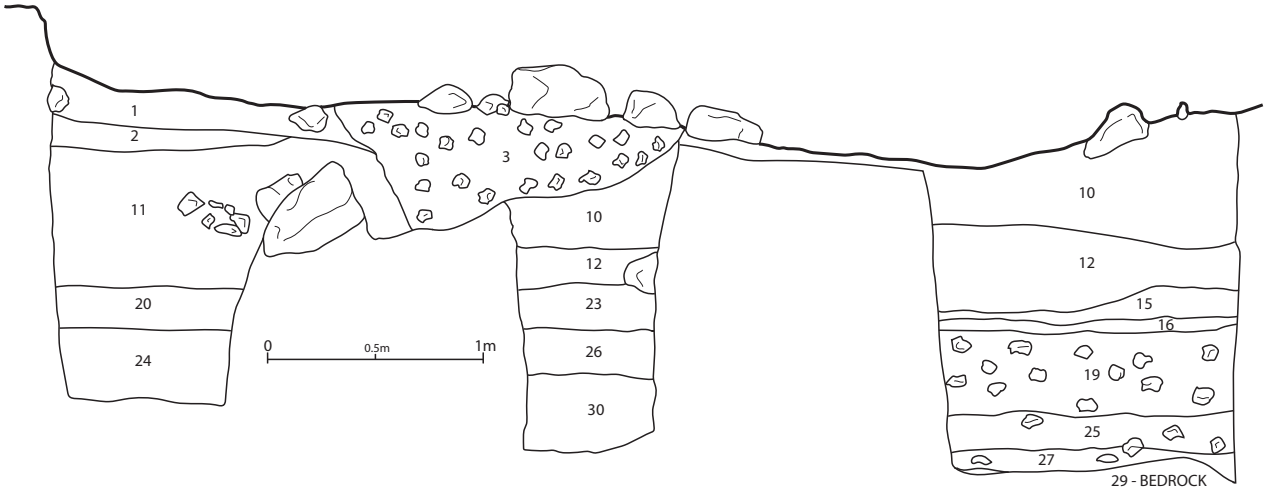


Figure 7.9. *Southwest-facing vertical section showing northern corner (far left), central (centre) and eastern corner (far right).*

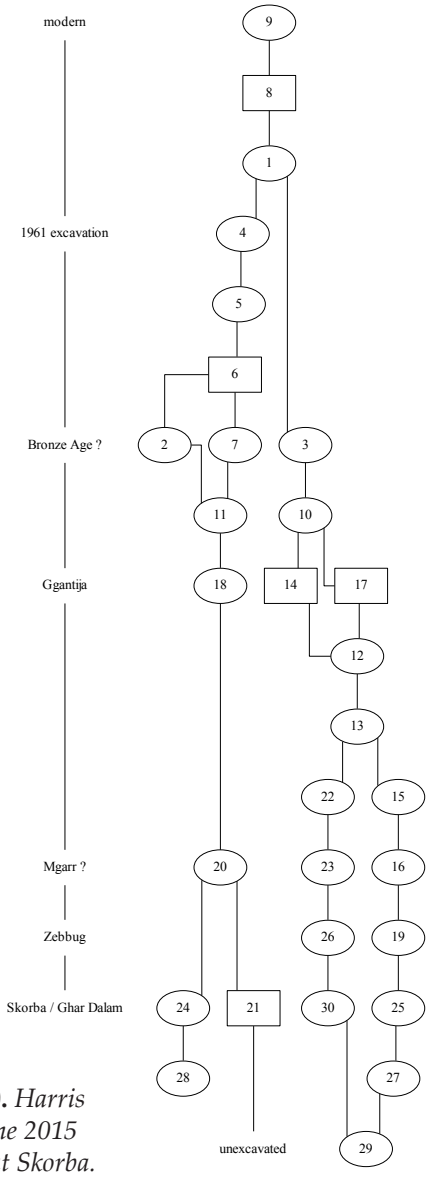


Figure 7.10. *Harris matrix for the 2015 excavation at Skorba.*



Figure 7.11. *Shell beads (SF5) recovered from the* FRAGSUS *excavation at Skorba.*



Figure 7.12. *Section of northwest end of trench, the Trump sondage is identified by its straight vertical cut.*

7.4.3. Eastern corner

Context (27) was located at the base of the sondage in the eastern corner of the trench and consisted of a 0.1 m deep firm creamy-brown deposit with infrequent stone inclusions, containing Skorba phase pottery (Fig. 7.9). The layer above, Context (25), was a 0.15 m deep deposit, similar in composition to (27), although with more stone inclusions throughout, and it also contained Skorba phase pottery. Context (19) was located above this and was made up of a 0.2 m deep compact layer of creamy-grey soil mixed with medium-sized stones, which contained Żebbuġ phase and pre-Temple Period ceramics. This layer was covered by Context (16), a loose, sandy/stony layer 0.05 m deep that contained mainly undiagnostic, prehistoric pottery, with the exception of a small number of sherds representative of the Skorba, Żebbuġ and Ġgantija phases, and produced a radiocarbon date of 5039 to 4777 cal. BC (UBA-33708, 6005±51) derived from a *Hordeum* grain. A second radiocarbon date from a piece of unidentified charcoal yielded a date of 4706 to 4519 cal. BC (UBA-35590, 5756±35). Context (15) overlay (16) and resembled (23) in the central sondage, yielding Ġgantija phase and earlier pottery sherds, and a radiocarbon date of 5190 to 4790 cal. BC (UBA-33709, 6035±54), obtained from a *Hordeum* grain (see Table 7.1). These deposits constituted a Ġgantija phase terrace related to the construction of the three-apse temple structure situated within the site boundaries (Fig. 7.15).

7.4.4. The upper levels

A central sondage was opened on either side of the Temple Period wall (Fig. 7.16) located in the northern corner of the trench (§7.4.1). The wall, identified as Contexts (14) and (17), was a double line of coursed stones, forming the 'inside' and 'outside' skins of a gently curving arc of large sub-angular Coralline blocks, each typically 0.5 m in length (Fig. 7.8e & 8f). This structure was left intact during the 2016 excavations, but is likely to date to the Ġgantija phase, based on pottery found in lower levels butting either side of the wall (Context (23) above).

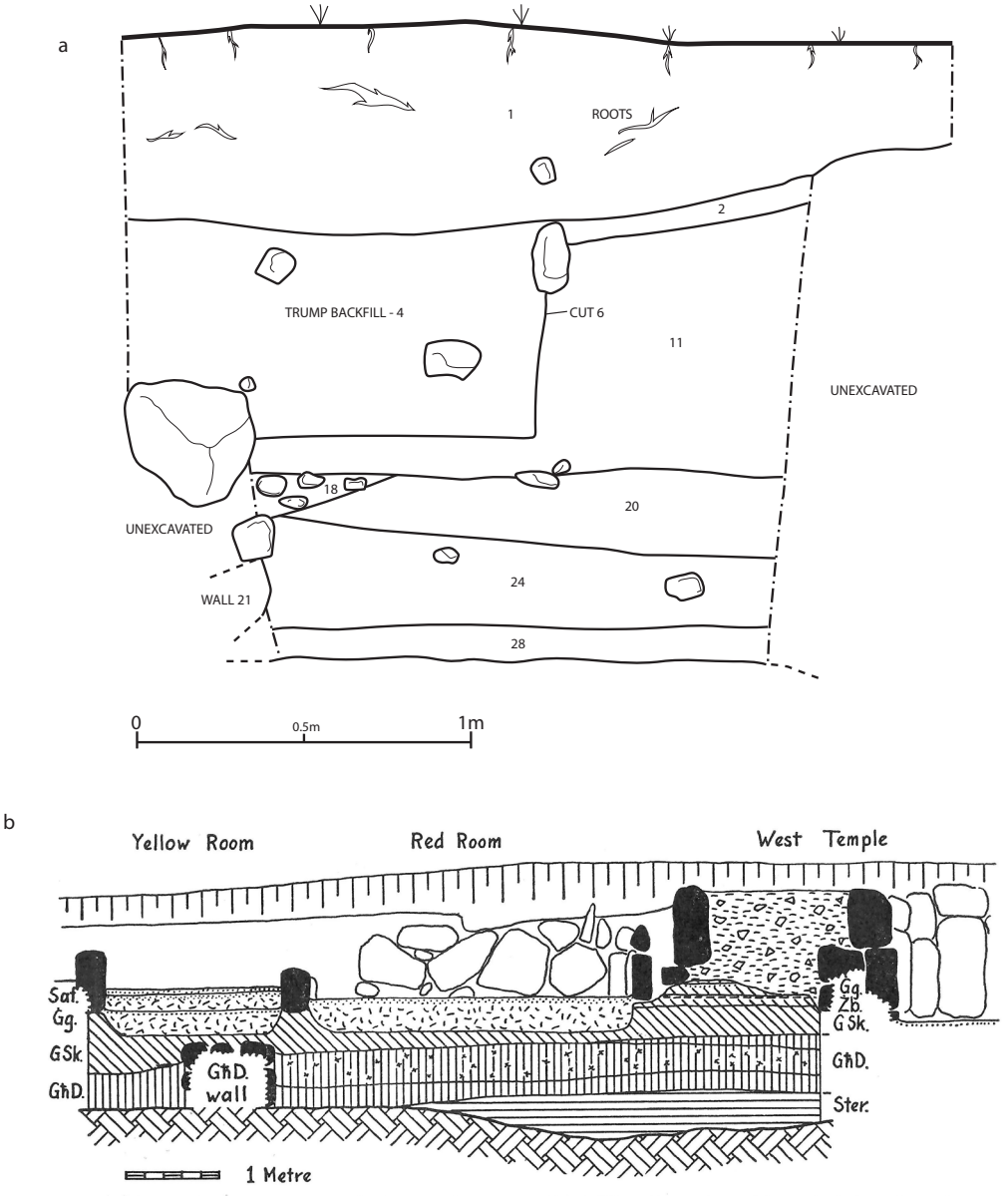


FIG. 6. Section across outbuildings and outer wall of West Temple, with underlying deposits.

Figure 7.13. *a) Drawing of southeast-facing vertical section of Trump trench 'Y'; b) Trump's 1966 record of the stratigraphy of the Għar Dalam wall area.*

Contexts (10) and (11) were both brown silt loams, located above the wall, where (10) was distinguished by a reddish hue and (11) by a lighter cream or pink colour. Pottery present in these layers included many prehistoric sherds (including Bronze Age Borġ in-Nadur examples), but also Roman sherds, and one modern glazed fragment from (10). Together, these layers were interpreted as the fills or base plough soil of an old field surface. Contexts (3) and (2) respectively formed the superficial layers which lay above. Context (2) was an intact stratum comprised of a moderately compacted light-grey-brown soil containing prehistoric pottery (including Borġ in-Nadur sherds). Immediately to the southeast of (2), Context (3) formed a layer of stones and rubble. Context (7) was also at this level and consisted of a lens of similar material to (2), which became apparent only after it had been excavated, once made visible in the southwest section face. Cut [6] represented the remnants of Trump's trench 'Y' (Figs. 7.12 and 7.13) which had been dug into Context (2). Its

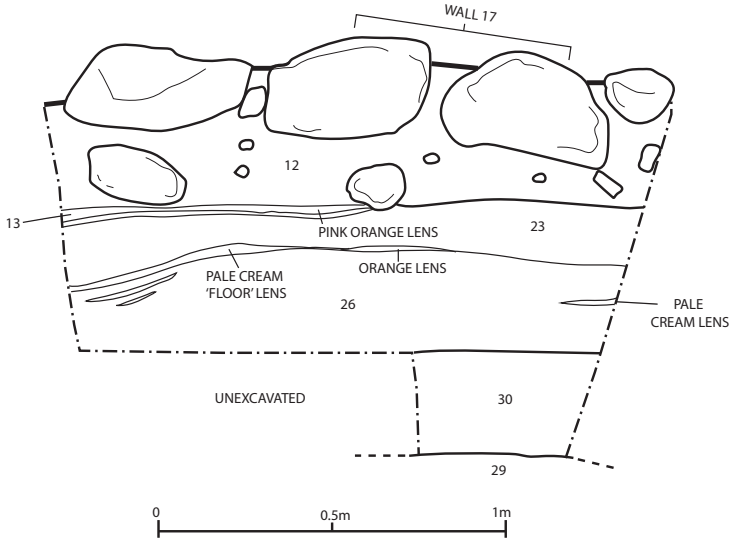


Figure 7.14. *Section drawing of the northeast corner of the trench, showing the deep sondage on the southeast side of the walls.*



Figure 7.15. *Photograph of the deposits in the eastern corner showing the terrace makeup deposits recorded in Figure 7.14.*



Figure 7.16. *Photograph of the Wall (14)/(17) revealed by sondages on either side.*

Table 7.1. *OSL and AMS dates from Skorba and the original dating from Trump's work.*

Lab. ID	^{14}C age	±	Calibrated date (95% CI)	Context	Material	Interpretation
FRAGSUS Belfast AMS dates						
UBA-35590	5756	35	4700–4520	16	Charcoal	Abandonment layer
UBA-33711	5996	46	5000–4780	30	*Lens* sp. seed	Temple complex (residual)
UBA-33708	6005	51	5030–4780	16	*Hordeum*	Neolithic settlement
UBA-33709	6035	54	5200–4790	15	*Hordeum*	Neolithic settlement
UBA-33710	6158	51	5280–4960	28	*Hordeum*	Neolithic settlement
Trump British Museum bulk-sample dates						
BM-142	5240	150	4350–3700	GC3 hut of querns	Charcoal	Presumably erroneous
BM-143	4380	150	3500–2550	West temple floor	Charcoal	Temple complex
BM-145	5000	150	4250–3350	ZA4	Charcoal	Likely mixture of material as per AMS date from Context 30
BM-147	5140	150	4350–3650	GA7	Charcoal	
BM-148	5175	150	4350–3650	RSk shrine	Charcoal	
BM-216	5760	200	5300–4100	FB6	Charcoal	Neolithic settlement
BM-378	6140	160	5500–4700	FB6	Charcoal	Neolithic settlement
BM-712	4478	56	3360–2940	GC3 hut of querns	Charcoal	Late Ġgantija phase settlement
FRAGSUS SUERC OSL dates						
OSL10 SUTL2925	7760 ± 560 BC			118 cm	constrains the final period the buried soil was exposed	
OSL11 SUTL2926	8090 ± 590 BC			128 cm	constrains the age of the buried land surface	
OSL12 SUTL 2927	8780 ± 710 BC			145 cm	constrains onset of soil formation	



fills were assigned contexts (4) and (5) and were only differentiated by their colour. Context (4) was a light grey and brown soil, whereas (5) had an orange hue and was also found in a band 'above' the 1961 trench, beyond the vertical cut; clearly it was a backfill slump. Above Context (2), the superficial topsoil was Context (1), and contained a large number of sherds of prehistoric pottery, from the Għar Dalam, Skorba, Żebbuġ and Ġgantija phases. The topsoil had been recently disturbed by a modern fire pit (Cut [8], Fill (9), which was recorded but was of no archaeological interest).

Figure 7.17. *Photograph of the initial clearance of topsoil of the trench.*



Figure 7.18. *Southeast facing section of trench showing locations of OSL for sampling the stratigraphy and Northeast corner (southwest facing) of the trench marking the OSL locations for dating the stratigraphy.*



Figure 7.19. *The column extracted for OSL dating in the northeast corner.*

7.5. Discussion

The work at Skorba was conducted to tackle some of the *FRAGSUS* questions (see Table 7.2), especially the chronological relationship of the Temple Culture with earlier occupation and also the possible hiatus suggested after the Temple Culture. Skorba had already informed on aspects of the early economies of successive Neolithic communities, but without much sense of how these might have differed over time. The hope was that the refined dating of known stratigraphic phases would expand our understanding of the possible economic and structural responses over time, related to the emerging environmental and climatic story of the project. The 2016 excavation did reveal some new insights and detail of two previously recorded aspects of the site: the Ġgantija phase terrace, and the Għar Dalam phase wall. Importantly, these features were exposed and sampled by the new work, which had plotted their extent well beyond the 'west temple' and the enclosed area of the site. Both previous campaigns in 1961 and 2011 had demonstrated that the terrace under the west temple was built during the Ġgantija phase (Fig. 7.15). Both studies had also noted that the underlying soils that constituted the build-up behind its wall contained mixed materials



Figure 7.20. *a) Area before excavation; b) general view of trench in relation to the main Skorba temple site beyond; c) work at the site, with sampling, sieving and excavation underway in 2016; d) The field team on tea break, with the main Skorba temple site in background (from front left clockwise: Petros Chatzimpaloglou, Eóin Parkinson, Simon Stoddart (chief rubbish remover), Emma Hannah, Stephen Armstrong, Catriona Brogan, Jeremy Bennett, Sean Taylor and Charles French (Caroline Malone behind the camera).*

from earlier phases. The 2016 excavations provided a much more secure stratigraphic link between the terrace soil and earlier structures, collecting samples that helped to frame the absolute chronology of the sequence. In summary, the stratigraphy, from the basal layers up, consisted of a layer of mixed Għar Dalam/Skorba phase material, pure Skorba layers, followed by Żebbuġ, Mġarr and Ġgantija layers. Trump's 1960s excavations were remarkable for their recovery of stratigraphy that encompassed nearly all of Maltese prehistory. The 2016 excavation was similarly successful, albeit on a smaller scale, in recovering a continuous sequence. Although later Temple Period phases (i.e. the Saflieni-Tarxien phases) were largely missing from the sequence, the 2016 excavation met its goal by providing a fresh examination of the timing of earlier phases of Maltese prehistory, through sampling and dating accurately collected organic material and sediments that produced single seed samples. Importantly the chronology of the site supports the

results from other *FRAGSUS* excavations, as well as providing an important absolute chronology for the Sicilian and southern Italian Middle-Late Neolithic (Chapter 2); these gave a rare insight into the earliest Neolithic of the Maltese Islands and wider central Mediterranean.

7.5.1. Contemporary settlement in southern Italy

One particularly interesting aspect of Skorba, revealed both by Trump in the 1960s and in the 2016 campaign, was the early Neolithic Għar Dalam wall. The wall extends beyond the modern temple monument boundary and probably into the field behind the temple, perhaps enclosing a space exceeding *c*. 70 × 25 m in extent. The presence of the enclosure, in spite of its modest size, suggests that space was demarcated, and that domestic places were marked with boundaries. The possible size implies that the Early Neolithic settlement at Skorba was substantial in size, and it is likely that there is buried settlement evidence under the hillwash in the slight hill behind the site, but without further investigation, we can only guess the extent.

To place the Skorba settlement in its context, we need to look beyond the sparse early settlement evidence of Malta and examine some of the contemporary evidence for demarcated domestic space from the central Mediterranean. In the 54 years since the original publication of Skorba, many new data have been presented relating to Neolithic settlements in Italy, including the reports on Passo di Corvo (Tiné 1983), Lagnano da Piede (Mallory 1987), Masseria Candelaro (Manfredini & Cassano 2005), Rendina in the Ofanto valley (Cipolloni Sampò 1977–82) and Ripa Tetta (Tozzi 2015), Capo Alfiere in Calabria (Morter 2010) and Piano Vento in southern Sicily (Castellana 1995) (see Whitehouse 2013). In recent years, similar ditched settlements have been identified in the western Mediterranean in Spain and Portugal demonstrating the widespread pattern of 'dwelling' and living in the earlier Neolithic in southern Europe.

Demarcation with a ditch or surrounding wall was widespread in the Sicilian and southern Italian Neolithic, and is particularly evident in the ditched villages, or *villaggi trincerati*, of the lowland Tavoliere of Apulia and the plain of Catania in Sicily. The often huge Tavoliere sites contained smaller 'C'-shaped ditch elements that formed individual domestic foci containing single or small groups of huts, outbuildings and activity areas (see Tiné 1983 for the evidence from Passo di Corvo). Contemporary settlement included more isolated and rarely ditched settlements in the low hill country of the Materano of Basilicata-Apulia and the Apennines, such as Lagnano di Piede (Mallory 1987). That site was estimated to be 4–7 hectares in extent, while other settlements consisted of extended hamlets such as Rendina (Cipolloni Sampò 1977–82). The lowland sites were typified by some multi-ditched sites, such as Passo di Corvo near Foggia, which contained scores of individual farmsteads within a 30 hectare area (Tiné 1983). Other ditched sites were much smaller and enclosed by single ditches and in some cases these also included low walls of rubble, such as Coppa Nevigata on the Apulian coast. The functional interpretation of the south Italian Neolithic ditches (and enclosures more generally) has included a role in herding and containing animals (Jones 1987), water management (Tiné 1983), or symbolic boundaries (Skeates 2000), although the structures evidently had a multitude of practical and social functions (Pessina & Tiné 2018; Robb 2007). An intriguing combination of both ditch and wall was recorded at the site of Stentinello in eastern Sicily (the type site for impressed-stamped pottery (Leighton 1999, Orsi 1890), and the Sicilian-south Italian variant of Għar Dalam ware). The Neolithic settlements at Piano Vento and Serra del Palco in southern Sicily (Castellana 1995) and Capo Alfiere (Morter 2010) in southern Calabria featured just walled enclosures that probably performed a similar practical and symbolic function to the ditches, and seem typical of the central Mediterranean (Pessina & Tiné 2018). Most sites seem to date from the mid- to late sixth millennium BC, broadly contemporary with the very modest walled enclosure at Skorba. This wall could be considered as the southernmost extension of the tradition of settlement demarcation within the central Mediterranean.

The overall shape of the Skorba wall, from the little that can be traced, is not concentric like the ditches known from southern Italy and southeast Sicily. Instead it follows the contours of the slope, and what remains may have been only a short stretch of boundary walling that connected around the lower edge of the hillside, leaving the upper slope unwalled. This partial type of boundary echoes the boundary structure at Capo Alfiere, where the perimeter wall does not appear to have surrounded the entire site (Morter 2010). The small size and oval shape of the Għar Dalam hut structure at Skorba is quite typical of hut-house forms known from many of the ditched and walled sites, and its form returns later in the shapes of the early lobed temples, in the house forms of Għajnsielem and indeed, the later domestic structures at Skorba.

Trump's excavations at Skorba recovered a small assemblage of human remains from the Għar Dalam deposits (Mangion 1966a & b), consisting of cranial and mandibular fragments. The presence of human

Table 7.2. *Skorba and the* FRAGSUS *questions.*

***FRAGSUS* questions**	**Skorba**
1a. What was the impact of human settlement on Malta?	Enclosed terrace settlement with stone wall indicates early territoriality of settlement in Għar Dalam phase. Settlement continuity exploited the valley landscape around Skorba intermittently for millennia.
1b. How rapid was the process of deforestation, erosion and degradation?	Charcoal suggested burning and perhaps clearance of area while soils show depletion of humic matter, even the deeply buried soils at the site. The evidence supports theory of deforestation and erosion.
1c. When did technical mechanisms to manage the environment develop – such as terracing, water and food storage?	Earlier Neolithic settlement organization is apparent in the spacing and layout of successive structures. Major terrace constructed in front of temple, over the original Earlier Neolithic walled enclosure, compares with similar at other temples, enlarging the external social space, and reflecting potential in agriculture.
1d. Were such mechanisms in place before or after the Temple Culture collapsed?	Skorba's long occupation sequence implies successful storage, water supply and use of valley landscape through out Neoltihic.
2a. How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this?	Skorba suggests the use of ritual as part of its long-term settlement continuity, from 'shrines' to temples. The possible association implies settlement was formalized and symbolic.
2b. Were the monumental temples instrumental in the process of sustaining cultural life?	Very likely Skorba played a role in centralizing ceremonial life and community identity, as well as providing an economic focus for local communities.
3a. What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable?	Evidence for cereals, pulses and domestic animals.
3b. Were there failures in the food supply?	Difficult to assess on present evidence, but clearly food was not abundant and wasted, since little bone remains intact or identifiable.
3c. What impact did diet, disease and stress have on the population?	
4a. What was the size and nature of the early Maltese population?	The scale of the settlement at Skorba might suggest a few dozen residents, but no detail on the full extent of settlement.
4b. What role did demographic connectivity (immigration) play in maintaining island sustainability?	Imported chert and obsidian in the form of cores and worked materials, as well as later imported pottery forms from Sicily, demonstrate connectivity throughout Neolithic. Stock and plants originally imported and improved types must have been from outside Malta.
5a. Was there social-economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically?	Trump identifies breaks and 'squatters' in the late deposits of the temple, suggesting new episodes of occupation. Without substantial settlement evidence, these cultural changes could imply aspects of failure.
5b. Was there a hiatus between the Temple Culture and later Bronze Age settlers?	Trump identified breaks on the basis of sterile deposits between phases. Tarxien Cemetery and Bronze Age levels were noted in specific upper deposits, indicating a distinct cultural break with Neolithic.
5c. Are other hiatuses apparent in the sequence, such as between the earlier Neolithic and the Temple Period?	The clear establishment of the early phase of Skorba extending over more than half a millennium, but with no evidence for dated occupation between *c*. 4800 and 3800 Cal. BC, strongly suggests drastic changes if not abandonment and thus a hiatus in the sequence..

remains in the Għar Dalam occupation layers might suggest that domestic sites in early Malta reflected similar practices in southern Italy and Sicily (Robb 1994; Conati Barbaro 2008; Dolfini 2015). Such burial was within or under or beside dwelling places, rather than formalized external cemeteries, and similar scatters of human remains were recovered from contemporary occupation layers at Għar Dalam cave (Despott 1917).

7.6. Conclusion

The 2016 excavations at Skorba have addressed several of the *FRAGSUS* questions (Table 7.2) and they provide important insights into and confirmation of the chronology of the Early Neolithic of the Maltese Islands. The work establishes the chronology of the earliest features (Għar Dalam wall) firmly, with additional AMS dates (Table 7.1) that refine the remarkably accurate dates achieved from comparatively large bulk carbon samples collected in the early 1960s. Indeed, the new dating confirms the later sixth millennium BC occupation of the site, some 1500 years before the Temple Culture emerged. Dating also suggests that the hiatus in human activity between the Skorba and full Temple Culture phases noted at Santa Verna is repeated at Skorba (note question 5c in Table 7.2). The 2016 excavation of Skorba, 50 years after the publication of the original 1966 report has provided an opportunity for a new discussion of the site and its legacy. Skorba is now more firmly placed within the context of the chronology from other sites in Malta and outside. Importantly, the refinement of chronology and the application of calibration and Bayesian statistics revise the dating of the first Maltese Neolithic phase (Għar Dalam-Skorba), which now can be considered as one extended episode of about half a millennium in length that links to many of the trends and changes in the environmental story of Malta (Volume 1).

In comparison with David Trump's ambitious fieldwork half a century earlier, the intensive 2016 programme of interdisciplinary applications focused on a small trench which has certainly added an unexpected level of new detail and archaeological understanding.

Notes

1. Site code: SKB2016.
2. *FRAGSUS*: Fragility and sustainability in restricted island environments: Adaptation, cultural change and collapse in prehistory. A collaborative programme of research between Queen's University Belfast, Heritage Malta, Cambridge University, the University of Malta and the Superintendence of Cultural Heritage, Malta. European Research Council seventh framework programme (FP7) 'Ideas' Advanced Grant: 323727. Principal Investigator: Prof. Caroline Malone http://www.qub.ac.uk/sites/FRAGSUS/
3. https://research.bournemouth.ac.uk/project/maltese-temples-landscape-project/

Chapter 8

In-Nuffara

Stephen Armstrong, Catriona Brogan, Anthony Bonanno, Charles French, Rowan McLaughlin, Eóin W. Parkinson, Simon Stoddart & Caroline Malone

8.1. Introduction

The excavations at In-Nuffara,[1] Gozo, were undertaken as part of the ERC funded *FRAGSUS Project*.[2] In 2015, work focused on the excavation of two Bronze silo pits located on the southeastern aspect of the plateau identified over the course of survey work in 2014. The plateau had formed a substantial, naturally defended Bronze Age hilltop settlement with steep sheer rock sides around much of its perimeter. The goal of the 2015 fieldwork was to address some of the *FRAGSUS* questions relating to the end of the Temple Period that could explore how landscape, culture and economy changed in the second millennium BC. Our aim was to excavate, record and sample sealed archaeological deposits for radiocarbon dating, zooarchaeological, palaeobotanical and geoarchaeological analyses. Such material had the potential to illuminate the chronology and economy of these poorly known aspects of the Maltese Bronze Age, as well as give context to the broader environmental changes of Malta after the end of the third millennium BC.

The Maltese Bronze Age has suffered from a lack of recent systematic fresh archaeological research, given that the major sites for the period at Borġ in-Nadur (Murray 1923, 1925, 1929; Vella 2015; but see Tanasi & Vella 2011) and Baħrija (Evans 1971; Peet 1910; Trump 1961) were last substantially excavated over half a century ago, before routine scientific sampling and dating were possible. In this respect, the data retrieved from the 2015 excavations on In-Nuffara have yielded important insights into the diet, economy and landscape of the Bronze Age settlement, an aspect that could not be considered during the 1960 excavations at In-Nuffara (Evans 1971). The information obtained from In-Nuffara also provides important context for post-Temple Period Malta and enables a more nuanced understanding of changes within the Maltese environment and economy over the course of prehistory (§8.4.1, Excavation rationale). This understanding links with the broader environmental changes that are recorded and discussed in Volume 1 of the Project, and with our discussions of the role of Malta within the central Mediterranean area in later prehistoric times.

8.2. The site

8.2.1. Location and physical setting

In-Nuffara is a small uninhabited plateau located approximately 1 km southeast of the Xagħra Plateau, overlooking the Ramla Valley to the north and the central plain of Gozo to the south (Fig. 8.1). Rising steeply from the surrounding countryside, the plateau of In-Nuffara forms a prominent feature within the local landscape (Fig. 8.2). From the summit there are extensive views of the surrounding countryside as well as clear views of the sea and the neighbouring islands of Comino and Malta. The northern side of the plateau looks out across the Ramla Valley towards the southern slopes of the Xagħra Plateau and the prehistoric temple of Ġgantija (Volume 1, Chapter 5). The physical location of the Bronze Age settlement at In-Nuffara, on a mesa plateau, conforms to the broader shift to naturally defended locations that were chosen for other Bronze Age settlements on the Maltese Islands (Volume 1, Chapters 6–7) and the wider southern-central Mediterranean (Terranova 2015; Vidal Gonzàlez 1998).

The In-Nuffara Plateau is formed from Upper Coralline Limestone, which itself is undergoing a process of fissuring and collapse, especially along its eastern border, while the lower ground surrounding the plateau is composed of Blue Clay. The soils on the plateau today tend to be very thin and eroded, mainly comprised of carbonate raw soils derived from weathered Globigerina Limestone. These immature soils tend to have a very low organic content, making them unsuitable for agricultural purposes (Vella 2001). The soils may not have been so eroded in the past, if



Figure 8.1. *Location map of In-Nuffara.*

we draw analogy with the well-developed pre-temple soils at Ġgantija and Santa Verna on the northern side of the Ramla valley (Volume 1, Chapter 5). The soils on the surrounding clay slopes of the plateau are formed of soils from the L-Inglin series (Lang 1960) and today are heavily terraced. The 2015 excavation site is situated in the southeastern corner of the plateau at an altitude of approximately 139 m, at grid reference UTM 33S 434635E 3988925N (or 36.230° N, 14.1624° E on the WGS84 datum).

8.2.2. History of the site

There is little of archaeological interest to be seen on the present surface of In-Nuffara, and few traces of human activity, save for a scatter of modern walls, hunting hides (low stone walled enclosures) and bird traps across the plateau. Today, the plateau is isolated and barren, with a thin covering of garrigue scrub and large areas of exposed rock. Despite the apparent lack of resources, the plateau evidently supported a substantial Bronze Age settlement, although most surface traces of the settlement have disappeared as a result of aggressive surface erosion and destruction. The settlement evidence survives most substantially in rock-cut surface features and bell-shaped rock-cut pits. The rock-cut pits on In-Nuffara were first reported by L. Gravina, who noted concentrations of Borġ in-Nadur pottery and bell-shaped pits cut directly into the hard



Figure 8.2. *View of In-Nuffara mesa and the Ramla Valley below, taken from the northwest of the plateau, from the direction of Ġgantija temples.*

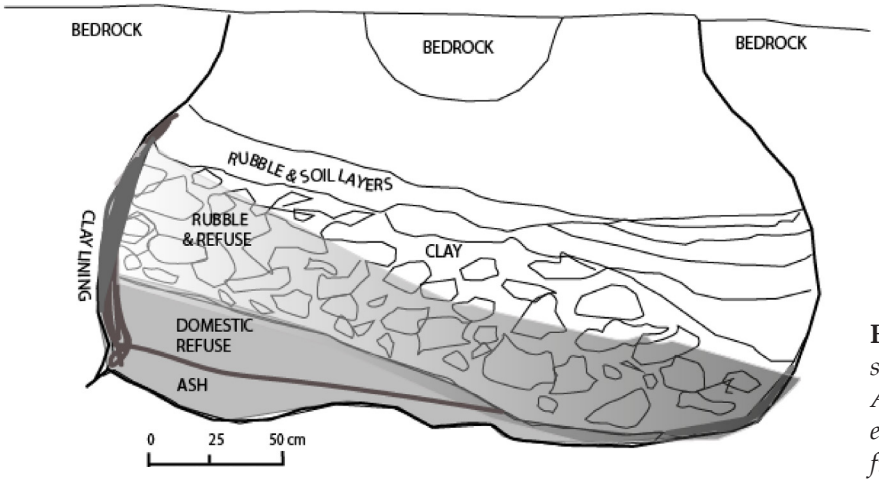


Figure 8.3. *Sketch of a vertical section of two adjoining silo pits from Attard-Tabone and Trump's 1960 excavation at In-Nuffara, redrawn from Trump's notebooks.*

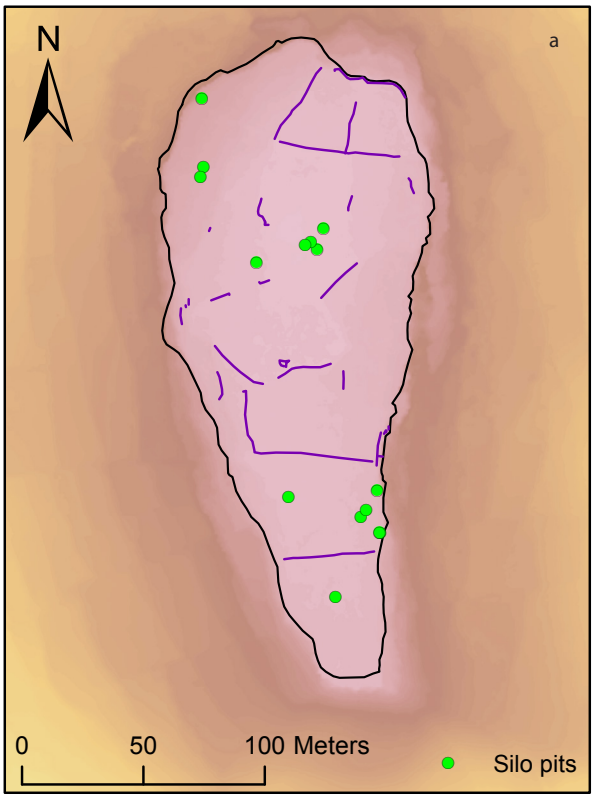
Upper Coralline Limestone (Evans 1971, 171). In total, fifteen rock-cut pits have been located on the plateau, although the presence of partially eroded pits along the cliff edge of the plateau raises the possibility that others have been already lost. Clusters of bell-shaped rock-cut pits are commonplace throughout the Maltese Islands, often found in naturally defended locations, and are generally interpreted as either grain silos or water cisterns associated with Bronze Age defended settlements (Evans 1971, 200–1). Elsewhere on Gozo, *c.* 100 rock-cut pits were found on the Gozo Ċittadella in Rabat in 1860, constituting evidence for a second substantial Bronze Age settlement nearby (Bonanno 1986; Volume 1 Chapter 7), and more have come to light during recent renovation works. On Malta, clusters of bell-shaped rock-cut pits are known at several sites, such as at Wardija Ta' San Ġorġ, St. George's Bay and il-Qlejgħa tal-Baħrija (Cardona & Zammit 2015; Evans 1971).

In-Nuffara was first investigated archaeologically by Joseph Attard-Tabone and David Trump in 1960 (Trump 1972, 153), when they excavated a rock-cut pit with a double aperture. A section drawing of the pit by Trump shows that they discovered four distinct layers during the excavation (Fig. 8.3). At the base of the silo there was a clay lining lay beneath a grey 'ashy' deposit, believed to contain grains of cereal. This was covered by a midden layer of domestic refuse containing quantities of Bronze Age ceramics. Over this lay the final layer which represented several episodes of silting, clay, refuse and rubble. According to the excavation notes, Attard-Tabone and Trump interpreted the rock-cut feature as a grain silo, rather than as a water cistern. This was partially based on the discovery of cereal grains within the deposits, but they also believed that the natural crevices within the bedrock would have made it unsuitable for the retention of water. The excavators concluded that the pit's function changed from a grain silo to a refuse pit during the Middle to Late Bronze Age Borġ in-Nadur phase (*c.* 1500–750 BC) on the basis of ceramic evidence from the midden layer. Yet, the precise date of this transition remained unknown. Some of the notable finds, as well as the section drawing, from the Attard-Trump excavation are displayed in the Casa Bondi Museum (Rabat, Gozo) including several complete or near complete ceramic pots, spindle whorls, clay anchors, and a bell-shaped lid with triple handle of Sicilian Pantalica North type (Vella *et al.* 2011).

8.3. Surface survey

In 2014 and 2015, the *FRAGSUS Project* conducted a Global Navigation Satellite System (GNSS) survey of the plateau to record the archaeological features and identify potential areas for future excavation. All possible anthropological and archaeological features were recorded, including modern bird-traps, hides, pottery concentrations and all rock-cut features. Particular importance was placed on locating all rock-cut silo pits that might contain intact archaeological deposits relating to Bronze Age activity on the plateau (Fig. 8.4).

The survey of the steep slopes surrounding In-Nuffara was of limited success. The unavailability of real-time GNSS on the Maltese Islands resulted in survey readings that were only accurate to within several metres. Furthermore, confident identification of rock-cut pits along the highly eroded and fissured cliff face of the plateau-top was difficult. The survey was also inhibited by the density of vegetation growing on the slopes. This made access to potential features challenging, although a selection of rock-cut features were identified (Fig. 8.5). The survey of the surrounding slopes also highlighted the fragile and

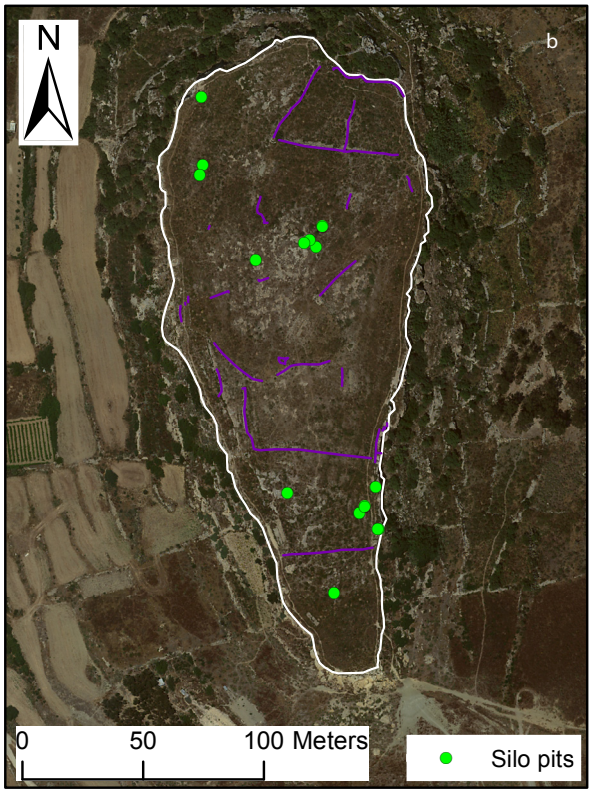


eroding nature of the archaeological features on the plateau. The survey of the plateau recorded 15 rock-cut silo pits including two adjacent pits suitable for archaeological prospection (Fig. 8.4). The location of each silo was recorded using the GNSS receiver in uncorrected mode. The survey also identified and recorded a spring line at the foot of the hill that was situated within private gardens.

8.4. The 2015 excavations

8.4.1. Excavation rationale

Excavation at In-Nuffara fulfilled the *FRAGSUS Project* goal to sample contexts covering a wide chronological range of Maltese prehistory. The work ensured that material representing the later Bronze Age palaeo-economic environment was captured to construct a more robust understanding of landscape and economic changes after the Temple Culture phase. A pair of adjacent and apparently intact rock-cut silo pits located on the southeastern aspect of the In-Nuffara Plateau were chosen for excavation. One major benefit of excavating the rock-cut pits is that archaeological deposits are generally sealed and protected from erosion, in contrast to deposits situated on the plateau surface. The



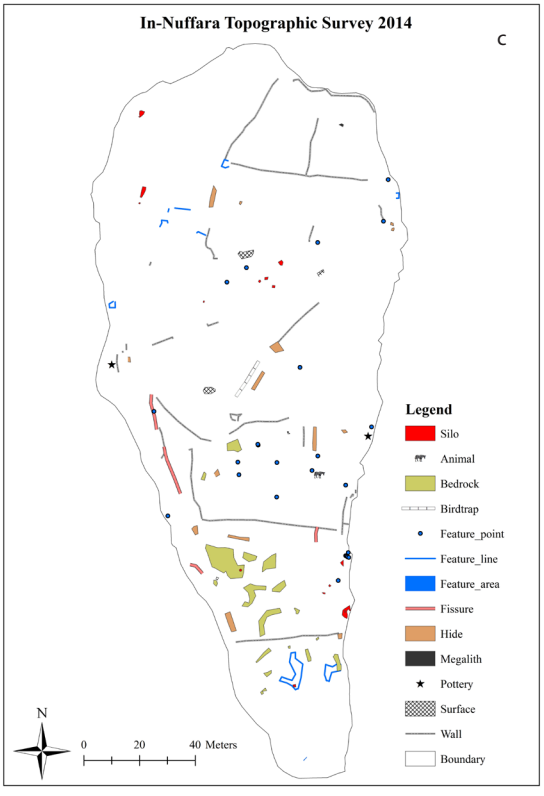


Figure 8.4. *a) Orthographic imagery of In-Nuffara; b) LiDAR-derived Digital Terrain Model (DTM) map of the site; c) Topographic features recorded through survey and remote sensing in 2014–15.*



Figure 8.5. *The remains of a partially eroded rock-cut pit along the limestone cliff-face.*

excavations of Bronze Age pits at In-Nuffara aimed to retrieve environmental data in the form of pollen, faunal and plant remains by extracting soil samples. A second goal was the retrieval of material suitable for radiocarbon dating, which, when combined with the associated ceramic record that was likely to be in the deposits, would enable a greater refinement of Maltese Bronze Age chronology; a period that spans over 1000 years but lacked detailed radiocarbon dating (Chapter 2).

8.4.2. Methodology and personnel

The excavation at In-Nuffara took place from 15 March to 3 April 2015 and was granted a permit from the Superintendence of Cultural Heritage (SCH). This permit enabled a trench measuring 6 × 4 sq. m to be set out around the openings of two rock-cut pits identified during the 2014 survey. A local site grid was established using a Total Station and which was later aligned to the UTM grid using differential GNSS.

Following the clearance of topsoil within the trench and the recording of a number of small rock-cut features on the surface of the bedrock, work commenced on excavation of the pits themselves. In each pit, the uppermost fills were removed until there was enough working room to create a half section. The sections were continued to the base of each pit and recorded. All of the fills were dry-sieved on site for finds, except for bulk samples of soil taken for environmental data, which were subsequently wet-sieved by flotation off-site. A total of 53 10 litre soil samples were taken, at least one from every context from within the two pits, and many more samples were taken from the intact Bronze Age contexts. Each context was sub-sampled for palaeobotanical or geoarchaeological analysis, and ascribed a hue using Munsell colour designation. In addition, three soil micromorphology samples and four pollen column samples for palaeoecological analysis were collected. Five organic samples were submitted for radiocarbon dating (three cereal grains, a legume a fragment of charcoal) and successfully dated. Soil samples were also taken for OSL dating but were not processed as the radiocarbon evidence provided adequate chronological precision.

The excavated pits, and several others known to exist around the plateau, were surveyed using Ground Penetrating Radar (GPR), and these provided baseline data for future explorations of pit and feature locations where there was no surface indications of such features. The bedrock features around the openings of the excavated pits were planned using the Total Station in reflectorless mode. Structure from Motion (SfM) photogrammetry was undertaken at several points during the excavation by Robert Barratt (Cambridge Archaeological Unit – CAU) and Donald Horne (CAU), enabling accurate recording and visualization of the pits and their intact archaeological deposits in section. A post-excavation 3-D laser scan of the rock-cut surface features and both silo pits was also undertaken by John Meneely (Queen's University Belfast) (Fig. 8.7).

8.4.3. Results

8.4.3.1. Rock-cut surface features

The removal of topsoil layers revealed a number of small features cut into the bedrock surrounding the entrances to the pits (Figs. 8.6, 8.7 & 8.8). In total, there were ten cuts within the 6 × 4 m trench, representing the two pits, natural fissures, possible postholes, and a number of short rectangular cuts. All the fills of the rectangular cuts were treated as equivalent to topsoil since they gave no indication of their function or date. Many of the cuts and shapes in the bedrock appear to respect the pit entrances and were probably contemporary or slightly later in date.

8.4.3.2. Silo 1

The rock-cut pit to the south was named 'Silo 1' and assigned context number Cut [12]. Its capstone was found intact above the silo entrance. The pit was about

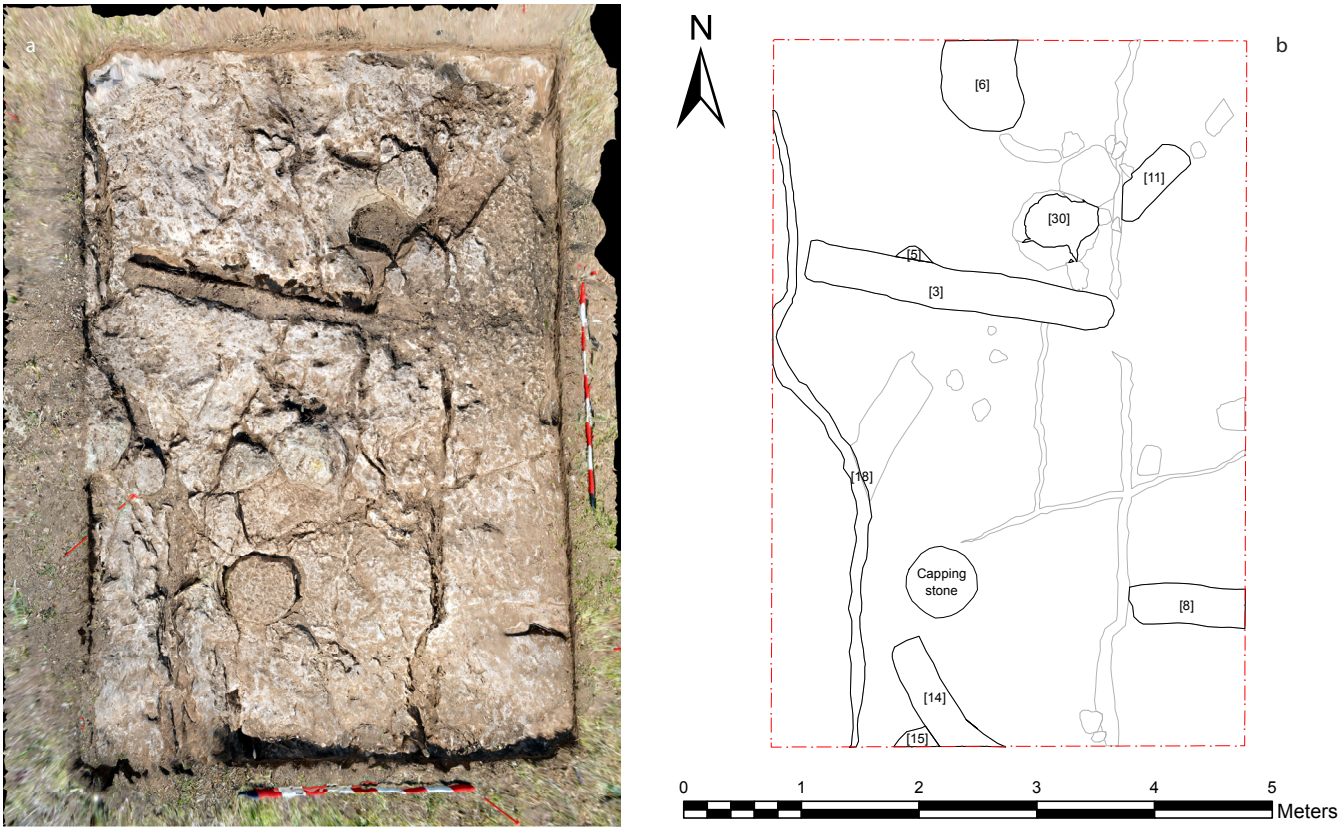


Figure 8.6. *a) Structure from Motion orthograph and plan of the trench showing the position of the rock-cut gully features and rock-cut pits (Silo 1 is represented by the* in situ *capping stone and Silo 2 is represented by Cut [30]); b) plan of trench.*



Figure 8.7. *Photograph of the trench after removal of the topsoil. The opening Silo 2 can be seen in the mid-left of the photo, while the intact capstone of Silo 1 is visible towards the rear of the trench. Also visible are a number of rock-cut gullies.*

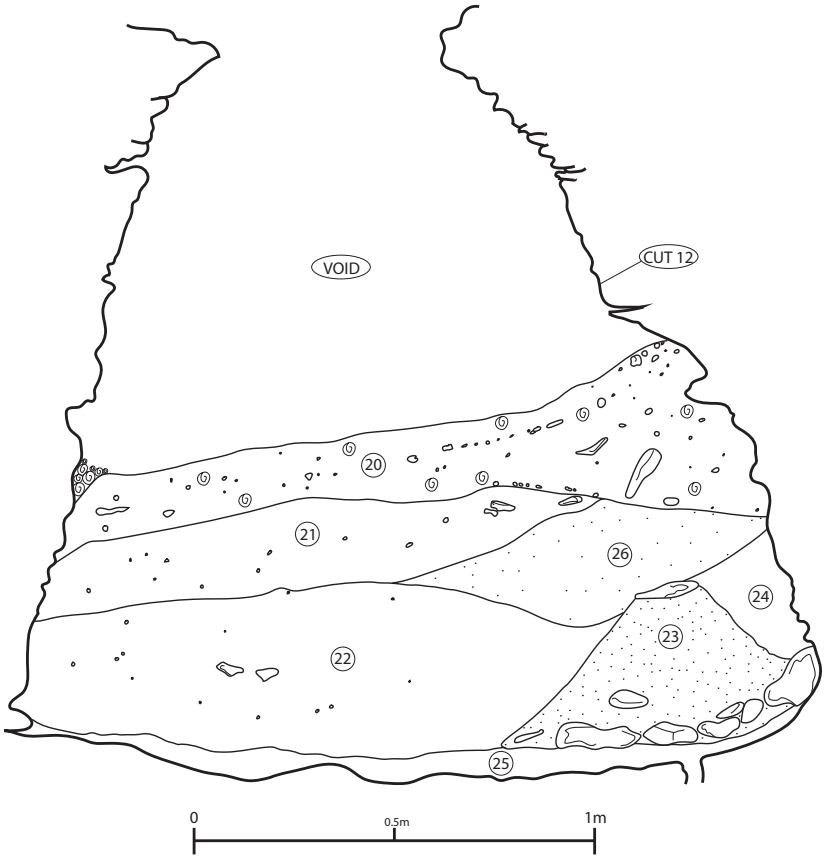


Figure 8.8. *North-facing half section of the archaeological deposits within silo 1 (Cut [12]).*



Figure 8.9. *Photographs of the* in situ *capstone of Silo 1 following the removal of topsoil.*

2 m deep and, at its widest point, about 2 m across and contained seven contexts (Fig. 8.8, Silo 1). Context (25), a clay layer approximately 8 cm deep, was formed against the base and sides of the pit. Context (23), a layer of silt *c.* 42 cm deep containing large amounts of pea grit and medium-sized limestone rocks, lay on top of Context (25). Micromorphological analysis of this context suggested that this was a fine sandy/silty clay loam soil material derived from the ambient soil on the plateau, exhibiting similarity with the pre-temple buried soil at Ġgantija (Volume 1, Chapter 5). This was covered by friable silts Layers (22) and (24) most probably derived from wind-blow and rain splash. Context (22) was *c.* 45 cm deep and was considered to be an intact archaeological layer that contained a Roman amphora sherd. Context (24) was 33 cm in depth and contained Borġ in-Nadur phase pottery. Context (26), a 31 cm thick layer of friable silt with frequent inclusions of pea grit was above Layers (22) and (24), although it was restricted to the western half of the pit. The next deposit, Context (21), contained slightly larger gravel as well as sherds of medieval pottery and modern material, including plastic, and was 24 cm deep. The uppermost fill was Context (20), was a thick silty deposit *c.* 44 cm deep, which contained slightly smaller gravels than (21). Context (20) also contained medieval pottery, a large number of snail shells and was contaminated by topsoil. There was a void of approximately one metre height between the uppermost fill and the entrance hole of the pit, which was blocked with an apparently intact capstone (Figs. 8.9 & 8.10).

8.4.3.3. Silo 2

'Silo 2' to the north of 'Silo 1' was assigned the cut number [30]. Silo 2 was unsealed and measured approximately 2 m deep by 2 m at its widest point. Unlike 'Silo 1', and although it was unsealed by a capstone, this pit contained a greater quantity of material and intact archaeological deposits, with a total of 16 separate stratigraphic contexts (Figs. 8.11 & 8.12).

At the very base of the pit, there were three crevices or fissures in the bedrock, orientated east- west. On closer inspection, a quantity of soil, Context (46),



Figure 8.10. *North-facing half section of the archaeological deposits within Silo 2 (Cut [30]).*

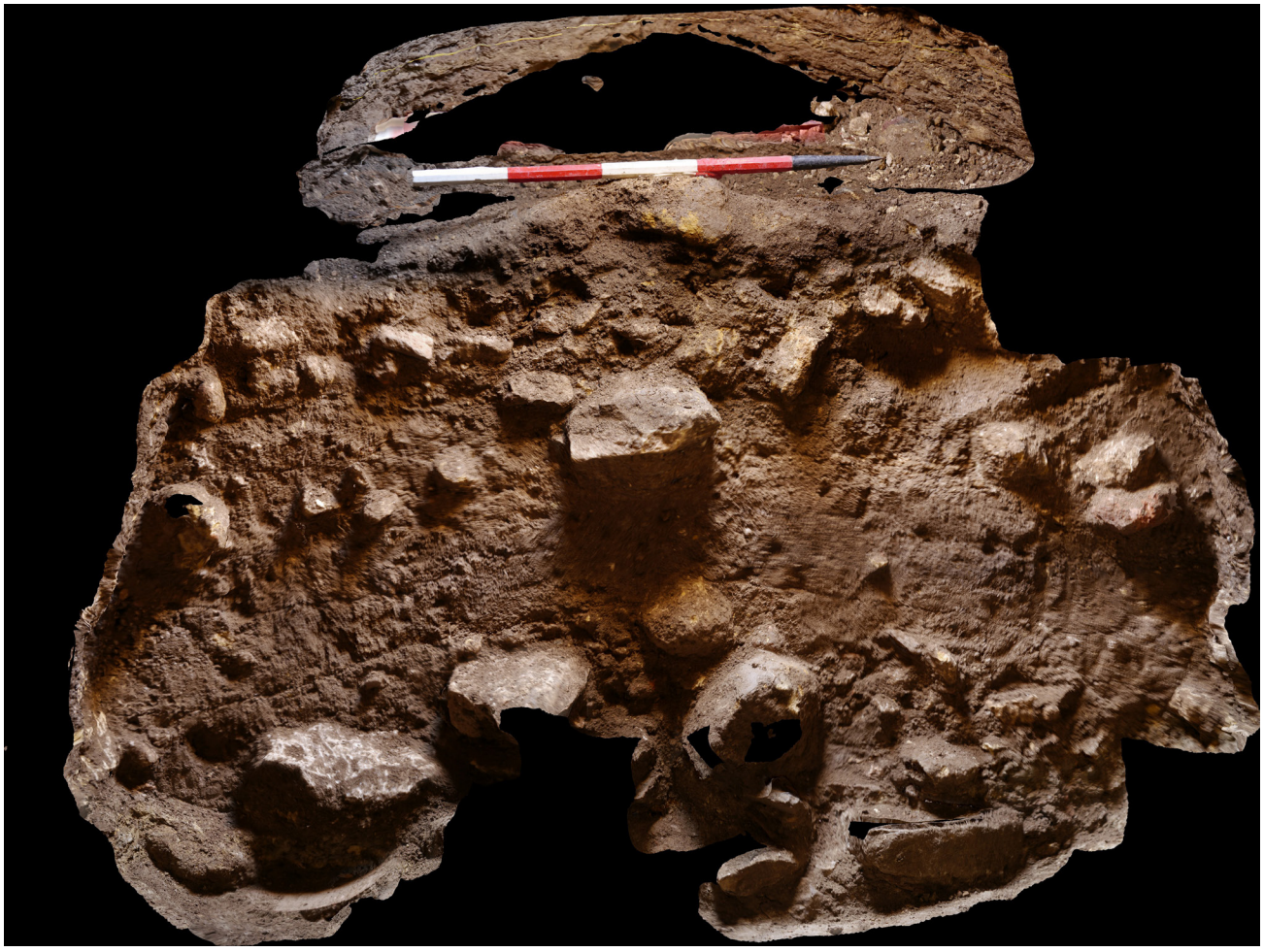


Figure 8.11. *Structure from Motion model of the half sectioned archaeological deposits within Silo 2 (Cut [30]).*

was found trapped within one of the crevices. This soil was partially removed and, although much more soil had slipped further down into the fissure, enough was gathered for a pollen sample (Sample #53) (see detailed palynological report in Appendix A8.3). This was dominated by Lactuceae, an indicator of pastoral vegetation (Volume 1, Chapter 3). A few small sherds of undiagnostic prehistoric pottery were also recovered from this context. These fissures were sealed by Context (44), a clay lining that covered the entire base of the pit to a depth of about 10 cm. Approximately 90 per cent of this lining was bulk sampled (Sample # 51). Although relatively sterile, some charcoal was found in the sample, as was a small quantity of undiagnostic pottery. Above the clay lining, Context (43) formed a 17 cm deep layer of pale green-grey compacted clay with frequent pale-yellow silt inclusions and a small proportion of midden material. Context (43) produced two samples suitable for AMS radiocarbon dating, a charred Fabaceae seed dated to 1117–926 cal. BC (UBA-31032, 2856±32 BP) and a fragment of *vesicular cerealia* that was dated to 1260–1002 cal. BC (UBA-31031, 2924±43 BP). These dates place this layer within the Late Bronze Age. This deposit, which was presumably also derived from the lining material, had only been preserved because of the thick layer of midden material, Context (41), which had been added on top of it. Context (41) formed a friable, silt loam about 35 cm deep, and contained a large amount of domestic refuse, including broken pottery and a large amount of animal bone. The pottery, dating from the Borġ in-Nadur phase, ranged from small pieces of delicate pot, including one nearly complete juglet (similar to Evans 1971, Fig. 40: 8) found upturned at the bottom of the context (Chapter 10), to large thick pieces of huge storage vessels. Two dating samples from Context (41) were submitted for AMS radiocarbon dating which yielded dates spanning the Middle-Late Bronze Age. A charred *Hordeum* grain was dated to 1207–948 cal. BC (UBA-31033, 2890±36 BP) and a charred grain of *Triticum* was dated to 1412–1234

cal. BC (UBA-31034, 3065±30 BP). Additional finds from Context (41) were a spindle whorl, a selection of oddly shaped stones, which may represent grindstones or querns, two potential capstone fragments and a possible structural stone (Chapter 10).

Context (42), identified along the northern edge of the pit above Context (41), was a pale green-grey compact clay with silt inclusions, and appears to represent a layer of collapsed lining from the pit's walls. Context (40), a moderately firm clay silt with frequent medium and large stones, with a depth of 36 cm, overlay both contexts (41) and (42). Both contexts (40) and (41) were very similar in composition, containing both pottery and bone, although it was noted that the pottery sherds in the upper deposit (40) were more abraded and weathered than those in the lower Context (41). The pottery was of later Bronze Age style, although one of the sherds was from a Punic period bowl. Context (45) was found around the edges of the pit, encircling (40), and contained a particularly high concentration of snail shells. A similar layer, Context (39), overlay (40), and comprised a moderately firm dark brown clay silt, around 21 cm deep. As with the preceding Context (40), this appeared to be another midden layer that was rich in Bronze Age pottery, but with two probable Punic or Roman sherds. Another band of snails, at the edge of the silo walls, *c*. 15 cm wide and 12 cm deep, surrounded this context. This deposit was overlain by Context (38), a moderately firm clay silt, with occasional stones. This layer contained mainly Borġ in-Nadur phase pottery, as well as the rim of a Roman 'crisp' ware cup and two well-fired Roman sherds.

Context (37) overlay Context (38) as a loose stony 19 cm deep deposit. Context (37) contained a substantial amount of medium and large sized stones that, upon their removal, were found only just to fit through the entrance of the pit, and had been intentionally forced into the silo. Pottery from this layer was predominately from the Borġ In-Nadur phase, although it also contained wheel turned Punic ceramics and post-medieval Knights Period sherds, including a neck fragment of a red-slip amphora. The next layer, Context (36), was a sandy silt containing medium-to-large stones. Finds from this layer included a possible capstone, discovered lying in the bottom of the layer, near the interface with Context (37) and a diverse collection of ceramics. Amongst the pottery identified from Context (36) were 'Crisp' ware of Punic or Roman date, one sherd of a Late Roman corrugated amphora, one large piece of a ring-based bowl with green glaze dating to the medieval period and one sherd of Knights Period red-slip ware. This was covered by Context (35), a clay silt containing medieval glazed pottery. The following Context (34), was also a clay silt with a number of limestone inclusions measuring >50 cm in diameter and containing medieval glazed pottery. This was covered by a silt Context (33) with occasional stone inclusions and a mixture of modern material, including glass and iron, as well as Roman and medieval ceramics. Above this was Context (32) composed of compacted small to medium sized stones (typically up to 0.4 m in diameter), mixed with fine-grained sediments. The stones were unrolled and unweathered and contrasted with the rare and highly abraded ceramic finds. The uppermost layer of this pit, Context (32), was a topsoil-derived silt, comprising stony deposits and bioturbation.

8.4.4. Geoarchaeological report

Analysis of soil geomorphology was undertaken on selected pit fills by Prof. Charles French (University of Cambridge). The excavations on the Upper Coralline Limestone plateau of In-Nuffara revealed a number of primary/lower secondary fills composed with what appeared to be soil-like material (Figs. 8.9 & 8.11). Given the otherwise severe denudation of the topsoil over this plateau, the silo deposits presented an ideal opportunity to sample for micromorphological analysis. Accordingly, four soil blocks (samples 17, 40, 503, 509) were taken from the two pits and were prepared for thin section analysis (Appendix A8.6).



Figure 8.12. *Spindle whorls recovered from Silo 2 (Cut[30]).*

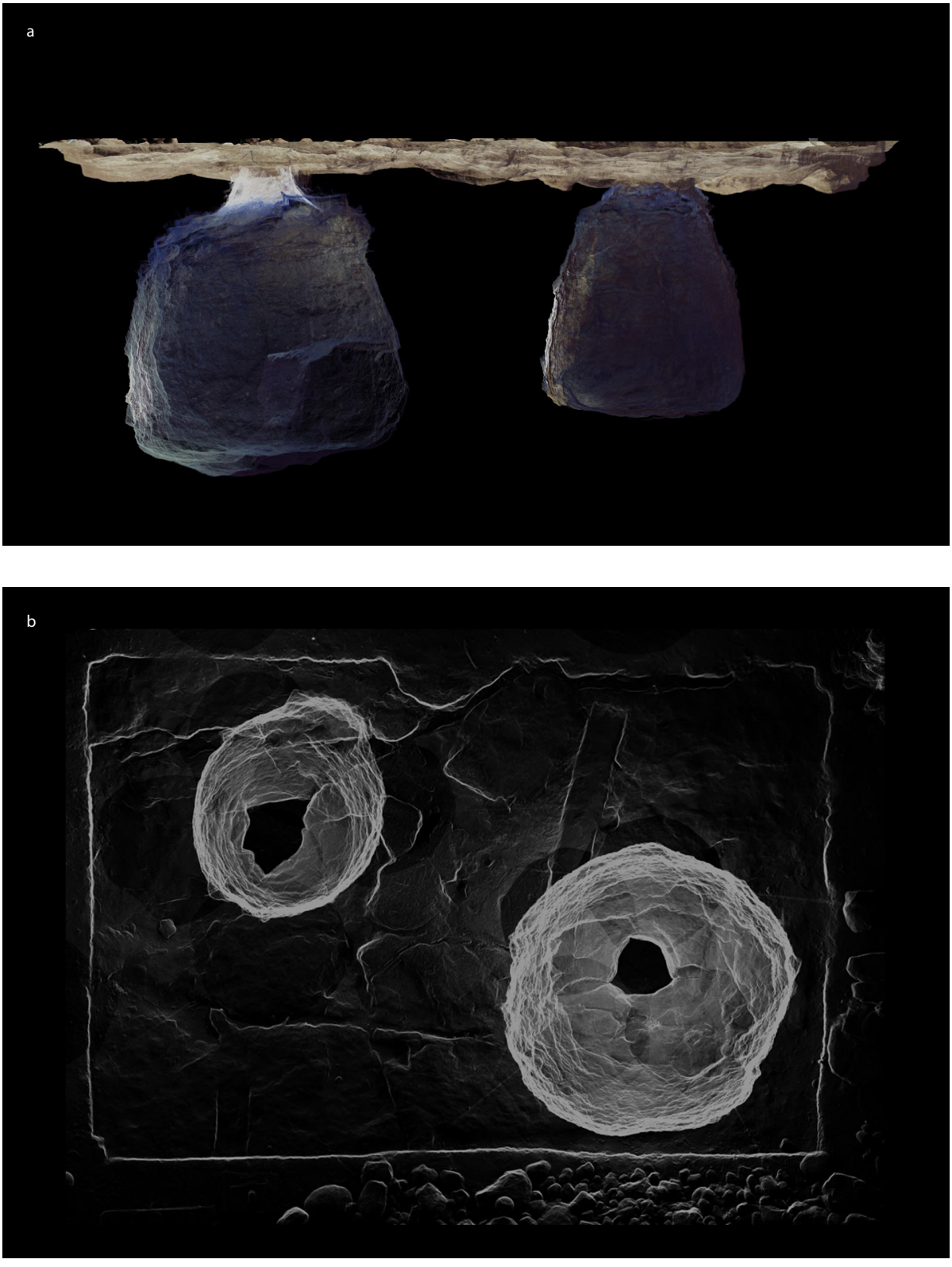


Figure 8.13. *a) 3-D laser scan section of 'Silo 1' (left) and 'Silo 2' (right), illustrating their 'bell-shaped' morphology; b) 3-D laser scan of the silos showing them in plan. The difference in volume can clearly be seen between Silo 1' on the left and 'Silo 2'.*

8.5. Discussion

8.5.1. The Bronze Age settlement at In-Nuffara and contemporary use of the rock-cut pit

The years of natural erosion and anthropogenic activity have left few traces of the Bronze Age settlement on In-Nuffara, and thus it is difficult to draw conclusions about the size or complexity of the settlement. On the surface of the plateau, the only surviving indicators were two concentrations of Bronze Age pottery and a number of shallow rock-cut features, whilst the 2014–15 site survey revealed more extensive subterranean evidence of settlement activity. The fifteen rock-cut silo pits recorded indicate that In-Nuffara was once a substantial settlement extending over the entire surface. Without further data, it is unclear whether each silo related to an individual dwelling or instead, was part of a collective storage facility for the hilltop community.

From the collapsed lining in the base of both pits, it is evident that the material contained within did not relate to the initial phase of settlement. It is likely that the earlier (Middle) Bronze Age deposits in the silos were removed when they were repurposed as refuse pits. Consequently, the pits inform on the later phases of Bronze Age occupation on the plateau. The ceramic assemblages and radiocarbon dates from the lower deposits of 'Silo 2' produced Middle-Late Bronze Age dates. In particular, the five AMS radiocarbon dates retrieved from Silo 2 place the settlement at 1412–895 cal. BC, spanning the Middle-Late Bronze Age Borġ in-Nadur phase (II B2-II B3), according to Tanasi and Vella's (2011) chrono-cultural scheme.

The position of In-Nuffara, atop a steep sided plateau with commanding views of the surrounding countryside, is typical of several second millennium BC Bronze Age settlement sites on the Maltese Islands. These naturally defended locations were enhanced by the construction of additional defences, as seen at the Borġ In-Nadur type-site (Fig. 13.2) (Terranova 2015; Vidal Gonzàlez 1998), with the situation on the Maltese Islands following a trend noted throughout the southern-central Mediterranean Bronze Age. Similar shifts towards nucleated settlement appear to have occurred throughout the second millennium BC in Sicily (Leighton 2005), but are most notable on the Aeolian Islands, where settlement shifted to naturally defended elevated locations and promontories (Bernabò Brea & Cavalier 1960, 1991; Martinelli *et al.* 2010). The emergence of fortified settlements in the mid-second millennium BC also occurred in southern peninsular Italy, as at Coppa Nevigata (Cazzella *et al.* 2012) and Roca Vecchia (Pagliara *et al.* 2017); on the Tyrrhenian Islands; in the Sardinian Nuraghic complexes (Melis 2017); and the mountaintop Torre of southern Corsica (Peche-Quilichini & Cesari 2017).

The presence of silo pits and large ceramic storage vessels at In-Nuffara and other Maltese Bronze sites indicates that the shift to defended and nucleated settlement was contemporaneous and closely related to major economic changes in the organization, management, storage and distribution of food resources. These economic shifts were common in other Bronze Age Mediterranean contexts. They were arguably employed as a display of power, perhaps related to the control and management of territory and its associated resources, whilst also reinforcing the appearance of strength and control (Trump 2008; Vidal Gonzàlez 1998), rather than responding to a genuine need for defence (Sollars 2005).

The location of In-Nuffara also reflects the trend on Malta in the Middle-Late Bronze Age to occupy more marginal areas, set away from productive soils (Boyle 2013, 346–8). Whilst it is not possible to tell from the pollen evidence if any cultivation was practised on or near, the plateau, relatively intense pastoral activity was active within the wider landscape (Volume 1, Chapters 3 & 5). Faunal assemblages from In-Nuffara and the Temple Period sites reported on in this volume also suggest that the pattern of animal husbandry did not significantly change over the course of Maltese prehistory, with an overall reliance on ovicaprines that were best adapted to the dry conditions (Malone *et al.* 2019; Chapter 9).

Table 8.1. *AMS dates from In-Nuffara.*

ID	BP	Error	Material	Phase	Context	Calibrated date BC (95% CI)	Details
UBA-31034	3065	30	*Triticum* cf. *aestivum/durum/turgidum*	Borġ in-Nadur	41	1412–1234	Midden material
UBA-31031	2924	43	vesicular cerealia fragment	Borġ in-Nadur	43	1260–1002	Midden material mixed with collapsed clay lining
UBA-31033	2890	36	*Hordeum*	Borġ in-Nadur	41	1207–948	Midden material
UBA-31032	2856	32	Fabaceae (possibly *Pisum*)	Borġ in-Nadur	43	1117–926	Midden material mixed with collapsed clay lining
UBA-33024	2824	39	Charcoal	Borġ in-Nadur	44	1110–850	Date of clay lining

The micromorphological evidence from Silo 1 suggests that the soils on the plateau had once been much better developed and more similar to those observed in pre-late Neolithic contexts on the Xagħra Plateau. During the earlier Holocene, prior to the establishment of the Bronze Age settlement, the plateau was well vegetated with greater soil cover. The Later Bronze Age fills from the silos show evidence for drying soils and decreased vegetation, echoing a similar process of transformation seen between the Early Neolithic and Temple Period (French *et al.* 2018). This evidence demonstrates the adverse impact of anthropogenic activity on In-Nuffara in late prehistory, and the erosion over centuries has left few traces of the Bronze Age settlement.

The recovery of five loom weights and three spindle whorls (see also Fig. 11.4) from within Silo 2 also indicates that textile manufacturing was practised on the plateau during the second millennium BC (Fig. 8.13). This would have drawn the Maltese Islands into the wider orbit of contemporary textile production and craft specialization typical of the period in the central Mediterranean (Bazzanella 2012; Gleba 2014, 2017). Loom weights have been found at other Bronze Age sites (Evans 1971; Sagona 1999, 2015), and fragments of actual textiles and spindle whorls are well documented from the early second millennium BC Tarxien Cemetery cremation burials at Tarxien. Some scholars have debated whether Malta may have supplied textiles to Sicily during the Borġ in-Nadur phase; although it has been suggested that any trade impetus came from the Maltese because of the few identifiable imports from Sicily during this period (Leighton 1999, 208–9). Sagona (1999, 2015, 2016) has presented the hypothesis that bell-shaped pits at St. George's Bay on Malta may have been used as dying vats for the large-scale production of purple murex shell dye and the dying process of textiles during the Bronze Age. Whilst evidence for localized production of murex-dyed textiles in the Mediterranean does extend back to the early second millennium BC, large-scale Punic industrial production is thought to have occurred much later in the first millennium BC (Marín-Aguilera *et al.* 2019). There is no suggestion here that textile production at In-Nuffara was particularly associated with the silos or that murex dye was used.

Other than the silo pits, the only other discernible features of Bronze Age settlement activity on the plateau are a series of rock-cut gullies that criss-cross the bedrock around the entrance to the pits (Fig. 8.7). The possibility that the rock-cut gullies were created in the Roman period as rock-cut agricultural trenches was dismissed, given their inconsistent orientation and spatial relationship with each other, as well as their short, shallow and narrow morphology. Similar rock-cut gullies have been found in association with other silos on the Maltese Islands, such as the Bronze Age coastal settlement of Wardija ta' San Ġorġ (Evans 1971). It is possible the rock-cut features may represent bedding trenches for structures associated with the silo pits, or as drains to control and direct the flow of surface water away from the pits.

8.5.2. The silos and their construction

The excavation on In-Nuffara showed that the pits were cut directly into the Upper Coralline Limestone of the plateau. 'Silo 1' had a volume of 2.9 cu. m, while 'Silo 2' was larger with a volume of 6.74 cu. m, which increases to 6.88 cu. m when the clay lining is removed (Figs. 8.14 & 8.15). Whilst they share the same basic bell-shape shape, their distinct forms suggest that the construction of each silo took advantage of the natural qualities of the limestone by utilizing natural voids within the rocks. It is also possible that the different silo shapes were designed for different functions.

The presence of capstones, both *in situ* on 'Silo 1' and within the Fill (36) of 'Silo 2', indicates that both pits were intended to be sealed in order to protect their contents. Both pits were also found to have vestiges of a clay lining, intended to seal the natural fissures in the bedrock, making the pits more suitable for storage. A sample of charcoal contained within the clay lining of 'Silo 2', Context (44), dated the construction of the silo to 1110–895 cal. BC (UBA-33024, 2824±39), the end of the Borġ in-Nadur phase. Although the date from the clay lining is among the latest retrieved from the site, all radiocarbon dates display considerable overlap and reflect the turbidity of the archaeological deposits within the pit.

Although the excavation was unable to identify any *in situ* material from the pits that was directly related to their precise function, the clay lining in both pits implies they were used for storage. Bell-shaped silo pits are common across the Maltese Islands and it is generally agreed that they were originally used either as grain silos or water cisterns. Attard-Tabone and Trump's 1960 excavation on In-Nuffara noted the partially preserved clay lining and cereal grains in the lowest fills of two conjoined silos, leading them to conclude that the pits were primarily used for grain storage (Trump 1972). Similar clay lining from the 2015 excavations suggest that Silos 1 and 2 could have been sealed and made suitable for either grain or water storage. This latter interpretation is plausible given that the closest water source to the site lies at the base of the plateau, and large clay vessels could have been placed inside the silo as water storage containers, if not the clay-lined pit itself. Many of silo pits

on the Maltese Islands are found in close proximity to sources of fresh water, such as at Qlejgha, Qala Hill and Wardija ta' San Ġorġ (Trump 1972, 125, 140 and 120–1, respectively) hinting perhaps that water security may have been just one function. The association of silos with naturally defended upland or coastal settlement locations could suggest that food and drinking water security, in hidden cool subterranean pits, was a concern in second millennium BC Malta.

8.5.3. Site abandonment and later activity at In-Nuffara

The collapsed layer of clay lining found at the base of Silos 1 and 2 (Layers (23) and (43) respectively), represent the point at which both the pits fell out of use. After the collapse of the lining in 'Silo 2', it was repurposed as a refuse pit. A thick layer of material (Context (41)) derived from the settlement site on the plateau above was thrown into the pit, on top of the collapsed clay lining. Based on the pottery and radiocarbon dates of 1412–926 cal. BC (UBA-31031, UBA-31032, UBA-31033 and UBA-31034), the collapse and subsequent reuse of the silo took place during the Borġ In-Nadur phase. When compared with the construction dates for the silo, the radiocarbon dates indicate the settlement only lasted a few centuries before the site was abandoned.

8.5.4. Punic, Roman and later activity at In-Nuffara

Following the abandonment of the Bronze Age settlement archaeological evidence records continuing activity at In-Nuffara. Intermittent and deliberate depositional activity added to deposit in the silos, interspersed with episodes of silting. Despite the abandonment of the settlement and the absence of evidence for later settlement activity on the plateau, the pits remained in episodic use for a long time, perhaps up to 2000 years after their initial abandonment.

In 'Silo 2', the deposits show that after the dump of midden material (Context (41) concurrent with the abandonment of the site, another layer of midden material, Context (40), was added to the silo. This contained a large quantity of abraded and fragmentary Borġ in-Nadur pottery that appears to have been exposed on the plateau for a considerable length of time before deposition. Significantly, some sherds from Context (40) refitted with sherds from the lower Context (41), which revealed that they were from the same vessel. Context (40) also contained a sherd of highly abraded Punic pottery, dated tentatively to the fourth and third centuries BC, indicating several centuries had elapsed between deposition of Contexts (41) and (40). This observation demonstrates that the pots were not deposited in their entirety, and instead were broken at ground level before being dumped or swept into the pits at various times. Context (40) was covered by a series of layers of silting and deliberate infilling episodes. These silts (Context (39) represented a long episode during which large quantities of terrestrial snail shells were deposited around the pit edge and suggest the silo was open and exposed. The majority of pottery from this context was unidentifiable, but it included two sherds of Punic/Roman pottery. Similarly, Context (38), also represented a long episode of silting, but contained mixed Borġ In-Nadur and Roman sherds (§8.4.3.3). Context (37) above was interpreted as deliberate backfill because of the presence of large stones barely able to fit through the aperture of the pit. This layer contained two sherds of Roman *terra sigillata* pottery, as well as sherds of Punic and later Knights Period ceramics, suggesting that the infilling of Silo 2 probably occurred from the post-Medieval period onwards. The deposit above this, Layer (36), also contained Knights Period pottery, a sherd from a Roman amphora, as well as a possible capstone. The three uppermost layers in 'Silo 2' (35), (34) and (33) contained nothing identifiably older than the Medieval period. The large size of the stones in Context (34) suggests a deliberate backfill. The top Context (33) contained fragments of modern glass and iron as well as medieval pottery and suggests a relatively recent modern silting episode.

Medieval ceramics were also recovered from 'Silo 1', whilst Roman material was found at the bottom of the pit (Context (25) and was covered by episodic silt accumulations, Contexts (22), (24) and (26). The presence, however, of modern and earlier materials, including plastic in the fill demonstrated that the pit lay open for a long period of time, before a deliberate in-filling during the sixteenth and seventeenth centuries.

8.6. Conclusions

The campaign of excavation and survey carried out at In-Nuffara in 2014 and 2015 focused on the recovery of samples for dating and economic-environmental reconstruction with the goal of addressing the specific *FRAGSUS* questions (see Table 8.2). The survey in 2014 identified remnants of walls and various rock-cut features which could not be definitively attributed to the Bronze Age, but it did identify fifteen rock-cut pits scattered across the mesa top. The distribution of the pits helps to established the extent of settlement activity on the plateau, and indicates that In-Nuffara was once the setting of a substantial settlement.

The radiocarbon evidence and material culture obtained from the 2015 excavations of the two silos confirm they were constructed and used during the

Table 8.2. *In-Nuffara and the* FRAGSUS *questions.*

***FRAGSUS* questions**	**In-Nuffara**
1a. What was the impact of human settlement on Malta?	Fortification and defence in upland fragile locations, rapid impact on vegetation and slope stability, erosion, loss of soil, exhaustion.
1b. How rapid was the process of deforestation, erosion and degradation?	Possible indication of rapid contemporary erosion and loss of vegetation cover. Possible first exploitation of unstable clay slopes with new vine and olive crops, leading to rapid soil movement and loss.
1c. When did technical mechanisms to manage the environment develop – such as terracing, water and food storage?	Middle to Late Bronze Age silo strategy for safe storage of food or/and water. Possible introduction of terraces, but undated
1d. Were such mechanisms in place before or after the Temple Culture collapsed?	Pits for storage appear to be a Bronze Age innovation.
2a. How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this?	Evident defence concerns dictated settlement choice, hidden stores in pits, possible use of stored cereals, oil, vine products, concentrated communities. Settlements were short-lived, only a few centuries and perhaps not continuously.
2b. Were the monumental temples instrumental in the process of sustaining cultural life?	No evidence they played any role by the Middle to Late Bronze Age.
3a. What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable?	Cereals, pulses, possible olive and vine products, fish also exploited, ovicaprid-focused farming.
3b. Were there failures in the food supply?	Silos suggest value of hidden food stores in unstable world.
3c. What impact did diet, disease and stress have on the population?	No evidence.
4a. What was the size and nature of the early Maltese population?	Possibly large groups in sites like In-Nuffara, several dozen people but uncertain size of communities.
4b. What role did demographic connectivity (immigration) play in maintaining island sustainability?	Stock and plants. Metals. Exotic Italian pottery styles from the wider Mediterranean world. Boats suggested and more interaction.
5a. Was there social-economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically?	Suggested episodes of drought and poor climate in the second millennium BC, with rapid soil and vegetation loss, shown by pollen data.
5b. Was there a hiatus between the Temple Culture and later Bronze Age settlers?	No evidence before the Middle to Late Bronze Age at In-Nuffara, but short-lived occupation suggests unstable and punctuated settlement on Malta in the second millennium BC.
5c. Are other hiatuses apparent in the sequence, such as between the earlier Neolithic and the Temple Period?	

Borġ in-Nadur phase of the Middle to Late Bronze Age, dating to the second half of the second millennium BC. 'Silo 1', despite having a seemingly *in situ* cap stone, contained largely later and disturbed deposits, whilst 'Silo 2' yielded greater quantities of Bronze Age material culture and intact ancient deposits. The chronological span of the dates indicates that Bronze Age settlement on the plateau may have been short-lived, with the dates representing the construction and abandonment of the site clustering around the end of the second millennium BC. Whilst the 2015 excavation at In-Nuffara yielded little insight into the surface features of the Bronze Age settlement itself, it is clear that materials contained within the pits were largely secondary deposits related to the abandonment and later use of the site. The collapsed lining at the base of both the pits shows that they fell out of use and ceased to be maintained, and that both appear to have been cleared out at the end of the settlement's existence, before being repurposed as refuse pits. Consequently, any material directly relating to their original function is now absent from the archaeological record. The clay lining implies their use as storage containers, but without firm evidence to indicate what was contained within – although grain and water were likely. Previous excavations of rock-cut silos on the Maltese Islands have proven to be similarly uninformative, with the pits cleared of

their original contents. This reuse of bell-shaped silos seems to have been widespread across the Maltese islands, either being repurposed as refuse pits (e.g. St George's Bay, Mtarfa Ridge, Qlejgħa, Tal Mejtin, Wardija ta' San Ġorġ and In-Nuffara) or, in some cases, used as tombs during the Punic period (e.g. Ġnien is-Sultan, Mġarr, Birkirkara and Għajnsielem).

The study of the In-Nuffara silos has added significantly to the knowledge of later Bronze Age Malta, especially in terms of economic data and of the pottery in use in the final centuries of the second millennium BC. The dating of various levels of deposition within 'Silo 2' has yielded the first absolute radiocarbon dates for the later Bronze Age in Malta, and these provide a control point around which to estimate the longevity of the later prehistoric cultural phases and to link with those beyond Malta. The difficulty in removing the upper levels of large stones dumped in the top of the silos most likely deterred later generations from clearing them of their contents. Silo 2 was left relatively intact for its fortuitous discovery in 2015 and may represent a rare find, given the later history of these features across the landscape. When found in quantity, prehistoric pottery sherds have long been regarded as a valuable ingredient in the production of *deffun* (plaster for roofing and flooring), and were actively sought in the past, perhaps with ancient pits cleared of their contents for this purpose. *Deffun* includes quantities of crushed prehistoric pottery sherds mixed to a thin water-proof mortar with clay and crushed limestone (Chetcuti 2003, 2005; Dudley *et al*. 1921, 31). As it is, some thousand or so diagnostic later Bronze Age pot sherds were recovered and are reported on below.

8.7. The pottery from In-Nuffara

The typological study and cataloguing of the ceramic material was undertaken by Prof. Anthony Bonanno (University of Malta). Prof. Caroline Malone (Queen's University Belfast) drew the material and prepared the plates.

8.7.1. Introduction: In-Nuffara pottery overview report

A homogenous group of around a thousand pottery fragments was retrieved from a distinct sealed deposit in 'Silo 2', one of two silo pits excavated on the In-Nuffara Bronze Age settlement by the *FRAGSUS* team in 2015. The pottery assemblage ranges from very small (classified as 'miniature') cups and jars, through bowls of various sizes and medium-size jars, to very large, thick-walled storage jars. The maximum diameter of the latter (e.g. storage jars 49 – NUF41-30, with a rim diameter of 46 cm, and 50 – NUF41-2919, with rim diameter of 48 cm) exceeds that of the opening of the silos and could not have been introduced in the pit unless they were broken. The layer they were found in, Context (41), was sandwiched between two others, Contexts (40) and (42), both of which produced fragments that could be refitted with others from it. This suggests that these came from the interface between Context (41) and the other two layers during the 2015 excavation, or else that there had been some partial, even if minimal, displacements since their deposition.

This is not the first of such rock-cut pits discovered with a quantity of pottery inside. In 1960 another such bottle-shaped pit was partially cleared by Joe Attard; when the find was reported to the Museum Department the rest was cleared (Trump 1962, 5). As in the 2015 case, 'traces of the original clay lining to the walls survived'. The stratigraphic sequence in 1960 was much simpler; only three strata were identified, the middle of which (2), being 'soft, dusty brown earth', contained much pottery and animal bones. The other two layers, (3) above and (1) below, were 'practically sterile'. The pottery belonged to the Borġ in-Nadur phase described as 'mainly red-slipped, varying to blotchy black, unburnished' (Trump 1962, 5). Only one complete pot was retrieved, a small jar with incised decoration. The rest were very large fragments that could be, and some were, recomposed. Among the shapes the author listed 'a large cup with high handle, a small three-handled lid, bowls, large jars, etc.' Trump also highlighted the presence of sherds decorated with dots of red slip, or 'dribble Borġ in-Nadur painting', which he had already noted at Baħrija. On the basis of the lowest stratum (1), namely 'the mouldered residue of the last contents of the pit', he interpreted the original purpose of the pit as a grain storage one, followed by a domestic rubbish tip (2) and rain-wash (3) (Trump 1962). Trump's short report is, apart from a drawing of the section of the pit, not illustrated, but the description of both the stratigraphic sequence and the list of shapes are uncannily similar to those of the 2015 find.

During a visit to the site in 1985, a few pieces of pot were picked up from the surface of In-Nuffara by members of the Grupp Arkeoloġiku Malti. A trench 1 × 1.5 m was cut in a place near the edge of the cliff, which yielded a 27 cm deposit full of large sherds and animal bones as well as pebbles. Fifteen cm below the surface a change of colour was noted. The lower layer contained a lot of pottery mostly of the Borġ in-Nadur type. What is noteworthy is that a few Baħrija type sherds and a green stone pendant were also identified among the finds (*Il-Menhir* I, 4 (March 1986), 48).

8.7.2. The catalogue

The present catalogue is selective and does not intend to cover all recognized vessels. Moreover, owing to editorial constraints, only a selection of the most representative shapes from the catalogue have been illustrated by drawings and photographs. After the drawings were made, the profiles of some vessels (such as the ribbed cup 19 – NUF41-49/19 and the large storage jar 50 – NUF41-19 were further extended with more joinable fragments, including their respective bases. As far as bases are concerned, apart from those incorporated within the drawing of the whole profile, only one out of a score has been drawn (36 – NUF43-A) belonging to a largish bowl or jar. Lids are noted for their scarcity at Borġ in-Nadur (Tanasi 2011, 130–1) and only two probable specimens have been identified in the 2015 assemblage from In-Nuffara [36 C-D].

8.7.3. Catalogue numbers

The criterion selected for the sequential order of the catalogue is mainly the size of the pots, ranging from small (1, 2, 5, 6, 7, 8, 9), to medium (21–23), to largish bowls and jars (14, 16–20, 31–33), to large thick-walled storage jars (*pithoi*) (47–50) and trays (55, 56). The sequence is also dictated by the arrangement of the figures (8.16–8.21). Where numbers are cited, they refer to the sherd/drawing in the catalogue, whilst a more detailed additional identifier (NUF41- etc.) refers to the primary study numbers that are retained on the material (stored in the National Museum of Archaeology in Valletta). As most of the loose handles (all of the strap type, narrow in the middle and widening toward the edges) belong to largish bowls and jars, they are placed after these, followed by examples of loose fragments with incised decoration.

8.8. Characteristics and manufacture

One of the questions posed from the beginning of the pottery analysis was whether this Bronze Age pottery was thrown on a wheel, even if a slow one. What appears to be an indication of the use of a potter's wheel are finger marks on the interior of some largish pots and a series of concentric circles in low relief on the lower surface of a flaked crust and on the corresponding upper surface of a 4 cm thick flat base of a jar. These ringed surfaces appeared after sections of the upper crust had flaked off. Sagona (2015, 235, item no 2112/9, fig. 1:159.1) noted and illustrated this feature on the Borġ in-Nadur pottery from the University of Malta excavations at Tas-Silġ. Yet, she attributed it to the coil technique which she extended to the whole structure of the pots, including the walls (Sagona 2015, 23). While the above feature could well be the result of coil technique, no trace of the latter has been noted in the elevation of the pottery structure.

In the case of the small (miniature) pots with grey inside surfaces, it would seem that this rough surface was achieved by pressing the fingers while some pressure was being exerted on the outside, perhaps for burnishing.

8.8.1. Fabric

Apart from a few miniature pots in totally grey fabric, the rest, from small-sized cups to large thick-walled storage jars, are pretty uniform, that is, in pinkish buff clay for walls less than 0.5 cm thick, fired to a grey/black core in thicker walls.

8.8.2. Surface treatment

Apart from the rough surface of the grey fabric miniature pots, most items are burnished both on the exterior and the interior. In most cases they are covered by a red slip ranging from bright orange-red to coral-red with widespread blotches. In some cases, the slip also covers the top margin of the interior leaving the rest without. This slip has a tendency to develop hairline cracking, but only a few fragments of the NUF41 assemblage display such cracks suggesting that this phenomenon results from (millennial) aging rather than an intentional, or consciously tolerated, quality.

A small group of undiagnostic sherds (not drawn) carry circular red spots characteristic of the 'dribbled ware' that David Trump identified among the material from the In-Nuffara silo-pit of 1960 (Trump 1962), and that were also found at Tas-Silġ (Sagona 2015, 130–1, figs. 1:19.10–13, 1:160.2, 4, 5). Of interest in this respect is also an article by Davide Tanasi (2008–2009) that deals with the pottery deriving from the 1960 silo-pit at In-Nuffara, but that, in reality, is focused mainly on the 'dribbled ware class' from this site.[3]

8.8.3. Decoration

Surface decoration, generally consisting of a band of several parallel incised lines, is also well represented by many sherds, many of which are joinable to form large bowls, both conical and spherical. These lines tend to be shallower and less careful and steady than in some corresponding shapes from Tas-Silġ (Sagona 2015, 129, fig. 1:18.2) and Borġ in-Nadur (Briffa & Sagona 2017, figs. 38: 1, 4, 8; 39: 2, 7; 41: 4, 7–12; Tanasi 2015, 45, fig. 23). Zig-zagging incised lines are not uncommon and examples have been recorded in the Borġ in-Nadur assemblage (Briffa & Sagona, 67, 73, figs. 40: 7, 44: 6–8, etc), but bands formed of two parallel lines enclosing incised dots or lentils (such as on 43) have not been traced elsewhere. No traces

of soot or blackening arising from use of the pots for cooking have been encountered; the abundant black blotches clearly result from bad or uneven firing. There are also a couple of examples of perforated holes intended for mending or securing cracked walls of medium-sized pots.

8.9. Comparanda

The range of recognized shapes for Borġ in-Nadur pottery has been increasing at a fast pace over the last decade. Those illustrated by Evans (1971) were limited to sixteen, only one form of which is close to our cup 6, NUF41-21. Comparisons were also made with the classifications created by Sagona (2015), Tanasi (2011, 2015) and Trump (2004). It must be said, more and closer comparisons were expected for the 2015 assemblage than have been made. The lack of many clear parallels may be attributable to the different nature of the context in which this assemblage was found and, possibly, to the different scenario(s) behind the act of its deposition. The depositional process of the other two published contexts was slow and protracted, involving the gradual disposal of individual pots following their breakage from normal use. That of Għar Mirdum, in a cave, or former overhang, is of an even more aberrant nature, one that is even more difficult to reconstruct. In the case of NUF41, a considerable number of pots of a wide range of shapes and sizes were thrown inside a man-made pit in the ground whose original function (that of storage of food or water) was no longer viable. The larger context in four cases seems to be that of a settlement, probably a group of inhabited huts, although a case has been made for a continuation of a sacred or cultic purpose at the Tas-Silġ site (Cazzella & Recchia 2012). What still remains to establish is whether NUF41 was merely a dump or some sort of ritual, possibly connected with the closure of the container as a functioning storage space. Notwithstanding the similarity of context observed above, there are certain differences between the typologies, some of these differences involve absences, while others concern items that are unparalleled elsewhere.[4]

8.9.1. Noteworthy missing shapes

The most notable missing shape is that of the hourglass biconical 'fruit bowl', which seems to belong to the Early Borġ in-Nadur phase, unless some of the medium-sized bowls with curving profile were originally joined to any of the bases of the same fabric and slip. Yet, we have never found the joining floor sections in between, except in [14] and [24]. Even the Cups/Basins Type 1A specimen from Borġ in-Nadur illustrated by Tanasi (2015, 45, fig. 23, 108) does not seem to possess the missing waist-line section. Also absent are typical ladles (or dippers) with axe-shaped handles such as those present at Tas-Silġ (Sagona 2015, 127, fig. 1: 16.2–10). Even the large storage jars seem to have had no handles.

8.9.2. Unique representations, without parallels elsewhere

The most conspicuous example of unique vessel forms is a group of beautiful and artful bowls with undulating profiles (10, 12, 16), which must have originally extended down beyond the waist and that do not seem to have any parallels elsewhere. It would be interesting to check whether the as yet unpublished material from the silo-pit excavated in 1960 at In-Nuffara had any similar shapes. Similarly, the cup with ribs on both the inside and outside that probably extended to form handles raised above the rim (19) is not noted anywhere else. Another remarkable difference between this and other assemblages is the frequent flat insloping lip on the rims of the medium-sized and largish bowls of NUF41 (e.g. 8, 24, 27, 29, 30, 38, 39, 46, 51–53, 62) in contrast to the generally rounded ones found elsewhere.

8.10. Stratigraphic context and date

Some movement of sherds from Context (41) to other contexts, has already been noted. Contemporary sherds from (40) and (42) were identified and some of these were actually joinable to forms in Context (41). The presence of refitting sherds in strata immediately above or below 41 could possibly be explained as having come from the interface between the two strata during excavation. Others from further up would suggest later disturbance; but one from Context (44), lower down, is more difficult to explain.

The clay lining from the very bottom of the silo pit, and from the soils sealed below it, have produced radiocarbon dates ranging from 1260 to 895 cal. BC. These dates (with an average of *c.* 1100 BC) provide a *terminus post quem* for all the layers above it, suggesting that they belonged to contemporary or later episodes. This would mean that the deposition of all the Borġ in-Nadur pottery in Context (41) took place around or after 1100 BC. It would also mean that all the forms, fabrics, slips and decorations present in this assemblage were in current use when they ended up inside the pit. This is of fundamental importance for the study and dating of the ceramic repertoire of the Maltese Middle Bronze Age (the Borġ in-Nadur phase), and certainly cannot be ignored in future studies.

8.11. Recent archaeometric results

Recent petrographic and chemical analysis (Barone *et al.* 2015) have attributed all the fabrics of Borġ in-Nadur pottery to only two main groups: Fabric A and Fabric B. Apart from the miniature pots with their purplish brown slip, and the gritty fabric of one of them (5, 7, 9), we can say that all the pottery from NUF41 belongs to either subclass ('Fabric') 2 of Fabric A in Tanasi's classification (Tanasi 2015: Table 3), which is described as 'Pink fabric with red mottled slip' and corresponds to Trump's phase IIB2; or to subclass ('Fabric') 4 of Fabric A, which is described as 'Reddish yellow fabric with dark red mottled slip', corresponds to Trump's phase IIB3.

Some undiagnostic fragments with disc shaped painted spots fall under the class of 'Dribbled and painted Ware' also classified by Trump as occurring in phase IIB3.

A thin section was taken of one large thick sherd (vessel 29) that showed the fabric comprised calcite, shell and iron, fired in an Fe rich groundmass, and was porous. The sample demonstrates a high level of fire cracking, shown on the typical 'crocodile skin' effect on the surface of much of the pottery. Shell fragments are large and evident in thin section (Appendix Fig. A10.2.1).

8.12. Impact of the above on the In-Nuffara assemblage

Taking into consideration the assessment on the Borġ in-Nadur pottery made by one of the most authoritative scholars involved in its study (Tanasi 2015: 39), namely, that 'with regard to technological characterization related to the manufacture and decorative repertoire of Borġ in-Nadur phase pottery no further data can be added to the previous study' (Tanasi 2008, 69–73; 2011, 88–98), the above remarks, especially the firm *post quem* radiocarbon dates produced by the In-Nuffara silo, need to be taken into consideration in any future assessment of this prehistoric phase and its pottery.

8.13. Concluding remarks

What is Context (41)? The current interpretation seems to be that of a mere 'midden', the same explanation given to the rock-cut pit cleared in the early 1960s. We find this interpretation hard to buy. There are so many easier ways of disposing of pottery and animal bones, including dumping beyond the cliff edge. The animal remains would have been better used for fertilizing the soil outside the settlement. The effort involved in breaking up the large jars whose diameter was greater than that of the pit mouth militates against such a description. In many ways the general characteristics of this pottery assemblage are paralleled by that excavated in 1960 by Joe Attard Tabone and David Trump inside the similar silo-pit at In-Nuffara.

In her recent account of Maltese archaeology, Claudia Sagona has interpreted a number of scenarios in Maltese prehistory denoting the ritual termination of the original use of a building or a feature as 'ritual closure'. Given the contextual similarities with the 1960s silo pit and its contents, possibly also with the 1985 uncontrolled investigation of another silo pit on the same hill, it is tempting to see a ritualistic exercise rather than a simple dumping episode. This suggestion, however, begs a number of other questions: in this case, a closure of what? Of just this particular silo pit, or of the whole site? The total absence of Baħrija style pottery would suggest an abandonment of the site before the arrival of the carriers of the Baħrija style pottery around 900 BC. However, the short report of the 1985 clearance does refer to some Baħrija pottery.[5] Why would people bother to ritualize 'dumping of pottery'? In the present circumstances I do not have an answer. It is easier to explain the ritualization of the animal bone disposal, especially if it comes from ritual feasting. It is a real pity that the similar assemblage discovered in similar circumstances (the other silo pit at In-Nuffara with a similar sequence of layers) has not been published properly.[6] It too was described as dumped. With a fuller knowledge of both of these instances we would be in a much better position to derive further evidence for a better interpretation.[7]

8.14. Catalogue of Bronze Age pottery from In-Nuffara

Abbreviations used in Figures 8.14–8.19:

BD	Base diameter
D	Diameter
RD	Rim diameter

Note: This catalogue, beginning overleaf, lists items more or less in order of size, ranging from miniature pots, through medium-sized bowls and jars, to huge, thick-walled storage jars and finally handles. Sequential numbering is applied to relate to the order of the drawings in Figures 8.14–8.19.

1. NUF41-29. Miniature cup (Evans 1971, fig. 40, Shape 8) with globular body curving out sharply from an inward kink at the shoulder to an undulating neck and rounded rim. Umbilicate base.

RD 4 cm.

Crispy thin walls of very fine fabric fired beige. Dark purple-brown slip on the outside and on the inside of neck; the rest is un-slipped.

2. NUF41-56. Miniature cup, rather globular with rounded shoulders and narrowing neck to rim. Umbilicate base. Part of a handle projecting from shoulder.

RD 4 cm.

Somewhat badly fired dark grey throughout. Roughly shaped on the inside, somewhat smoother on outside. Few red blotches on dark grey surface on the outside. No apparent slip.

Decoration: row of six lentil-like pellets aligned with the rim, *c.* 1 cm below the lip.

Similar rows of pellets but on differently shaped cup and juglet in the 2003–2009 Tas-Silġ assemblage (Copat *et al.* 2012: fig. 8 (1, 9)). Parallels also with Borġ in-Nadur (Murray 1923, plate XII 114–115). Tanasi & Vella (2011, figs. 117 (no 37497), 119 and 112) show other comparable forms decorated with small pellets.

3. NUF40/41-53. Two joining fragments of small spheroid cup with slightly everted and thinning rim.

RD 11 cm.

Typical pink fabric with pinkish red slip on the outside, with a wavy band of a darker (brownish) hue. Dark brown slip on the inside.

Similar to 'dipper cups' of Type 3, nos' 37134 and 37137, from Borġ in-Nadur (Tanasi 2015, fig. 53a-b).

4. NUF41- 54. Small fragment of small cup of spheroid shape with a short tapering upright rim.

RD 11 cm.

Pinkish fabric with irregularly applied slip: thick and pasty, from brownish to dark brown on the outside; similarly, at the top of the rim on the inside, fading out further down.

Similar in profile and size to 'closed pot' no. 291 in Briffa & Sagona (2017: 61, fig. 36:7, 94:5), but without ridge on juncture between neck and shoulder.

5. NUF41-24. Squat pear-shaped miniature cup. Drawing extends profile to a widened mouth. Umbilicate base.

RD 5 cm.

Fabric fired dark grey inside; blotchy dark grey to light grey and pinkish on the outside. Very rough, bumpy surface on inside; slightly smoother on the outside, revealing plenty of white grits. No visible slip.

6. NUF41-21. Small single handled cup with very complex profile. Slightly baggy lower body with a narrow umbilicate base, topped by a curving swell before meeting an in-sloping shoulder. The latter is separated from the vertical rim by a deep groove which corresponds to a sharp indent on the interior. The handle rises from the thinning but rounded lip and re-joins the body on mid-shoulder.

BD 3 cm; RD 7.5 cm.

The fabric is pinkish-buff in colour, without any grey core. A coral red slip with large black blotches covers the whole exterior surface except for a third of it where it has eroded away. The same slip covers the interior of the rim with only four circular dribbled spots on the un-slipped rest.

Similar to Evans' (1971, fig. 40, Shape 7, 16; and fig. 4, 7) 'high-handled jug', and Sagona's (2015, 123, no. 2034/70, fig. 1: 12 (1)) 'small jug with swelling neck off-set from the shoulder and the juncture of neck and shoulder is defined by a groove: traces of a handle where rim rises near break; thin walled; grey 10YR 5/1 through section; lightly burnished dark mottled greyish brown 10YR 4/2 on interior and exterior slip. RD 5'. Murray (1923, Plate XII, no. 115; 1929, Plate XXV, no. 258) also illustrates similar profiles from Borġ in-Nadur.

7. NUF41-57. Small globular cup with in-sloping neck, umbilicate base and two handles linking rim to neck and extending upward beyond the rim. About half of the circumference is represented by three large glued fragments and two unglued ones. No part of the rim survives.

RD *c.* 9 cm, narrowest D 10 cm.

Pink buff fabric, but fired entirely grey on the inside and pink on the outside. Inside surface is very coarse and rough; somewhat smoother on the outside, but still comparatively coarse. Blotchy coral red slip. No slip inside. Large portion of outer surface is blotchy black. Small areas preserve typical orange slip on a lighter pink surface.

The form has similarities with Murray (1929, Plate XIII), although with a smoother neck profile.

Umbilicate base is similar to fragment of 'small omphalos base probably from a closed vessel' no. 364 in Briffa & Sagona (2017, 70, fig. 42.13). The In-Nuffara example compares with an example from Borġ in-Nadur (Murray 1929, Plate XIII) but with a smoother neck angle.

8. NUF41-30. Small fragment, 1 cm high, of inward sloping curved rim of a miniature jar, preserving also a tiny part of the shoulder which probably expanded out into a globular body.

RD 5 cm.

Greyish brown fabric with white lime specks covered by a purplish dark brown slip.

9. NUF41-2. Small inverted jar.

Max D 7 cm.

Orange, fine fabric. Reassembled from several fragments.

10. NUF41-50. Medium sized open bowl on hollow base (Evans 1971, fig. 40, Shape 6, but apparently without a separating floor between bowl and base). Undulating profile narrowing at the bottom to splay sharply out again to another curve of the missing supporting base. Single handle rising at an angle from the rim. The whole diameter of the rim is preserved from at least seven joinable fragments.

RD 17 cm.

Well-fired, pinkish fabric with slightly greying core. Outer and inner surfaces covered by a flaking dark orange slip with large black blotches on the exterior.

Same profile as [12] but larger.

Some similarity to the 'thin-walled cup' from a silo at Mtarfa (Sagona 1999, 55, fig. 7:4), but without the 'sharp groove at the juncture of the neck and shoulder'.

11. NUF42-69. Circular, solid clay base supporting a broken cylindrical pillar, possibly belonging to a figurine or a lamp.

BD 6 cm.

Pink-beige, badly fired clay with grey core up to 2 mm from the surface. No slip.

A lamp with such a base (no 37437) is illustrated in Tanasi 2015: fig. 90 (Type 3).

12. NUF41-52. Small bowl (Evans 1971, fig. 40, Shape 5/6, but without a separating floor between bowl and base) with undulating profile narrowing at the bottom before turning sharply out again to another curve of the missing base. Remarkably thin walls. Only a third of the rim survives in four glued fragments. No hint of a handle.

RD 11 cm.

Well fired pinkish fabric, grey at the core. Brown-orange slip on outer and inner surfaces. Some blotches on the exterior.

Same profile and fabric/slip characteristics as [16], but smaller and squatter.

No parallels in Tanasi (2015).

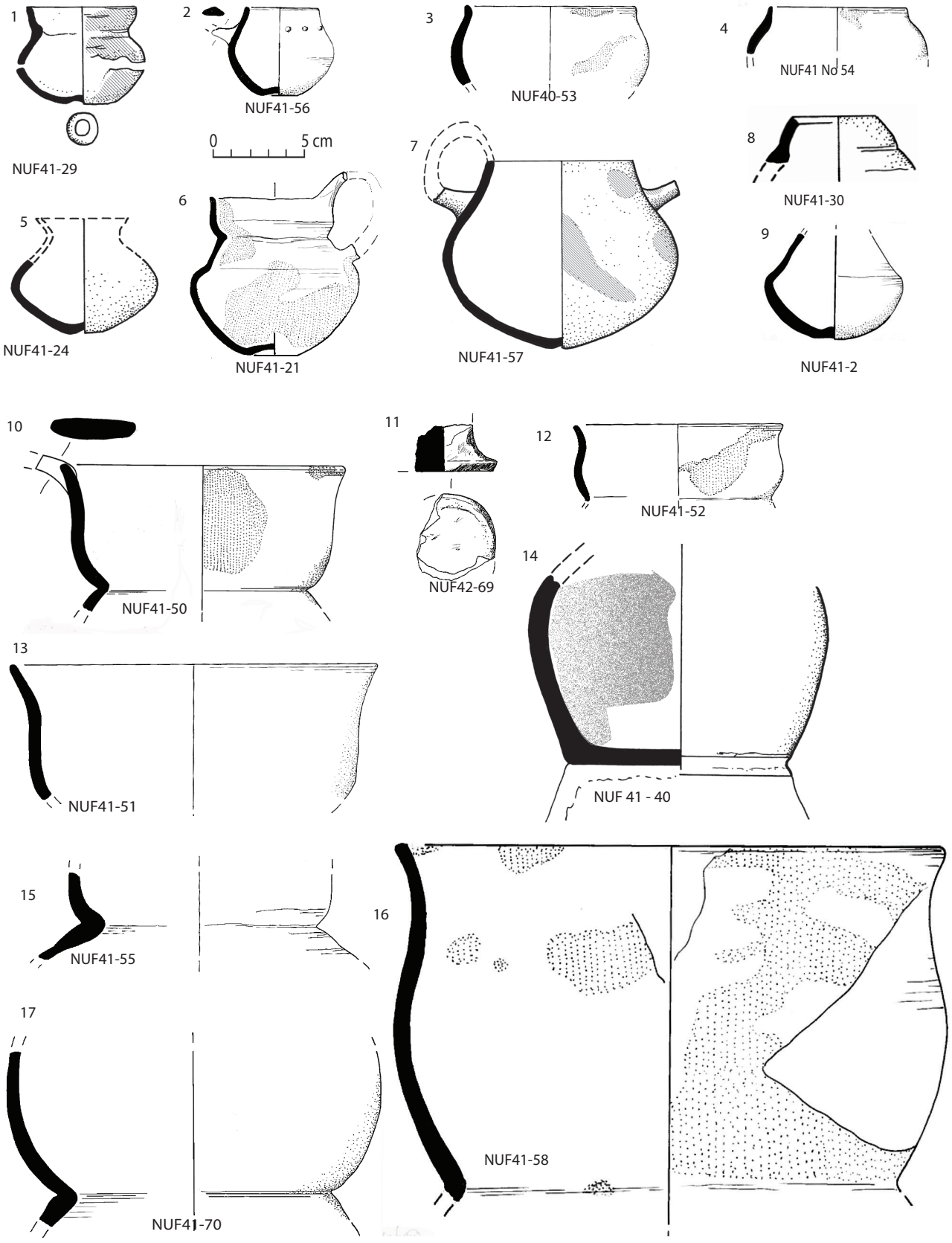


Fig 8.14. *Ceramics catalogue numbers 1–17.*

13. NUF41-51. Medium sized deep open bowl with undulating profile (Evans 1971, fig. 40, Shape 6, but apparently without a separating floor between bowl and base). Three glued fragments. Same typology as [1–10], [12 and [16] but with more gently curved profile.

RD 20 cm.

Pinkish-orange fabric with a darker slip partly worn off on the inside surface. Lighter orange-coloured slip on the outer surface where even less of it survives.

Same profile, but slightly more elongated is the 'deep bowl fragment with gently curved profile; thin angular lip' no. 307, with same fabric and slip, in Briffa & Sagona (2017, 63, fig. 37: 12, 96: 6).

14. NUF41-40. Lower part of a very deep, thick-walled globular bowl with lower belly ending in a flat floor and extending downward probably to form a cone-shaped base. Upper container is separated from the lower base by the flat horizontal floor on the inside and by a deep line on the outside.

The surface is smooth and covered by a coral-red slip on the outside and very rough on the inside.

Probably similar to a 'fragment from a conical footed deep bowl' in Sagona (2015, 125, no. 2169/23, fig. 1.14 (2)); and to a 'waist fragment of a large bi-conical bowl' no. 344 in Briffa & Sagona (2017, 68, fig. 41: 5).

15. NUF41-55. Several fragments (up to five joining ones) probably belonging to a medium-sized bowl (broadly Evans 1971, fig. 40, Shape 5/6) with undulating profile like that of [10] and [16], or gently curved profile like that of [13] and [17], but only the midriff section survives, missing most of the upper and lower profile.

Minimum internal D 11.5 cm.

Pinkish, relatively well-fired fabric. Uniform bright pinkish red slip becoming dark brown on the exterior, beyond a vertical break.

16. NUF41-58. Very large and deep bowl with undulating wall profile and a sharp angular kink at the bottom of the surviving fragments (Evans 1971, fig 40, Shape 5/6 but apparently without a separating floor between bowl and bas), suggesting a prolonged section serving as a base. Formed of at least seven glued fragments. Eight more unjoined pieces are bagged with [16] having a similar body form and blotchy coral-red slip. Two of these are joinable to the rim.

RD 32 cm.

Fabric fired pink and covered with a coral-red slip inside and outside, with large black blotches and cracking areas, in some fragments more than others.

Same typology as [10] and [13]. Also Tanasi's (2011, fig. 4: 30) Beaker type 4, but upside down and with a floor between upper and lower parts.

17. NUF41-70. Spherical bowl with a lower extension below a waistline inward kink, whose profile is reconstructed from three joined fragments and a separate fragment preserving a part of the upper body and a part of the lower one (Evans 1971, fig. 40, Shape 6 but apparently without a separating floor between bowl and bas). Missing rim.

Rather coarse fabric fired pink throughout, covered by a blotchy dark brown slip on outside and scattered discs in the inside (dribbled paint), ranging from light pink to dark brown.

18. NUF41-39. Largish open-mouthed pot of bulbous shape. Formed of 14 sherds, permitting the reconstruction of great part of the rim and upper body. Lower walls curved in towards base.

RD 23 cm.

Crispy, regularly fired pink fabric. Extremely blotchy coral red slip, with large black blotches on the outside and overlapping on the inside for the uppermost 5.5 cm. Characteristic hair-line cracking on the whole outer surface, but limited to a 5 cm band, from the rim down, on the inside.

19. NUF41-19. Ten joinable fragments providing whole profile of a small bowl with two reinforcing ribs emerging from both inside and outside and projecting upward beyond the rim, probably to form a (missing) handle, balanced by a similar feature on the opposite side. Umbilicate base.

DM 15 cm.

Sandy pink-beige fabric fired grey at the core, covered by a purple-brown slip on both sides displaying traces of burnishing where preserved.

A similar fragment from Tas-Silġ, no. 2034/72 in Sagona (2015, 134, fig. 1: 23 (11)): a 'body fragment with applied raised oblique bar; Late BN (Brown) Slipped Ware; medium coarse, grey brown fabric; greyish brown slip on exterior, smoothed plain interior'.

20. NUF41-6/8-39. Largish open-mouthed pot of bulbous shape. Formed of 14 sherds, permitting the reconstruction of great part of the rim and upper body. Lower walls curved in towards base.

RD 23 cm.

Crispy, regularly fired pink fabric. Extremely blotchy coral red slip, with the characteristic hair-line cracking on the whole outer surface, but limited to a 5 cm band, from the rim down, on the inside. May be distorted parts of [18], but profile seems different.

21. NUF41-25. Small open bowl with straight walls on the inside, slightly convex on the outside. Thin, sharp-edged lip. Painted blotchy pattern inside and out. Umbilicate base.

RD 15 cm.

Similar in profile, but without incised decoration to Borġ in-Nadur Slipped Ware fragment no. 3033/4 from Tas-Silġ in Sagona (2015, 125, fig. 1: 13.9), a 'deep conical bowl; simple rounded lip; deeply incised horizontal and oblique grooves'. Also Evans (1971, fig. 40) shape 1, but without handles; and Tanasi (2015), Type 7.

22. NUF41-71. One fragment of rim of simple open bowl with lightly curving walls, like [25] and [26].

RD 14 cm.

Coarse fabric fired pink. Typical coral-red slip, mostly worn off.

Same comparanda as for [25] such as Tanasi (2011, no. BNP/136a, fig. 4.18) 'cup/basin type 1b'.

23. NUF41-60. Medium-sized open bowl with simple curving sides and a base that is flat on the interior but with a depressed margin on the perimeter on the exterior (Evans 1971, fig. 40, shape 1, but without handles). Tapering rim with a rounded lip. Whole profile made up of three joined fragments.

RD 14 cm.

Orangey pink fabric with some black blotches penetrating deeply in the core. Coral-red slip with black blotches resulting from the same defective firing.

Similar to [21] and [22] with their respective comparanda. Similar to Briffa & Sagona (2017, 67, fig. 40) vessel 6, but without handles or studs; and Sagona (2015, 125, fig. 1) 13.9, but without incised decoration.

24. NUF41-36. Base and rim sherds of a container (consisting of at least eight joinable and/or glued fragments) with curved out-sloping walls and missing lower section.

D (at the narrowest point) 17–18 cm. thickness of walls 1-1.5 cm; of base 2-4 cm. External D at base 16 cm.

Fabric fired grey at core and internal rough surface. Coral-red slip on outside. Pink-buff fabric fired grey at the core. Coral-red slip, rather uneven inside, with black blotches outside. No decoration.

Similar double tronco-conic shape to no. 2169/24 in Sagona (2015, 125, fig. 1.14.2), Tanasi's (2015) Type 1A.

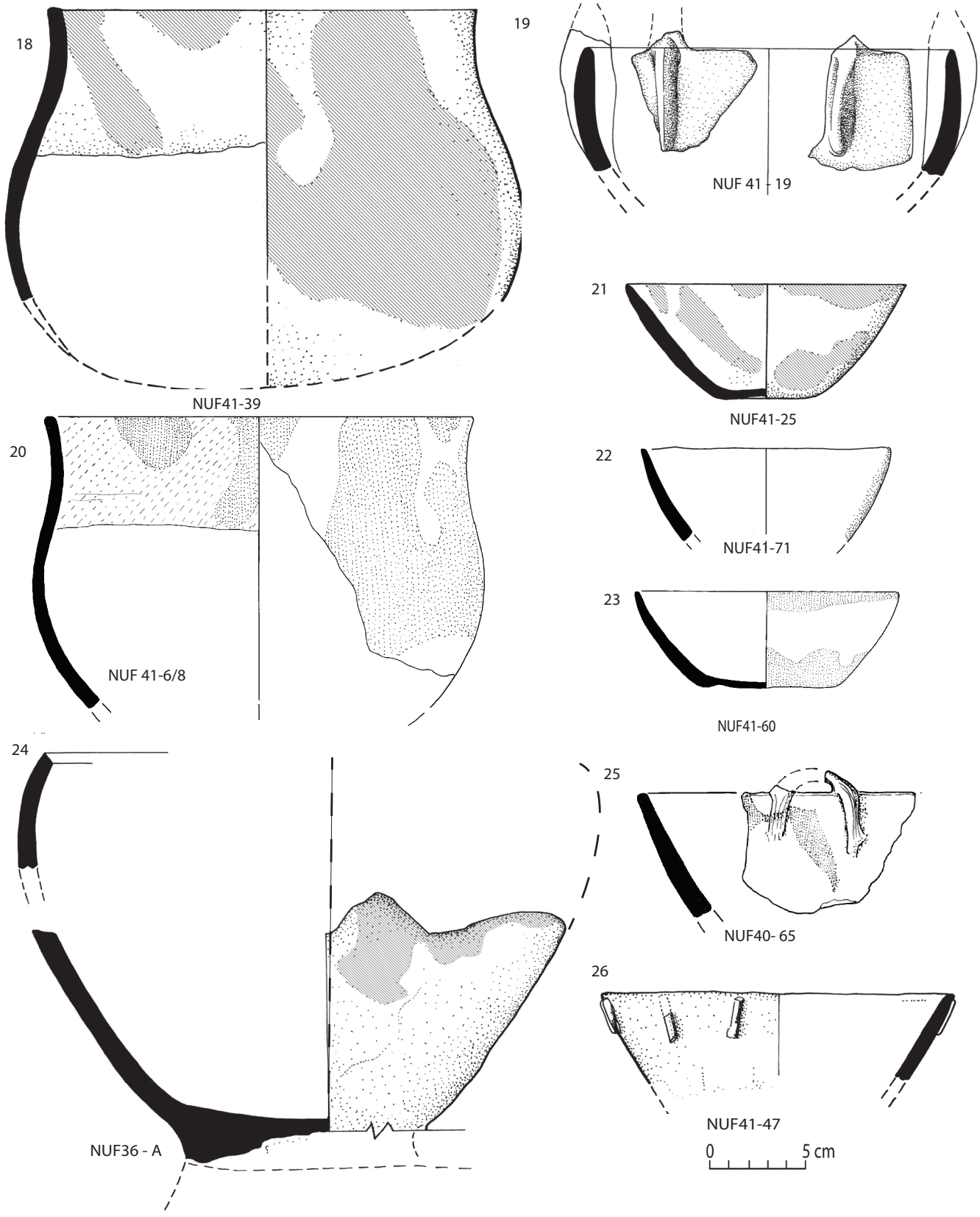


Fig. 8.15. *Ceramics catalogue numbers 18–26.*

25. NUF40-65. Medium-sized bowl with outward slanting walls, including a rounded lip and two external ribs rising upward to join in a handle beyond the rim.

RD 18 cm.

Rather coarse fabric fired pink with coral-red slip, blotchy in places and worn off in others.

26. NUF41-47. Just two not joinable fragments of the rim of a largish cup with rather straight everted walls. On one fragment are two slightly raised ribs broken off close to the rim, most probably part of a loop handle projecting up beyond the rim. The second fragment seems to come from the opposite side because it preserves only one rib.

RD 17 cm.

Coarse fabric fired pink to grey. One of the fragments shows coral-red slip with black blotches dominating. The other fragment is covered by orange slip, quite uniform on outside, wearing off on the inside.

27. NUF37-A. Large fragment of medium-sized, hemispherical bowl with flattened, inward sloping lip and vertical strap handle. Made up of four joined fragments. Two mending holes. Upper end of handle attachment highlighted by incised groove.

RD 35 cm.

Fabric fired grey almost from surface to surface. Coral-red slip, fired dark grey almost on whole internal surface, with a small area fired red on and around handle.

Similar in shape, rim, low handle to Tanasi's 'Cup/basin Type 1B' (Tanasi 2011, 1000, fig. 4.18 BRG/010/90; and 2015, fig. 23). Bowl 2161/6 in Sagona (2015, 126, fig. 1:1 5 (9)) has the same profile and RD, whereas no. 1046/16 (Sagona 2015, fig. 1:15 (5)) has a similar handle but is one-third the size. Copat *et al.* (2012, fig. 825) has the same shape, lip, and one dimple. Briffa & Sagona (2017, 65, fig. 39.3) has the same shape and low position of strap handle, but with pellets.

28. NUF41-37B. Large fragment of a large bulbous pot with narrowing mouth.

RD 30 cm.

Red slip inside; red slip with extensive blotches outside.

Parallels can be seen in Copat *et al.* (2012, 59, fig. 8.6, 7), but with decoration; and Sagona (2015, 129, no. 2101/24, fig. 1: 18 (5)), 'deep pot with walls sloping inward; rounded lip; drab ware; dark grey N4/ clay; mottled light brownish-grey slip both inside and outside; matt and smoothed finish'.

29. NUF41-31. Fragment of a medium-sized hemispherical globular bowl with in-sloping neck and flat and horizontal rim with a raised dimple 2 cm below the rim.

RD 19 cm.

Dark purple-brown slip on outside and inside on a pinkish-beige fabric.

Some similarity in profile to a rim sherd of a 'large hole-mouthed jar in Coarse Pink Buff Ware' no. 2061/17 from Tas-Silġ in Sagona (2015, 138–9, fig. 1:27 (7)). The bevelled rim profile compares with Murray (1923, Plate XIV-153) and Tanasi (2015, fig. 24, no. 37392).

30. NUF41-15/2. Largish bowl with simple curvilinear walls and in-sloping rim with rounded edges, and traces on some sherds of a strap handle springing from the rim, much like [1]–[10].

RD 24 cm.

Coarse, gritty fabric fired red and black. Mostly grey slip on the inside. Large black blotches on outside, sparing small coral-red patches on outside. Similar bevelled rim to [32] below, same comparanda apply.

Not illustrated: A similarly shaped larger, thicker pot to [30] [NUF41-31], with similar fabric but with very unevenly fired slip with large black blotches on outside; orangey slip with uneven hue intensity on inside, and fired differently. Flattened, slightly insloping lip. Four glued sherds, the middle one with a fresh break.

RD 31 cm.

Coarse fabric fired dark-grey throughout. Unslipped, grey inside surface. Dirty yellow-brown on outside, covered by dark-grey grime.

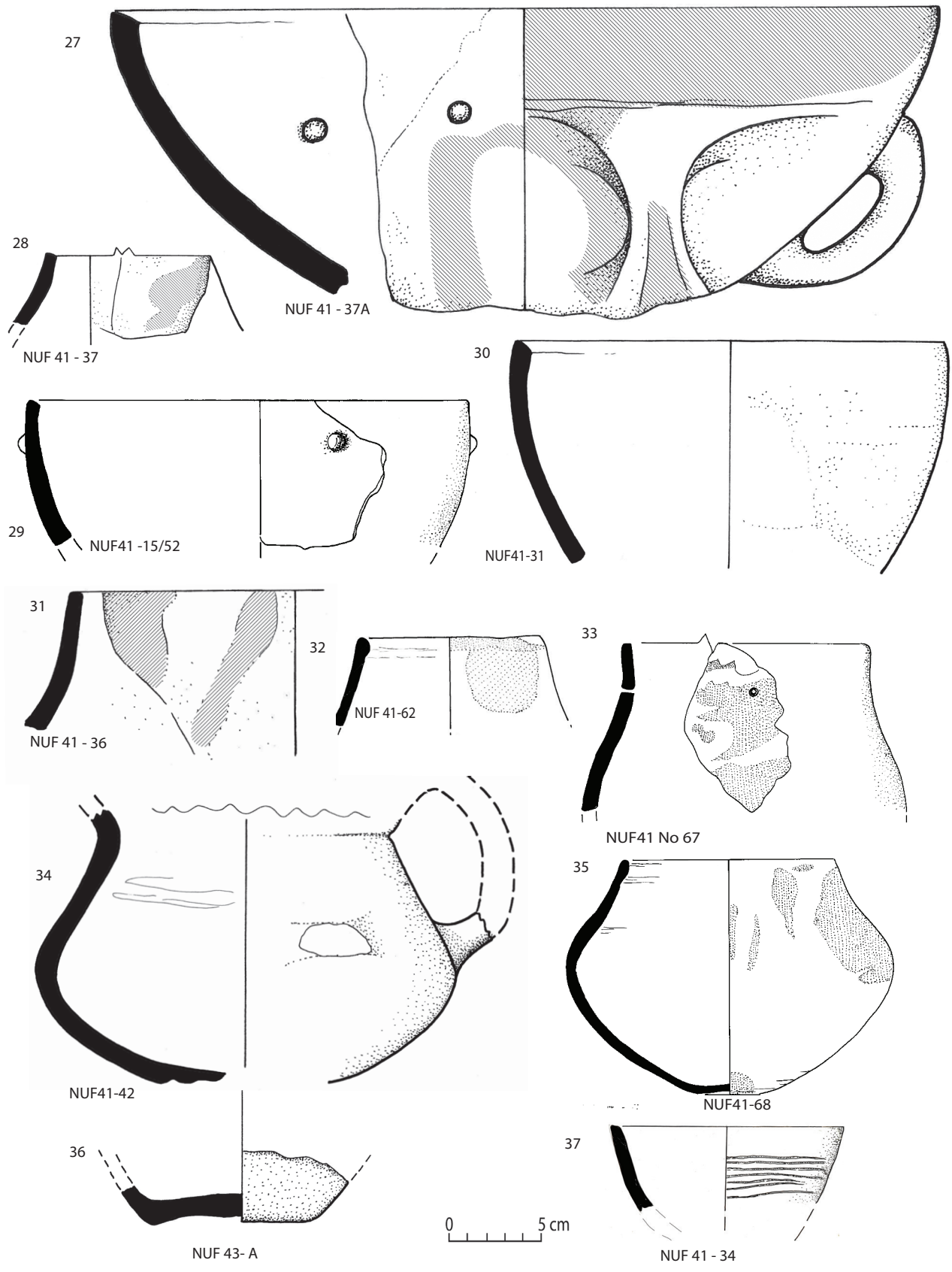


Fig 8.16. *Ceramics catalogue numbers 27–37.*

31. NUF41-36. Large fragment of a large bulbous pot with narrowing mouth. Similar to [28] but with narrower rim diameter.

RD 20 cm

32. NUF41-62. Rim of small-sized jar with inward sloping mouth and slightly rounded rim, thickened on the inside.

RD 8 cm.

Usual pink fabric fired grey at the core and, in this case, also on the inside surface which is left very rough. Blotchy coral-red slip only on the outside.

Inner thickening of lip like that of jar no. 37139 from Borġ in-Nadur (Tanasi 2015, fig. 45: Jar Type 4), but more vertical. Rim fragment of 'deep pot with walls sloping inward' no. 2101/24 in Sagona (2015, 129, fig. 1:18 (5)) has similar RD but no thickened lip.

33. NUF41-67. Medium-sized jar. Two joining fragments of upper body preserving 2 mm of the rim and a perforated hole, probably for mending.

RD uncertain.

Typical pink fabric fired grey at core. Typical coral-red slip: hairline crackling but uniform inside; some crackling and black blotches outside. Similar in shape to vessels illustrated in Copat *et al.* (2012, 59, fig. 8.6, 7).

34. NUF41-32. Kettle-shaped jug with sagging lower body and in-sloping neck before turning out sharply at the height of the upper attachment of the handle. Lower handle attachment on the point of maximum expansion of body. Comprised of three large glued sherds joinable to two other glued sherds; other loose sherds of same shape.

Unknown RD (Max. D 22 cm).

Usual pink-buff fabric fired greyish at core. Brownish-red, partly worn off, slip with black blotches on the outside; un-slipped on inside.

35. NUF41-68. Small squat pear-shaped jar with walls thinning from the waist down. Umbilicate base. Rim with thinning rounded edge. Wholly reconstructible profile from 19 sherds, out of 38 (some joined and glued).

RD 15 cm.

Fabric fired grey in upper half, turning pink from waist down. Very rough grey surface, without slip inside; typical smooth coral-red slip, blotchy and crackling on the outside.

Same profile in jar rim fragment from Tas-Silġ in Sagona (2015, 131, fig. 1: 20 (4)), but without handle.

36. NUF43-A. Base of a largish bowl with raised centre. Three glued fragments.

Base D: 9 cm.

Coarse grey fabric. Usual coral-red clay with uneven hues and black blotches on outside, including under surface of base; creamy rough surface on inside.

Other bases identified (but not illustrated):

A-Similar to [36] with raised (umbilicate) centre. More than 10 cm of height of body preserved.

Base D: 11 cm.

Usual pink-buff fabric fired grey at core. Self-slip inside; usual coral-red slip with large blotches outside.

B-Similar base of a largish globular bowl with raised (umbilicate) centre.

Base D: 6.5 cm.

Usual pink-buff fabric fired grey at core.

Coral red slip on outside. Unslipped and coarse surface inside.

C-In crate 4. Fragment of a medium-thick disc, flat and plain on one side and rough and bumpy on the other. Probably a lid.

D: 24 cm.

Well fired pinkish buff clay without a grey core. Self-slip.

Similar to Tanasi's (2015, 64, fig. 84a-b) lid type 3A.

D-In crate 4. A similar fragment of medium-thick disc with a slightly concave profile tapering towards the centre. Probably a lid.

D: 24 cm.

Pink-buff clay fired slightly grey at the core. Rather rough surface on both sides.

37. NUF41-34. Small bowl. Flattened rim. Consists of four glued sherds (whole rim + 5 cm height of wall).

RD 22 cm.

Pink fabric fired grey at core. Coral-red slip only on outside.

Decoration: seven horizontal irregular incised lines encircle the bowl *c.* 2 cm below rim.

Similar comparisons as for [40] below.

38. NUF41-35-36. Largish spheroid bowl with flattened, inward sloping rim. Same shape as [39] but preserves a small part of a handle pointing down. Two separate fragments, each of two glued sherds.

RD 30 cm.

Pink buff fabric. Coral-red slip: evenly spread inside, blotchy outside.

Decoration: four irregular horizontal lines incised below the rim.

39. NUF41-32/45. Almost entire profile of a largish spheroid bowl with flattened, inward sloping flat lip. Three joined pieces extend profile by *c.* 18 cm from the rim. Numerous other sherds, including handle (not drawn) on shoulder.

RD 36 cm.

Pink buff fabric. Coral-red slip: uniform on outside, apart from two flaked areas; less uniform on the inside. Decoration: four lightly incised, irregular horizontal lines.

A vessel illustrated in Briffa & Sagona (2017, 63–4, fig. 38: 1) has the same profile and decoration but lip not flattened.

40. NUF41-44. Chalice-shaped largish bowl with curved walls sloping out towards the rim. In-sloping lip with rounded inner edge. Two large fragments extend profile downward by 16 cm from rim.

RD 28 cm.

Pinkish buff coarse fabric with a large eroded patch on the left. Coral-red slip, uneven both inside and outside. Decoration: four irregular horizontal lines incised below the rim and two diagonal others on top of them. Seven other diagonal lines near the base.

Possibly Tanasi's (2011, fig. 4.17; 2015, Type 1A, fig. 24, no. 31012) 'Cup/basin Type 1A'; the form is similar to the upper cup, but it does not seem to join to a conical base. Similar in profile and incised decoration to Briffa & Sagona's (2017, 66) no. 39: 7. Also similar in shape and inclined lip surface to a deep bowl fragment no. 2101/13 in Sagona (2015, 125, fig. 1: 14 (1)), an 'even grey hard-fired fabric; red burnished exterior slip, dark reddish grey interior streaky slip'; and even closer in profile to fragment no 3036/6 (Sagona 2015, 125, fig. 1:13 (7)). None of these, however, present a flat lip.

41A. NUF41-51 and additional fragments. Similar zig-zag decoration (Copat *et al.* 2012, fig. 8, no 6.

41B. NUF41- 64. Part (without rim) of a jar with undulating wall profile consisting of five joinable pieces.

Typical pinkish fabric misfired to various hues, including black patches.

Decorated with two horizontal bands consisting of two parallel incised lines enclosing short oblique incised lines. The top band is interrupted at the upper right corner by zigzagging bands with the same pattern hanging from a single incised line.

42. NUF41-53. Four other loose fragments with similar decoration, but marked [16], two of which are thicker and have a chamois-coloured interior surface. Unclear whether they are from the same vessel as [41] above.

43. NUF41-50. Small fragment of wall of medium-sized bowl with three parallel incised lines (with white paste infill) meeting obliquely at an angle.

Dark grey-brown fine fabric.

44. NUF41-59. Wide-mouthed, medium-size jar with flat horizontal lip rounded at the edges, and a curiously slanting strap handle. Walls *c.* 1 cm thick. Larger fragment from Context (40); fragment with handle from Context (41).

RD 20 cm.

Orange-pink fabric fired grey at the core and covered with coral-red slip, cracked and wearing off on the outside, more consistent on the inside, but wearing off close to the rim.

Jar with similar skewed handle in Sagona (2015, 131, fig. 1:20 (5)).

45. NUF41-54. Fragment of a thick-walled container with a slightly raised vertical rib on the outside.

Rather gritty fabric fired pinkish brown close to the surface and grey in the centre of the section. Dark purple-brown slip wearing off on the inside.

Though sharing the unusual rib and purple-brown slip exhibited by sherd [19] above, it belongs to a much thicker-walled container.

46. NUF41-27-33. Large globular jar represented by an unnumbered fragment (Crate 5): *c.* 12 cm high, medium thick (1.3–1.5 cm) rim and walls and flattened rim, and indent.

RD 21 cm.

Fabric fired grey to black at the core and inside surfaces. Brownish slip on the outside.

Jar 28, NUF41-37, is the same as Copat *et al.* (2012, 59) fig. 8.7.

47. NUF41-27. Medium sized, elongated jar with slightly curved, in-sloping sides and horizontally flattened lip. Consists of four glued fragments, the extreme right tip of which fits the extreme left tip of two more joined and glued fragments (six fragments of rim in all) forming more than half the diameter. One more fragment, joinable with the extreme left of the main combination discovered on 20/11/2017.

Inside RD 22 cm.

Usual pink-buff fabric fired black at the core. Brownish slip with black blotches on the outside and unslipped coarse surface on the inside.

None of Tanasi's types of 'cooking jars' or 'storage jars' have a similar profile with a similar flattened and externally thickened rim, except his 'New Type 6' of Jar (Tanasi 2015, 53–6, fig. 41).

48. NUF41-38A. Handle. Fragment of a largish bowl with wall thickness ranging from 1 to 1.2 cm, and a vertical strap handle.

Coarse and gritty fabric fired grey right into the internal unslipped surface. Unusual yellow-brown slip, mostly turning dirty grey on outer surface.

Not illustrated: Five fragments of a similarly shaped jar with slightly thicker walls and wider flat rim. Rim separated from body by a sharply incised groove.

Coarse fabric fired grey with unusual dark brown slip on both surfaces.

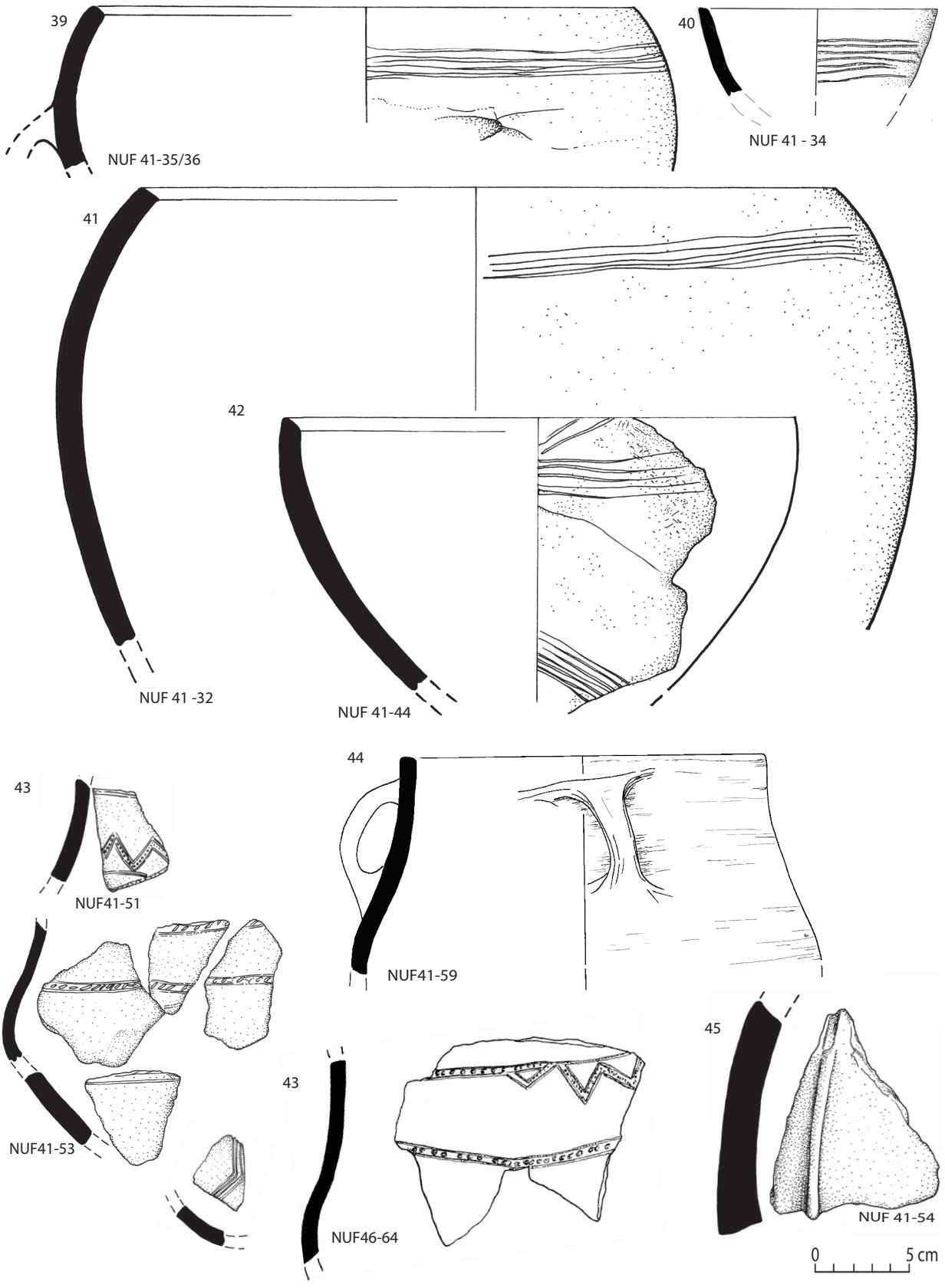


Fig. 8.17. *Ceramics catalogue numbers 38–45.*

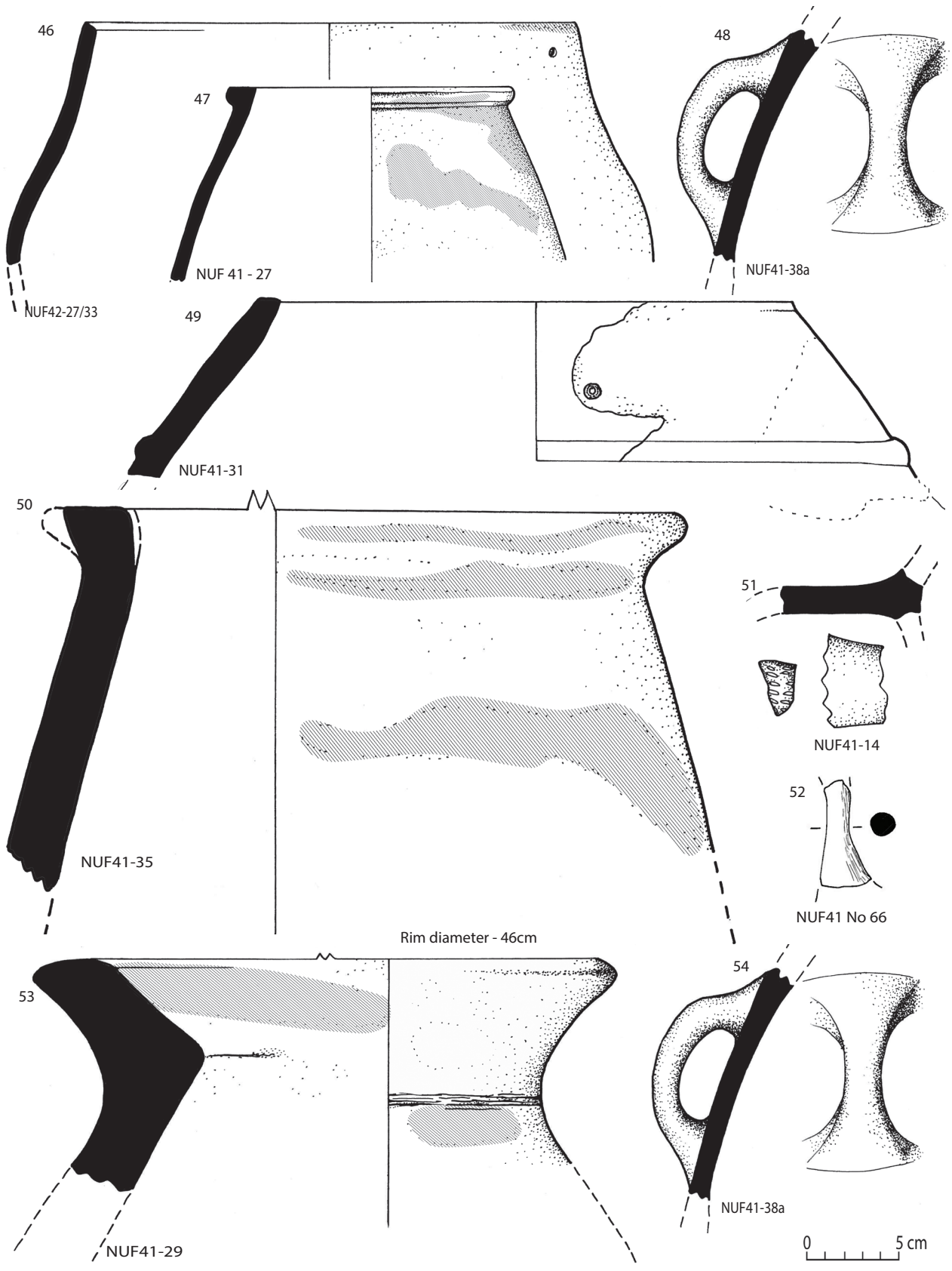


Figure 8.18. *Ceramics catalogue numbers 45–50.*

49. NUF41-30. Huge jar of roughly the same size as [50] but with walls sloping gradually inwards towards the rim which turns out at the very top. The profile can be extended far beyond the drawing from joinable pieces which do unite with a flat base *(Crate 2).*

Flat base (3.25 cm thick) with part of the rising wall joinable to wall fragments in crate.

RD 48 cm.

Base: pink fabric fired grey on the inside upper surface. Self-slip on both sides, but pinkish on the inside and creamy pink to yellow on the outside.

Similar profile in closed jar fragment from Borġ in-Nadur (Briffa & Sagona 2017, 72, fig. 44: 3).

50. NUF41-29. Huge globular jar with very thick (3-4 cm) walls sloping inward towards a narrow neck where they curve out sharply to a wider rim. The sharp turn is more angular on the inside, marking more distinctly the separation of the mouth from the body. At least four joinable fragments.

RD 46 cm.

Irregularly incised horizontal lines mark the separation of the mouth from the body on the outside. Typical pinkish-buff fabric fired grey at the core. Dark purplish slip on the outside; coral-red slip on the inside, turning white at one spot in lower part of neck.

Compares with fragment from Borġ in-Nadur (Murray 1923, plate XIV, 162).

51. NUF41-48. Large spheroid jar with neck sloping inwards. Six glued fragments and joining complete typical strap handle.

RD 30 cm.

Usual pink fabric fired grey at the core. Coral-red slip preserved entirely on the inside and wearing off on the outside. No blotches. Similar shape and handle noted by Murray (1925, plate XVIII, 2).

52. NUF41-34. Large jar with 1 cm-thick walls with neck sloping inwards, preserving upper part of strap handle. Similar to [53] but without horizontal raised rib.

RD 24 cm.

Pinkish buff fabric fired grey at the core. Coral red slip, without black blotches, inside and outside, wearing off in patches on the outside.

Similar to Tanasi's Type 4 Jar (1915: 52, fig. 45) but rim is not thickened internally. Some similarity in profile to small rim fragment of a jar in Coarse Pink Buff Ware (no 1039/43) from Tas-Silġ in Sagona (2015, 138, fig. 1:27 (4)), a 'hole-mouth form, rounded lip, self-slipped and smoothed surfaces'. Similar shape and handle also noted by Murray (1925, plate XVIII, 2), although without the neck cordon.

53. NUF41-46. Large jar with curved body and straight, sharply inward-sloping neck and rim. More than 12 fragments, practically all joinable and most of them glued together. A raised horizontal rib encircles the neck below the rim, with a strap handle attached to its lower side. Another joinable fragment of the rim, which has a drilled mending hole, and other sherds survive that could enable a full profile to be reconstructed. The jar had probably three, possibly four, handles since two of the handles within one quarter of the jar are placed at different levels: the drawn one joins the body just below the horizontal rib, the undrawn one (better preserved) joins it 4.5 cm below the rim.

RD 28 cm.

Pinkish buff fabric, fired grey at the core. Coral red slip, uniform on the top third of the outer and inner surface, but with large black blotches on outer surface and no slip on inner surface below that. Similar to Tanasi's (1915, 52, fig. 45) Type 4 Jar, but rim is not thickened internally.

54. NUF41-12. Rim and part handle. Fragment of a large bowl or pot with upper part of a strap handle attached to the rim.

RD 23 cm.

Coral red slip on exterior and interior surfaces.

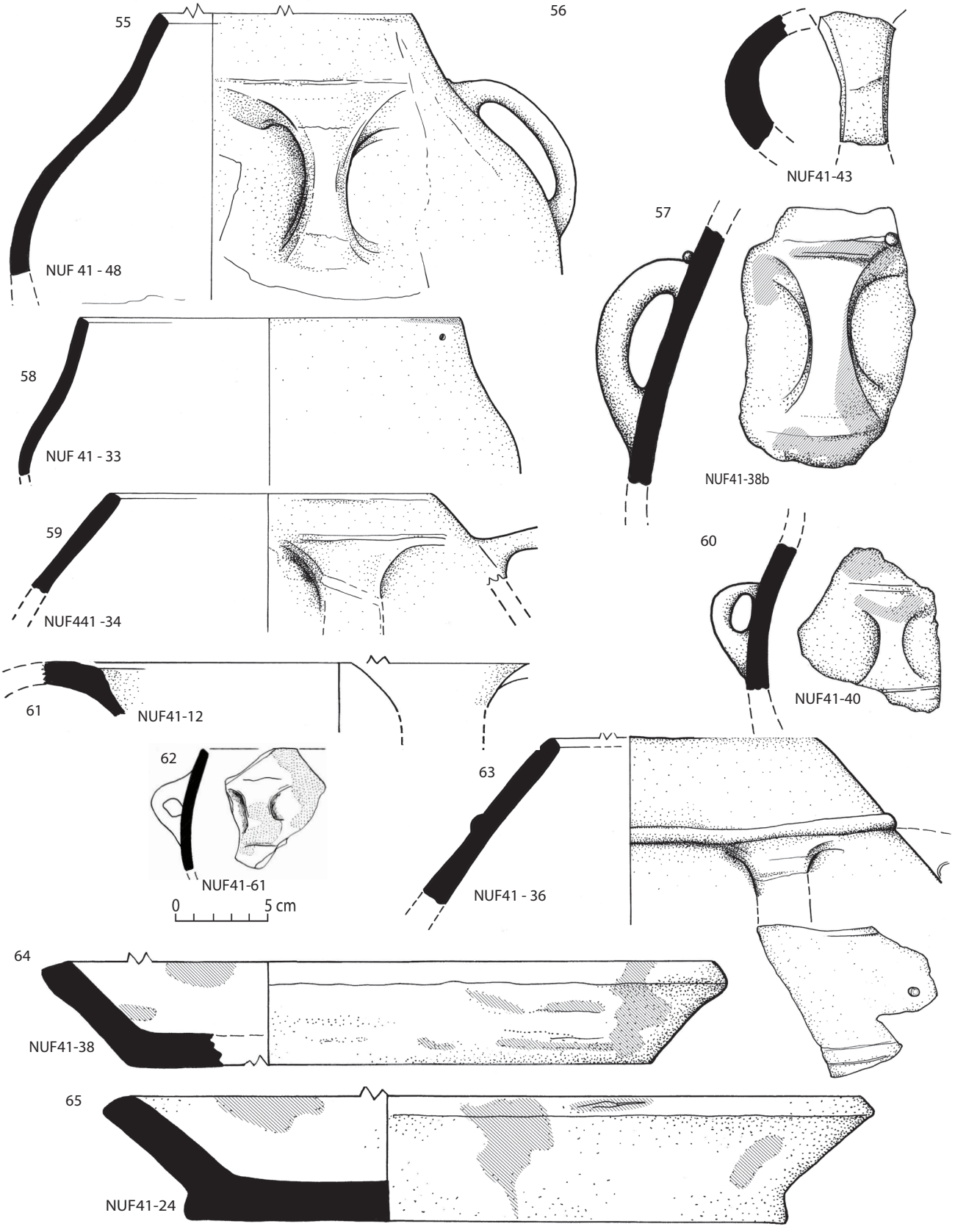


Fig 8.19. *Ceramics catalogue numbers 51–65.*

55. NUF41-24/4. Medium-sized tray with flat base and splayed straight sides. Rim rounded on the inside; angular and slightly inclined on the outside. Floor projecting out at an angle.

RD 45 cm. External base D 23 cm.

Typical pinkish buff fabric with thick grey core, almost to the surface. Typical coral-red slip with large black blotches on both surfaces.

Parallels are evident in Tanasi's (2011, fig. 4.32) Tray Type 2A; Copat *et al.*'s (2012, 59, fig. 8.10) tray with tronco-conical walls; and Briffa & Sagona's (2017, 71–2, no. 378, fig. 43: 12, 104: 5) wider and shallower 'baking pan'. Also similar to Tas-Silġ tray nos. 1027/736, 1043/144, 1043/211 in Sagona (2015, 141, fig. 1.31 (1-3)).

See also Copat *et al.* (2012, 59, fig. 8.10); Tanasi (2011, 121, fig. 4.32 (PN/P81h)).

56. NUF41-24B. Tray similar to [55] but floor does not project at an angle. Very little survives of the floor (2 not joinable fragments).

RD 44–46 cm.

Fabric very different from [55] and from the rest of the assemblage: very coarse and badly fired, similar to that of Punic-Roman cooking ware. Very gritty in section, showing tiny bits of stone or fired clay. Buff colour and relatively smooth on inside, mostly grey and rough on outside.

Similar in shape, but slightly deeper and narrower, to Tas-Silġ tray no. 1042/47 in Coarse Pink Buff Ware (Sagona 2015, 141, fig. 1.31.4).

57. NUF41-38B. Handle of largish bowl with walls up to 1 cm thick and vertical strap handle with upper attachment highlighted by a horizontal groove on top of its upper attachment and a small knob on its right end. Very coarse and gritty fabric, fired grey at the core and purplish brown on the inner face. Surface is rougher on outside than inside. Usual coral-red slip on the outside, fired almost entirely black. Similarities to handle knob from Borġ in-Nadur (Murray 1923, Plate IX, 8).

58. NUF41-38A. Handle fragment of a largish bowl with wall thickness ranging from 1 to 1.2 cm, and a vertical strap handle. Coarse and gritty fabric fired grey to the internal unslipped surface. Unusual yellow-brown slip, mostly turning dirty grey on outer surface.

59. NUF41-66. Small long handle with round section and widening out to join the wall of its pot at one end.

Max. L. 4.8 cm.

Typical pink fabric with some traces of black soot on one side.

60. NUF4-13/43. Two joined fragments of a strap handle, like [63].

61. NUF41-14. Fragment of a strap handle, similar to [63], with rice-shaped impressions filled with white paste on the interior of the rim.

Grey sandy fabric.

62. NUF41-61. Medium-sized spherical bowl with inward slanting rim top. Consists of one fragment with smallish strap handle.

Uncertain RD, probably 16 cm.

Pink fabric fired grey, without a slip, on the inside, and pink with blotchy coral-red slip on the outside.

63. NUF41-41. Strap handle (one of a series of such handles) of large bowl or pot. Wide at the attachment to the pot, and narrowing toward the centre. Lower attachment missing.

Usual pink-buff fabric. No apparent slip on inside; blotchy coral red on outside.

64. NUF41-42. Large fragment of a large bowl or pot with a relatively smaller, but thicker, strap handle (one of a series of such handles), wide at the attachment to the pot, and narrowing toward the centre.

65. NUF41-40. Fragment of a whole strap handle of a largish bowl. Outer edges of attachments to the body highlighted by a groove. Two sherds.

Fabric: coarse, unusual purplish right through in section, from surface to surface. Dark purplish-brown slip, with predominating black blotches on outside; almost, but not quite, self-slipped on inside.

[Note: 33 other pieces of similar strap handles but of different sizes are not illustrated here]

Decoration characteristic of 'Dribbled ware', so called by Trump (and later Tanasi), was noted on numerous sherds, particularly from NUF41-70. This comprised some 16 sherds, including two separate glued sherds, with similar painted discs ('dribbled').

Dribbled wares were discovered at Borġ in-Nadur, Baħrija, a silo pit at In-Nuffara and at Tas-Silġ (Tanasi 2008–2009 [2013], with previous bibliography).

Notes

1. Grid ref. UTM 33S 434635E 3988913N (ED50 datum). WGS84 36.041°N, 14.274°E. Site code: NUF2015.
2. *FRAGSUS*: Fragility and sustainability in restricted island environments: Adaptation, cultural change and collapse in prehistory. A collaborative programme of research between Queen's University Belfast, Heritage Malta, Cambridge University, the University of Malta and the Superintendence of Cultural Heritage, Malta. European Research Council seventh framework programme (FP7) 'Ideas' Advanced Grant: 323727. Principal Investigator: Prof. Caroline Malone http://www.qub.ac.uk/sites/FRAGSUS/
3. See Note 4 below.
4. D. Tanasi, whose help is gratefully acknowledged, identified parallels for five of Borġ in-Nadur pottery shapes from the list AB submitted to him (personal communication dated 12/06/2018).
5. In connection with this, the present writer has a hand-written note saying that a report on this activity by G.A.M. [Grupp Arkeoloġiku Malti] was submitted to Dr Tancred Gouder [the Director of the Museums Department] on 3/8/1995.
6. Although D. Tanasi's article (2013, Table 1) about prehistoric painted pottery focuses on the 'dribble ware', it also gives a numerical breakdown of the shapes and types represented by the pottery assemblage of 2944 sherds retrieved from the In-Nuffara pit in 1960.
7. It is relevant to recall Tanasi's (2008–2009, 11–12) suggestion that three to four identified shapes of the dribbled ware from the 1960 pit must have been used for ritual purposes on the grounds of the special technical features evident in its manufacture, which were understood to represent 'a pottery class of high level produced by the most skilled potters'.

Chapter 9

Economy, environment and resources in prehistoric Malta

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9.1. The environment of early Malta

Reconstruction of the changing environmental context of the human settlement of the Maltese Islands has been a major focus of the *FRAGSUS Project* and readers are referred to the first publication in this series for the full details, against which the evidence presented here can be read (Volume 1, Chapters 2–5 & 11). It is important to note from the outset that much evidence confirms that certain aspects of the environment – particularly soil properties, levels of vegetation cover and surface water – changed considerably during prehistory and indeed subsequently (Fig. 9.1).

9.2. Material resources

9.2.1. Indigenous materials

9.2.1.1. Rock (PC, AR)

The local materials of Malta were always limited in range, but in accessible and plentiful supply. (Volume 1, Chapter 2). The parent rock Limestone, provided ready sources of easily worked building material. The Coralline Limestone whilst generally too hard and brittle to shape (Pedley 1993; Pedley *et al.* 1976, 2002), could be shattered into blocks and slabs that were employed in megalithic construction, employed as hammer-stones and sometimes as rudimentary grindstones. The softer Globigerina Limestone was the stone of choice for worked building stone, and for a variety of other worked objects, such as stone bowls, troughs and figurines, which were chipped and ground from the stone. Both of these materials were available in ample supply, and even today most building work still relies on Globigerina Limestone (Cassar 2010). It is worth remarking that the most prominent features of prehistoric identity in the islands, the monuments, were constructed out of these local materials.

Coralline Limestone and Greensands was widely used for querns and grinders (Pedley 1993; Pedley *et al.* 1976, 2002), and most prehistoric sites produce evidence of ancient objects fashioned from the hard, dense material. The Greensand, however, was not the hardest or best material for querns. Although rare before the Bronze Age (Zammit 1930, 85), the routine importation of lava and other igneous rock, presumably from Sicily or Pantelleria, was the material of choice for grinding, since it did not shed sharp quartz particles that entered the ground food and damaged human teeth (§9.9.1). The evidence from the human remains studied in this project (Volume 3) presents a varied picture of tooth wear. Evidently cereals were ground with local limestone querns, for instance the examples from Taċ-Ċawla, which were examined for phytolith residue but without success. Chert is present in several limestone formations in the Maltese Islands and artefacts made from this and other stone objects from the *FRAGSUS Project* sites are described in Chapter 11, Part 2.

9.2.1.2. Soil (CF, AR, RMcL, CH, PJS)

Soils in Malta, before and during its early occupation history differ from those of today. Prior to human colonization, the landscape was a mosaic of steppe, woodland and scrub; it was supported by soils that developed under particular conditions, especially in protected areas such as the sides of *widien*, below the escarpments, and in the larger depressions. Evidence from our excavations suggest the presence of moist, humic and well-developed soils that were progressively thinned and that lost their organic content with time, eventually exhibiting strong signatures of calcification and xerification from Late Neolithic times onwards (Volume 1, Chapter 5). Rainfall and human activity-driven erosion led to the continuing loss of soil from upland parts of the landscape (such as the In-Nuffara Plateau), leading to a thickening of deposits

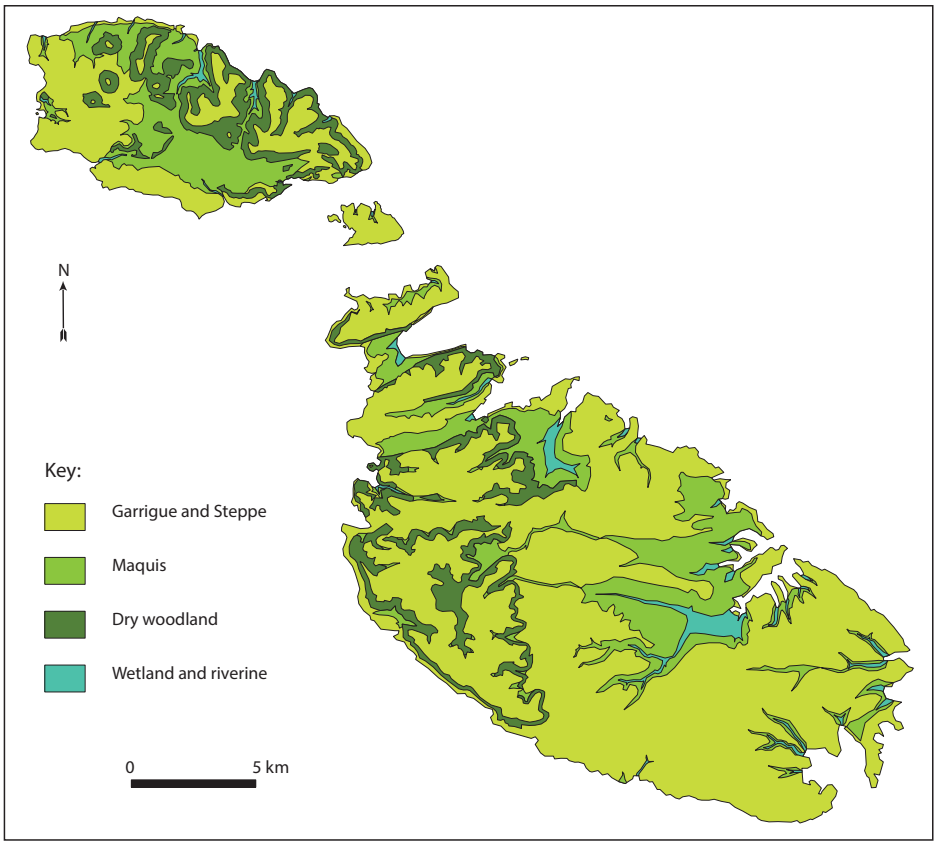


Figure 9.1. *Holocene potential vegetation at first colonization,* c. *6000* BC. *The extent of wetland, dry woodland and maquis would have been somewhat greater during times of high effective moisture, for instance before the 8.2 ka event and during much of the Neolithic and Temple period. Vegetation composition: Wetland and Riverine – reedbeds, bulrushes, and riverine woodland with alder, willow, tamarisk; Dry Woodland – open woodland including oak, pine, juniper, oleaster, phillyrea, hop-hornbeam, maybe other trees; Maquis – scrub with lentisk, juniper, oleaster, phillyrea, cistus, rosemary, privet; Garrigue and Steppe – low-growing scrubby vegetation with thyme, erica, spurrey, rock-rose, centaury, cistus, juniper, and grassy vegetation with a wide variety of herbs.*

in valley floors, making these locations valuable for later agriculture (Volume 1, Chapter 2). The loss of soil begins in the very early Neolithic and is a continuing feature throughout prehistoric and historic times, but with some soil conservation practices associated with the development of terraces re-shaping the landscape, probably from the mid-second millennium BC onwards.

The evidence for soil loss is particularly well documented through *FRAGSUS*, since the cores taken from the coastal inlets demonstrate continuing soil erosion throughout the Neolithic. The depth of dated Neolithic sediment carried down to the coast from the interior of the islands can be measured in many metres, for example at Salina, this was up to 14 m in depth, at Salina Bay and Salina 4 boreholes, the depth reached 7 m, at Marsa at least 4 m, and at Xemxija at least 5 m. Such deposition demonstrates enormous levels of soil erosion in the period between the first human settlement in the mid-sixth millennium BC and the start of the Bronze Age in the second millennium BC. The possible relationship between soil loss and the cart-ruts (Magro Conte & Saliba 2007) of Malta remains a much-debated issue. There could have been active attempts throughout prehistory to drag soil, perhaps laden on timber sledges, or later on wheeled vehicles of some kind, to return eroded soil to the cultivated plots on the plateaux and slopes. By the Bronze Age, soil erosion may have stabilized somewhat, perhaps because so much of the soil cover was already removed, but also because it is possible that a rudimentary terrace system began to evolve in response to soil loss. Where soil was harnessed in the Neolithic, there is evidence that efforts were made to enhance it, with the addition of midden waste, as shown at Ġgantija (Chapter 5.6). Overall, however, there were occasional peaks of erosion that imply

exposed soils in a semi-vegetated landscape, and this is documented by the soil organisms (root symbiotes) and the changing presence of snails throughout later prehistory (§11.2 & 11.5; Volume 1, Figures 11.1 & 11.2). Those peaks were probably associated with episodes of human activity, namely the first impact of agriculture, and then intermittently over time, perhaps coinciding with changing patterns of intensification, extensive cropping, grazing regimes and population pressure. These debates are highlighted in Volume 1, Chapter 11, and in Chapter 12 of this volume.

9.2.1.3. Clay and Ceramics (CB, CM, AR)

The Blue Clay strata that interspersed the limestone geology of Malta were exploited for ceramic production throughout the human occupation of the islands. As discussed below (Chapter 10), recent archaeometric studies on clay sources (Mommsen *et al.* 2006; Pirone 2017; Chapter 10, Appendix A10.2) demonstrate that local clay was exploited, and that a variety of sources of Blue Clay were used. Some sources evidently included greater quantities of shelly material (perhaps from Holocene lagoonal sediments), which is apparent as small white spots in the thin sections of some ceramics, such as the Skorba phase pottery. It is also possible that the shelley material was added by the potter as temper. Other clay mixes included small grit, sand, plant material and dung, and from the local area, silt-grade quartz, carbonate clasts and polycrystalline quartz. Some clay had high levels of precipitated iron or was rich in glauconite that had weathered in the clay and this shows in thin section and may be apparent in the colour of the fired fabric. Clay which was low in iron enabled darker colours, such as the glossy Ġgantija pottery. Potters employed a number of different clays, evidently from various parts of the islands; and these appear to change over time, with a preference for different clay quality for vessels of different scale and function. They also mixed additional temper into the clays which can make some fabric particular diagnostic. Yet, with a limited mineralogical range, there is little to distinguish the material at a chemical level of analysis.

The pottery traditions that developed on Malta drew initially on styles and forms that were in use across Sicily and Calabria. One aspect of early Malta that emerged over the succeeding millennia was how different and individual the pottery styles became during the Temple Period in the fourth and third millennia BC. Much of the argument for distinctiveness and isolation rests on the interpretation of the pottery styles and their apparent identity. As Pirone (2017) has argued, however, the boundaries between Sicily and Malta may have been quite fluid at times, with pottery made in Malta regularly making its way to sites in southern Sicily, possibly accompanying settlers; but just as possibly forming some type of exchange good, in return perhaps for stone and chert (Chapter 11, Part 2) (Pirone 2017; Recchia & Cazzella 2011).

Pottery was a key component in the successful agricultural exploitation of Malta. It provided vessels for the storage of foods, and probably the conversion of liquid milk into solid and preservable products such as curds, cheese and yogurts. Pottery was also important for cooking and one important contribution by the *FRAGSUS Project* to expanding knowledge of this is in the recording and presenting (Chapter 10) of a range of (to-date) unrecorded coarseware material. The brewing of liquids into preservable drink (ales? beers?) is also quite likely in the context of the evidence for quantities of drinking vessels from temple buildings. By the Middle and Later Bronze Age, domestic vessels were sometimes of very large size, and could have been used for liquid storage (possibly of water) and set within the rock-cut silos, where such pottery has been found (see Chapter 8). Future analysis of lipids and other indicators, such as proteomics, may enlighten interpretation of the rich ceramic assemblage and reveal that some forms, fabrics and stylistic elements functioned for particular activities. Prehistoric potters were evidently skilled and they developed their craft in relation to the raw materials they had locally. They also developed effective ways to fire their pots, some of which were of large size, as shown by the examples from Neolithic to later Bronze Age (§8.7, 8.14, 10.2.4; Chapter 8, Chapter 10). That was quite an achievement given the relatively treeless landscape (§9.2.1.5), and alternative fuels such as dung may have been employed.

Another use of clay was architectural, since clay was a key component of the plaster material used for flooring '*torba*', and roofing *'deffun'*. These materials consist of crushed limestone, mixed with crushed pottery sherds, clay and water and were applied in a particular manner that compressed the paste into a hard, smooth and watertight surface. Almost all the prehistoric structures explored reveal remains of successive floors of the material, and a comparable plaster material was used to level up rough natural limestone bedrock to a level living surface that was safe and hygienic. The practice of making *torba and deffun* has extended down to recent times in Malta (Cassar 2010; Checuti 2010, 2005).

The evidence from the domestic structure at Taċ-Ċawla suggests domestic buildings may well have had a considerable and hitherto unrecognized timber element involved in their construction (Chapter 3, §3.4–3.5). Walls made partly of timber or brushwood

would have required a daub coating for waterproofing and wind-proofing, smeared on to wattle-style upper walls. At Taċ-Ċawla the evidence might suggest that timber uprights were set between the internal and external faces of a drystone built base. This plaster daub material was presumably comprised mixed dung, crushed limestone, plant matter and clay. The use of many materials within traditions of domestic construction in prehistoric Malta is logical, but until now, has not been convincingly demonstrated. The Għajnsielem house, excavated in 1987, also demonstrated the use of clay in the form of mud brick blocks that adhered to the cut limestone base of the structure (Malone *et al*. 1987).

9.2.1.4. Water (CH, RMcL, AR)

With low rainfall and high Mediterranean temperatures (Chetcuti *et al.* 1992), the dry limestone landscape poses challenges of ready access to year-round water supplies. Palaeoecological evidence for perennial streams exists in some lower parts of valley systems, and there is evidence of ample water storage in at least some places on the islands, prior to human colonization, particularly in the *widien* channels. Some *widien* had permanent streams fed from the perched aquifer set beneath the plateau tops, whilst towards the mouth of the *widien*, freshwater wetlands developed (Fig. 9.2), and these became more brackish the closer they were to the coast. The climate seems to have been wetter during the Neolithic in all but the last phase of the Temple Period. There is good evidence that freshwater resources declined steadily after that period (later third millennium BC), with only a few *widien* still carrying perennial streams and the majority only channelling water during the wet season, and these would have dried up by the second millennium BC (Volume 1, Chapter 4).

Yet, water is a surprisingly available resource thanks to the permeability of the Upper Coralline formations and the Blue Clay aquiclude underneath. Given sufficient rainfall across the Maltese islands in the winter months, there is a guaranteed source of water the year round. In some places, where faulting and erosion have brought the water close to the surface, springs are of key importance, such as the example at Ġgantija, where a fault runs beneath the 'temple' complex (Ruffell *et al.* 2018). As Grima (2005) discovered, many prehistoric sites lie much closer to water-related toponyms than would be expected with random location. The Neolithic and Temple Period soils of Santa Verna and Ġgantija on the Upper Coralline aquifer contain evidence for freshwater micro-plankton and there are also signs of dampness in the presence of ferms and bryophytes. Together, these also point to waterbodies close to the sites, whence water-lain silt occasionally made its way into the local soils. Later on, during the first millennium BC, there is evidence from

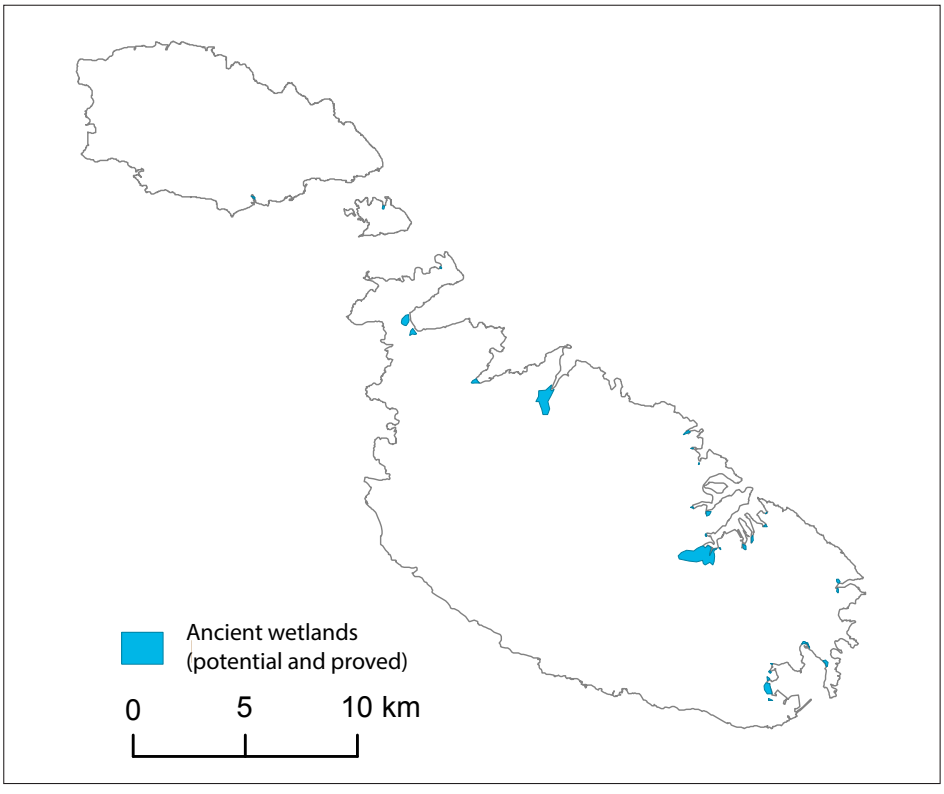


Figure 9.2. *Lagoon wetlands map of Malta in the early Holocene.*

Tas-Silġ (a Phoenician, Punic and Roman sanctuary site, which had earlier antecedents as a megalithic temple complex; Cazzella & Recchia 2006–7, 2012, 2015) for ferns and bryophytes; indicating local damp conditions throughout the Tarxien phase and Bronze Age, while water lily pollen in a Hellenistic layer is consistent with a pool (Hunt 2015). At Tarxien, the wells on the site penetrate an aquifer close to the surface, whilst at Taċ-Ċawla, the aquifer lay just a few metres below the rock base of the site, and was evidently exploited in the close vicinity of the site (Chapter 3, Appendix A3.7).

Brackish wetlands developed at the mouths of the main *widien* systems, with associated lagoons (Fig. 9.2). Fresh, or almost freshwater bodies existed in some of the lagoons that lay behind the bay-barriers at Marsa, Salina, Xemxija and Santa Maria Bay on Comino, until at least the medieval period. This is indicated by the freshwater molluscs and aquatic plants and non-marine plankton that have been identified in the *FRAGSUS* and earlier Marsa cores (Carroll *et al.* 2012; Volume 1, Chapter 4). The lagoons would have provided a number of resources, including shellfish and fish for prehistoric communities, as evidenced by the molluscs found in the archaeological excavations. Both freshwater and brackish water wetlands would also have attracted birds and it may be that the ubiquitous slingstones from several Neolithic sites (Chapter 11, Fig. 11.5) were used to bring waterfowl down. Interestingly, the use of these stones may be limited to the sixth and fifth millennium BC, since almost none are recorded from later deposits. This could imply the brackish lagoons had ceased to be productive hunting grounds, as they gradually became submerged and salty or infilled with sediment.

9.2.1.5. Wood and other vegetation (COH, PJS, NW)

The natural vegetation of pre-human Malta comprised a mosaic of open vegetation equivalent to steppic grassland and garrigue, with a shrubby vegetation equivalent to maquis, and woodland in sheltered and watered locations with deeper soils. These latter were never extensive, whilst the maquis was probably common over many areas at all times (Volume 1, Chapter 3). Snail evidence supports the idea that open landscapes existed throughout recent millennia, with little evidence for abrupt change between one vegetation type and another (Volume 1, Chapter 4). Importantly, many of the indigenous snails were edible, and could have been collected in different parts of the landscape (Appendix A3.8).

The ubiquity of wood charcoal in most of the soil samples floated from our excavations suggests wood was an important resource. Deciduous and evergreen oak were used as fuel, as were a range of maquis shrubs (Volume 1, Appendix 9). The presence of *Abies* (fir) charcoal in the Salina Deep Core also speaks of the availability of driftwood, which as a resource may have become more important as the indigenous woodland became depleted and shrubbier (Volume 1, Chapter 3).

A detailed microscopic study was made of charcoal retrieved from the excavated sites, as well as from the environmental cores (Volume 1 and Table 9.1) to identify tree species. The work reveals that local vegetation in prehistory comprised numerous tree species that had value for timber, fodder, fuel and shade. These trees would have also ensured soil stability of parts of the steeper landscape. Santa Verna contained charcoal from both deciduous and evergreen oak, lentisk, pistachio, olive, poplar, and a range of other wood from smaller maquis and scrub vegetation. Kordin III and In-Nuffara both yielded examples of pine as well as oak, pistachio and olive.

There are accounts of charred beams and charcoal strewn over the floor of the 'Huts of the Querns' at Skorba (Trump 1966, 48), and several instances of charcoal from likely burnt roof structures at Mnajdra and Tarxien (Evans 1971). From Skorba, wood charcoal was identified from *Cercis siliquastrum* (Judas Tree), *Craetagus* sp. (hawthorn) and probably *Fraxinus* sp. (ash). This was interpreted as fuel, whilst wood ash in the East Temple was interpreted as likely to be from a burnt olive wood roof (Metcalfe 1966; Table 9.1). Such wood might well have originated in a plantation of olive trees, grown as much for construction material as for its fruit. Since olive is a low pollen producer, only odd grains occur in the pollen studies, but they do demonstrate its presence. Oak was important and was fairly frequent, whilst poplar appears to be present, if on minimal evidence. The presence of pine and juniper is typical too. Yet, pine would have been scrubby, much as seen today in coastal northeast Libya with its similar climate, and similarly, juniper would have had low level growth. It is possible some wood was actually imported into Malta, perhaps floated alongside rafts or canoes from nearby Sicily, or even found as driftwood washing up on the beaches of Malta. The charcoal also shows the use of shrubs, particularly *Pistacia* – lentisk, and perhaps terebinth. Sheep love its leaves and it has edible oily (though unpalatable) fruits and seeds. Some parts of the woodland/garrigue/maquis environment could provide fodder for animals, including coppiced leaves from oak, poplar and other plants. It is likely that the steeper slopes of the landscape were exploited for grazing during the Neolithic. The pollen data suggest there was a forest of lentisk at or near Burmarrad throughout much of the Neolithic period, and with little or no cereal cultivation. Such a concentration could suggest a semi-managed

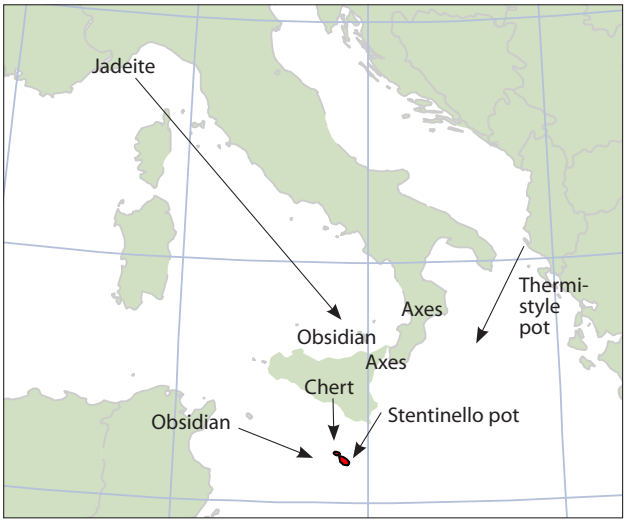


Figure 9.3. *Map showing the origins of exotic materials brought to Malta in prehistory.*

harvested (coppiced?) woodland, as suggested for Syria (Asouti *et al.* 2015). Active management would appear to be vital for the survival of such plants in the Maltese context. Indeed, this would have been a necessity, given the quantities of fuelwood required for ceramic manufacture and domestic fuel, particularly if dung, the alternative domestic fuel, was being used as a soil ameliorant, as is suggested by the soil analyses. From Roman times until about AD 1000, there was a pine plantation/woodland at Xemxija. This evidence resonates with accounts by Arab geographers, who describe Malta as being a good source of ship-building timber. It is possible some wood was actually imported into Malta. In this category, we can place *Abies* (silver fir), *Betula* (birch) and *Ulmus* (elm). Pollen of the first two are present in our cores (Volume 1, Chapter 3), but in the central Mediterranean these three species are trees characteristic of high altitudes, such as those found in the Sicilian uplands. Large fragments of *Abies* occur in the Salinas Deep core and the most plausible hypothesis for their occurrence is that they arrived as driftwood.

9.2.2. Exotic materials: their origins and distribution

The islands of Malta had a limited range of natural materials available for exploitation in prehistoric times. The most significant of exotic materials were the imported agricultural plants and animals,which must have been brought direct to Malta in the first wave of settlement in the early sixth millennium BC, although thereafter they were locally produced. The evidence for cereal pollen at an early stage (Volume 1, Chapter 3) provides irrefutable proof for this importation. Unfortunately, the pollen evidence is not yet paired with dated evidence for domesticated animals, but the contemporaneous rise of grazing indicators and spores of coprophilous fungi (characteristic of animal dung) makes it very likely that the first settlers arrived with the typical Neolithic 'package' of Near Eastern domesticates (Barker 2006; Bogaard & Halstead 2015; Guilaine 2015; Malone 2015; Price 2000). As this chapter describes, the Neolithic sites investigated by the *FRAGSUS Project* have extracted samples of early agricultural activity that are dated and provide a solid base on which to build stronger interpretation and guide future investigation.

The lack of hard stone for tool making in Malta demanded the exploitation of other sources to supplement the poor local chert supplies. As Chapter 11.5, Part 2, describes, there is clear evidence for the importation of certain chert materials, most likely from Sicily, and from areas perhaps long-known by the immigrants to Malta whose ancestors mostly originated on the larger island and Calabria. Some of the chert came from southeast Sicily, whilst other coloured cherts were sourced from the interior.

Obsidian from the island sources of Pantelleria and Lipari were also of great importance in the lithic assemblage of Malta. From the outset of settlement, the material was acquired and brought to Malta. As our study shows (§11.3) the material is almost always in very small pieces, implying constant reworking until so reduced as to be useless. One important object located at Taċ-Ċawla was a Lipari obsidian prismatic core that was incompletely reduced, suggesting on-site knapping took place (§11.3.4). Another important object from Santa Verna was a fine, and uncharacteristically shaped, arrowhead of Lipari obsidian (Chapter 11, Figs. 11.10 & 4.36), one of only very few arrowheads ever identified in Malta. The implication may be that such prestigious objects were made elsewhere than Malta and imported as finished artefacts.

Hard stone for the manufacture of axes has been a theme of past research (Leighton & Dixon 1992; Malone *et al.* 2009, 253–60). The *FRAGSUS Project* located only one complete small ground-stone item, a crude pendant in the survey around Santa Verna, together with some possible fragments of a ground stone artefact (Chapter 11); but the need for hard, crystalline rock was always clear in Neolithic economies. Tree clearance was most likely undertaken in part with stone axes, and other wood working, stone shaping and craft activities also relied on hard stone tools. Neolithic Maltese people evidently imitated the stone grinding and polishing process on local limestone stone (as revealed in the 'dummy' limestone axes from the Xagħra Brochtorff rock-cut tomb (Malone *et*

al. 1995, 2009, Figure 256). Limestone did not have the physical strength or polishing properties to provide a local alternative. The importation of the hard stone appears to have always been quite limited, given that the total numbers of axes recorded amount to perhaps a couple of hundred items, and many of these were concentrated in the funerary sites of Ħal Saflieni and the Xagħra Brochtorff Circle and the temples. When found in their totality, as at the Xagħra Brochtorff Circle, where strict sieving of deposits ensured small finds were retrieved, it was clear that few of the objects were functional, having been reworked and reduced to tiny size, and in many instances, converted instead to pendants. This pattern of reduction suggests that far from having a regular importation of exotic materials from Calabria, Sicily, and in one instance, the Maritime Alps, Malta may have actually been excluded from the exchange networks. This exclusion demanded the recycling of rare materials by turning them, in the process, into symbolic and prestigious objects. As noted above (§9.2.1.1), lava was a material that was imported and probably only in any quantity from the Bronze Age onwards. To date, no analysis has been conducted on the precise sources of the fragments retrieved, but in all likelihood, they derive from the Mt. Etna region – or, just possibly, from the Aeolian Islands and Pantelleria.

Metal appears to have been unknown in Malta until the Bronze Age, and no evidence has yet been identified to suggest that raw copper or metal objects were imported during the Temple Period. By the Tarxien Cemetery phase, the importation of firstly, copper tools (the axes from the cemetery at Tarxien) and then later on, bronze objects, follows a process of acquisition and manufacture that was probably similar to that seen in Sicily and the central Mediterranean area. Quite evidently, there was no indigenous metallurgical tradition on Malta, given the complete lack of raw mineral ore, and that situation was possibly similar in Sicily, although recent research implies some exploitation of local ores from the third millennium onwards (Giannitrapani *et al.* 2014).

9.3. Economy and foodways

9.3.1. Introduction: the lines of evidence

Food is central to the lived human experience. Beyond subsistence economy, food can provide structure to people's daily lives, define how social activities are organized, and even play a prominent part in ritual and religion (Appadurai 1981; Fischler 1988; Goody 1982; Hastorff 2016; Messer 1984; Twiss 2012; Smith 2016; van der Veen 2014). We see these patterns of behaviour repeated today with prestige dining, exotic foodstuffs, elaborate serving equipment and specialized eating 'manners'. There has been much discussion focused on the likelihood of whether similar themes featured prominently in prehistory as well (e.g. Parker Pearson 2003). The case of prehistoric Malta affords the opportunity to study the prehistory of food in a relatively 'closed' system (the islands' isolation prevented the bulk import and export of materials in small seacraft). Prehistoric food remains associated with a rich archaeological and environmental record have, with the multiple coexisting lines of evidence, the potential to shed light on the many questions posed by the *FRAGSUS Project*. The importance of the human-food relationship in the Temple Period in Malta in particular is highlighted by the prominence of food and perhaps feasting using the material culture associated with the 'temple' buildings themselves (Malone 2007, 2018). The evidence for ritualized food preparation and re-distribution to a large community of diners is implied by the formal layout of the temple buildings, and from the rich archaeological materials within them. These comprise astonishing quantities of fine pottery vessels, many of styles that appear to conform to particular shapes that were replicated at different scales (e.g. Evans' shape 40–41 'offering cup' (§10.9.1–10.9.3). Enormous vessels were placed in strategic, visible and probably symbolic locations in the buildings, presumably for the distribution of whatever food/drink they contained (e.g. the huge stone bowls of Tarxien (Fig. 13.17), Xagħra Brochtorff Circle (Volume 3), and fragments from Santa Verna (Fig. 11.4)). In tandem with this evidence, cooking evidently took place within the buildings, as shown by the circular fire pits at Tarxien and Ġgantija, which were strategically placed on the central or right-hand-side of the main corridor of the building. Ħaġar Qim produced considerable evidence for burning and charcoal in the 1839–40s investigations (Evans 1971, 80–1; Vance 1842), and other sites have also reported deposits of charcoal fragments, sooty soil and animal bones, although there has never been sufficient study to date of butchery or other indicators. Tarxien, in particular, which was excavated with greater care than earlier temple investigations by Zammit (1930), yielded repeated patterns of animal bones and horns; these were often placed on the stone benches or around the apparent 'altars' that gave visual focus to the many internal rooms of the complex (Attard-Mallia 2018; Malone 2018). More recent excavations at Tas-Silġ seem to have recovered similar evidence (Cazzella & Recchia 2012). Together with the imagery of animals in stone friezes and modelled forms, the implication is that food, animals and their consumption were an important activity. Indeed, they seem to have been highly symbolized,

in comparison with many contemporary communities in neighbouring areas, since not only was 'art' used to depict the potential 'food' subjects, but also, the external installations of the buildings incorporated stone tethering places. These were generally located directly by the entry to the building, in the forecourt, and usually on the left side of the entrance (Malone 2008). Fine examples are known from Tarxien, Ħaġar Qim, Ġgantija, and Mnajdra, and doubtless were also located at other sites which have been less well preserved or examined. Alongside these structures, stone-cut holes that have usually been designated as 'libation' holes seem more probably intended to contain wooden posts that could perhaps have displayed the animal skulls that later made their way into the display and rubbish deposits mentioned above.

Whilst animal-based food was evidently important to the festivities of the Neolithic communities who, we presume, came together in and around the impressive building forecourts, cereal foods also played an important role. Many grindstones have been retrieved from all the temple sites, and this in combination with the surprising concentrations of cereal pollen found near sites (Volume 1, Chapter 11) could imply that many aspects of food production, re-distribution and consumption were community-based. Given the potential for food scarcity, and the need for practices that buffered people from moments of food failure, the Maltese temple 'food culture' appears to offer a very particular strategy for island survival (McLaughlin *et al.* 2018)

The *FRAGSUS Project* has focused on collecting data from archaeological contexts associated with prehistoric Maltese food production, distribution and collection that are integral to understanding the temple system. The primary aim for improving the understanding of prehistoric subsistence in Malta, i.e. the nature of agriculture and what people ate, may enable our research to identify possible changes over time, and perhaps link these changes to climate change and its impact on prehistoric landscapes. Although secondary to these aims, we also wished to test a model that might demonstrate society in prehistoric Malta – like societies everywhere, ultimately – was controlled, to a degree, by its access to available food. This model suggests that the 'temple' sites, and perhaps the social, or even a religious, elite who presided over them, were central to a system that maintained control over the landscape through a socially – and symbolically (ritually) – motivated population (Bray 2003; Dietrich *et al.* 2012; Hayden 2001; Hayden & Villeneuve 2011; Rosenwig 2007; van der Veen 2007).

There is growing evidence to suggest that the temple buildings were carefully and deliberately orientated towards particular solar and celestial views and events (Barratt 2018; Barratt *et al*. 2018, Lomsdalen 2018; Ventura & Agius 2017). These moments might have coincided with the festivals and carnivals that marked out the annual agricultural cycle – a cycle that followed a prescribed calendar for the slaughter, feasting and social activities that appear to have directed the lives of these ancient people.

The implications of subsistence on the Temple Culture lead us to pose the following questions: did the unique Temple Culture develop first to meet the demands of making a living in a relatively difficult and geographically limited environment? Did it then evolve to maintain and indeed to flourish over centuries as a consequence? Was food central to all this?

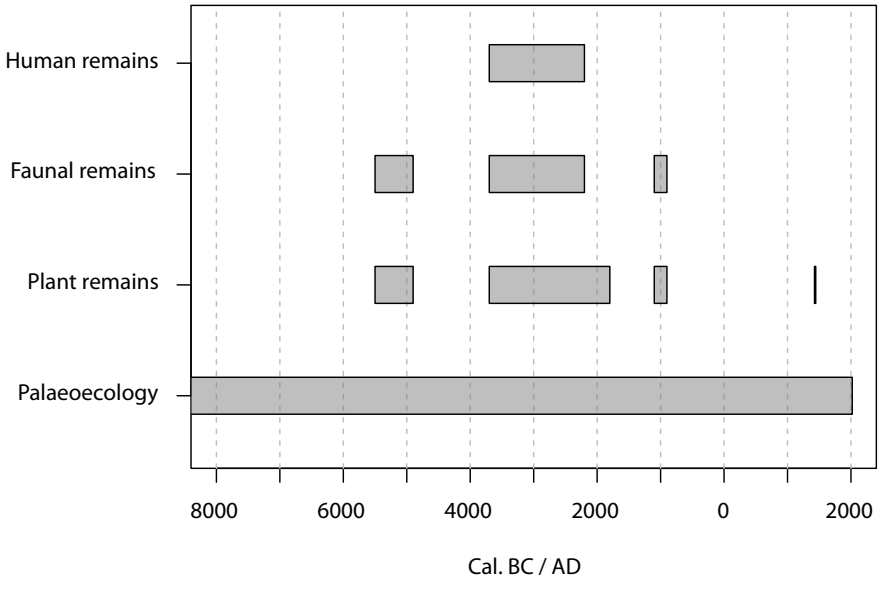


Figure 9.4. *The temporal distribution of evidence obtained by the* FRAGSUS Project *for food, diet and the environment (palaeoecology) in Malta since 8000 BC.*

The various lines of evidence for food and diet in prehistoric Malta can be synthesized, and it is important to note that we have not been able to obtain data from every possible source across the long time horizon (Fig. 9.4). Future data collection thus remains an important objective for any future research.

9.3.2. Palaeoecology

Cereal pollen of *Avena*/*Triticum* type (oats/wheat) and *Hordeum*-type (barley) appear in the Salina Deep Core at the base of zone SDC-06 at 6067–5821 cal. BC (8017–7771 cal. BP). This coincides with the appearance of a variety of coprophilous fungal spores, and a rise of ruderal herbs, both of which are strongly associated with grazing animals. Cereal pollen can be differentiated from the pollen of wild grass on the basis of its size, geometry and surface ornament (e.g. Albert & Innes 2020; Andersen 1979; Joly *et al.* 2007). It is a noted feature of Maltese palynological sequences from *c.* 6067–5971 cal. BC (8017–7921 cal. BP) (Volume 1, Chapters 3 and 11). It has been reported previously from the Neolithic and Temple Period (e.g. Carroll *et al.* 2012). *Ceratonia* (carob) appears in the Salina 4 core *c.* 2600 BC in zone SA4-06, but it is present earlier than that as charred wood, in the Early Neolithic at Skorba (Metcalfe 1966). Carob produces very little pollen so this is unsurprising. Carob pods were utilized as famine food until late into historic times in Mediterranean countries, but they are much more widely used as animal fodder, and it is likely that grazing animals will have eaten carob pods when they found them, even if they were not cultivated (Volume 1, Chapter 3).

Olea (olive, but also the wild oleaster – we cannot distinguish cultivated from wild forms palynologically) is present from before the Neolithic in the Xemxija core, so we can conclude that oleaster was part of the native flora of the Maltese Islands. The pollen seems to rise and fall with other tree and shrub pollen until the Punic period from *c.* 400 cal. BC (2450 cal. BP), when olive pollen started to rise and fall with the cereal pollen curve, suggesting that cultivated olive occurred only from the end of the Temple Period (Volume 1, Chapter 3).

Vitis (grape) pollen appears at *c.* 4750 cal. BC (6700 cal. BP) at Burmarrad (Djamali *et al.* 2013). It is quite possible, given the low pollen productivity of vines, that it was present on the Maltese Islands long before this, as part of the native flora. Wild grapes are, of course, edible; but their presence in the flora is not very good evidence that they were eaten (Volume 1, Chapter 3).

A variety of other taxa present in the pollen diagrams have edible parts, for instance *Pistacia* (lentisk), *Borago* (borage), Brassicaceae (cabbage and mustard family), *Rubus* (blackberry), *Quercus* (oaks; although most acorns need prolonged soaking to make them edible). Several other taxa are difficult to distinguish palynologically (for instance the Lamiaceae, Apiaceae, Poaceae and Fabaceae have members that have edible parts). It should be stressed, however, that the presence of potentially edible plants does not mean that they were eaten. For that, evidence from macro-remains associated with crop-processing, cooking or latrines is more reliable.

9.3.3. Plant remains

9.3.3.1. Overview and general remarks

Soil samples were taken from all the sites excavated by the *FRAGSUS Project*. The samples were floated using a Siraf-style flotation machine (French 1971; Nesbitt *et al*. 2017; Williams 1973) with a 500 μm mesh in order to ensure that small weed seeds and chaff as well as large grains were recovered. An average of 10–20 litres of soil per context was our target; however, in many cases, the contexts were too small to achieve this, and less material was collected. The total number of litres per sample is shown in Table 9.1. Samples were floated and the heavy fraction sorted using a field microscope in Malta. The Taċ-Ċawla samples were brought to the Pitt Rivers laboratory of the McDonald Institute for Archaeological Research, University of Cambridge and compared with the Institute reference collections by J. Bates using a Leica MZ8 microscope at 0.8x, 1.0x, 2.0x and 2.5x magnification. The Santa Verna, Ġgantija, and In-Nuffara samples were initially sorted by J. Bates in the Pitt Rivers lab through comparison with the laboratory's reference collections so that material could be sent for AMS dating at Belfast. The remaining material was analysed by J. Morales Mateos at the Laboratory of Archaeology in the University of Las Palmas de Gran Canaria (Spain) with reference to the laboratory's seed reference collections for consistency in analysis, using a Nikon SMZ-2T (8x-80x) stereo microscope was used. The Kordin III material was analysed in the University of Las Palmas de Gran Canaria by J. Morales Mateos. The species have been named according to the *Flora Europea*.

Charred plant remains were recovered from soil samples taken from all the sites excavated by the *FRAGSUS Project*. In general terms, the deposits were not particularly rich in charred seeds, but nonetheless there were seeds in most of them. This outcome is promising, as ancient, open-air sites have generally poor preservation of organic remains. In many cases, the samples were contaminated with modern local flora, but these were easily differentiated from the archaeobotanical specimens as they were not charred

Table 9.1. *Charcoal identification of timber from* FRAGSUS *sites and cores (Nathan Wright).*

	SV15 (95)	SV15 (95)	SV15 (90)	SV15 (90)	KRD15 (77)	KRD15 (77)	KRD15 (99)	KRD15 (99)	NUF15 (41)	NUF15 (41)	SDC	SDC	Total*	
Taxon/site	*Af*	*%f*	*Af*	*%f*	*Af*	*%f*	*Af*	*%f*	*Af*	*%f*	*Af*	*%f*	*Af*	*%f*
Quercus deciduous spp.	11	10.6	10	23.3	4	3.6			14	9.0			59	13.5
Quercus evergreen cf. *ilex*	16	15.4	6	14.0	20	17.9			33	21.3			55	15.2
↑ Woodland total	**27**	**26.0**	**16**	**37.2**	**24**	**21.4**			**47**	**30.3**			**114**	**28.7**
Pistacia cf. *lentiscus*	31	29.8	4	9.3	21	18.8			39	25.2			95	20.8
Olea cf. *europea*	21	20.2	5	11.6	19	17.0	2	100.0	32	20.6			77	17.4
Rosaceae family	1	1.0			11	9.8			20	12.9			32	5.9
Ceratonia siliqua					2	1.8							2	0.4
Cistus sp.	3	2.9							4	2.6			7	1.4
Rhamnus cf. *oleioides*	12	11.5	3	7.0	3	2.7			4	2.6			22	5.9
Crataegus sp.	3	2.9	1	2.3	5	4.5			2	1.3			11	2.7
Cercis cf. siliquastrum	1	1.0							1	0.6			2	0.4
Ostrya carpinifolia					2	1.8							2	0.4
Carpinus spp.			1	2.3	1	0.9			1	0.6			3	1.0
↑ Woodland sub-dominant and maquis	**72**	**69.2**	**14**	**32.6**	**64**	**57.1**	**2**	**100.0**	**103**	**66.5**			**253**	**56.3**
Tetraclinus articulata	2	1.9			1	0.9							3	0.7
Abies sp.					2	1.8			1	0.6	5	100.0	3	0.6
↑ Conifers total	**2**	**1.9**			**3**	**2.7**			**1**	**0.6**	**5**	**100**	**6**	**1.3**
Salix/Populus	3	2.9	9	20.9	14	12.5			3	1.9			29	9.6
Ulmus cf. *canescens*			1	2.3	4	3.6							5	1.5
Fraxinus angustifolia			1	2.3									1	0.6
Myrtus cf. *communis*					1	0.9							1	0.2
Tamarix sp.			1	2.3									1	0.6
Betula spp.					2	1.8			1	0.6			3	0.4
*Laurus nobilis***			1	2.3									1	0.6
↑ Riparian total	**3**	**2.9**	**13**	**30.2**	**21**	**18.8**			**4**	**1.9**			**41**	**13.5**
NTAXA	**11**		**12**		**16**		**2**		**13**		**5**		**21**	

or otherwise preserved. These intrusive seeds were discarded and not included in any analysis.

Details of identified plant remains are presented in Appendix A9.1. Images of them are shown in Figures 9.8a & 9.8b. The data enable some general points to be made about the seed assemblages. The greatest quantity of seeds was found at Taċ-Ċawla (Chapter 3) which was extensively sampled (Appendix A3.3). Similarly, seeds were recovered from the earlier layers at Santa Verna (Chapter 4., Context (90)), which also contained a relatively rich assemblage. In total, 435 seeds and several seed fragments were recorded. Among the crops identified, both cereals and legumes were present. Although both were present, the most frequently recorded cereal was barley (*Hordeum vulgare*) with the naked variety (*H. vulgare* var. *nudum*) more commonplace than the hulled variety. Naked barley was the variety used in the Neolithic, but is of little importance today (Zohary *et al.* 2012). Wheat (*Triticum* sp.) was also present at Taċ-Ċawla, Kordin III and Santa Verna, especially the free-threshing *Triticum aestivum/durum*. Legumes were represented by two main crops, lentils (*Lens* cf. *culinaris*) and peas (*Pisum* sp.). The lentil and pea seeds were poorly preserved in general, hampering our ability to identify these with confidence. In fact, the large majority of seeds are fragmented or show damage, with few seeds intact (Figs. 9.7a & 9.7b), indicating processes of erosion and movement of the sediments, and also processing of plants in activities such as cooking (Antolín & Buxó 2011).

Wild taxa were also identified. Grasses were frequent, alongside seeds of the Fabaceae family. This is a group of wild legumes that include several genera such as *Lathyrus*, *Medicago*, *Trifolium*, and *Vicia*, among others, which were, and are, commonly used as fodder, although the seeds can also be consumed by humans (Bullita *et al*. 2007; Butler 1995; Rivera *et al.* 2011). In some contexts, such as the foundation deposit of the Santa Verna temple (§4.3.8, Context 87; Appendix Table A9.1.3), there was a large concentration of wild vetch (*Vicia/Lathyrus* sp.) and other legume seeds, but no crop seeds. This may indicate the use of the plants as fodder, which had been used as domestic fuel or a building material in the form of animal dung (van der Veen 2007). Wild plants are also recorded at Taċ-Ċawla, Skorba, Santa Verna and Kordin III – mostly wild grasses such as *Avena* sp. and *Bromus* sp., which are common weeds in cereal fields. They probably arrived in the archaeological contexts as contaminants of the crops.

In broad terms, Neolithic contexts and non-temple sites had better preservation conditions, with a higher number of remains and seed density per litre of sediment (Tables 9.1 & 9.2, Appendix Table A9.1.1). Taċ-Ċawla in general had more plant remains than the 'temple' sites, although it was not significantly richer in crop plants, and the amount of seeds recovered was uneven. Indeed, by far the highest counts of plant remains came from one context, (268) (§3.5.3), in part made up of a large number of wild grass seeds. At the 'temple' sites, the seed assemblages from Ġgantija and Kordin III (Appendix Tables A9.1.4a & A9.1.5) were poor compared with those of Santa Verna and Skorba (Appendix Tables A9.1.3 & A9.1.6). At Kordin for example, despite the sampling and flotation of over one tonne of soil, the seed assemblage was limited to only 29 seeds, with no concentrations (Tables 9.2, 9.3). One of the seeds was a grain of charred rice (*Oryza sativa*) recovered from a relatively well-sealed context (Chapter 6, Context (216)). An AMS radiocarbon date was obtained from this grain because of its potential significance – rice may have been introduced during Roman times but this is not certain. In the event, however, the grain proved to be modern in date highlighting the turbid nature of Maltese sediments on ancient sites, and the fact that small items like charred cereals can readily move between strata. This exercise illustrates how AMS radiocarbon dates from charred cereals need to be interpreted carefully, if they are to provide information about the date of the context

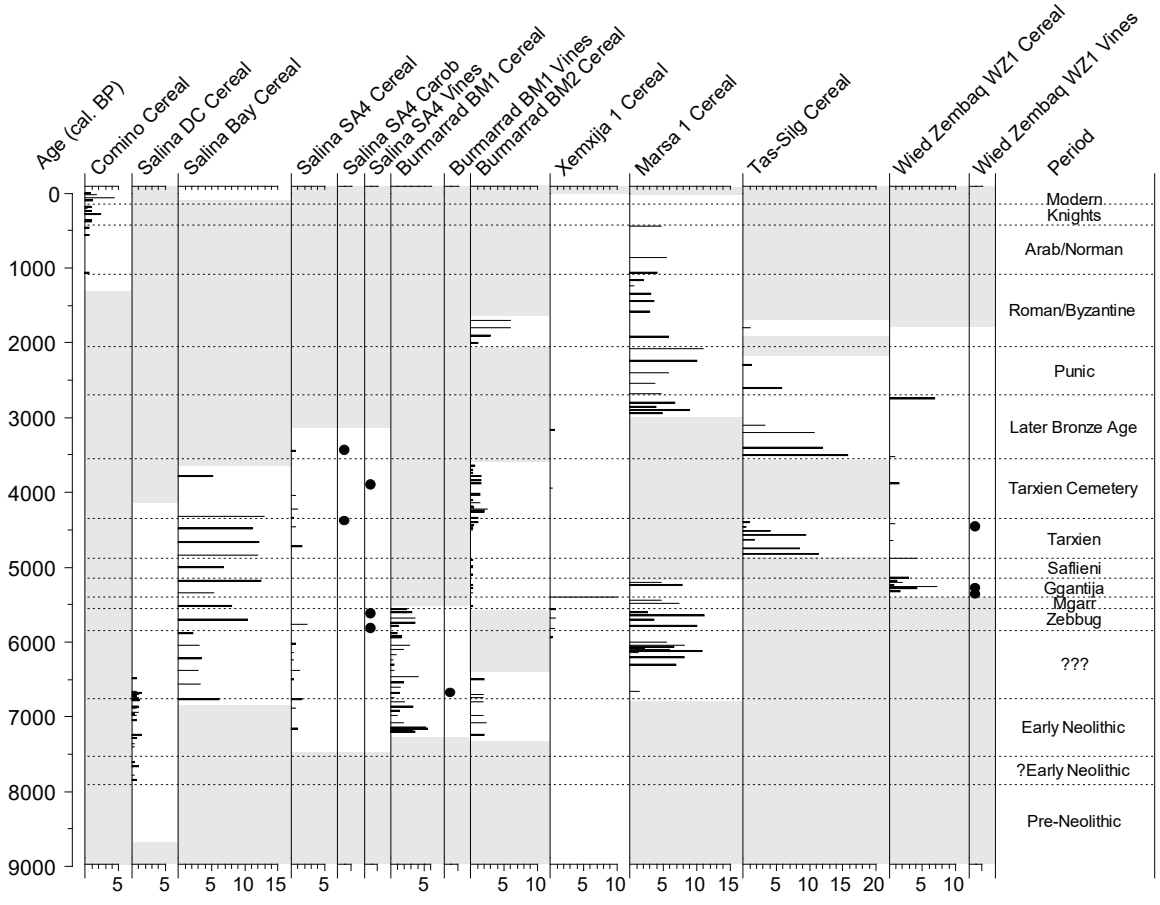


Figure 9.5. *The Maltese pollen data over time.*

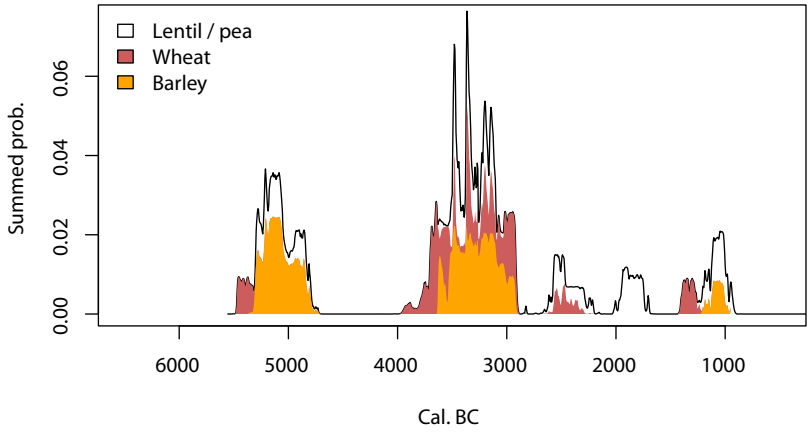


Figure 9.6. *The temporal distribution (summed radiocarbon probability) with dates from legumes, wheat and barley added to the plot separately.*

where they were found. For this reason, multiple AMS dates were obtained (Chapter 2) for important contexts (Fig. 9.6).

Although the raw number of seeds and the number of seeds per litre of sediment floated varied between sites and between contexts (Tables 9.2 & 9.3), similar plant assemblages were found at all of them, since cereals (barley and wheat) and pulses (lentil and pea) were the only crops recorded. Barley and wheat seem to be the most abundant during all the periods, although the low number of remains at some sites does not allow us to be conclusive in this respect. For wild plants, it is interesting that the highest number of seeds is from legumes. These species can constitute good food for domestic livestock (Bullita *et al.* 2007; Butler 1995; Rivera *et al.* 2011), so it is possible that some of those seeds arrived on the site as fodder for animals which were kept nearby. Another possibility is that the legume seeds arrived in animal droppings that were used as fuel, a practice common in arid and fuel poor places, or they could be crop processing waste (Fuller *et al*. 2014).

9.3.3.2. Changing patterns of agriculture

Few excavations of prehistoric sites in Malta in the past have undertaken a systematic flotation sampling strategy to retrieve plant remains. Trump (1966) managed to

Table 9.2. *Number of seeds recovered relative to the number of samples taken and their volume.*

Site	Number of sediment samples processed	Volume of sediment samples processed (litres)	Number of samples containing archaeobotanical remains	Number of archaeobotanical seeds (>1 mm)	Number of seeds per litre	Date range
Taċ-Ċawla (Context 268)	7	106	7	3362	31.7	3600–3100 BC
Taċ-Ċawla	114	1092	96	1423	1.3	3700–2200 BC
Santa Verna	50	863	37	275	0.83	5500–2900 BC
Ġgantija	13	212	10	19	0.08	2700–2500 BC
Kordin III	67	970	16	29	0.29	3600–2900 BC
Skorba	27	213	20	95	0.44	5300-4900 BC
In-Nuffara	23	763	3	4	0.005	1300–1000 BC

Table 9.3. *Ubiquity of cereal and pulse use at the* FRAGSUS Project *excavation sites. Ubiquity is a measure of the frequency of use or deposition of a plant at a site (see Appendix A9.1 for a full list of seeds retrieved).*

Site	Number of sediment samples processed	Number containing cereals	Number containing pulses	% with cereals	% with pulses
Taċ-Ċawla	121	57	48	47%	40%
Santa Verna	50	23	10	46%	20%
Ġgantija	13	4	1	31%	8%
Kordin III	67	6	0	8.9	0
Skorba	27	11	3	40%	11%
In-Nuffara	23	3	1	13	4

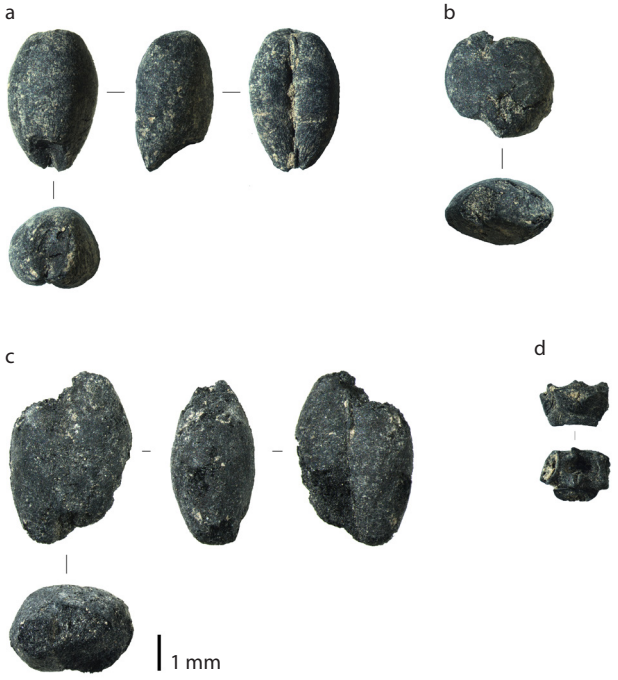


Figure 9.7a. *Cultivated plants recorded at the sites: a)* Triticum *sp., grain (wheat, Santa Verna); b)* Lens culinaris, *seed (lentil, Santa Verna); c)* Hordeum vulgare *var.* nudum *(naked barley, Skorba); d)* Hordeum vulgare, *rachis segment (barley, Santa Verna).*



Figure 9.7b. *Wild plants recorded at the sites: a) Fabaceae, large seeded (Santa Verna); b)* Avena *sp. (Skorba); c)* Erodium *sp. (Santa Verna); d)* Scorpiurus, *(Skorba); e)* Sherardia arvensis *(Santa Verna); f) Small seeded legume (Santa Verna). Scale bar = 1 mm.*





Figure 9.7c–d *(left and above). Carbonized beans from Tarxien Cemetery (excavated by Zammit) in their museum flask, and enlarged images of selected beans for AMS dating by the* FRAGSUS Project *in 2018.*

retrieve carbonized seeds and wood charcoal from his work at Skorba (40 c.c. barley, 3.5 c.c. wheat, five lentil seeds, one each of Field Madder and Caterpillar weed seeds are listed but not interpreted in the site report, Helbaek 1966, Appendix IV; Metcalfe 1966, Appendix V), but there has been no addition to that initial identification work until recent years. The application of a flotation methodology was only systematically employed in recent years at Tas-Silġ (University of Rome campaign) (Fiorentino *et al*. 2012), whilst the University of Malta has applied flotation, wet sieving and soil sampling to its recent fieldwork focused on Punic and Roman sites. Attempts were made to wet sieve deposits at the funerary Xagħra Brochtorff Circle in the 1980s and 1990s, but given the burial context and harsh alkaline conditions, no surviving samples were obtained. Other than study of the later Neolithic levels at Tas-Silġ and the Skorba campaigns of the 1960s, the *FRAGSUS Project* is the only attempt to explore systematically Neolithic agricultural, subsistence and food strategies in Malta. Any improvement on this overall lack of Neolithic archaeobotanical study is hampered by relatively small assemblages, and the generally poor contextual security of any particular seed.

The archaeobotanical evidence recorded by the *FRAGSUS Project* and its several sites nevertheless constitutes a robust and well-sampled assemblage and provides high-resolution and well-contextualized data to study agriculture and plant exploitation, especially during the Neolithic and the Temple Period. Systematic AMS-dating of seeds has allowed direct information about the chronology of the sites, but also of the plants cultivated during each period (see the distribution of AMS-dated seeds in Fig. 9.4). The crops introduced by the Neolithic colonizers were wheat (*Triticum* sp.), naked barley (*Hordeum vulgare* var. *nudum*), hulled barley (*Hordeum vulgare*) and lentil (*Lens culinaris*), whilst pea (*Pisum sativum*) was only recorded in the Temple Period. This group of domesticated plants is also recorded at other Neolithic sites in the central Mediterranean region (Rottoli & Pessina 2007; de Vareilles *et al.* 2020). Dating of plant remains imply that agriculture along with other Neolithic innovations probably arrived in Malta around as early as 5900 cal. BC as attested by pollen evidence (and from carbonized grain evidence from 5600–5400 cal. BC), at a similar time with other islands in the region (de Vareilles *et al.* 2020).

While our understanding of the Neolithic economy is increasing, our insight into Bronze Age subsistence is still limited. Very few Bronze Age strata, particularly Early Bronze Age 'Tarxien Cemetery' levels, were identified on the *FRAGSUS* sites, and therefore limited any sampling. Previously published work from the Tarxien Cemetery type site (Helbaek 1971; Renfrew, J. 1972) revealed that the some of the cinerary urns found there contained a large quantity of beans, *Vicia faba*, in addition to a smaller quantity of barley and lentil (Fig. 9.7c). Two beans from the Tarxien Cemetery from the collection at the National Museum of Archaeology were AMS-dated by the *FRAGSUS Project* to confirm their Bronze Age origin (Chapter 2). It seems that this crop was introduced in the Bronze Age, or at any rate was not present on any *FRAGSUS Project* site from the preceding periods. The assemblage from the later Bronze Age settlement excavated by the *FRAGSUS Project*, In-Nuffara, was small compared with the Temple Period sites, despite intensive sampling and flotation (Appendix Table A9.1.7). This disappointing outcome undermines Trump's (1962) original suggestion that the 'silo' features were underground grain stores, and to a lesser degree the results conflict with other evidence from the In-Nuffara plateau, such as finds of grinding stones (two were found), that could imply cereals were an important aspect of life there. Only two whole grains were present (a barley seed and an indeterminate cereal grain); no wild plants were recorded, although it is possible that those grains came from the sediments washed into the silos, not from the original content stored there.

9.4. Faunal remains: mammal bone

9.4.1. Introduction

Animal bone assemblages ware examined from the six excavations undertaken in the *FRAGSUS Project*. Most of these were small in size, except for the settlement site at Taċ-Ċawla, which produced enough material to be able to produce some statistical analysis of some aspects of the data. All of the assemblages were characterized by two consistent features, uniformity and fragmentation. The faunal remains in virtually every context were dominated by the remains of sheep/goat, with cattle and pig remains appearing in smaller quantities. Goat comprised a small percentage of the caprovine remains.

The great majority of the remains were fragmented and unidentifiable. Such bone almost invariably comprised over 90% of the bones in any given context and in some there were no identifiable fragments present. The acute fragmentation posed problems for quantification so it was necessary to define which bones would be counted for inclusion in the tables. The methodology used was similar to that applied by McCormick and Murray (2007), which is in turn a modified version of that outlined by Albarella & Davis (1996). All of the recovered faunal material was examined, but what was generally considered as low-grade information was not

recorded. A narrower range of clearly defined bone elements are counted rather than all the identifiable fragments. The method counts any bone where at least 50% of the diagnostic zone survives. The details of the methodology are provided in McCormick & Murray (2007, 9–11).

9.4.2. Fragmentation

Fragmentation can either occur before or after deposition. Pre-deposition fragmentation can generally be attributed to the deliberate breaking of bones to facilitate marrow and fat removal. Post-depositional fragmentation can result from poor preservation due to soil conditions, trampling or the reworking or redeposition of deposits. In the present assemblages, fragmentation seems to be the result of both factors. Acute fragmentation was also a characteristic of human remains from the Xagħra Brochtorff Circle, which is likely to be the result of disturbance of the remains as new burials were added to the assemblage. Attempted AMS radiocarbon dating of human and animal remains, however, demonstrated a much higher failure rate for the animal bones because of the low collagen content in the samples collected for dating. As the soil conditions were similar, this suggests that the fragmentation had to be accounted for by pre-depositional factors. The most likely explanation is that the animal bones had been boiled prior to being discarded, thus removing much of the collagen from the bone. The intense deliberate fracturing and splintering of mammal bone is also a feature of Neolithic and Bronze Age Greek sites, although the incidence declines over time (Halstead & Isaakidou 2017, 117–18). The bones from Bronze Age In-Nuffara also tended to be less fragmented than in the earlier Neolithic sites in this study.

Table 9.4. *MNI percentage distribution, based on Appendix Tables A9.1, A9.17, A9.25, A9.32, A9.38 & A9.41.*

	Cattle	Sheep/goat	Pig	Dog	Cat	N.
Taċ-Ċawla	14.3	67.9	14.3	1.8	1.8	56
Santa Verna	9.1	72.7	16.6	4.5	-	22
Kordin III	27.3	54.5	18.2	-	-	11
Skorba	16.7	50	16.7	16.7	-	6
Ġgantija	16.7	66.6	16.7	-	-	6
In-Nuffara	9.1	81.8	9.1	-	-	11

Table 9.5. *NISP percentage distributions, based on Appendix Tables A9.1, A9.17, A9.25, A9.32, A9.38 & A9.41.*

	Cattle	Sheep/goat	Pig	Dog	Cat	
Taċ-Ċawla	12.1	81.2	6.5	0.1	0.1	1509
Santa Verna	16.6	72.2	10.8	0.4	-	482
Kordin III	15.4	74.5	10.1	-	-	48
Skorba	19.5	61.9	16.8	1.8	-	111
Ġgantija	20.7	44.8	34.5	-	-	58
In-Nuffara	3.7	81.8	9.1	-	-	267

9.4.3. Species distribution

The distribution of mammal species and skeletal elements are listed in Appendix Tables A9.2.1, A9.2.17, A9.2.25, A9.2.32, A9.2.38 and A9.2.41. All samples are characterized by rather large proportions of phalanges and teeth – clear indicators of the high degree of fragmentation in the samples. The minimum numbers of individual (MNI) and number of identified specimens (NISP) values from the different assemblages are shown in Tables 9.4 and 9.5. The same values for the main species are shown in Figures 9.8 and 9.9. The assemblages are relatively small and the contexts and phases are amalgamated in these tables and figures. Sub-analysis of the material, however, demonstrated a remarkable uniformity in the makeup of material; they were all dominated by caprovines with smaller number of cattle and pig in each sample.

9.4.4. Sheep/goat

Sheep and goat bones are generally difficult to differentiate, especially when they are so heavily fragmented as in the present context. In some instances, however, identification was possible, and the great majority were of sheep. Appendix Table A9.2.2 lists the diagnostic sheep and goat bones from Taċ-Ċawla; 92% are of sheep. The dominance of sheep on the other sites can also be seen in the caprovine measurement tables (Appendix Tables A9.2.21–23, A9.2.31, A9.2.40 and A9.2.44) where in nearly all instances the great majority are of sheep, with the exception of the small sample form Skorba which produced very few diagnostic elements (Appendix Table A9.2.37). One of the easiest elements that allow differentiation is the horn core but very few of these were present. It may well be that they were removed and treated separately in the carcass (§9.6). Very few bovine horn core fragments were noted.

Given that the great majority of the caprovines were sheep, it is legitimate to try and reconstruct the age-slaughter pattern of that species. Even though most of the bones could not be identified at the species level (especially in the case of immature specimens), the component of goat in the samples is too low to invalidate the analysis. The tooth eruption data for the individual sites are presented in Appendix Tables A9.2.6, A9.2.36 and A9.2.45. Only in the case of Taċ-Ċawla were there sufficient mandibulae to allow analysis on the basis of tooth eruption and wear. The data are presented in Appendix Table A9.6, and are summarized in Figure 9.10. The age at death bands

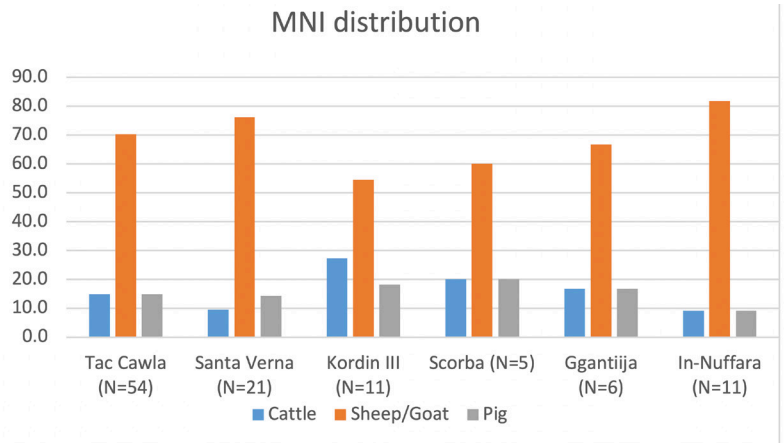


Figure. 9.8. *MNI percentage distribution, based on Table 9.4.*

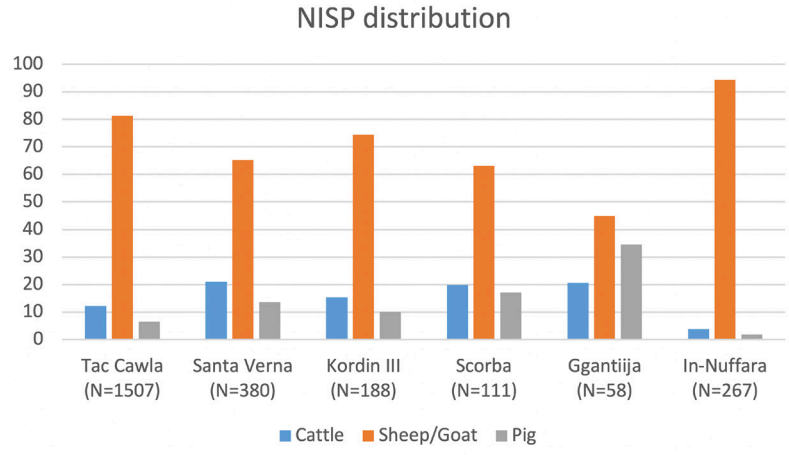


Figure 9.9. *NISP percentage distribution, based on Table 9.5.*

are approximate, but one can immediately identify a peak in the death of young animals. This is probably an underestimate of the true level of lamb slaughter as there are post-cranial neo-natal bones present, which are not represented in the mandible assemblage.

The assemblages from the other sites produced very few mandibulae and the samples were too small to be of use for reconstructing age-slaughter patterns. The fusion data for the sheep/goat long bones are recorded in the Appendix Tables A9.2.5, A9.2.20, A9.2.26, 9.2.34, A9.2.39 and A9.2.42. Such data are problematic and sometimes contradictory. The main problem is that they will tend to under-estimate the presence of younger animals since the surfaces of unfused diaphyses would be easily destroyed during the cooking process. Despite these limitations, however, all samples indicate the

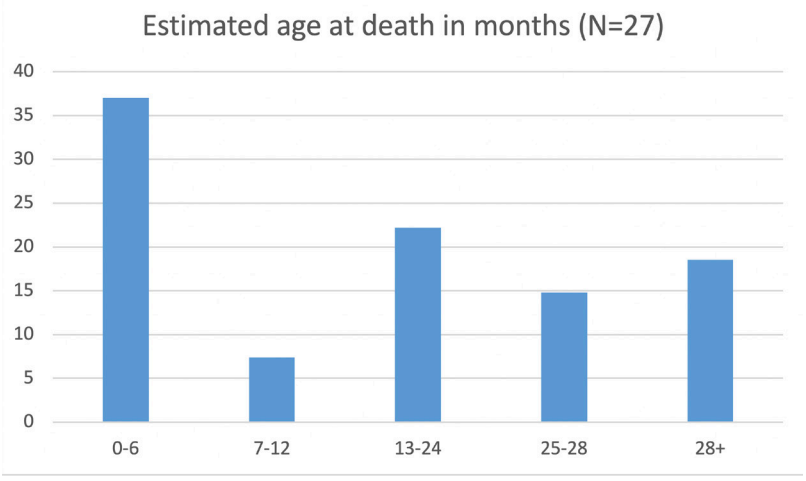


Figure 9.10. *Taċ-Ċawla sheep age slaughter pattern based on Appendix Table A9.2.7.*

slaughter of a high proportion of younger animals. At Santa Verna, for instance, only three out of eighteen (17%) distal metapodia are fused (Appendix Table A9.2.20). The age at which these bones fuse has been found to vary, but Zeder's (2006, 92) study of the various estimations indicate that they generally fuse during the second year of the animal's life, with occasional outliers. These findings would indicate that over 80% of the sheep/goat in our sample were killed off before the age of 24 months. The low incidence of older animals is also demonstrated at other sites. The calcaneus fuses at about the same time as the distal metapodia (Zeder 2006, 92). Although the samples are small it can be seen that at all the sites the majority were unfused.

A high young animal kill-off can be attributed to two factors. Payne's (1973) classic model equated this with dairy production. In this model, young animals are deliberately killed so that the mother's milk becomes available for human consumption. Lipid analysis of pottery from Skorba (Debono Spiteri & Craig 2011) indicates that dairying was being practised during the Neolithic in Malta, as has been demonstrated elsewhere. McCormick (1998) argued that the killing of young animals could be the result of marginal conditions; where there was simply not enough fodder to maintain all of the animals born. A combination of other explanations could explain the high incidence of young sheep in Malta. Halstead's (1993, 66) ethnographic studies indicated that most male lambs were slaughtered in 'infancy' in traditional Greek farming economies, 'partly to avoid competition for resources with valued lactating females and partly because of the high market value of tender young meat'. Additionally, lamb's rennet was necessary for cheese making, which would have necessitated the killing of young animals. The scarcity of fodder could also explain some of the peaks in the slaughter of the animal.

The highest incidence of slaughter among the lambs at Taċ-Ċawla is at about the age of four months. While lambing generally occurs in spring in northern Europe it tends to be earlier in the Mediterranean and the Near East. Early Mesopotamian texts indicate lambing occurred during winter (van Driel 1993, 227–8), while in Roman Italy lambs were generally born between mid-September and mid-December, although some were born in spring (MacKinnon 2004, 117). Late born lambs, however, were regarded as being of less value (Hooper 1967, 333; Varro 2.2.5). This is because winter lambing ensured that lambs were strong enough to endure the heat and drought of summer. Pliny advocated winter lambing as it 'is much better they should be strong before the heat of summer and the long days, than against the cold of winter and the shortest days' (Pliny 8.72.187). The peak in slaughter at four months suggests a cull in early spring. Varro (2.2.17; also Hooper 1967, 341) notes that lambs were weaned at four months. This implies that excess lambs were ewe-fed until slaughter at this time; and then the ewe's milk, enhanced by spring pasture growth, would become available for human consumption and cheese production.

Late autumn/early winter lambing meant that the ewes had to be pen-fed on fodder for part of the year, a feature confirmed by the Roman writers (MacKinnon 2004, 114). Leaves were particularly important for feeding sheep and Egyptian farming scenes sometimes display scenes of leaves being gathered from trees for fodder. The Saqqara tomb of Nefer and Kahey shows a person plucking leaves and putting them in bags (Altenmüller 1998, 84). Cato (5.8; Hooper 1967, 341) noted 'Cut poplar, elm, and oak leaves betimes, store them before they are entirely dry, as fodder for sheep'. Other Roman writers noted that willow and broom leaves were also used (MacKinnon 2004, 116), and many of these taxa are represented in the pollen and charcoal remains from the islands.

As noted above, sheep greatly outnumber goat in the Malta assemblages. The predominance of sheep over goat is a feature of ancient Mediterranean agriculture. Sheep generally comprise over 80% of the caprovine remains on Roman sites in Italy (MacKinnon 2004, 121). They also predominate in prehistoric Near Eastern sites (Hesse & Wapnish 2002, 475–91). Redding (1993, 88–9) notes that goat tend to dominate during the earliest Neolithic in the Near East, but that after *c.* 5500 BC sheep begin to dominate. He attributes this to the development of secondary products, i.e. milk and wool. Sheep milk has a much higher proportion of solid/fats than either that of cows or goat.

Goats, proportionate to body weight, produce much more milk than sheep (White 1970, 315) and they can also be extremely hardy. Some Bedouin sheep can be without water for four days (Borowski 1998, 61). Clutton-Brock (1999, 75) notes that goat 'are perhaps the most versatile of all ruminants in their feeding habits'. They are browsers rather than grazers, but their catholic eating habit is also their principal drawback as they can be extremely destructive. Pliny, for instance, noted that they could kill trees (Book 8.76.204) while the Jewish Talmud have laws restricting goat grazing (Borowski 1998, 62). That said, goat would have allowed a more economic exploitation of the resources available in prehistoric Malta as they could browse in woodland and thorny scrubland while the sheep generally grazed the grass. Egyptian depictions of goat show them grazing on bushes or trees (Houlihan 1966, 24–5), as does the famous goat in the thicket stature statuette from the royal cemetery at Ur (Amschler 1937). The

same motif is also occasionally depicted in Roman art (White 1970, plate 71).

The distribution of sheep/goat fragments for the largest samples are shown in Figures 9.11–9.15. As can be seen, all parts of the carcass tend to be represented with high values for small robust elements such as phalanges and loose teeth. A notable under-representation is provided by the horn cores. Some small fragments are poorly represented in all samples. One can conclude that these were disposed of differently from the other elements (see below).

The predominance of caprovines noted on all the present Maltese sites is a feature of many prehistoric assemblages from the Mediterranean and Near East (Hesse & Wapnish 2002, 475–8; Redding 2003 85–8). Çakirlar & Atici (2017, 272), discussing the evidence from Turkey, note that 'sheep and goat seem to remain the staple resources throughout the millennia', but that the livestock economy becomes more varied in the later Roman period. McKinnon (2014, 208) has shown that caprovines predominate during early prehistoric periods in the Athenian Agora, but that the makeup of the assemblages become more varied after that. De Grossi Mazzorin & Minitti (2017, 128) noted that the caprovine dominated livestock economy of Bronze and Iron Age Rome gave way to a more varied livestock economy in later periods. These changes were occasioned by urbanism and the commercialization of livestock. In Malta, the there is no such change. Medieval urban assemblages (McCormick, pers. comm.) indicate the continuation of caprovine dominance first noted during the Neolithi*c.*

The fragmentary nature of the few horn core samples that were collected makes it difficult to ascertain the type of sheep or goat present. There is no evidence for the horizontal corkscrew-shaped horn type noted in Egyptian (Houlihan 1996, 22–3) and Mesopotamian (Ryder 1993, 27) iconography. The few goat horn fragments were all of the straighter type (Clutton-Brock 1999, 79) and similar to the Tarxien horn cores curated in the National Museum of Archaeology in Valetta (§9.6). The sheep and goat measurements from the *FRAGSUS* excavations are presented in Appendix Tables A9.2.11–A9.2.16, A9.2.21–A9.2.23, A9.2.30, A9.2.40 and A9.2.44. The limited metrical data for caprovine and the other species do not allow useful analysis. Neither is there much comparative material with which to compare the data. The information is, however, presented in the Appendix tables so that it can be used in futures studies.

9.4.5. Cattle and pig

Cattle and pig were invariably present in small, but relatively equal, quantities on all the sites (Figs. 9.6 & 9.7). There was slightly more pig at Santa Verna and more cattle at Kordin III, but the samples were small so the differences are probably not significant. The distribution of skeletal elements of cattle and pig samples are generally the same as the caprovines with high values for teeth and, to a lesser extent, phalanges (Appendix Tables A9.2.1, A9.2.17, A9.2.25, A9.2.32 and A9.2.41 and Figs. 9.10, 9.11 and 9.13).

A notable exception is the distribution of pig from Taċ-Ċawla the only settlement site amongst all of the sites that were investigated (Fig. 9.17). The incidence of loose teeth is much lower than on the other sites in the present study. The general fragmentation of the bones at Taċ-Ċawla was similar to the other sites, so one possible explanation is that skulls were generally disposed of in a different way in comparison with the other sites (see discussion below). The vertebrae of all species were extremely fragmented in the faunal samples and were not included in the tables. The robust caudal vertebrae of cattle should have survived well, but none were noticed in the samples. This would indicate that tails were disposed of differently than the rest of the carcass. A Mesopotamian slaughterhouse account dating to about 2040 BC lists tails of oxen separately from other parts of the carcass (Englund 2003, 2). They may have been used for mundane purposes, such as a fly swatter, but it should be noted that the Egyptian Early Dynastic King Narmer has a bovine tail suspended from his belt on the palette bearing his name (Wengrow 2001, 94), which might suggest a more sophisticated usage for the tail.

The ageing data presented for cattle and pig are extremely limited (Appendix Tables A9.2.3, A9.2.4, A9.2.7, A9.2.8, A9.2.18, A9.2.19, A9.2.27, A9.2.28, A9.2.33, 9.2.35 and A9.2.43) with the most extensive data again discovered at Taċ-Ċawla. Both old and younger cattle are present, but there is little evidence for very young calves. The single surviving cattle mandible from Taċ-Ċawla is of an old animal with a well-worn third molar. The epiphyseal fusion data is often contradictory. In the case of the calcaneum, which fuses at approximately 36–42 months (Silver 1969, 286), four are fused and nine are unfused. This is contradicted by the distal femur data (*c.* 42–48 m) where four are fused and two unfused. In general, one could tentatively conclude that most of the cattle were young adult or adult at time of slaughter. Roman agriculturists indicate that cattle in the Mediterranean were bred for traction and their appearance, i.e. their suitability for sacrifice, with meat and milk of secondary importance (MacKinnon 2004, 86; White 1970, 276). That said, not all bovines were raised to maturity, be it for traction, sacrifice or breeding, so immature beef was an important component of the diet.

The pig ageing data were, as already noted, extremely limited with the largest sample again drawn from Taċ-Ċawla (Appendix Tables A9.2.3 & 9.2.7). The site produced two mandibulae, one of an adult (*c.* 21–23 months) and the other of a young individual (*c.* 6–7 months). The epiphyseal fusion data indicates that most of the pigs were slaughtered at a young age. According to Silver (1967, 286) the distal humerus fuses at about 12 months. Five of the six distal humeri present were unfused. Fusion data for other bones confirm the bias towards younger animals. Pig are the only one of the main domesticates that are exclusively raised for their meat. They are extremely fecund, so much so that Roman agricultural writers state that the litters were deliberately limited to six or eight to prevent the sow from exhausting her milk supply (McKinnon 2004, 160). This killing off of some new-born piglets might account for a neo-natal humerus present at Kordin III (Context (22)).

9.5. Other species

Only a few fragments of dog and cat were present, with both dog and cat present at Taċ-Ċawla, and dog alone at Santa Verna and Skorba. The cat bone comprised one poorly preserved mandible fragment (L. tooth row 20.4 mm, height of mandible behind M1 12.4 mm). It is difficult to ascertain if such cats were wild, tame or domesticated. In early Egypt, the earliest depiction of a cat in a domestic context, and therefore presumed to be domesticated, comes from an eleventh dynasty (2130–1191 BC) stela (Osborn & Osbornová 1998, 106). The Taċ-Ċawla (Layer 143) bone is from a Neolithic context dating to Żebbuġ-Ġgantija in the second half of the fourth millennium BC, and is therefore most likely to be from a wild cat. This species has also been noted at the Xagħra Brochtorff Circle, where 12 fragments from three individuals were found in apparently Tarxien levels (Barber *et al.* 2009, 332). The Santa Verna and Skorba dog fragments are of medium size dogs. No complete long-bones were present, so it was not possible to estimate the height of the animals. The metrical data are presented in Appendix Table A9.2.46. Dog bones identified at the Xagħra Brochtorff Circle were largely from Bronze Age and later contexts, although 89 fragments from four individuals were in Temple Period deposits (Barber *et al*. 2009, 332).

9.6. Mammal bones: discussion

The animal bone assemblages from the various *FRAGSUS* excavations were remarkably similar. Each bone sample was heavily fragmented consisting mostly of unidentifiable fragments dominated by compact skeletal elements, especially loose teeth and phalanges. The distribution of species present was similar on all sites; dominated by caprovines with smaller quantities of cattle and pig. The caprovines were dominated by sheep, but goat was present on all sites. In terms of ageing, there was a high incidence of young sheep slaughtered, which is likely to reflect the importance of dairying. Pigs tended also to be killed at a young age, while most of the cattle appear to have been adult.

In order to be able to reconstruct the livestock economy of early Malta, one needs to supplement the zooarchaeological data with other sources of information. Roman agricultural writers, although considerably later than the sites under investigation, describe livestock farming in a Mediterranean climate that was broadly similar to that of prehistoric Malta. Early Mesopotamian sources also provide valuable evidence about livestock rearing in a hot arid climate. Iconographic evidence from Malta, and beyond, is also a valuable source of information.

The Mediterranean climate, characterized by winter rain and mild temperatures followed by summer drought and heat, makes the rearing of livestock difficult, where the provision of fodder was a particular limiting factor. This must have been particularly so in early Malta where the options for seasonally moving livestock to different kinds of pasture, as in transhumance, were limited given the lack of variability in the Maltese landscape. The keeping of goat and pig allowed the exploitation of marginal areas, but cattle and sheep need good grassland pasture, something that would have been of limited availability as the hot Maltese summer progressed. Indeed, Cato (55.5), discussing cattle in Italy, stated that oxen should only be pastured during the winter, with the implication that they were stall fed for much of the year. Supplementary foods include hay, leaves, mast and legumes (MacKinnon 2004, 87–90). In Mesopotamia, cattle were fed with barley (Nemet-Nejat 2002, 251), while it is also recorded that sheep were fed grain, dates and even bread on a daily basis (Abdalla 1994, 28). Egyptian iconography also depicts cattle and goat as hand-fed, presumably on grain (Darby *et al.* 1977, figs. 3.18a–c). Such supplementary feeding must also have occurred in Malta. This is perhaps demonstrated by the multiple sectioned stone trough from the temple at Kordin III, which could have accommodated seven feeding animals. Its presence in a temple complex might imply that the temples were the owners of estates with herds of livestock, as was the case in Early Egypt, which were sacrificed in large numbers on a daily basis (Ikram 2017, 453). The Kordin trough might be seen in the context of the 'animal fattener' recorded in Mesopotamian texts (Postgate 1992, 161).

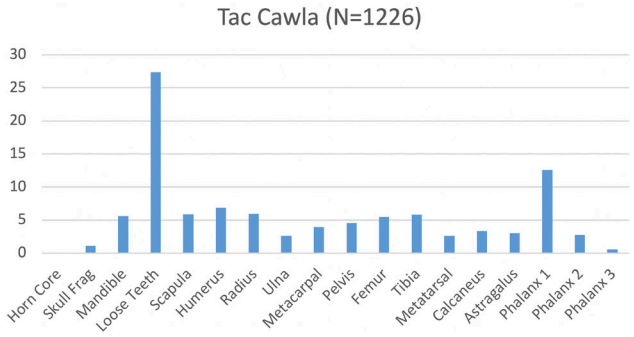


Figure 9.11. *Percentage distribution of sheep/goat bones from Taċ-Ċawla, after Appendix Table A9.2.1.*

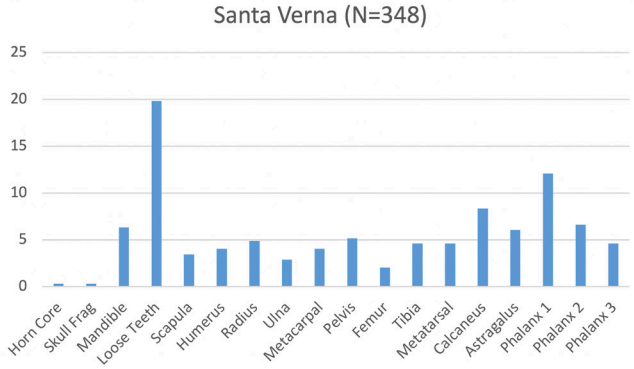


Figure 9.12. *Percentage distribution of sheep/goat bones from Santa Verna, after Appendix Table A9.2.17.*

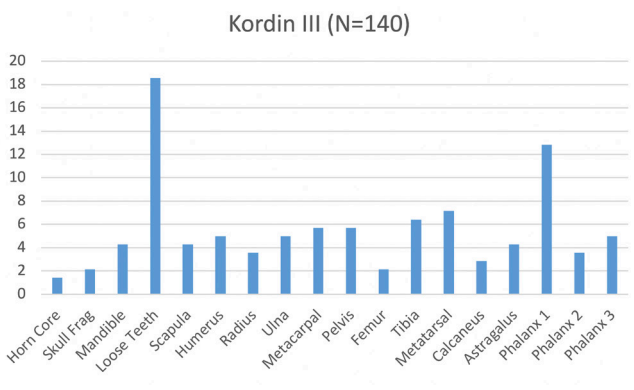


Figure 9.13. *Percentage distribution of sheep/goat bones from Kordin III, after Appendix Table A9.2.25.*

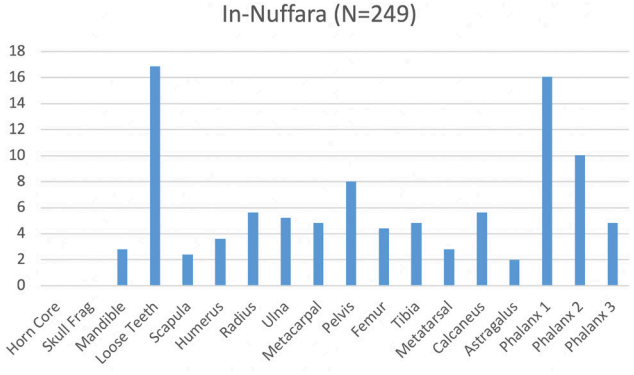


Figure 9.14. *Percentage distribution of sheep/goat bones from In-Nuffara, after Appendix Table A9.2.41.*

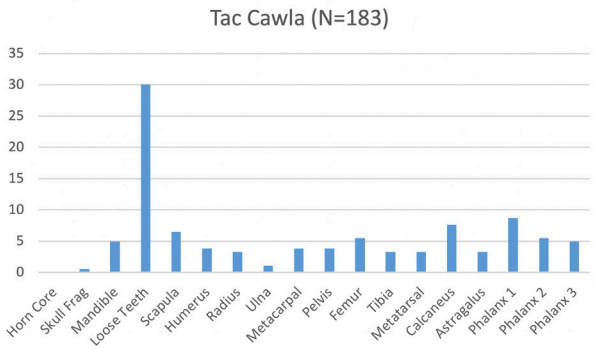


Figure 9.15. *Percentage distribution of cattle bones from Taċ-Ċawla, after Appendix Table A9.2.1.*

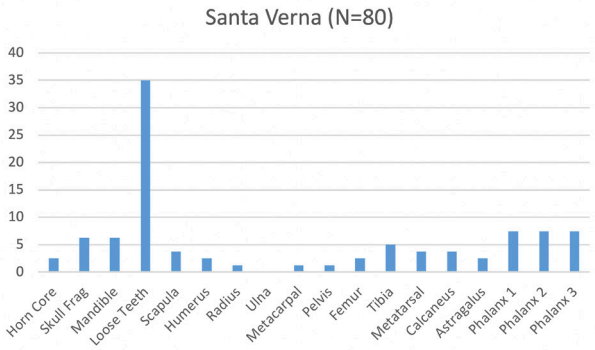


Figure 9.16. *Percentage distribution of cattle bones from Santa Verna, after Appendix Tables A9.2.18 & A9.2.24.*

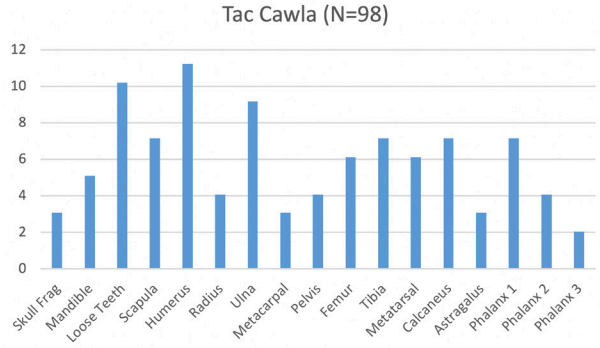


Figure 9.17. *Percentage distribution of pig fragments from Taċ-Ċawla, after Appendix Tables A9.2.4 & A9.2.10.*

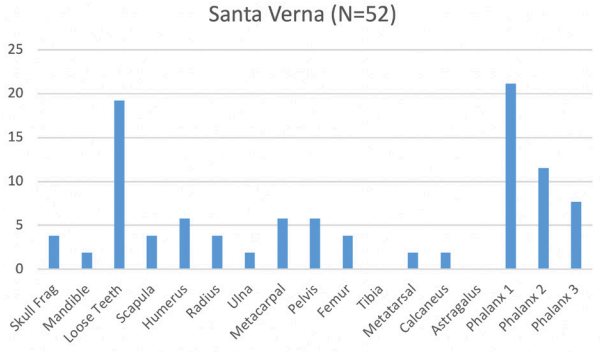


Figure 9.18. *Percentage distribution of pig fragments from Santa Verna, after Appendix Table A9.2.19.*

Their duty was to feed animals with barley prior to slaughter, and presumably, sacrifice.

Despite the difficulties of raising livestock, farm animals were a necessity for early agricultural societies, since effective arable agriculture could not be maintained without the application of their manure. Additionally, livestock acted as an insurance against crop failure. Such failure was a constant feature of early Mediterranean agriculture, where the main cause was drought. Garnsey's (1988, 8–13) analysis of rainfall in areas of modern Greece indicated wheat failure one year in four, barley failure one year in twenty, while the legume failure rate could be as high as three years in four. Deficiency, as opposed, to failure occurred more regularly. Flannery (1969, 87) noted that early farmers could offset this by either storing excess grain or converting grain into 'live storage' in the form of livestock. Halstead's (1993) study of modern traditional sheep farming indicated that 'banking in livestock' was an integral part of the livestock system, which protected against harvest fluctuation. For the early Maltese farmer, livestock, used in this way, were as much about providing future security, as they were for providing present needs.

9.6.1. Livestock and religion

It is impossible to separate livestock from religion in early societies. In Malta, as elsewhere, sacrifice was likely the main vehicle for the distribution of food. In Greece, for instance, there was an 'absolute coincidence of meat-eating and sacrificial practice' (Detienne 1989, 3). This meant that virtually all meat consumed in Roman Greece had been 'sanctified' during the ritual of sacrifice before it was consumed. In early Mesopotamia, the feeding of the gods, and consequent distribution of meat, provided the main vehicle for the consumption of meat (Scurlock 2002, 2006a & b). Ikram (2017, 453) notes that in Egypt the temples were centres of meat distribution in the form of leftovers from sacrifices. The assemblage from the Maltese temple deposits analysed in the present study indicate that they were no different than the settlement site at Taċ-Ċawla. Essentially the deposits from ritual and domestic contexts were the same, which could confirm the observation made by Detienne (noted above).

The question arises as to whether or not the actual slaughter, disembowelling and jointing of the animals took place within the actual temples. This is a messy business, producing blood, excrement and the semi-digested content of animal's stomachs. Ikram (1995, 81–108) considers this question in the context of early Egyptian temples; she concludes (1995, 87) that such activity would have occurred in nearby slaughterhouses, for which there are both extant surviving examples and representational examples in Egypt. In Rome, representations of 'sacrifice' never depicted the process of killing and dismemberment, again implying that this messy aspect of the ceremonies occurred 'offsite'. A similar situation may have existed on Malta.

Depictions of animals in the early Mediterranean and the Near East take many forms. Root (2002, 173) has divided these into several categories. They can be 'vehicles for experimentation with abstraction and decorative compositional dynamic', 'figures in cosmic contests and performances', 'figures/symbols in emblematic or narrative portrayals of human experience', 'figures/symbols in emblematic or narrative portrayals of the animal world', 'players in specific rituals of human society' or 'signifiers of specific political/social ideas of human society' (Root 2002). Processions of livestock are depicted on two rectangular friezes in the temple at Tarxien. The larger one depicts a procession of twenty-two goats (or possibly sheep) arranged in two registers of eleven. The goats display two horns of different shapes. The longer horns are similar to the slightly twisted horns of domestic goats depicted in fifth and seventh dynasty Egyptian tombs (Altenmüllar 1998, 84; Osborn & Osbornová 1998, 188, fig. 13-202). The smaller horn is more curved in form like the curved female goat horns found at the temple and preserved in the National Museum of Archaeology, Valletta. The depiction of the two horn types is consistent in all the animals and it may well be that the sculptor(s) were displaying a hybrid goat of both sexes. The identification of ungulate on the basis of horns was sometimes problematic even in the ancient world. In Egypt, depicted animals are sometimes identified incorrectly in the accompanying hieroglyph label (Osborn & Osbornová 1998, 185). The second frieze of male animals at Tarxien depicts three goats, a pig and a sheep with downwardly curving horns and pronounced tufts of hair between the horns. Ryder (1983, 68) notes of the sheep that it 'has Mouflon-like horns and has been identified by some as a wild sheep, but the horns are comparable to that of a Soay'.

Processions of animals are often depicted in hunting scenes, or scenes of trophies or tribute, but also in what Osborn & Osbornová (1998, 12) refer to as 'offering processions'. This would fall into Root's (2002, 173) category of animal depiction as 'players in specific rituals of human society'. An implicit example of this is the procession of the pig, sheep and bull at the festival of the *souvetaurilia*, described by Cato (141; Hooper 1967, 121), which is frequently depicted in Roman art. Usually the scenes are inhabited by people, but sometimes the animals are displayed alone as in a frieze found in the Roman Forum (Spalding Jenkins

1901, 59). The row of sheep along a lower register on the Uruk or Warka vase (Ryder 1993, 27) could also be interpreted in this way. The friezes at Tarxien are most likely to also represent an 'offering procession' of animals to be sacrificed at the temple. The predominance of goat is unusual as Puhvel (1978, 356) has noted that goat is usually low in the animal sacrificial hierarchy noted in early sources. It suggests that the goat held a special place in the religion and ritual of the Maltese temple builders. Perhaps goat, as animals of the 'live storage' discussed above, were primarily responsible for saving the Maltese from starvation at some important stage in their history, proportionate to the local ecological conditions.

Cattle are conspicuous by their absence in the Tarxien friezes. Two relief carvings of bulls, however, are present on orthostats in an inner chamber at the site, along with an enigmatic carving that may represent a sow and piglets. A group of long horned cattle are also displayed on a plate from the Ħal Saflieni Hypogeum while a clay model of a bovine was found in the Ta' Ħaġrat temple (Evans 1971, plate XXXIII, 13), and tiny bull beads were found at Ħal Saflieni (Evans 1971, plate XXVII, 9). Could this indicate that bovines were sacrificed only on very special occasions? It is noteworthy that horn cores of both caprovines and bovines were under-represented in the assemblages from all the sites. It is possible that they were displayed separately as trophies of sacrifices elsewhere in the temples. Zammit (unpublished Field Notes, 1915–19) noted the presence of caches of horn cores at Tarxien (Malone 2018, Mallia- Attard 2018). The pig skulls under-represented at Taċ-Ċawla could also have been deposited in this way. More mundanely, horn could simply have been removed so that the sheaths could be used for industrial purposes. The Mesopotamian slaughterhouse account, discussed above, itemizes 'horns of five oxen' as objects of commercial value (Englund 2003, 2).

Whatever their religious significance, cattle played a vital role in early Maltese society as they were the only species used for traction. Arable agriculture would be extremely difficult without the use of an ard-drawn by oxen, especially when land was left fallow between cultivation. Halstead (1995, 13) noted that various traditional Mediterranean farming sources, including ancient ones, indicate that a plough team could till between 0.1 and 0.3 hectares a day. In contrast to this, the area dug by hand ranged from only between 0.02 and 0.05 hectares a day. Given the amount offood, and water they consume, this significantly increased scale of cultivation must have made the maintenance of cattle stock viable (see Malone *et al.* 2019, Table 1). Experimental archaeology for drawing large stone blocks indicate it is more efficient using cattle rather than human power (Rosenstock *et al.* 2019) and it is possible that they were used during temple building on Malta.

9.7. Birds and fish

9.7.1. Bird bones

A number of bird bones were identified within the faunal assemblages from the *FRAGSUS* sites and studied separately. Taxonomic identifications were made using the author's modern comparative collections. All fragments were recorded and identified to taxon and element where reasonably possible. Measurements were taken following von den Driesch (1976) and are presented in Table 9.6. The twelve bones are in mixed

Table 9.6. *Bird and fish bone. Measurements (in mm) after Von den Driesch (1976).*

Site	Context/layer	Common name	Anatomical element	Bp	SC	Bd
Ġgantija	1042	dove/pigeon	humerus			
Ġgantija	1004	shearwater small	ulna		3.3	7.1
Ġgantija	1041	dove/pigeon	carpometacarpus			
Santa Verna	103	Owl	tarsomatatarsus			
Santa Verna	42	Owl	femur			
Santa Verna	53	shearwater small	humerus			
Santa Verna	36	shearwater small	femur		2.8	6.7
Santa Verna	6	shearwater larger	humerus			
Taċ-Ċawla	130	shearwater larger	tibiotarsus		4.3	7.0
Taċ-Ċawla	130	Shearwater	tibiotarsus			
Taċ-Ċawla	238	shearwater larger	humerus			
Skorba	19	shearwater small	ulna	6.1		
Santa Verna	64	grouper	atlas			

condition and none is complete, but all could be identified at least to family and are of four different taxa.

A distal femur from Santa Verna and a distal tarsometatarsus from the same site are eroded but are a good match for owl. The exact species is uncertain but the short-eared owl *Asio flammeus* is probably the most likely and a better match than barn own *Tyto alba*.

Two bones from Ġgantija, a proximal humerus and a proximal carpometacarpus, can be identified as pigeons. Both bones are damaged, but are probably of wood pigeon *Columba palumbus*. Yet, the slightly smaller stock dove *C. oenas* is not entirely ruled out.

Eight bones match shearwater, including: four bones and an ulna from Skorba 16, a femur from Santa Verna, a humerus from Santa Verna and an ulna from Ġgantija. The size of these bones probably best matches the Mediterranean shearwater *Puffinus yelkouan*. This migratory seabird, once thought to be a subspecies of Manx shearwater, returns to breed on Malta in late winter with the young birds fledging by mid-July (Borġ *et al.* 2010). The birds could have been caught at night when they visit the nest burrows in the cliffs in the same way that the closely related Balaeric shearwater was exploited on Fomentara until recently (ACAP 2013). The shaft of the humerus has been shaped to a point and is highly polished. A similar artefact, also from Santa Verna, is of a larger species of shearwater, probably Scopoli's shearwater *Calonectris diomedea.* Two fragments of tibiotarsus from Taċ-Ċawla Context (130) are also probably of this larger species; they are both of the right side and could be parts of the same bone. The final bone is the distal part of a humerus. This bone is porous and probably from a juvenile *Calonectris diomedea.*

9.7.2. Fish bones

The single fish bone recovered at Santa Verna is the first precaudal (atlas) of a very large individual. This best matches a grouper *Epinephelus* sp. of at least 1 m total length. Of the twelve groupers found in the Mediterranean, the two species that most frequently achieve this size are Dusky Grouper *E. marginatus* and White grouper *E. aeneus.* Although these species are considered threatened (Pollard *et al.* 2018) and large specimens are rarely captured today, these fish can reach 1.2 to 1.5 m and weigh up to 20 kg.

9.8. Faunal remains: conclusions

The most notable aspect of the livestock economy of early Malta was its consistency throughout all periods. It would seem that the population discovered the optimal way of exploiting the landscape for the raising of domesticated animals at an early stage and maintained this from then onwards. It has been noted that the raising of livestock would have been difficult; but at the same time wild food resources, specifically bird and fish, were rarely exploited, a phenomenon that has been noted throughout Neolithic Europe (Schulting 2015), as well as in the island of Tasmania (Jones 1978).

Given the proximity of the sea to all areas of Malta, it is difficult to understand why sea fish were not exploited. The current excavations produced only two fish bones; a vertebrae of a large groper from Santa Verna and the tooth of a sand tiger shark tooth from Taċ-Ċawla (which may have been prized as an artefact (Taċ-Ċawla, Context (208), SF270) and is not included in the bird and fish bone report above (Fig. 9.19)). Given the paucity of shells from the excavated sites, one wonders if there was a taboo against the eating of fish and perhaps molluscs too (Appendices A3.8 & A6.7.1). Such taboos were noted in some early Egyptian cultic sites, where certain fish were regarded as sacred, but in general fish was an important food source (Simoons 1994, 255–7). A relief carved with fish was found at the coastal temple at Buġibba but the significance is unknown (Evans 1971, plate XIII, 2, 3).

Shearwaters were the most commonly noted bird noted in the small assemblage present. As Hamilton-Dyer has noted above (§9.7.1), these birds can be easily caught in their cliff nests. What is interesting is that two polished pins were made of the humeri of these birds found at Santa Verna (Fig. 11.6). The flattened proximal end of the humerus allowed a good grip of the bones, compared with other parts of the avian



Figure 9.19. *Tooth of a sand tiger shark from Taċ-Ċawla, Context (208), SF270.*

skeleton, but the fact that both pins are extremely short would suggest that they would have had a specific use. The symbolism of bird bones used as ornament or tool cannot be overlook, and since the Shearwaters would typically have been trapped, netted or taken from their cliff-side nests, it seems possible prestige was attached to them. Birds did have a special role in the artistic minds of prehistoric Maltese (Malone 2008), as shown by their representation in the Ħal Saflieni and Tarxien bird buttons (Evans 1971, plate XXXVII, 9–10 & plate LI, 7) and on pottery (Evans 1971, plate XLVII, 5 & plate LXIV, 2), and future fieldwork may identify additional species and bone uses.

It is impossible to estimate the relative importance of grain and meat in the diet of the Neolithic Maltese population using animal bones alone; but it is likely that meat was only occasionally eaten, perhaps at special events (Volume 3, Chapter 10). Grain was the basis of the Mediterranean diet in later times (Garnsey 1988; White 1970), and it is likely that it was the same in Neolithic Malta. It is also likely that the consumption of meat was primarily enjoyed by the elite in society. The statement of a late Sicilian nineteenth-century peasant may well reflect the reality of the poor in Neolithic Malta: 'I am fifty years old and I have never eaten meat' (Dickie 2004, 157).

9.9. Human remains

9.9.1. Dental wear

Dental wear is caused by hard particles present within the food that causes micro- and macroscopic damage as food is chewed. It can also be caused by habitual, hygiene-related and sociocultural practices such as craft activities where items are held in the mouth. At the Xagħra Brochtorff Circle, during the Tarxien phase, cases of extreme wear were relatively rare, occurring in less than 3% of the teeth in each context studied, and probably were of a non-dietary origin (Volume 3, Chapter 4). That said, the relatively unworn status of a significant quantity of the permanent dentition indicates a diet that is relatively soft and free from abrasives, by prehistoric standards.

The prevalence of dental caries is, by contrast, rather high; early in the Tarxien phase this approached 12% before falling to around 4% after 2500 BC (Volume 3, Chapter 4). This suggests a diet rich in simple sugars or carbohydrates, such as fruit, honey and processed cereals, although other biological and demographic factors could have also had an effect.

The important question of whether the diet was sufficiently nutritious can be addressed by palaeopathological data. From 2500 cal. BC, enamel hypoplasia increases, which indicates more frequent episodes of nutritional or pathological stress or trauma whilst teeth were forming in childhood (Volume 3, Chapter 4). Significantly, this signal of increased stress occurred simultaneously with the caries rate decrease, hinting of a population that had more hunger in childhood and less access to prestige food. More broadly, this all occurred as the population at Ġgantija were laboriously supplementing soil in an ill-fated bid to counteract long-term trends towards aridification and lower soil fertility (Chapter 5) and the islands was entering a phase of demographic decline (§2.3.12). This was clearly a moment of stress and a turning point in the economic history of the islands that drew the once productive Neolithic system of agriculture to a conclusion.

9.9.2. Stable isotopes

The *FRAGSUS Project* completed a study of palaeodietary isotopes from Xagħra and Xemxija, adding to the corpus of previous work (Richards *et al*. 2001; Stoddart *et al*. 2009). This method reveals valuable information about diet and agricultural practices in the past that is difficult or impossible to obtain from other sources. This is achieved by looking at the isotopic content of human bones and tooth roots, which reflects the food consumed as this tissue formed. The results are more fully discussed elsewhere (Volume 3, Chapter 10) but the main points are addressed here. Carbon isotopes from Temple Period humans from both sites provide no evidence whatsoever of marine protein in the diet. This may be surprising in the context of a relatively small islands, but is a typical finding for prehistoric agriculturists (Richards *et al*. 2003) and in general agreement with the scarcity of fish bones at the sites (§9.8). Fish and other marine sources of food (molluscs, seaweeds, sea birds) may have been eaten frequently, and indeed the ubiquity of limpets on the sites suggests this may have been the case, but not in volumes that contributed significantly to the bulk of dietary protein. Similarly, C4 pathway foods such as millet were not part of the diet. Nitrogen-15 isotopes from Xagħra Brochtorff Circle are rather enriched compared to Neolithic and Bronze Age populations from Sicily and peninsular Italy. At face value this suggests a diet rich in meat, but it also likely to be a function of aridity and soil development as the effect is also present in samples of herbivore fauna we have analysed. There is evidence also that the nitrogen-15 enrichment in humans (but not animals) declines significantly with time during the Tarxien phase, which might in-turn reflect a long-term decline in meat and/or dairy consumption. In general, however, variation in the isotopic data is slight and consistent with the food sources evidenced by the botanical and faunal remains at the sites.

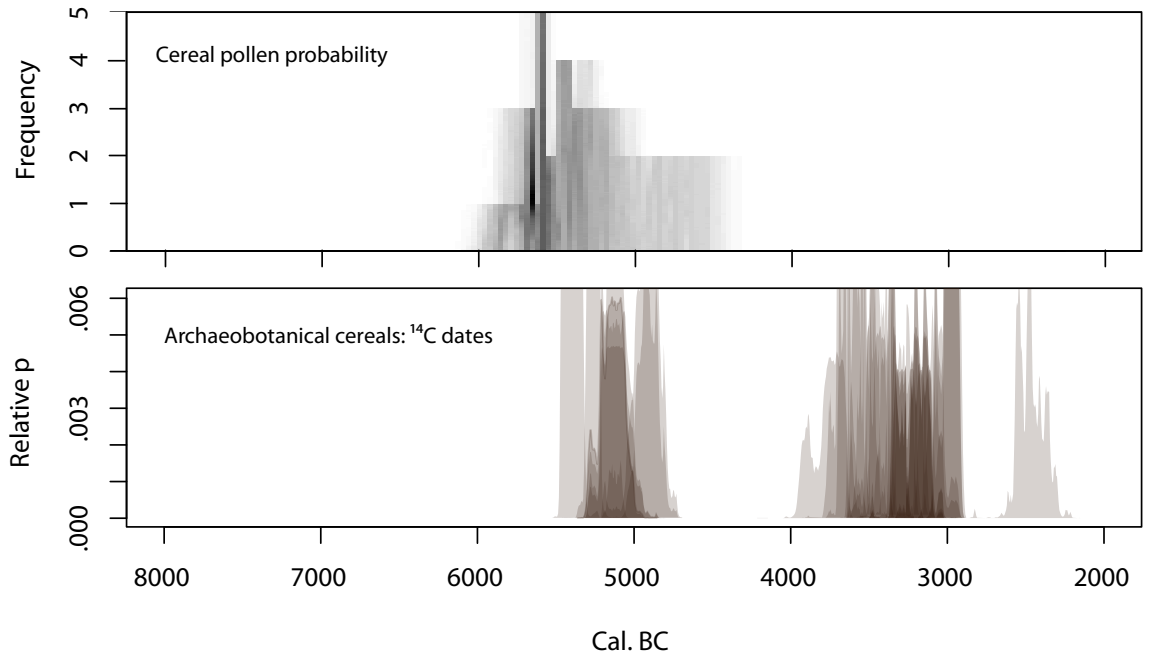


Figure 9.20. *Graphs of cereal detection probability for the arrival of agriculture (it should be noted that cereal pollen continues to be present after this initial event). The uppermost graph is a 'ghost' plot (cf. Blaauw & Christen 2011) for cereal counts in the Salina Deep Core; the bottom is radiocarbon dates of cereals from our excavations.*

9.10. Conclusions: the economic basis of prehistoric Malta

Arguably the most important economic and environmental event that ever occurred in the islands of Malta was the introduction of agriculture, without which, any sizeable human population density would have been unsustainable (Malone 1997–8). This was a significant event in any context, but in Malta in particular the ancient, rich but unstable soils were already displaying signals of their fragility, which made them particularly susceptible to erosion and other forms of damage once agriculture was introduced (Volume 1, Chapter 5). A key question, therefore, is when this occurred. Palynological evidence from the 30 m Salina core (Volume 1, Chapter 3) suggests that cereals were being grown in Malta shortly after 6000 cal. BC. As discussed in Chapter 2, that cultivation pre-dates any secure, sealed archaeological deposit from our excavations; but its presence has been robustly estimated using the radiocarbon evidence from the core in a Bayesian model of sediment accumulation. In Figure 9.20, the height of the histograms represents the pollen counts; the density of the pixels represents the probability that the pollen dates to a given point in time. In the lower graph, individual calibrated probabilities of AMS-dated cereal grains are over-plotted, so the density of the image reflects the number of cereal grains dated by the *FRAGSUS Project*. There is a lag of around 500 years between the two, indicating that the palaeoecological evidence for cereal agriculture pre-dates the archaeological evidence. This apparent discrepancy should not necessarily be surprising, since at Taċ-Ċawla (Chapter 3), Santa Verna (Chapter 4) and Skorba (Chapter 7) the ceramic evidence suggests our excavations did not reach intact strata from the so-called Għar Dalam phase – the earliest stage of the cultural sequence. Furthermore, as discussed in Chapter 2 and elsewhere (Volume 1, Chapter 11), a 6000 BC date fits better the evidence from Italy and Sicily (Natali & Forgi 2018). This was an important episode in the expansion of the Neolithic more generally, and Malta fits well into a pattern of western expansion of the Neolithic economy by pioneering, sea-faring agriculturists. In common with neighbouring Mediterranean agriculturalists, this production system was focused on terrestrial resources, particularly barley and sheep, as far as the evidence so far suggests.

Over subsequent millennia, the archaeological record suggests much cultural change, but a remarkably stable pattern of agriculture. The degree of variability from site to site, and from context to context is very limited, especially in terms of the

faunal remains. This likely reflects aspects of climate and environment in Malta. There was only one way to make agriculture 'work' in an environment of highly seasonal rainfall and summer especially. The availability of freshwater all the year round must have been key for growing crops and securing a supply of fodder. The soils of Santa Verna and Ġgantija contain ferns and bryophytes suggesting stands of fresh water nearby (§9.2.1.4), which in turn suggests some form of irrigation was being carried out, even if this was as basic as manually pouring water from a permanent pool during dry weather. The importance of a water supply is also amply demonstrated by the successive waves of settlement at Taċ-Ċawla.

Interpretation of the fluctuating evidence for the intensity of economic practices is a matter for debate. Pollen evidence suggests continuity, or perhaps certain intensification or certainly reorganization, during the fifth millennium BC (Volume 1, Chapter 3), whereas the archaeological record is empty. There are even hints at a downturn in the scale of arable agriculture in the middle Temple Period, around 3000 BC. This can be inferred from the archaeobotany, the pattern of AMS radiocarbon dates (Fig. 9.18) and in several pollen cores (Volume 1, Chapter 3), although the chronological resolution is generally too coarse to allow close dating.

Whereas the direct subsistence evidence reported here suggests the longue durée patterns of Maltese agriculture, we have to turn to other evidence (§9.9.1) to detect the stresses on the human populations that contributed to the end of the Temple Period. Equally, we have to turn elsewhere, towards other evidence that indicates the changes that followed the Neolithic (Volume 1, Chapter 7). These include the systematic introduction of Mediterranean tree crops (vine and olive) and techniques such as terracing, which expanded the use of the landscape, as well as a substantial increase in connectivity, which ultimately affected food supply as much as other sectors of island life. We attempt to marshal these many data and their interpretation and scrutinize them against the original *FRAGSUS* questions in Chapter 13, Table 2, with the aim of addressing how the economic adaptations and evolution of prehistoric Malta underpinned the core questions of subsistence and survival in the small island environment.

Chapter 10

The pottery of prehistoric Malta

Caroline Malone, Catriona Brogan & Rowan McLaughlin

10.1. Introduction

Pottery is used in the study of prehistory as a key artefact in the designation of cultural phases and cultural affiliations, and as such often dominates archaeological accounts of past cultures. Malta with its bewildering array of rich stylistic ceramic material from the first occupation of Neolithic settlers from early in the sixth millennium BC to later prehistory in the second millennium BC (cf. Malone & Stoddart 2000), presents a wonderful resource with which to explore and interrogate the prehistoric period. The pottery functioned in domestic and more ceremonial and ritual contexts, from cooking and storage to feasting and burial. Archaeological ceramic exploration, however, is accompanied by considerable intellectual baggage, because, as a durable and intriguing survival of prehistory, there has been much study of the forms, decoration and their presumed cultural links without much consideration of the context of discovery. As the decades have passed since prehistoric Maltese pottery was first identified as a tangible means to identify particular episodes (a tradition that probably extends back to the mid-nineteenth century), researchers have built an increasingly convincing chronological structure, largely drawn on the pottery styles. As described below (§10.1.2), the phasing structure has evolved over about sixty years, since the seminal study by John Evans (1971), who in turn drew on earlier scholars (e.g. Zammit, Ashby, Tagliaferro and Caruana). From initial stylistic and stratigraphic association, increasingly absolute dates have been added to the structure. It is now perhaps time to see how well style and science coincide in our present knowledge of ceramic sequence and time.

Chronology, however, is not the only concern in the *FRAGSUS Project*'s research, since pottery in all its forms implies so much more about past times than just a means to date the past. The primary function of pottery is generally considered to be in the storage, preparation and presentation-eating of food, and it is an essential component of an agricultural society. Without pottery containers, many food preparation processes are almost impossible, since the cooking of foods requiring liquids such as stewed meat, or the long-term storage of liquids (milk, ale, water, oil), would not be as effective in organic materials, such as leather or wood. This observation is, however, directed only at the most basic level of pottery, its fundamental role; but in Malta, where there are endless variants on the ceramic form, from enormous vessels to miniature ones, coarse and fine, plain and decorated, there are other dimensions of pottery use to consider. One consideration is how this changing variety of forms actually functioned in the social and economic context of each episode of prehistory. If we take the analogy of modern ceramic use, and the cultural distinction of how we identify and use different ceramic items such as a butter dish, a mug, an eggcup, a soup tureen, a side plate and so on, then perhaps we can see that prehistoric people were not so different. In modern Japan, where food culture is strictly followed (Heimann & Maggetti 2014, 457–80), and every food item served in its own specific type of dish, a further dimension is added. There, it is not simply the functional use of a form that contains food that is significant, but also how it symbolizes a particular delicacy that has to be consumed in a particular and specific manner.

In each phase of Malta's prehistory, the pottery style is distinct, and contains a range of forms normally comprising bowls, cups and jars and sometimes ladles, flasks and platters, as designated typologically by archaeologists over the years. Incomplete as the assemblages are for any period, the extraordinary range and scale of ceramic material implies a complex food culture in early Malta, one involving not only food preparation and storage, but more importantly, a sophisticated and theatrical presentation and serving of food and drink employing a wide array of scaled vessels in clay

and more rarely in stone. Evans (1953, 62) noted how elaborate and often varied the Tarxien phase pottery was even within its stereotypical forms. He suggested that the association of form and decoration might have been directed by observation of special rules relating to customs and practice. The development of elaborate handled cups in most phases in Maltese prehistory, for example, imply the ceremonial practice of drinking something of special significance. What that 'special' liquid was can only be speculated on at this stage, but it seems unlikely to have been simply water! Milk perhaps formed one beverage, but probably a more prestigious and possibly alcoholic liquid such as ales or fermented fruit ('wine') stimulated the production of high quality, labour intensive and evidently culturally value laden vessels. As the discussion and descriptions below demonstrate, style and form combined with decoration and workmanship created a rich, diverse and remarkably extensive material culture in early Malta.

The sheer volume of surviving pottery is extraordinary too, and almost unparalleled in other parts of contemporary prehistoric Europe. Not only does the pottery survive well in the limestone landscape, but because of the restricted local resources on the Islands, the abundant clay enabled pottery to become one of the principal vehicles for expressing identity and cultural distinction (cf. Bourdieu 2010), from the earliest Neolithic to the metal ages. That distinction was further extended to terracotta sculptures representing models of people, animals and buildings, and this tradition represents some of the most sophisticated expression of clay work in the prehistoric central Mediterranean region. Clay art, as it might be described, in Malta reached heights unsurpassed in neighbouring contemporary cultures, alongside its precocious stone architecture and sculpture (Stoddart & Malone 2008). The ceramic forms of Għar Dalam (a Stentinello derivative) were quite ornate and highly decorated when first introduced to Malta, and those forms in the later middle Neolithic (Skorba) developed local distinctive characteristics (Malone 1985, 2003) that mirrored, but also differed from the contemporary (we assume contemporary in the absence of better dates) cultures of Serra d'Alto and Diana-Bellavista-Spartarella in the immediate surrounding region of Sicily and Calabria.

Trump noted presciently in various of his writings (e.g. Trump 2004), that there were few stylistic ceramic strands to link the earlier phases of the Maltese Neolithic with the later Temple Culture material, and the new AMS ^{14}C dates from the *FRAGSUS Project* now bear this observation out as correct. The evident break in continuity is revealed as a long span of time that genuinely seems to explain the marked change in ceramic tradition and style, which until now (Robb 2007, 329) has been assumed to be an unbroken continuous occupation. Moreover, the wider regional context is significant in the revival of ceramic tradition in Malta, since the early Temple Period pottery bears strong similarities with the early so-called 'Eneolithic' or Copper Age assemblages of Sicily. In particular, strong similarities can be noted between the funerary assemblages of the Conca d'Oro (of north and west Sicily), and the San Cono-Piano Notaro cultures (of the south, east and centre of Sicily) and the pottery of the Żebbuġ culture. Both islands employed rock-cut tombs as the principal burial monument of the period, although funerary practices differed a little with Sicilian tombs containing relatively few individuals in comparison to the multiple inhumations of Maltese examples. Few recent excavations, however, have been directed to the Sicilian sites to provide a modern update (but see Gullì 2014), and had the Xagħra Brochtorff Circle tomb (with its 60+ individuals) not been excavated so carefully, then Maltese sites too would have been assumed to have contained small numbers as well (Malone *et al*. 1995). Slightly further afield, there is some possibility that the Piano Conte pottery tradition of the Aeolian islands also contributed stylistically to the earlier Żebbuġ styles (namely the so-called Trefontane) (Cafici 1915–16; Trump 1966, 36), although insufficient numbers of radiocarbon dates make comparison difficult. Nevertheless, there is direct evidence for Maltese ceramic imports into southern Sicily, related to the Żebbuġ ceramic phase, which offers insights into networks of exchange between the two regions in the fourth millennium BC (Barone *et al.* 2010; §10.2.1).

10.1.1. History

The development of chronological ceramic study in Malta, as documented by Evans (1971) had a slow start from the mid-nineteenth century, and there was no stratigraphic work until Albert Mayr (Mayr 1901) introduced a northern European tradition of study. This was soon followed by the stratigraphic approach of Ashby and Peet in their campaigns between 1908 and 1911 (Ashby *et al.* 1913) on several megalithic temple sites. The impact of identifying stratigraphy as a means to separate phases chronologically, and thus typologically-stylistically, was felt by Zammit. He was influenced by the expanded chronological potential of stratigraphic separation. In particular, this was shown by his understanding of the black soil layer that divided Temple Period from the Tarxien Cemetery episode at the site. Zammit also postulated the Neolithic episode and the Bronze Age time gap (Evans 1971, 207) related to changed pottery style (Table 10.1). The work on prehistoric pottery, however, received little more attention over the following three decades,

Table 10.1. *Evans' 1953 scheme of pottery phasing (see B).*

Period	Type Site	Pottery decoration	Monuments	Other features
1a1	Għar Dalam	Impressed		Elaborate Animal handles
	Mġarr	Cut out broad bands, white inlay	Trefoil temples	Imported 'Diana'-type pottery with trumpet lugs
1a2	Żebbuġ	Cut out narrow bands	Trefoil temples, rock-cut tombs	Statue menhir, V-perforated buttons, painted pottery
1b	Ġgantija	Scratched with red incrustation	Trefoil temples, first temples with sets of apses	Rusticated and drilled ornament on stones. Figurines showing Cycladic characteristics
1c	Tarxien	Scratched with red incrustation, inlaid, rusticated, and studs or jabbing with white inlay	Temples with two sets of apses. Unique temple with three sets at Tarxien	Developed spiral and animal carvings on stones, evolved figurine statuettes etc. Imported Castelluccio idol
IIa	Tarxien Cemetery	Scored, sharks-tooth and applied knobs	Cremation cemetery and stone cairns	Seated idols, disc idols, simple copper axes, daggers and awls, spindle whorls, sherd of Castelluccion painted ware
IIb	Borġ in-Nadur	Cut out and scored	Fortified villages	Pottery anchors, spindle whorls, sherd of Mycenean (LHIIIb) ware
IIc	Baħrija	Cut out and scored	Fortified villages	Pottery anchors, decorated spindle whorls, loom weights, animal head 'becco-ansa'. Sherd of Pantalica ware

and there was no revision to the basic sequence of an Earlier Neolithic (Għar Dalam), a Temple Period and a Bronze Age Period. This remained the case until Evans (1953) proposed a reconsideration, based on his re-examination of all the excavated material from the Malta Archaeology Museum collections. Evans made the link with the Stentinello cultures of Sicily and identified the Copper Age/Neolithic. Evans' work identified eight distinct phases of prehistoric Neolithic and Bronze Age pottery phases. As explained by Evans at the time, there was little potential from the muddled storage and recording systems in damaged post-WWII museum collections for obtaining stratigraphic knowledge of the original sites. Evans had to focus on style and his knowledge of the wider region, rather than context. He thought the Tarxien Cemetery (TXC) phase had close links with the Capo Graziano of Lipari, and assigned the Borġ in-Nadur style to a later period, similar to the Thapsos of Sicily, whilst the Baħrija style was seen as more comparable to Iron Age southern Italy. The scheme was elaborated in publications (Evans 1956a, 1956b, 1958, 1959). This proposed a bipartite scheme, of Period I and Period II, which combined the Temple Period into three sub phases of Period I, and the Bronze Age phases in Period II (Evans 1953, fig. 2).

10.1.2. Dating pottery

The major transformation that linked calendrical time with pottery style came with D. H. Trump's work at Skorba. Trump, who was active in Malta between 1958 and 1963, further refined the Bronze Age sequence based on his excavations at Baħrija and Borġ in-Nadur (Trump 1961), and then his attention turned to the Neolithic and was supported by the stratigraphic work at Skorba (1961–63). This work focused on not only a temple site, but also the first domestic Neolithic site to be explored in Malta. For its time, the Skorba work was transformative. It produced scientifically dated stratigraphic sequences of deposit associated with specific calendrical dates and pottery types. The key importance of the work was not only the ^{14}C dating, but also the revision of the ceramic phases, re-positioning some of the Periods identified by both Zammit and Evans (e.g. Mġarr and Żebbuġ were reversed) and providing the sequence of cultures that have been accepted now for over half a century.

Trump's scheme (Tables 10.2 & 10.3) employed a tripartite division of pottery phases, based on Neolithic, Copper and Bronze Age types and used type sites to name the phases. As Evans commented (1971, 208) the notion of Copper was probably misleading, given the total lack of metallurgical technology in Malta throughout the period, but the concept nevertheless linked the Maltese sequence with the wider Mediterranean.

10.1.3. Recent research on Maltese pottery

Since the 1960s work at Skorba, surprisingly little revision has been made to the ceramic sequence. The publication of the Skorba site (Trump 1966) presented a selected sample of material, but it was not systematically analysed to the standard now expected, with no final assessment of quantity, frequency, fragmentation,

Table 10.2. *Trump's 1966 chronology scheme.*

Period	Phase	Abbreviation	Suggested date	Evans	
				1954	1959
Neolithic	Għar Dalam Grey Skorba Red Skorba	GħD GSk RSk	3800 3600 3400	Ia1 early	IA
Copper Age	Żebbuġ Mġarr Ġgantija Saflieni Tarxien	Zb Mġ Ġg Saf Tx	3200 2900 2850 2450 2400	Ia2 Ia1 late Ib Ic	IC IB ID IE
Bronze / Iron Age	Tarxien Cemetery Borġ in-Nadur Baħrija	TC BN Baħ	2000 1450 900-800	IIa IIb IIc	IIA IIB IIC

technology, or fabric study (and Trump had to depart from the newly independent Malta soon after the close of excavation in 1963). The increased demands and forms of analysis have only developed in the later decades of the twentieth century, and there is still potential to return to Skorba and reassess its ceramic archive. It may be noted that there has been a reassessment of the lithic assemblage (Vella 2008) and of lipids in pottery (Debono Spiteri & Craig 2011). Evans' (1953, 1971) seminal work on Malta's prehistory included, along with a study of monuments and material culture, all of the arguments and revisions that had been made to the prehistory ceramic sequence; and in particular, it also summarized the sequence in elegant diagrams that illustrated the specific forms of each key phase (see Fig. A10.3.1). These form-sequences have remained unchallenged, and still provide the basic reference today, with a detailed description of the ceramic material (Evans 1971, 208–28), although not tightly tied in with the absolute chronology of Skorba.

The major addition of new absolute dates achieved with the Xagħra Brochtorff Circle study (1987–94) was based on the phases of Żebbuġ-Ġgantija-Tarxien-Tarxien Cemetery that were present on the site. The focus of that work was on human remains associated with often quite disturbed/reworked ceramic and artefact assemblages. Nevertheless, these dates represented more accurate calendrical dates, compared with the bulk carbon samples required for the early radiocarbon work at Skorba. The outcome of the new dates (Table 10.4), processed by three laboratories, was a clearer understanding of the Żebbuġ-Ġgantija phases and also the extension of the Tarxien phase by a century or more, from 2500 to about 2400 BC. The date achieved for the Tarxien Cemetery material also indicated an earlier date than previously achieved from the type site (Renfrew 1972).

Table 10.3. *Trump's 2002 revised chronology scheme (see also Table 10.12c).*

Neolithic	
Għar Dalam	5000 – 4300 BC
Grey Skorba	4500 – 4400 BC
Red Skorba	4400 – 4100 BC
Temple Period	
Żebbuġ	4100 – 3700 BC
Mġarr	3800 – 3600 BC
Ġgantija	3600 – 3200 BC
Saflieni	3300 – 3000 BC
Tarxien	3150 – 2500 BC
Bronze Age	
Tarxien Cemetery	2400 – 1500 BC
Borġ in-Nadur	1500 – 700 BC
Baħrija	900 – 700 BC

Table 10.4. *New chronological sequence.*

Pre human settlement		Before 6000 BC
First settlement		5800–5400
Earliest pottery – Għar Dalam Impressed	Phase 1	
Skorba	2a b c	5400–4800
Żebbuġ	3	3800–3630
Mġarr	4	3630–3510
Ġgantija	5	3510–3080
Saflieni	6	3080–2840
Tarxien	7	2840–2350
Early Tarxien Cemetery – 'Thermi' almond rim grey wares	8a	2350–1600
Full Tarxien Cemetery – cremations	8b	
Borġ in-Nadur Middle Bronze Age	9	1600–750
Baħrija Final Bronze-Early Iron Age	10	

10.2. The *FRAGSUS* ceramic research programme

The pottery study of the Xagħra Brochtorff Circle complex was extensive and detailed in a manner not previously employed in Malta. All of the material (822 kg or over 76,000 sherds) (see Tables 10.5, 10.6, 10.7 & 10.8) from the excavations of the funerary site was retained, cleaned, counted, weighed and subjected to statistical analysis to enable an understanding of fragmentation and absolute quantity for each ceramic phase (Malone *et al*. 2009; Stoddart *et al*. 2009b). This work demonstrated that some periods (or ceramic phases) were far less well represented than others, indicating likely episodes of burial activity, but also, episodes of site clearance. For instance, Ġgantija although evident in the dates for burials, was sparsely represented by actual pottery, whilst Saflieni style pottery was reasonably well represented, and as at the type-site, seemed to occur in specific forms perhaps only encountered on funerary sites. The frequency and quantity of variation between the various styles has raised questions about the actual chronology of pottery (for example, Żebbuġ material has dates in the Ġgantija phase). Evidently, pottery cannot always be relied on to date a stratigraphic unit, since it may have been retained over decades or even centuries, and reused, or is imitated in later times, and these are ongoing issues for discussion in the case of Malta.

The typological study undertaken for the Xagħra Brochtorff Circle material was focused by Trump on key forms and styles, particularly those not encountered before in his previous studies, or that were of particular interest within the burial site (see Malone *et al*. 2009, Chapter 10). Some of these forms were only found on Gozo, and because previous research on Gozo had been very limited, the style and fabrics, in particular, were reported. Other more ubiquitous pottery, such as the classic 'type 43' and 'type 47' offering cups were noted (see B), but not described in detail. The report, nevertheless, is the most detailed account of Maltese Neolithic prehistoric pottery published to date. More recently, archaeometric methods of analysis have become more routine and scientifically demanding, with characterization work undertaken particularly on Mediterranean amphorae and wares that have demonstrated trade and sources. Far less effort has been directed to prehistoric material, but pioneering work by Debono Spiteri and Craig (2011) has undertaken a study of lipid residues

Table 10.5. *Total number of pottery sherds from Neolithic sites.*

Site	GħD	Sk. C.	GSk	RSk
Ġgantija	14	49	1	8
Santa Verna	195	778	390	254
Kordin III	19	208	50	3
Skorba	29	130	408	274
Taċ-Ċawla	28	0	844	409

Table 10.6. *Total number of pottery sherds from Temple Period sites.*

	Zb	Mġ	Ġg	Saf	Tx	Other T. P.
Ġgantija 2014–15	470	5	201	25	500	531
Santa Verna 2015	4113	18	906	5	16	61
Kordin III 2015	373	293	1003	6	35	549
Skorba 2016	1212	167	1076	0	1	273
Taċ-Ċawla	5039	8	5008	9	1009	31,959
Xagħra Brochtorff Circle, 1987–94	19,262	10	697	451	10,806	48,292

Table 10.7. *Total number of pottery sherds from Bronze Age sites.*

	TxC	BN	BA
Ġgantija 2014–5	0	7	
Santa Verna 2015	0	14	
Kordin III 2015	0	0	
Skorba 2016	0	55	
Taċ-Ċawla 2014	58	19	
Xagħra Brochtorff Circle, 1987–94	219	468	2544

Table 10.8. *Total sherds recovered by the* FRAGSUS Project *(2014–16) for each phase.*

Pottery Phase	Number of Sherds	Neolithic/ Temple Period/ Bronze Age totals
Għar Dalam	285	
Skorba – unclassified	1165	
Grey Skorba	1648	
Red Skorba	948	Neolithic: 4046
Żebbuġ	11,207	
Mġarr	491	
Ġgantija	8194	
Saflieni	45	
Tarxien	1561	
Other Temple Period	33,373	Temple Period: 54,871
Tarxien Cemetery	58	
Borġ in-Nadur	95	Bronze Age: 153
Other prehistoric	23,382	
Roman	580	
Other	13,841	
Estimated no. of sherds	17,864	
Totals	**102,279**	

using Organic Residue Analysis (ORA) on early Neolithic and early Temple Period pottery. Whilst less conclusive than anticipated, there is evidence in the Għar Dalam phase for ruminant fat (probably milk) and marine oil (SKB sherd 161). The analysis demonstrates potential for further work that describes fabrics, technology and function of pottery in tandem with analysis of actual use. Similarly, work by Barone *et al.* (2010) used archaeometric analysis to identify the presence of Maltese ceramic imports in southern Sicily.

10.2.1. Pottery phase descriptions. After Evans & Trump. With additions from Malone and Brogan[1]

Previous research by several scholars has begun to build up a means to categorize and define the different cultural periods of pottery making in the Maltese islands collected from many sites across Malta (Fig. A10.3.2). David Trump, in tandem with Malone and Stoddart, developed detailed descriptions of forms and the general characteristics of fabric and appearance. This contribution to the Xagħra Brochtorff Circle ceramics study (Malone *et al.* 2009, Chapter 10) was an attempt to advance the definitions of phases of pottery. The study employed modern approaches in terms of fragmentation and basic statistics (Stoddart *et al.* 2009b). These were added to the form descriptions, but there was not opportunity then to delve more deeply into the ceramic production of Malta (Appendix A3.2). Since that time, Tanasi and Vella have explored Bronze Age ceramics, whilst Sagona has worked on the later prehistoric ceramic material alongside Punic and Roman (Bonanno & Vella 1915; Sagona 2011, 2015a, 2015b; Tanasi 2008, 2010, 2011; Tanasi & Vella 2011). Trump promised, before his death in 2016, to complete a compendium of pottery recognition for Malta, building on the scheme he had initiated for the 1980s–90s study (Trump *et al.* 2009; Fig. A10.3.2). During the work in 2014 at Taċ-Ċawla, he paid a visit to the excavations and inspected the pottery assemblage, which excited him because of its domestic nature. The promised work however, never materialized, so here within the *FRAGSUS Project*, we assess the diagnostic criteria established by scholars over the last half century and present a current and systematic classification of form, type and fabric. These revised criteria must be a work in progress, because inevitably, more studies, new sites and better technical analyses will transform the definitions into ever more complex and distinct episodes of pottery production.

The ceramic study presented here combines the various form/type definitions that Evans and Trump devised (Figs. 10.9 & A10.3.1).

Evans' 1953 typology scheme (see Figure 10.9) numbered each form from 1 to 108, and this approach spanned from the earliest Neolithic through to the latest Bronze Age. The forms identified in this exercise became the standard ones later employed in Evans' 1971 work (Evans 1971, figs. 30–41) with individually numbered forms separated into 11 distinct phases, and these have been referred to in this current study (e.g. Tarxien, Evans shape 5) to identify shape. Although Evans' studies are without question, major contributions to our understanding of Maltese prehistoric ceramics, there is scope for much more discussion on function and issues of continuity and connectivity. In particular, the continuity or absence of some forms at particular moments is a matter of interest when we try to use pottery as a means to distinguish phases and 'cultures'. The functional aspect of pottery likewise represents an important line of discussion that may enrich our interpretation of the changing economic strategies, for instance, the increase in deeper, larger vessels with narrower necks could imply increasing focus on liquid processing and storage, or the dominance of offering cups could imply festive rituals. In this current study, we have based the recognition of forms on Evans' types but have also examined the continuity by rearranging the 'shapes' into groups rather than phases. This is illustrated in Figure A10.3.1a–f.

The Maltese prehistoric pottery forms fall into the following categories, illustrated in Figures A10.3.4–A10.3.9.

1. BOWLS – Tronco-conic bowls, ovoid, globular or biconical with convex and concave sides (Fig. A10.3.4).
2. JARS & FLASKS – Globular, biconical, inverted, necked, everted neck, cylindrical neck (Fig. A10.3.5).
3. CUPS – handled smaller vessels of everted form (Fig. A10.3.6).
4. CARINATED bowls, footed or pedestal bowls, open and closed forms (Figs. A10.3.7 and A10.3.9).
5. LIDS, PLATTERS, spoons, ladles, varied forms (Fig. A10.3.8).

When all the forms are arrayed in a single scheme as represented in Figure A10.3.3, it becomes clear that there are episodes when particular shapes, such as the carinated forms favoured in the Tarxien Phase, or the sharply angled neck and shoulder forms of the Tarxien Cemetery style stand out. Other forms, such as bowls and flasks and cups with tronco-conic or globular 'S'-shaped profiles are almost ubiquitous throughout the sequence, and suggest continuity in vessel forms that had basic functions. Although Evans only shows a Għar Dalam jar with a low neck, the example illustrated from Santa Verna (Fig. 10.7, SV9.1,

Table 10.9. *Recognized sherd numbers as recorded in Evans (1971) (X indicates presence of sherds but no counts).*

Site	Bur Mghez	Tal Qada	Ħal Saflieni	Kordin 1-2	Kordin III	Ħaġar Qim	Mnajdra	Nadur tomb	Buġibba	Tarxien	Ġgantija	Xewkija	Skorba
GhD												X	X
SK												X	X
Zb			36		12		4			15	22	X	X
Mg			21	X	32	X (1)	1			2	2	X	X
Gg	X	13	996	X	164	2	34	X		212	145	X	X
Saf			884										X
Tx	X	847		X	351	71	700		X	1652	83		X
TC	X	X	48		2					300	60		
BN					3						2		
Bah													

Site	Ta' Ħaġrat	Ħal Ginwi	Għar Dalam	Għar in-Nġhag	Għajn Tuffieħa	Xrobb l-Għaġin	Għajn Tuffieħa	Bush-isija tomb	Torri Falka	Qortin Kunzz-one	Xemxija tombs	Żebbuġ tombs	Ta' Marżiena
GhD	8		82										
SK			3										
Zb	1006		18			4					X	X	
Mg	88		6	X		1					X	X	
Gg	200	X	29	X	X	118	X	X		X	X		X
Saf													
Tx	660	X	59	X	X	445	X		X	X			X
TC	6		X	X	X				X				
BN	13		X	X		1							
Bah	1		X										

Site	Pergla	Santa Verna	Xagħra RCT	Xagħra Brochtorff Circle	New Santa Verna	New Ġgantija	New Skorba	New Kordin	Taċ-Ċawla	New Santa Verna	New Ġgantija		
GhD		3			195	14	29	19	28	195	14		
SK					1186	58	261	216	824	1186	58		
Zb		29	??	19262	4113	470	1212	373	5039	4113	470		
Mg		3	??	10	18	5	167	293	8	18	5		
Gg	X	76	??	697	906	201	1076	1003	5008	906	201		
Saf		X		451	5	25		6	9	5	25		
Tx	X	450		10806 (48929)	16 +61	500 +531	1 + 273	35 +549	1009 + 31,959	16 +61	500 +531		
TC		14		2159					58				
BN		8		468	14	7	55		19	14	7		
Bah				?									

no. 13) would suggest a much taller form more similar to prototypes from Stentinello in Sicily. Such a form continues in the sequence though to Żebbuġ (shapes Zb7 and Zb15) and Ġgantija (shapes Gg12 and Gg13) and Tarxien (shapes Tx24, Tx26) and recurs again in the later Bronze Age in Borġ in-Nadur (shape BN10 at a larger scale) (see Figs. A10.3.3 & A10.3.5). Useful flask/storage jars forms such as this evidently were reinvented or represented a continuation of tradition, and the same is true of many of the bowls. Bowl shapes

evolve a little from rounded based to small dimpled base to larger flat bases, although rounded bases do continue too, in the form of drinking cups or bowls (cf. Bah1) as late as the Late Bronze Age (see Figs. A10.3.4 & A10.3.6).

Carinated forms (Fig. A10.3.7) are a particular feature of Maltese prehistoric ceramics, and from as early as the Red Skorba phase in the late sixth/earliest fifth millennium BC, sharply carinated shapes are present on fineware bowls (RSKB2 and 3) with everted shapes. These carinated shapes recur particularly in the Tarxien phase where the larger proportion of known forms include a carinated profile, with everted and inverted shapes, flat and round bases; and are also present in cups, bowls and jars. In the Mġarr phase a 'baggy'-shaped inverted jar form (shape Mġ6) later becomes a more pronounced carinated form in the Ġgantija, Saflieni and Tarxien phases; it does so along with what has been called by Evans and Trump 'the hole mouthed jar' where the rim is curved inwards to form a flat 'shoulder-rim' around a smaller orifice (shapes Gg15, SAF5 & 6, TX20, 21 & 28). This shape completely disappears in the Thermi and the Tarxien Cemetery, perhaps confirming the redirection of ceramic production in those phases of great cultural change. Carination however does not disappear following the Tarxien phase and instead is directed to the sharply angled and handled cups and jugs of Tarxien Cemetery (TXC6 and 7), Borġ in-Nadur (shape BN7) and Baħrija (Bah 4, 5, 6).

Cups form a continuing shape that clearly had use in early Malta through the whole sequence from Skorba onwards. Drinking cups have been much debated in prehistory as evidence for ritual, for alcohol and so on, but in Malta these forms could confirm the suggestion that milk products were significant in the diet and food culture (see Chapter 9). Characteristically the cups (or scoops/ladles as some could be defined) have a single handle, sometime high and quite often embellished with patterns, shapes and imagery (animal heads for example). The investment made in these objects could imply that participation in the liquid had status and value attached, and certainly the small cups of the Tarxien Cemetery phase, associated as they were with burials and cremations, do strongly imply food offerings. The ubiquitous Saflieni-Tarxien offering cups (see below) (Evans shapes 41–44 in particular) of sizes varying from miniature to enormous occur in large numbers on the temple and burial sites, but far less frequently in the domestic setting of Taċ-Ċawla. Whether this is simply due to the size of the sample, or a genuine trend is unclear; but it is tempting to see specific ceramic forms produced for festive and ritual use, and as specific to mortuary functions too, as shown by the Saflieni types which are only found in funerary settings (Malone *et al*, 2009, 230, fig. 12.12).

Maltese potters were inventive and made forms that are unique to the islands, and in particular some of the lid and platter forms represent a local tradition. Doubtless, as with all the forms discussed here, there were precursors from outside Malta which then became elaborated, reinvented and specific to the islands. There are new forms to add to the Evans scheme, and these have been included in Figure A10.3.3 as the BR (Brochtorff) shapes identified by Trump (Malone *et al*. 2009, Chapter 10), and there are many more that could be now included from this current study. This is, however, a grand work in itself, and instead we suffice with descriptions below and await a future study that will reassess the 'typological' categorization of Maltese pottery.

The tables (10.1 & 10.13–10.22) below identify the stylistic characteristics of each phase of pottery in a tabulated format and describe the fabric, forms, surface treatment and so on, in an attempt to present a systematic approach across the many phases of production. There is a tendency in typological studies to develop distinct methods of study for different pottery types, mainly because there is little attempt to see the greater whole or changing patterns over time, and the focus is on patterns, forms, and comparisons through tallying features with known sequences and chronologies. Since the *FRAGSUS Project* has sought radiocarbon AMS estimates for absolute chronology, relative time measurement through pottery style has become less prominent. Instead, here we are less interested in further definitions of style, but in determining the nature and continuity of ceramic style, production, function, and their evolution over the course of Maltese prehistory. This work is an ambitious goal, but not unrealistic given the quality of archaeological data that now support ideas of time and spatial distribution, even in the small islands of Malta. Evans developed an important and simple scheme to describe forms for each phase of ceramic type in Malta and we employ this as a starting point for the current study. Evans' useful 'phase' diagrams are reproduced with each style table. Such diagrams are inevitably schematic and cannot represent the scale of forms that ranged from miniature to enormous storage and feasting vessels. Some forms may have been exclusively for storage or for funerary purposes and these distinctions are only now being identified, although some are suggested in the study of the Xagħra Brochtorff Circle assemblage (Malone *et al.* 2009, 231).

In order to take Maltese ceramic studies further, and to enable ongoing research that continues to add to the present state of knowledge, we recorded the entire assemblage of excavated sherds from the six prehistoric

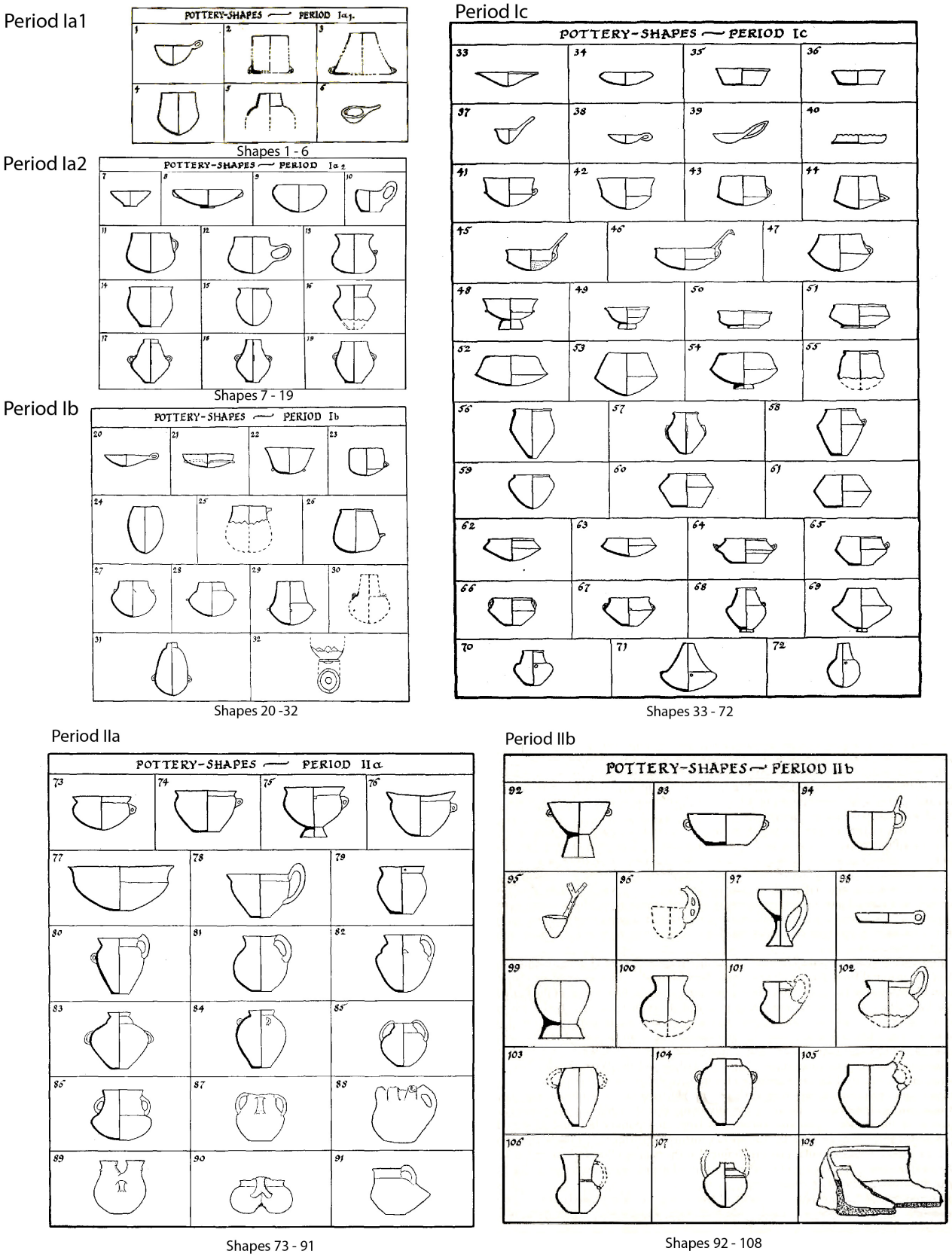


Figure 10.1. *Evans' typological scheme for Maltese phases, 1953.*

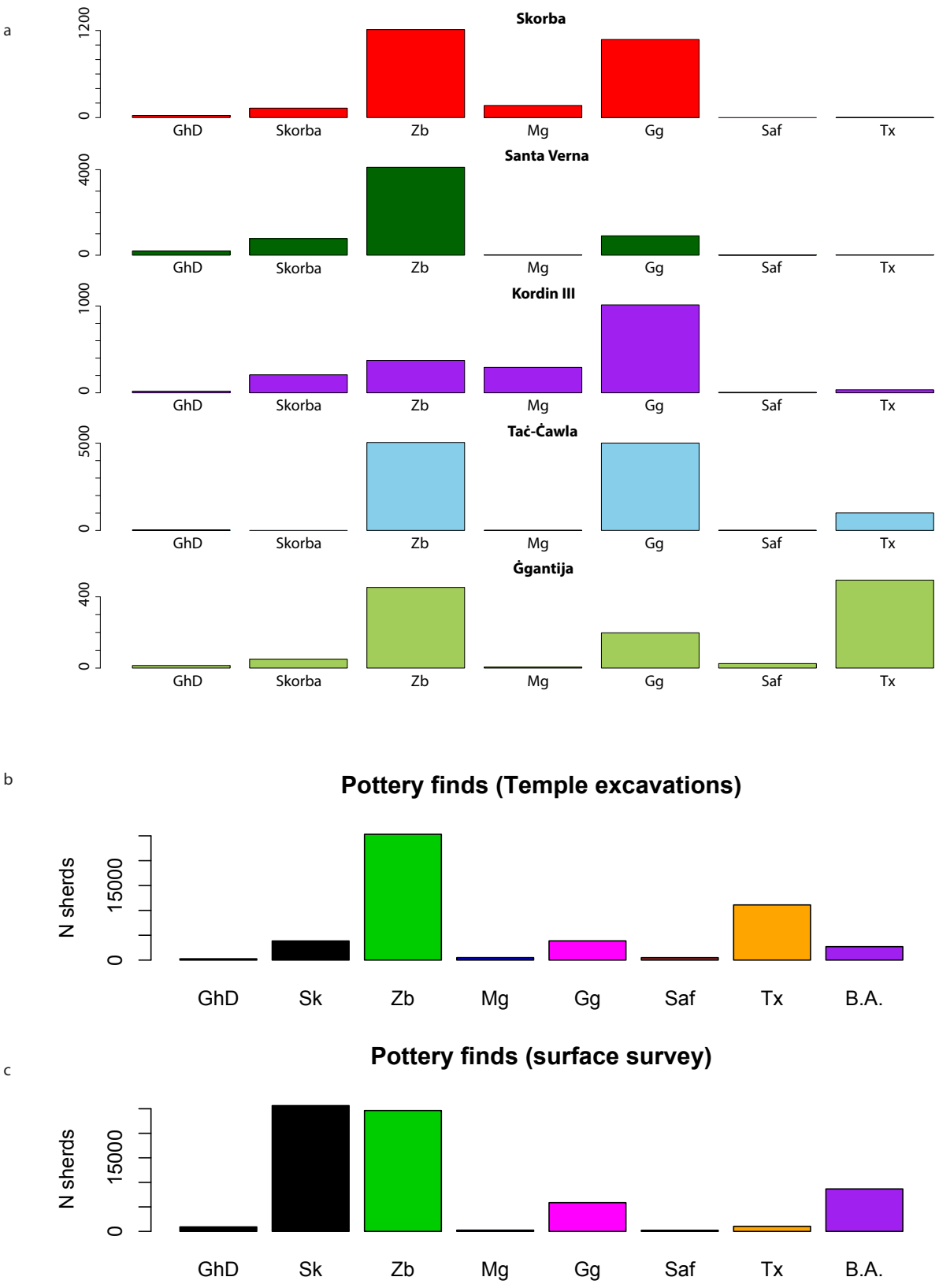


Figure 10.2. *a) Number of sherds found per phase at FRAGSUS excavations at temple sites; b) total number; c) total number from the Cambridge Gozo Survey.*

sites studied and reported on in this volume. The work has added new forms and types to the Evans Scheme and also undertaken limited fabric analysis and linked dated stratigraphy with pottery types. The excavated sites focused on the Neolithic through to the end of the Temple Period, and importantly, they include domestic material from non-temple sites, with Taċ-Ċawla, the underlying levels of Santa Verna and Skorba, and the Bronze Age settlement of In-Nuffara all representing domestic occupation. In contrast, the upper levels of the Temple sites (Skorba, Santa Verna, Kordin III and Ġgantija) are likely to represent more 'ritual' or at least,

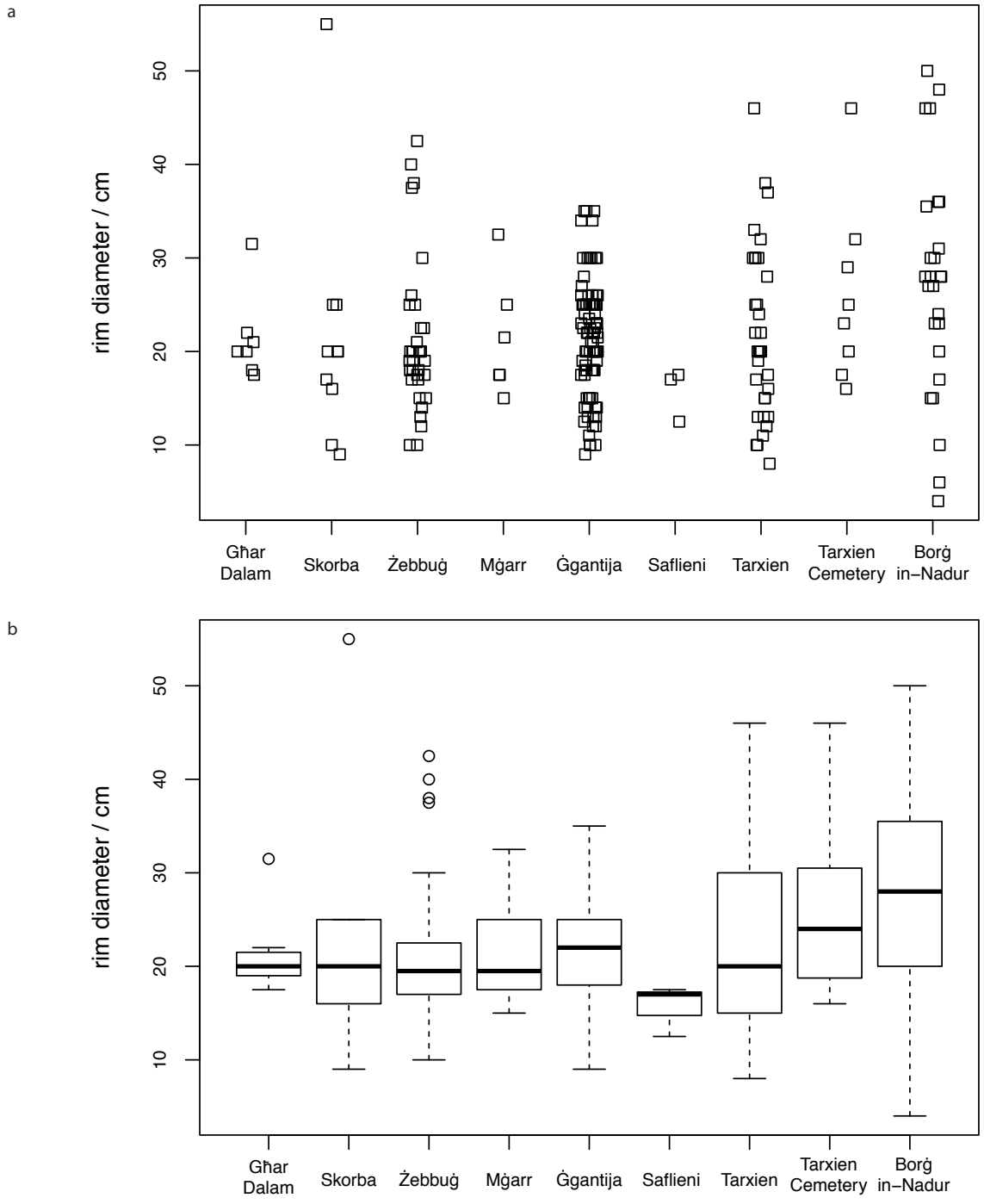


Figure 10.3. *Estimated vessel sizes recorded from rim diameter in the different phases of pottery production: a) stripchart; b) box-and-whisker plot showing median estimates and their interquartile range.*

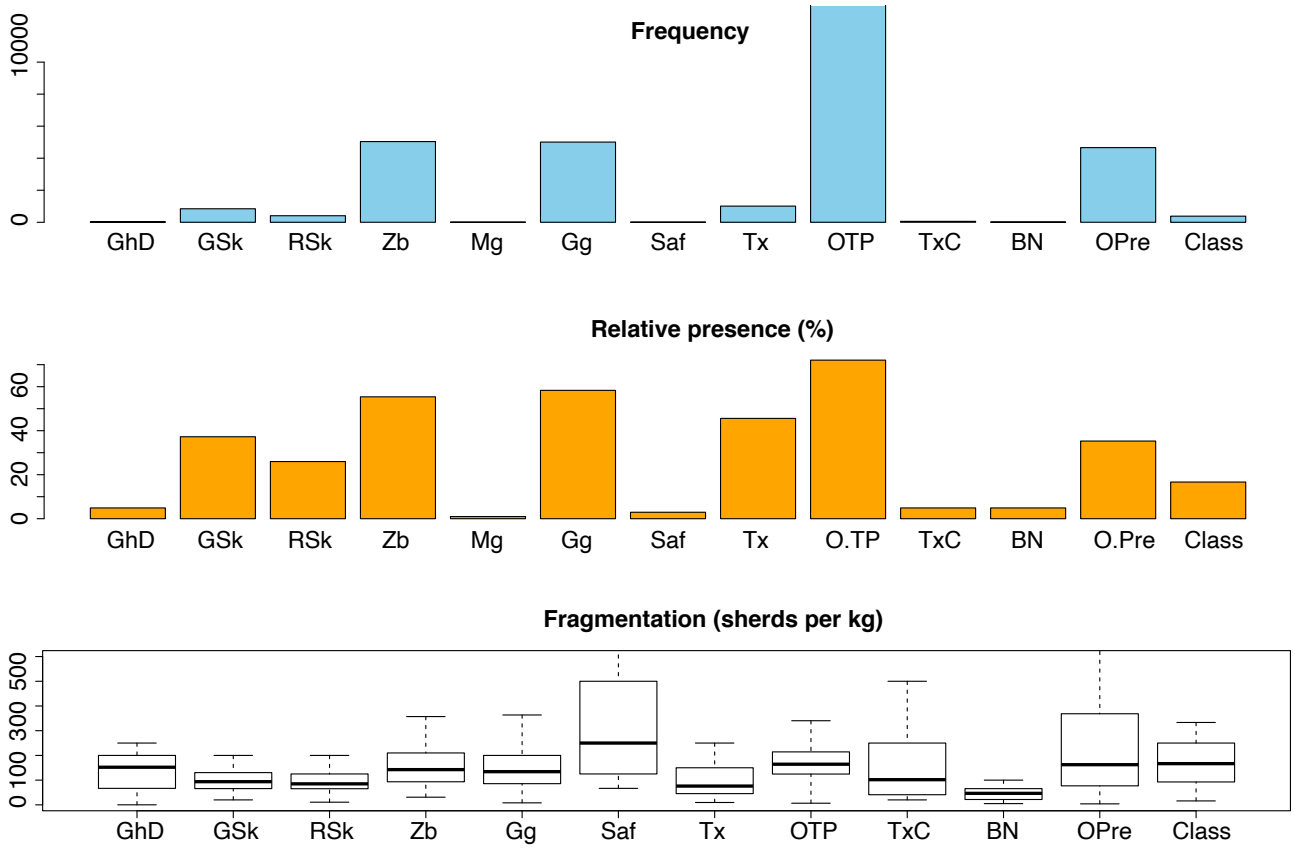


Figure 10.4. *Pottery frequency and fragmentation: a) frequency of sherds in the pottery sherd counts from the* FRAGSUS *assemblage; b) relative presence of pottery by phase from the* FRAGSUS *assemblage; c) estimated fragmentation of the phased pottery from the* FRAGSUS *assemblage based on number and weight.*

more symbolically structured occupation. This study may be able to discern distinctions between these types of site in terms of the pottery used and discarded and this exercise may expand understanding of the pottery by identifying both its functional and more symbolic role in early Malta. It has long been recognized for example, that the classic 'Tarxien' carinated cup in Period 1c (Evans' 1953, types 41–44; Figure 10.1) repeats at many scales, from tiny miniatures to the enormous metre high stone vessel, such as from Tarxien (Fig. 13.17). These 'cups' were perhaps part of the apparatus of festive feasting within the temples and were also presented as grave offerings with the burials of the Xagħra Brochtorff Circle. The cups do not appear frequently in assemblages from what are considered domestic sites, such as Taċ-Ċawla, but there are so few examples of domestic site that this observation needs far more evidence to support the idea that vessels may have been exclusive to site type and function. As noted above, Maltese pottery represents some of the most sophisticated and aesthetically decorated ceramic art in prehistoric Europe. The refined forms, handles and exquisite decoration are unparalleled, and it is surprising that focus on the 'art' form remains undeveloped, nevertheless, it offers abundant opportunities for future research.

Below we present a detailed and quantitative approach to the assemblages. Each site assemblage was cleaned context by context, and then sherds were sorted into identifiable chronological phases, and each context counted and weighed. Inevitably, much material was too fragmented to enable phasing beyond the general term 'Temple Period'. Yet, a surprising level of distinction was nevertheless possible on the basis of their fabric and surface finish. The data presented below are the outcome of the analyses.

10.2.2. The typology and recognition of pottery types in Malta

The tabulated pottery descriptions that follow attempt to represent the collected knowledge of scholarship of prehistoric Maltese pottery. In some instances, where detailed accounts have recorded fabric, it is possible to describe a fine ware and a coarse ware type, but more generally fabrics are hard to define and instead a

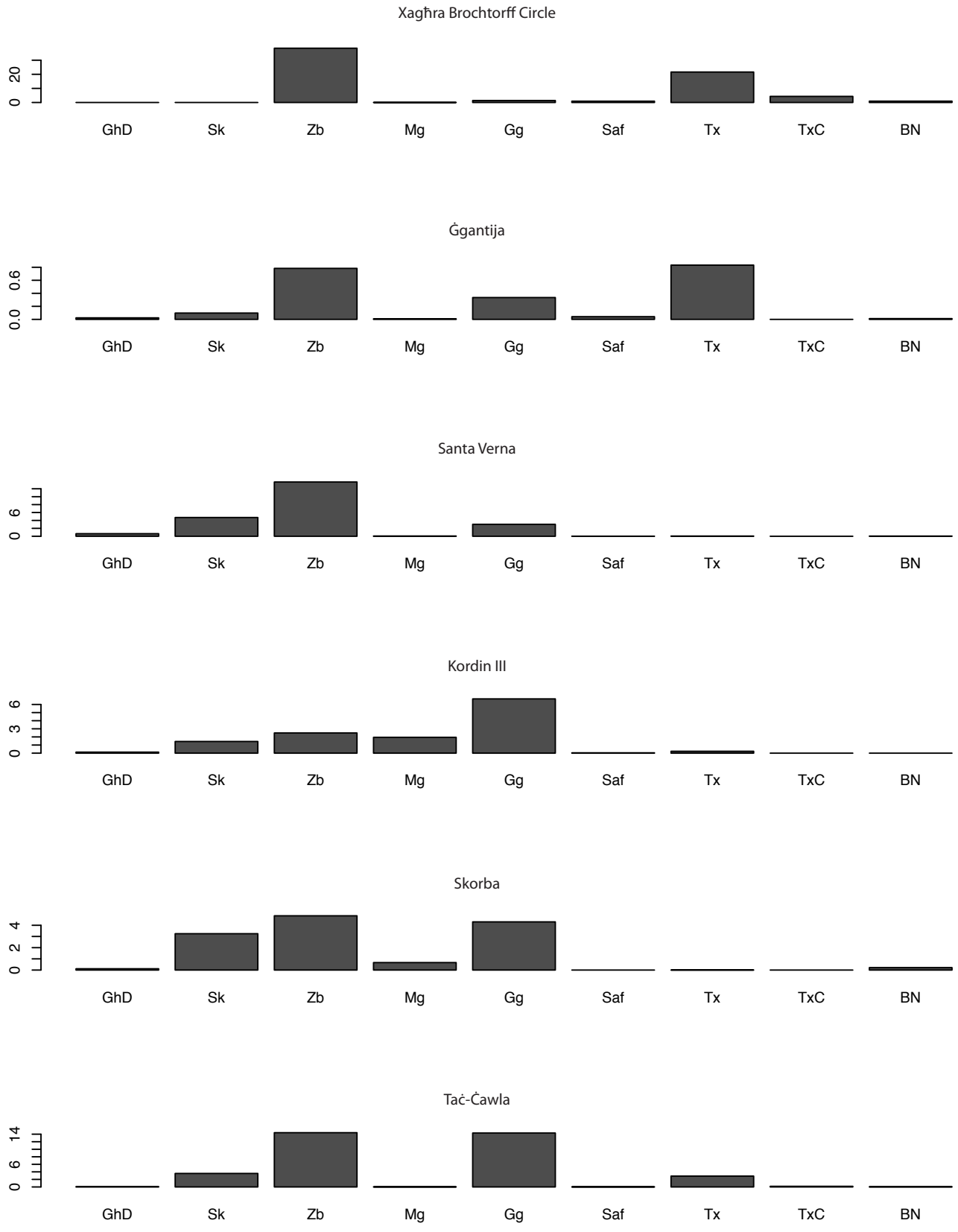


Figure 10.5. *Aoristic totals of pottery by phase from each site in the* FRAGSUS *assemblage.*

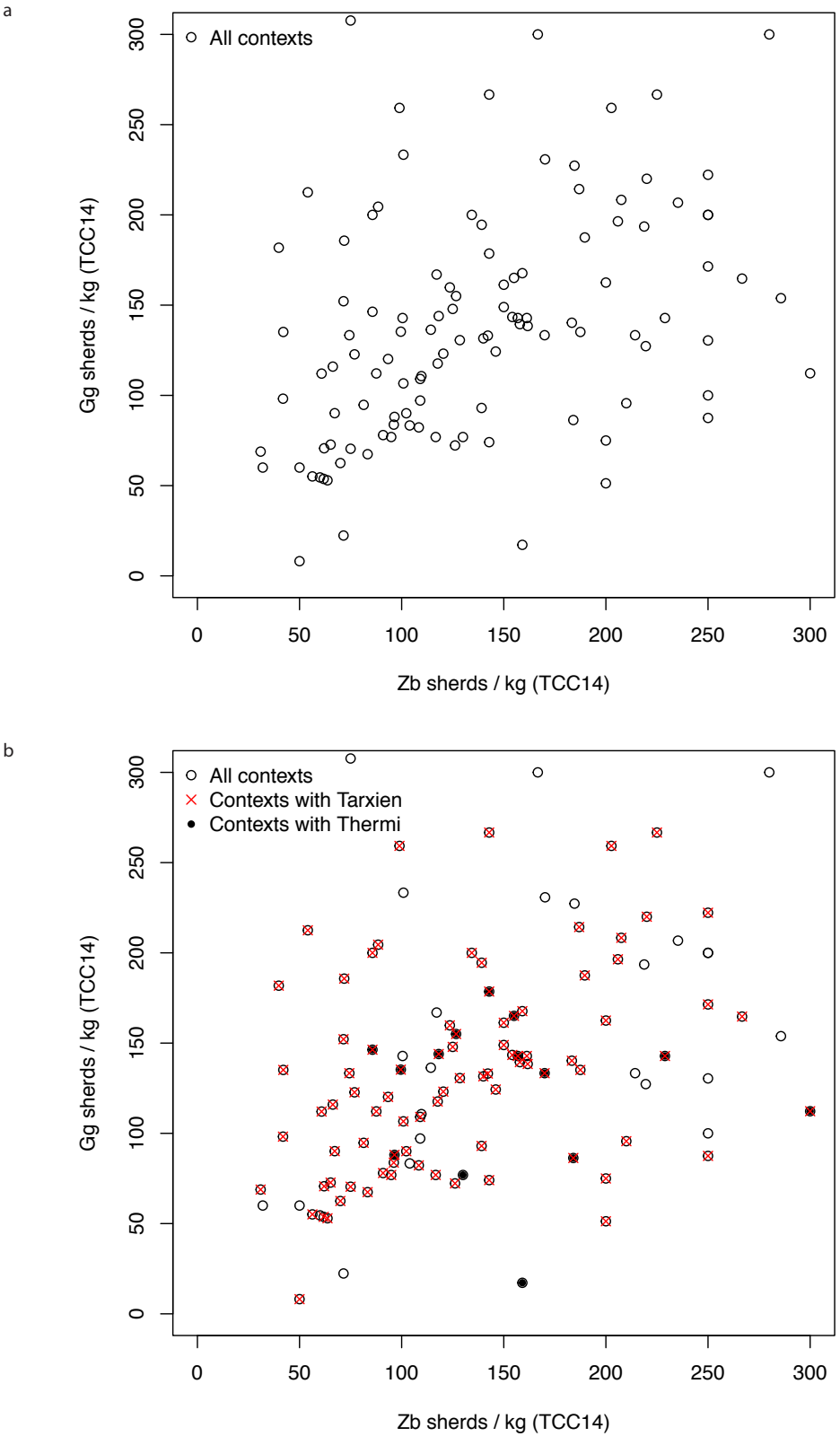


Figure 10.6. *Context-by-context comparison of fragmentation for Żebbuġ and Ġgantija pottery at Taċ-Ċawla; a) all contexts; b) later contexts highlighted.*

continuum between finer and coarser is seen. In some episodes, such as the Mġarr phase, the lack of study and of material means that we still have only a partial understanding of the forms. The *FRAGSUS* work, however, does, at last, provide data from new assemblages excavated with absolute dating, which offers an exciting precision into the likely chronology of the material that itself, for so long, represented chronology.

10.2.3. The FRAGSUS *pottery analysis: general data from across the sites*

A total of 103,316 sherds of pottery weighing 811.83 kg was excavated by the *FRAGSUS Project* from four temple sites (Ġgantija, Santa Verna, Kordin III and Skorba) and one domestic site (Taċ-Ċawla). Some statistics for pottery totals for the Xagħra Brochtorff assemblage have also been included (Stoddart *et al*. 2009b; Trump *et al.* 2009). The Bronze Age pottery from In-Nuffara is described separately (Chapter 8). (Please note, the abbreviations previously employed by Trump to define each phase are also used here[2]).

10.2.4. Pottery frequency

The analysis of the ceramics collected during the *FRAGSUS Project* campaigns represents a sample from modest trenches, often retrieved from previously excavated deposits and backfill. These excavations were generally on the periphery of the main site, and thus they form a particular sample, perhaps not fully representative of the classic 'temple' or tomb assemblages that have previously been reported. That said, because of the large and systematic collection of material, these new assemblages may assist in identifying some trends and patterns that add to the wider interpretation of chronology and site functions that can be gleaned from the ceramic evidence. Previous antiquarian and rescue samples, such as those reported by Evans (1971), were selectively retained, presumably because of sherd size and attractiveness, rather than as total collections. All material in the *FRAGSUS* study has been retained and assessed, with Neolithic and Bronze Age, and indeed, later pottery phases represented on the excavated sites. As demonstrated below, some sites produced particular episodes and styles; for example, no Saflieni pottery was present in the Skorba sample, whilst the Mġarr pottery style was only frequent at Kordin III. Similarly, although Mġarr pottery was represented at all of the sites, it has a greater representation on Malta (460 sherds) than on Gozo (31 sherds). This might suggest that the Mġarr style was largely a Maltese phenomenon (a regional style and production), and perhaps not a major 'phase' indicator as previously argued by Trump (1966, 2003). It may be that an early Ġgantija style formed the main transitional ceramic style bridging between distinctive Żebbuġ and classic Ġgantija on Gozo. Tarxien Cemetery pottery occurred only at Taċ-Ċawla in the present study, and whilst the assemblage is modest when compared with the nearby Xagħra Brochtorff Circle (which yielded 2159 sherds) the absence of this pottery at most sites is significant. Tarxien Cemetery material is quite rare on Maltese sites generally, but its presence has long been noted in association with settlement or reoccupied temple sites. There is also a growing distinction between the occurrence of earlier 'grey' and the darker 'later' material for the Early Bronze Age. They do not necessarily occur together, or in sequence, an observation that is significant when the new chronological work is taken into account (Evans 1971, 224; Volume 1, §6.7). All sites in the present study produced a presence of later Bronze Age and Roman period material.

Pottery from each excavation site in the *FRAGSUS Project* was quantified by context, with the pottery sherds counted and weighed from each diagnostic group. The resulting pottery frequency data acts as a good proxy for activity levels at the different sites over time, since by plotting the frequency of sherds at each of the sites, it is possible to suggest when the different sites were in use. The results (displayed in Fig. 10.5, Table 10.10) illustrate the main periods of Neolithic/'Temple Period' activity at each of the sites – and these broadly correlate with the radiocarbon evidence obtained by the *FRAGSUS Project* (Chapter 11). In particular, the radiocarbon data also indicate less activity during the Mġarr phase. The Żebbuġ phase is particularly noteworthy as a large quantity of material of this style was found across all the Neolithic sites excavated by the Project. Pottery sherds lacking diagnostic features, and that are often fragmented or abraded, could only be ascribed to period by their fabric or general Temple Period characteristics. Consequently, a total of 17,864 were assigned to the Earlier Neolithic; 33,373 were classified as belonging to the Temple Period; and 23,382 were dated more generally to the Prehistoric Period.

10.2.5. Phase frequency on the 2014–16 excavated sites

From Evans' 1971 account of chronology in the various individual site reports, the recorded quantities of pottery are relatively modest (and gained from counts of material stored in the National Museum following WWII when much material remained unaccounted for). Their presence, and in some instances quantities, are logged in Table 10.9.

10.2.6. Fragmentation of pottery (Table 10.10)

The majority of the Neolithic ceramic assemblage from all sites in this analysis was highly fragmented, averaging around 100 sherds per kilogram. This ratio

Table 10.10. *Frequency, relative frequency and fragmentation of pottery by phase.*

	Ġgantija	Santa Verna	Kordin III	Skorba	Taċ-Ċawla	Total *FRAGSUS Project*	Xagħra Brochtorff Circle
No. contexts	29	90	117	23	28	287	640
Għar Dalam	14	195	19	29	28	285	0
Skorba (general)	49	778	208	130	0	1165	0
Grey Skorba	1	390	5	408	844	1648	0
Red Skorba	8	254	3	274	409	948	0
Żebbuġ	470	4113	373	1212	5039	11207	19262
Mġarr	5	18	293	167	8	491	10
Ġgantija	201	906	1003	1076	5008	8194	697
Saflieni	25	5	6	0	9	45	451
Tarxien	500	16	35	1	1009	1561	10806
Other Temple Period	531	61	549	273	31959	33373	48929
Thermi	0	0	0	0	58	58	0
Tarxien Cemetary	0	0	0	0	0	0	2159
Borġ in-Nadur	7	14	0	55	19	95	468
Undetermined prehistoric	4759	14193	16240	1394	4660	41246	2544
Classical	28	32	134	5	381	580	32
Other	20	14	100	2	1248	1384	937
Total number sherds	6466	21546	18766	5859	50679	103316	86295
Total weight	66.9	184.6	115.6	53.3	391.4	811.8	800
Average fragmentation (sherds per kg)	96.7	116.7	162.3	109.8	129.5	127.3	107.9

closely matches the degree of fragmentation observed during earlier work at the Xagħra Brochtorff Circle (Stoddart *et al.* 2009b). The fragmentation varies slightly between style and fabric, and significantly across deposition contexts. The floors of the Santa Verna 'temple' for example, contained a highly fragmentary ceramic assemblage. This was presumably because of the process of working soil and other deposits into a flat, durable surface that had involved crushing and pounding. By contrast, midden-like deposits found at Ġgantija, Kordin III and Taċ-Ċawla contained larger and more frequent pieces of pottery. In general, the *FRAGSUS* sites were all well-worked locations, with disturbed upper levels and many signs of ancient disturbance, which explains the rolled nature of the sherds. The act of incorporating midden material into field soil has also impacted on the sherd size, as shown by the Ġgantija deposits. On analysis, it seems that fragmentation is similar across all the phases, so later phases seem just as damaged as earlier ones. The only substantial and large sherds of pottery from the entire programme of work came from In-Nuffara – specifically from one intact Bronze Age silo, where the pottery appears to have been deliberately deposited as almost intact vessels and left undisturbed since about 1000 BC (§8.7).

10.3. Għar Dalam pottery (Phase 1)[3]

The earliest pottery identified in Malta is the so-called Għar Dalam, a form of Stentinello later Early Neolithic impressed and stamped pottery, known from Sicily and Calabria. The Maltese material was first identified at the cave of Għar Dalam in the mid-nineteenth century, when the cave was excavated for fossil fauna (Despott 1923). Pottery in significant quantities was located in an important stratigraphic sequence (Fabri 2007; Zammit Maempel 1989). Since then, the pottery has remained scarce and rarely been identified in the later Neolithic assemblages, with little focused research (Bonanno 2011). As Table 10.11 shows, previous work identified the style at Xewkija, Santa Verna and Skorba, although sherds doubtless occurred in most assemblages but received no comment. More recently, the Cambridge Gozo Survey located a number of Għar Dalam sites (Volume 1, Chapters 6–7; Boyle 2013), usually associated with Skorba style pottery, around the plateau-tops of Gozo, where early settlement seems to have been particularly centred. The current study has identified Għar Dalam pottery in each of the prehistoric sites, except In-Nuffara. Ġgantija produced 14 sherds, Santa Verna 195, Kordin III 19, Skorba 20 and Taċ-Ċawla 28.

Table 10.11. *Phase 1. Ghar Dalam style characteristics. Stratigraphically and perhaps chronologically, finewares may be less frequent in later GħD with a reduction in decoration, fabric may be grittier, whilst transitional levels GħD to GrSk have thinner lips on tronco-conic dishes with more knobs and decreased decoration. Relatively few complete or even reconstructible vessels are present on Malta, but it seems clear that there were three main functions for pottery. Food storage, food preparation and food serving were the main uses, with large vessels for cooking and for storing liquids, especially the flask-shaped jars. Most GħD ceramics are quite small and modest vessels, suitable as tableware, but this may be a bias in preservation and recognition. The coarseware pottery is more liable to damage and surface loss, making it much harder to identify with certainty, and, to date, almost no intact GħD site or level has been extensively excavated where retrieval of reliable material has been possible.*

Fabric	**Surface**	**Known sites**
Well-polished/burnished, may be slipped – blackish-grey, some orange on surface Soft paste. Smooth, homogeneous fabric Occasional small white grits visible Dark to milky grey or yellow, rarely brown. Never creamy grey Surface flakes and decays. Thin walled 3–14 mm thick, average *c.* 8 mm	Grey, to reddish brown tint Thick and gritty, brittle, crumbles and breaks, soft, white grits Dark core and lighter surface – dark grey – black, dark brown, buff coloured pinkish Often burnished Finish – rough, poorly polished (burnishing facets visible) Thickness – 7–35 mm, average 12 mm SK produced corky textured thick, soft material (not portable)	Għar Dalam Skorba Taċ-Ċawla Ta' Kuljat Xewkija Cambridge Gozo Survey Santa Verna
Bowls	**Jars**	**Other forms**
Coarseware Simple round-based oval profile form – slightly curved walls Tronco-conical and deeper forms Fineware: Small deep bowl (form a) – walls vertical or closed, rarely with handles, but occasional broad strap handles rising from angle between base and wall (19e) Tronco-conical dish form – flared flat based bowl (form d)	Coarseware Ovoid, in-sloping 'closed' Fineware: Globular jar with short cylindrical neck (forms b and e), flask-like, with straight – in-sloped neck with distinct shoulder angle (similar to Stentinello forms). Small horizontally pierced lugs frequent on belly of vessel or on shoulder/neck lugs vertically pierced. Tunnel handles occur on thick large vessels	Flat based flared bowl
Handles	**Rims**	**Bases**
Common Vertical/horizontal large, ungainly straps and loops Some recessed handles – semi-tunnel type Finewares – broad and thin strap type, may have pinched end (i.e. pointed angle shape), mostly horizontal or tunnel Animal Protomes – i.e. models (GħD only) with incised features (parallels to Stentinello)	Heavy rims, simple, rounded profile Rarely more than simple, rounded or slightly angled-narrowed at edge	Rounded Flat bases rare Pedestal bases 4-8 cm high supporting tronco-conical bowl, out-turned profile Foot rings
Lugs	**Decoration**	**Location of decoration patterns**
Knobs – unpierced, single and double Large lugs Tubular lugs placed on shoulder of fineware jars and edge of dishes Bosses with horizontal or vertical piercing, sometimes both Occasional 'ledge' lugs – long, rectangular, D-shaped profile No unperforated knobs, but SK produced an asymmetrical strap handle with raised knob of likely GħD type	Coarseware Rare decoration – 1 in *c.* 30 sherds at SK Random incised lines and lines of nail impressions Fineware Around a third to a half of sherds from SK decorated and patterns more varied Grooves, incisions, all over stabbing, nail impressions and stamped/punched impressions Shell impressed or purpose-made tool or twine Impressed patterns – chevrons /close-set hatching / transverse or diagonal hatched bands White fill – gypsum plaster, some colour washed	Necks of jars: bands of impressed marks. Lips of small bowls Focused on knobs/lugs Body of pot: random and banded Patterns: Impressed 'C' scalloped edgings around hatched areas, or in lines Dots or dashes in single or multiple lines– may fill band between two parallel lines Linear decoration more common than impressed Groups of two to four parallels Cross-hatched triangle or bands Stamped decoration using diamond/circular punches (No evidence for shell impressions or rocca in Malta yet)

This latter site was reputed to have yielded many Għar Dalam sherds (Veen & Van der Blom 1992), although none have been systematically studied, published or placed in an accessible public collection. In total, *FRAGSUS* identified 285 sherds, a significant addition to the known assemblage, although relatively few forms were identified. These and diagnostic patterned sherds are illustrated in Figures 10.7 & 10.8.

10.3.1. Għar Dalam pottery from FRAGSUS *sites*

The *FRAGSUS* excavations identified Għar Dalam pottery, where it occurred most commonly at Santa Verna (195 sherds). The Għar Dalam sherds were mainly from trench B (a test trench to the northeast of the temple ruins that recorded ploughsoil, buried soil and subsoil-bedrock layers), although material also occurred in many levels across Santa Verna. Much smaller quantities were recovered from the other sites: Ġgantija (14 sherds), Kordin III (19 sherds), Skorba (29 sherds) and Taċ-Ċawla (28 sherds).

The forms of pot recovered from the sites have been recorded, and the bulk of decorated sherds drawn, together with those fragments that allow reconstruction. By employing the Evans 1971 typological scheme the following forms were recorded: 2, 3, 4, 5, 6, whilst form 1 is most likely present too, but difficult to determine from small sherds.

10.3.2. Għar Dalam style representation

All the main forms of Għar Dalam style distinguished by Evans are represented, with a preference in Santa Verna for necked jars and more flat bases than found in the original Skorba assemblage. The flask form of necked jar (Trump E/Evans 4) presents a new variant, a flared neck jar (SV7-8) and another possible example (SV7-9), which differ from the more familiar inverted or closed shape previously reported. This more open form resembles some of the necked jars from Castellaro Vecchio on Lipari associated with fine painted Neolithic pottery (Bernabò Brea & Cavalier 1960, Preface, 1980, figs. 32, 82; Cavalier 1979, figs. 4, 5, 6, 8, 9), and also a very large impressed and ochre stained example from Capo Alfiere (CA0008-14) (Morter 2010).

10.3.3. Għar Dalam: catalogue descriptions (Fig. 10.7)

1. SV79-1 Inverted globular bowl, rounded rim, with chevron incised pattern (similar to miniature form C in Trump 1966, fig. 20; Lipari Castellaro Vecchio, Cavalier 1979, fig. 9.C; Morter 2010, fig. 7.13b, c, g). D – *c.* 19 cm. Black gritty fabric.
2. SV60-2 Inverted rim of small vessel (D approx. 9 cm) with dot impressed decoration. Black fabric with white paste filled patterns.
3. KRD71-8 Inverted bowl with vertical cut rim, and diagonal incised band pattern, D – *c.* 11 cm. Grey fabric.
4. SV10-1 Everted bowl with incised band. Fine grey-black fabric with white paste fill.
5. SV7-11 Everted bowl (form 5) with horizontal linear pattern bordered with dots (Cavalier, 1979, fig. 5.E). D – *c.* 11 cm. Grey-black fabric with white paste fill.
6. TCC244-4 Belly sherd of jar (form 3-4) incised chevron pattern. Max D – *c.* 15 cm. Red-buff surface with ochre patches.
7. SV52-3 Belly sherd (form 3-4) with large chevron and horizontal incised pattern. D – *c.* 13 cm. Grey burnished fabric.
8. SV113-2 Base of decorated strap handle, rising from shoulder of flask/jar (form 3-4), incised chevron pattern. Black shelly fabric.
9. SV7-14 Miniature flask with shoulder and belly lugs and incised chevron pattern. D – 5–6 cm. Black, gritty fabric with white paste fill.
10. TCC128-1 Body sherd of bowl with applied cordon and stamped pattern, D – *c.* 20–22 cm. Black fabric, red-grey surface.
11. SKB16-24 Neck sherd with vertical stamped pattern. Orange-buff fabric.
12. SV7-18 Everted bowl with parallel line pattern of indented 'C' impressions. D – 12 cm. Fine dark-grey fabric with creamy grey surface.
13. SV9-1 Flask shoulder with 'C' impression band at neck-shoulder junction and impressed lines on shoulder (Stentinello narrow necked vase, Syracuse Museum). Max. D – *c.* 13 cm. Dark grey fabric with white paste fill.
14. SV7-8 Flask rim, slightly everted neck with 'C' impressions at neck-shoulder junction and sweeping zigzag incised band above, broadly shape 4 (Cavalier 1979, fig. 11; Morter, 2010, fig. 7.13:a; Robb 2003, fig. 27a). D – 10 cm. Grey burnished.
15. SV7-9 Everted vessel rim with 'C' impressions combined with horizontal/diagonal incised lines. D – *c.* 13 cm.
16. SV61-1 Sherds from a necked vase, shape 4, with horizontal 'C' impressions at neck junction, and linear patterns across body. Max. D – *c.* 16 cm. Hard grey fabric, white paste fill.
17. SV61-3 Inverted neck sherd with short linear pattern.
18. SKB26-2 Shoulder sherd of thin-walled vessel with 'C' impressions at base of sharply angled neck. Probable D – *c.* 18 cm. Grey fabric with white paste fill.

19. SV61-23 Sherds from large flask necked wide bellied vessel, with impressed criss-cross band. (Morter 2010, fig. 7.6, C). D – *c.* 23 cm.
20. SKB24-6 Footed vessel base. (Morter 2010, 244, CA 0074-01 for similar footed base). D – *c.* 10 cm
21. SKB23-26 Flat base of jar/flask with linear incised patterns (see 21 below for comparators). Max. D – *c.* 7.5 cm.
22. GG1002-5 Base of flat vessel with zigzag linear pattern. (Morter 2010, 232, CA 0179-02, for similar base). D – *c.* 11 cm. Coarse grey fabric.

10.3.4. Għar Dalam: style characteristics (Fig. 10.8)

Multiple impressed lines in parallel and angled patterns.

1. SV1-4 Impressed sherd, fine lines. Buff brown fabric.
2. TCC120-18 Impressed sherd, fine lines. Grey-pink fabric, white shell inclusions, back surface, white paste fill.
3. TCC272-6 Impressed sherd, parallel lines. Beige-grey fabric, cord impressed with white fill.
4. KRD306-3 Impressed sherd, parallel lines
5. SV61-12 Impressed sherd, vertical lines
6. SV10-2 Impressed sherd, parallel lines
7. SV61-5 Impressed sherd, vertical lines
8. SKB81-14 Impressed sherd, parallel lines. Buff fabric with black grits and white paste fill.
9. SV61-7 Impressed sherd, parallel lines
10. SV61-15 Impressed sherd, parallel curved lines. Dark grey polished, white paste filled cord impressed.
11. SV61-14 Impressed sherd, parallel lines
12. SV46-2 Impressed sherd, dense parallel lines. Grey with white paste.
13. SV61-4 Impressed sherd, parallel lines. Brown fabric.
14. SV61-11 Impressed sherd, parallel and vertical pattern
15. SV61-1 Impressed sherd, band of design
16. SV61-9 Impressed linear pattern sherd (orange buff fabric)
17. SKB21-1 Impressed vertical line sherd
18. SV68-1 Impressed horizontal pattern sherd. Rosy coloured fabric.
19. TCC233-1 Impressed horizontal pattern sherd
20. TCC30-3 Impressed banded pattern sherd
21. SKB24-2 Chevron impressed sherd. Buff fabric fired black on surface.
22. SV52-6 Chevron design, impressed sherd
23. SV113-1 Geometric patterned sherd
24. SKB16-24 Geometric pattered sherd. Grey fabric.
25. SV34-21 Fine feather patterned sherd
26. SV7-7 Parallel and diagonal impressed sherd.
27. SV95-3 Diagonal line patterned sherd.
28. SV61-10 Impressed sherd.
29. SV7-1 Handle tip (parallels with Capo Alfieri, Morter 2010, fig. AC1129).
30. SV60-8 Chevron patterned vertical lug through body wall. Grey fabric.
31. SKB23-3 Parallel chevron patterned, buff-rosy fabric, hard burnished with white paste fill.
32. SKB24-1 Chevron design. Black fabric buff surface.
33. SV61-16 Geometric patterned sherd. Grey fabric with white paste fill.
34. TCC261-15 Chevron patterned sherd. Buff fabric.
35. SV60-11 Rim with 'rice' grain impressions. Creamy-grey fabric.
36. SV89-1 Linear patterned sherd. Black burnished with white paste fill.
37. SV61-18 Banded impressed sherd. Grey burnished fabric with buff surface and white paste fill.
38. SV61-2 Thick sherd with traces of impressions.
39. TCC261-5 Parallel chevron patterned sherd. Orange-buff sandy fabric with white paste fill.
40. SV61-13 Thick sherd with 'nail' impressions.
41. SV7-17 Sherd with 'C' impressions. Buff-orange fabric.
42. SV61-17 Impressed sherd, possibly a handle fragment.
43. SKB11-1 Patterned sherd. Black burnished fabric.
44. SV32-5 Large criss-cross pattern handle. Dark, gritty fabric.
45. SV98-1 Linear and 'rice' grain patterned sherd. Black burnished, white paste.
46. SV86-2 Sherd cord impressed with parallel lines.
47. SV34-7 Criss-Cross semi-geometric hatched sherd.
48. SV60-3 Hatched incised decorated sherd. Grey burnished with white fill in cord impressed pattern.
49. SV17-1 'Stentinello' style thin and fine stamped sherd with Calabrian diamond design (Morter 2010, 224-5, CA 0481 & CA0498-02, and 234–5; Bernabò Brea & Cavalier 1960, fig. 32). Buff orange fabric with darker surface patches.

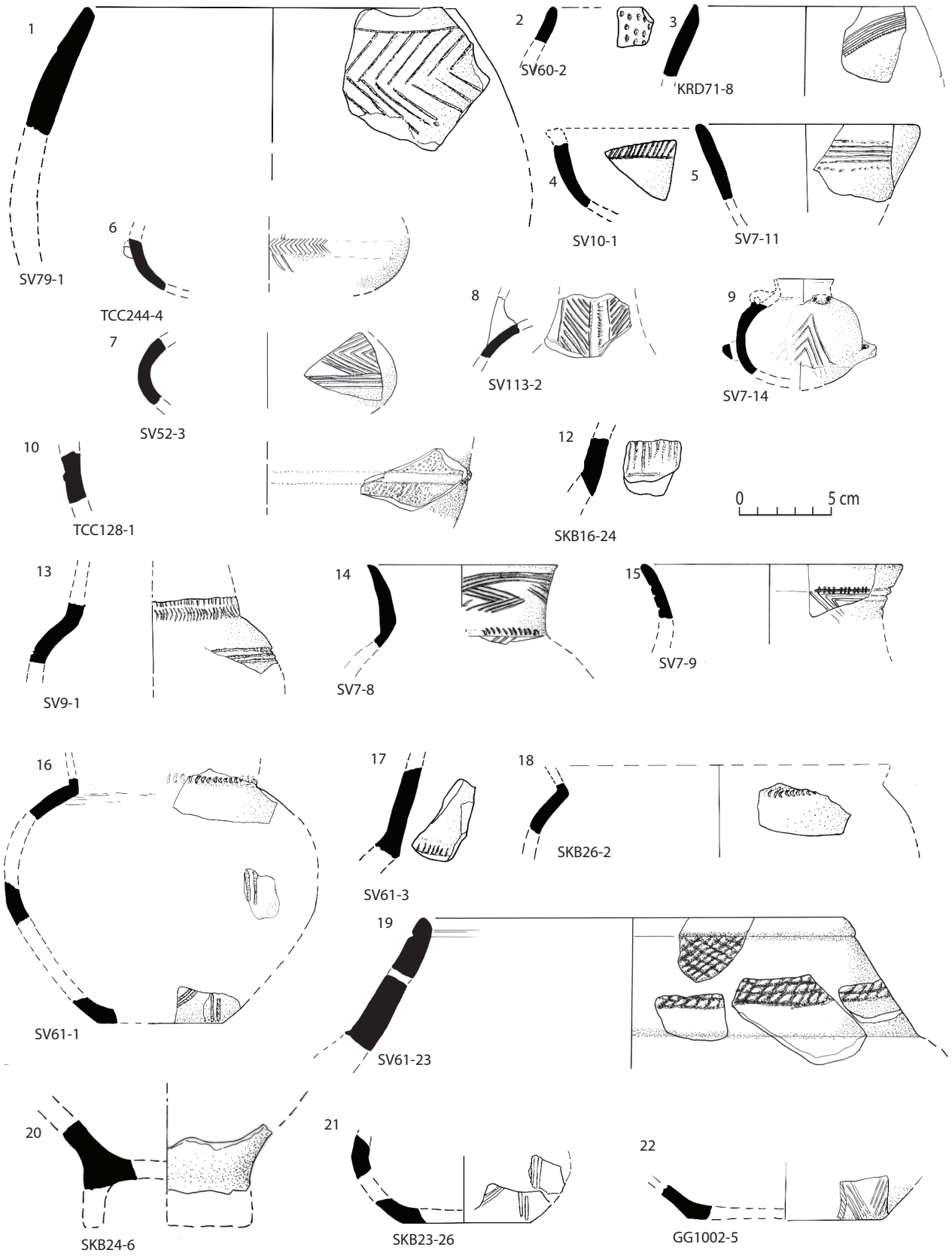


Figure 10.7. *Ghar Dalam pottery forms.*

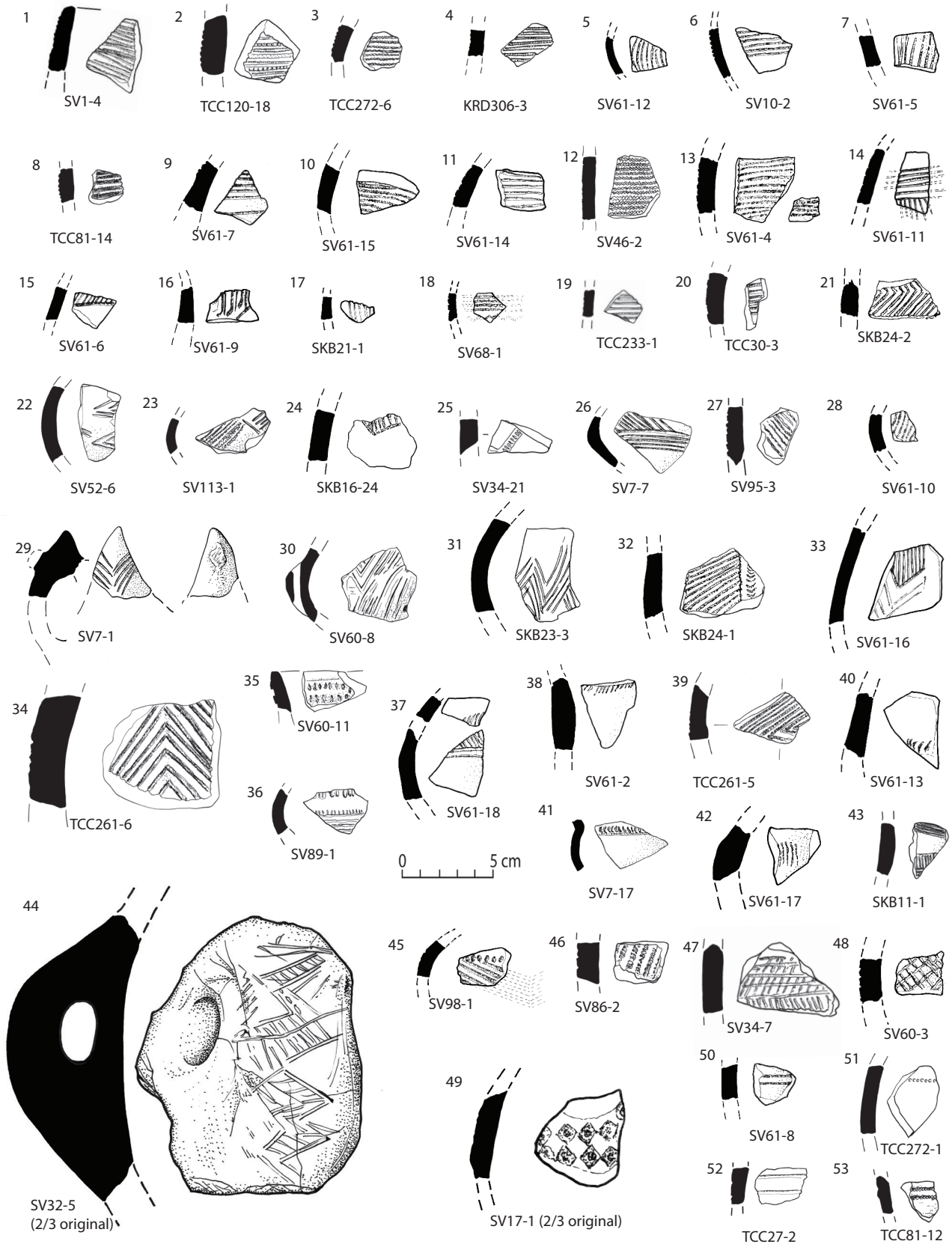


Figure 10.8. *Ghar Dalam: classification of patterns.*

50. SV61-8 Sherd with parallel line impressions.
51. TCC272-1 Lightly impressed sherd. Roulette linear impressed sherd. Grey-blackish gritty with matt surface.
52. TCC27-2 Linear impressed sherd with traces of white paste in grooves.
53. TCC81-12 Linear impressed sherd.

10.3.5. Għar Dalam: fabric, finish and decoration

The Għar Dalam assemblages excavated in the *FRAGSUS Project* are mostly highly fragmented small body sherds, and this is a result of the Project's focus on accessible and previously examined areas on the respective sites. In the case of Santa Verna, much of the upper deposit examined in 2015 was old backfill from the Ashby 1911 campaign (Ashby *et al.* 1913). However, undisturbed pockets of Pre-Temple period Neolithic deposits were uncovered from the northern and western extents of Trench D and from Trench B, and through the re-cutting of Trump's deep test pit (Chapter 4). Later Temple Period and Medieval activity had been extensive at Santa Verna, leaving no early stratum without some form of disturbance, hence the small sherd size. The fragmented material nevertheless, has been illustrated here (Figs. 10.7 & 10.8), which present a range of pattern-making, and an informed guess has been applied to the orientation of the sherds in the drawings, since they could be angled in many ways. The most frequent pattern style is of closely placed parallel lines, impressed with a small bone/wood point or with a form of comb, sometimes bounded by horizontal/diagonal lines or lines of other patterns and dots. In other instances, linear patterns have been incised, or scratched into the surface, or small or large dots in lines (which may also relate to later Żebbuġ patterns), 'finger-nail' impressions in lines and bands, and whilst the larger patterns are not easily discernible from the smaller sherds, chevrons, zigzags, filled bands and more random incised patterns are present. Where neck sherds are identifiable, they frequently display closely placed lines of 'C' or short diagonal line impressions. The Taċ-Ċawla Għar Dalam assemblage is smaller than that from Santa Verna, and appears to be quite thick and hefty, but this may be a factor of survival in a heavily reworked site, rather than a true representation of the original assemblage. Whatever the reason, it is evident that the domestic site demanded storage vessels of some size. For example, the large handle SV32-5 (Fig. 10.8, 44) (measuring *c.* 11 cm in length, handle width 5 cm) has particularly fine surface scratched lines in a rough zigzag pattern and belonged to a substantial pot. The pattern, as with the more generic material, is similar to Stentinello ceramics from Capo Alfiere, Calabria (Morter 2010, 241, CA 0010-2). The actual handle form is more similar to a Skorba example (Trump 1966, figs. 19 a & b).

The decorated sherds represent a substantial number of vessels, varying in size and thickness, from extremely fine small vessels (e.g. SV7-14) to heavy and probably very large vessels (TCC261-6), reinforcing the notion that the decoration of pottery was a standard part of the ceramic repertoire of Għar Dalam, whether for fine or coarse pot making. There were only two recognizable forms from Taċ-Ċawla TCC244-4 (belly Fig. 10.7: 6) and TCC128-1 (cordon body sherd Fig. 10.7: 10). Santa Verna has yielded a wide range of forms and decoration, including base fragments (cf. SKB24-6, Fig. 10.7: 20 pedestal SKB23-26, Fig. 10.7: 21), SV61-1, Fig. 10.7: 16, and another from Ġgantija – ĠG1002-5 Fig. 10.7: 22). Two neck forms (SKB16-24, Fig. 10.7: 12, and SKB26-2, Fig. 10.7: 18) from Skorba were both in grey smooth fabric. However, for many sherds, without their distinctive Għar Dalam patterning, the fabric alone is quite difficult to discern from later prehistoric fabrics. No sample was thin-sectioned in this study, although other scholars have been examining Għar Dalam (Brogan, pers. comm.; Pirone 2017), suggesting the clay used for most pots was local. Only one example of Pirone's study of Għar Dalam/Stentinello sherds suggested an exotic origin, probably derived from clay of the type around Syracuse in Sicily. The rest conformed largely to his type C, a local Maltese clay.

10.3.6. Regional style

The Għar Dalam ceramic assemblage collected from the Maltese sites between 2014 and 2016 provides several parallels forms to those retrieved by Trump at Skorba (Trump 1966, 21–24) and to Stentinello forms from assemblages in Sicily, Calabria and the Aeolian islands (Bernabò Brea & Cavalier 1960, 1980; Cavalier 1979). The most recent and extensive studies (Morter 2010; Robb (unpublished reports- 2003, 2007; forthcoming) presents fine illustration and fabric description of the Calabrian material, and although different in many respects, some valid comparison between the pottery forms and decorations can be made. Earlier studies (Salvatori 1973; Ammerman 1983; 1985; Bernabò Brea & Cavalier 1960, 1980; Cavalier 1979; Pessina & Tiné 2008, 66–8, 79–81) reveal several parallels in decoration and in vessel form, but the distinction between Stentinello material and the Għar Dalam appears to be clear for much of the production. Essentially, Stentinello represents a later phase of the early Neolithic in the central Mediterranean area between 5500 and 5000 cal. BC, although many Sicilian and Italian sites have earlier precursors with cruder

impressed 'Cardial' style pottery present in their assemblages. In the Maltese assemblage to date, there is no Rocca Cardial (shell) Impressed material or the crude finger-nail impressed patterns on thick impasto associated with the first ceramics seen for example at Grotta dell'Uzzo (Palermo) (Tusa 1993, 1997), Fontana di Pepe (Syracuse) (Cafici 1920), Castellaro Vecchio on Lipari (Cavalier 1979, figs. 6 & 8), at Curinga/Acconia (Ammerman 1985, figs. 4.1–4.3) or Capo Alfiere (Morter 2010). The Calabrian and Sicilian Stentinello pottery has highly decorated finewares, often with round bases, which differs from the largely flat and footed bases of Għar Dalam examples. Għar Dalam, on the basis of the current assemblage, appears to draw on only some of the central Mediterranean Stentinello ceramic forms and types of decoration, and its decoration appears more restrained. There is still, however, insufficient analysis of the few ceramic assemblages to enable more than initial observations. From the classic Acconia study, Ammerman (1983, 1985) demonstrated that for the most decorated vessels, there were three zones of impressed pattern making on a pot. In the table below, these observations, combined with the Capo Alfiere and Lipari assemblages, are presented as a possible scheme of decoration for Stentinello (Table 10.12).

Such pattern organization can be seen in sherds from Curinga, the Stentinello type site in Sicily, and from Capo Alfieri (e.g. Morter 2010, fig. 7.10; Robb 2007, Ch. 5), and from Table 10.12, elements of these are replicated in the sherds from Malta. Impressions are difficult to define for the most part, and a variety of terms have been used including: slash, fingernail, stamp, twine impression, scored, incised and so on.

Table 10.12. *Pattern organization of Calabrian Stentinello pottery (Ammerman 1983).*

Stentinello pattern structure	Common Motif	Orientation
Rim Band	Diamonds, close zigzag, 'feather' or wavy bands, circular stamps CA= Close vertical or diagonal lines below a diamond or punched circle band	Horizontal
Central body	Dense variable impressed patterns executed by several tools- broad zigzags, double line zigzags enclosing detailed patterns, filled triangles	Variable
Lower body	Parallel lines, zigzags	Diagonal or vertical impressed patterns

Yet, stamp marks are perhaps the most diagnostic element of Stentinello, decorated with purpose-made tools carved into geometric designs formed in baked clay, animal bone or wood. These enabled regular and repeated decorative designs, but until now, no stamp decoration pottery has been identified in Malta. One 'Għar Dalam' sherd from Santa Verna (SV17-1, Fig. 10.8: 49) reveals stamped decoration, whilst another imitates this with carefully executed criss-cross lines (SV60-3). The resulting patterns present close parallels to the typical stamped designs of the evolved decoration from Calabria and Sicily. Sherd SV17-1 is similar to Capo Alfieri (AV-0274-02), examples from Penitenzeria (Robb 2007, fig. 33) and Lipari (Bernabò Brea & Cavalier 1960, fig. 32), with rows of stamped diamonds with central dots. A similar motif is reported from Acconia (Ammerman 1983, fig. 8), of a similar diamond impression with a central dot. These patterns were made with a purposely formed tool (wood, bone, clay?), typically carved with open circles, 'V' shapes and diamond/squares or parts of, which are massed together to create a band of design.

10.4. Skorba pottery (Phase 2)

Skorba pottery (as defined in the scheme in Table 10.13) was identified on five sites in the *FRAGSUS Project*, (many more in the earlier Cambridge Gozo Project Survey, see Volume 1, Chapters 6 & 7). Excavated material amounted to a total of 3906 identified sherds (Table 10.8). Of these, 1165 were unclassified Skorba, 1693 Grey Skorba, and 948 Red Skorba, but it remains rather unclear whether the surface colour and its survival is a genuine factor of chronology or even of form. Trump was convinced there were stratigraphically distinct Red Skorba levels at Skorba, but none were apparent in the recent fieldwork at any of the sites. Here, we present the diagnostic material laid out in Grey, Red and undifferentiated Skorba figures to enable ongoing study of this rather poorly known phase of Malta's Neolithic ceramic development. The largest assemblages were collected from Santa Verna and Taċ-Ċawla, although the more diagnostic forms were identified especially from Santa Verna, where there was better preservation of early occupation levels. Kordin III had only a small presence of early Neolithic pottery and even less was located in the small trenches at Ġgantija, where work concentrated on later structural levels. Skorba material, however, was routinely identified in surface survey work of the Gozo and the *FRAGSUS* projects, suggesting that its fine and regularly fired fabric survives well, but the slipped or painted surface might not. The fabric, nevertheless, was mostly low fired, and thus

Table 10.13. *Phase 2. Grey Skorba, Grey to Red Skorba Transitional, and Red Skorba style characteristics.*

Phase 2a. Style characteristics of Grey Skorba. Main forms – mostly open, closed forms rarer		
Fabric fineware	**Fabric coarseware**	**Classic sites/references**
Compact dark and lighter grey fabric Distinctive white gritty inclusions which under a microscope are shells Surfaces – un-slipped, often highly polished, grey colour Coarseware has more grits, poorly polished and tends to pinkish surface		Skorba Santa Verna Ġgantija – Survey Ta' Kuljat
Bowls	**Jars**	**Other forms**
Open convex profiled tronco-conical bowl – most round based Smaller bowls, some with quadrilateral-shaped handles projecting as ladle form Trump describes as 'Round bottomed dippers' (Trump 2002, 47) Deeper bowls, some with 'S' profile open, almost carinated forms, some have thick lip and probably around base, transitional form to RSk	Necked jars – range from cylindrical neck clearly demarcated from body by 'S' profile shapes Ovoid jars – general small and reflect the deeper bowl forms	
Handles	**Rims**	**Base**
Pinched tip – pointed handle – high broad handles that sweep up from wall of ladle sharply to rim, sometime 'M'-shaped top High swept axe-shaped handle form rising above void, some with reduced loop at base, other with knob applied to internal face above bowl rim ('saddle') Plain strap handles, plain or 'saddled' or indented in section	Rounded, simple, some everted in a slightly thickened lip	Flat splayed, Concave-hollowed Foot rings Pedestals of varying height – concave – 'S'-shaped
Lugs	**Decoration**	**Location of decoration patterns**
Lugs – 'Skorba' type – 2-7 cm long horizontal splayed trumpet lugs, pierced or solid placed on carination or on 'S' profile bowls Simplified pierced lug with a trapezoidal section Vertical, pierced tunnel lug – usually coarseware large lugs, knobs and ledge-lug handles	Rather rare Incisions on coarseware Mostly decoration occurs from the transitional phase	Body and shoulders
Phase 2b. Style characteristics of Grey to Red Skorba Transitional pottery		
	Fabric	**Classic sites/references**
This is asserted by Trump, but on the quantity of material known and the lack of clearly stratified ^{14}C dates is still unclear. Evident continuity between Grey and Red Skorba in fabric and forms (if indeed this is a chronological division)	Coarseware rare in transitional levels – more compact in fabric, and coarse on surface Unpolished Orange-buff colour or irregularly fired, grey-black blotches	Skorba Taċ-Ċawla Cambridge Gozo Survey sites
Bowls	**Jars**	**Other forms**
Combinations of GSK fabric but with RSk splayed lugs on carinated bowls Limited range of RSk forms – commonest is the carinated bowl.	Simple, large ovoid jars with thick lips	
Handles	**Rims**	**Base**
No handles noted -Trump asserts 'M'-shaped handles may be transitional.	Thick lips	Flat bases

Table 10.13 *(cont.).*

Phase 2c. Style characteristics of Red Skorba		
	Fabric	**Classic sites/references**
Carinated bowls and dishes, necked jars, straight-walled vessels, biconical vases forms in Fig. 27; Evans 1971, Fig. 32)	Little difference between Grey and Red fabric (especially after removal of red slip) Dense, fairly well fired, but still soft, with white speckles (shell forms under magnification) pinkish, grey and even dark	Skorba Taċ-Ċawla Santa Verna
	fabric depending on firing conditions Surface – bright red slip – sometimes variegated or black, highly polished Coarsewares greyer, thicker, some very large vessels of over 60 cm diameter	
Bowls	**Jars**	**Other forms**
Shallow open bowls with rounded base, no handle (scratched decoration -pendant loops or concentric circles) Ovoid rounded forms, some with small flat bases Carinated bowls: – slightly closed forms and open everted lips types (biconical forms rarer) some deep almost 'jar' forms Pedestal bowls: straight-convex sided bowls, 15–50 cm diameter. Tapering pedestal, some 'S' profile, no handles, but holes in pedestal wall	Necked jars with squat globular body, ovoid and wide belly, flat-concave base, neck sharply distinguished from shoulder Small classic 'flask' of SDA form with everted rim, and often lugs on shoulder (Evans 1971, fig. 32, 8). Deeper globular-ovoid jar-bowls – closed forms, some with vertical lugs below rim, or horizontal lugs at widest part of body (Evans 1971, fig. 32, 7)	Ladle – rounded deeper base with high double pointed handle (forked tongue 'M' profile), which is thickened into a rib on outside (Trump 1966, fig. 28:b) (stylistic remnant of strap attachment) Handle profile may be 'V'-shaped with valley between the two sides. Ladle diameter 6-11 cm
Handles	**Rims**	**Base**
Strap handles high and wide or narrow on ladle-cups, with two projections or 'M'-profile with ridge below outer top, some impressed Large perforated lugs – often below/near thin lipped straight sided bowl.	Simple, rounded, some sharply cut and angled	Mostly small flat bases Saucers, flasks and ladle cups round based Pedestal bases some with cross incised on base
Lugs	**Decoration**	**Location of decoration patterns**
Trumpet (tunnel) handle lug – horizontal and vertically set, asymmetrically angled ends, typically on deep bowls not common on grey fine ware instead pinkish, with grits, 'Horseshoe' lugs Broad, square-topped projecting pierced lugs Various lugs, ledges, bosses, horizontal, diagonal ribs, short wedges (some pierced horizontally or vertically)	Simple incised/scratched designs executed before firing Closely incised chevrons, diagonal lines, 'ear of grain', leaf-patterns Incised pendant arcs, loops (saucers) – on shoulder of bowl. Patterns include incised 'loops', 'C' incised patterns, paired 'C's – like eyes, undulations White paste filled lines, lines along carination Applied ribs/undulations, Cordons in various patterns, some are functional lugs, others decorative, zoomorphic, some in combination with lugs, knobs, incisions, 'C' marks.	Around and on lugs, horizontally around body and neck

relatively soft and susceptible to breakage into small fragments. The thin sections taken from a selection of Red and Grey Skorba sherds all indicate a very high level of foraminifera/shell incorporated within the clay matrix. Often of microscopic size and leaving a tell-tale white speckle on the vessel surface, these spots under magnification are revealed as small spirals, the remains of shells, wither large (echinoid, rare bivalve) or small (foraminifera) shells. There is also a high level of glauconite within the clay used for Skorba production, derived from the Greensand with some in the Blue Clay (Appendix A10.2). This impression seems to tally with Pirone's recent analysis (2017) that suggested much of the earlier Neolithic, and indeed later Neolithic and Bronze Age pottery was derived from his Group C – a local Maltese clay type.

10.4.1. Skorba (Red and Grey) bowl and jar forms from Santa Verna and Skorba: catalogue descriptions (Fig. 10.9)

1. SV3-4 GSk Shape 2 everted bowl, rolled rim. D – *c.* 11 cm. Grey burnished.
2. SV3-1 GSk -Shape 1 vertical sided bowl, rolled rim. D – *c.* 19 cm.
3. SV68-2 GSk Shape 2/RS Shape 6 inverted ovoid bowl with perforated lug, form not previously noted or classified. D – *c.* 13 cm. Grey burnished fabric.
4. SKB24-5 GSk Shape 1 deep coarseware bowl. D – *c.* 13 cm.
5. SKB19-1 Shape 1-2 bowl thick upright sides, square bevelled rim. D – *c.* 17–20 cm. Highly burnished grey fabric.
6. SV41-1 RSk shape 6-7 type inverted ovoid jar with lugs. D – *c.* 12 cm. Coarse gritty black fabric.
7. SKB10-4 GħD Shape 1, miniature bowl. D – *c.* 5 cm. Red slip over darker fabric.
8. SV6-5 Upright jar GSk Shape 4 with curved ledge lugs. D – *c.* 23 cm. Grey fabric.
9. SV45-4 GSk Shape 4-5 neck with perforation. D – *c.* 10 cm. Pale yellow fabric.
10. SV36-1 RS Shape 6 inverted jar with lug. D – *c.* 18 cm. Gritty buff fabric with burnish.
11. SKB5-5 Inverted ovoid jar – GħD Shape/RS Shape 6 incised/comb decoration (Trump 1966, figs. 25a, 29). D – *c.* 10.5 cm. Grey fabric.
12. SV7-15 Inverted jar broadly RSk Shape 6. D – *c.* 23 cm.
13. SV7-5 Inverted jar RSk Shape 6, with lug below rim, thick coarseware. D – *c.* 17 cm.
14. SKB18-1 Inverted jar, RSk Shape 6. D – *c.* 25 cm.
15. SV61-20 Inverted coarseware jar RSk Shape 6. D – *c.* 16.5 cm. Smoothed grey fabric.
16. SKB10-7 Inverted bowl or neck, RSk Shape 6, rolled rim. D – *c.* 11.5 cm. Fine grey-buff fabric.
17. SV61-22 Inverted coarseware jar RSk Shape 6. D – *c.* 12 cm. Dark burnished fabric.
18. SV20-7 Inverted ovoid bowl RSk Shape, rolled rim. D – *c.* 17.5 cm. Gritty fabric.
19. SKB18-3 GSk Shape 2/RS Shape 4 footed base. D – *c.* 9 cm.
20. SV61-21 Ovoid bowl RSk Shape 6. D – *c.* 14 cm.
21. SV13-7 Inverted jar with rim lugs RSk Shape 6. D – *c.* 15 cm. Grey rough surface
22. SKB5-1 Fineware sherd with two indented marks. Highly burnished grey fabric, semi-holes appear drilled.
23. SKB23-1 Sherds with incised linear decoration (similar to Trump 1966, fig. 29d).
24. SV7-12 Thick coarseware flat base. D – 25 cm.

10.4.2. Skorba general forms: catalogue descriptions (Fig. 10.10)

Closed vessels and larger vessels of Skorba type from Taċ-Ċawla, Santa Verna, Ġgantija and Kordin III. Skorba handles and Red Skorba forms from Skorba, Santa Verna, Taċ-Ċawla and Kordin III. Handles include the distinctive raised cup handles surmounted by 'horns' or points. Red Skorba forms displaying bright red slip and 'trumpet' lugs.

1. TCC1-1 Inverted RSk Shape 6. D – *c.* 18 cm. Grey fabric.
2. KRD105-3 Inverted RSk Shape 6. D – 18 cm. Gritty orange-brown fabric.
3. TCC81-10 Inverted RSk Shape 6 with vertically pierced rim lug. D – *c.* 26 cm. Grey typical white spotted fabric with orange-pink surface.
4. GGMM5-1 Large storage vessel, RSk Shape 6 (show at half size). D – *c.* 54 cm. Gritty red fabric.
5. TCC81-16 Small inverted RSk Shape 6 vase. D – *c.* 10.5 cm. Grey fabric, buff surface.
6. SV3-5 Bowl GSk Shape 2. D – *c.* 14 cm. Red paint or slip on surface.
7. TCC27-1 Jar neck, GSk Shape 4. D – *c.* 11 cm. Grey fabric, buff surface.
8. TCC272-9 Thick inverted jar with angled rim. Grey gritty fabric.
9. SV94-2 Bowl GSk Shape 2. D – 18 cm. Black with orange patches.
10. KRD147-2 Belly sherd with horizontally pierced lug set within groove-textured surface. Max. D – 15 cm. Grey fabric.
11. SV94-1 Large bowl, GSk shape 1 or 4. D – *c.* 38 cm. Gritty fabric, brown grey, burnished on surface.
12. SKB12-3 Tunnel handle with angled end, horizontal placement on inverted neck, most similar to RSk Shape 7. Pale yellow-grey fabric.
13. TCC81-3 Base.
14. SV26-2 Trumpet tunnel handle, coarseware (Trump 1966, fig. 24f). Creamy-orange burnished surface.
15. SV41-1 Inverted rim sherd with horizontally pierced lug GSk Shape 4/RS Shape 6. Burnished grey-red surface.
16. SKB18-2 RS Shape 6-7 Strap handle with raised edges. Typical RSk red fabric.

17. SKB19-2 Pointed raised strap handle fragment (similar to Trump 1966, fig. 28a). Red fabric with black surface.
18. SKB5-4 GSk Shape 3/RS Shape 5 raised handle with knob and two top points (Trump 1966, fig. 24g). Gritty buff fabric.
19. TCC120-17 Classic RSk (possibly set horizontally) part hollowed rim trumpet lug (similar to Trump 1966, fig. 28f). Grey gritty fabric with red burnished surface.
20. KRD215-1 Belly sherd with small horizontal tunnel handle. Grey fabric.
21. SV61-19 Strap handle fragment with oval profile. Grey fabric.
22. TCC81-15 Scored decoration. Grey fabric with buff-red surface.
23. SV26-1 Pointed handle or lug end GSk Shape 3/RS Shape 5.
24. SKB12-1 Raised handle with twin points and extending to a cup strap. Dark grey fabric, orange surface. Twin pointed top of raised strap handle – GSk Shape 3/RS Shape 5 (similar to Trump 1966, fig. 28b).
25. TCC81-13 Sherd with scored decoration.

10.4.3. Red Skorba: catalogue descriptions (Fig. 10.11)

1. SV41-2 Upright-inverted bowl with small horizontal lug, slightly angled. Perforated. D – *c.* 16 cm. Coarse gritty fabric.
2. SV20-11 Inverted RSk Shape 6 jar with indented top rim decoration, and tapered rim. D – 7 cm. Brown-red burnished fabric.
3. SV60-1 Large strap handle base and body sherd, flattened oval section. Coarse fabric.
4. SV20-6 Rim sherd with vertical rib, red slipped, the applied rib (similar to the zigzag applied patterns in Trump 1966, fig. 29g). Red burnished surface.
5. SV1-1 Very large inverted bowl RSk Shape 6. D – *c.* 33 cm Traces of paint, red, on surface.
6. SV7-4 Raised strap handle base rising from a slight carination, most similar to GSk. Grey fabric, but with black to red surface.
7. SV7-13 Everted rolled rim RS bowl GSk Shape 1. D – 16.5 cm. Coarse gritty fabric.
8. SV3-2 Inverted bowl RSk Shape 6 with tapering rim. D – *c.* 17-18 cm. Burnished pink-grey on black fabric.
9. SV32-1 Twin pointed raised handle top GSk Shape 3/RS Shape 5 (Trump 1966, fig. 24h). May have been a zoomorphic animal head.
10. SV41-11 Horizontal ledge lug with two projections, form appears to be inverted Red Skorba (similar to Trump 1966, fig. 24e, but without perforations). Gritty fabric with rough black surface.
11. SV1-2 Trumpet lug, horizontal on belly sherd. Grey fabric, typical Skorba white flecks.
12. SV7-3 Large strap handle base from jar. Raised strap handle base of large coarseware vessel. Coarse orange-brown fabric
13. SV7-16 Flared and perforated trumpet lug – RSk Shape 7 – raised on rim. Red slipped surface.
14. SV20-6 Carinated bowl, Grey gritty fabric, with red slip around rim and shoulder but browner coloured slip on interior. D – *c.* 25 cm. Classic Diana-Bellavista shape (cf. Lipari, Bernabò Brea & Cavalier 1960, 1980).
15. SV7-2 Strap handle – very large, with typical Skorba grey speckled fabric.
16. SV2-1 Round section raised handle fragment, part of ladle or cup shape 4. Typical Skorba speckled grey fabric.
17. TCC119-4 Raised knob handle/lug (Trump 1966, fig. 24h).
18. SV20-12 Everted bowl. D – 16 cm. Red slipped on all surfaces, fineware.
19. SKB19-5 Textured red sherd, dot impressed.
20. SV34-3 Horizontal large rolled tunnel handle. Coarse gritty fabric, fired red on surface and brown-grey on interior
21. SV34-20 Sharp angled handle, with raised edges culminating in central point. Dark burnished fabric.
22. TCC31-1 Inverted fineware jar. D – 11 cm.
23. SKB19-3 Large inverted jar. Bevelled rim cut at angle. D – 40-4 cm.

10.4.4. Forms and shapes

The general correspondence of Skorba shapes from the *FRAGSUS* sites is sufficiently close to the Evans-Trump scheme, and demonstrates that these simple forms do genuinely represent a ceramic type. The rather simpler rim forms, however, in the Grey and undifferentiated Skorba, where many bowls tend towards an inverted rather than everted shape, suggests the bowl forms need expansion in typological terms. We suggest that the repertoire of GSk is expanded to include a Shape 1a, which is everted; and 1b, which is inverted; and likewise, the many variations of handles/lugs need expansion, especially GSk Shape 4 and RSk Shape 6. Coarse and fineware characteristic rolled, tunnel and trumpet lugs are represented in the assemblages together with some distinct remnants of red slip, but also occur in the classic matt grey ware. There are few evident carinated forms of the shapes suggested by

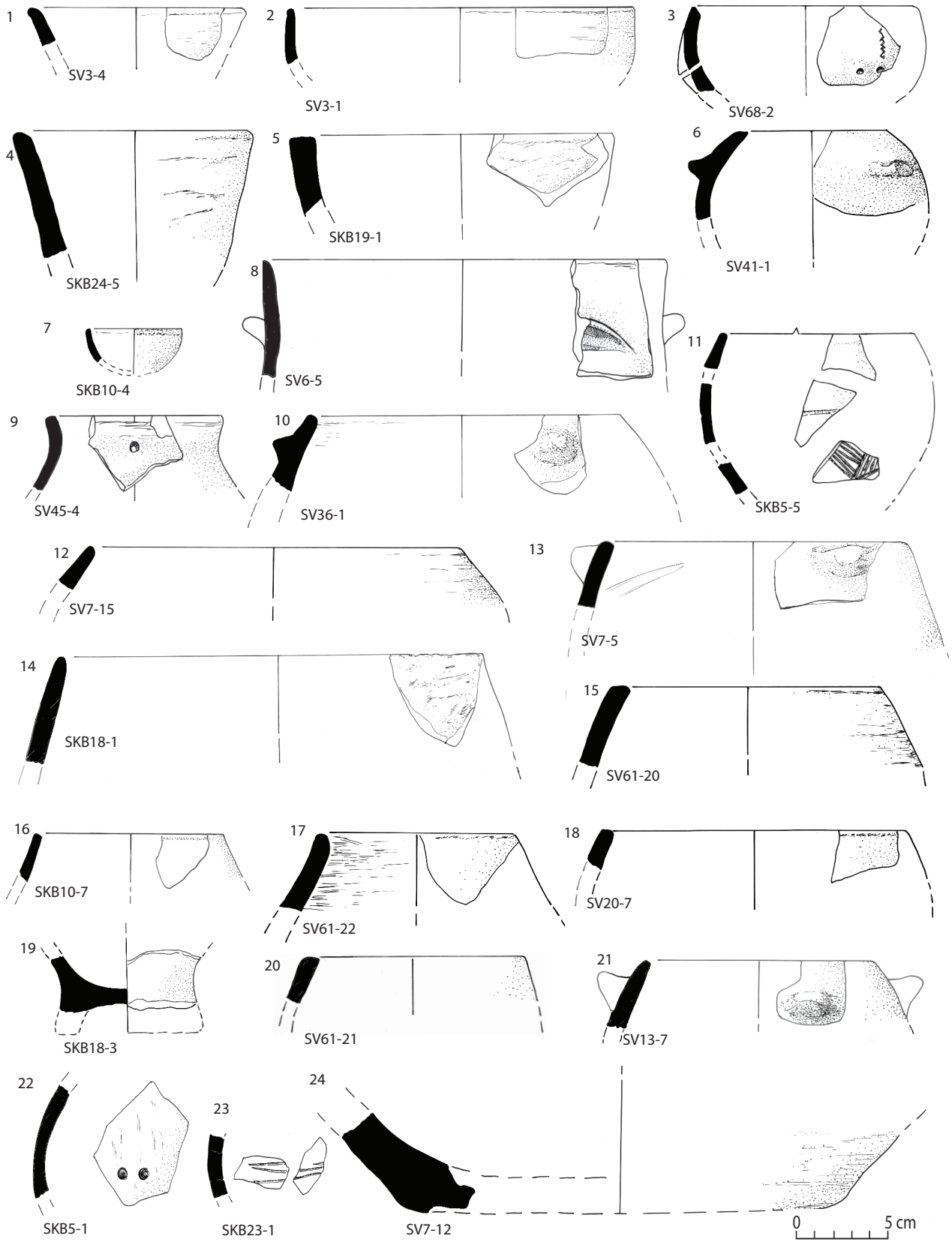


Figure 10.9. *Skorba (Red and Grey) bowl and jar forms from Santa Verna and Skorba.*

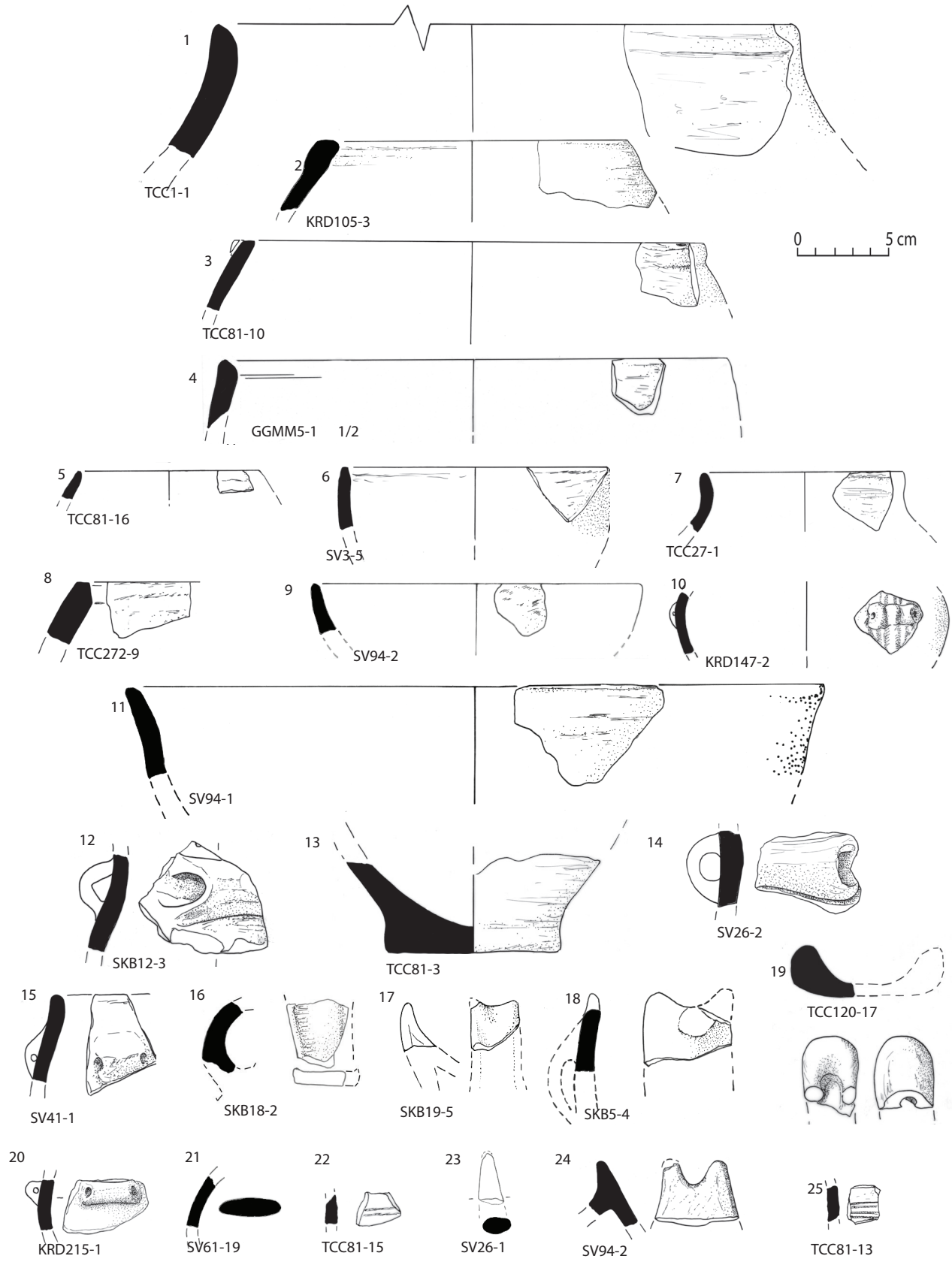


Figure 10.10. *Skorba general forms.*

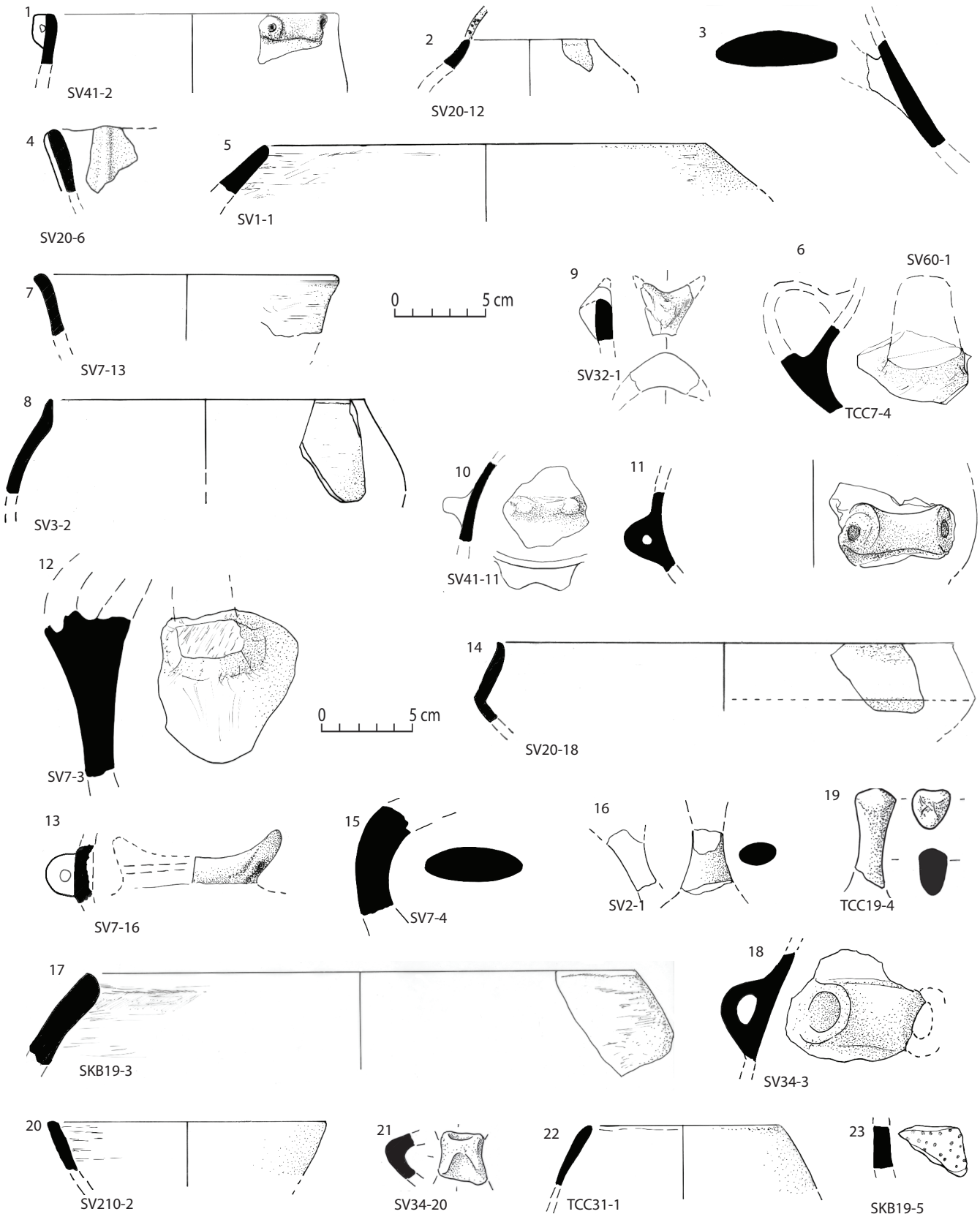


Figure 10.11. *Red Skorba.*

Evans (1971, fig. 32, Shapes 2 & 3), which are characteristic of Diana-Bellavista pottery in Sicily/Lipari in particular (Bernabò Brea & Cavalier 1960, figs. 13–21). Although detailed chronological control of the changing forms of Diana pottery are not yet clear, it may be that the Lipari assemblage represents a quite late phase where carinated forms became frequent, whilst the material of Gozo/Malta may simply be both early, and perhaps stylistically isolated. The distinction between the possible fabrics that Trump identified may be less clear cut than implied by his 1966 study of Skorba; and the colouration may be a result of firing, of survival and indeed of original quality, rather than representative of chronology. Slipped Red Skorba pottery, however, has a deep iron-rich red slip on the fabric surface which is completely distinctive, when preserved (Brogan pers. comm.). Since little of the Skorba phase ceramic assemblage has been studied or published on Maltese sites more generally, we can only present our findings visually, statistically and through the fabric analysis described in Appendix A10.2.

The Skorba phase material frequently occurs in the same contexts as the Għar Dalam, and it appears to occur across the same broad date range of the final centuries of the sixth millennium cal. BC. Potentially, these phases may be broadly contemporary within the immense 500+ year time frame of this earlier Neolithic occupation of Malta. One characteristic that stands out from the entire ceramic study undertaken here, is the large size of some of the vessels, which have rim diameters of well over 30 cm. Such vessels were doubtless storage jars with a capacity of more than 10 litres, possibly twice that, and this implies the storage and processing of milk or other liquid. In Sicily, and in particular Lipari (Bernabò Brea & Cavalier 1960, 1980; Cavalier 1979) the Diana-Bellavista assemblages frequently include sieves, strainers and pouring spouts, indicative of a milk-cheese economy, and there is little reason to think that Maltese settlers did not also engage in this type of production. The difficulty in firing large vessels is considerable, given that bonfires were the most likely 'kilns'. The typical fabric of Skorba pottery was, in fact, low fired, since the shells survived the firing, and remain visible indicating a temperature of no more than 900°C, and barely reached the point of clay fusion. Indeed, if this material were subjected to damp and disturbed conditions, it would not survive for long, which may be one explanation for its relative rarity.

10.5. Żebbuġ pottery (Phase 3)

The Żebbuġ ceramic style covers a wide range of fabrics and forms (Table 10.14) and appears to span a considerable length of time, from earliest dates currently estimated around 3800 to about 3600 BC. The pottery styles show little direct continuity with the previous phases (Għar Dalam and Skorba), and the fabrics employed are very different in appearance and treatment. A greater variety of forms are evident as well, and together with the refined chronology achieved by the *FRAGSUS* study we may assume that there is little chronological continuity from the earlier-middle Neolithic production to the Żebbuġ phase. As described in Table 10.14, the fabrics appear to be more inconsistently fired, sometimes harder, sometimes more brittle, and they do not display the characteristic white spots that define the Skorba material. There is also variety in surface treatment, with many incised and painted and slipped versions, as well as entirely new and more complex body shapes.

The later Żebbuġ styles seem to merge with the Ġgantija and the Mġarr pottery production, as suggested by Trump (1966, 35–6). From this study of six sites, a very large quantity of Żebbuġ pottery was assigned to the phase, which outnumber all the other phases represented in the *FRAGSUS Project* (Table 10.10) in terms of both sherd number and weight. There are possible explanations:

- that the phase was especially long,
- that there was more timber available for firing pottery,
- that there was a larger population requiring ceramic vessels, or
- that there was a growth in the variety of vessels and functions, demanding more storage equipment than in earlier phases when there are evidently fewer shapes and forms in production.

Vessels ranged from small cups to large storage jars, and many if not most of the Żebbuġ material is decorated with either incised or painted patterns. Lugs and handles are quite common, and often have incised patterns focused around/on them, and this device distinguishes Żebbuġ from later Temple Period material where handles and lugs are invariably plainer.

10.5.1. The Żebbuġ assemblage

Some 11,207 Żebbuġ sherds were identified from the assemblages; the diagnostic sherds are illustrated in Figures 10.12–10.16. Tac-Ċawla yielded the largest assemblage (5039 sherds), and evidently the settlement was heavily occupied during the Żebbuġ phase. Santa Verna, however, also demonstrated major Żebbuġ activity (4113 sherds) and these proportions are similar to those from the Skorba phases, and the quantity largely relates to the extent of excavation rather than levels of intensity. Skorba, however, given the size

of the small trench excavated, produced a surprising quantity (1212 sherds); while in contrast, the quite large excavation area of Kordin III produced 373 sherds, less than that the modest trenches from Ġgantija (470 sherds). Evidently the sites flourished at different times, but also experienced very varied taphonomic processes resulting in the contrasting ceramic assemblages. The sites have also had previous interventions over the last century or more, that has denuded some deposits of pottery. The typological assessment here attempts to find parallels with Evans' and Trump's studies, so that we continue to build and expand understanding of the period and its pottery.

10.5.2. Trefontane style: forms

Trump identified a particular open bowl form at Skorba that he named the 'Trefontane' style, after examples of similar material recorded in Eastern Sicily (Trump, 1966, 37, fig. 34), and deriving from a Late Neolithic site of that name near Mount Etna (Cafici 1915). Trump commented that the style appeared to be early in the development of Żebbuġ, and disappeared before some characteristic forms appeared. He also felt there was a strong relationship with San Cono-Piano Notaro pottery in Sicily. After the Skorba work, very similar style bowls with scratched semi-geometric band patterns on the internal rim were reported from the Lipari sites of Spartarella (Cavalier 1979, figs. 21a, & 24d, e, f, g, i, j) and Predio Magna (Cavalier 1979, fig. 27b, d). The open splayed bowl form from these sites is generally of well-made and high fired fabric, often dark and burnished. It would seem to be a late version of the Lipari Diana ceramic assemblage, morphing into the characteristic bowl forms of Piano Conte style (Cavalier 1979, fig. 24) with its characteristic ripple-ribbed burnish marks around the inner rim. The 'Spartarella bowl' is similar to the Diana-Bellavista open bowls from the Lipari Acropolis excavations (Bernabò Brea & Cavalier 1980, fig. 103), and seems to fit into the mid-later part of the fifth millennium BC, although there are no specific ^{14}C dates for the material. In Malta, it is possible that the so-called 'Trefontane' style may be a feature of the earliest part of the Żebbuġ phase, where the vessel style incorporates not only the internal decorative patterns of Lipari/Trefontane, but also develops the external linear patterns that become a familiar part of the Żebbuġ ceramic style. The Trefontane-Żebbuġ bowls of Malta may be a short-lived form, replaced by other bowl and jar forms. The external linear style also bears strong resemblance to the San Cono-Piano Notaro and possibly also Conca D'Oro pottery designs, which is characterized by crudely incised parallel lines, which meander in vertical, horizontal and diagonal patterns, interspersed with dots, fills and other motifs.

10.5.3. Trefontane

The *FRAGSUS* excavations recovered a number of Trefontane-Żebbuġ sherds decorated with the characteristic motifs of wavy lines surmounted by filled arcs and zigzags (24 examples are shown in Figure 10.12, and the greatest number were recorded from Santa Verna). In most cases, the pattern fill is made by finely scratched vertical lines, although criss-cross infill is also common. The Lipari Spartarella material generally has criss-cross infill and tends towards more distinct filled triangles without a lower line of pattern or zigzag (Martinelli pers. comm.). One example (Fig. 10.12: 10, SV20-2) displays one of the characteristic 'stick man' motifs; whilst the external decoration on most is more abstract and the majority belong to everted shallow dishes or bowls, although there are also a number of more vertical, straight sided vessels (Fig. 10.12: 21, SV38-3; 19, SV58-2; 23, SV87-1; 22, GG003-2). Trump (2008, 51) had noted the use of Trefontane-style on Żebbuġ pottery before, but this seems to have been confined to tronco-conical-shaped bowls, and these were not true of the tronco-conical bowls recovered from the *FRAGSUS* excavations. The vessels range from about 18–30 cm in diameter and between 9 and 12 cm in height, although the more vertical vessels may have been deeper. It is not clear if the bases were flat or slightly rounded, but if the Evans Żebbuġ forms 1 and 2 equate to this particular bowl form, then a small flat base was characteristic. No handles or lugs have been recorded on this vessel type which gives weight to the idea that the pottery was a derivative of the Lipari late Diana styles that survived across the Sicilian-Calabrian area until the mid-fourth millennium cal. BC. The quite fine material tends to be well burnished on a buff or grey surface. Unlike the more characteristic Żebbuġ material, the decoration is scratched into the pottery after firing- allowing the decorators to produce a much finer line. One of the sherds (Fig. 10.12: 19, SV58-2) retained traces of white gypsum paste, which had been used to infill the lines. None of the recovered sherds were painted but some had ochre staining.

The Trefontane-Żebbuġ everted open bowl shape with a straight or slightly tulip-shaped profile is not classified by Evans, although it is noted by Trump (1966: 36, 45, 50) from Skorba. There he noted that the pottery style occurred in levels directly above the Red Skorba Shrine, and also in Levels A9 and 10 at Santa Verna. It was described as a deep tronco-conical bowl with simple rim, with incised hatched bands of triangles around the inside, and two parallel oblique lines on the outside. He also described light scratched zig zags with dashes at each angle as another characteristic. At the time, Trump was not confident to describe the ware

Table 10.14. *Phase 3. Żebbuġ style characteristics. Distinguished by fabric and deeply scored patterns, mostly made before firing, and in parallel lines forming non-geometric designs. Fabric generally less consistently fired than Skorba material, sometimes softer, sometimes brittle. Strong similarities in form and in decoration with Conca d'Oro in northwest Sicily, in particular the paired incised lines with dot decoration (e.g. Carini, Via Roma-Palermo and Uditore) often focused around lugs and on strap handles (e.g. Villafrati twin cups). Large range of forms and shapes, early open Trefontane style bowls of hard, polished fabric, and classic Żebbuġ baggy forms and simple rims. Strong similarity with Sicilian Copper Age forms (San Cono, Piano Notaro, Conca d'Oro etc.). Painted variants common, often on large coarse vessels.*

Fabric	**Classic sites/references**
Zb fabric lacks white grits of Skorba material, yellow coarseware has stony temper Thick pale ware, lightly fired, brittle, painted in red, brown or black Yellow, often painted	Almost all prehistoric sites Għar Dalam-18; Xrobb l-Għaġin 4; Ta' Ħaġrat; Temples, rock-cut tombs: Xemxija, Buqana tomb, Żebbuġ Ta` Trapna; Xagħra Brochtorff Circle, Ħal Saflieni Hypogeum (domestic sites Mġarr and Skorba)
Fineware: Hard and brittle Burnished Thin buff-pale well fired ware incised with white paste infill (domestic – Mġ Sk)) Thin hard, high quality burnished milk-grey ware (domestic – Mġ Sk) Thin walled black paste with medium limestone grits, smoothed surfaces (Malone *et al.* 2009, 222) Thin brittle and overfired red-purple coloured fabric, grey on exterior Thin red slipped ware (Malone *et al.* 2009, 222) Thin-wall grey-black fineware Highly fired (Pellegrin) brittle overfired gritty, bright red, with plaster-like surface Softer fabric with finer surface treatment although rough around incised patterns	Coarseware: Irregular firing on larger vessels, usually dark (Malone *et al.* 2009, 221) i.e. funerary vessels less well fired than settlement/temple contexts, softer fabric Thick walled, gritty, various temper used (vegetable, shell, crushed limestone and sand) Oven example TCC – corky textured with sand and grit-vegetable temper, surface flakes/breaks Coarser fabric with small grits with pale cream-yellow surface, lower firing temperature

Bowls	**Jars**	**Other forms**
Trefontane style tronco-conical bowl – open, straight sided, with decoration following inner rim, freer incised patterns on exterior (likely to be an early style – not found devolved or at Xagħra Brochtorff Circle) Shape 1-2 Hemispherical bowl from small to large (Shape 3) Open shallow bowl with lugs, pierced and un-pierced (Evans 33, Shape 1) or open form with horizontal strap handles (Evans 33, Shape 6) – vestigial carination Bag-shaped bowl with strap handles (Shape 9)	Deep globular bell-shaped jar with everted open rim-neck, bulging neck, often with lugs on shoulder and two opposing strap handles, often two of each (Evans 33, Shape 15) – heavy flat to round base Wide bellied jar with tapering narrow neck (Evans 33, Shape 16) Full bodied with conical or cylindrical necks – usually incised decoration Squat necked jar (Shape 9) 'Hole mouthed' biconical jar (Shape 15) Ovoid jar with wide heavy rim (Shapes 13, 14)	Loop handled simple hemispherical cup with rounded bases with dimple (Shape 10) Baggy cup/jug with strap handle (Shape 8) Rough cup with high handle (Evans 33, Shape 4) Rarer forms: Spoons with rod and ring handles (17) Strainer bowls/cups, with holes drilled through vessel wall (Shape 5) Bell-shaped jar (Evans 33, Shapes 12-13)
Handles	**Rims**	**Base**
Broad straps often with central incised line(s) decoration attached to shoulder of jars or rising above rim in cups Thin straps on baggy deep bowls Rounded handles on coarseware jars Rounded lug handles Notched and dimpled edge decoration	Rolled, plain and continuing angle of wide Trefontane type bowls lightly angled 'S' profile rims on biconical jars Dimpled and notched rims	Flat, small bases for bowls and some cups and the large jars Rounded bases in cups, bowls, small jars
Lugs	**Decoration**	**Location of decoration patterns**
Small decorative knobs and lugs, often on neck, shoulder Pierced and unpierced lugs False string holes set below rims Loop lugs	Painted lines, sometimes fairly abstract patterns. Usually on cream surfaced fabric in red and black-brown, lines, zigzags, focus on handles and rims Slip – red or sometimes pale or paint layer over buff fabric Incised at the soft and leather hard stages, often with raised rough edges to incisions	Around handles and lugs All over body from base to rim Trefontane style motifs inside rim of open bowls Patterns: Incised paired lines, ladder pattern – often narrow at one end, wider the other, or around rims Sharks tooth around rims and along parallel lines

Table 10.14 *(cont.).*

	Decoration (cont.)	Location of decoration patterns (cont.)
	Incised lines often in pairs, rarely very regular or straight, following the horizontal and vertical shape of vessel. Sometime filled with red ochre wash. Devolved later style sometimes employs horizontal line to suggest divisions Incised lines with feathering or sharks-tooth zigzags on one or two edges Incised line around and down/along handles Stick figures and other geometric/ random forms	Zig zag chevrons – inner rims, along parallel lines Incised infilled waves, scallop, zigzags – inner rims of Trefontane style Cross-hatched incised semi-geometric – particularly at BR – a late devolved device seen in Mġ and Ġg styles? Incised Arabesque, arcs and wavy lines often focused around a knob/handle Incised parallel lines with lines of dots, stabs or zigzags Motifs – crossed flail-crossing diagonals, anthropomorphic motif Painted – similar designs, thick and thin lines

as a separate phase, but now with the support of AMS dates at Santa Verna, we believe that we can see this material as the first distinctive element in the Żebbuġ phase. Importantly, the Trefontane style has not been found in any Żebbuġ rock-cut tombs and seems to be associated only with domestic levels that are probably considerably earlier than the burial tradition and the funerary pottery that combines classic Żebbuġ styles with Mġarr and early Ġgantija forms. In form, Trefontane bowls bear a strong similarity to the Red Skorba shape 1, and this coincidence does further support the idea that the bowls are some of the earliest of the Żebbuġ production, and may be strongly influenced by the final Diana-Bellavisita forms in northeast Sicily and Lipari. As Trump (1966, 36) proposed, there is a strong likelihood of cultural connectivity with eastern Sicily, but this will need to be tested through fabric studies (pXRF, thin section etc.) to identify any actual movement of material between Sicily and Malta.

10.5.4. Trefontane-Żebbuġ bowls: catalogue descriptions (Fig. 10.12)

1. TCC81-18 Everted open bowl with internal and external decoration. D – *c.* 19.5 cm. Black fabric buff surface.
2. SV20-13 Shallow everted open bowl fragment, internal decoration of two inverted infilled scallops over a wavy line. Black burnished.
3. SV20-3 Everted open bowl with internal inverted infilled scallops over wavy line.
4. SV32-3 Shallow everted bowl with internal large inverted infilled scallop pattern very small scallops over 'plaited' wavy lines. D – *c.* 24 cm. Black burnished.
5. SKB 13-1 Everted open bowl with scratch vertical lines (no internal decoration). D – *c.* 14 cm
6. GG004-3 Shallow everted bowl, internal decoration of large inverted filled scallops over broad filled horizontal line. D – *c.* 24 cm
7. SV60-9 Everted open bowl fragment internal decoration of feathered lines over shallow scallops over narrow zigzag.
8. SV13-22 Everted open bowl fragment, internally decorated with dense feathered lines and scallops. Grey burnished.
9. SV20-5 Shallow everted bowl, internally decorated with broad scallops, vertically filled and narrower wavy filled line. D – *c.* 26 cm.
10. SV20-2 Deep everted bowl with internal pattern of filled scallops closely set in two bands over filled way line and external decoration (quasi stick figure) D – *c.* 15 cm.
11. SV20-14 Shallow everted open bowl, dark polished, with internal inverted broad scallops over closely set scallops over mirroring wavy line and external decoration of diagonal 'plaited' lines. D – *c.* 26 cm. Black burnished.
12. SV104-1 Everted bowl with internal scallop pattern, line filled over wavy line, and external double feathered chevron pattern. D – *c.* 17.5 cm. Dark burnished.
13. SV20-17 Wide shallow everted bowl, thick body, internally decorated with broad shallow scallops over double filled wavy line and scratched wavy line. D – *c.* 26 cm. Buff burnished.
14. SV20-16 Deep everted open bowl with internal filled scallops over intertwined lines. D – *c.* 14 cm. Black burnished.
15. SV13-4 Everted open bowl, internally decorated with shallow widely spaced filled scallops over feathered zigzag line. D – *c.* 20 cm. Cream-buff burnished.

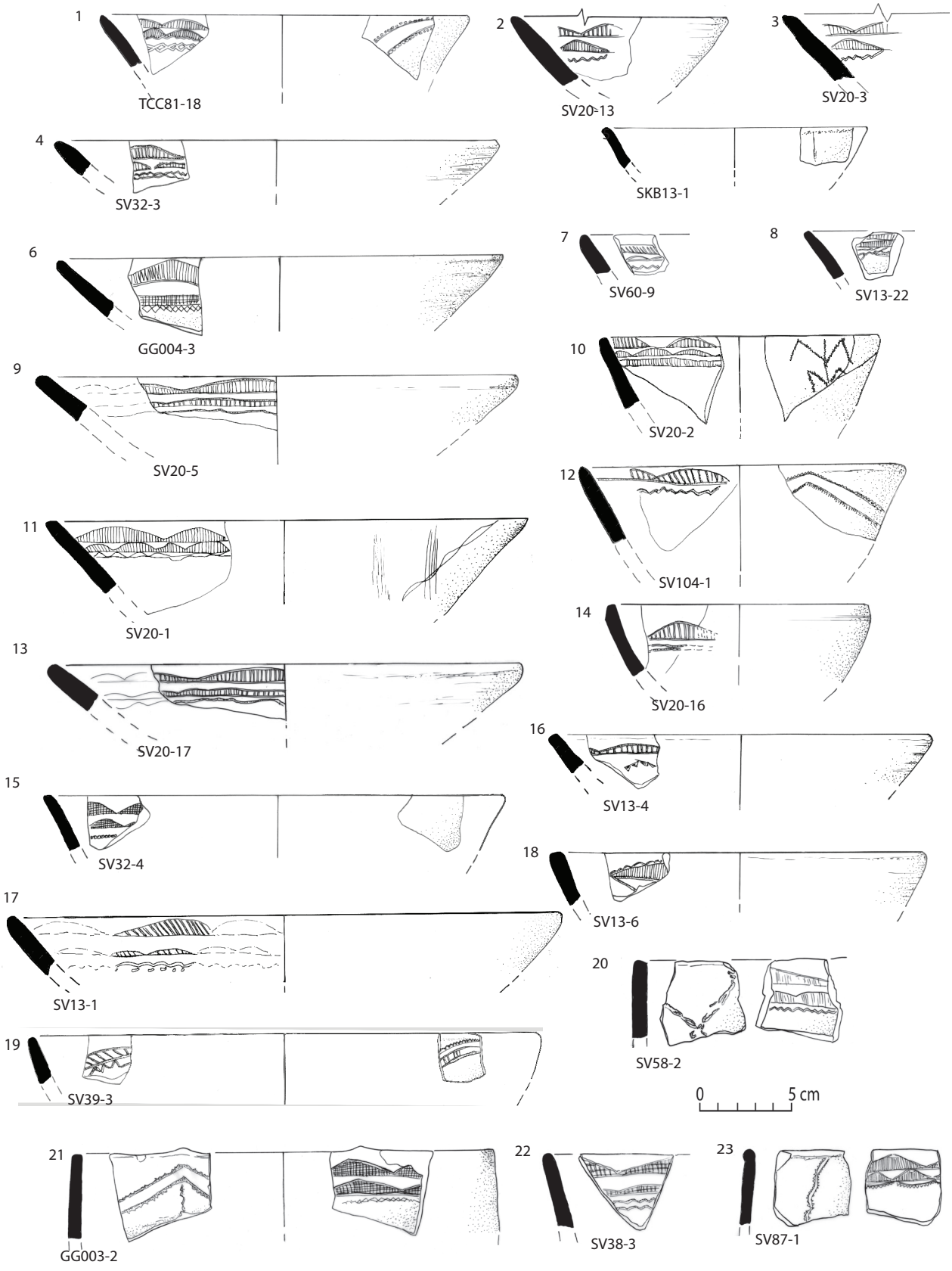


Figure 10.12. *Trefontane-Żebbuġ bowls.*

16. SV 32-4 Everted open bowl, internally decorated with two lines of regular filled scallops over scratched line. D – *c.* 24–25 cm. Buff burnished.
17. SV13-1 Shallow everted bowl with three lines of internal pattern, broad filled scallops over thin scallop line over lopped line. D – *c.* 30 cm. Mottled grey-brown-red-orange with ochre infill.
18. SV13-6 Everted open bowl, internally decorated with scallop pattern embellished with additional zigzag lines. D – *c.* 20 cm. Black-buff burnished.
19. SV39-3 Everted bowl, with internal widely filled scallop over linear zigzag, and external scallop pattern on two close lines. D – *c.* 27–28 cm. Black burnished.
20. SV58-2 Straight-sided vessel with internal filled horizontal scallops in two lines over a narrow zigzag, and external decoration in diagonal 'twisted plait' curving lines. Grey with white paste infill.
21. GG003-2 Vertical sided bowl with external linear pattern of double widely spaced chevron over vertical feathered line, and internal double row of filled scallops over fine scratched line. D – *c.* 23.5 cm. Dark yellow-pink surface.
22. SV38-3 Upright bowl profile with three registers of internal pattern, scallops, over hallow filled semi-scallop over double wave lines. Grey burnished.
23. SV87-1 Inverted bowl with slight rolled rim, and internal double row of filled scallops and external decoration of diagonal 'plaited' lines. Yellow-grey fabric.

10.5.5. Żebbuġ bowls: catalogue descriptions (Fig. 10.13)

The remainder of the very large Żebbuġ assemblage has been selectively recorded, with the most characteristic pieces illustrated. Evans defined bowls as shapes 1, 2, 3, 6 and the assemblage here has been classified against these shapes. Although Żebbuġ pottery has been collected and identified for a very considerable period (many tombs were cleared and their contents became part of numerous private collections in Malta), there has never been a comprehensive study. Evans and Trump both presented selected pieces, but to date, this presentation of forms and sherds represents only the second assemblage to be illustrated, while the first was from the Xagħra Brochtorff Circle (Malone *et al.* 2009, Chapter 10).

1. GG009-1 Shape 1 everted bowl, horizontal/ diagonal decoration inside and out.
2. TCC81-20 Small shape 1 everted bowl, decoration linear inner rim, external filled arcs. D – 13 cm. Burnished buff-rosy surface.
3. GG009-5 Shape 1 everted bowl, paired internal horizontal lines and external chevrons. D – *c.* 19 cm. Orange fabric.
4. TCC268-12 Shape 1 everted bowl, plain surface, tapering rim. D – *c.* 21 cm. Grey fabric buff burnished surface.
5. TCC130-6 Shape 1–2 bowl with scored patterns inside rim and on external face. D – *c.* 19–20 cm. Buff-grey burnished.
6. TCC251-1 Shape 2–3 bowl with horizontal strap lug, scored interior, vertical lines below handled. D – *c.* 15 cm. Grey buff.
7. SV13-4 Shape 1–2 (6?) bowl, parallel lines external pattern below rim. D – *c.* 28 cm. Cream buff.
8. TCC130-10 Shape 2 bowl, diagonal tri-lines external decoration. D – *c.* 20 cm. Grey beige.
9. SV121-1 Everted bowl, almost Trefontane shape, with incised line inside and diagonal shark-tooth lines externally. D – 19–20 cm. Cream-grey surface.
10. SV41-4 Shape 2 bowl, external scored tramline pattern below rim. D – *c.* 27 cm. Buff coloured lightly scratched.
11. SV13-18 Shape 2–3 bowl with crude scratched internal pattern.
12. SV34-22 Everted Bowl, feathered diagonal external line pattern.
13. SV34-2 Tulip- ('S'-) shaped profile bowl, Shape 1(?), lug below rim. D – *c.* 16–17 cm
14. TCC266-1 Deep bowl with slightly thickened rim, external curing line pattern. D – *c.* 13.5 cm. Burnished grey-orange-brown surface.
15. TCC81-19 Shape 1/6 external incised decorated bowl. D – *c.* 15 cm. Black grey.
16. GG1002-12 Shape 1/6 tulip ('S') profile bowl, external line decorated 'branches' pattern. D – *c.* 23 cm. Black red.
17. SV13-3 Everted bowl, internal scallop lines, external vertical line decoration. D – *c.* 16 cm. Grey-buff.
18. SV6-8 Shape 6 bowl with external curvilinear linear pattern. D – *c.* 18 cm. Grey fabric.
19. TCC130-5 Shape 3 bowl with vertically pierced rim lug, internal scratched 'tramlines' and external chevron/lines. D – *c.* 18 cm.
20. ĠG009-4 Deep shape 1 bowl, with everted and slightly thickened rim, external curvilinear design, almost Ġgantija in style. D – *c.* 23 cm. (form from Xemxija Xe6, P4, Evans 1971, Pl. 44:6).

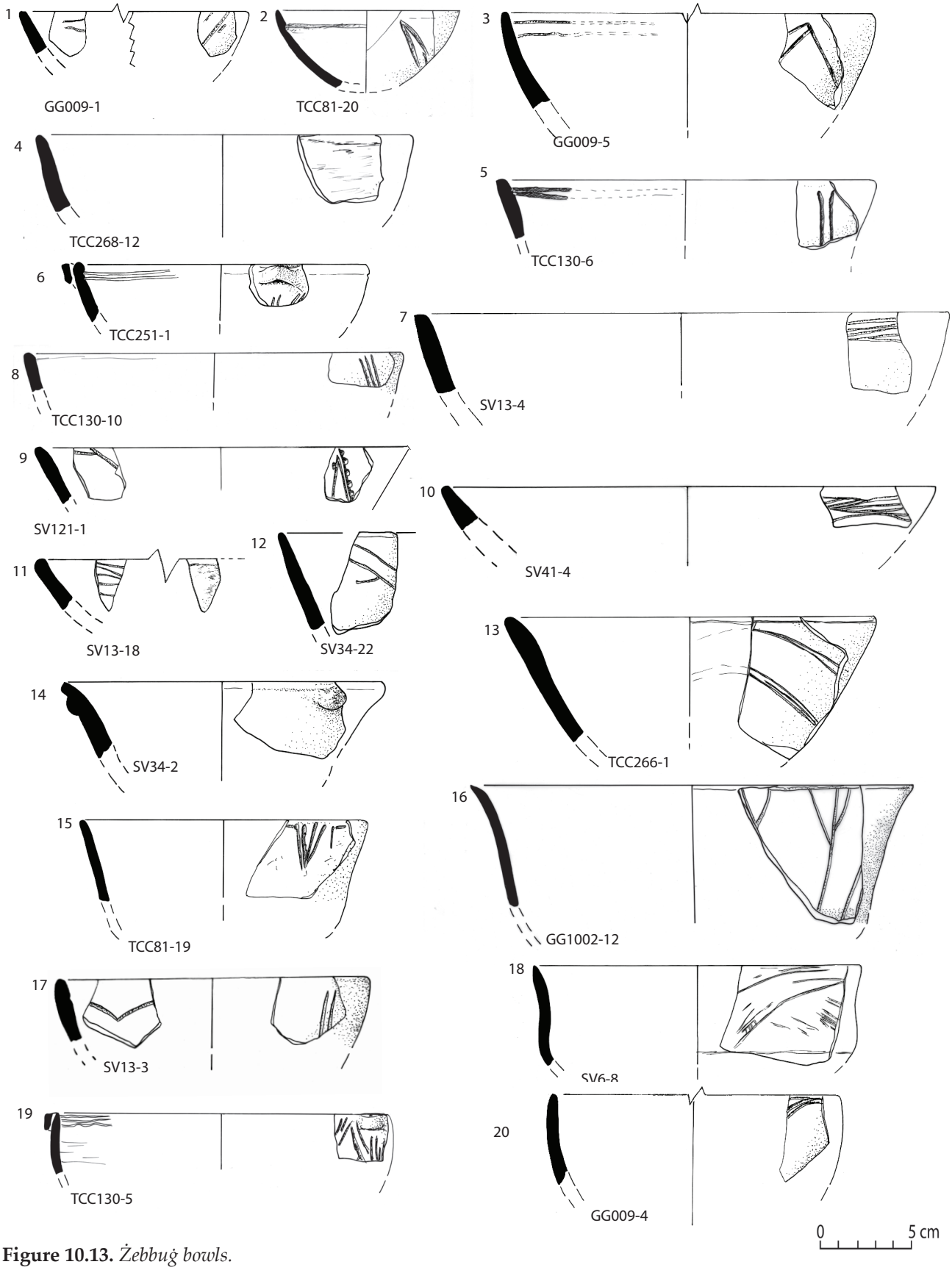


Figure 10.13. *Żebbuġ bowls.*

10.5.6. Żebbuġ cups, handles, lugs, bases and profiles: catalogue descriptions (Fig. 10.14)

Evans' Żebbuġ Shapes 9–10 are mostly smaller vessels of rounded cup form. Some examples from the *FRAGSUS* assemblage had handles, either single or paired.

1. TCC283-1 Shapes 9–10 shallow, wide bellied bowl with lugs on angle, scratched decoration around them. Max. D – *c.* 24 cm. Dark grey black fabric, buff burnished surface.
2. SV41-5 Shapes 9–10 bowl with knob-lug. max D – *c.* 17 cm. Dark brown burnished.
3. SV12-4 Shapes 9–10 shoulder sherd of inverted bowl with external paired chevron line pattern. D – *c.* 20 cm.
4. SV98-3 Shapes 14–15–16 wide shoulder jar with horizontal linear pattern and paint on shoulder. D – *c.* 26 cm. Grey fabric with white paste fill.
5. TCC266-7 Transitional (MĠ shape 6?) late indented profile bowl. Externally decorated with curvilinear base and vertical lines in upper register. D – *c.* 19–20 cm. Brown-black fabric.
6. TCC80-3 Shape 10 round based cup decorated with cut line 'Ogham' patterns (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.4. J). Grey matt brittle fabric.
7. TCC120-1 Shape 9 cup with cut line ('Ogham') decoration. D – *c.* 12 cm. Grey matt brittle fabric.
8. SV34-9 Shape 15 biconical jar (narrow necked), linear horizontal/vertical pattern. Max. D – *c.* 15 cm.
9. TCC130-1 Shape 10 strap handled round based cup central vertical line down handle with diagonal 'Ogham' lines (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.4. J).
10. TCC120-6 Shape 10 strap handled round based cup (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.4. J). D – *c.* 6 cm. Buff-pink fabric.
11. TCC130-8 Shape 15 biconical jar shoulder with small rolled handle and incised parallel lines arranged in curves around handle. D – *c.* 16–20 cm. Grey fabric.
12. GG1002-19 Sherd with double band of zigzag decoration.
13. GG010-3 Shape 10 round based cup (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10. 5.i).
14. TCC120-10 Large strap handle (Shape 8–9, possibly shapes 15–16) with central broken line (rice) decoration. Grey fabric with white inclusions, cream surface.
15. KRD85-1 Horizontal rolled handle with vertical parallel line pattern. Grey fabric, cream surface.
16. KRD71-1 Shape 9–10 evolved semi-carinated base of small vessel geometric linear pattern. Max. D – *c.* 7–8 cm. Grey-yellow fabric with red painted surface.
17. KRD306-8 Rounded base of small cup Shape 10 type, fine linear pattern. D – *c.* 8–9 cm.
18. SKB12-5 Lug horizontally pierced, decorated. Grey yellow fabri*c.*
19. TCC120-2 Small flat base coarseware vessel. D – *c.* 4 cm. Rough grey fabric.
20. TCC74-4 Flat base. D – *c.* 10 cm. Grey fabric, creamy-rose surface.
21. GG012-3 Vertically set horizontally pierced lug with vertical line pattern. Grey fabric.
22. GG012-1 Strap handle with central double line down centre of handle and depression on rim.
23. SV20-11 Small lug from fineware vessel. Fine dark fabric.
24. GG005-1 Rolled handled with angle cut ends and central vertical line. Grey fabric, with pale grey surface.
25. SV62-3 Flat base with feathered chevron pattern. D – *c.* 9.5 cm. Grey burnished fabric.
26. TCC119-2 Flat base parallel line pattern. D – *c.* 9 cm. Black fabric with buff-red surface and red ochre paint.

10.5.7. Żebbuġ jars and bowls: catalogue descriptions (Fig. 10.15)

Żebbuġ Jars have deep and generally narrower necked and more highly varied forms than the more open and shallow bowls. Such forms were suitable for storage and cooking, perhaps reflecting the preparation and storage of food during the period. Evidently some vessels were sealed, either with upturned bowls or covered with a lid of some material secured by string around the narrow indent. These forms may have ledge handles on the rim or just below, enabling the vessel to be lifted easily when full and heavy. Decoration on these forms is limited, often around the rim or focused on the handle.

There are evident parallels between the Żebbuġ assemblages from Taċ-Ċawla, Santa Verna and the Xagħra Brochtorff Circle material. Given their geographic proximity, this is not surprising. For example, the indented rim of KRD51-1 (Fig. 10.15: 18) is similar to the bucket form TCC75-2 (Fig. 10.15: 2). Strong stylistic as well as chronological parallels such as these are useful in building a coherent and interrelated body of material for future reference.

The scale of some storage jars hints at the quantities of food stuff stored in the Żebbuġ phase. The

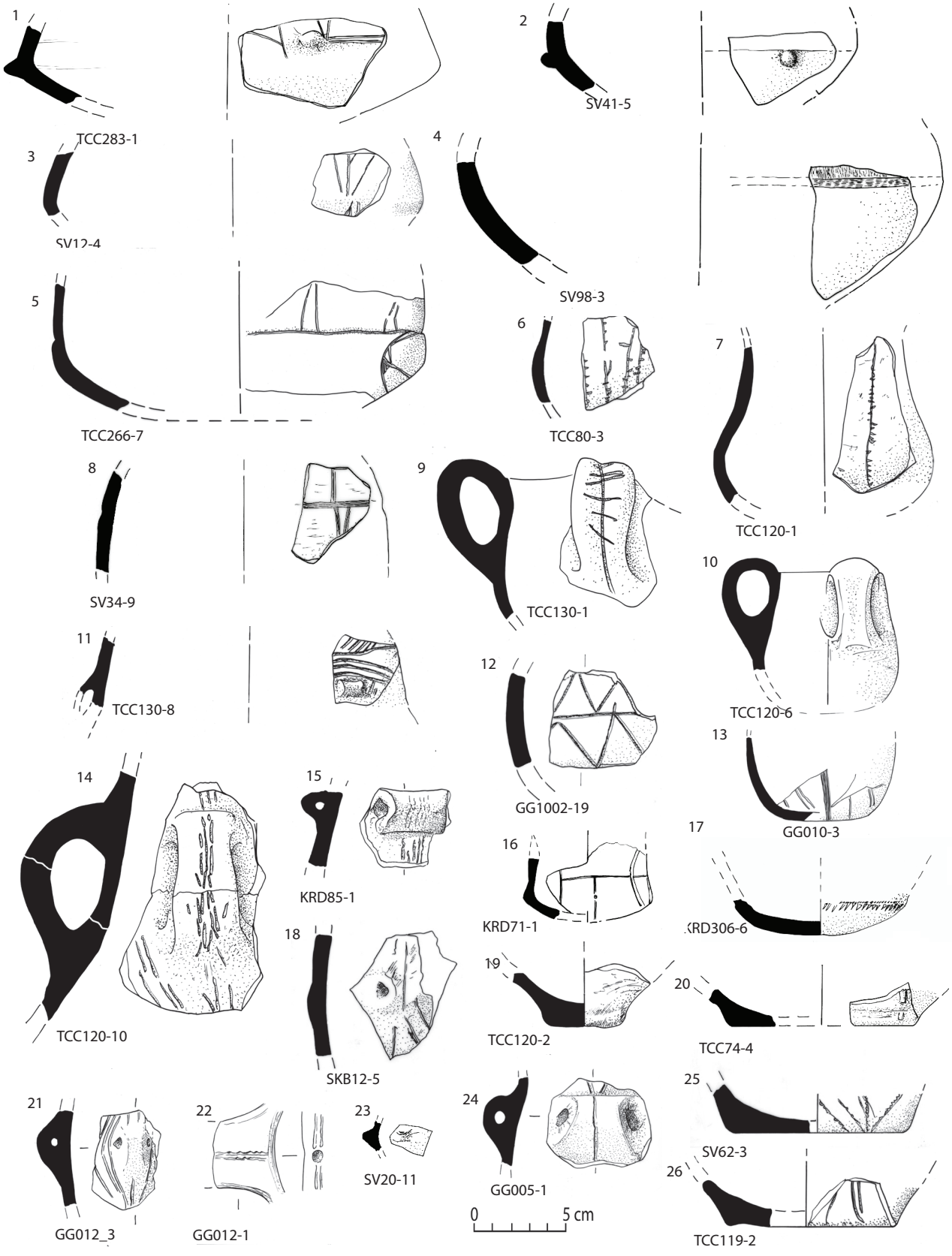


Figure 10.14. *Żebbuġ cups, handles, lugs, bases and profiles.*

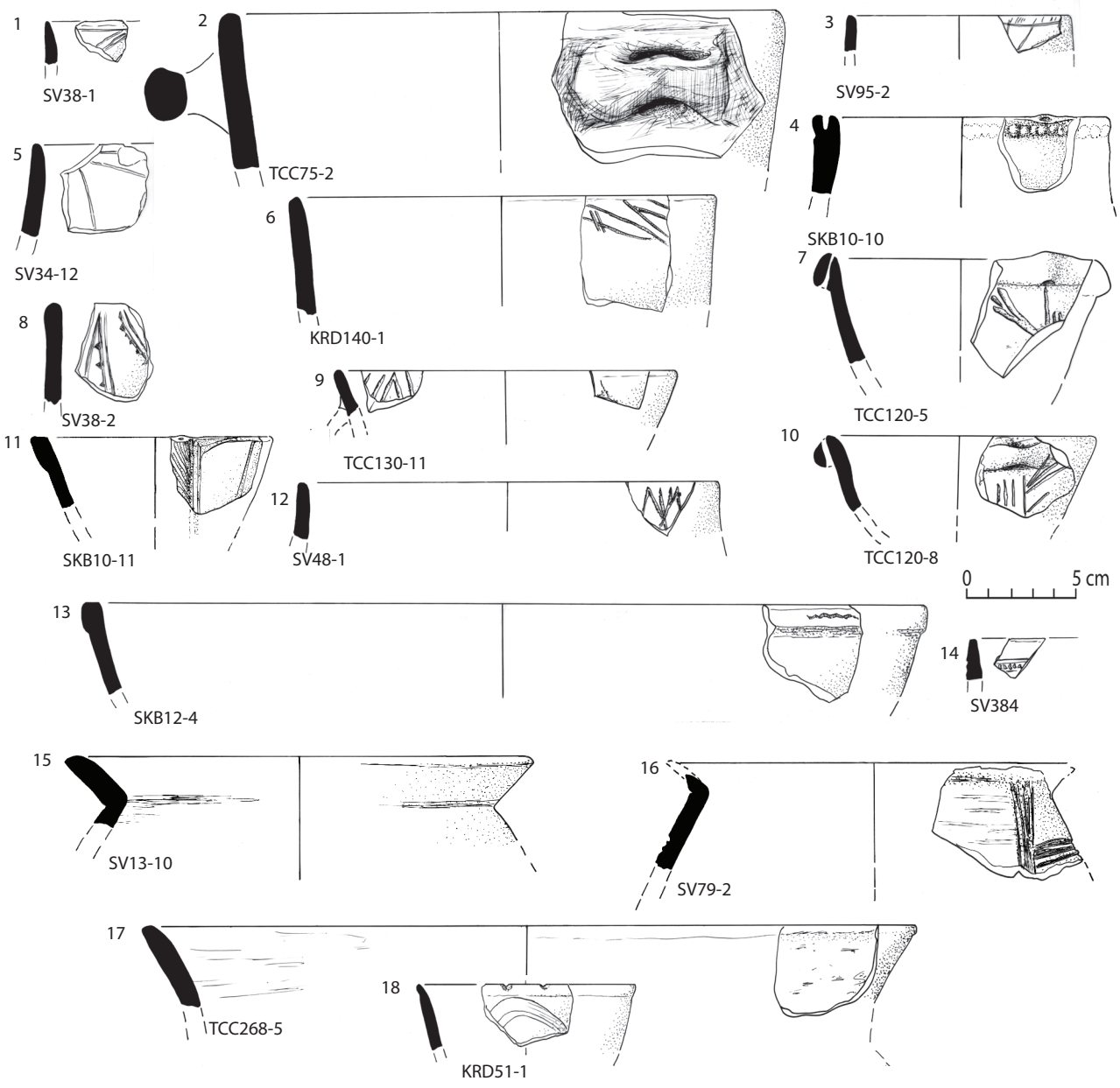


Figure 10.15. *Żebbuġ jars and bowls.*

largest tend to have minimal decoration, plain rims and rather 'baggy' profiles, suggesting they were considered utilitarian, and perhaps rarely in public view.

1. SV38-1 Tapered rim sherd with external diagonal lines. D – 10 cm. Black burnished.
2. TCC75-2 Large bucket form (more similar to Ġg shape 7) with horizontal rounded handle, coarseware. D – 26 cm. Grey fabric with cream-buff surface.
3. SV95-2 Small vertical bowl, shape 3, final linear pattern. D – *c.* 10 cm.
4. SKB10-10 Shape 2/6 Slightly inverted bowl with thickened bead cordon around rim and vertically pierced lug. D – *c.* 13 cm.
5. SV34-12 Tapered rim sherd with fine line design.
6. KRD140-1 Upright bowl shape 6 with linear band. D – 19 cm. Grey-yellow fabric.
7. TCC120-5 Shape 2/6 everted bowl with thickened vertically pierced lug on rim, and linear patterning below. D – *c.* 12 cm. Rosy-buff with white paste fill.
8. SV38-2 Rim sherd with shark's tooth diagonal pattern. D – 17 cm. Brown-orange burnished.

9. TCC130-11 Everted shape 1/6 bowl with strap handle terminal and linear chevron pattern. D – 15 cm. Orange red fabric.
10. TCC120-8 Shape 2/6 everted bowl with horizontal lug below rim, and abstract linear patterning below. D – 12 cm. Fine grey fabric, buff-pink surface.
11. SKB10-11 Everted shape 1/2 bowl with thickened vertical rib lug, forming spine to chevron lines. D – *c.* 11 cm. Grey fabric, red paint and white fill on surface.
12. SV48-1 Upright shape 2/6 neck of bowl, with 'stick man' pattern. D – 19 cm.
13 SKB12-4 Shape 1-2 very large everted bowl with thickened rim with light zigzag around rim. D – 38 cm. Orange-brown burnished surface.
14. SV38-4 Rim sherd upright profile, indented band pattern. Orange buff fabric.
15. SV13-10 Flared rim jar, shape 14. D – *c.* 21 cm. Grey burnished.
16. SV79-2 Flared rim jar, shape 14, with multi-line vertical/diagonal pattern. D – *c.* 19 cm. Buff burnished.
17. TCC268-5 Very large flared rim jar, shape 14. D – *c.* 40 cm. Gritty red fabric with pink slip surface.
18. KRD51-1 Thinned rim everted shape 1 bowl with indented cut rim. D – *c.* 10 cm. grey orange fabric.

10.5.8. Żebbuġ inverted jars and bowls, sherds and decoration: catalogue descriptions (Fig. 10.16)

1. KRD28-1 Shape 7/16, transitional inverted jar with Mġarr Tri-line scallop pattern (Evans 1971, fig. 27, Z1/P5). D – *c.* 14 cm. Grey fabric, red paint.
2. TCC87-1 Inverted bow with combed tri-line chevron motif. D – *c.* 20 cm. Black-grey fabric.
3. SV1-5 Inverted bowl/jar shape 9–10, with zigzag motif. D – *c.* 15 cm. Orange grey.
4. TCC107-1 Small shape 7/9 inverted bowl with rolled rim, sharks-tooth vertical/diagonal pattern. D – *c.* 10 cm. Grey fabric, ochred surface.
5. KRD11-1 Large inverted shape 9/16 bowl with fine linear geometric pattern. D – *c.* 22 cm. Grey fabric orange surface.
6. TCC117-6 Inverted shape 3 bowl, scratched linear pattern below rim. D – *c.* 19 cm.
7. TCC205-6 Inverted bowl with bevelled inner rim, filled arc pattern more Ġgantija (shape 6) in style. D – *c.* 19-20 cm. Dark red-brown burnished.
8. TCC250-1 Inverted shape 13 bowl with rolled rim, paired linear pattern. D – *c.* 14 cm. Buff fabric.
9. TCC93-3 Inverted bowl with chevron pattern paired lines. D – 20 cm. Grey fabric.
10. TCC272-16 Thick ware inverted bowl with abstract diagonal line pattern. D – 20–25 cm. Buff-grey fabric red-grey surface.
11. TCC130-4 Thick coarseware rim sherd with flat bevelled top edge and short linear decoration. Buff fabric and surface.
12. SV34-11 Tapered inverted rim linear decoration.
13. SV34-13 Tapered inverted rim, fine line pattern.
14. SV90-2 Diagonal line decorated body sherd, coarseware.
15. SKB15-1 Line decorated body sherd. Grey-pink fabric.
16. GG004-5 Body sherd with shallow zigzag line. Grey fabric.
17. SV37-2 Triangle line decorated body sherd. Black burnished fabric.
18. SKB23-5 Horizontal line decorated body sherds.
19. SV52-5 Short hatched-line (rice grain) decorated 'neck' sherd. Grey burnished fabric.
20. TCC80-2 Line decorated body sherd.
21. GG004-4 Sharks tooth paired chevron line decorated body sherd. Grey buff fabric.
22. SV20-10 'V' decorated body sherd. Dark grey-brown burnished fabric.
23. TCC74-2 Random line decorated large thick body sherd. Max. D – *c.* 35–40 cm. Buff grey , smoothed surface.
24. SV48-2 Knob-lug sherd with radiating line design. Yellow buff brittle fabric.
25. KRD74-10 Zigzag line decorated body sherd. White paste fill.

10.5.9. The Żebbuġ assemblage

The Żebbuġ assemblage generally conforms to the known material from the many tombs and also temple excavations reported in Malta. The Gozitan sites excavated by *FRAGSUS*, however, reflect a non-funerary assemblage, somewhat different to that retrieved from the Xagħra Brochtorff Circle. Yet, nevertheless, showing some close parallels in form, handle-lug and decorative features. The Taċ-Ċawla assemblage is particularly significant since it is the first substantial excavated ceramic group from a settlement, rather than a temple or tomb site (even though such sites may also include domestic elements), and there is a large quantity of

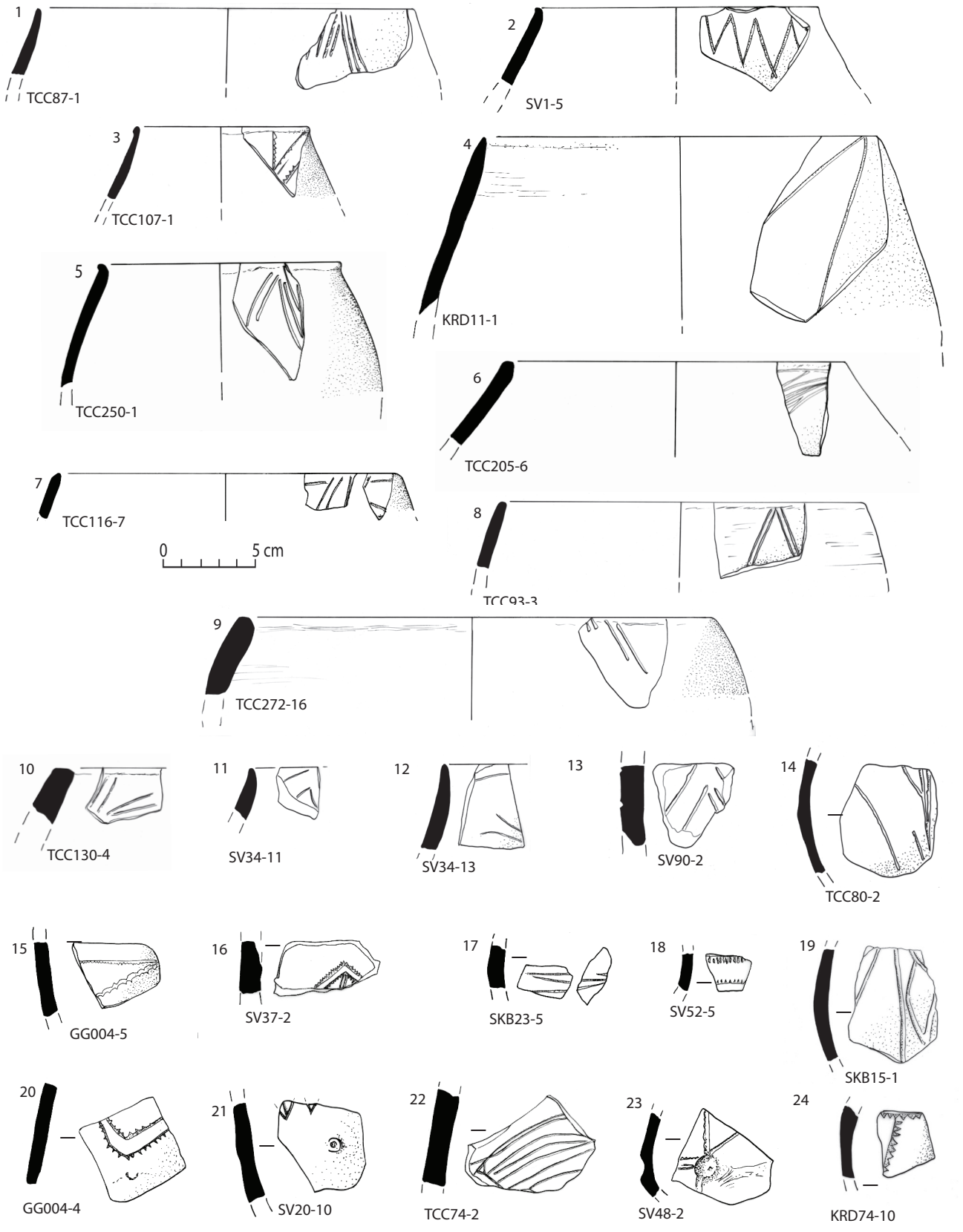


Figure 10.16. *Żebbuġ inverted jars and bowls, sherds and decoration.*

thick cooking pot material (mostly too fragmentary to illustrate because of its 'corky' porous fabric resulting from vegetable temper). The fabrics represented include the full range of recorded Żebbuġ types, with brittle pale surfaced fine and coarseware, smooth grey surfaced vessels, some very 'overcooked' pink-grey-purple material, and a significant number of thick painted vessels with creamy coloured surfaces decorated in brown-red-black rather abstract patterns and in lines on rims and bordering strap handles. The incised and scratched designs featured on the Żebbuġ pottery range from the familiar pairs and multiple rough meandering and crude chevron lines and arcs, arranged in verticals and horizontal patterns. Criss-cross patterns are less common, but do anticipate the more organized geometric designs of Mġarr (for example, Fig. 10.14: 12, GG1002-9; Fig. 10.16: 2, SV1-5; Fig. 10.16: 8, TCC93-3), whilst the arcs anticipate the sophisticated Ġgantija (Fig. 10.13: 2, TCC266-1; Fig. 10.13, 18. SV6-8; Fig. 10.13, 12.SV34-22). Handles include the thick strap form attached to the baggy round-based cups, usually with a central incised pattern running down the centre (Fig. 10.14: 9, TCC130-1; Fig. 10.14: 21, GG005-1; Fig. 10.14: 14, TCC120-10), which may align with a dimple on the rim (Fig. 10.14: 22, GG012-1). The range of forms is extensive in the Żebbuġ phase, and because it was made using a rather crude and haphazard production method, it is impossible to assign forms to an absolute type and many of the Evans shapes merge into each other in terms of detail of rim, base and body.

10.6. Mġarr pottery (Phase 4)

The Mġarr type pottery retrieved from the excavations represents an important addition to the limited assemblage recorded to date for this rather elusive style. All of the key sherds retrieved from the *FRAGSUS* sites have been drawn, recorded and presented here. Evans (1971, fig. 34) identified eight shapes of which three were lids. Excluding the latter, there are only five vessel shapes, vaguely described for the most part, although both Evans and Trump describe others, including a squat neckless jar with a rolled rim. Here we shall add this jar as Shape 9, although it could be classified as a version of Shape 6. The examples described here are mostly very fragmentary, and fragmentation seems to be a characteristic of the rather soft and breakable Mġarr fabric noted by Trump, and one reason why so few identifiable vessels have been recorded or reconstructed. Table 10.15 describes the style's characteristics.

10.6.1. The FRAGSUS *assemblage*

Nearly all the characteristic material was retrieved from Kordin III, where an early Temple phase midden deposit in Trench 1 (2015) yielded an interesting range of material (Chapter 6). The majority of forms fall into either the Shape 6 biconical jar (represented here only by the upper element of the vessel) or the new form, Shape 9. Almost 500 sherds of Mġarr pottery were excavated during the course of the *FRAGSUS* excavations. The majority came from Kordin III (293 sherds) followed by Skorba (167 sherds); all of the other sites contained considerably fewer sherds (five sherds from Ġgantija, 21 sherds from Santa Verna and eight sherds from Taċ-Ċawla). It may be that Gozo was peripheral to the main Mġarr production, which from current evidence seems to be a Maltese phenomenon. Certainly, the decoration from the Gozo sites is rather different to that of the Maltese sites. Future fabric characterization may demonstrate a distinction in the clay source between the two islands.

The size of the Mġarr vessels varied considerably, from small cups of around 10 cm diameter, to enormous bowls vessels of between 30 and 50 cm diameter (for example, Fig. 10.17: 1, KRD306-11, 36 cm diameter; and Fig. 10.17: 2, GG1021-5, *c.* 30 cm. Evidently, the Mġarr potters were competent in the making and firing of large and consistent vessels. Generally, the fabric, although quite soft and smooth, is fired to the same colour throughout the thickness of the sherd body with only surface flashes of oxidization, in red-brown or buff colour. This might suggest a steady low firing temperature was maintained, whilst the dark colour suggests bonfire style firing. Rims vary considerably in detail, some thickened, others bevelled or tapering. Numerous rims are emphasized with wide horizontal grooves incised on the exterior, singly or in two or three lines. Originally the wider and roughened grooves were filled with white paste, vestiges of which survive in fifteen examples. Evidence for other decorative finishes was scarce, one sherd was red slipped and some sherds had traces of ochre wash staining the white paste.

10.6.2. Mġarr inverted bowls: catalogue descriptions (Fig. 10.17)

1. KRD306-11 Shape 4/6 inverted large jar, with broad cut band below slight rolled rim, originally white paste filled. D – *c.* 36 cm.
2. GG1021-5 Inverted shape 9 jar with rolled rim and 'rice' indents over narrow cut horizontal line and diagonal line. D – *c.* 30 cm. Grey-pink fabric.
3. KRD77-2 Inverted jar Shape 6/9 with lug on rim. Broad feather cut horizontal bands below rim, and vertical 4-parallel line pattern. D – *c.* 30 cm.

Table 10.15. *Phase 4. Mġarr style characteristics.*

	Fabric	**Classic sites/references**
A poorly defined ceramic production that seems short-lived and to span between the end of Żebbuġ and Ġgantija productions, with both of which Mġarr has similarities of form. Occurs in some late rock-cut tombs (Xemxija) Estimated time frame: 3600–3400 BC	Dark grey-black, some is yellowish, occasionally slipped Compact and harder than Żb Well fired	Ta Ħaġrat (200) Kordin III (32) Xemxija tombs 4 vessels Ta' Trapna Żebbuġ tomb 1 – 1 necked bowl Għar Dalam (6 sherds) Għain-Nahag Xrobb l-Għaġin (1) Ħal Saflieni (21) Ħaġar Qim – (1 remaining from 80 boxes! Mnajdra =(1) TX-(2) Ġgantija (2)
Bowls	**Jars**	**Other forms**
Deep baggy bowl (shape 4) Single handled cup form (shape 1) Open hemispherical bowls (shape 2) Flat based platters and cylindrical covers with rib at junction of base and wall, marked by lug (shape 3 7, 8)	Squat-neckless jars with rolled thick rim (New form 9) Biconical jars with indented mid-section and low cylindrical neck and two handles/two lugs (shape 6) Globular jar with upturned lip (new form 10) Ovoid Flask form (?) (shape 5)	Limited knowledge of forms
Handles	**Rims**	**Base**
Rare ring / strap handles on cups or ladles (shape 1)	Simple, rounded, slightly out-turned rims on jars, slight bevel on shallow bowls	Rare, but where present, rounded bases seem to be usual, other than the flat platters
Lugs	**Decoration**	**Location of decoration patterns**
Horizontal or vertical with pierced string hole, sometimes bevelled or square cut ends Vertical pierced lugs set below rim	Broad cut out lines, made at leather-hard stage, deep enough to hold a white paste, rough irregular grooves, often colour washed with ochre, some shorter line patterns are thin scratched incisions Feathering of the cut-out lines Curvilinear patterns more common than straight lines One to three cut out horizontal bands on jars with offshoots at diagonals or verticals, organized in panels and forming ribbons, or ladder patterns or vestigial 'comets' Indented 'rice' grain pattern Patterns run over lugs/handles Painted grey black	On rims and all over body, possibly on handles where present

4. KRD306-2 Vertical bucket shape, flat topped rim, with meandering cut horizontal paired line below. D – *c.* 26 cm. Black fabric, white paste fill.
5. KRD28-1 Inverted shape 4 jar, with tri-line arc of broad cut lines. D – *c.* 14–15 cm. Grey fabric, red
6. KRD86-1 Wide vertical rimmed bowl, with shallow dot pattern around neck. D – *c.* 17 cm. Cream-yellow fineware fabric.
7. KRD306-15 Shape 9 inverted jar with rolled rim, broad cut line below. D – 15 cm.
8. SV41-3 Inverted shape 6 jar, feathered cut line below rim, vertical cut tri-line and feathered line. D – 11 cm. Black burnished fabric, traces of red slip or paint in white filled grooves.
9. KRD57-1 Large shape 9/6 inverted jar, pronounced rolled rim, cut rim, over tri-lined and lower shark-tooth band. D – 24 cm.
10. SKB10-2 Shape 6 inverted jar, broad cut lines below rim. D – *c.* 16 cm. Grey fabric, white paste traces.
11. KRD90-2 Shape 6/9 inverted convex jar, rim lug, with cut line on rim, over dense band of vertical cut lines, formerly white paste filled. D – 23 cm.
12. KRD10-1 Carinated inverted bowl, dense band of vertical cut lines between horizontal lines. D – 18 cm.
13. KRD91-2 Inverted convex walled jar, with broad band of dense cut vertical lines, set between upper twin horizontal line.

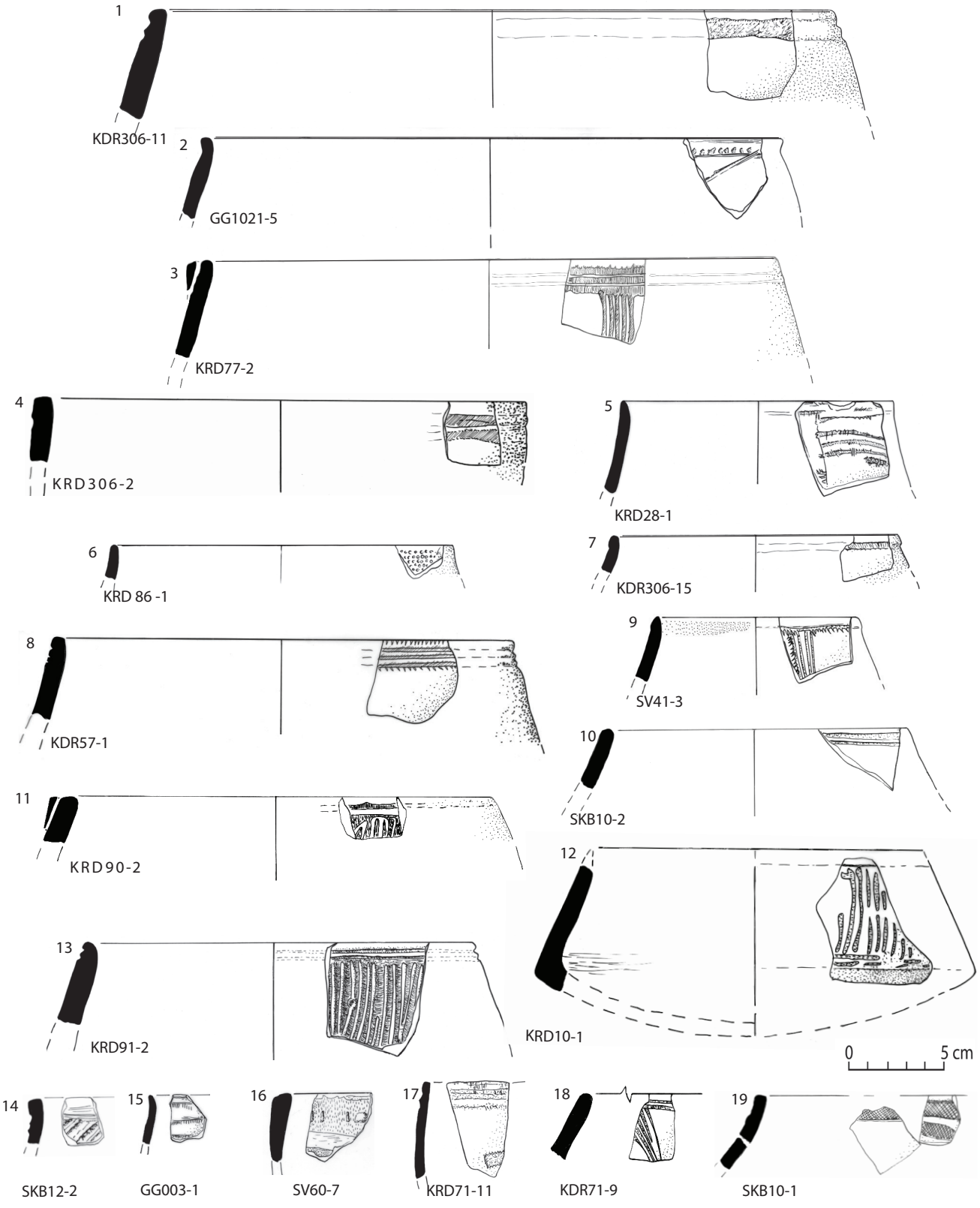


Figure 10.17. *Mġarr inverted bowls.*

D – 20–22 cm. Black, soft fabric, white paste fill.
14. SKB12-2 Flat topped rim of vertical walled bowl, diagonal cut line pattern. Pale grey fabric.
15. GG003-1 Rim sherd, inverted form with feathered horizontal-diagonal ridge pattern.
16. SV60-7 Inverted bowl, with angle cut rim, low button attachments below rim, and over diagonal pattern.
17. KRD71-11 Vertical profile bowl with angle cut top rim, over broad cut horizontal lines.
18. KRD71-9 Inverted shape 4 jar with twin cut lines below rim, and volute lines. Buff fabric.
19. SKB10-1 Shape 5 jar neck, broad semi-horizontal criss-cross line bands. Grey fabric, white paste.

10.6.3. Mġarr patterned sherds and bowls: catalogue descriptions (Fig. 10.18)

1. KRD74-7 Body sherd with vertical broad cut bands. Burnished.
2. SKB23-2 Body sherd with broad rough edged cut bands. White paste stained with red ochre.
3. KRD74-9 Sherd with cut 'branch' or fan pattern. White paste fill.
4. SV45-1 Body sherd with feathered cut lines. Black burnished fabric.
5. KRD306-5 Body sherd with diagonal feathered lines. Black fabric.
6. KRD71-4 Sherd with 'ladder' pattern.
7. TCC91-2 Belly sherds of jar with close set cut wave band. (Ashby *et al.* 1913, Pl. XI). Grey fabric, red orange surface.
8. SKB7-1 Sherd with feathered lines. Highly burnished grey fabric with white paste.
9. SV34-1 Body sherd with tri-cut lines.
10. KRD77-6 Sherd with traces of cut circles. White paste fill.
11. KRD57-3 Fine sherd with diagonal set line pattern. White paste traces.
12. SKB5-2 Large vessel sherd with multi-line pattern blocks.
13. KRD74-6 Small, horizontal perforated lug handle. Black fabric with ochre on surface.
14. KRD71-7 Rounded vertical set perforated lug, line pattern. Burnished.
15. KRD306-8 Horizontal perforated lug-handle.
16. KRD306-7 Horizontal perforated lug-handle.
17. KRD77-4 Shape 2 sharply everted bowl with remnant vertical lug over concentric line pattern (similar form to Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.7.L; and compares with Evans 1971, fig. 27.2 from Żebbuġ). D – 27 cm. White paste traces.
18. KRD306-4 Shape 1 convex profile everted bowl with twin parallel cut lines below rolled rim. D – 12 cm.
19. KRD74-8 Sherd of upright profile (shape 1) bowl with deep cut twin horizontal bands. Soft black fabric with white paste fill.
20. GG009-3 Shape 1 baggy rounded bowl with horizontal solid lug on rim. D – 51–20 cm. Orange rough fabric.
21. TCC259-1 Sherd from Shape 4 rounded bowl/flask with small button lug surmounted by ladder pattern. D – 15 cm. Grey fabric with pink-grey surface, with white paste traces.
22. SKB11-4 Shape 2 everted bowl with intertwining horizontal lines. Black burnished fabric.
23. KRD74-12 Flat base sherd with pronounced foot, shallow jar or bowl. D – 13 cm.
24. SV62-1 Shape 4 belly sherds of rounded bowl/flask with matchstick pattern. Max D – 16 cm. Burnished pale grey fabric with orange surface.

10.6.4. Mġarr decoration

Decoration identified in the Mġarr assemblage is diagnostic because of the distinctive broad shallow rough cut lines, formerly filled with white gypsum paste, and sometimes washed with red ochre and a dark soft fabric. Pattern making using the cut line technique includes feathering on the outermost lines, often set in bands below the vessel rim (Fig. 10.17: 10, SKB10-2; Fig. 10.19: 15, TCC140-1), or in diagonal and vertical bands (Fig. 10.18: 11, KRD57-3), sometimes as a 'fan' pattern (Fig. 10.18: 3, KRD74-9) either in several short lines, or one shallow groove (Fig. 10.19: 5, KRD71-11). The vessel belly sometimes has concentric circles (Fig. 10.18: 10, KRD77-6) and closely incised bands (Fig. 10.18: 7, TCC91-2). Feathered lines are a characteristic device in the Mġarr style (Fig. 10.19: 16, TCC261-1; Fig. 10.17: 9, SV41-3; Fig. 10.17: 3, KRD77-2; Fig. 10.18: 5, KRD306-5; Fig. 10.19: 16, TCC261-273-1), incised zigzag pairs of lines around the neck (Fig. 10.19: 7, SV39-2; Fig. 10.19: 6, SV20-9; Fig. 10.19: 8, SV62-2), a 'matchstick' pattern of line and dot (Fig. 10.18: 24.SV62-1), and a broad vertical ridged band (Fig. 10.17: 13, KRD91-2; Fig. 10.17: 11, KRD90-2; Fig. 10.17: 12, KRD10-1) around the upper body/shoulder of a possible carinated form. Carinated forms have not been identified before in the Mġarr style, but do anticipate shapes that become characteristic in Ġgantija

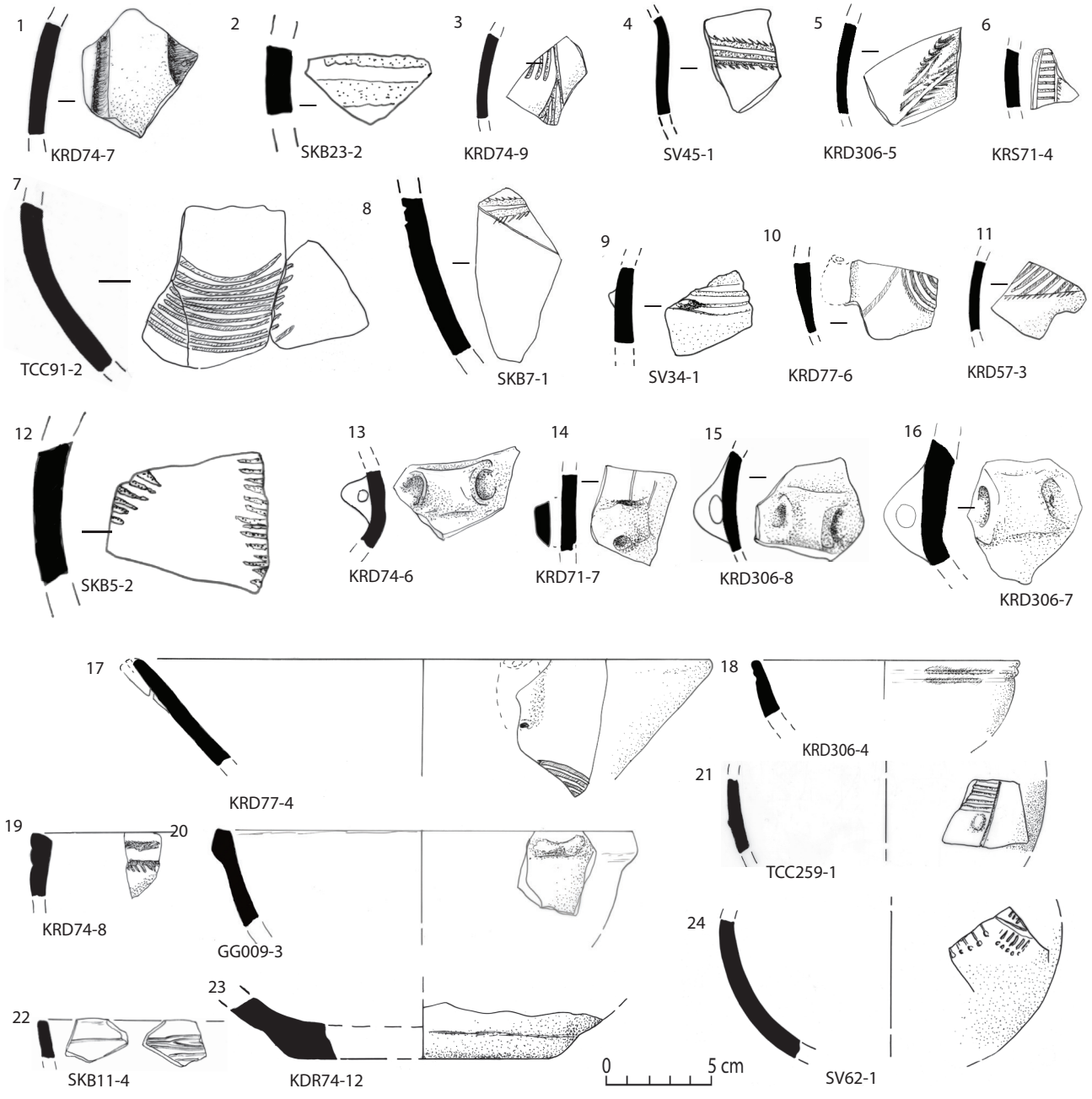


Figure 10.18. *Mġarr patterned sherds and bowls.*

(Evans shapes, fig. 35, 9–12). Other decoration includes impressed dots (Fig. 10.17: 6, KRD86-1) and small buttons/knobs (Fig. 10.17: 16, SV60-7; Fig. 10.18: 21, TCC259-1). The handles recorded here are simple rolled horizontal slightly 'trumpet'-shaped and attached the main body of the vessel. Two vertical lugs occurred on an open bowl form (Fig. 10.18: 17, KRD77-4; Fig. 10.18: 14, KRD71-7) and a horizontal solid lug on the rim of a bowl (Fig. 10.18: 20, GG009-3).

10.6.5. Mġarr inverted and everted forms and lugs: catalogue descriptions (Fig. 10.19)

1. KRD91-3 Shape 9 Large inverted plain/roll rim jar. D – 26 cm. Black soft fabric.
2. KRD77-5 Shape 6 biconical jar with rolled rim. D – 16 cm. Black fabric, burnished buff surface.
3. KRD306-14 Shape 6 biconical jar with rolled rim and cut band below. D – 25 cm.

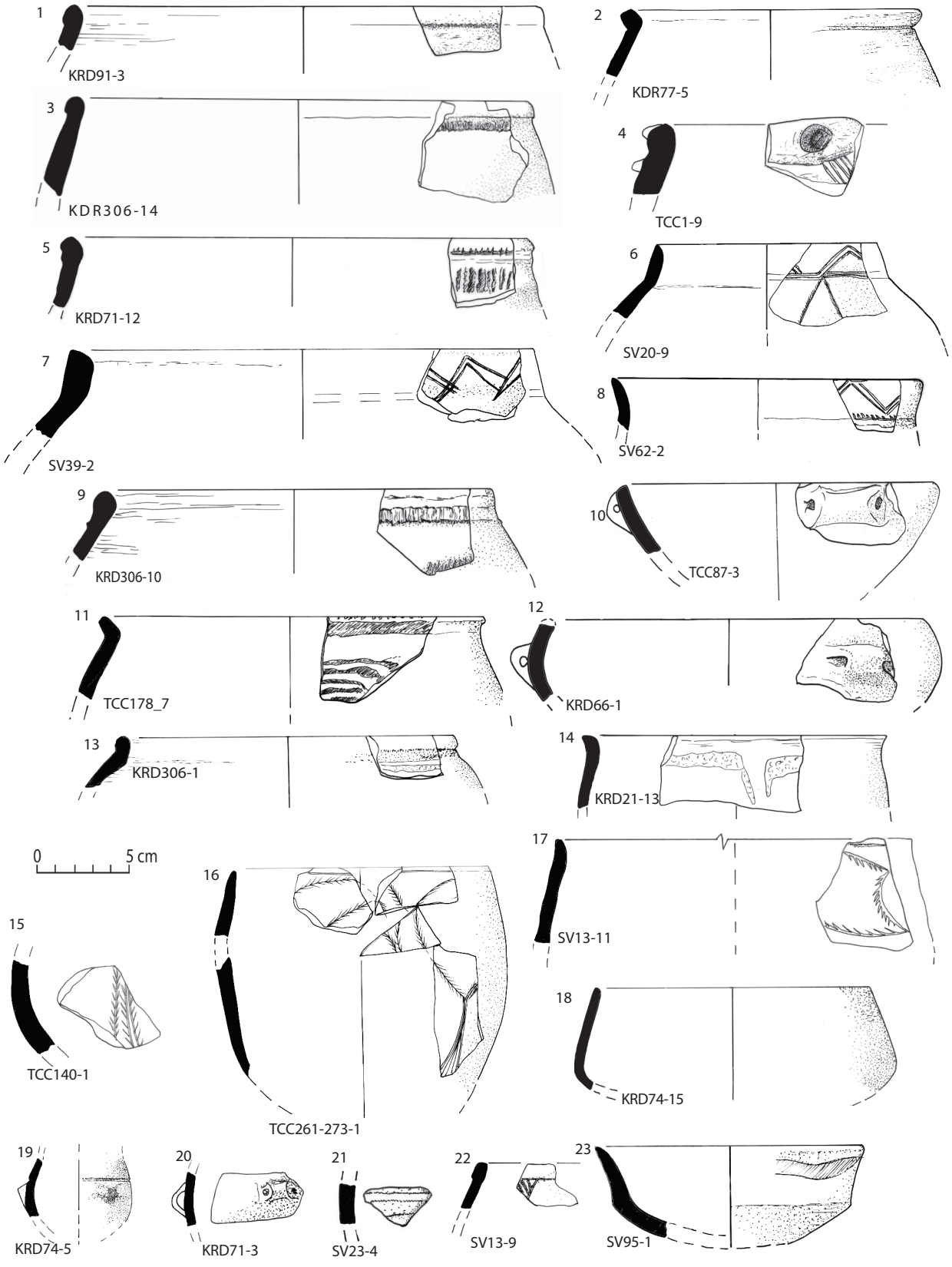


Figure 10.19. *Mġarr inverted and everted forms and lugs.*

4. TCC1-9 Shape 6/9 thick inverted plain/roll rim jar, with hollow lug, and diagonal lines. (Evans 1971, fig. 13.6 for an everted example from Xemxija Ex5/P.6). Black matt fabric, white paste traces.
5. KRD71-12 Shape 6/9 inverted plain/roll rim jar, with feather cut outer rim, over close set vertical cut band. D – 25 cm. Grey-yellow fabric, smooth, with red paint traces.
6. SV20-9 Shape 5- flask neck with broad paired zigzag over horizontal lunes and lower chevrons. D – 12 cm. Smooth grey fabric.
7. SV39-2 Shape 5 large inverted neck jar with paired zigzag around neck (form and decoration from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.7.D). D – 25 cm. Grey fabric.
8. SV62-2 Shape 5 everted neck of flask with paired zigzag on neck over feathered line. D – 16 cm. Pale yellow burnished.
9. KRD306-10 Shape 6 biconical inverted jar with rolled rim with cut band around base. D – 20 cm.
10. TCC87-3 Shape 1 bowl with horizontal pierced elongated lug. (Evans 1971, fig. 13.6 from Xemxija Xe5/P.7). D – 16 cm. Black fabric with burnished buff surface.
11. TCC178-7 Inverted shape 6 jar with marked out-turned rim, with feather cuts on top, over broad cut band, and concentric ring pattern on shoulder. D – 20 cm. Beige grey fabric, white paste traces.
12. KRD66-1 Inverted convex bowl with horizontal pierced lug. D – 14 cm. Grey fabric.
13. KRD306-1 Inverted shape 6 jar neck with cut pattern on shoulder. D – 16 cm.
14. KRD71-13 Shape 4 inverted jar with shallow geometric pattern (and for 17 below, similar lip to example from Żebbuġ, Evans 1971, fig. 27.7). D – 15 cm.
15. TCC140-1 Sherd with leaf-feathering pattern. Beige brown smoothed fabric.
16. TCC261-1/273-1 Shape 4 bowl with extensive feathered line pattern (feathering from Xemxija Xe5/P11, Evans 1971, fig. 13.2 and similar form fig. 29.13U/P.19). D – 14 cm. Black-grey fabric with brown burnished surface.
17. SV13-11 Inverted shape 4 inverted bowl with feather line pattern. D – *c.* 19 cm. Grey-brown fabric with red ochre patches.
18. KRD74-15 Shallow shape 4 bowl inverted, plain. D – 14 cm.
19. KRD74-5 Small cup with button lug on belly, below incised horizontal line (miniature from XemxijaXe1/P.2, Evans 1971, fig. 13.4). Max. D – 7–8 cm. Pale buff fabric.
20. KRD71-3 Small angle cut lug. Dark fine burnished.
21. SKB23-4 Grooved sherd. White paste with red ochre wash.
22. SV13-9 Shape 6 inverted biconical jar (rolled rim), filled lozenge design with traces of paint.
23. SV91-1 Small carinated shape 5 bowl, with marked carination and broad cut line pattern (Evans 1971, fig. 16.8 shouldered bowl for similar shape). D – 10 cm. Brown paint evident around neck on dark fabric.

10.7. Ġgantija pottery (Phase 5)

Ġgantija pottery was the second most common pottery retrieved from the *FRAGSUS* excavations with a total of 8194 sherds identified across the excavated sites. Over half of all the Ġgantija pottery came from the domestic site of Taċ-Ċawla, where 5,008 sherds were recovered. The style was well represented at Santa Verna (906 sherds), Kordin III (1003 sherds) and Skorba (1076 sherds), but comparatively rare at Ġgantija itself (201 sherds) where *FRAGSUS* excavations concentrated on later Tarxien levels (Chapter 5).

Recognition of Ġgantija pottery is relatively simple, since even small sherds often preserve distinctive fine rim lines around the outer rim edge, a characteristic which no other phase of Maltese prehistoric pottery routinely employs. The pottery is generally highly burnished and fired to a high temperature, typically resulting in a fairly reduced grey-black surface colour, although larger vessels and some finewares have red or yellow orange surfaces, suggesting use of more open oxidizing firepits or kilns. Decoration was applied after firing in most cases, usually as finely scratched arcs and curvilinear and volute designs, sometimes with red ochre fill and occasional use of white/red/grey paint. Rarely, a slip was used to coat the surface (Table 10.16).

10.7.1. Ġgantija ceramic repertoire

The ceramic repertoire of the Ġgantija phase represents the most decorative and elegant of all the Temple Period production. Graceful rounded and carinated shapes, usually supported on a very small dimpled base typify the fine ware forms. Coarsewares, on the other hand, tend to have either rounded, solid flat or foot ring bases. There are 16 recognized shapes (Evans 1971, fig. 35), which are referenced here for simplicity, although there is considerable variation across the forms in size and detail, especially in the larger jars and cooking pots, which until now, have

Table 10.16. *Phase 5. Ġgantija style characteristics.*

	Fabric	**Classic sites/references**
Dark grey to black but also brown, blotchy, buff-orange-yellow Red purplish surfaces High burnish Hard and well fired	Coarseware: Some large and thick vessels, grittier fabric, usually no decoration, well defined rims, mostly jar forms. Cooking or storage vessels. Fineware: little grit or evident temper in well fired, hard, brittle fabric. Surface usually very smooth and shiny, well-polished	Classic assemblages from Xemxija (Evans 1959), Ġgantija (Evans 1953) and Skorba (Trump 1966)
Bowls		**Jars**
Bowls: Large bag-shaped with splayed to vertical sides, rounded slightly indented base Simple forms with everted rims with horizontal lugs on rim or at angle with base, sometime pierced Flanged globular bowl – with rounded base, marked angle with vertical wall and cordon or long lug Globular bowls, shallow based, with marked cordon below bulging wall of closed form (Xemxija) Shouldered cups and bowls with 'V'-shaped handles set on angle between body and base Shallow dishes with slightly convex base – bead around angle between wall and base with string holes Shallow platters with single oval handle on rim Circular covers lids – with broad rolled rim – with string holes through wall often well decorated, flat, curved (BR 10.8,K, M, N) (Evans 1971, 28, 3, 16) Hole-mouthed bowls Miniature bowls		Globular forms Squat forms with flattened body and large tronco-conical neck with straight-concave walls (often with four knobs on shoulder Short upright or inclined neck or longer neck on globular body
Handles	**Rims**	**Base**
Continuity from previous phases Tunnel lugs and handles 'V'-shaped triangular types project from angle between base and wall Simple straps on jars Pointed narrowing strap handles placed on carination 'Nose-bridge' handles on carination	Distinct rolled rims, usually fine scored line along base of rim Thick vertical short neck-rim on jars Broad flat rim Plain rounded rim on bowls and cups Pie crust rim tops only on coarseware Slash or dimpled rims in finer ware	Round based or dimpled bases Tiny flat bases on cups/bowls Foot rings Lids – flat topped/based with vertical or slightly splayed sides, often perforated, some with cordon band, sometimes curved base, usually decorated
Lugs	**Decoration**	**Location of decoration patterns**
Continuity from previous phases Large and small, some with indents or two projections, Set horizontally on neck / shoulder Small lugs set into neck/rim or on carination with vertical holes or false holes Knobs set onto body, often the focus for decoration Vertical perforations through fineware rims	Lightly scratched linear patterns, executed after firing, finely and precisely marked, often in arcs, infilled with criss-cross lines, sweeping curvilinear designs with geometric patterns Comet or cherry design, often two curved lines converging with small circle (comet) or tear drop, part of all-over curvilinear designs, divided between upper and lower half by horizontal line Rectilinear chequerboard with infilled/hatched in alternate block Lines often coloured with ochre Indented and incised rim tops – often closely set cuts or finger nail impressions, usually on coarser pots Some painted decoration dark ware with white/grey patterns	All over body Rims – line around base of rim, and indents and cuts along top Patterns Converging curvilinear arcs, with criss-cross infill at junctions Under rim scored line Comets or cherries

been little recorded. Many of the identified forms for the phase have origins earlier in the Żebbuġ and Mġarr (Evans 1953), and many elements continued into the Saflieni and Tarxien. Indeed, attempting any strict typological system for phasing Temple Period pottery is probably not advisable. It seems evident that tradition and function together ensured that certain ceramic shapes, fabric use and decorative motifs endured throughout the long evolution of the later Neolithic of Malta. Nevertheless, some characteristic features are diagnostic, and indicate a phase. Whether the endurance of these continuing styles were the result of a deeply entrenched tradition of making, or whether the perpetuation of style was a conscious action reflecting cultural identity remain subjects for future investigation.

The fabric and colour are also distinctive, as are the heavy, regular thick rims of the larger coarser

vessels Some rims also have characteristic cut marks on the top surface. Vertical rim lugs, with suspension holes are also typical, formed through slightly thickened rims/shoulders. Cup handles are mostly confined to the sharply angled and pointed single 'nose-bridge' straps (Evans 1953, 1971) formed on carinated or curved cups or as large strap handles on jars.

10.7.2. Ġgantija everted tapered rim bowls and cups: catalogue descriptions (Fig. 10.20)

Bowls are common in the Ġgantija assemblages, often rather thick and plain, and evidently functional for various food preparation activities. Many of the examples illustrated represent a slightly different version of the bowls described by Evans, and have thickened rims defining the form (only indicated in Evans 1971, fig. 35, Shapes 8 & 9), whereas here Shapes 4 and 7 frequently demonstrate robust rims, suitable for cooking/storage vessels, some incorporate lugs which presumably suspended the vessel either for storage or cooking. Such lugs often formed the focal point of the typical linear designs of the Ġgantija style. Since many of the examples shown here are fragmentary, and missing their bases, the final forms and base shape cannot always be determined.

1. SV49-2 Shape 5 flared rim bowl, arc pattern, similar to Xemxija 5/P7 (Evans 1971, fig. 13.2). D – 15 cm.
2. TCC272-3 Shape 5 small plain flared bowl. (Evans 1971, fig. 27.1, Z2/P.1). D – 10 cm.
3. TCC244-2 Shape 4 open bowl, arc pattern. D – *c.* 16.5 cm.
4. SV60-4 Shape 5 flared rim bowl, plain. D – 15.5 cm.
5. TCC120-14 Shape 5 flared rim bowl, arc patterns. D – 19.5 cm.
6. KRD74-2 Shape 4 thickened rim with horizontal rim lug and arc pattern. D – 16 cm.
7. TCC272-8 Shape 4 tapered rim decorated bowl. D – *c.* 19.5 cm.
8. TCC206-1 Shape 7 Deep cup/bowl arc pattern. D – 15 cm.
9. TCC266-2 Shape 5 Carination fragment, patterns, comet. D – 16 cm.
10. TCC81-5 Shape 2 Shallow bowl form, plain rounded rim (lacking cordon indicated by Evans shape 2) (similar to a larger version with a cylindrical basin from Xemxija, Evans 1971, fig. 14.3, Xe5/P.8). D – 19.5 cm.
11. TCC261-1 Shape 2 Shallow bowl with rolled everted rim, arc patterns. D – 21 cm.
12. GG1016-13 Shape 5 Deep tapered rim bowl, plain (profile from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.8 E & F). D – 16 cm.
13. KRD81-1 Shape 7 Deep vertical walled bowl, patterns. D – 19.5 cm.
14. KRD74-3 Shape 2 Semi-carinated shall bowl with cordon/string line with triangle pattern (horizontal cordon-rib form Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.8 E, H, I; and from Xemxija, Evans 1971, fig. 16, shapes 1–2, 4, Xe3/P.1, P6 & P.5). D – 17 cm.
15. KRD105-2 Shape 7 deep vertical walled bowl, hatched arc pattern. D – 18 cm.
16. TCC206-4 Shape 5 thick walled flared rim bowl, patterns. D – 20 cm.
17. TCC120-12 Shape 4 tapered rim bowl, patterns. (shape of Żebbuġ Z1/P.5, Evans 1971, fig. 27, 5) D – 16 cm.
18. TCC120-16 Shape 7 deep cup, no handle evident, arc patterns. D – 13 cm.

10.7.3. Ġgantija everted rolled rim bowls: catalogue descriptions (Fig. 10.21)

1. TCC273-1 Shape 4 bowl with thickened rim. D – 25 cm. Black buff burnished.
2. TCC140-3 Shape 4 deep bowl with thick rim, and vertically perforated rim lug. D – 23 cm. Grey fabric, brown-grey burnished.
3. SV41-10 Shape 7 deep bowl, bevelled rim, arc lines. D – 22.5 cm. Dark brown burnished.
4. KDR57-2 Shape 4 shallow bowl with pronounced almond rim. D – 25 cm. Buff burnished.
5. TCC140-5 Shape 7 shallow bowl with irregular rolled rim. D – 18 cm. Soft beige-rosy fabric, burnished surface
6. TCC87-2 Shape 4 deep bowl with slight bevelled rim (bowl forms from Xemxija Xe6/P.3 and Xe3/P.2, Evans 1971, fig. 16, 5 & 6). D – 25 cm. Black-brown and smoothed surface.
7. SV46-1 Shape 7 bowl with overhanging thick rolled rim. D – 23 cm. Dark brown burnished.
8. TCC74-5 Shape 4 shallow bowl with irregular rim. D – 26 cm. Grey buff.
9. KRD5-1 Shape 7 deep bowl with vertical lug/string hole, with pattern emphasis. D – 20 cm. Smoothed surface, red ochre traces.
10. TCC81-7 Shape 2/7 deep bowl with rim lug. D – 25 cm. Buff-brown.
11. SV13-5 Shape 7 bevelled rim deep bowl, with filled arc pattern and cut top rim (cut rim from Xemxija Xe1/P.3, Evans 1971, fig. 13,

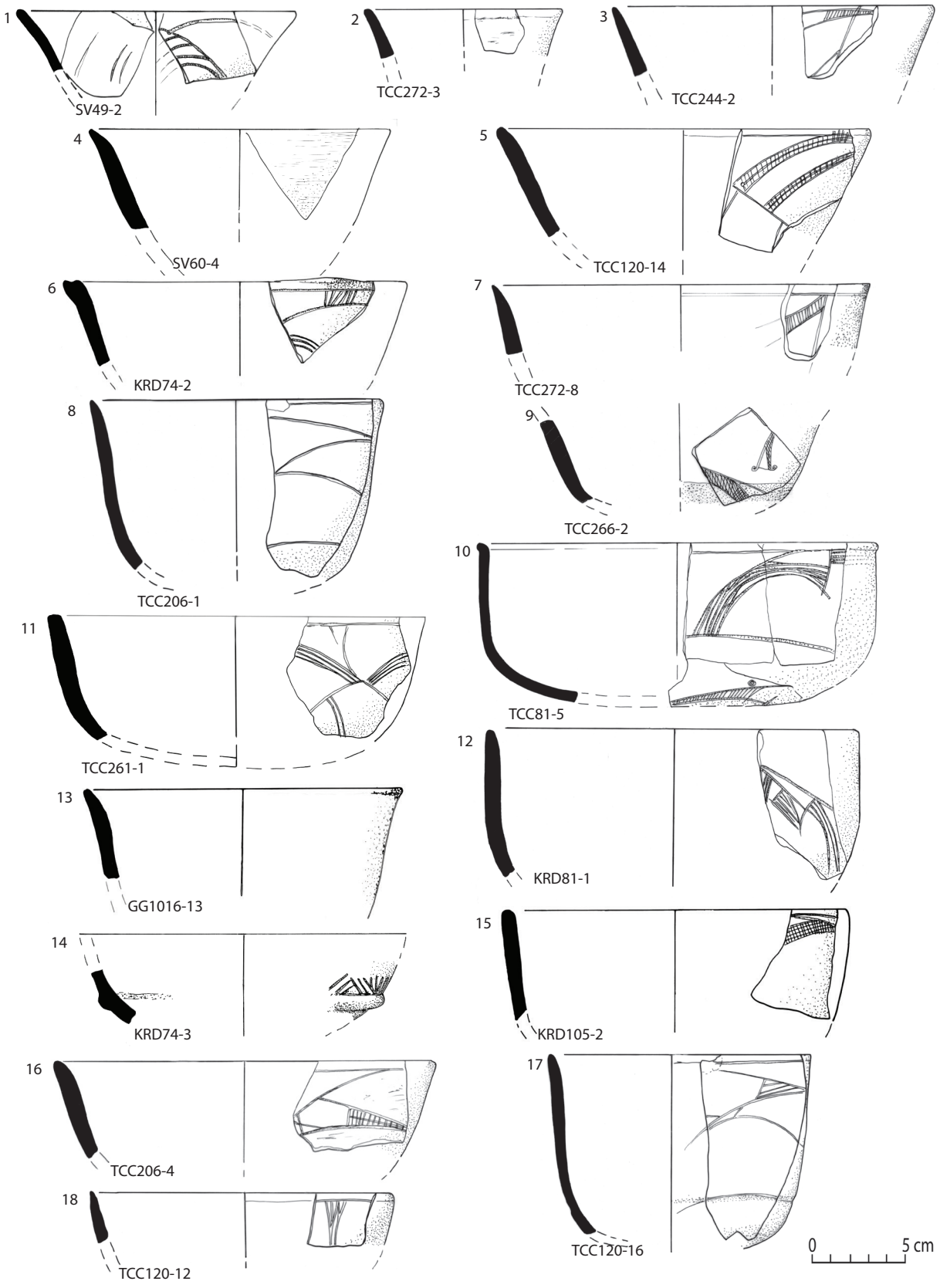


Figure 10.20. *Ġgantija everted tapered rim bowls and cups.*

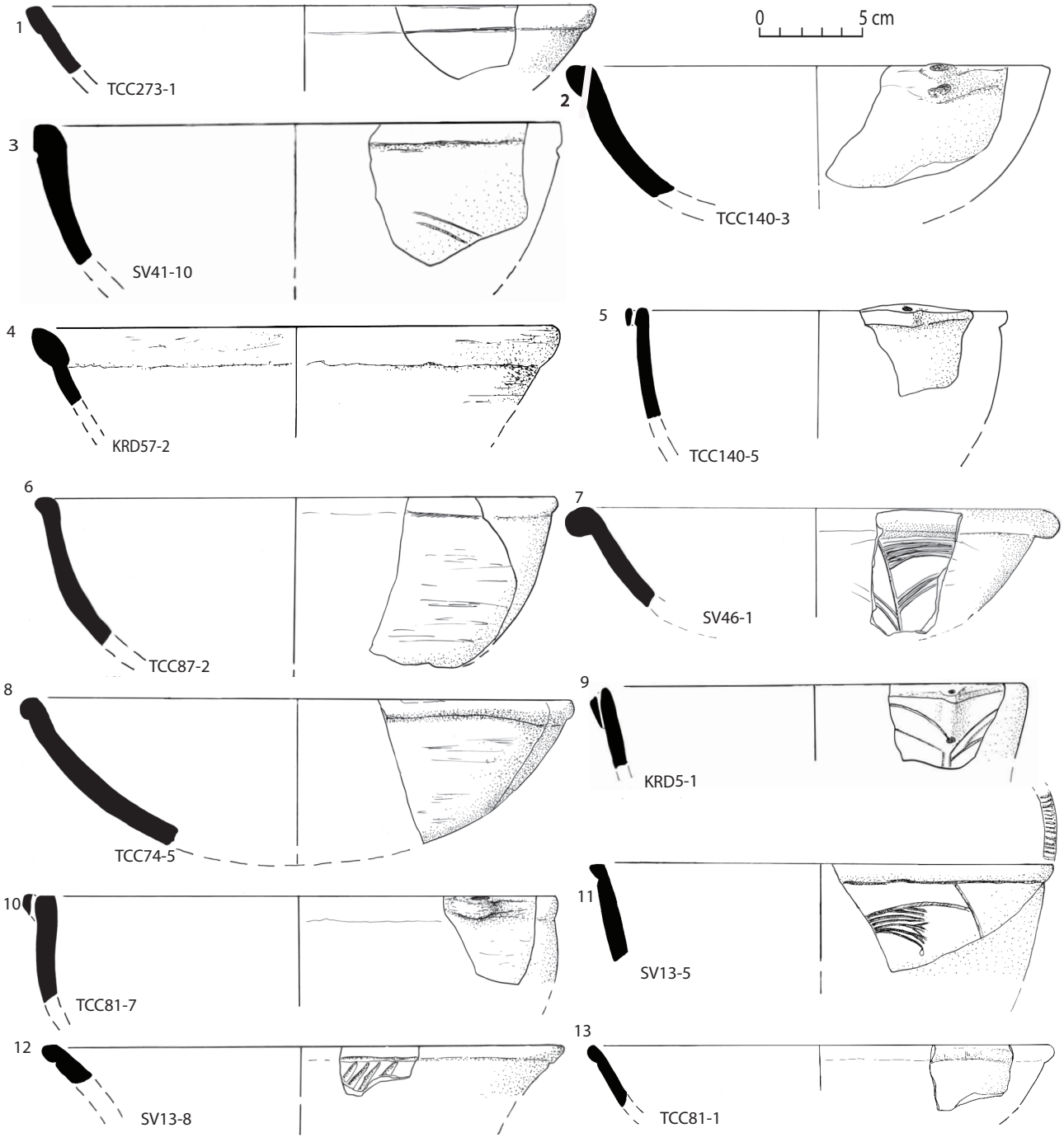


Figure 10.21. *Ġgantija everted rolled rim bowls.*

12). D – 22.5 cm. Black burnished, with ochre traces.

12. SV13-8 Shape 5 splayed bowl with external diagonal line pattern. D – 18 cm. grey fabric, buff brown surface.
13. TCC81-1 Shape 4/5 shallow bowl with bead rim. D – 20–22 cm. Grey red.

10.7.4. Ġgantija tapered rim bowls: catalogue descriptions (Fig. 10.22)

1. SV65-1 Shape 5 bowl. Volute pattern. D – 23 cm. Orange.
2. SV69-1 Shape 5 bowl, filled arc pattern. D – 19 cm. Grey orange.

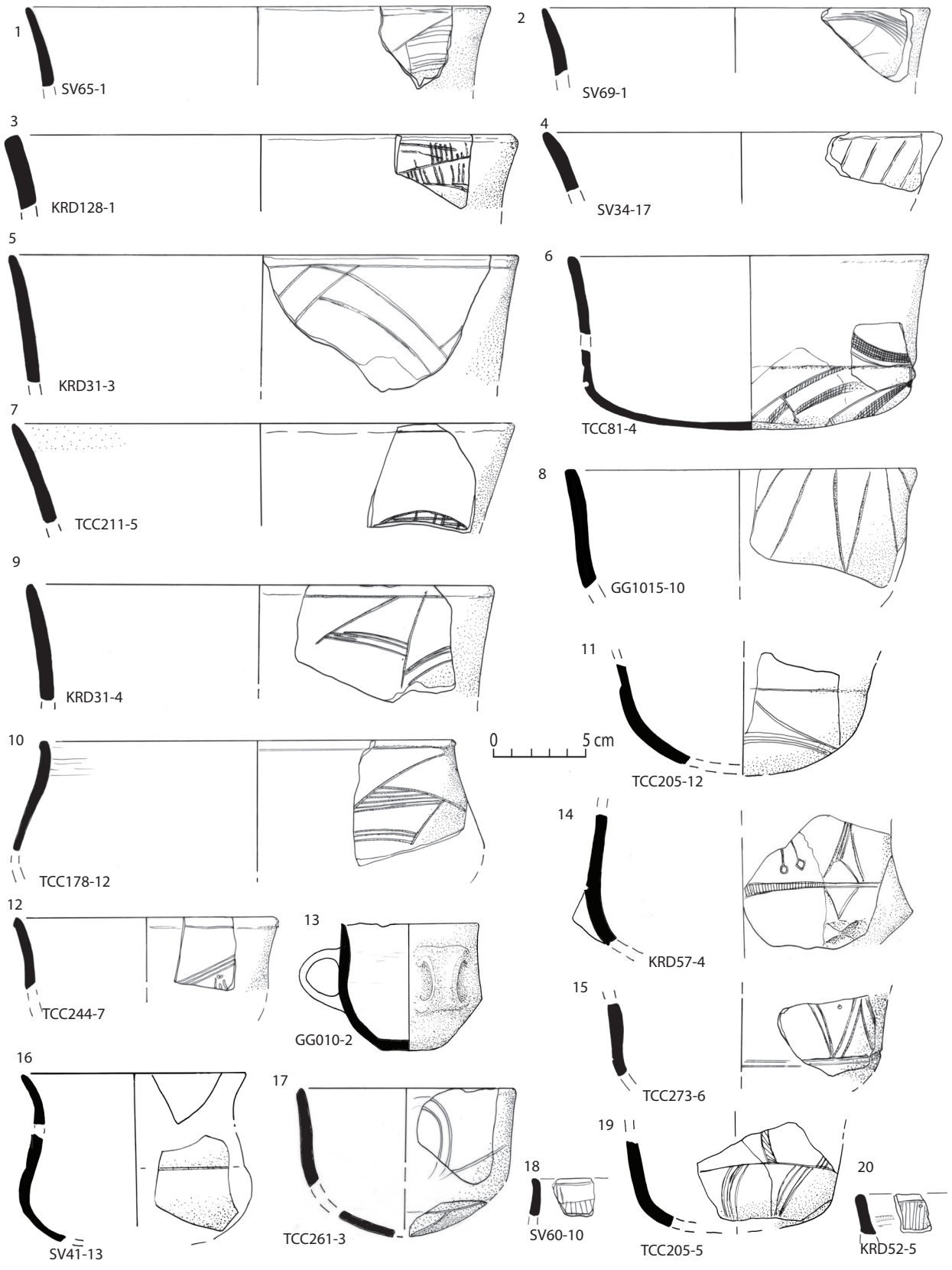


Figure 10.22. *Ġgantija tapered rim bowls.*

3. KRD128-1 Shape 5 bowl, thick body, filled arcs. D – 26 cm. Grey orange.
4. SV34-17 Shape 5 bowl, with Ġg rim line and diagonal incised lines. D – 20 cm.
5. KRD31-3 Shape 5 large bowl, rim line and broad open arc pattern. D – 26 cm. Grey with red paint.
6. TCC211-5 Shape 5 carinated bowl with hatched arcs across round base. D – 18 cm. Grey fabric, brow-red burnished surface.
7. TCC81-4 Everted shape 5 bowl, arc decoration. D – 25.5 cm. Grey buff fabric with slipped and burnished surface.
8. GG1015-10 Everted bowl, broadly shape 5, probably late Ġg, 'V' incised patterns. D – 18 cm.
9. KRD31-4 Shape 5 bowl, underline on rim, arcs. D – 24 cm. Grey orange.
10. TCC178-12 Inverted Shape 5/10 bowl, filled arcs, rim line. D – 22 cm. Beige-grey burnished.
11. TCC205-12 Shape 5 bowl base, arc pattern. Actual D – max 14 cm. Black burnished fabric with ochre traces.
12. TCC244-7 Small bowl, shape 5, rim line and massed line pattern. D – 13 cm. Red brown, ochre.
13. GG010-2 Small plain shape 5 cup with single strap handle. D – 7.5 cm. Orange-brown.
14. KRD57-4 Belly sherd of shape 5/9 bowl with pronounced angle lug. Comet and filled arcs (forms from Xemxija, Xe6/P.6, Evans 1971, fig. 14,4). Max. D – 16 cm. Orange-grey.
15. TCC273-6 Sherd of shape 5 cup with carination and double zigzag lines. D – *c.* 14 cm. Red-orange.
16. SV41-13 Shape 5 cup with indent line around belly (form from Żebbuġ, Z1/P.2, Evans 1971, fig. 27, 3). D – 11 cm. Red burnished.
17. TCC261-3 Shape 5 cup with arc line pattern. D – 14 cm. Orange burnished.
18. SV60-10 Inverted rim sherd, with hatched pattern. Black burnished.
19. TCC205-5 Angled shape 5 belly sherd with arc lines set between parallel lines. D – *c.* 12 cm. Black fabric, grey-red-orange surface.
20. KRD52-5 Everted rim sherd with hatched pattern. Black burnished, traces of red ochre.

10.7.5. Ġgantija inverted rolled rim jars: catalogue descriptions (Fig. 10.23)

Closed or inverted Ġgantija ceramic forms tend towards the globular, round based and slightly carinated, with few sharp angles, other than the angular lids. The majority (almost two thirds) of identifiable forms from the excavations are inverted, closed shaped; and were probably intended for storage rather than food serving, but insufficient work has been done on food stuffs and contents of the pots to be sure of how this variable phase of ceramic production actually functioned. The catalogue below attempts to allocate a shape to most vessels for simplicity, but there is evidently more variety than described by Evans. For instance, the inverted jar-bowls have a variety of rims, sizes, angles and probably lower body shapes; and none of the examples here have the applied ring shown in Evans (1971, fig. 35, 9), even though the rim angle does appear similar.

1. GG1012-2 Shape 9 simple rolled rim on broad bodied vase. Such rims on larger vessels do not appear to have been recorded in the past. D – 25.5 cm. Red fabric, dark grey surface.
2. GG1002-21 Shape 9 small globular rolled rim vase (see rim form noted at Żebbuġ Z5/P.13, Evans 1971, fig. 27, 7). D – *c.* 9 cm. Buff, matt.
3. TCC80-7 Shape 9 rolled rim on a fairly vertical walled plain vessel. D – 27 cm. Grey black fabric, brown-red-grey mottled burnished surface.
4. TCC276-2 Small inverted bowl with slight rolled rim. D – 13-5 cm. Grey burnished.
5. TCC178-13 Shape 9 rolled rim narrow topped vessel. D – 21 cm. Red-brown slipped and burnished.
6. TCC206-3 Shape 9 bevelled inner rolled rim. D – 12 cm. Red-orange burnished.
7. TCC44-1 Shape 9 slight inward sloping rolled rim, with traces of arc decoration. D – 25 cm. Black fabric, red brown surface.
8. TCC80-4 Small rolled inverted vessel with trace of hatched arc. D – 13–15 cm.
9. SV13-15 Shape 10-15 rounded inverted rim, little definition. D – 26 cm. Hatched decoration, brown burnished with white paint.
10. TCC268-8 Shape 9 bead rolled rim of inverted bowl, incised decoration. D – 15 cm. Red-rose with ochre fill.
11. CC81-11 Shape 7 vertical walled shape 3 bowl with traces of incised curvilinear pattern. D – 22 cm. Grey-red.
12. TCC266-9 Shape 9 squared rim inverted bowl. D – 17 cm. Black burnished.
13. SV98-4 Large jar with likely everted rim. D – *c.* 30 cm. Grey fabric with rosy-yellow surface.
14. TCC272-15 Shape 8 small cup, broadly shape 3, rolled rim. D – 10 cm. Grey-black burnished.
15. TCC119-5 Shape 9 inverted bowl, with hatched arc decoration. Black with ochre traces.

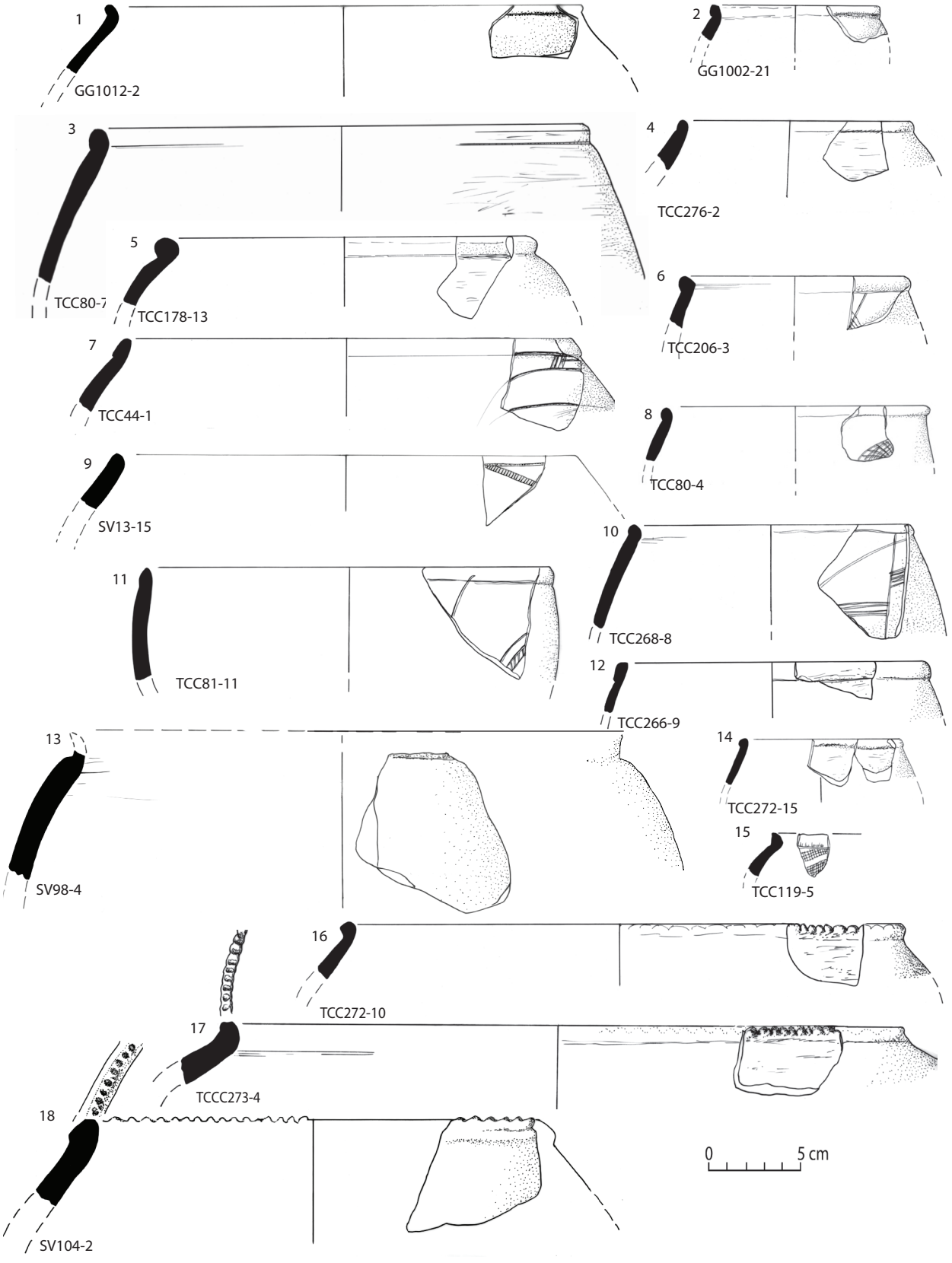


Figure 10.23. *Ġgantija inverted rolled rim jars. Shapes 7, 8 and 9. (Evans 1971, Fig. 35).*

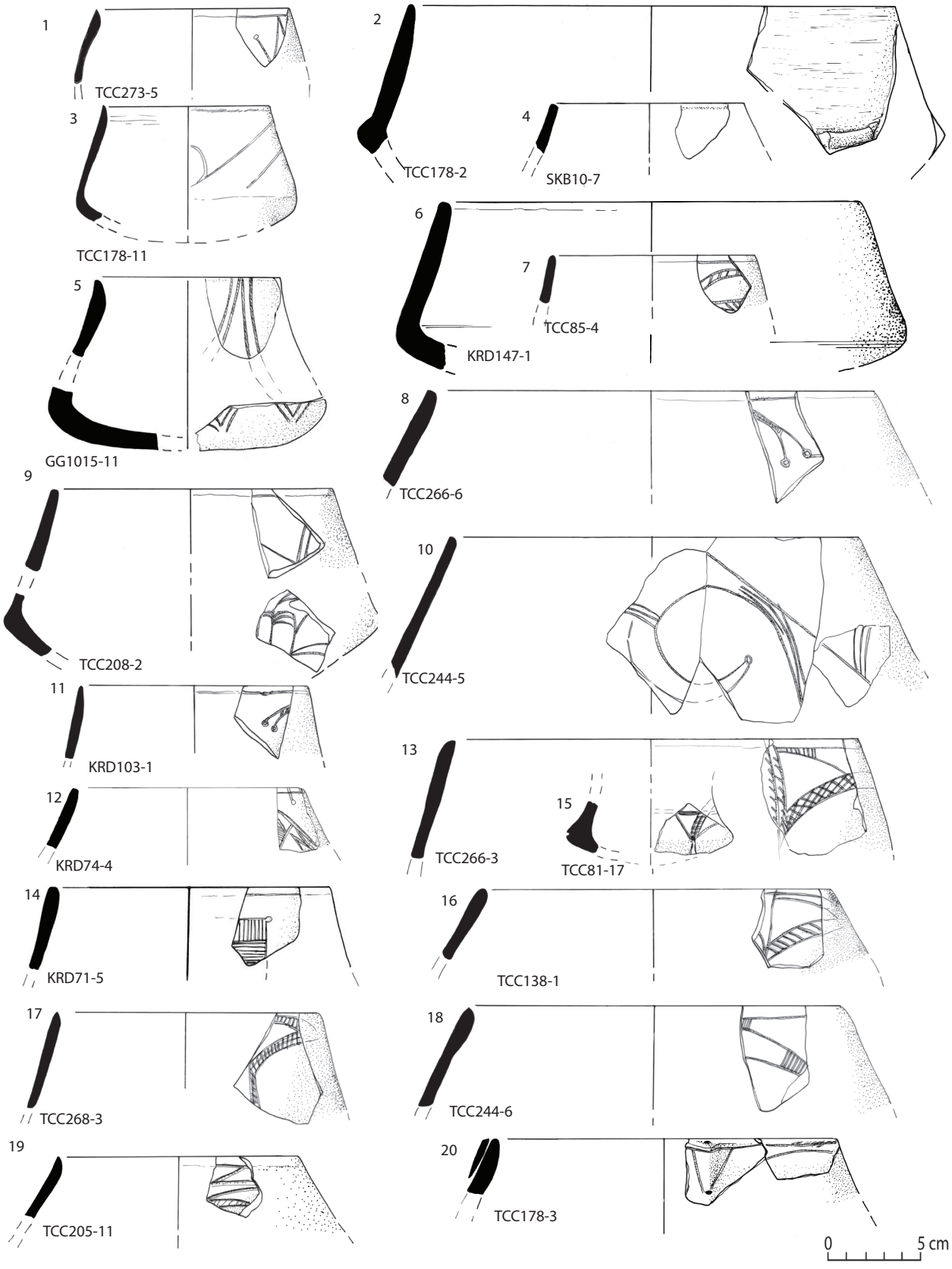


Figure 10.24. *Ġgantija inverted tapered rim bowls and cups.*

16. TCC272-10 Shape 9 large roll rimmed inverted jar with dimple pinched top rim. D – 30 cm. Grey gritty fabric.
17. TCC273-4 Shape 9 inverted roll rimmed ovoid jar with dimpled rim. D – 33 cm. Buff.
18. SV104-2 Shape 9 heavy, thick inverted jar with dimpled rim. D – 27 cm. Coarse burnished buff fabric.

10.7.6. Ġgantija inverted tapered rim bowls and cups: catalogue descriptions (Fig. 10.24)

Some vessels may have been carinated forms resembling Evans (1971, fig. 35) shapes 6, 9, 10, 12. This form is commonplace in the Ġgantija assemblage and represents a generally handle-less cup or bowl, invariably decorated with curvilinear patterns. Whilst some vessels were very large most seem to have ranged between 10–15 cm diameter. Some have pierced rim lugs.

1. TCC273-5 Shape 6 tapered rim cup with traces of incised comet pattern. D – 10 cm.
2. TCC178-2 Large carinated bowl shape 8 (see TX shape 9) with knob/lug on carination. D – 28 cm.
3. TCC178-11 Shape 8 inverted cup-bowl. D – 9 cm.
4. SKB10-7 Small inverted bowl, shape 8/12. D – 11 cm.
5. GG1015-11 Shape 10 thick-walled inverted bowl, paired line pattern. D – 9 cm.
6. KRD147-1 Large carinated shape 10 bowl. D – 23 cm.
7. TCC85-4 Small shape 6 inverted bowl-cup with arc patterns. D – 10.5 cm.
8. TCC266-6 Large shape 10 inverted bowl with comet pattern. D – 25 cm.
9. TCC208-2 Inverted shape 6 carinated bowl with linear pattern. D – *c.* 15 cm.
10. TCC244-5 Large inverted bowl with volute pattern. D – 22 cm.
11. KRD103-1 Small inverted shape 6/12 bowl, with comet pattern, D – *c.* 13 cm
12. KRD74-4 Inverted shape 6/12 bowl, filled triangle pattern. D – 13 cm.
13. TCC266-3 Ovoid inverted shape 10 bowl with hatched arc decoration. D – 22 cm.
14. KRD71-5 Inverted shape 6/12 bowl with hatched rectangles. D – 14 cm.
15. TCC81-17 Miniature shape 10 carinated cup/lid fragment with string hole and arc pattern. D – *c.* 9 cm.
16. TCC138-1 Inverted shape 10 jar/bowl, hatched arc pattern. D – 19 cm.
17. TCC268-3 Inverted shape 6/10 jar/bowl, hatched geometric pattern. D – 15 cm.
18. TCC244-6 Inverted thickened rim shape 10 jar, arc pattern. D – 21 cm.
19. TCC205-11 Inverted tapered rim shape 6/10 bowl, linear zigzag arc pattern D – 13.5 cm.
20. TCC178-3 Inverted shape 7/10 bowl, with vertical lug and string hole on rim emphasized by incised line pattern. D – 19 cm.
21. SV35-1 Thick rimmed shape 7/10 inverted bowl with traces of vertical lug and string hole, with hatched decoration. D – 16.5 cm.

10.7.7. Ġgantija inverted tapered rim bowls: catalogue descriptions (Fig. 10.25)

Bowl shapes include inverted closed forms, which seem to show continuity from Żebbuġ and Mġarr types, and in some cases are quite large and coarse, evidently used for cooking and storage. Here the examples range from small cups to quite large vessels measuring about 20–25 cm diameter.

Shape 6 is described by Evans as a shouldered cup, and the smaller examples (Fig. A10.3.1c, Ggantija shape 6) may be versions of this. Fig. 10.25: 7, KRD75-2 has the remnant of a handle on the gentle carination. Similar examples include: Fig. 10.24: 1, TCC273-5; Fig. 10.25: 10, GG001-2; Fig. 10.25: 12, GG1016-3; Fig. 10.25: 14, SV13-2; Fig. 10.25: 15, TCC211-2; Fig. 10.25: 16, SV50-6-1; Fig. 10.25: 17, KRD75-3.

Shape 7 represents a common and loosely defined shape – the baggy bowl with lugs under the rim, and the examples here are the inverted rim forms which more properly might be considered Shape 8, but since they have no rolled or everted rim, they represent a variant of shape 7. Examples include Fig. 10.25: 3, TCC85-1; Fig. 10.25: 5, TCC266-4; and with traces of a lug Fig. 10.25: 13, TCC268-10; Fig. 10.25: 6, TCC250/301-1; Fig. 10.25: 18, SKB5-3.

Shape 8 is described as an inverted baggy bowl but with a short, everted rim and lugs at the angle of wall and base. SV41-14 provides many of the features of the shape, with traces of a vertical rim lug and another at the shoulder. TCC85-6 is similar but without any flaring of the rim, and is similar to the cruder coarser examples with large strap handles Fig. 10.25: 9, TCC140-4 and Fig. 10.25: 11, TCC273-7. These two latter fragments echo the earlier forms of Żebbuġ and Mġarr (especially Evans 1971, fig. 33-8), but appear to be Ġgantija fabric.

1. SV41-14 Shape 8 globular ovoid jar with vertical rim and belly lugs, line pattern. D – 18 cm. Burnished red-grey.
2. TCC85-6 Shape 8 globular ovoid bowl with vertical rim lug, linear arcs. D – *c.* 21 cm. Black-grey burnished

3. TCC85-1 Shape 7 inverted ovoid bowl. D – 21 cm. Red-brown, burnished with ochre traces.
4. SV104-3 Shape 8 ovoid bowl with rounded rim, linear arcs. D – 20 cm. Red-brown, burnished with ochre traces.
5. TCC266-4 Shape 7–8 round rimmed ovoid bowl, line pattern. D – 13.5 cm. Black burnished with ochre traces.
6. TCC250-301-1 Shape 7 large ovoid bowl, hatched arc decoration and rim lug. D – *c.* 15.5 cm. Buff fabric.
7. KRD75-2 Shape 6 vertical walled cup with traces of handle, linear patterns. D – 10 cm. Black burnished with red paint.
8. TCC272-5 Shape 6 sharply angled tapered rim ovoid bowl, arc patterns. D – 15 cm.
9. TCC140-4 Shape 9 strap handled jar more typical of ZB shape 8. D – 20 cm.
10. GG001-2 Shape 6 inverted ovoid bowl, arc pattern. D – 14 cm.
11. TCC273-7 Ovoid jar with strap handle springing from rim, comparable to Zb shape 8. D – 25 cm. Brown-grey burnished.
12. GG1016-3 Shape 6 small tapered rim bowl, arc pattern. D – 12 cm.
13. TCC268-10 Shape 7 inverted ovoid bowl, with arc pattern. D – 22.5 cm. Brown-grey slipped.
14. SV13-2 Shape 6 small, almost miniature cup with chevron patterns. D – 7 cm. Black burnished.
15. TCC11-2 Shape 6 small inverted cup with dimpled rim. D – 7.5 cm. Grey fabric, red burnished surface.
16. SV50-6-1 Shape 6 vertical walled cup, hatched arcs. D – 10.5 cm. Orange-brown burnished.
17. KRD75-3 Shape 6 fragment of vertical walled cup with patterned rim and hatch arcs. Grey-orange burnished.
18. SKB5-3 Shape 7 ovoid inverted bowl with slash rim and arc patterns. D – 22 cm. Grey fabric, black surface.

10.7.8. Ġgantija rolled rim jars (biconical forms): catalogue descriptions (Fig. 10.26)

Closed vessels with rolled and defined rims compare with Evans (1971, fig. 35) shapes 8 and 9, and possibly 10–11; but given the small size of most fragments it is not possible to reconstruct fully the shape below the rim. Both shapes 8 and 9 are everted globular forms, with rolled or defined rims, thickened rather than tapering, and are usually marked by the characteristic incised line under the outer rim. Evans describes Shape 9 as a hanging vase or cup, defined by a globular shape and with a cordon-string line defining the angle between wall and base, and usually displaying elaborate decoration. Unfortunately, no examples of the cordon can be linked to the rims, but it is possible the smaller sherds – even if rather plain, may belong to the broader version of the shape.

1. GG1002-36 Plain closed narrow necked vase. D – 13.5 cm. Black burnished.
2. KRD156-1 Almost vertical necked vase, rolled rim, with linear 'spine' decoration. D – *c*. 24 cm. Grey fabric, yellow painted surface.
3. TCC30-2 Plain inverted rolled rim vase. D – 13.5 cm.
4. GG1002-13 Inverted rolled rim jar. D – 20 cm. Black-grey.
5. SKB10-6 Fragmentary rolled rim with broad groove around rim, possibly transitional Mġarr-Ġgantija. D – 15 cm.
6. SV33-1 Thickened angled rolled rim with external applied decoration, slightly everted lip. D – 16 cm. Rough rosy buff fabric, red-orange-buff surface.
7. KRD75-1 Large decorated inverted vase, arc pattern. D – 28 cm. Grey.
8. TCC272-11 Ovoid inverted jar, with sharp tapered rolled rim. Linear decoration. D – 15 cm. Grey. Burnished.
9. TCC273-2 Thick rolled rim jar with vertically pierced lug. D – 25 cm. Brown, burnished.
10. SV121-1 Small inverted, decorated rolled rim vessel. D – 13 cm.
11. TCC119-1 Small rolled rim fragment. D – 15 cm.
12. TCC197-2 Inverted bowl, with traces of hatched patterns. D – 19 cm. Black-buff surface.
13. TCC244-8 Inverted small bowl, with rolled rim, comet decoration. D – 11 cm. Brown, with ochre.
14. TCC272-15 Miniature, inverted bowl with slight rolled rim. D – 9 cm.
15. SV35-1 Deep rimmed jar-vase with part perforated vertical string hole, hatched pattern. D – 16 cm. Dark brown burnished.

10.7.9. Ġgantija rolled and collared rim jars and bowls: catalogue descriptions (Fig. 10.27)

There has been little classification of the domestic ceramic assemblage for Ġgantija, and in particular of coarseware vessels. Trump (1966) described the Pellegrin ware as one example of a jar form in rough fabric. One characteristic stylistic element that may straddle the Mġarr-Ġgantija phases is a marked bevelled or out-turned rim form that occurs on several

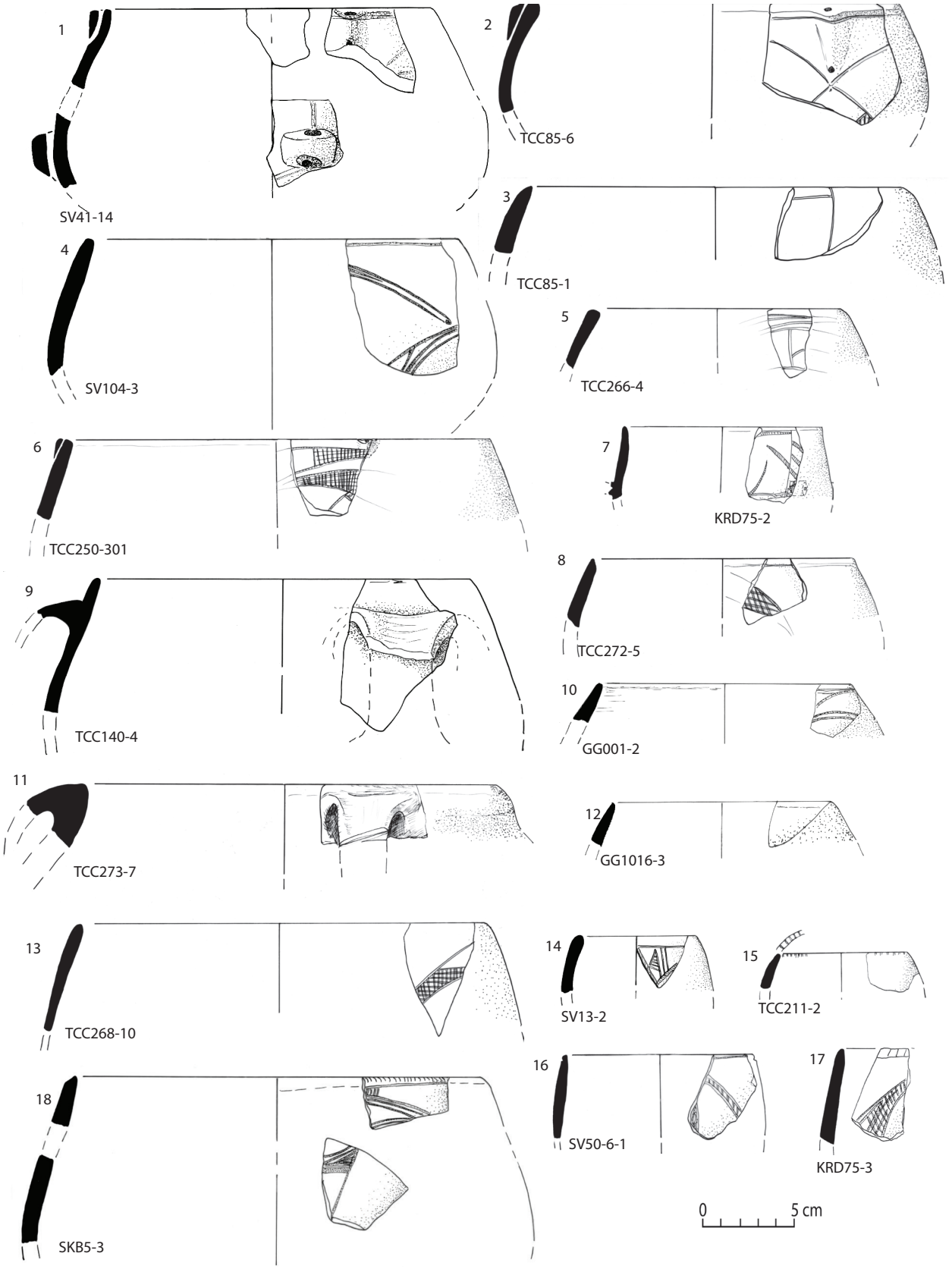


Figure 10.25. *Ġgantija inverted tapered rim bowls.*

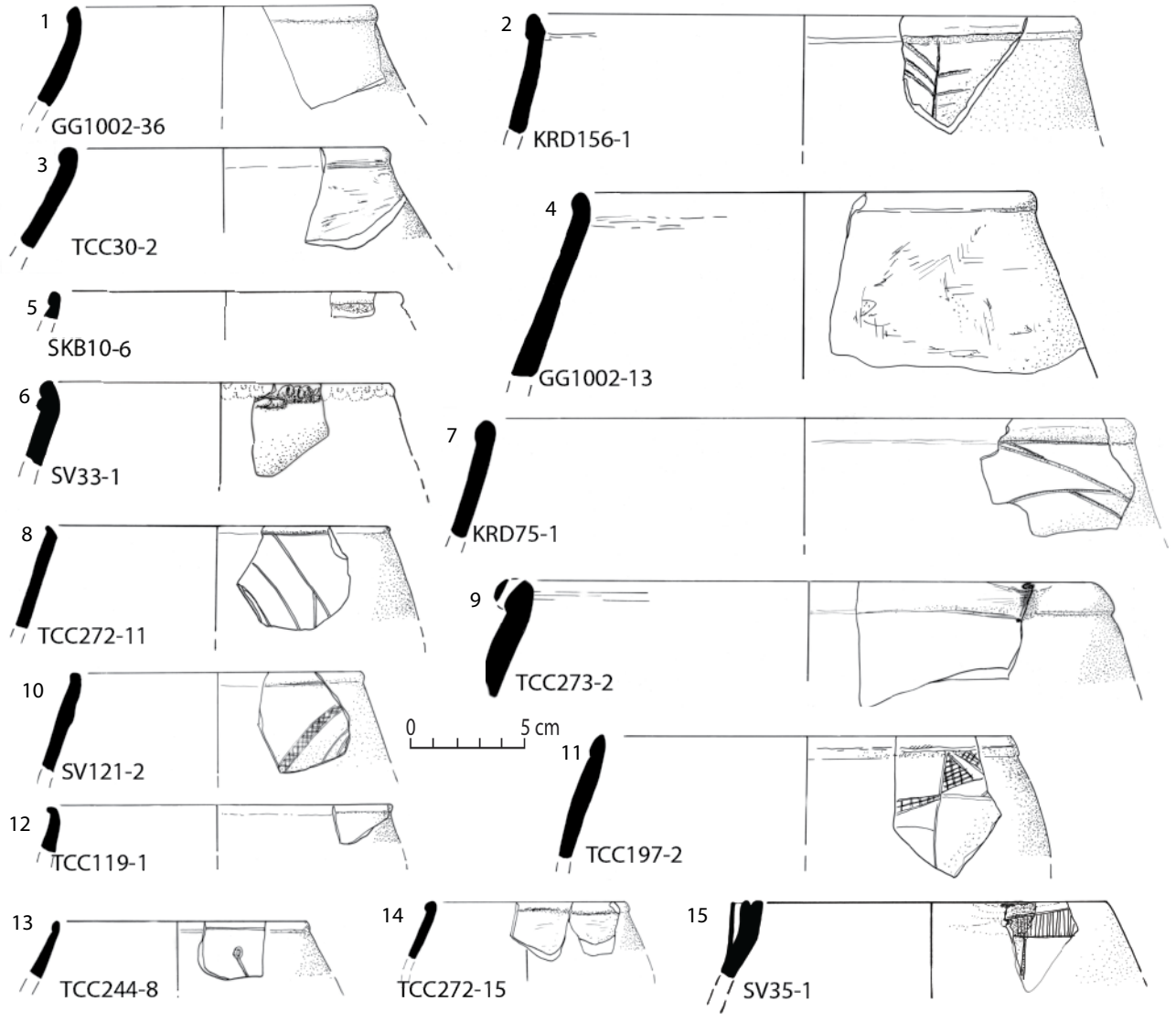


Figure 10.26. *Ġgantija rolled rim jars (biconical forms).*

sites. Figure 10.27 (1–5) presents a range of these forms. A similar slightly splayed rim form was identified at the Xagħra Brochtorff Circle (Malone *et al.* 2009, fig. 10.7: A & D) and identified as Mġarr by Trump. It occurs, however, in a variety of fabrics, often a burnished orange-brown, which might indicate a more likely Ġgantija date.

1. TCC140-2 Heavy slightly everted shape 8 bevelled rim jar. D – 21 cm. Gritty orange fabric, brown rough surface.
2. GG1002-35 Small, heavy bevel-rimmed shape 8 jar. D – 12 cm. Grey burnished.
3. TCC80-6 Bevelled rim ovoid jar with traces of line decoration. D – 23–24 cm. Gritty orange fabric, with orange-red slipped surface.
4. TCC193/194-1 Large inverted ovoid jar, angle rim, arc decoration. D – 30–35+ cm. Buff-orange with burnish.
5. SV45-3 Angled thick rolled rim inverted jar, traces of black-white paint, suggestive of Mġarr style, with three parallel grooves around outer rim. D – 31 cm. Orange fabric with creamy-grey paint.
6. TCC205-1 Almost vertical rolled rim vase, line pattern. D – 20 cm. Light rosy-buff burnished.
7. TCC81-8 Shape 9 ovoid bowl, small rolled rim, flat top surface, arc pattern on body. D – *c.* 22 cm. Brown burnished.
8. SV35-2 Vertical walled jar with defined deep rim, top surface dimple pattern. D – 27 cm. Brown-grey burnished.

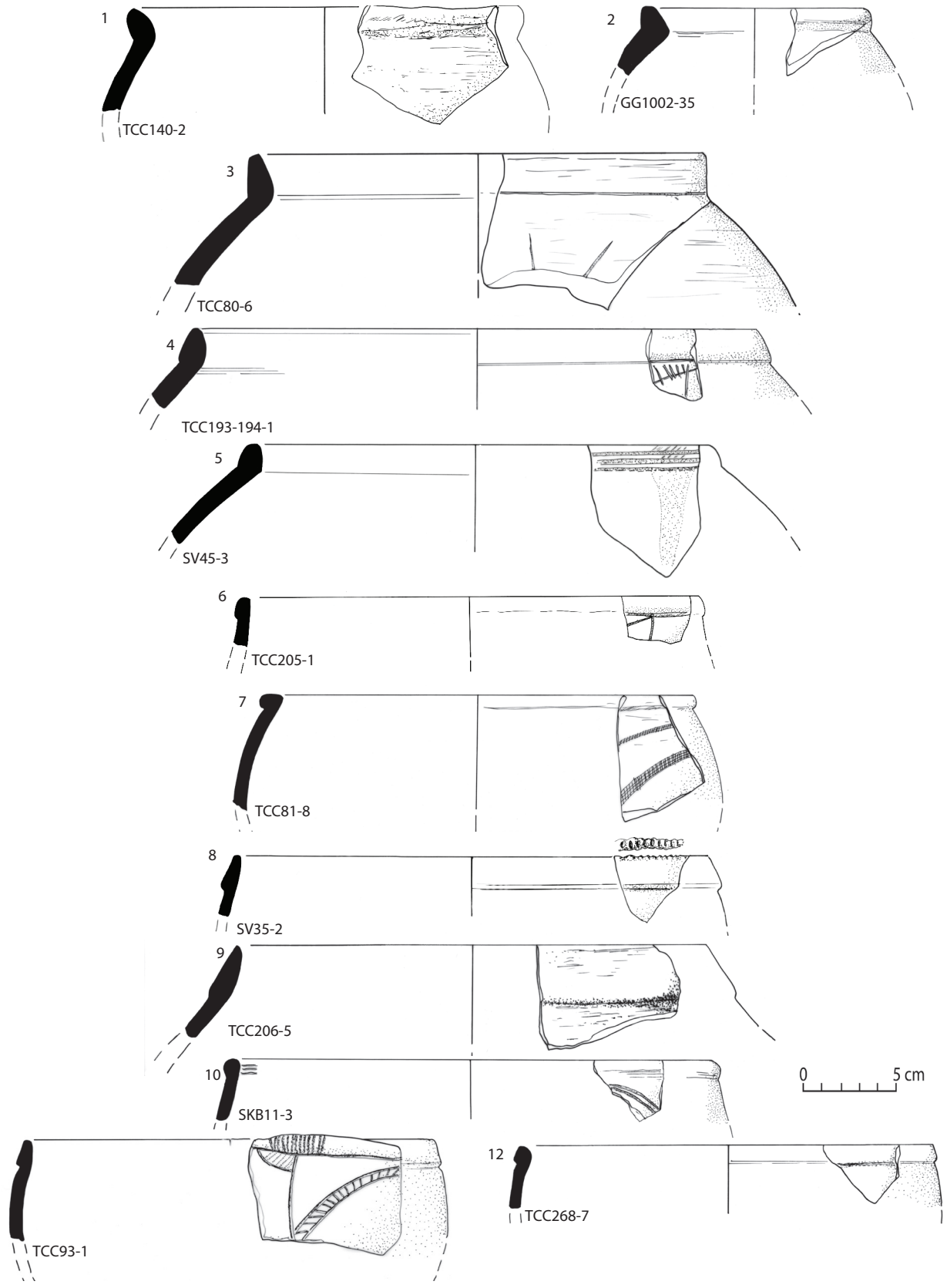


Figure 10.27. *Ġgantija rolled and collared rim jars and bowls.*

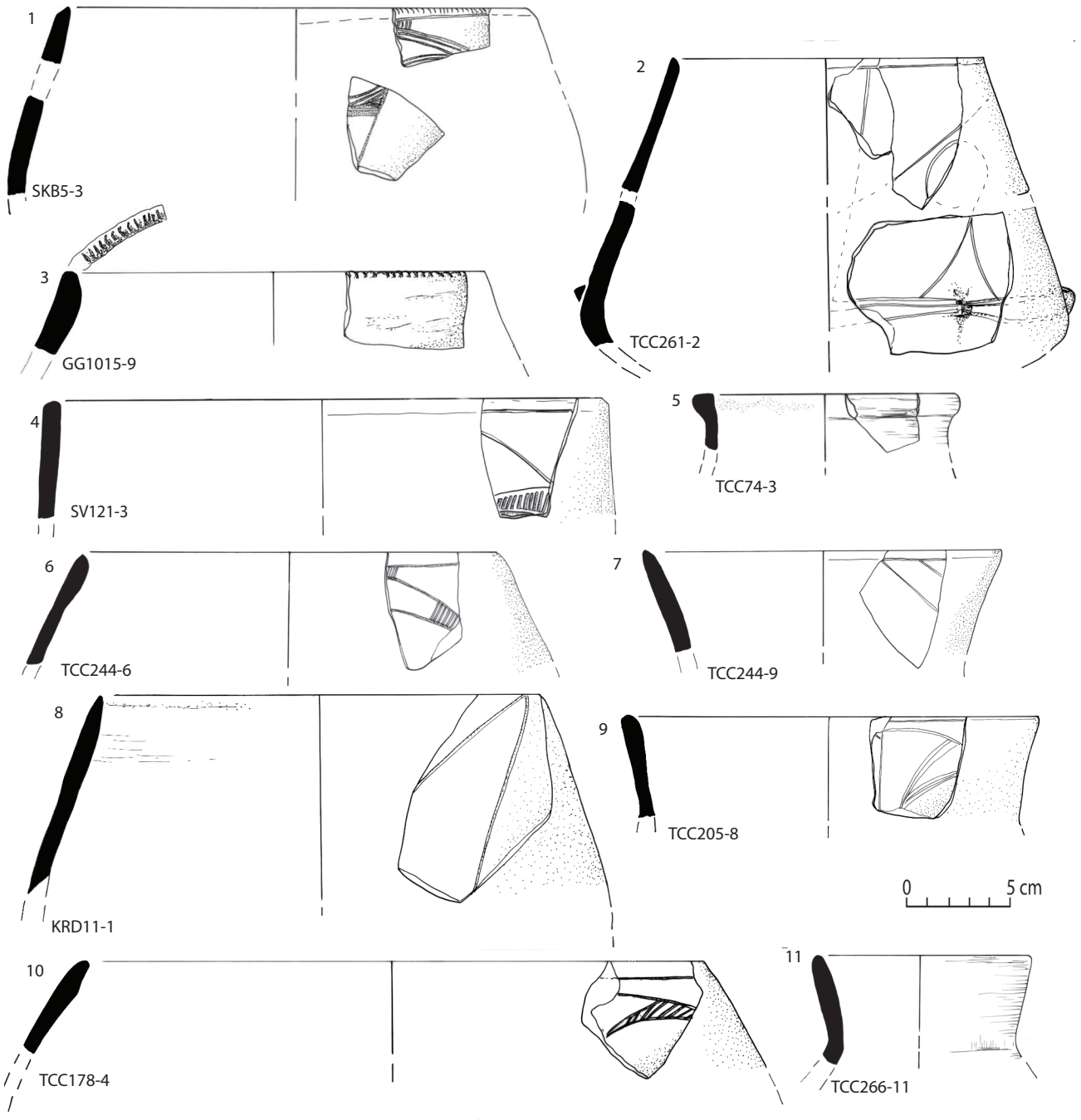


Figure 10.28. *Ġgantija deep and tapered rim jars.*

9. TCC206 -5 Inverted jar neck, thickened around broken lug. D – 24 cm. Orange.
10. SKB11-3 Rolled rim almost vertical sided jar, with internal incised rim line, external arc pattern. D – 26 cm.
11. TCC93-1 Ovoid shape 9 bowl with deep rim supporting a raised lug, hatched pattern in arcs and on lug. D – 21 cm. Buff-grey burnished.
12. TCC268-7 Bevelled rolled rim vertical walled bowl. D – 22 cm. Burnished, red slip.

10.7.10. Ġgantija deep and tapered rim jars: catalogue descriptions (Fig. 10.28)

Coarser and larger vessels often conform to the ovoid jars presented by Evans (1971, fig. 35, 8–9, 11–12), and have inverted neck shapes and mostly tapered rims.

Figure 10.28 displays a number of these. Some vessels are quite fine and large, one example (Fig. 10.28: 10) is *c.* 30 cm diameter and may have been a quite shallow basin with thin walls. Others inverted examples have similar cut and dimpled rim decoration on an otherwise plain vessel (Fig. 10.23: 16–18, TCC272-10, TCC273-4 and SV104-2; and Fig. 10.28: 3, GG1015-3). Cooking vessels of the ovoid shape with everted rolled rim (Fig. 10.27: 1, TCC140-2; Fig. 10.27: 2, GG002-35), have thickened rims and substantial walls.

1. SKB5-3 Shape 10 large ovoid bowl, slightly bevelled rim thickening to lug attachment, arc pattern, cut rim top. D – 22.5 cm. Grey black.
2. TCC261-2 Shape 10 carinated bowl, with lug at base wall junction. D – 15 cm. Brown buff-orange burnished.
3. GG1015-9 Shape 10/12 dimpled rim thick walled inverted jar. D – 20 cm. Sandy brown-red fabric, buff-grey surface.

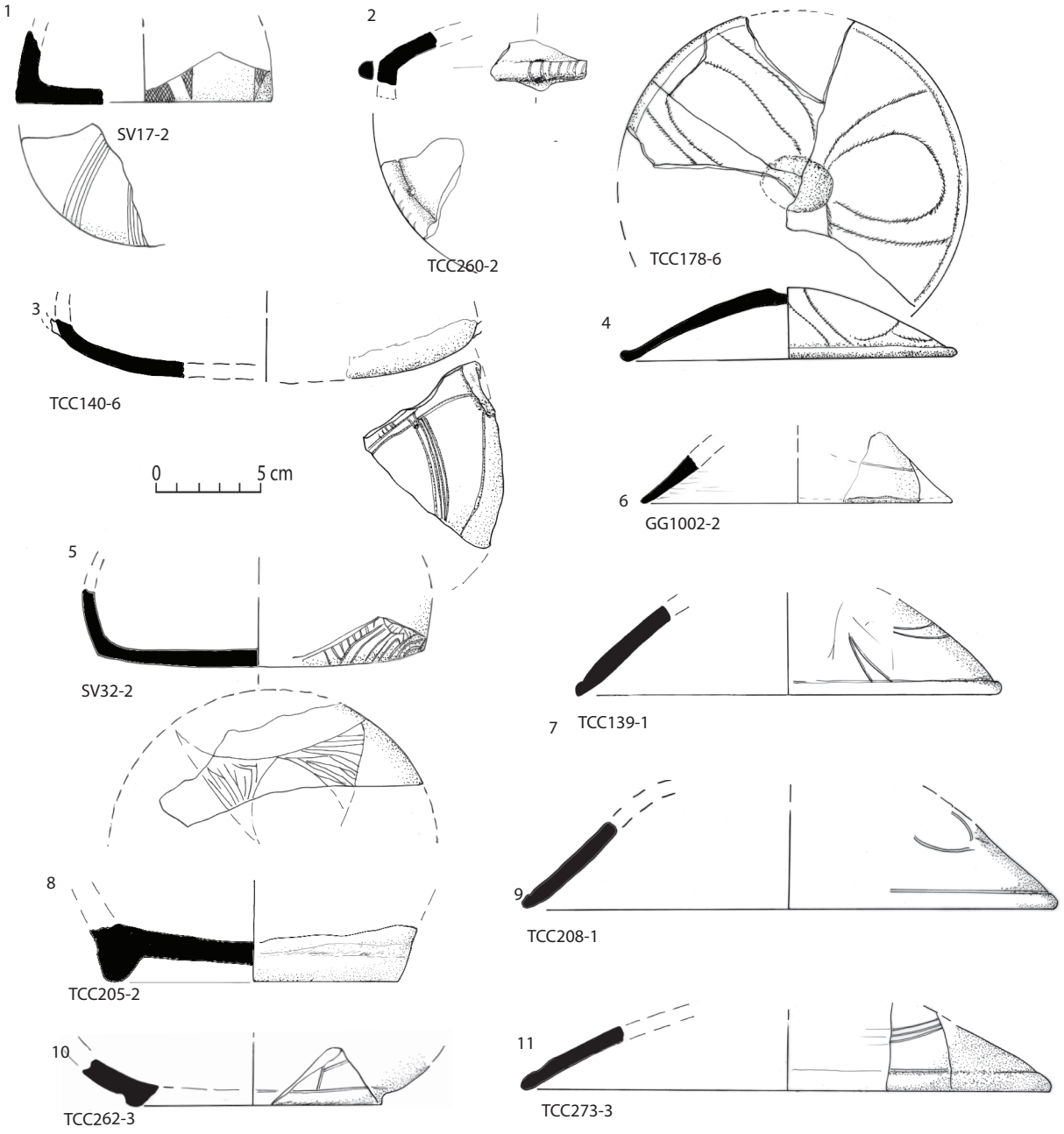


Figure 10.29. *Ġgantija lids, bases and base decorated sherds.*

4. SV121-3 Shape 7/11 vertical walled, arc line pattern. D – 27.5 cm. Black burnished.
5. TCC74-3 Shape 14 jar neck with flat topped bead rim (possible TX Shape 22–23 but with Ġg rim line). D – 13 cm. Grey fabric, cream slip with red paint.
6. TCC244-6 Shape 10 inverted bowl with arc decoration. D – 24 cm. Red-brown burnished, with ochre paint.
7. TCC244-9 Shape 10 flared everted rim of necked jar with simple (late) linear pattern. D – 15–17 cm. Black-grey with ochre.
8. KRD11-1 6 Shape 10 inverted simple line decorations (more similar to TX shape 9) but rim line present. D – 20 cm. Brown-red burnished, with ochre traces
9. TCC205-8 Shape 11/14 tall flared necked jar, arc pattern. D – 19.5 cm. Light rosy buff.
10. TCC178-4 Shape 10 inverted large bowl with internally bevelled rim, arc decoration. D – 30 cm. Buff burnished.
11. TCC266-11 Shape 14 tall flared necked jar flask. D – 10.5 cm. Brown-grey burnished.

10.7.11. Ġgantija lids, bases and base decorated sherds: catalogue descriptions (Fig. 10.29)

1. SV17-2 Lid shape 16 with decorated top and sides. Unusual form without parallels. Arc patterns. D 12 cm. Grey.
2. TCC178-10 Lid or shallow shape 2/3, with carination cordon and string lug (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.8.N is very similar). D – *c.* 15–18 cm. Black burnished.
3. TCC10-6 Curved base shape 2 lid, with possible lug and fine arc pattern. The curved form may be more similar to Saflieni forms, of Evans shape 1. D – 20 cm. Ochre stained.
4. TCC178-6 Shape 1 lid with curvilinear patterns cut in feathered lines over top surface. (Ħal Saflieni example, Evans 1971, fig. 5.8, S/P.2). D – 16 cm. Buff-grey burnished.
5. SV32-1 Shape 2 lid with arc patterns (the decorated base (?or lid) has parallels with examples from Xemxija Evans, 1971, fig. 14.2 and 4. Xe2/P.3 and Xe6/P.6). D – 16 cm. Reddish-brown.
6. GG1002-2 Shape 2–4 everted lid (6, 7, 9 and 11, this figure, are similar to Tarxien types from the Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.8.M). D – 15 cm. Pink-grey burnished.
7. TCC139-1 Shape 2 everted lid, with arc pattern and rim line. D – 20–25 cm. Grey-black burnished.
8. TCC205-2 Base with foot ring. D – 13.5 cm. Purple brown fabric.
9. TCC208-1 Everted shape 2–4 lid, with curvilinear pattern and rim line. D – 25 cm. Grey.
10. TCC262-3 Flat base with slight foot cut. D – 12 cm. Grey fabric, with red-brown burnished surface.
11. TCC273-3 Shape 2 lid with tri-line arcs and rim line. D – 25 cm. Brown-grey burnished.

10.7.12. Ġgantija handles, lugs and decorated sherds: catalogue descriptions (Fig. 10.30)

1. TCC197-1 Pointed 'nose-bridge' handle. Brown-black.
2. SKB13-2 Sharply angled 'nose-bridge' handle. Pale orange fabric.
3. TCC238-1 Horizontal round handle. Black burnished with ochre stains.
4. SV26-5 Pointed angled handle with small incised dots. Black-brown burnished.
5. SV17-4 'Nose-bridge' pointed handle (with parallel examples from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.11, P, and also with 6 and 7, this figure). Grey fabric, brown-rosy burnish.
6. SV17-3 'Nose-bridge' handle. Buff grey
7. TCC261-4 'Nose-bridge' handle. Gritty grey fabric with black burnished surface.
8. GG012-4 Double holed rectangular-shaped raised handle. Brown-red. Smoothed surface.
9. GG1002-3 Zigzag decorated sherd.
10. TCC74-1 Chequerboard hatched sherd. Brown burnished.
11. SV42-3 Hatched band decorated sherd. Grey burnished surface on orange fabric.
12. SV12-2 Chequerboard decorated sherd.
13. TCC77-1 Hatched chequerboard sherd. Buff-black-grey mottled surface.
14. KRD71-10 Arc patterned sherd.
15. KRD74-11 Chevron line patterned sherd. Ochre stained.
16. SV16-1 Joined perhaps ancient mend of broken sherd. Hard grey fabric, fired black with white paste fill.
17. KRD105-4 Arc pattern sherd. Black fabric.
18. SV41-12 Linear patterned sherd. Black-brown.

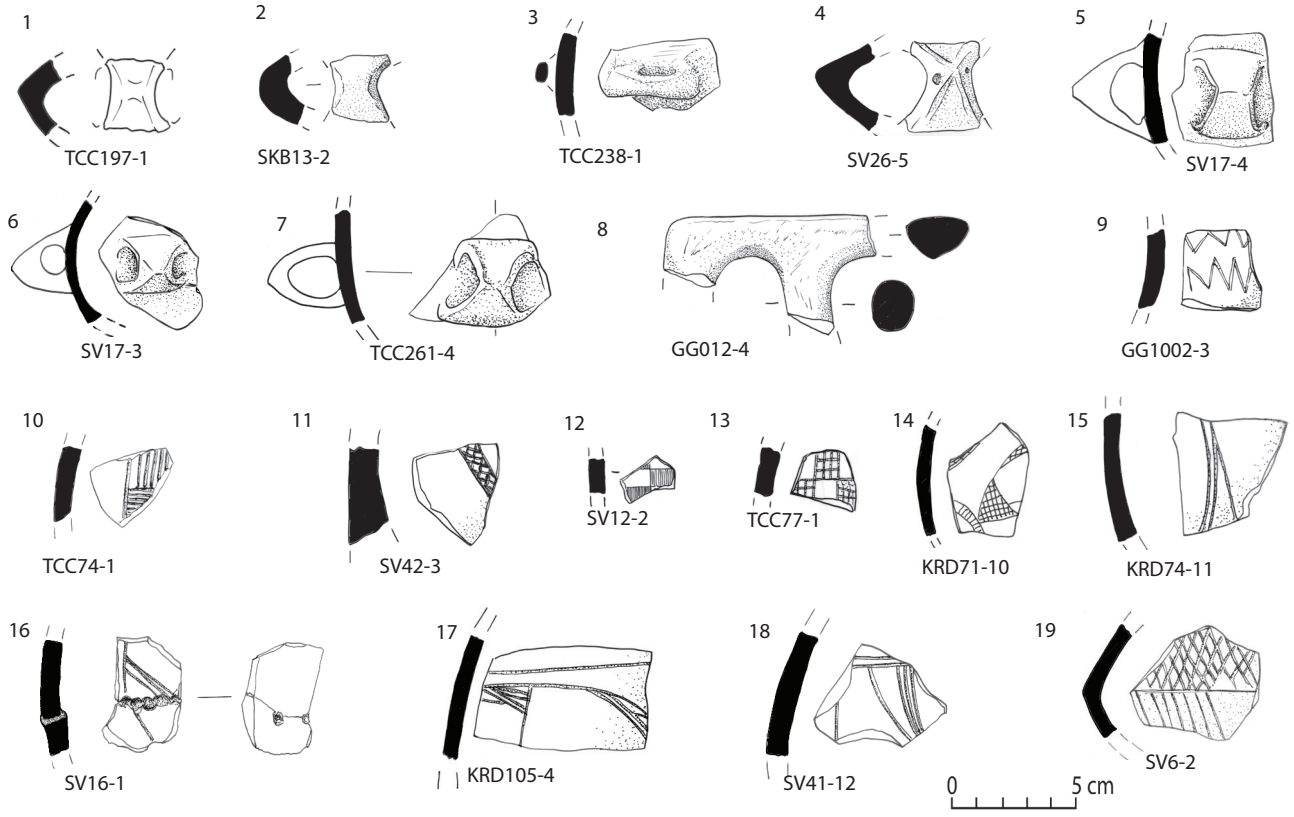


Figure 10.30. *Ġgantija handles, lugs and decorated sherds.*

19. SV6-2 Densely criss-cross patterned sherd (see examples identified as Saflieni phase by Trump, Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.11, M & J). Brown.

10.8. Saflieni pottery (Phase 6)

Saflieni pottery represents a style in use in the middle of the Temple Period. It has been assigned as an intermediate style, between Ġgantija and Tarxien (Trump 2004, 258). It is, however, a rare ceramic in terms of number and longevity, with style elements that relate to both Ġgantija and Tarxien. The style was assigned by Trump on the basis of the typical hard grey fabric, and what he described as 'innovative' patterns (white paste dot infill) and shapes. The pottery style was numerous at the 'type' site of Ħal Saflieni, but far less so at the Xagħra Brochtorff Circle, or indeed the temple sites. Saflieni pottery was also scarce in the assemblages excavated by *FRAGSUS*, and in total there were only 45 diagnostic sherds. The greatest number were recovered from Ġgantija (25 sherds) where sondages focused on the later levels, confirming Trump's sequential idea. Small amounts were also found at Santa Verna (five sherds), Kordin III (six sherds), Taċ-Ċawla (nine sherds) and (one or two sherds) Skorba.

Evans (1971) identified six main forms, which provide a base for the designation of shape type suggested in the catalogue below. The fragments, however, were all small, and other than their distinctive decoration and fabric, provided little indication of a greater range of forms. Generally, the forms suggest bowls, rather than cooking or storage jars, and it seems probably that this finely made and finished ware had a particular function in serving or offering rather than in more mundane activities. Perhaps it is more associated with early Tarxien styles, or indeed, is simply part of a continuum of production (Table 10.17).

10.8.1. Saflieni vessels and sherds: catalogue descriptions (Fig. 10.31)

1. SV6-1 Shape 3 curved profile- rolled rim bowl, with partial band of stab decorated pattern (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.11.E with a similar rolled rim). D – 19 cm. Grey fabric.
2. GG1016-8 Fragment with stab pattern. Black fabric.

Table 10.17. *Phase 6. Saflieni style characteristics.*

	Fabric	**Classic sites/references**
Dating: precise dating for the pottery remains elusive and although Trump has consistently seen Saflieni as a distinct episode of Maltese pottery making, there are few instances where contextual evidence survives to support this. More likely Saflieni may represent a specialist style, largely associated with funerary contexts, whilst the decoration of positive/negative patterns anticipates similar, if rather cruder versions in the Tarxien period.	Thin walled (especially at lip) Hard Dark throughout fabric, some rosy-brown surfaces Shiny surface finish when polished Coarseware and some miniatures pinkish sandy fabric no large inclusions	Ħal Saflieni where mixed with Tx, Mg Santa Verna Xagħra Brochtorff Circle
Bowls	**Jars**	**Other forms**
Open splayed bowl, some with long horizontal unperforated lug, rounded bases (Evans 36,1, shapes 22, 23) Splayed flat bottomed dish (Evans 36, 2), BR 10.10 Carinated bowl/cup with inverted rim (Evans 35, 3) Carinated bowl with upstanding triangular plaque-shaped handle	Saflieni 'hole mouthed' bowl (Evans 36, 5-6, shape 52) with and without pedestal. BR 10.11 A-D Ovoid jar (Evans 36, 4, shape 57)	Rarer forms: full inventory unclear, possibly a funerary variant of Tarxien, but shows continuity with Ġgantija forms
Handles	**Rims**	**Base**
Triangular handle with point on open bowls/cups project from upper wall of vessel, above carination High triangular-shaped cup handle with angled 'axe'-shaped bent tip (Trump 1966, fig. 42d Generally handles rare.	Plain and inverted types, usually rather fine, simple rounded and slightly flared, rolled or plain. No line incised around rim. Closed forms have in-turned flat rim.	Flat Pedestal on carinated bowls/jars Small footring on rounded base
Lugs	**Decoration**	**Location of decoration patterns**
Perforated and unperforated, often quite small, and on shoulder or at angle between body and base of cups	Incised curved volute and bands filled with light flecks, or void ovals against flecked base, and variants, white paste fill common Lightly fringed lines (BR10.11E) Punched point patterns ('V'-shaped) on shoulder of carinated bowls (Malone *et al*. 2009, 10.11G) No cross-hatched fill Infilled with white paste Arrangements of curved lines – volutes – some back to back, some fringed with short lines, flecks Inverted 'V' with parabola	Panels of pattern around rims, shoulders different bands of decoration on vessels – neck/shoulder/body etc. Banded with upper and lower sections differently patterned/textured (e.g. miniatures) Patterns: Scratched post firing in panels infilled with dots or fine parallel lines– rectangular panels, chequered, alternatively filled and plain

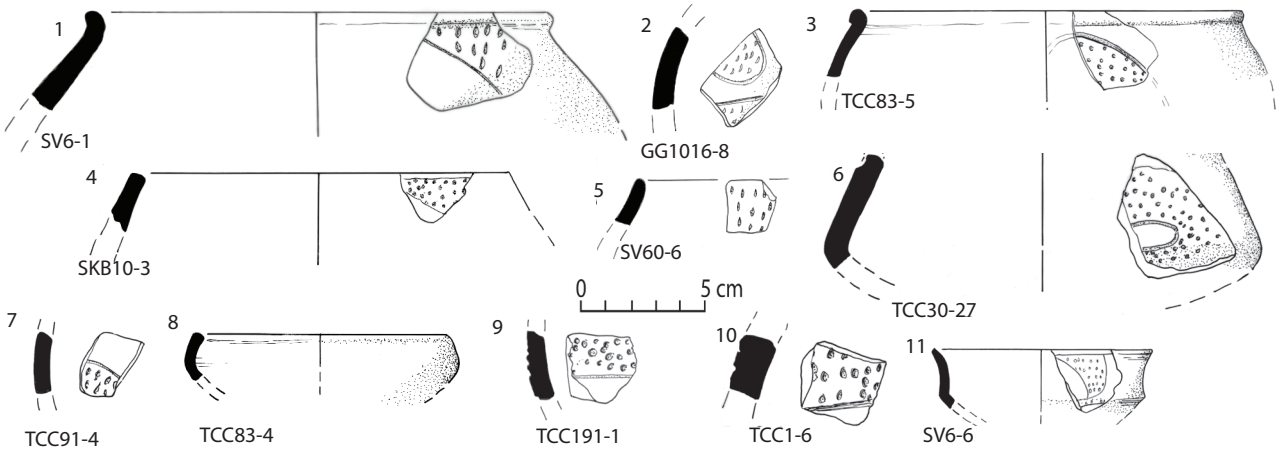


Figure 10.31. *Saflieni vessels and sherds.*

3. TCC83-5 Shape 3-4 inverted curved profile-rolled rim bowl. D – 10-15 cm. Orange grey burnished with white paste fill.
4. SKB10-3 Inverted tapered rim bowl, shape 4. D – 15 cm.
5. SV60-6 Decorated rim sherd, inverted bowl. Black fabric, white paste.
6. TCC30-27 Carinated shape 1/6 bowl with dot filled pattern (carination compares with Evans 1971, fig. 6, 7, where the shape occurs on large hole mouthed vessels; also one example from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.11.B). Max. D – 18 cm. Orange buff, white paste fill.
7. TCC91-4 Stab decorated sherd. Orange red.
8. TCC83-4 Small inverted bowl, a shallow shape 4. D – 10.5 cm.
9. TCC191-1 Dot decorated sherd. Orange fabric, white paste fill.
10. TCC1-6 Thick stab-dot decorated sherd. Grey buff fabric, fired to red burnished surface with white paste fill.
11. SV6-6 Miniature shape 1 carinated bowl with typical patterning. D – 8.5 cm. Brown-orange.

10.8.2. Discussion of Saflieni ceramics

The debate on character of the so-called Saflieni pottery style was raised in the study of Xagħra Brochtorff Circle pottery material (Malone *et al.* 2009, 229–31). The questions are not resolved through the new work. In 2009, we questioned whether Saflieni was properly a phase rather than a particular style of mainly funerary pottery that particularly occurred in the hypogea, and this continued the discussion started by Evans in 1954 (Trump 1966, 41). Trump maintained the view that Saflieni was a phase antedating the main appearance of Tarxien pottery and that this interpretation seemed appropriate on the basis on the Skorba evidence, where this stratigraphy contained a large amount of Saflieni style sherds, but nevertheless, mixed with other phases too. The main sites for the style remain the funerary hypogea, since Saflieni style pottery was relatively scarce at all of the *FRAGSUS* sites which were Temple Period sites. In total there were only 45 recognizable sherds recorded from an assemblage of over 58,000 prehistoric sherds, or 0.001% of the entire assemblage. The greatest number of sherds were from Ġgantija (25 sherds), with little from Santa Verna (five sherds), Kordin III (six sherds) and Taċ-Ċawla (nine sherds). At the Xagħra Brochtorff Circle, some 451 sherds were identified from over 88,000 sherds, or about 0.5% of the assemblage. No Saflieni pottery was recorded from Skorba. The material was identified through its characteristic hard grey fabric and the indented pattern of dots enclosed within carved arc patterns. The material, however it is identified or calculated, is extremely rare, suggesting either a very short period of production or a specialized production.

10.9. Tarxien pottery (Phase 7)

Evans (1953) suggested a numeric form system for the prehistoric pottery amounting to over 30 specific shapes for the Tarxien phase. This episode saw the most flamboyant of forms and decoration, and because the excavation of the temple sites (Tarxien, Mnajdra, Ġgantija, Ħaġar Qim, etc.) by Zammit, Ashby and Evans had produced ample, often well preserved material, there was a solid body of data for typology (Table 10.18).

10.9.1. The Tarxien assemblage

The *FRAGSUS* work has produced a smaller Tarxien assemblage in numeric terms than assemblages of earlier phases because the *Project* focus was on the early origins of temples, with the aim of balancing the lack of research focus in the past. By contrast, see the large quantity of Tarxien material from the Xagħra Brochtorff Circle (*c.* 10,000 sherds/212,860 kg which was some 60 kg more than all Żebbuġ sherds combined).

In essence, as with earlier phases, the pottery forms fall into distinct groups; closed and narrow necked jar and flask forms; a variety of inverted and everted cups and bowls, often with carinated profiles; ladles and spoons; and a variety of serving dishes produced as varied scales, from miniature to enormous. As was the case in Mġarr and Ġgantija pottery, a series of lids to cover other vessel forms were also in use. In this assessment of the selected drawn material, adherence to Evans' (1971, fig. 37) forms has been employed.

10.9.2. Tarxien open carinated bowls and cups: catalogue descriptions (Fig. 10.32)

1. GG1002-7 Shape 10/13 everted carinated bowl, possibly from a footed base (Evans 1971, fig. 19 forms). Linear patterns. D – 12 cm.
2. TCC211-1 Miniature carinated bowl fragment, shape 10. D – *c.* 10 cm.
3. SV34-5 Inverted carinated shape 9–10 bowl, incised pattern. D – 15 cm.
4. GG1002-31 Inverted shape 10/13 bowl, linear pattern. D – 17 cm. Black matt.
5. GG1004-1 Miniature inverted carinated bowl, shape 10. D – 5.5 cm. Pale grey-pink burnished.
6. SV13-21 Small everted shape 1 bowl. D – 14.5 cm. Grey speckled fabric, fired to rosy-grey, burnished.

Table 10.18. *Phase 7. Tarxien style characteristics.*

	Fabric	**Classic sites/references**
Wide range of forms, shapes, sizes, decoration, much is drawn from Ġg and Saflieni forms. Decoration on exterior, sometimes rusticated or rough and white paste filled, whilst interiors highly polished	Well prepared clay, high fired, fine invisible temper –grey, black light red Fineware highly polished Decoration scratched after firing, or rusticated while clay still soft and wet Temper varies depending on coarseness, thick material gritty-sandy Colour often dark purplish brown in large jars and vessels Colour range from buff to orange, red to brown-darker mottled Carinated bowls of orange colour with channelled patterns Sandy, pink and unpolished and rusticated decoration (Malone *et al.* 2009, fig. 10.16) often with indented rims, jars	Ħal Saflieni Hypogeum Xagħra Brochtorff Circle Tarxien Mnajdra Most temple sites
Bowls	**Jars**	**Other forms**
Carinated bowl with 'V' or 'Nose bridge' handles, miniature to huge size (Evans shape 41 = handle; 42 = no handle) Shallow bowls Flat bottomed dishes, often with pellet decoration (Evans shape 35-36) Handless carinated bowls on hollow pedestal (Evans 37, 12) Biconical bowls with beaded rim (Evans 36, 15) Tripartite bowls with twin triangular handles (Evans 37, 16) Strainer bowls with upstanding triangular plaque handles (Evans 37, 11) Saflieni bowls Closed ovoid bowls – large example Malone *et al.* 2009, fig. 10.15A	Small ovoid jars (Evans 37, 19) some in orange sandy fabric (Malone *et al.* 2009, 10.16, G, K) Amphorae with twin tunnel handles and necked storage jars Bell-shaped storage jars	Rarer forms: Covers for pots shaped as shallow or conical bowls, some with handle (wishbone) Shallow platters with crinkled (pie crust) rim with gap in wall (Mnajdra) (Evans 37, 6) Biconical jar with triangular handle on shoulder and 4 small tunnel handles around rim (Tx) (Evans 37, 27) Ladles Large vessels, one with hole for spigot (Sk) (parallel this with drain/spigot in stone bowl: Malone *et al.* 2009, 264)
Handles	**Rims**	**Base**
Quite rare in Tx 'Nose-bridge' triangular handle with thumb-nail nib (Malone *et al.* 2009, fig. 10.13A, G) 'Nose Bridge' handles emerge from carination, triangular lower section larger than upper part Triangular handles applied to angle between base and carination Tunnel handles, some very large High handles attached to small ring handle, some with central applied ridge (Malone *et al*. 2009, fig. 10.14, O) Long, oval or pointed Animal headed high handles on straps or rods, on cups 'Wishbone' on covers Loop handles – rare, sometimes decorated with pellets or patterns (Malone *et al.* 2009, fig. 10.15, J)	Rolled rims Some rims decorated with slashed or dimpled patterns on top or side	Mostly flat based, or tiny bases on carinated vessels Pedestal forms on gently carinated bowl (Evans shapes 48, 50)
Lugs	**Decoration**	**Location of decoration patterns**
Increasingly rare, some incorporated as part of tunnel type Studs around rims or shoulders, sometimes impressed with lines	Scratched and incised linear patterns, red inlay in bands (yellow fabric) Impressed dot and stab infill and all over surface, dotted bands, 'rice' pattern Scratch volutes in random patterns	Bands All over body Often division between upper and lower part of carinated vessels each decorated differently

Table 10.18 *(cont.).*

	Decoration (cont.)	
	Ogival patterns, hatching, interlocking arcs, circles Scratched lattice and boat patterns Cut out broad lines for white paste infill Channelled, scored or grooved in vertical lines for white paste infill Jabbed, raised 'lentoid', dimpled surfaces Plastic applied studs or scales Use of white infill to emphasize patterns, Button studded especially with white paste and ochre wash Fringed incised lines Naturalistic scratched motifs – leaves, animals, humans Applied motifs – animal heads	

7. SV60-5 Everted shape 8 bowl with linear pattern. D – 22.5 cm. Orange burnished.
8. GG008-2 Inverted shape 10 bowl with extensive pattern (this and 11 below, compare closely to Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.14, B & C). D – 12 cm. Black, highly burnished.
9. TCC69-1 Large everted shape 7 bowl, with scratched pattern (similar to open forms from Xagħra Brochtorff Circle, Malone *et al*. 2009, fig. 10.13). D – 28 cm. Gritty grey fabric, red-grey surface.
10. GG1002_1 Carination fragment of shape 9 inverted bowl, with carination lug. Max. D – 14 cm at lug, rim probably *c.* 12 cm. Black red.
11. TCC244-1 Inverted small squat bowl shape 9 / 15, with linear patterns, possibly early with Gg style rim line and lug on carination. D – 10.5 cm. Orange-red burnished.
12. GG1040-2 Large everted shape 8 bowl, plain. D – 25 cm.
13. GG1002-28 Shape 10 bowl rim fragment, some linear design. D – 14 cm. Grey.
14. GG1015-10 Slightly inverted shape 7 bowl, crude 'V' pattern. D – 18 cm.
15. TCC178-1 Large inverted bowl of broadly shape 10 with hatched pattern, more reminiscent of Ġgantija style with rim line. D – 30 cm. Red-grey burnished
16. GG1002 – 20 Everted shape 7 bowl. D – 16 cm. Pink-grey burnished.

10.9.3. Tarxien small carinated bowls and cups: catalogue descriptions (Fig. 10.33)

Shapes 8 and 10 (formerly shapes 41, 43, 44 under Evans 1953 system). A surprising number of very small, miniature shallow bowls were retrieved from both Ġgantija and Taċ-Ċawla, and well represented also at Santa Verna and Kordin III. Such small vessels clearly had a function, though what this was remains unclear. Perhaps they had ritual use for containing ochre or unguents, but more likely they served for some particular culinary items – perhaps a mustard or other special addition to a dish, or perhaps for drinking a concentrated alcoholic liquid! The concentration at Ġgantija might encourage an interpretation of ritual use, but a good many also came from the far more domestic context of Taċ-Ċawla, which might counter the ritual idea. There is a strong similarity with examples from Xagħra Brochtorff Circle (Malone *et al*. 2009, fig. 10.13, D, H); and from Ħal Saflieni (Evans 1971, fig. 5, 1–3). Invariably, these small vessels were well fired, often orange red in colour and often all over decorated with vertical textured lines. Their form closely imitates the much larger vessels across the Tarxien style.

1. GG1015-14 Everted miniature shape 8 bowl with vertical cut surface. D – 5 cm. Orange pink.
2. GG1016-2 Everted shape 7 bowl with all over textured surface. D – 7 cm.
3. TCC272-12 Everted shape 7 bowl, vertical textured surface. D – 10.5 cm. Red orange rusticated and part burnished.
4. SV42+60 Miniature everted shape 7 bowl, all over vertical cut surface. D – 7.5 cm. Pink-grey burnished.
5. GG1015-15 Miniature shape 7 bowl. D – 5 cm. Yellow-pink buff.
6. GG1015-7 Miniature carinated fragment of bowl. D – *c.* 7 cm. Black burnished.
7. GG1015-20 Everted shape 7 shallow bowl, patterned surface. D – 6.5 cm. Yellow pink.
8. SV1-17 Everted shape 7 bowl, undecorated. D – 8 cm. Black-grey burnished.

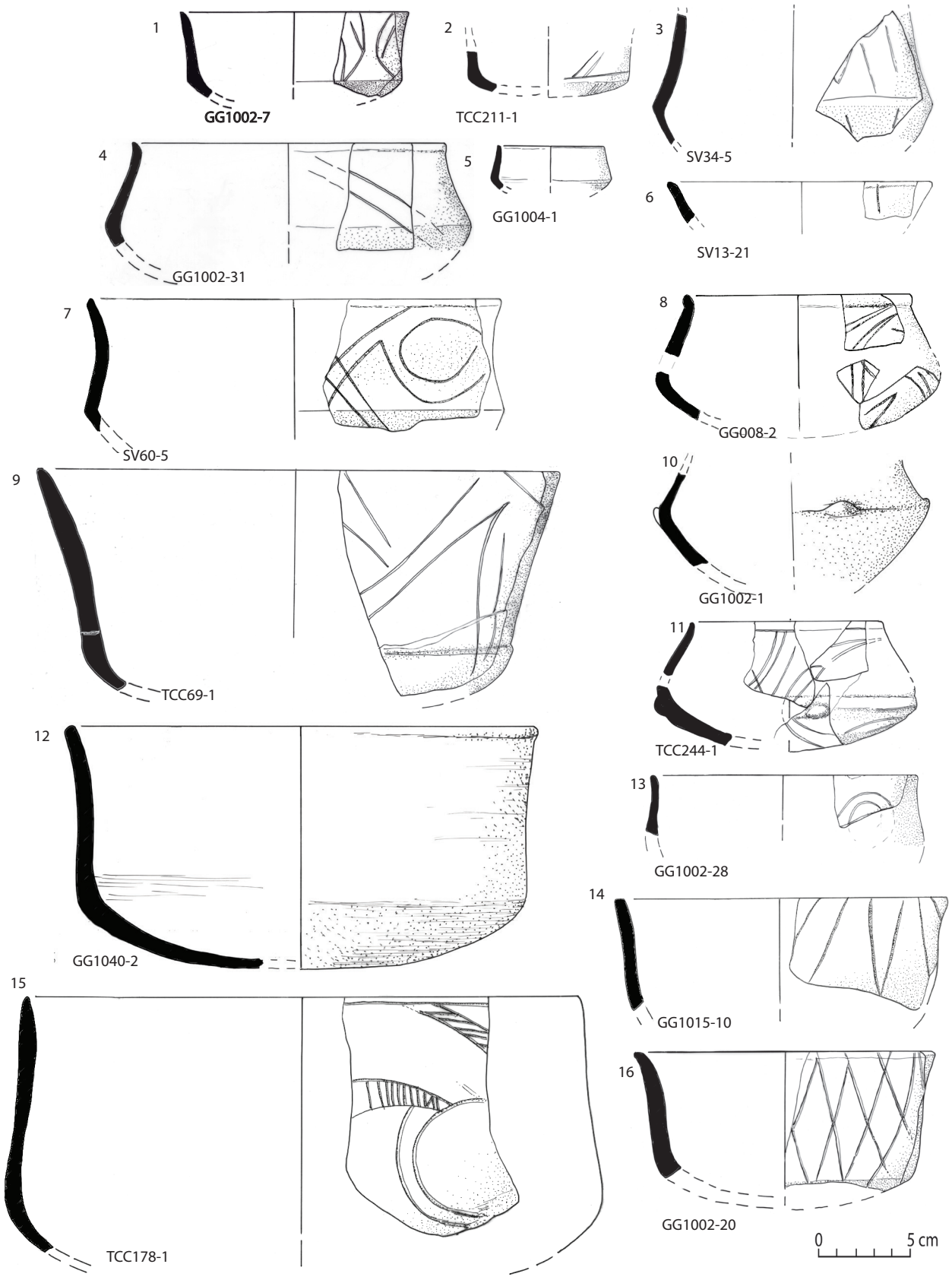


Figure 10.32. *Tarxien open carinated bowls and cups.*

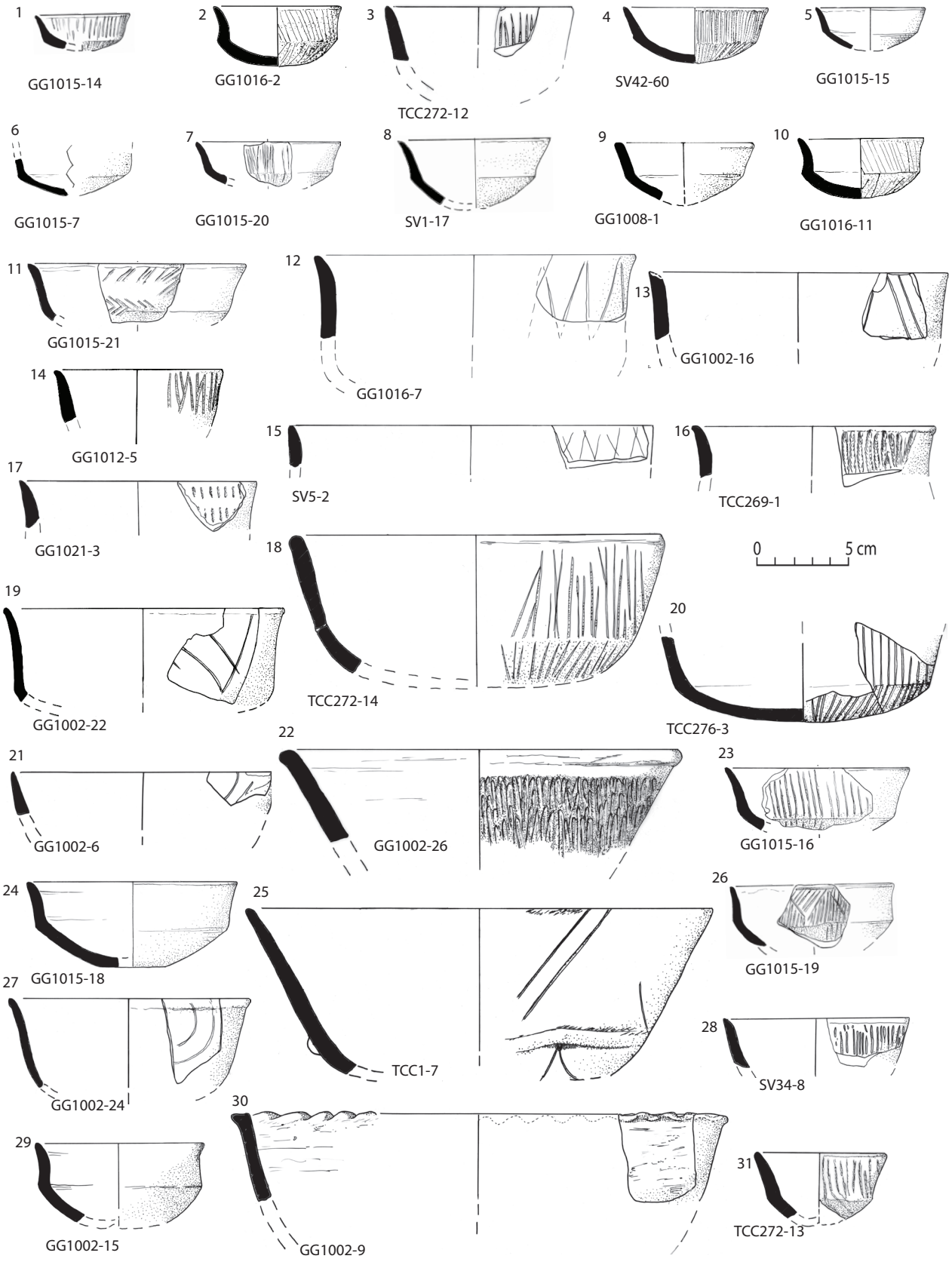


Figure 10.33. *Tarxien small carinated bowls and cups.*

9. GG1008-1 Everted shape 7 bowl undecorated. D – 7.5 cm.
10. GG1016-11 Everted shape 7 bowl, diagonal linear pattern above and below carination. D – 7 cm. Orange
11. GG1015-21 Everted bowl shape 7. With herringbone line pattern. D – 12 cm. Orange pink.
12. GG1016-7 Slightly everted shape 7/8 bowl/cup crude zigzag pattern. D – 16.5 cm. Dark grey burnished.
13. GG1002-16 Upright walled cup/bowl, shape ?8 with tri-line diagonal lines. D 16.5 cm. Black burnished with white paste fill.
14. GG1012-5 Small everted shape 7 bowl, with vertical lines. D – 9 cm.
15. SV5-2 Rim of slightly everted bowl, shape 7/8, with criss-cross pattern. D – 19–20 cm. Grey orange.
16. TCC269-1 Everted shape 7/8 bowl/cup with vertical line pattern. D – 13 cm. Orange-grey, rusticated surface.
17. GG1021-3 Everted shape 7 bowl, vertical short line pattern. D – 13 cm. Orange-grey.
18. TCC272-14 Everted shape 7 bowl, with vertical line pattern. D – 20 cm. Orange-red, burnished.
19. GG1002-22 Everted shape 7 bowl, broad linear pattern. D – 14–15 cm. Orange-beige,
20. TCC276-3 Base of shape 7/8 cup/bowl, with neat line pattern (very similar in form and decoration to Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.14. A & F). D – *c*. 15 cm. Orange fabric and surface
21. GG1002-6 Everted shape 1 bowl. D – 14 cm. Burnished red slip.
22. GG1002-26 Shape 3 everted bowl. Band of close textured pattern (type recorded from Ġgantija and Santa Verna by Ashby *et al*. 1913, fig. 23, which is described as pitted ware). D – 21.5 cm. Orange brown, white paste infill in vertical ridged rustications.
23. GG1015-16 Shape 7 miniature bowl, regular vertical line pattern. D – 10 cm. Yellow pink.
24. GG1015-18 Everted shape 7 bowl, undecorated. D – 11 cm. Yellow-pink-buff.
25. TCC1-7 Large everted shape 3 bowl with lug at wall/base angle, linear pattern. D – 24.5 cm. Brown-buff, with ochre stained white paste.
26. GG1015-19 Miniature shape 7 cup with dense textured pattern. D – 8 cm. Pale orange.
27. GG1002-24 Everted rounded bowl, shape 3, with broad linear pattern. D – 13 cm. Grey orange.
28. SV34-8 Miniature shape 7 bowl with vertical linear pattern. D – 9.5 cm.
29. GG1002-15 Shape 7 miniature bowl, undecorated. D – 9 cm.
30. GG1002-9 Large pie-crust shape 3 bowl. D – 26 cm. Black-red, smoothed.
31. TCC272-13 Miniature shape 7 bowl, linear pattern. D – 7 cm. Buff with white paste in rustications.

10.9.4. Tarxien inverted jars and bowls: catalogue descriptions (Fig. 10.34)

1. GG1015-6 Large inverted pinch-cordon rimmed jar, shape 25/27. (Ashby 2013, Pl. XVII, 3 from Ħaġar Qim). D – 30 cm. Sandy grey fabric, with orange rather porous surface.
2. GG1012-3 Inverted roll rimmed jar, shape 21/25, with bi-line festoon pattern around shoulder (similar examples from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.14, H; Santa Verna, Ashby *et al*. 1913, fig. 24, which is described as a soft grey ware; and also in Evans 1971, fig. 25.9 V/P.1; and another from Ġgantija G/P.16, Evans 1971, fig. 28.10, described as having a hard buff red fabric). D – 28 cm. Grey green fabric, with white paste fill.
3. GG1008-3 Inverted tapered rim jar/bowl (?shape 10) with vertical scored pattern around neck. D – 33 cm. Orange sandy fabric, black on inner face.
4. TCC1-8 Inverted shape 9-10 bowl, with vertical scored pattern around neck. D – 24 cm. Matt orange fabric.
5. GG1016-5 Large shape 5 carinated bowl, with small rolled rim, indented textured shoulder band, and curvilinear pattern below (see form in Evans 1971, fig. 21, 7-8, T/P.29 & T/P.79; carinated form similarities with Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.11G.). D – 36 cm.
6. GG1002-33 Inverted bowl/jar neck shape 9/10, with applied plaited cordon-lug. D – 14 cm. Orange-grey burnished.
7. SV34-10 Carinated sherd, line pattern. Max. D – 15 cm.
8. TCC268-1 Inverted shape 14/15 jar/bowl. D – 20 cm. Rosy cream fabric with red slip.
9. GG1016-5 Sieve base of round based bowl (form from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.16, O; and Evans 1971, fig. 19,7 T/P.25). D – *c*. 15.5 cm at carination. Brown, lightly burnished.

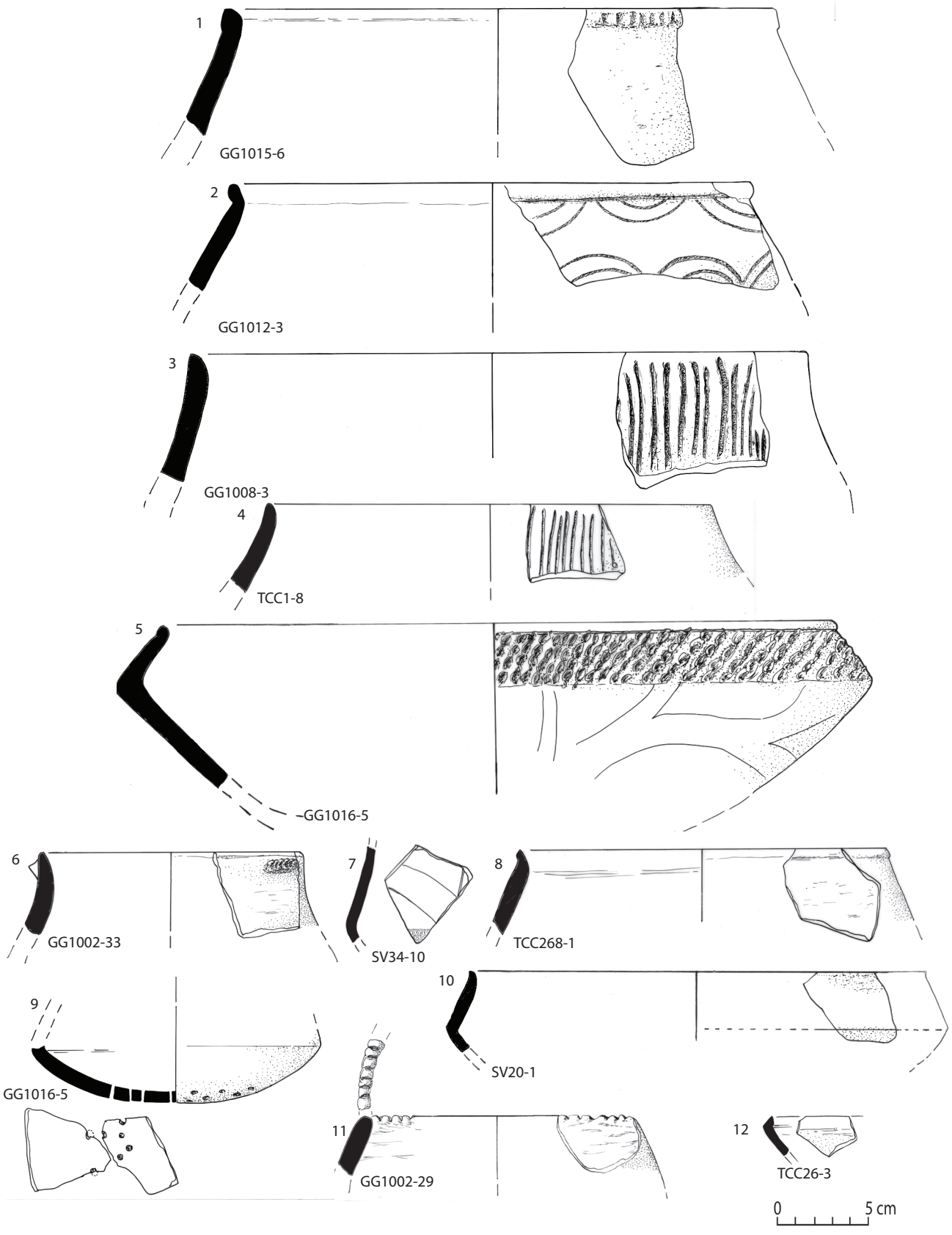


Figure 10.34. *Tarxien inverted jars and bowls.*

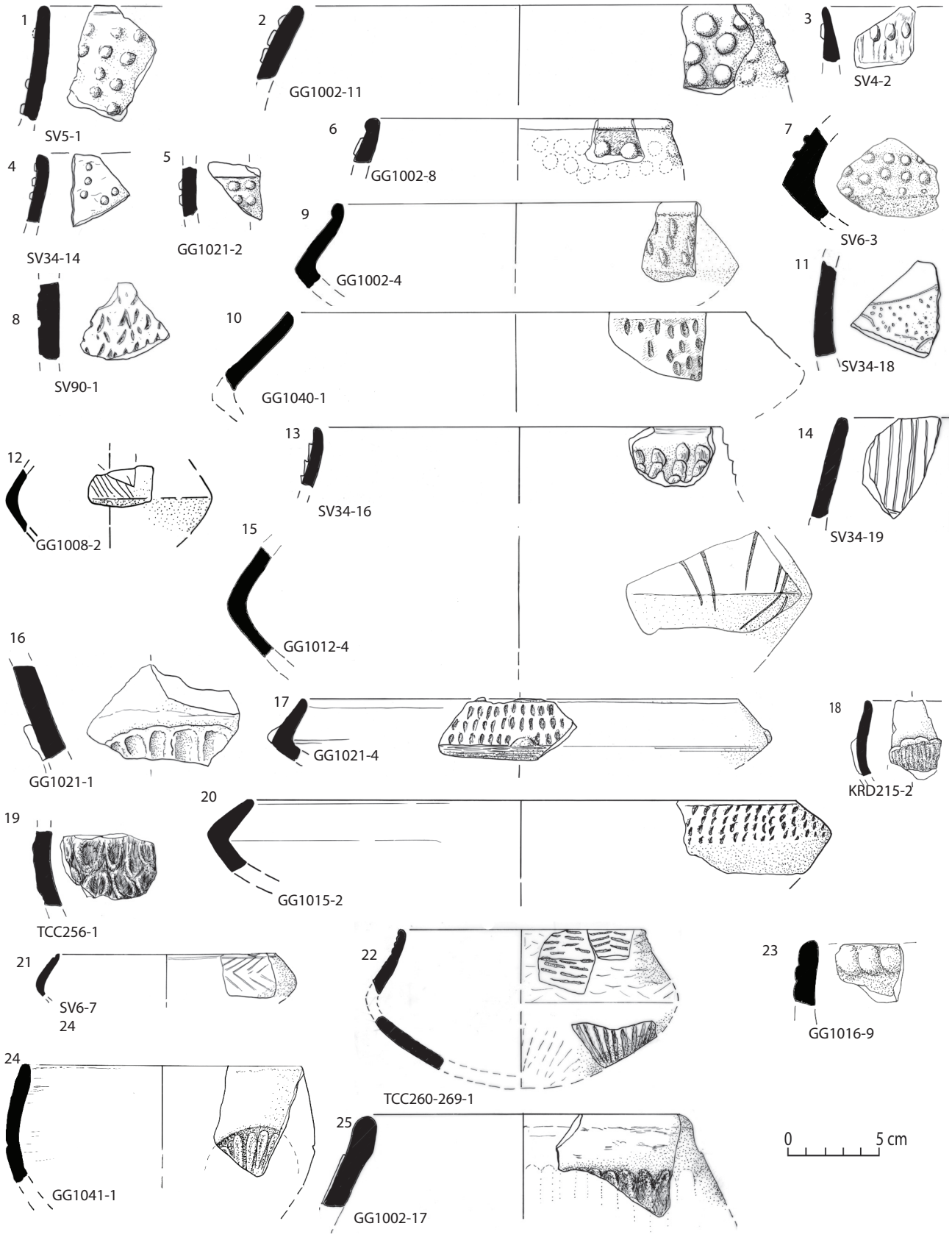


Figure 10.35. *Tarxien textured and rusticated surface vessels.*

10. SV20-1 Carinated shape 15 bowl. D – 25 cm. Slipped red orange on grey gritty fabric.
11. GG1002-29 Inverted pie-crust rimmed jar/bowl. D – 15 cm. Brown-orange.
12. TCC26-3 Shape 15 miniature bowl. Max D – 15 cm. Fine fabric.

10.9.5. Tarxien textured and rusticated surface vessels: catalogue descriptions (Fig. 10.35)

Tarxien pottery is often distinguished by the rough surface patterns of the style, with a variety of cuts, slices, applied patterns, impressed and finger-pushed surface designs resembling petals, leaves and tree bark. Applied pellets or studs ('Smartie ware') also decorate the surface, in tandem with rough and more carefully incised curvilinear designs, often with the rough zone on the vessel shoulder and the curvilinear pattern on the belly or side. Ashby *et al.* (1913, 118) noted the use of the pellets/studs from Santa Verna. The rough surface was sometimes filled with white paste painted with ochre.

1. SV5-1 Inverted jar neck with applied pellets, shape 9/10. Grey surface on orange fabric.
2. GG1032-11 Inverted shape 18 jar with large pellet embellished neck. D – 25–30 cm. Grey buff fabric.
3. SV4-2 Everted neck shape 3, with row of pellets applied. Yellow grey fabric.
4. SV34-14 Inverted shape 9/10 small vessel, with pellet pattern. (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.15).
5. GG1021-2 Sherd with pellet pattern. Grey.
6. GG1002-8 Inverted shape 2/9/10 bowl with rolled rim and pellet pattern. D – 16 cm. Burnished buff grey fabric with white paint/paste.
7. SV6-3 Carinated bowl with regular pellet pattern on upper angle, shape 15. Black.
8. SV90-1 Thick sherd with slashed pattern surface.
9. GG1002-4 Carinated shape 15 bowl with defined rim above elongated pellets (Ashby *et al*. 1913, Pl. XV.1 from Ħaġar Qim). D – 19-5 cm.
10. GG1040-1 Carinated shape 15 bowl with tapered rim and indented pattern on shoulder. D – 25 cm. White paste.
11. SV34-18 Inverted rim sherd with vertical slashed pattern.
12. GG1008-2 Carinated bowl shape 14? With diagonal linear pattern (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.11, M is similar, but in a fine black fabric). D – 11 cm at carination.
13. SV34-16 Inverted shape 16 jar with applied pellet pattern. D – 22 cm.
14. SV34-19 Inverted bowl, shape 9, with vertical cut line pattern.
15. GG1012-4 Large shape 27 carinated bowl/jar, with abstract lines. D – *c*. 31.5 cm at carination. Sandy grey fabric.
16. GG1021-1 Rosette decorated sherd, applied pattern (see similar design from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.15, A & D). Orange grey.
17. GG1021-4 Carinated shape 15 bowl, with indented shoulder band and small carination lug (see 20 below and a similar carinated shape, albeit assigned to Saflieni phase, from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.14, H). D – 25 cm. Orange grey.
18. KRD215-2 Inverted globular bowl rim with applied rosette pattern. Grey-orange.
19. TCC256-1 Rusticated body sherd (see examples in Ashby *et al*. 1913, Pl. XII, 1–2, 4).
20. GG1015-2 Large sharply carinated bowl with stab pattern on shoulder. D – 30 cm. Grey buff.
21. SV6-7 Carinated shape 15 bowl with herringbone pattern on shoulder. D – 12 cm. Pink-buff.
22. TCC260-269-1 Shape 9 bowl with horizontal grooved pattern on neck and vertical lines on belly (see similar biconical form from Kordin III, Evans 1971, fig. 9, 1, KIII/P.3; and the rosette pattern on lower belly parallels Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.14, B). D – 13 cm. Rough, grey-beige and rusticated fabric.
23. GG1016-9 Bead decorated rim of inverted jar. Coarse orange fabric.
24. GG1041-1 Shape 2 globular bowl with rosette pattern. D – 16 cm. Burnished orange fabric with white paint.
25. GG1002-17 Inverted bevel rimmed shape 21–23 jar with rusticated band on shoulder. D – 17 cm.

10.9.6. Tarxien rusticated coarseware and larger vessels: catalogue descriptions (Fig. 10.36)

1. TCC140-7 Inverted jar, with marked rim/neck. (Evans 1971, fig. 20.6, with rolled rim). D – 30 cm.
2. GG004-1 Inverted shape 21/22 jar neck. Coarse cream buff fabric.
3. TCC270-2 Inverted jar with marked rim, shape 21. D – 25 cm. Brown-red smoothed.

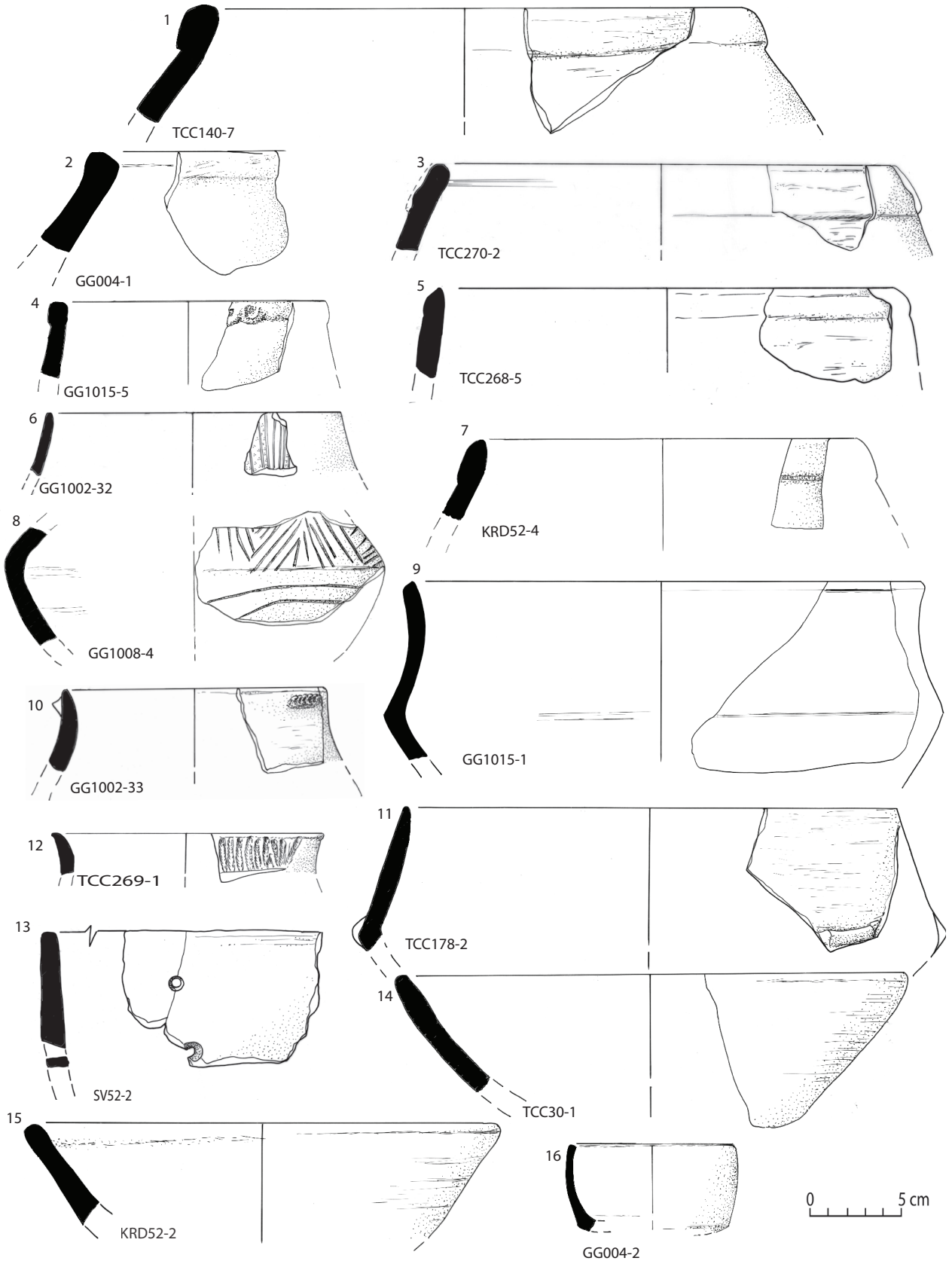


Figure 10.36. *Tarxien rusticated coarseware and larger vessels.*

4. GG1015-5 Inverted jar shape 21 with square profile cordon-rim. D – 15–20 cm. Sandy orange fabric.
5. TCC268-5 Vertical walled jar with heavy rim, broadly shape 21. D – 26 cm.
6. GG1002-32 Shape 9 bowl, inverted with vertical incised pattern on neck. D – 16 cm. Orange burnished fabric with white paste fill.
7. KRD52-4 Inverted shape 21 jar neck with marked rim. D – 20 cm. Orange smoothed fabric.
8. GG1008-4 Carinated body fragment of shape 17-18 bowl. With diagonal lines on shoulder and bi-line meanders below carination. Max. D – 21 cm at carination. Sandy grey fabric with white paste fill.
9. GG1015-1 Large shape 10 bowl, undecorated. D – 28 cm.
10. GG1002-33 Inverted neck of shape 22–23 jar, with applied cordon (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.16 C). D – 14 cm. Burnished orange grey.
11. TCC178-2 Inverted shape 10/15 bowl, with small lug on carination. D – 27 cm. Orange-grey.
12. TCC269-1 Inverted bowl shape 9/10 with vertical line pattern. D 13 cm. Rusticated orange grey fabric.
13. SV52-2 Biconical bowl, with ancient drill holes for mending a cracked vessel. Grey-orange.
14. TCC30-1 Shape 1 everted shallow bowl. D – 27 cm. Buff fabric, orange-buff surface.
15. KRD52-2 Shallow shape 1 bowl. D – 20 cm. Orange smoothed fabric.
16. GG004-2 Shape 2 cup. D – 12 cm. Red-black burnished.

10.9.7. Tarxien two-sided patterned vessels, lids and bases: catalogue descriptions (Fig. 10.37)

Maltese potters decorated their vessels in various ways, as shown by the scratched, incised, applied and painted examples, and evidently, the decoration of just one face of the vessel was insufficient, and finewares especially were decorated on both interior and exterior surfaces. Figure 10.27 presents a number of mostly small, fine vessels that present two-sided patterns. Lids were also frequent, presumably to cover foods, and they show a clear evolution from Mġarr and Ġgantija forms, especially the wide splayed shape 31 lid (Fig. 10.27: 13).

1. SV34-8 Shape 32 lid with delicate scratched curvilinear patterns on both sides (see similar pattern on a small dish from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.10, identified as Saflieni by Trump; also from Ħaġar Qim, Ashby *et al*. 1913, Pl. XVII, 4 on a rimmed vessel). D – 10 cm. Black burnished with white paste traces in pattern, on both side of vessel.
2. GG1016-10 Shape 3 cup with extensive curvilinear pattern (see forms on large 'cups' Evans 1971, fig. 22,8- 9 T/P.45 & T/P.18). D – 19 cm. Red and white paint traces.
3. SV34-21 Fragment of carinated cup with fine external design (above 1-SV348 for similar attribution). D – *c.* 12 cm at carination. Dark burnished.
4. TCC205-3 Flat based vessel or lid, with marked rounded 'rim' (Xagħra Brochtorff Circle example, albeit identified as Ġgantija phase, Malone *et al.* 2009, fig. 10.8, K). D – 10 cm. Grey fabric with purple-dark red surface.
5. GG008-1 Shallow bowl/lid with patterns on both faces. D – 15–20 cm. Grey.
6. TCC91-3 Small shape 1 cup, with linear patterns. D – 6 cm. Black-grey.
7. TCC178-10 Small cup or lid, curved base. D – *c.* 5.5 cm.
8. KRD71-2 Small shape 8 cup, with internal and external patterns. D – 6 cm.
9. TCC140-6 Large curved base of vessel, with linear patterns of multi-lines. D – 19 cm. Ochre traces.
10. KRD90-1 Flat lid or base, with pronounced rolled edge, perforated with string hole. D – 10.5 cm.
11. TCC81-2 Flat platter. D – 25 cm. Black coarse fabric, pink grey surface.
12. TCC268-8 Small lid or cup, with slightly curved base, rim-ring. Shape 2, D – 5.5 cm at carination.
13. TCC146-1 Shape 31 lid, slight marks around inner rim (see similar cover/lid to Tarxien example, Evans 1971, fig. 21.5 T/P.31). D – 21 cm. Grey fabric, burnished orange surface.
14. TCC26-2 Base of jar or bowl. D – 9 cm. Matt black fabric.
15. GG1002-37 Small flat base. D – 5 cm Rough grey fabric with pink surface.
16. TCC205-10 Footed flat base. D – 13 cm. Black buff burnished fabric.
17. TCC178-9 Flat base of rusticated vessel. D – 10 cm. Black grey fabric with buff surface.
18. TCC178-5 Small flat base with applied cut decorated cordon. D – 7 cm. Probably originally 4 vertical cordon ribs. Black-red-brown coarse fabric.

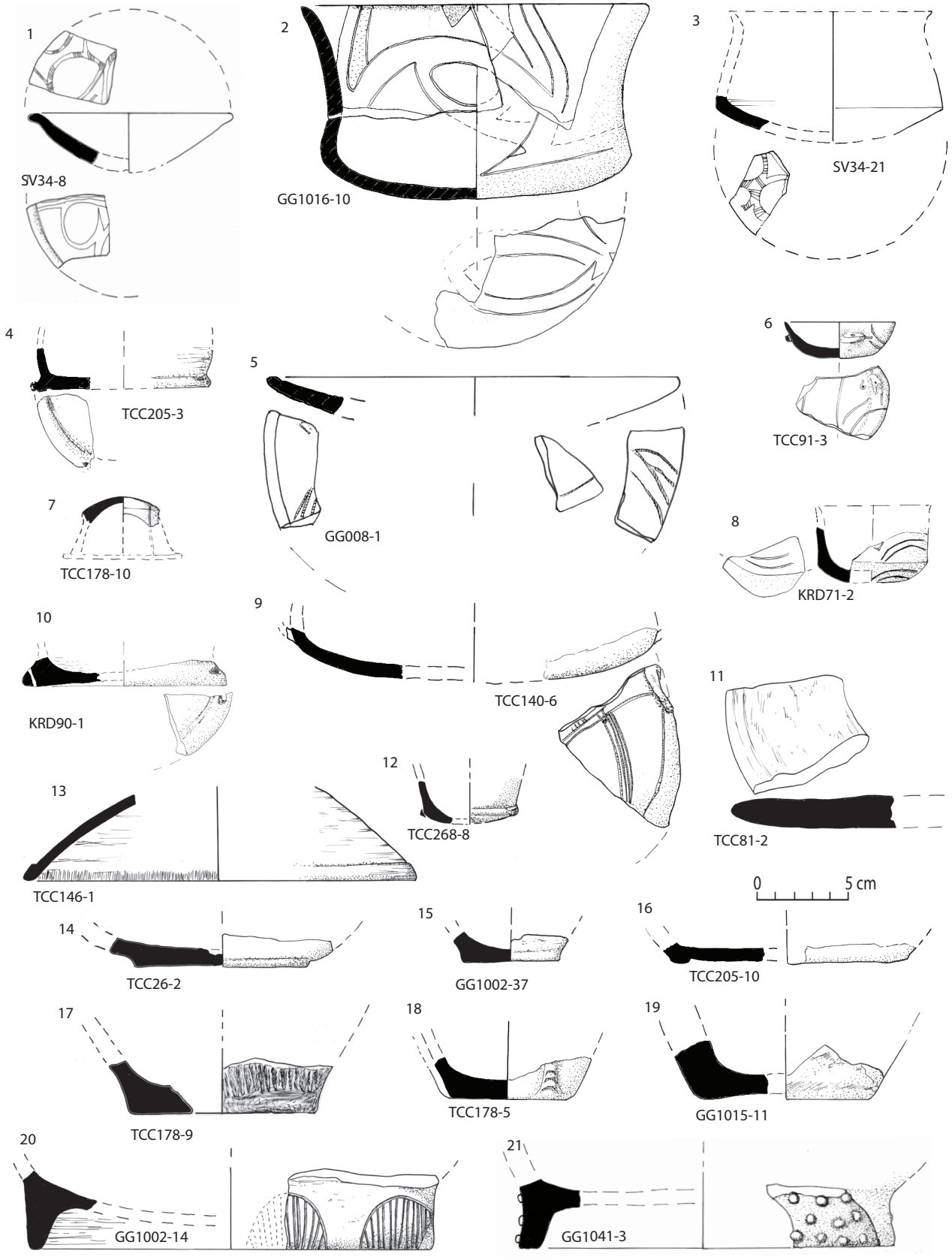


Figure 10.37. *Tarxien two-sided patterned vessels, lids and bases.*

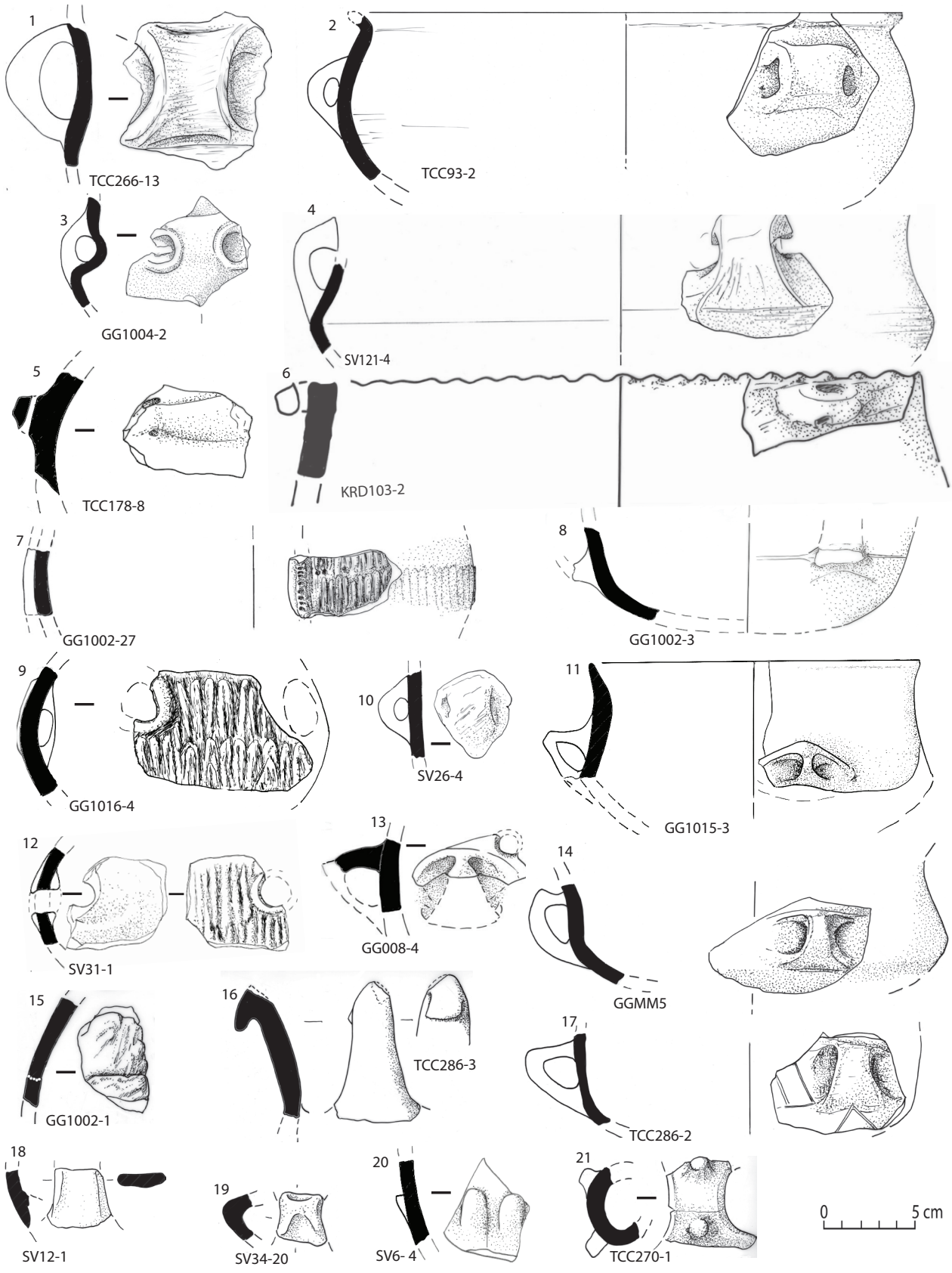


Figure 10.38. *Tarxien handles and lugs.*

19. GG1015-11 Thick coarseware base. D – 9 cm. Sandy grey fabric.
20. GG1002-14 Pedestal base of a shape 12-13 vessel, decorated with infilled half circle pattern (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.15, H, for similar foot ring; and Evans 1971, fig. 35, 5 S/P.18, & fig. 28.6 G/P.1; similar decorative motif on shoulder of vessel from Ħaġar Qim, Ashby *et al*. 1913, Pl, XVII, 3). D – 22 cm. Matt grey black fabric, with white paste fill.
21. GG1041-3 Pedestal base of large shape 12-13 vessel, decorated with applied pellets (see 20 above for similar attributions). D – 20.5 cm. Black grey.

10.9.8. Tarxien handles and lugs: catalogue descriptions (Fig. 10.38)

1. TCC266-13 Strap handle with angled flared sides. Grey burnished.
2. TCC93-2 Shape 2 shallow 'chamber pot' with everted rim and parallel rolled handle (see Ashby *et al*. 1913 Pl. XII, 7). D – 30 cm. Orange buff fabric, brown burnished surface.
3. GG1004-2 Tunnel handle. Pale pink grey.
4. SV121-4 Strap handle on carination of wide bowl, shape 10. D – 34 cm. Grey.
5. TCC178-8 Perforated cordon. Buff grey fabric, orange red surface.
6. KRD103-2 Pie crust rim on inverted jar with rim handle, vertically perforated. D – 33 cm. Grey.
7. GG1002-27 Channel lug on rusticated vessel. D – 24 cm. Orange-grey-black with rusticated surface.
8. GG1002-3 Base of raised strap handle on shape 8 cup. D – 17 cm. Matt black.
9. GG1016-4 Tunnel handle fragment on rusticated vessel. Orange.
10. SV26-4 Small rounded handle. Orange.
11. GG1015-3 Nose bridge pointed handle set on carination of shape 8 cup (see a deeper bowl, Evans 1971, fig. 18,5 T/P.11; and Ashby *et al.* 1913, Pl. XII, 5 & 10). D – 19 cm.
12. SV31-1 Fragment of tunnel handle, showing both sides. Orange, rusticated surface.
13. GG008-4 Nose bridge handle with drilled hole above.
14. GGMM5 Nose bridge handle on gently carinated shape 8 cup (see 11 above for similar attributions, and possibly a more inverted form). D – 19 cm.
15. GG1002-1 Repaired fragment, suggesting ancient repair. Black-red.
16. TCC286-3 Raised cup handle from shape 4 cup, with hooked end.
17. TCC286-2 Pointed strap handle on shape 8 cup. D – 19 cm.
18. SV12-1 Strap handle.
19. SV34-20 Fragment of pointed handle.
20. SV6-4 Applied lug-pellet decoration. Orange.
21. TCC270-1 Strap handle with applied pellets (see pelleted handles Evans 1971, fig. 22, 2 T/P.19, & fig. 23,1 T/P.23). Grey.

10.10. Early Bronze Age pottery

The Bronze Age in Malta represents a period of major change in the cultural life of Malta (see Volume 1, Chapter 7), and there has been a considerable focus of research on the broader implications of that change. Burial traditions moved from inhumations in collective graves/hypogea to individual cremations set within pots arranged in earlier sites (Tarxien Cemetery, *c.* 1800–1400 BC). The use of the megalithic sites (except possibly dolmens) appears to have declined, with very different activities associated within them, together with partial demolition or destruction of temple sites. Pottery in particular reflects the apparent cultural changes, with styles and materials that are far more similar to production in the Aeolian Islands and the Adriatic-Aegean areas than from the prehistoric antecedents of Malta. Zammit identified the original Tarxien Cemetery site and its material, and for decades this was seen to epitomize the first post temple phase. The pottery forms defined by Evans (1971, fig. 39) presented mostly small vessels, usually with sharply out-turned rims from a narrow neck, small flat or curved bases, and ring and raised handles; jars and intriguing multiple cups; and double necked jugs and 'baggy' jugs. The first use of metal (copper) in Malta was noted in burial assemblages. Those forms, however, were not the only ones to raise questions, since another exotic type also was recognized. For several decades, scholars noted a strong association between the pottery forms identified at Troy and Lerna in the early decades of the twentieth century (Lamb 1938) and similar types from Malta (Copat *et al.* 2010; Evans 1971, 223–5; Recchia & Fiorentino 2015; Tanasi & Vella 2014; Trump 1976, 1980). This type comprised bowls with thickened 'almond' rims that carried incised geometric patterns on both top and base surfaces, comprising triangles, lines and dot and criss-cross infill, highlighted with white paste. Dating for this apparent two-stage change in material culture was for a long time plagued by an unreliable radiocarbon chronology. Trump did not

Table 10.19. *Phase 8a. Thermi style characteristics; and Phase 8b. Tarxien Cemetery style characteristics (note this table identifies two separate phases of pottery production between 2300 and 1600 BC).*

	Fabric	**Classic sites/references**
A. Thermi Early so-called 'Thermi' style, local pottery, dating around 2300–2200 BC. Part of a wide spread style of Adriatic, western Aegean, central Mediterranean. Not associated with TC burials, but with late temple use and final burials at Xagħra. The total assemblage is too small to categorize fully, with very few forms represented	A. Thermi Fineware hard-fired, grey to black fabric, polished and burnished Some polished slip surfaces evident – patterned incisions with dot-filled triangles of Capo Graziano /Thapsos? style, enhanced with white paste (Evans 1953, 68)	A. Thermi Taċ-Ċawla Xagħra Brochtorff Circle Tas-Silġ
B. Tarxien Cemetery Tarxien Cemetery is later stage of a primary Bronze age *c.* 2000–1600 BC, associated with cremation cemetery at type site, and rare material from other sites. Similar to Capo Graziano and other south Italian styles, typified by juglets, bowls, asymmetric vessels and linear incised patterns and plain wares	B. Tarxien Cemetery Coarser, thicker, less compact than TP i.e. 10 mm+ Large grit temper -sandy, crumbly on fracture. Less well fired than TP. Surface often rough and irregular, less burnish, some slipped. Colours red-yellow–brown-grey-black Incised decoration before firing, or applied strips, knobs and discs	B. Tarxien Cemetery Bur Mgħez Borġ in-Nadur Taċ-Ċawla Tas-Silġ Ġgantija Sites with comparable material known in Sicily and Italy
Bowls	**Jars**	**Other forms**
A. Thermi Typified by thickened lip (almond rim) bowls –found at BR, TCC and Tas-Silġ, bevelled and distinct angle between lip and wall (BR 10.19, A-F) often decorated	A. Thermi Everted bowl forms dominate, with little evidence for storage vessels or jars	Not known
B. Tarxien Cemetery Bowls with sharply everted rims above ovoid body (Evans 1, 2, Borġ in-Nadur hut 2, Trump 61, pl15) Large open bowls (Evans 6) (BR 10.19, D-E-F)	B. Tarxien Cemetery Everted rim jar-deep vase forms (Evans 14) (BR 10.19, I, J), sharply angled shoulder – rim, but with baggy body shape below Round-based bipartite amphorae handled jar (Evans shape 12) Tripartite jars with neck bulge below everted rim, flat based (Evans 15, 16) Juglets (Evans 10) (BR 10.19, T, U)	B. Tarxien Cemetery Askoi Evans 20 Dual necked flasks (Evans 19) Double cups (Evans 18) Multi handled juglets (Evans 17)
Handles	**Rims**	**Base**
A. Thermi None recorded, possible example (Fig. 10.40:1) a sherd with thickened base	A. Thermi Wide thickened and defined with almond-shaped profile, oblique slope into vessel, inner rim edge Incised decoration a particular feature of both faces of everted rims	A. Thermi Bowls presumed to have small flattish and round bases other forms not recorded so base form unknown
B. Tarxien Cemetery Sharply angled strap (early pedestal bowl) Rod handle – usually short and rounded	B. Tarxien Cemetery Everted upstanding on jars and juglets Rolled rims on later material, everted raised rim above gently marked shoulder	B. Tarxien Cemetery Flat Small flat or dimpled bases Rounded with slight impressed centre Pedestal – high for shallow bowl (early)
Lugs	**Decoration**	**Location of decoration patterns**
A. Thermi None recorded	A. Thermi Incised geometric 'V' zigzags /triangles alternating with dot infill White paste infill of dot, stab and line patterns Infilled and alternating chequer patterns, sometimes with alternating motif (BR 10.19,Q, R)	A. Thermi Pattern focus on inner rim -finer smaller geometric, and outer neck and rim with larger patterns. Shoulder and body patterning evident
B. Tarxien Cemetery Plain knobs on shoulder of ovoid jars, some perforated as reduced 'handle'	B. Tarxien Cemetery Criss-cross infill in bands and geometric large parallel zigzags (BR 10.19, N, O), large spotted triangles Parallel incised-channelled lines below rim and on necks (BR 10.19, P)	B. Tarxien Cemetery Focus of pattern on body of pot, around belly, around outer neck-and handles, panels between handles Strong similarities in pattern design and execution with Cellino San Marco in southern Italy

sample the Bronze Age levels at Skorba, and the only radiocarbon dates achieved by Renfrew and Renfrew in the early 1970s were from the beans and cereals conserved from distinctive Tarxien Cemetery deposits (Renfrew, J. 1972; and see Chapter 2, this volume). The sequence from the Xagħra Brochtorff Circle (Malone *et al.* 2009, 342) provided the first stratigraphically controlled samples, and these revealed that Bronze Age occupation (*c.* 2100 BC onwards) followed soon after the apparent demise of the final Temple Culture Neolithic. The chronology gap lasted at least a couple of centuries at Xagħra, but the nature of a funerary cave is not comparable to a settlement or shrine where stratigraphic levels might more readily demonstrate continuity.

The new dates from Taċ-Ċawla appear to do just that, suggesting an occupation of Thermi style Early Bronze Age material in the second half of the third millennium BC, which has no really diagnostic Tarxien Cemetery material present. This sequence is particularly significant, since the chronology seems to tally with the extensive study at Tas-Silġ (dates still not yet published for comparison), which has identified the coexistence of final Temple Culture material with the Thermi ceramics. Quite how this should be interpreted remains an open question, since there seems little evidence in the archaeological stratigraphy for drastic change, and the material may be coexistent for at least one or two centuries. Therefore, the Thermi pottery might advance the suggestions made in earlier decades for continuity between the Temple Culture activity and the introduction of cultural traditions in the earliest Bronze Age (Evans 1959, 1971, 223–5, 180 re the Ġgantija sequence; Trump 1966, 49). Cazzella & Recchia (2012, 2013, 2015) argue that the Thermi pottery from Tas-Silġ occurs in the levels immediately above and in association with the final temple culture; which might indicate a variety of new cultural arrivals on Malta, and their gradual integration with the existing communities. The broader picture of this process is possibly reflected in the aDNA story that is beginning to emerge (Volume 3) and the bioanthropological identification of different ethnic characteristics amongst the latest burials at the Xagħra Brochtorff Circle. For the fully recognized Tarxien Cemetery phase, *FRAGSUS* sites did not retrieve any properly diagnostic pieces, although Figures 10.39 & 10.40 present possibly rather generic candidates of later material that could potentially relate to the phase. No new stratigraphic dates for the Tarxien Cemetery have been added through the current work, other than the re-dating of the TxC beans (see Chapter 2) since sites that have yielded the pottery have not been subjected to systematic radiocarbon dating to establish fully the chronology and its longevity into the middle-later Bronze Age of Malta (Bonanno 1993; Evans 1971; Tanasi 2011).

10.10.1. Pottery from Thermi-Tarxien Cemetery phases

The characteristic identifying features of Bronze Age material from the largely Neolithic assemblage are fabric type, rim and vessel form and the distinctive decorative motifs. The most intriguing material is the assemblage of thickened lip bowls of Thermi type, with their relatively shallow forms and in many cases, incised geometric patterns. Figures 10.39: 1, 2, 4, 6–10, and 10.40: 10, 11, 14 are examples of this distinctive form. The type is discussed at length by Cazzella & Recchia (2013, 2015, fig. 4) and Copat *et al.* (2012, 2013). It is likely to date from before the end of the third millennium BC, probably between 2300 and 2200 BC on the basis of dating emerging from Tas-Silġ, Xagħra Brochtorff Circle and Taċ-Ċawla. It has been demonstrated to be of local production (Mommsen *et al.* 2006). Examples of this distinctive material have been recorded from Xagħra Brochtorff Circle, Borġ in-Nadur, Tas-Silġ and Tarxien.

The only *FRAGSUS* site (other than In-Nuffara) that produced a significant assemblage of post-Temple Period material was Taċ-Ċawla. There, a number of levels and possible structural elements appear to represent a continuation of occupation beyond the end of the conventional Temple Period. In total some 56 sherds weighing only 0.95 kg were identified and retrieved from some 20 stratigraphic contexts; in particular, a superficial pit and level in the uppermost deposits of the stone structure. The presence of the early Bronze Age or Thermi phase (final Later Neolithic-Bronze Age transition) was evidently brief and slight given the sparse evidence retrieved. The material provides an interesting comparison to both the recent studies by Cazzella & Recchia (2006–07, 2011, 2013, 2015) from Tas-Silġ, and to the published assemblage from nearby Xagħra Brochtorff Circle (Malone *et al*. 2009, fig. 10, 19). Both sites include comparative examples of the Thermi style pottery present at Taċ-Ċawla. This style is defined by thickened lip, or almond section rims on bowls with a characteristic bi-sided (particularly upper and lower faces of everted rims), geometric dot and line filled patterning with white paste fill, and generally found as quite small vessels. The fabrics of the material identified as early Bronze Age tends to be dark fired, often hard and burnished, if sandy in texture, and the incised patterns have traces of white paste fill. The material, largely of the broadly defined Tarxien Cemetery (and Thermi) types, is illustrated in Figures 10.39 & 10.40. In comparison with the classic Tarxien Cemetery assemblage of angled neck funerary jugs and urns (see Evans 1971, figs. 25 & 26), the

Table 10.20. *Phase 9. Borġ in-Nadur style characteristics (Middle Bronze Age).*

	Fabric	**Classic sites/references**
Many forms similar to Proto Apennine – everted rims, high handles, and to Rodi-Tindari forms in Sicily	Variable firing quality, coarse and often gritty temper Some finer ware more brittle, high fired, crack fired with slip and paint decoration (dribble ware) Typical 'sandwich' of dark centre and lighter, red-buff surface Pale fabric – buff ware with grey core, slipped Surface smoothed and often red slipped/ painted with dark random patterns Red slip	Borġ in-Nadur Cambridge Gozo Survey In-Nuffara Mtarfa Il Qortin Mdina Citadel, Rabat Cala S. Ġorg Baħrija Tal Mejtin Buqana tomb Bir Miftuh Luqa Bidini Buleben (Zeijtun) Tal Horr Ta Caghqi Il Tumbata
Bowls	**Jars**	**Other forms**
Cup with high handles –axe topped (type 94) Inverted conical cups with horned handles decorated with applied studs (type 95) with white fill decoration High pedestal bowl with handle (Evans' type 97) Small pedestal open bowl with two vertical handles (type 92) Flat based open bowl (type 93)	Large short necked, flat-based storage vessels – thick walled – 1–2 cm – Evans (1953, 71, and type 104) ovoid *pithoi* with four handles on shoulder Handled jugs with flaring necks (type 106) Small footed jars (type 99) (usually dribble ware) Ovoid jars with conical necks Jars with handles	Rarer forms: Rectangular basins (type 108) Flat based lamps with ring handle, sometime wick slits (type 98)
Handles	**Rims**	**Base**
High straps or tubular handles – on jars and cups Loop handles Ring handles, some asymmetrical and waisted Cups with raised 'axe' handle (Malone *et al.* 2009, fig. 10.19, W) (strong similarities with Southern Proto Apennine handles	Convex everted rims, 'S' profile neck-rim (types 101–102) Thick rims on jugs (types 101–102)	Usually flat or pedestals
Lugs	**Decoration**	**Location of decoration patterns**
Lugs, knobs and small applied buttons	Painted – dark dots and smudges over red body paint 'dribble ware' (Vella & Tanasi 2015; Tanasi 2011) Incised in smaller vessels Roughly incised wavy bands of lines, some with dots (Malone *et al.* 2009, fig. 10.19, V) Applied ribs and cordons	Rather random patterns usually in upper part of body, and around inner rim/neck Patterns Parallel lines, linear and dots

Taċ-Ċawla material has more thickened lip (almond lip) bowls, (see Evans 1971, fig. 24, 2 T/P.314). The filled geometric patterns of triangles and dot/line fill anticipate the post-Temple culture pottery styles of the full Tarxien Cemetery, Borġ in-Nadur and Baħrija (see Tables 10.21 & 10.22), but also reflect pattern making in the Capo Graziano and Castelluccio cultures in Sicily and the Aeolian Islands. As argued by Cazzella & Recchia (2013, 2015), the dates for this ware may be some centuries in advance of the classic Tarxien Cemetery style. The data from Taċ-Ċawla (Chapter 3) certainly suggests continuity at the site, and the upper levels of the stone structure in particular appear to have been occupied in the final centuries of the third millennium BC after or coincident with, the end of Temple Culture ceramic traditions.

Post-Tarxien Cemetery Bronze Age (19 sherds, weighing 0.73 kg) are from the Middle to Late Bronze Age. These are noted in the catalogue, and they are distinctive for the very different sandy reddish-brown

Table 10.21. *Phase 10. Baħrija style characteristics (later Bronze Age – early Iron Age).*

	Fabric	**Classic sites/references**
	Fine and coarseware well made, fired and polished/burnished Dark grey-black, some reddish-brown Crackle slip, often highly polished on fine ware	Baħrija Mtarfa Tas-Silġ Għar Dalam Qallilija
Bowls	**Jars**	**Other forms**
Shallow bowl with in-turned rim (type 109) and rounded base or 'omphalous' (type 111), plain or elaborate decoration, sometime ledge handles (inverted 'V' form) or triangular handle below rim Angular bowl with shallow convex base and vertical sides below shape everted rim – shallow versions decorated on sides and base, deep versions undecorated Flat based dish with plain lug handle (type 115) Conical cup on footed base (type 116)	Large (almost 1 m high) ovoid flat based jars with wasp-waist or ring handles on widest past of shoulder (grey, unslipped of buff-red slip) Flat disc covers for jars with tubular handles Jugs Spherical or biconical jugs, cylindrical necks and rim-should handle (types 118, 119), sometime with strainer spouts, typically channel line decoration	Rarer forms: Animal handles Lamps Box-shaped vase – decorated and suspended by holes near rim
Handles	**Rims**	**Base**
Handles may be decorated in grooves and cut out patterns Splayed handles p Inverted 'V' ledge handles 'T' handles Narrowed wasp-waisted straps		Often flat and sometime decorated
Lugs	**Decoration**	**Location of decoration patterns**
Pierced ledge handles on shoulders of coarseware Triangular handle/lug	Cut out meanders, zigzags, arranged in bands bordered by parallel lines running horizontal below rim, criss-cross bands on base False relief bands, furrowed cut out patterns Red on buff painted on buff Geometric patterns Black, red and brown slipped Cut out dovetails Stamped patterns, circles	Body Base Handles and lugs Patterns Criss-cross semi geometric Bands

fabric, the spayed neck-rim jars and the use of cordon and linear decoration, all of which correspond with Borġ in-Nadur forms and material. As noted by Trump (Malone *et al.* 2009), such material is ubiquitous on many sites across Malta, indicating the extensive occupation of the landscape in the second millennium BC (see Tables 10.20 & 10.21), particularly a raised Borġ in-Nadur type handle (Fig. 10.40: 24) and two inverted jars, one (Fig. 10.39: 11) with dimpled cordons around the neck, and another (Fig. 10.39: 14) with fine roulette vertical lines in three narrow bands below the rim perhaps Baħrija in date. Some material is typical of Borġ in-Nadur (Fig. 10.40: 20, 23) from the Late Bronze Age, around 1200–1000 cal. BC. The main body of later material and its description, however, is examined in detail in Chapter 8, and dealt with separately as part of the In-Nuffara site report, which focuses on a closed, sealed assemblage of later Bronze Age ceramics.

10.10.2. Thermi and Early Bronze Age pottery from Taċ-Ċawla: catalogue descriptions (Fig. 10.39)

1. TCC271-1 Thickened lip deep bowl, almond rim, with external undulations around rim. Comprises five sherds. (Evans 1971, fig. 38-3, Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10-19D; Murray 1929, Pl. XXVII, 271 presents a similar rim pattern and fabric colour from Borġ in-Nadur).
   D – 32 cm. Dark gritty fabric, with reddish, roughly burnished surface, mottled and unevenly fired.
2. TCC193194-4-4 Thickened lip bowl. (Xagħra Brochtorff Circle form in Malone *et al.* 2009, fig. 10-19-D). D – 30 cm. Fabric gritty, hard, fired to rosy-buff, burnished on interior, but rough undecorated exterior.

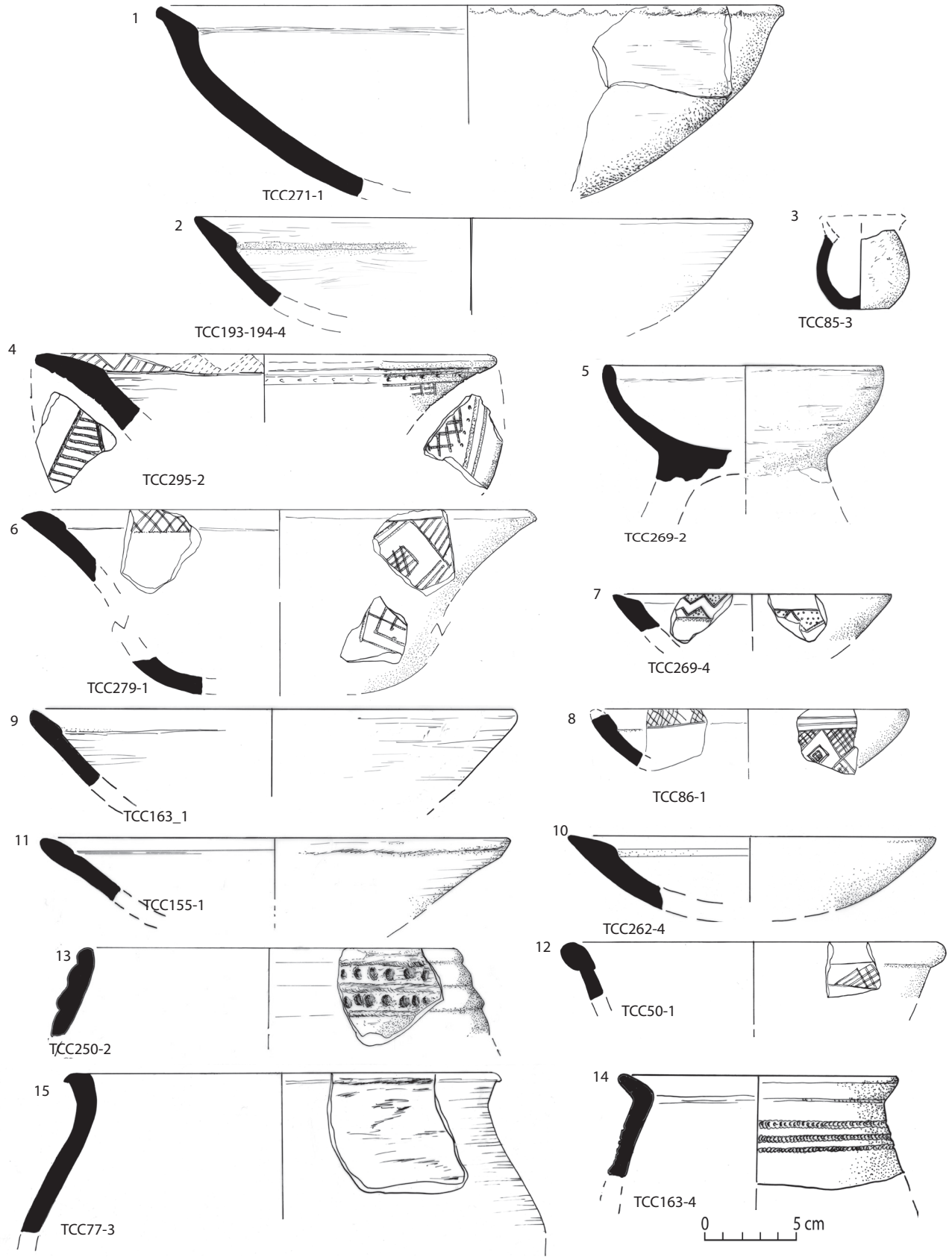


Figure 10.39. *Thermi and Early Bronze Age pottery from Taċ-Ċawla.*

3. TCC85-3 Juglet base (see Evans 1971, fig. 25, TXC/P.21; Xagħra Brochtorff Circle, Malone *et al*. 2009, fig. 10.19, T & U; Tas-Silġ, Recchia & Cazzella 2011, fig. 5, 5, for body shape). D – 3 cm. Burnished, beige fabric with rosy patches.
4. TCC295-2 Thickened lip tulip profile bowl with internal triangle pattern on rim, external criss-cross and dot design. Other sherds may be part of the vessel (Fig. 10.40.1, TCC259-1) (see rim pattern Evans 1971, fig. 24, T/P.31; also, Xagħra Brochtorff Circle, Malone *et al*. 2009, fig. 10.19 F; similar rim pattern from Borġ in-Nadur, Murray 1929, Pl. XXVII, 288). D – 24 cm. Black burnished.
5. TCC269-2 Pedestal bowl. This vessel has a plain rim, possibly more Borġ in-Nadur in form than Tarxien Cemetery in shape (Tanasi 2015, classified broadly as a Type 2 bowl, fig. 23, 27-37441). D – 15 cm. Fabric has black core and reddish buff exterior.
6. TCC279-1 Thickened lip bowl, rim and base elements, with internal criss-cross on rim and external hatched geometric pattern (cf. Evans 1971, fig. 24, T/P 31fc; and less patterned example from Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.19 F. D – 27 cm. Fabric hard, grey with orange-buff blotches, well smoothed, with darker grey core and white paste fill.
7. TCC269-4 Thickened lip bowl with internal zigzag dotted band internal, and similar external design (see Evans 1971, fig. 21, fig. 35, 4 pedestal basin; Malone et al. 2009, fig. 10.19A–F; and similar rim design recorded by Ashby *et al.* 1913, Pl. XXVI, from Mnajdra). D – 15 cm. Fabric fine, orange-buff, with darker grey core.
8. TCC86-1 Thickened rounded rim bowl, with internal criss-cross rim pattern and external hatched diamond pattern (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10-19-B & Q with similar cross-hatched patterning). D – 16.5 cm. Black fabric.
9. TCC163-1 Almond rim bowl, showing slight thickening and no decoration. D – 25-28 cm. Black burnished surface, grey smooth surface within.
10. TCC262-4 Undecorated thickened lip shallow bowl. D – 19.5 cm.
11. TCC155-1 Thickened rim bowl, with slight angle on inner lip. D – 24.5 cm. Fabric Grey-black matt on exterior and rough grey burnish on interior.
12. TCC50-1 Round rimmed everted bowl, with external hatched triangle pattern (see Murray 1923, Pl. XIV, 183 shows a rolled rim with vertical orientation). D – *c*. 15–21 cm. Orientation of the rim unclear, may be shallower form. Black fabric, burnished.
13. TCC250-2 Inverted dimple cordon-decorated jar neck of unknown style and date and no recorded parallels (Tanasi 2015, fig. 41, Type 5B/6, & fig. 7, 30980). D – 20 cm. Fabric is sandy in texture, black interior surface, but red-orange on exterior.
14. TCC163-4 Inverted jar with out-turned angled rim of Borġ in-Nadur, Shape 8 (see Chapter 8 for In-Nuffara). The vessel has an unusual tri-line roulette scored/punched linear decoration on shoulder (Xagħra Brochtorff Circle, Malone *et al*. 2009, fig. 10.19. P; and Evans 1971, figs. 25 & 26 for similar out-turned rim; Tanasi 2015, figs. 7, 8 & 48A, type 6 jars, described as Proto Bronze Age). D – 13 cm. Grey matt fabric, and blackish interior surface (see Table 10.20).
15. TCC77-3 Inverted jar with flat-topped bevelled rim. The vessel may be Middle Bronze Age, since the out-turned rim although similar to TXC neck/rims, is flattened and thicker (see Evans 1971, fig. 3.6). D – 24 cm. Black, brittle and rough fabric.

10.10.3. Bronze Age and Thermi pottery: catalogue descriptions (Fig. 10.40)

Only one or two sherds retrieved from the *FRAGSUS* sites are diagnostically Baħrija in style (Fig. 10.40: 13; see Table 10.21 and Fig. A10.3.1e–f), although it is quite likely that some of the Bronze Age material described from Taċ-Ċawla may belong to the broadly defined later Bronze Age. As yet, too little Late Bronze Age–Early Iron Age occupation has been comprehensively published to provide comparison. The table of characteristics below is nevertheless included for completeness.

1. TCC295-1 Thick sherd with distinctive rectangle/circle pattern, possibly base of handle or foot and possibly part of TCC259.2 (Fig. 10.39: 4) together with other sherds (6). Black burnished fabric.
2. TCC83-1 Sherd with criss-cross incised decoration (this and Fig. 10.40 decorated sherds, Copat *et al*. 2013, fig. 6 for pattern motifs). Grey gritty rough fabric.
3. TCC77-1 Sherd with chequerboard hatched pattern. Fabric black-grey with buff coloured surface.
4. TCC262-1 Patterned sherd with sparse infill dots in incised chevrons. Black burnished fabric.

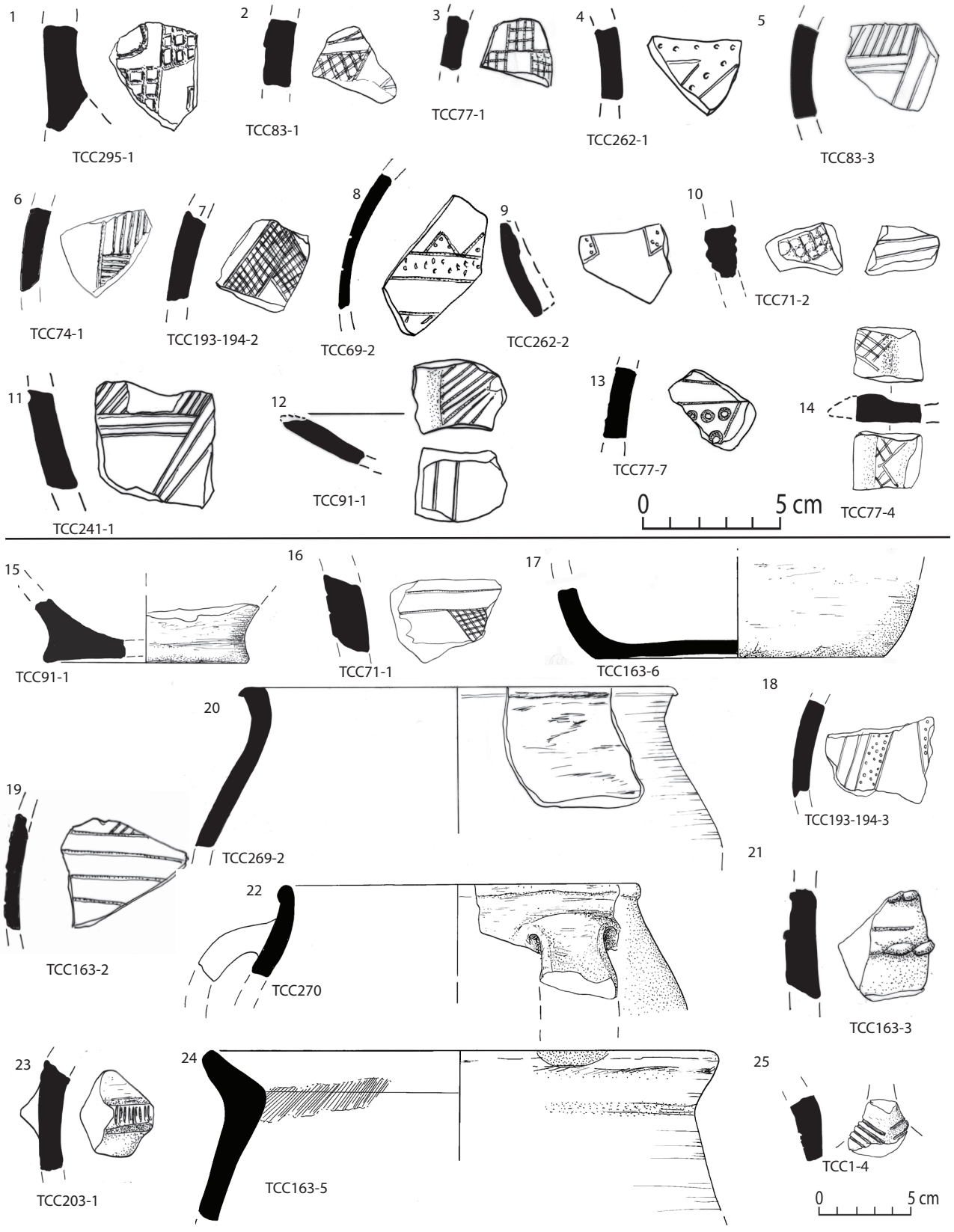


Figure 10.40. *Thermi and Middle to Late Bronze Age pottery (note difference in scale between upper and lower parts of the figure).*

5. TCC83-3 Patterned linear incised sherd. Dark grey gritty fabric.
6. TCC74-1 Patterned linear incised sherd, with cross hatch design. Brown burnished fabric.
7. TCC193-194-2 Sherd with hatched chevron design (Xagħra Brochtorff Circle, Malone *et al*. 2009, fig. 10.19, O). Black-red surface on grey fabric.
8. TCC69-2 Patterned body sherd with dot filled bands and zigzag. Dark grey fabric, with smoothed red-buff surface.
9. TCC262-2 Patterned sherd with traces of dot filled rectangles, buff colour with white paste fill in patterns.
10. TCC71-2 Rim/neck sherd with patterns on both faces. Fine black fabric with some grits visible.
11. TCC241-1 Everted thickened lip bowl with patterned surfaces inside and out, linear on underside, close-cut lines on upper surface. Black-brown fabric. Diameter unclear.
12. TCC91-1 Thick patterned sherd. (Xagħra Brochtorff Circle, Malone *et al*. 2009, fig. 10.19, F & L; Cazzella & Recchia 2015, fig. 9.5 for similar design motifs). Grey gritty fabric with red exterior and grey interior surfaces.
13. TCC77-7 Stamped circle patterned sherd, possibly Baħrija style, showing similarities with Late Bronze Age/Early Iron Age Sicani-Elymian styles in Sicily (Għar Mirdum, Tanasi 2015, fig. 109, MRD64/P851; Recchia & Cazzella 2011 describe roulette type patterns from Baħrija). Fabric is fine grey with few visible grits, buff interior and fired black on surface. Thickness – 6–8 mm.
14. TCC77-4 Thickened rim sherd with distinctive pattern. Grey matt fabric.
15. TCC91-1 Base of a thick walled flat-based jar with slight foot ring. Borġ in-Nadur in fabric type. D – 11.5 cm. Grey fabric, with red-orange surface
16. TCC71-1 Very thick (2 cm), hatch patterned sherd, black gritty fabric.
17. TCC163-6 Base of jar, flat, with rounded foot. D – 16 cm. Fabric grey, but buff interior surface and red on exterior.
18. TCC193-194-3 Patterned sherd, Chevrons filled with dots (Cazzella & Recchia 2015, fig. 4.5). Sherd 14 mm thick in section. Black on surface, gritty fabric.
19. TCC163-2 Line patterned sherd with trace of diagonal lines (Xagħra Brochtorff Circle, Malone *et al.* 2009, fig. 10.19, L, M, O, Q). Grey matt fabric.
20. TCC77-3 See description of sherd 15 in §10.10.2.
21. TCC163-3 Cordoned sherd with fine 'rope' twist design. Brown matt fabric.
22. TCC270 Inverted jar with strap handle. (Tanasi 2015, Type 6 jar; Murray 1925, Pl. XVI, 215 parallel for strap handle). D – 19 cm. Grey fabric, mottles orange grey over a matt surface.
23. TCC203-1 Cordon sherd with fine vertical fill (cordon in Tanasi 2015, fig. 41, with example on Type 5A–B and 6; Murray 1925, Pl. XVIII, 284). Fabric has grey interior, but surface fired to reddish colour.
24. TCC163-5 Inverted jar with heavy out-turn rim, typical Borġ in-Nadur with dribble paint on interior surface. D – *c*. 28 cm. Coarse fabric, smoothed brown surface.
25. TCC1-4 Raised strap handle base with distinctive Borġ in-Nadur style cut chevron grooves with white paste fill on brown fabric (see Murray 1923, Pl. XIII, 150–151 described as red and polished, Pl. XIV, 8, 1929, Pl. XXVIII, 295; Tanasi 2015, fig. 61, 3738).

10.11. Conclusions

The broad trends of pottery development for Malta are summarized in Figures 10.1 and A10.3.1, which show the classification of forms for each main ceramic phase. What is clear in Malta is the evolution of forms and decoration as a particular, regional canon over the fourth and third millennia BC. The Earlier Neolithic phase of Għar Dalam and Skorba fits more closely into a broader central Mediterranean maritime zone, with parallel stylistic developments in interconnected areas of mainland, islands and peninsulae. As indicated in Figures A10.3.2–A10.3.9, which have grouped various repeating forms into an evolutionary scheme, there seems to be evidence that a deeply embedded tradition of form and shape lasted for centuries if not millennia. Flasks, for instance, were present in the earliest phases together with ceramic ladles, and these forms keep reoccurring; likewise, the carinated forms do too. Whether the resurrection of an older shape was intentional, informed or simply serendipity, is impossible to know. Some episodes really do demonstrate a complete stylistic break from the former styles and this is particularly evident in the Tarxien Cemetery assemblage with its sharply angled shoulder and neck shapes and its odd, asymmetric forms. In contrast, the Thermi style looks far more familiar and in line with the preceding/or contemporary Tarxien and Sicilian forms. The ceramic forms recorded by Evans and Trump probably only represent the tip of a ceramic 'iceberg' that still remains unexcavated or remains unstudied. The rich assemblages of material retrieved from all the

earlier sites remain in the museum stores and have yet to be examined in detail; there is thus a wealth of very basic data still to be recorded and shared. Therefore, we present this study as a commentary on what we currently know, with the addition of just a few elements that fill some gaps, such as the Trefontane, the Għar Dalam and the coarsewares. Together with the material culture discussed in Chapter 11, we address the *FRAGSUS* questions through the perspective of pottery and artefacts in Table 13.2, and hope to demonstrate that this rich material can also inform and enlighten our interpretations and models about Maltese prehistory.

Notes

1. We wish to acknowledge the helpful advice from Maria-Clara Martinelli, Davide Tanasi, Nicholas Vella, and Francesa Spatafora on the identification of problem sherds.
2. Abbreviations: Bah – Baħrija; BN – Borġ in-Nadur; Gg – Ġgantija; GhD – Għar Dalam; GSk – Grey Skorba; Mg – Mġarr; RSk – Red Skorba; Saf – Saflieni; Sk – Skorba (combined); TC – Tarxien Cemetery; TP – Temple Period; Tx – Tarxien; Zb – Żebbuġ.
3. Pottery shapes refer to Evans 1971; see Figure A10.3.1 for reference.

Chapter 11

Small finds and lithics: reassessing the excavated artefacts and their sources in prehistoric Malta

Caroline Malone, Petros Chatzimpaloglou & Catriona Brogan

This chapter is divided into two parts. The first presents the recently excavated non-ceramic artefacts, whilst the second part examines the lithic material sources and their use in Maltese prehistory.

PART I – THE EXCAVATED ARTEFACTS

11.1. Introduction

Artefacts are one of the most informative forms of archaeological evidence from prehistory. Scholars make much of the forms, types and materials, perhaps because such themes offer the opportunity to look broadly at the problems of the distant past, but also because interesting analytical exercises can be performed on a body of diagnostic material. Museums celebrate the objects retrieved from the past, often out of context from the places they were found. This is not the place to debate objects and their value, other than to highlight that the objects from prehistoric Malta are highly specific to the islands, and generally little known and understood. Scholars for the last century have endeavoured (Chapter 1.2) to comprehend, classify and interpret the fragmentary pieces of Neolithic and Bronze Age Malta (Cilia 2004; Evans 1971; Murray 1923, 1925, 1929), often with an emphasis on artistic objects rather than the utilitarian. The aim here is to present the assemblages from the recently excavated sites. This comprises varied non-ceramic materials. Our study assesses them in terms of their composition, which is possible for a couple of the larger lithic groups (Taċ-Ċawla and Santa Verna), and to provide a basic catalogue of illustrated key pieces that will add to the growing reference archive of prehistoric Maltese material.

11.2. Small finds – 'Temple' Culture artefacts

Small Finds[1] in the context of the *FRAGSUS Project* were identified as recognizable artefacts that were not ceramic. These were collected and processed separately, with the focus on particularly complete or unusual items. Lithics comprise the major part of the artefact collection, numerically, although carved stone objects such as querns represent the largest bulk. Bone and shell items proved to be rare, but where identified (and usually during bone analysis) offered a rare insight into domestic craft activities. The excavation process, as described in the reports above, was generally undertaken by hand, carefully, with a routine of sieving soil samples, and submitting considerable quantities of soil for flotation. The process thus ensured that a representative artefact sample was retrieved; in particular, tiny chips of obsidian and chert. Such items are important since they enable interpretation of a site in terms of whether it was used for making lithic tools, or resharpening existing tools. Coupled with the micromorphology of the sites (Appendices A3.7, A4.5, A5.5, A7.7 & A8.6), it is possible to begin to identify variation between the different sites and periods and activities that took place. Small finds have been catalogued and listed for each site report and are referenced in Appendices A3.2, A4.2, A5.2, A6.2, A7.2 & A8.2. Whilst a standard excavation strategy was applied, following the Superintendence of Cultural Heritage (SCH) guidelines, the differing scale of the excavations and site types resulted in varied assemblages that are assessed below.

The aim of the descriptions below is to provide a summary of key objects, with the identification of material and scale. It is not exhaustive, and future study will be able to extract much more from this introductory study.

11.2.1. Stone artefacts – querns and ground stone

Almost all prehistoric sites in Malta produce stone objects that show signs of tooling, grinding and working. Limestone (Coralline and Globigerina) are ubiquitous on the islands, and yet the selection of

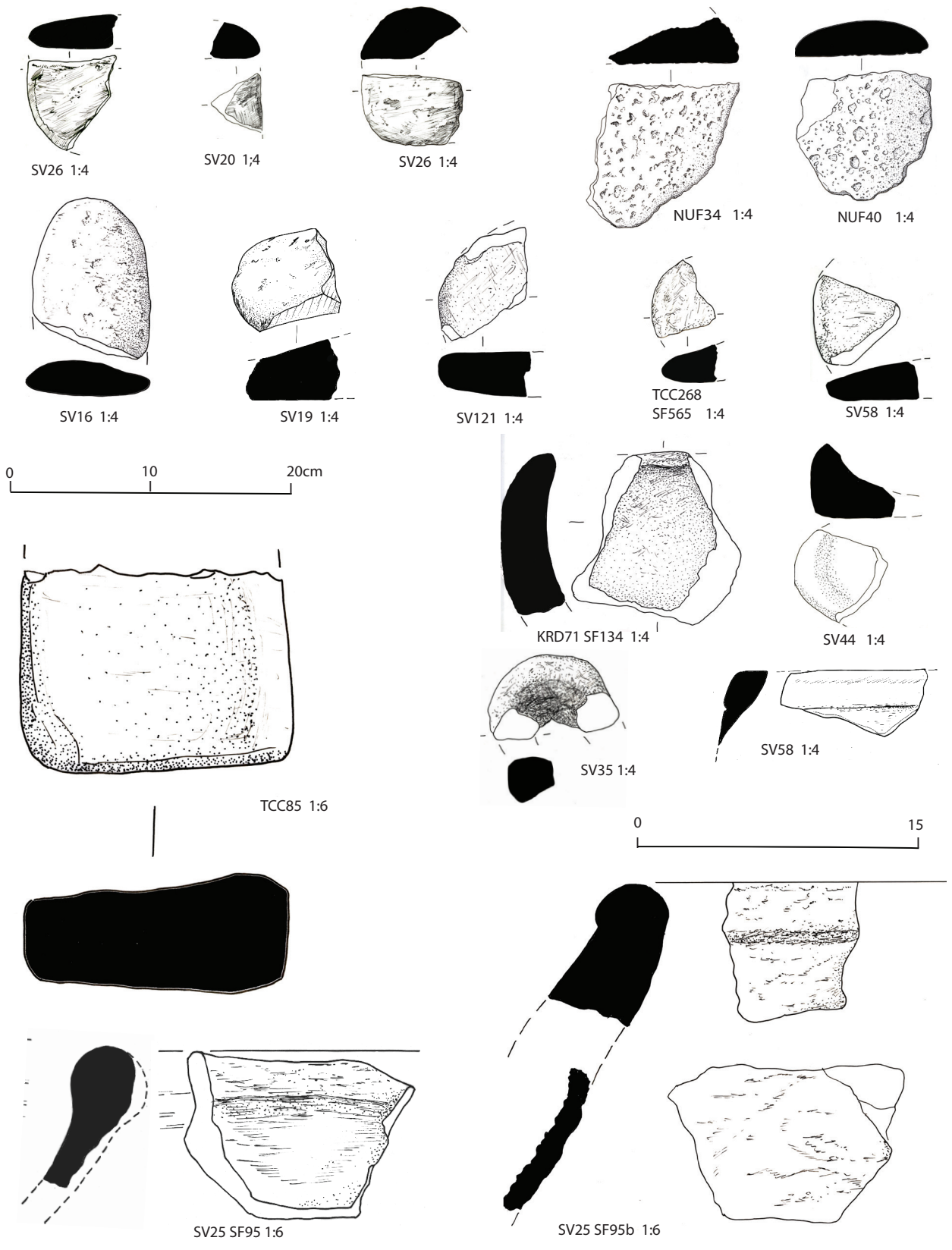


Figure 11.1. *Querns and worked stone.*



Figure 11.2. *Querns, bowls and worked stone, mainly from Taċ-Ċawla.*

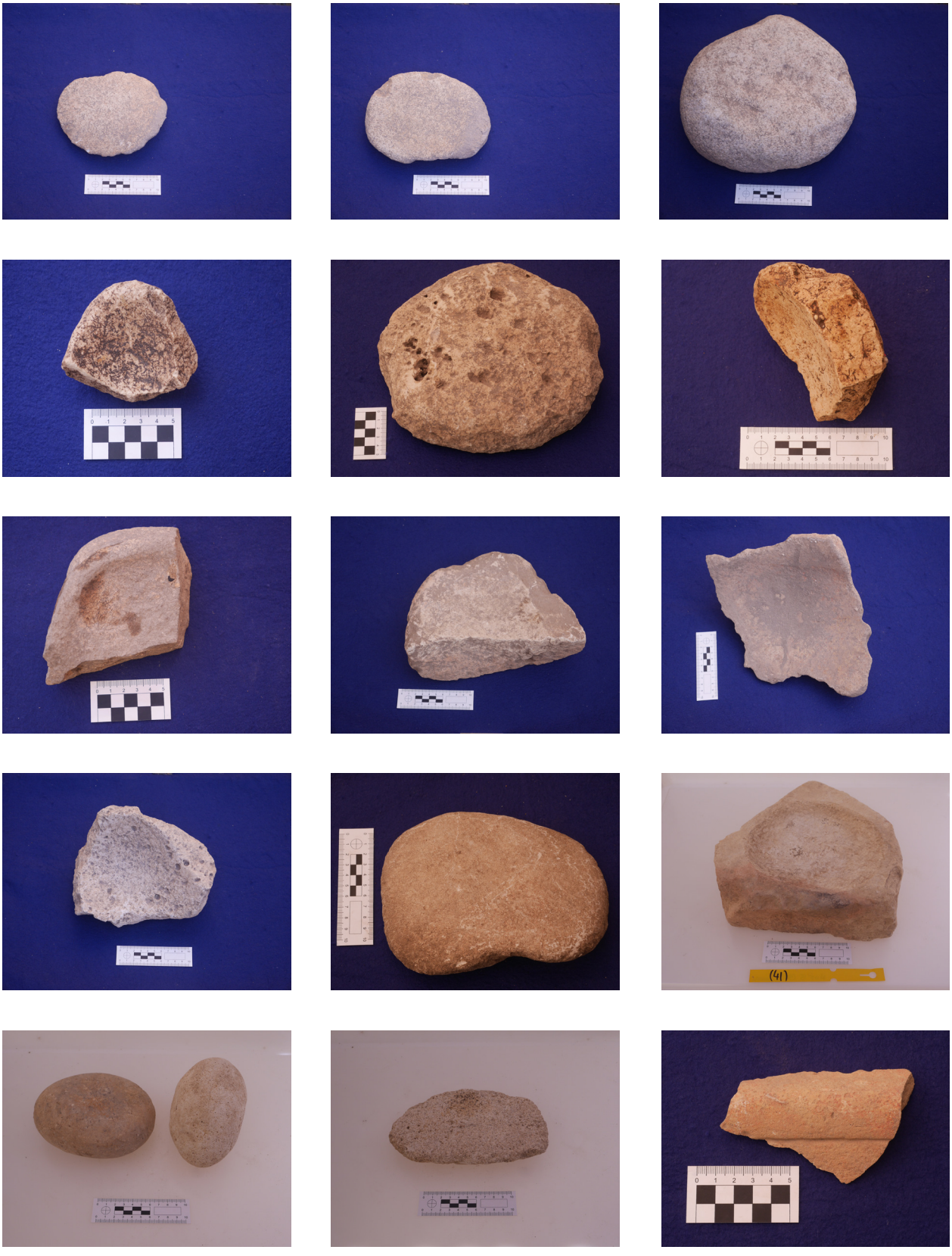


Figure 11.3. *Discs, querns and grinders from Santa Verna and Kordin III.*

particular rock was vital for certain domestic activities and chief among them for grinding cereals. Local Greensand is a less abundant sandstone material, rarely used for grindstones and querns, with most grinding tools formed from Coralline Limestone and more rarely, imported lava (Fig. 11.3, TCC SF284). These objects are found mostly in small fragmentary pieces, usually with a flattened side that once formed the grinding surface. Some small pieces are 'bun'- or 'loaf'-shaped and evidently were grindstone rubbers, used in the active motion of rubbing cereals against a lower stone. One fine example is the rectangular grindstone from Taċ-Ċawla (Figs. 11.3 & 11.4), which together with pottery, the obsidian core and a possible clay oven, formed a midden deposit. Evidently this was removed from a domestic setting since the obsidian core was set between the many layered and apparently undisturbed pieces. The pottery was Żebbuġ in date, suggesting all the items could belong to the mid-fourth millennium BC. It is not possible on the basis of the evidence to provide any means to divide the quern/grindstone assemblage into phases. Indeed, the comparison with the sealed and dated In-Nuffara context with its two grindstones, shows there was almost no change over time in the artefact style, and sometimes only in the material of its manufacture.

Soft Globigerina Limestone was exploited for a variety of carved stone artefacts. The most impressive of these are the huge stone bowls, familiar from several temple sites, and particularly from Tarxien. Several fragments of a stone bowl with an estimated diameter of about 1 m were found beside a threshold area in Santa Verna (Fig. 11.4, SF95a, b). The original vessel has a rounded slightly rolled rim which seems to have been rather variable in shape, doubtless because such an object was carved in one piece with simple tools. Much smaller items were also fashioned from Globigerina, including an inverted bowl from Kordin III (Fig. 11.4. SF134), and several small pieces (illustrated in Fig. 11.5) including the torpedo-shaped stone sling-stones that were known from Għar Dalam and later phases. Coralline Limestone was rarely used except in a semi-natural form when holes in the rock could be utilized to make suspension weights, presumably for nets (Fig. 11.5. KRD SF24, TCC SF434) (Appendix A11.1).

11.2.2. Ceramic objects, figurines

The bulk of ceramic material was pottery, discussed in Chapter 10. A few items, however, were made of baked clay, and include four finely made 'snail' models from Santa Verna. They are really just twisted clay spirals, but conform to a style of object recorded by Ashby *et al*. in 1913 from Santa Verna. The new objects are illustrated in Figure 11.6. According to Vella-Gregory (2005, 115, 118) such ambiguous objects were perhaps symbolic of foetuses. A peculiar terracotta snail figure from the adjacent Xagħra Brochtorff Circle (Malone *et al*. 2009, fig. 10.68, SF800, & fig. 10.69) presents a rather different type of snail figure; and from Ġgantija, snake figures, carved in relief in one of the upright megaliths within the temple structure, also imply an interest in cold-blooded amphibians, reptiles and molluscs (Malone 2008). Temple and burial sites seem to have a greater concentration of symbolic objects, but it is certainly not clear that such objects were not also in use in the domestic setting. Taċ-Ċawla yielded a single possible terracotta figurine fragment (Fig. 10.6), as well as the stone carving found in 1995 (Fig. 3.5f) (Appendix A11.2).

11.2.3. Shell, beads

The use of marine shells for making personal ornaments is well documented from Maltese burial sites, where beads and pendants were used to dress the dead (Malone *et al*. 2009, 272–5). The frequency of such objects from temple or settlement sites seems to be far lower, and only a small number of shell objects were retrieved, mostly through flotation. Taċ-Ċawla produced the bulk of shell beads, and a fine Cowrie shell, with a drilled perforation, was found at Ġgantija (Fig. 11.6, GG1015). Such objects hint at the probably lost or discarded 'jewellery' worn by Neolithic people. The shells are most likely to be from the local waters and beaches around Malta. Very small, thin shells were used almost in their natural form threaded as long beads (*dentalium* or tusk shell) (Fig. 11.8, SV SF76).

11.2.4. Bone tools and artefacts

Worked animal bone proved to be a scarce survival in the assemblages of all sites excavated. In most instances dense animal bone usually from sheep/goat but also bird, was selected, and either worked into points or in one instance, a spatula (Fig. 11.8; Appendix A11.3). The lack of finish to some objects, such as TCC SF349, where the joint element was retained and only the shaft of the metapodial worked into a sharp point, seems to be typical of the casual utility of the material. The lack of preservation reflects the poor preservation of bone in general from all prehistoric sites in Malta. The material was exposed, trampled, gnawed and weathered and generally disregarded by the people who made and used bone and animal products, so the survival of even a few items is illuminating. The most interesting discovery from the *FRAGSUS* work is the identification of several worked and unworked Shearwater bird bones (Fig. 11.8). These gulls inhabit the cliffs around Gozo, and their nesting places are set precariously out of general reach to all creatures, other than birds.

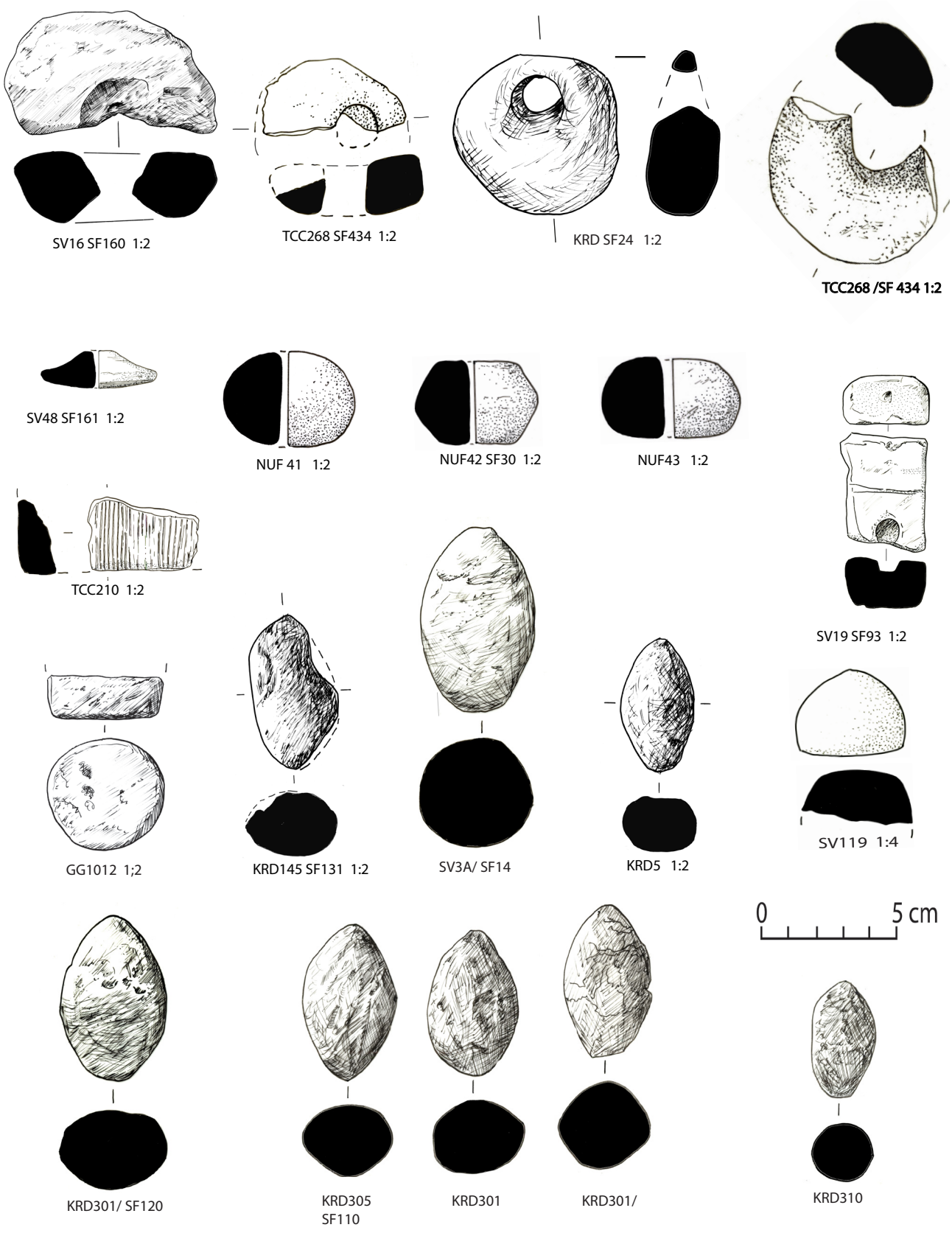


Figure 11.4. *Sling stone and weights, loom weights, worked stone.*

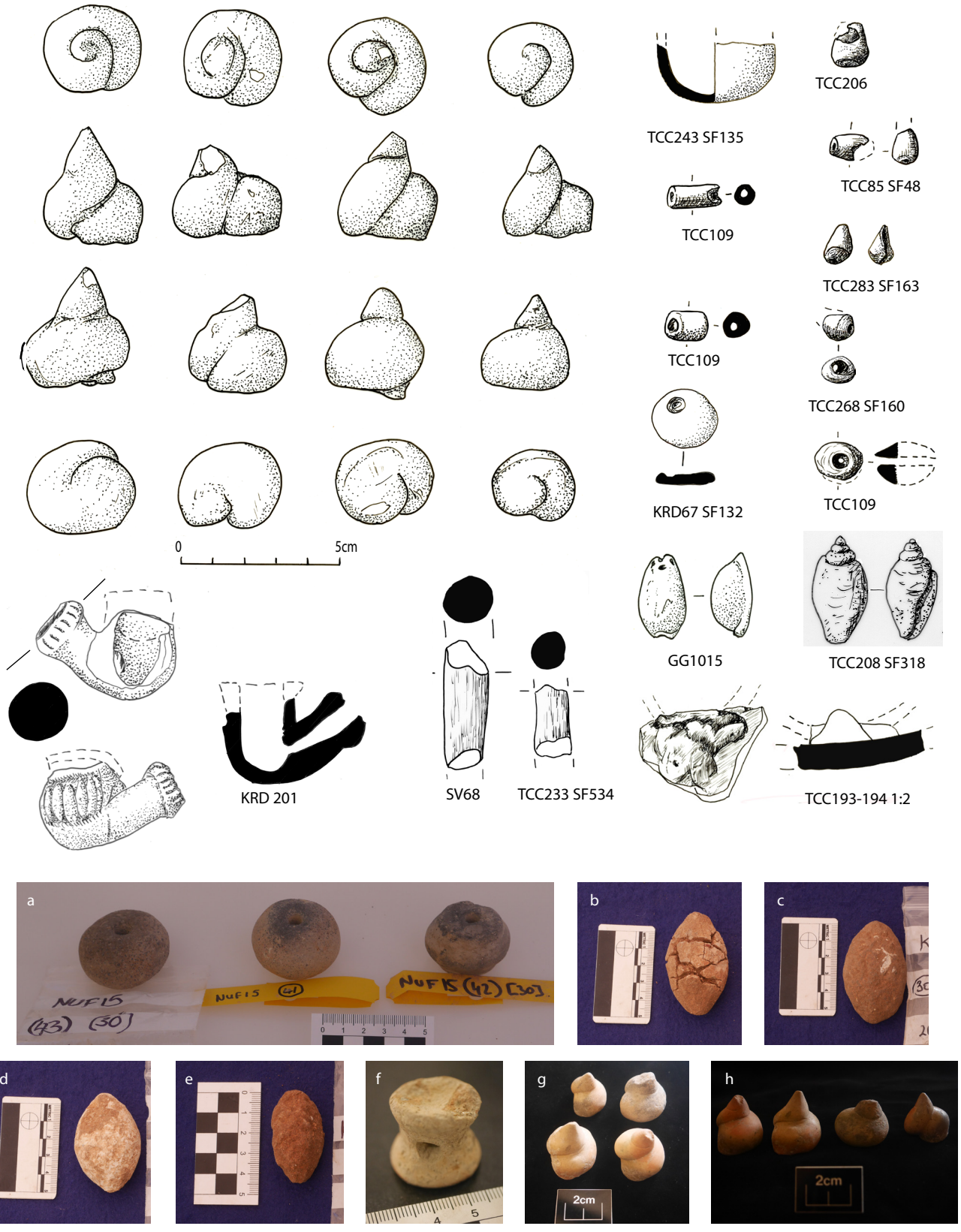


Figure 11.5. *Terracotta objects, snails, beads, shell objects. Photographs: a) spindle whorls from In-Nuffara; b–e) sling stones; f) terracotta toggle; g–h) terracotta 'snail' objects from Santa Verna.*

The acquisition of bird bones, perhaps from netted or captured birds requiring daring climbs on the cliffs, could imply that they had special value and symbolism in prehistoric Malta, and that pins and points made from the bones were prized items (Chapter 9, 9.7.1). Bone tools are important since they offer an insight into craft activities in early Malta, with the possibility that points were used for pottery decoration, making holes in leatherwork, or netting and other thread/textile production. The pins, if that is what some of the finer, smaller items were, suggests use as personal ornaments to hold garments together or for pinning elaborate hair arrangements. Such an observation can be supported by the detailed hair visible in many of the terracotta and stone figurines of Neolithic Malta (Malone 2008; Malone & Stoddart 2016; Stoddart & Malone 2018), whilst the rich assemblage of dressed/semi-dress figurines also demonstrate a concern for clothing and textiles.

11.3. Lithic tools: raw materials and technology

Prehistoric Maltese communities employed various stone materials to make tools for cutting, sawing, drilling, hunting and other activities. Their choice of material (Chapter 9) was limited to local cherts or limestone, but if hard stone was required, then exotic metamorphic and igneous rock and also fine chert/flint had to be sourced from outside Malta. Until recently, only obsidian was diagnostically shown to be exotic, along with hard ground stone artefacts (see Malone *et al*. 2009, Chapter 10). The current study has the benefit of geological assessment that allows identification of chert materials that are also from outside Malta (part II of this chapter). Local Maltese chert stone sources are of poor quality for the manufacture of specific tools that required retouch. As argued below, tools requiring particular shaping and knapping treatment were generally made from externally sourced finer quality stone, as the local chert seems to have been unsuitable. The coarse white-cream local cherts occurred in nodules that shatter unpredictably, although occasionally, finer bands of local chert were exploited. In the following assessment, it has been possible to break down the assemblages into specific chert colour group and their basic categories of flake and tool type. The chert and obsidian artefacts retrieved from fieldwork varied in size and quality very considerably. The largest objects measure up to 10 cm whilst very small chips and flakes of barely 5 mm are recorded at the opposite end of the scale. Part II of this chapter discusses the raw material and its possible sources, but here the assemblage is illustrated, quantified in broad groups, and some objects described in more detail.

The sites excavated represented settlements and more ceremonial places, and it is interesting to assess whether any differences can be identified in the composition of the material retrieved. Taċ-Ċawla as a settlement site is important, since it presents a rarely studied aspect of prehistoric Malta's domestic life. The site was excavated carefully to retrieve all artefacts, since such an assemblage may offer an insight into the range of tools and knapping materials present in the domestic setting. In comparison, assessment of the assemblages from the ceremonial temple sites (Santa Verna, Ġgantija, Skorba, Kordin III) could potentially reveal differences. The caveat, however, for anticipating variation in these lithic assemblages must be that it proved impossible to phase most of the lithic material from the sites. This is either because of the reworked or backfill deposits encountered, or because earlier interventions at the sites had collected substantial amounts of material without recording it. The aim here is simply to provide a modest assessment of the main characteristics of each site assemblage, breaking them down where possible into basic materials (obsidian or chert) and diagnostic forms (flakes, chips, cores, tool types). The large assemblages of Taċ-Ċawla and Santa Verna provided opportunity to record and compare a more detailed break-down of tool types and chert colours (Figs. 11.7 & 11.8). For Taċ-Ċawla the obsidian in particular has been recorded in greater detail, with most items illustrated to give an impression of the generally very small nature of the final pieces recovered (Fig. 11.13; Table 11.1).

Generally, prehistoric lithics in Malta are quite crudely made, and use the local chert that does not knap easily or precisely. Due to the fact that the material can shatter along lines of weakness, the production of long prismatic flakes and retouch is rare. When such workmanship is noted, the material tends to be a finer chert that is likely to have been imported. There was, however, a production of crude scrapers, large utilized flakes that could have functioned as chisels, wedges, cutting tools and hammer stones, and sometimes these display elementary retouch and reworking. A great deal of the shatter and waste knapping debris is from

Table 11.1. *Chert and obsidian from* FRAGSUS *sites.*

	Chert	Obsidian
Kordin III	153	18
Ġgantija	71	9
Santa Verna	460	71
TCC	570	124
Skorba	95	4

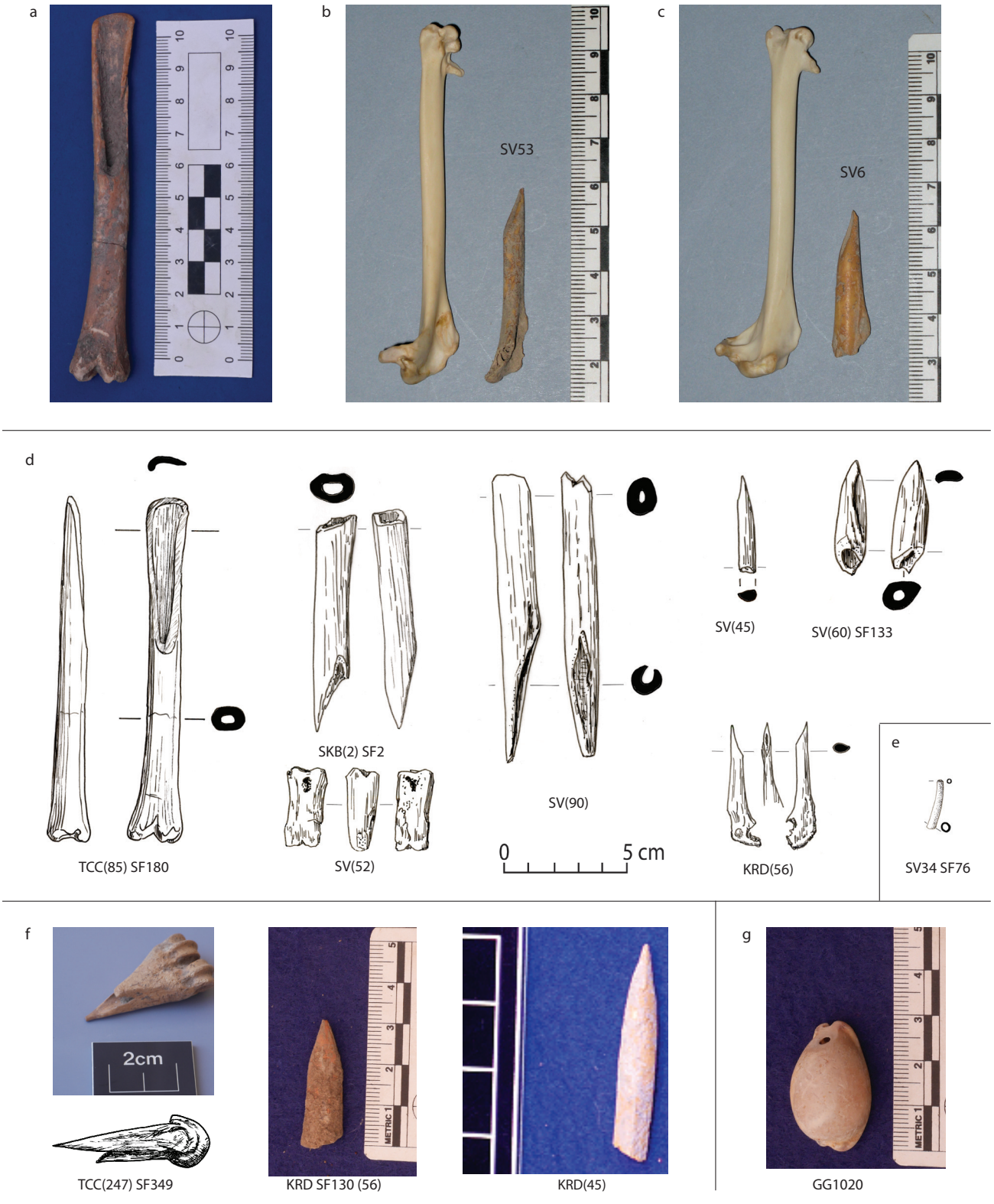


Figure 11.6. *Worked bone and shell objects: a) photograph and drawing of bone spatula (Taċ-Ċawla); b, c) shearwater humerus worked points or pins from Santa Verna; d) worked bone points and polishers from Skorba, Santa Verna, Kordin III and Taċ-Ċawla; e) dentalium shell bead (Taċ-Ċawla); f) photographs of worked bone points from Taċ-Ċawla, Kordin III; g) pierced cowrie shell from Ġgantija.*



Figure 11.7. *a) Pie charts showing percentages of obsidian (green) to chert (yellow) from the* FRAGSUS *excavation sites; b) var chart showing obsidian and chert from the* FRAGSUS *sites; c) bar chart showing ratios of Taċ-Ċawla obsidian and chert tools; d) pie chart showing the breakdown in percentages of Taċ-Ċawla chert tools and flakes; e) pie chart showing the breakdown in percentages of Taċ-Ċawla obsidian tools and flakes; f) scattergram of length-width of Taċ-Ċawla obsidian; g) bar chart showing ratio between retouched and unworked coloured chert flakes from Taċ-Ċawla.*

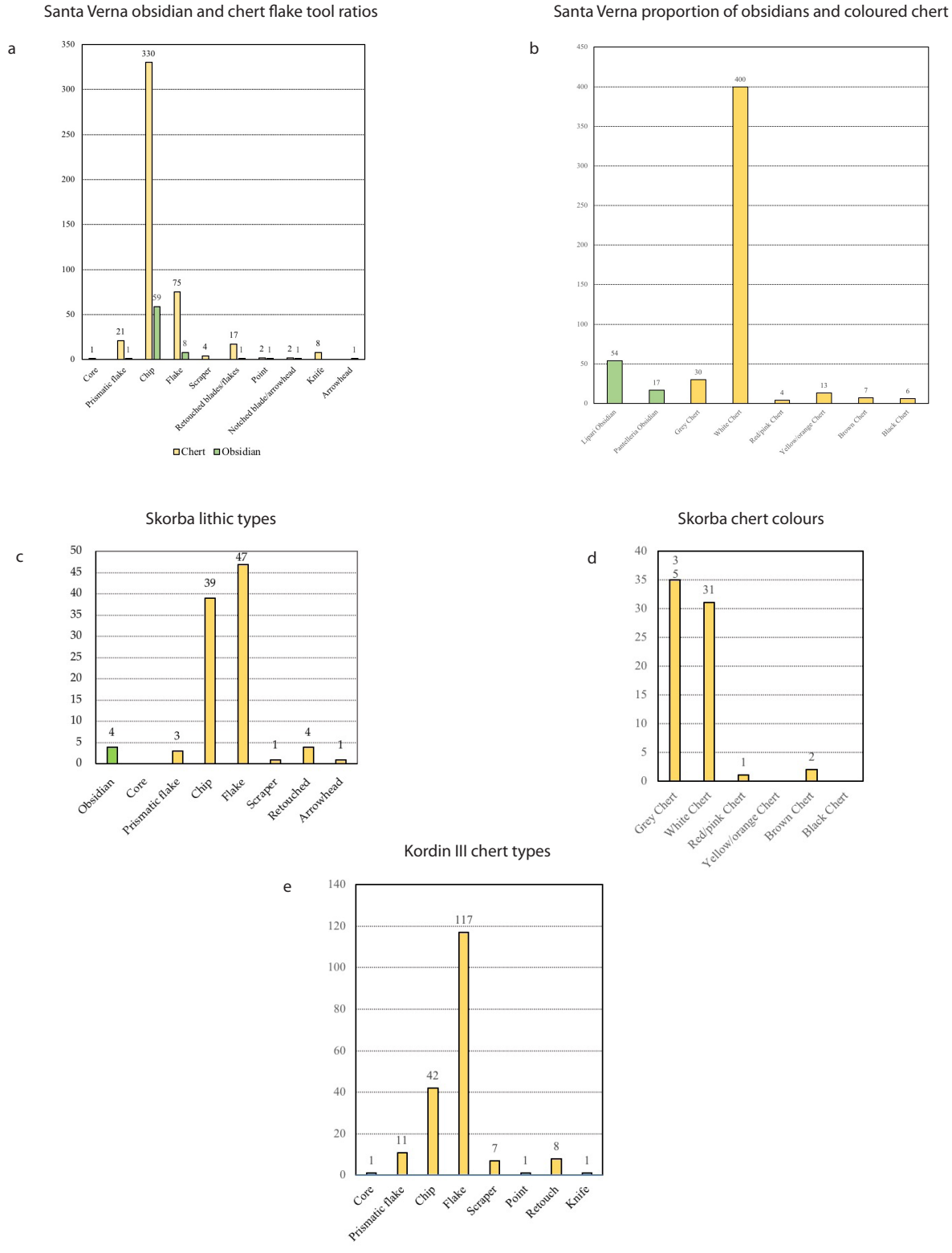


Figure 11.8. *a) Bar chart showing ratios of Santa Verna obsidian and chert tool/flake types; b) bar chart showing numbers of retouched and unworked coloured chert flakes from Santa Verna; c) bar chart showing ratios of Skorba obsidian and chert tool/flake types; d) bar chart showing numbers of coloured chert artefacts from Skorba; e) bar chart showing numbers of Kordin III chert tool-flake types.*

the local chert materials (both cream and black-grey). This is generally of a large size when compared with the obsidian knapping waste, which is of minute size (Figs. 11.7d & 11.13). The conclusion might be that basic tool making for simple utilitarian artefacts was undertaken on site (Fig. 11.1), whilst the rare, valuable and imported obsidian (often probably as tools) was simply retouched to refresh edges after breakage.

The technique employed to produce many of the lithic flakes appears to be hard hammer percussion of chert nodules to form the basic flakes, leaving a shatter of waste chips. In contrast, core pieces were rarely recorded, suggesting material was reduced to a minimal size before being discarded. For the finer chert material, prismatic cores seem to be favoured. These are typically Neolithic in form, and were probably shaped in their primary form elsewhere. The production of regular blades removed in widths of up to 2 cm seems typical, but many blades were narrower and suggest an accomplished knapping technique. Such blade fragments made up only a small percentage of each assemblage; and, apart from a prismatic obsidian core (Figs. 11.7 & 11.8), no similar core elements were found related to this type of production. This could imply that fine blades were actually imported in a semi-finished state. Edge ware, utilization scars and retouched edges are the most typical signs of further shaping and working both of prismatic blades and more crudely knapped flakes from local/exotic chert. Artefacts and tools with retouch comprised a small percentage of the assemblage. The best material shows classic percussion scars, eraillures, platforms and bulbs, whilst the poor-quality chert flakes are flattish, with little bulbs and often roughened hackles and ripples.

Table 11.2. *Santa Verna lithic assemblage totals.*

	Obsidian	Chert	Totals
Core	0	1	1
Prismatic flake	2	21	23
Chip	59	330	389
Flake	8	75	83
Scraper		4	4
Retouched blades/flakes	1	17	18
Point	1	2	3
Notched blade	1	2	3
Knife		8	8
Totals	**72**	**460**	**532**

Overall, few complete tools were found. As the illustrations show (Figs. 11.9–11.15), however, it is possible to identify a range of points, knives, scrapers and notched tools from the fragments and rare complete objects. Evidently the disposal of lithics was reserved for broken and discarded items. Some of the finer tools were almost certainly hafted or incorporated into bone, horn or wood handles. For example, a fine nosed point in cream chert (Fig. 11.12, SF265) may have formed a composite tool (likewise Fig. 11.12, SF85, SF81, SF139, SF449, SF273). Some edged blades may have functioned as knives or cutting tools, and they display a semi-abrupt retouch, and, in one or two instances, pressure flaking. One fine broken piece (Fig. 11.12, SF500) of dark grey chert with cortex on one side shows retouch on both faces of what must have been a large, yet barely 5 mm thick, flake. Another piece (Fig. 11.12, SF502) presents very fine retouch along one side of a broken prismatic blade, on brown granular chert. This latter technique, however, is rare, and it may be that tools were generally fashioned elsewhere, perhaps even outside Malta.

11.3.1. Chert – Santa Verna

The lithic assemblage from Santa Verna comprised a total of 460 pieces, of which 71 were obsidian, and 379 chert. This ratio of about 10–15% obsidian to 85–90% chert seems typical of all the excavated sites. The Santa Verna site had been extensively excavated in 1911, and the re-excavation encountered backfill with much of the original artefactual material already removed over most of the area. Nevertheless, all the remaining lithics were retained for study (Figs. 11.9 & 11.10) and included in this assessment and are listed below in Table 11.2.

The chert artefacts were broken down into groups, with the largest quantity identified as chips (58%), flakes (27%), prismatic blades (8%) and retouched flakes and blades (6%). These proportions are represented in Table 11.2 and Figs.11.1 &11.2. The material was also separated into chert colours, which may be indicative of choices that were made for the manufacture of material or indeed indicative of rarity and abundance. White local chert is the most frequent material, and it largely occurs in chips, suggesting not only that there was local knapping of the material on site; but perhaps that the finer, more attractive chert items were all taken off site, either by prehistoric people, or indeed early twentieth-century excavators.

Table 11.3. *Counts of raw material type from Santa Verna.*

Lipari obsidian	Pantelleria obsidian	Grey chert	White chert	Red/pink chert	Yellow/orange chert	Brown chert	Black chert
54	18	30	399	4	13	7	6

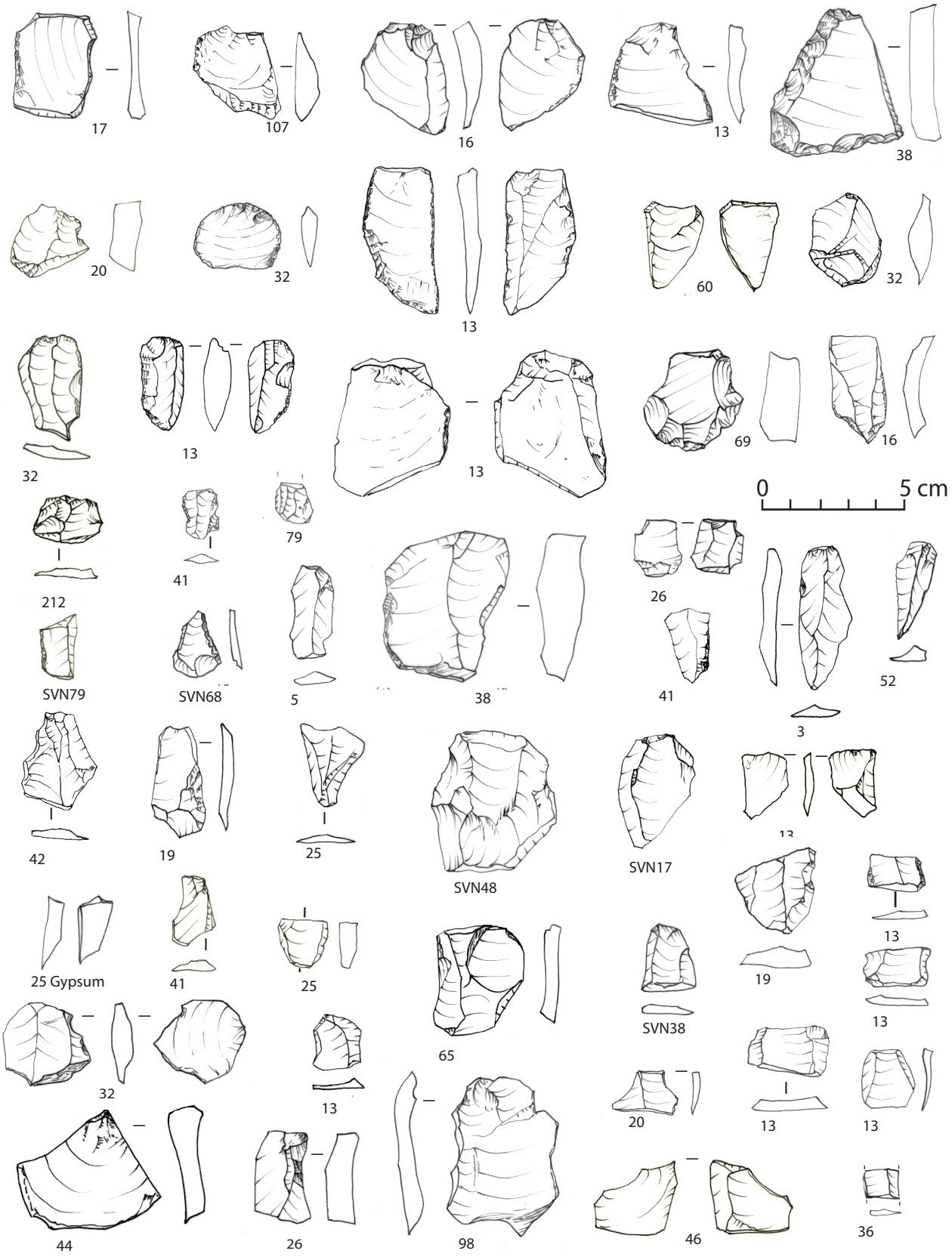


Figure 11.9. *Santa Verna chipped stone: chert.*

11.3.2. Obsidian – Santa Verna

The 71 pieces of obsidian comprised 54 that were grey-black, and likely to be from Lipari, and 17 that were green in colour and likely to be from Pantelleria (Fig. 11.10). Of this assemblage, one prismatic blade was identified (SF8), and one complete arrowhead (SF52); of the rest, 12 flakes and 57 chips were recorded.

11.3.3. Chert – Taċ-Ċawla

The site of Taċ-Ċawla, as reported in Chapter 3, was fairly disturbed before the 2014 excavation took place. Several parts of the excavation trench re-opened previous interventions where old sections, backfill and general disturbance was encountered. Regardless of this level of disturbance, a policy of collection and retention of all lithic material was maintained for the hand excavation, and a proportion of intact deposit was also dry-sieved with sample buckets of deposit and, in many instances, entire deposits sieved through a 1 cm mesh. Selected soil samples were wet-sieved to extract additional samples, enabling the retrieval of very small fragments. The position of each lithic was marked in almost all cases as a small find, with a three-dimensional location (Appendix A3.2). Bulk samples processed through flotation were not recorded with a precise location. The assemblage of lithic material retrieved from the site should be considered to be a fair representation of the typical material expected from a multi-phase domestic Neolithic site. Its excavation, therefore, is an important measure by which to compare with assemblages collected from the ceremonial and 'temple' sites.

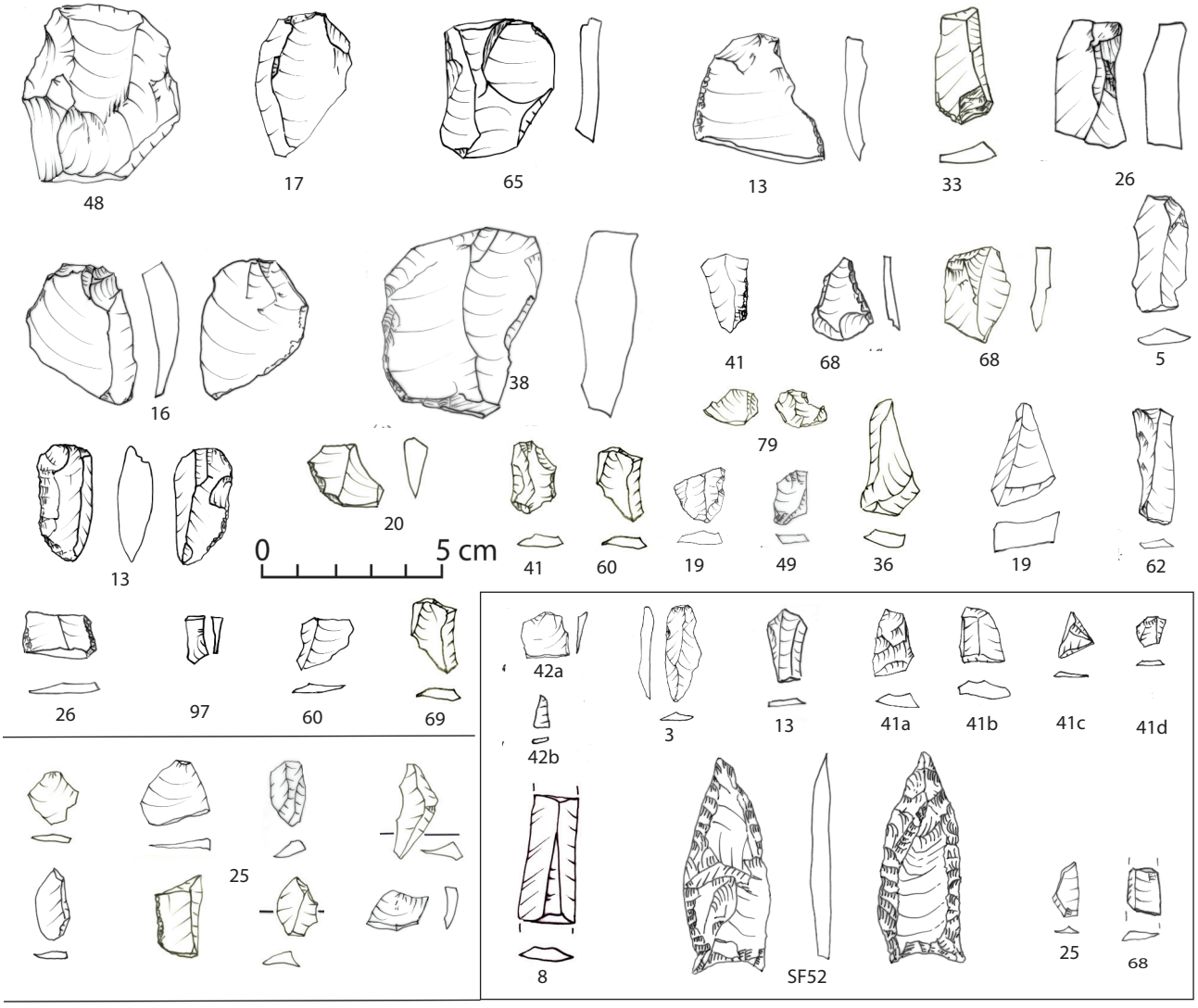


Figure 11.10. *Santa Verna chipped stone: chert and obsidian.*

Table 11.4. *Chert and obsidian tool categories from Taċ-Ċawla.*

	Obsidian	Chert
Core	2	11
Prismatic flake	7	50
Chip	77	100
Flake	33	362
Scraper		9
Retouched blades/flakes	4	22
Point	1	5
Notched blade		4
Knife		7
Totals	**124**	**570**

Table 11.5. *Taċ-Ċawla chert colours and flake/tool ratios.*

Colour	Retouch	Flake	Totals
Grey	24	88	112
Black	1	17	18
Brown	9	52	61
White-Cream	15	59	74
Yellow-Ochre	3	29	32
Orange	1	11	12
Red	1	5	6
Green		1	1
Pink		2	2
Totals	**54**	**264**	

A total of 694 individual lithic items were recorded, varying from small waste chips to larger core waste, flakes, and a selection of small tools and broken retouched blades and flakes. These comprised 570 chert artefacts (82.1%) (Fig. 11.12) and 124 obsidian artefacts (17.8%) (Fig. 11.13 & Table 11.3). Scrapers were not common at Taċ-Ċawla, only nine were identified. This is low in comparison to the nearby Xagħra Brochtorff Circle (Malone *et al*. 2009, 242–50), where a great variety of types and sizes were found. Perhaps scrapers were considered prestige tools, destined for burial rather than rubbish deposal on a settlement. Nevertheless, the types range from small to medium thumb scrapers (SF160), horseshoe, side and end scrapers, usually with abrupt retouch or edge working, and sometimes presenting large crude scars, such as SF30, SF278, SF515, and SF176. Notched tools were also found, which were possibly the remnants of projectiles or perhaps wood or bone-working tools. Some are simply cortex flakes removed from nodules and shaped, such as SF480.

11.3.4. Obsidian and chert – Taċ-Ċawla

The finest artefacts were generally fashioned from obsidian, and some exquisite edged points and knives (Fig. 11.13, SF108, SF255, SF204) survive as testament to objects probably imported in their complete and final form.

The finest retouched and shaped chert items were made only of dense, glossy cherts, usually white-cream or grey and occasionally red and orange colour. These materials seem to be imports, most likely from Sicily, and as argued below (Part II), may also have arrived in Malta in a finished form, since no matching retouch or knapping waste was retrieved.

The patterns that emerge from the analysis of the Taċ-Ċawla lithic assemblage show that 17.8% of the total number of pieces retrieved was obsidian and 82.1% was chert. A simple assessment was made of the material, identifying objects as core-core flakes, flakes, chips, prismatic flakes, and those with retouch as retouched flakes and blades, scrapers, points, notched flakes, knives, and polished. Of the latter, three pieces appeared to have polished surfaces, suggesting they may have been part of a polished tool, although quite possibly they were parts of broken polished pebbles.

The break-down of the remaining assemblage is shown in Table 11.3 and the charts in Figs. 11.7 & 11.8. Chert flakes (362) together with chips (100) represent the majority of chert material, which together with the presence of small core pieces (11) implies that there was considerable knapping of chert material on the site. Prismatic flakes, often of finer material comprised 50 pieces; but the numbers of worked, shaped and retouched pieces was much fewer. Only nine scrapers were identified, five points, 22 retouched or edge utilized blades, five points, four notch flakes and seven knives with continuous fine retouch on one or more long edge. The obsidian material presented a rather different picture, with the majority of material represented by tiny chips (77), suggesting that tools were reworked or reshaped during their lives, whilst larger flakes were far fewer (33). The discovery of a complete prismatic core of Lipari obsidian within the occupation deposits of the site (Context (109), SF94) provides a clear indication that knapping evidently took place, even if this fine item appears to have been lost (surely not discarded) long before its full use had been realized. A single core reduction flake was identified, together with four retouched blades, seven prismatic flakes, and a single point. The pie and bar charts in Figures 11.7 & 11.8 express their relative frequency, whilst bar chart (Fig. 11.1f–g) shows the relative frequency of these categories between chert and obsidian. No axes or other heavy cutting tools were located on the site, although a number of crude stone weights and hammer-like objects were retrieved that perhaps functioned to pound and crush foods or raw materials. No intact polished stone artefact was identified, although two or three possible



Figure 11.11.
Ġgantija lithics.

fragments (SF531, SF592) for hard stone with polished edges suggest such tools were present.

The colour of the chert appears to be of significance in the type of tool/artefact production that is seen. A summary inspection of the assemblage indicates that grey, brown and white-cream-yellow cherts were favoured for the production of the retouched tools, whilst the flakes were found of all colours, including the evident reworking of exotic orange-red chert, and other colours. The source and diagnostic discussion of the material is presented below (Part II).

Analyses by various scholars over the years (Tykot 1996, 1997, 2011) have established that two sources of obsidian are present in Malta, the Aeolian and the Pantelleria sources. The types are usually readily distinctive, since Aeolian-Lipari is grey and translucent for the most part, while Pantelleria produced a green-brownish opaque material, generally in much smaller and more inferior pieces. From the outset of the Neolithic, the material from both sources seems to be present in Malta, but there may have been periods when one or the other type was more frequent. Certainly, the later material at the Xagħra Brochtorff Circle, associated with the early Bronze Age, was invariably from Pantelleria (Malone *et al*. 2009, 250–3). Trump located a large Pantellerian core at Skorba (1.7 kg) (Trump 1966, 28), together with a smaller Lipari one (0.4 kg), both were found in apparently Grey Skorba levels. Obsidian at Skorba from the 1961–63 work represented 385 recorded pieces, which broke down, over all periods as 86.8% from Lipari and 13.4% from Pantelleria. Although here, we note that weight alone is not necessarily the best indicator. Given the size of the Pantellerian core, the presence or absence of a single artefact could affect these proportions considerably. Vella (2008) reassessed the assemblage and identified the generally broken nature of most artefacts and their relative and average sizes, which provides a useful comparison to the *FRAGSUS* assemblages. In stark contrast, the Xagħra Brochtorff Circle assemblage was dominated (69.8%) by Pantellerian obsidian artefacts, albeit, mostly of very small size, and only 26.2% of Lipari, 4% of which were undiagnostic. Lipari was more frequently found in the larger, finer blades and worked objects associated with the main Neolithic burials, compared with tiny chips of the Pantellerian obsidian that were most frequent in the superficial deposits. The explanation for that trend is partly because much of the obsidian was from Bronze Age levels (Malone *et al*. 2009, 250, Table 10.4), rather than Neolithic ones, and there would appear to be a closer connectivity with Pantelleria in the early second millennium BC than with Lipari. The Bronze Age occupation (areas P-NT and R) had Pantellerian obsidian that account for 34.9% and 23.8% respectively of the total lithic assemblage, compared with ratios of about 8% elsewhere. None of the *FRAGSUS* sites (other than In-Nuffara) include areas of extensive Bronze Age occupation.



Figure 11.12. *Tac-Ċawla chipped stone: chert.*

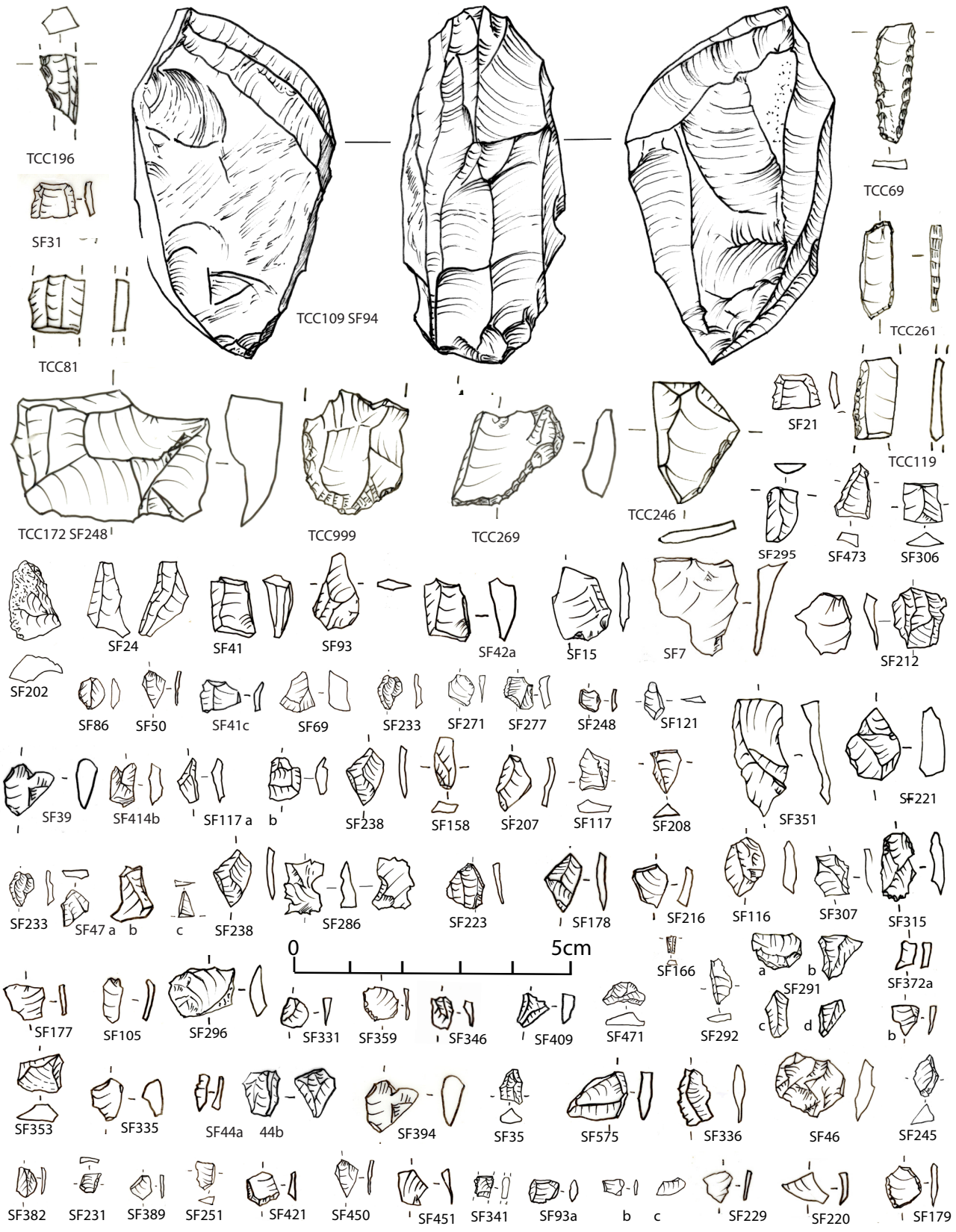


Figure 11.13. *Taċ-Ċawla chipped stone: obsidian.*

Measurement of the Taċ-Ċawla obsidian assemblage showed that the average size of the pieces was similar, 12.7 × 8.8 mm for Lipari, and 12.5 × 8 mm for Pantelleria. The undiagnostic pieces were considerably smaller, averaging 9.1 × 8 mm, and it was therefore harder to assess their colour and translucency. The assemblage will need more detailed scientifically based analysis in the future to establish the exact proportions of each source. The obsidian tools and flakes and many of the chips are illustrated in Figure 11.13.

11.3.5. Chert and obsidian – Ġgantija

Excavations at Ġgantija were on a much smaller scale than the previous two sites, and the retrieval methodology was different. This was because the work was directed towards environmental samples, and generally focused on disturbed upper levels that covered access to buried sediment. The ratio of materials is thus difficult to ascertain with accuracy. Nine pieces of obsidian were retrieved. Fourteen chert flakes from the southwest facade sondage (008), and 57 chert flakes from the 2015 WC excavation area were also retrieved. That area, however, had been greatly disturbed in previous times, with the construction of the WC block, new foundation works, mechanical activity and wall construction. Therefore, attempting any detailed analysis was not considered useful. An example of Ġgantija chert is shown in Figure 11.14b.

11.3.6. Chert and obsidian – Skorba

The work at Skorba in 2016 was small scale, and although every effort was made to extract lithic material, only a small assemblage was collected amounting to 132 pieces. Of these, four items were obsidian, comprising two prismatic blades and two chips.

The chert material was generally crude waste flakes and chips, and the most diagnostic pieces are illustrated in Figure 11.14a (see Table 11.4 a & b). One particularly interesting piece is a probable broken arrowhead, SF3, formed from a finely knapped flake. Two scrapers, SF12 and SF18, were formed on thick flakes with steep edge work. Core flakes (SF5, SF7, SF10) indicate there was local knapping at Skorba. Much more detailed assessment has been made of the old collections from the 1960s excavations (Vella 2008, 2008b) where sufficient quantities of material have been employed (see Table 11.4 a & b).

11.3.7. Chert and obsidian – Kordin III

The 2015 excavation at Kordin III focused on a number of separate trenches, which variously explored previously examined areas and untouched areas, including one outside the walled enclosure. In total, 153 chert items were retrieved and 18 obsidian pieces. Of the chert, a number of finely retouched blades, scrapers, knives and a range of prismatic blades indicated high-quality knapping.

A representative range of the lithic material is illustrated in Figure 11.15 and quantified in Table 11.4c & d and Fig.11.8.

Fine retouched knives and horseshoe, side and end scrapers (SF136, SF124, SF27, SF78, SF151, SF67, SF80, SF127, SF93) are good examples of the finer types of Maltese lithic production that used fine grain grey

Table 11.8. *Kordin III obsidian sources.*

Lipari obsidian	Pantelleria obsidian
18	5

Table 11.6. *Lithics from Skorba.*

Skorba lithics	
Obsidian	4
Core	
Prismatic flake	3
Chip	39
Flake	47
Scraper	1
Retouched	4
Arrowhead	1
Total	**99**

Table 11.9. *Chert artefact types from Kordin.*

Chert lithics	
Core	1
Prismatic flake	11
Chip	42
Flake	117
Scraper	7
Point	1
Retouch	8
Knife	1
Total	**188**

Table 11.7. *Chert colours from Skorba.*

Grey chert	White chert	Red/pink chert	Yellow/orange chert	Brown chert	Black chert
35	31	1		2	

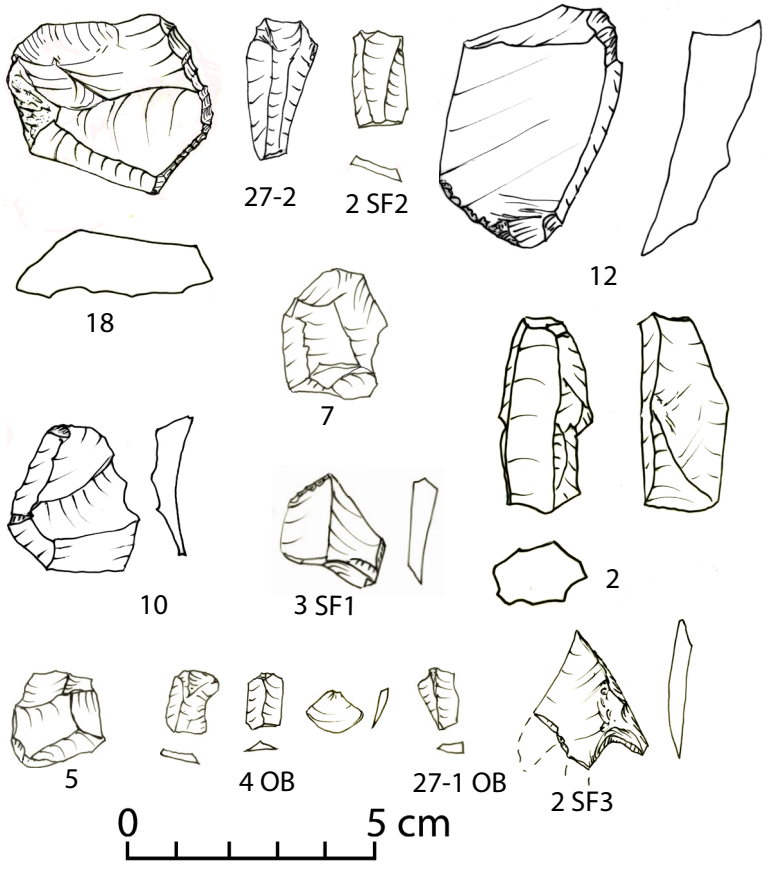


Figure 11.14.
Skorba chipped stone.

chert. SF148 was worked in fine grey chert and had retouched notches around the distal end of the flake, suggesting a broken arrowhead. Typical thick flakes (SF137, SF91, SF1) have steeply retouched edges, suitable for scrapers. The bulk of the assemblage is comprised of waste flakes and chips.

11.4. Discussion

The lithic assemblage from the *FRAGSUS* work has enabled a rudimentary analysis of the lithic industry during the Neolithic. What emerges is a rather consistent pattern, with the proportion of obsidian typically 10–15% of the total number of items recovered. In bulk of course, the obsidian represents a tiny proportion when compared with the heavy local chert. The range of tool types and the relationship between coloured exotic chert and retouched flakes/blades has become a little clearer. Of particular interest is the presence of arrowhead/projectiles. The fine example in obsidian with it hollow base is a type unknown in Malta until now, and almost certainly was manufactured elsewhere. More typical and still rare are the two or three possible arrowhead forms from Kordin, Skorba and Taċ-Ċawla, which add to a very small number previously recorded on Malta. Projectiles were probably restricted to the Neolithic subsistence strategies, since to date, no examples of projectiles embedded in human remains have been identified, suggesting that interpersonal warfare was not common. Instead, projectiles may have been used to bring down the shearwater gulls or other birds (Chapter 9). The considerable number of sling stones (Fig. 11.4) from Kordin especially, has been quite frequently recorded from Neolithic sites indicating that hunting, presumably for airborne prey, was undertaken routinely. Kordin, set above the Grand Harbour inlets would have been a particularly rich area for waterfowl as a supplement to a simple plant-based diet.

The quern stones and grindstone from the Neolithic contexts mostly suggest the use of local stone whilst the Bronze Age examples include some imported lava/basalt (although one example of lava was found at Taċ-Ċawla in late Temple Period deposits). Such observations demonstrate how the insular world of Malta expanded and responded to the importation of bulk materials by the second millennium BC with the age of more reliable sea-craft. Intra-island movement of commodities in earlier millennia, however, seems largely constrained to valuable materials, when every kilo of weight mattered.

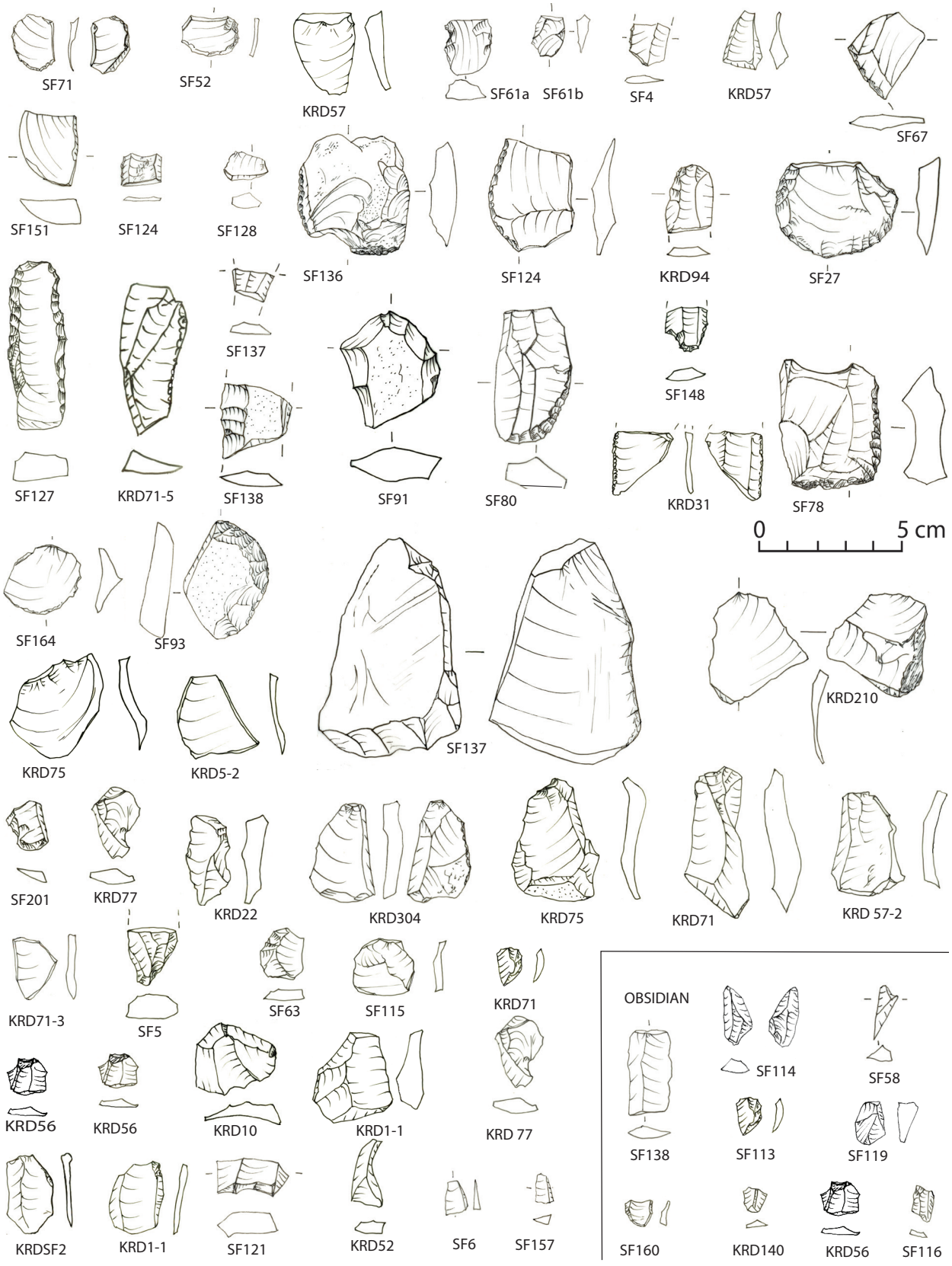


Figure 11.15. *Kordin III chipped stone.*

PART II – THE LITHIC SOURCES

(Petros Chatzimpaloglou)

11.5. Assessing the lithic assemblages and sourcing chert artefacts

During prehistoric times, stone resources played a significant role for Mediterranean communities, primarily for making chipped stone tools (Skarpelis *et al.* 2017). The origin of the raw materials (Brandl 2010; Bressy *et al.* 2008; Williams-Thorpe 1995) and the technologies employed on the tools (Larson 1994; Odell 2000; Pelegrin 1990) have been investigated in order to understand the identities of prehistoric people and the social organization of their societies. Furthermore, they have contributed to identifying trade/exchange networks and possible interactions between societies (Moutsiou & Kassianidou 2019; Skarpelis *et al.* 2017; Tykot 1996, 1997a, b). Therefore, provenancing the lithic assemblages from Late Neolithic sites on Malta is a new potential avenue of research that may be able to address questions of intra-and inter-island connectivity routes.

Although sourcing studies on some raw materials (e.g. obsidian) are well-established in the Mediterranean region (Cann & Renfrew 1964; Robb & Farr 2005; Tykot 1996; Williams-Thorpe 1995), little is known about the ubiquitous chert sources and their characteristics. The main reason is that chert rocks are considered significantly more difficult to characterize than obsidian (Skarpelis *et al.* 2017). Moreover, their greater geochemical and petrographic heterogeneity makes it much more difficult to discriminate clearly between products of different sources (Högberg & Olausson 2007; Luedtke 1992). A geoarchaeological approach is thus necessary to distinguish between the different geological sources, before attempting to connect them with the chert components of lithic assemblages at archaeological sites.

Archaeological research, especially that of the recent *FRAGSUS Project*, has investigated several late-Neolithic sites in Malta from which important lithic assemblages have been collected. This section focuses on the assemblages found in association with the following archaeological sites (Fig. 11.16a & b): a) Ġgantija, a temple site; b) the Xagħra Brochtorff Circle, a funerary site; c) Taċ-Ċawla, a settlement site; d) Kordin III, a temple site; e) Skorba, a settlement and temple; and f) Santa Verna, a settlement and temple. It assesses the quality and variety of lithics and presents a geoarchaeological provenance study of the chert artefacts. This research successfully pin-points Maltese and Sicilian chert sources from which these artefacts originated. Moreover, it is capable of distinguishing which of these artefacts are not related to these sources, and suggests that other locations must be investigated.

11.6. Lithic provenance

The provenance of stone finds (or lithics) and the sourcing of raw materials is part of lithic analysis and investigates stone artefacts using basic scientific techniques (Ballin 2000; Luedtke 1992; Malyk-Selivanova *et al.* 1998; Morgenstein 2006). Identifying the stone sources has proven to be useful in archaeological research, as it contributes to the understanding of human behaviour in the past, and highlights the relationships between people and their environment by providing evidence of movement systems of peoples and objects. Such movement includes patterns of mobility (e.g. migration routes), social boundaries, exchange systems, and trade routes. Lithic analysis may confirm locations of stone resources, the scale of exploitation and the extent of distribution and acquisition of the products which in turn might reflect social stratification, or the social and technical organization of ancient crafts and industries (Sellet 1993). Lithic provenance investigations employ standard geological research methods (e.g. petrological and geochemical analysis) including petrographic thin section analysis, X-ray fluorescence (XRF) and elementary analysis (Kemkin & Kemkina 2015; Kempe 1983; Luedtke 1992; Owen *et al.* 1999; Roll *et al.* 2005).

The first scholarly publication in Malta referring to lithic tools was written by Murray in 1923 who published a brief article on selected lithic tools recovered at the Borġ in-Nadur excavations and on Għar Dalam (Murray & Caton Thompson 1923). Although this work was written in such an early period, the author did an excellent job at annotating the location from which lithic tools were recovered (Vella 2009). Unfortunately, no further studies were carried out on the lithic finds during the following decades and there were only rarely reports of chert knives and blades. The situation changed in the 1950s, when Evans and Trump employed a more systematic and quantitative approach to the study of Maltese prehistoric material culture. Principally, however, they focused on ceramic and architectural typologies (Evans 1971; Trump 2002) and lithic finds remained largely ignored.

The first systematic investigation was conducted on lithics from the excavation of the Xagħra Brochtorff Circle between 1987 and 1994. The publication of this excavation (Malone *et al.* 2009) included a chapter dedicated to the material culture of the site; this was the first time that lithics were presented in detail and thoroughly investigated. John Dixon and Robert Leighton studied hardstone axes made out of non-calcareous stone (Malone *et al.* 2009, 242) and Tykot assessed the obsidian, whilst the chert assemblage was fully recorded and attempts were made to identify the sources of

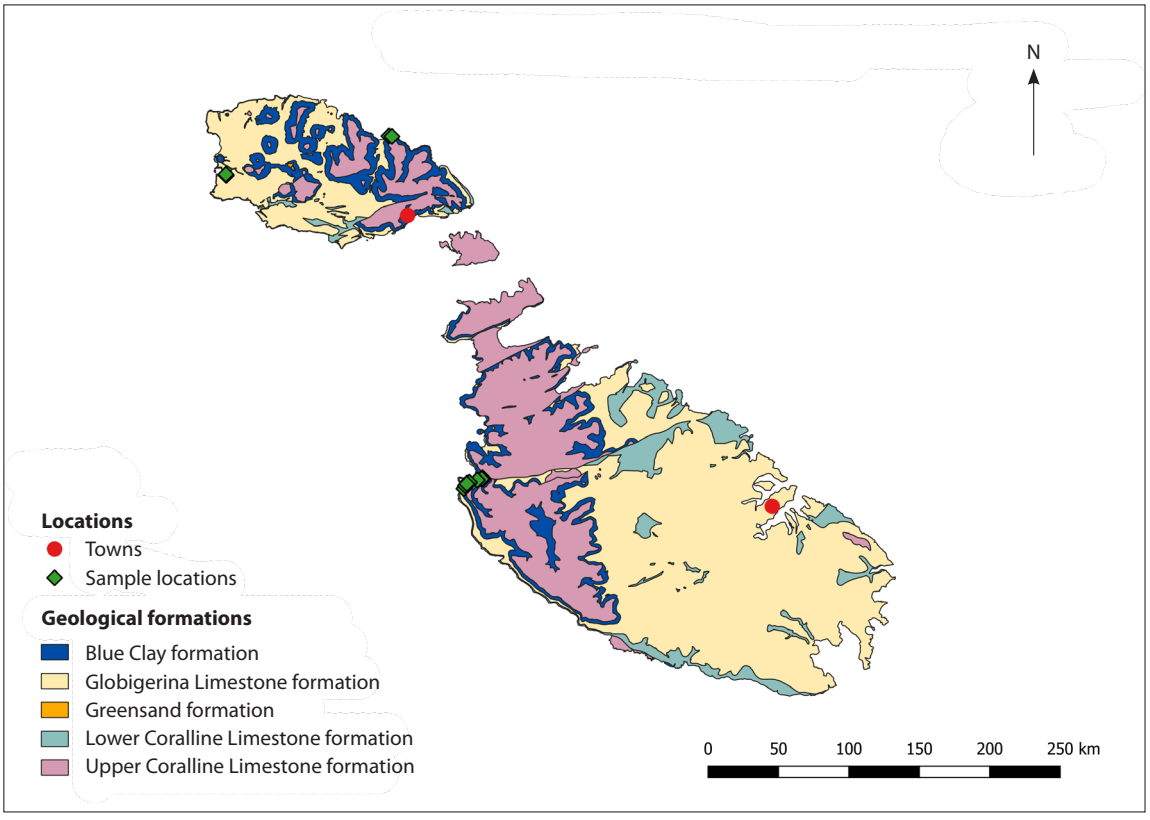


Figure 11.16. *Geological map of the Maltese Islands including sample locations.*

chert materials found in association with the Maltese Neolithic monuments. Cazzella & Moscoloni (2005) published a review of the prehistoric artefacts recovered by the Italian Archaeological Mission from Tas-Silġ in the 1960s. The main conclusion was that these belonged to the Bronze Age phase of Borġ in-Nadur. Clive Vella's work (2008–2012) is noteworthy since it focused on the chert materials from Neolithic sites across the Maltese Islands, and provided an investigation of the possible sources. Vella's investigation strategy was based on distinctive macroscopic characteristics (i.e. colour, texture and translucency), and it managed to distinguish between local and foreign material to his satisfaction (Vella 2009). The current study advances Vella's method of sourcing stone artefacts by employing modern scientific/geological approaches that have completely changed the procedure of analysis. The geological methodology examines and records a full spectrum of petrological characteristics, such as the mineralogical content and geochemical signature, which have provided more interesting and reliable results.

The principal problem of previous research was the lack of geological knowledge of the chert outcrops in the Maltese Islands. There had not yet been any investigation of the locations of potential chert formations, their extent or characteristics. This has been noted by Vella (2009), and a literature search confirms this lack of geological research including field investigation or sampling of reported chert sources. The current study, focusing on the re-evaluation of the origin of chert artefacts, production and use in the Neolithic monuments of the Maltese Islands was thus entirely justified.

11.6.1. Geological background and chert rocks

11.6.1.1. Geology of Malta

The Geological and geomorphological descriptions of Malta are detailed in Volume 1, but here it is useful to review the particular geological features that impact on archaeological lithics. The Maltese Islands are composed almost entirely of shallow marine sedimentary formations, mainly of the Oligo-Miocene age (*c.* 30–5 Ma BP). Previous research has reported five main rock formations, which are presented in a simple succession (Oil Exploration Directorate 1993; Pedley *et al.* 1976, 2002) (Fig. 11.16). Starting from the base and moving upwards, the succession is: a) Lower Coralline Limestone; b) Globigerina Limestone; c) Blue Clay; d) Greensand; and e) Upper Coralline Limestone.

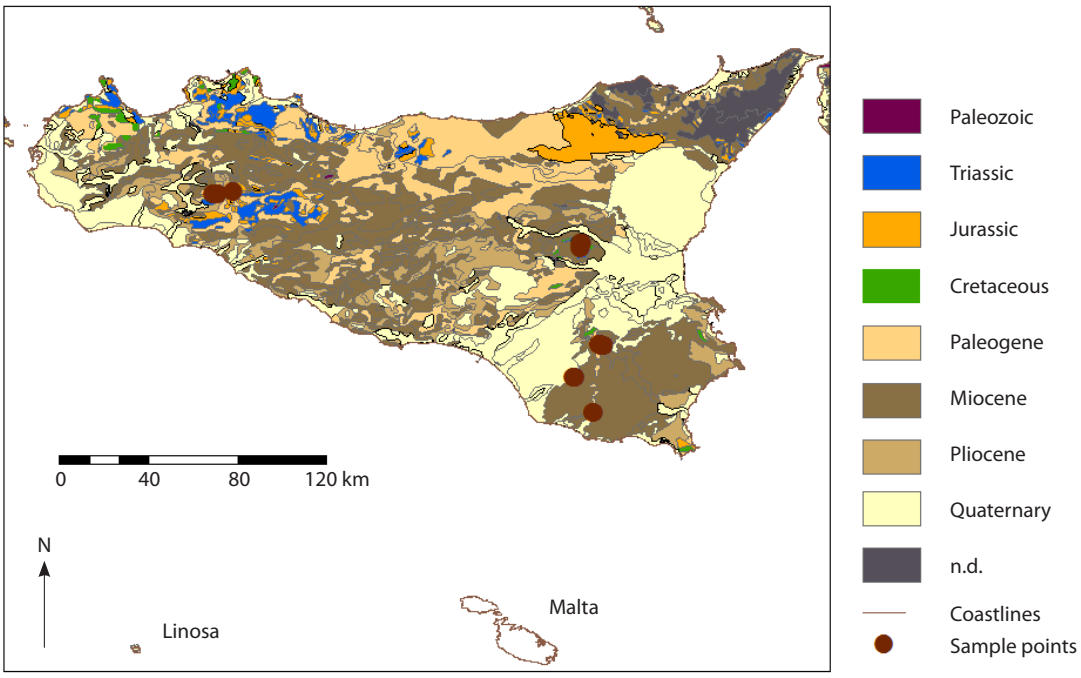


Figure 11.17. *Map of Sicily with the rock formations divided by age and sample locations marked.*

The existence of chert outcrops has been long reported (Cooke 1893), but little is known about their characteristics and the conditions under which they formed. Chert outcrops are found within the middle Globigerina Limestone formation (Pedley *et al.* 2002), whilst recent fieldwork (Chatzimpaloglou 2019) suggests that chert outcrops are present only on the western parts of Malta and Gozo (Fig. 11.16).

11.6.1.2. Geology of Sicily

Sicily is the largest island in the centre of the Mediterranean (Fig. 11.17) and presents three main groups of geological formation: a) the formations of the African continental margin (Hyblaean Plateau), b) the formations of the 'European group', and c) the formations related with volcanic activity (Catalano 2004). Chert formations are reported in all the main geological rock-groups of the island (e.g. Carbone *et al.* 1990; Lentini 1984). Recent fieldwork survey (Chatzimpaloglou 2019; 2020) used the baseline provided from the literature (Catalano *et al.* 1982, 1989; Lentini 1984; Lentini *et al.* 1995), and focused on regions with the most important and representative chert outcrops of the island (Fig. 11.20). These are: a) Ragusa province in southeast Sicily; b) Enna province in northeast Sicily; and c) Palermo province. Additionally, it has investigated all of the areas around Monte Tabuto (province of Ragusa) suggested by Vella (2008a, 2008b) as possible locations from where exotic material was imported to Malta.

11.6.1.3. Chert as raw material

Cherts are fine-grained, dense and very hard sedimentary rocks, which are composed predominantly of silicon dioxide (SiO_2) minerals (>90%). They break with a conchoidal fracture, often producing very sharp edges and variations in colour. Cherts are common but not abundant rocks in the geological record ranging in age from the Precambrian to the Quaternary (Boggs 2009; Tucker 2001). The origin of silicon dioxide (SiO_2) is considered to be either entirely biogenic or a product of hydrothermal activity (Maliva *et al.* 2005; Shen *et al.* 2018). Although they are typically composed predominantly of silica (Si), they can include other major elements such as aluminium (Al), iron (Fe), manganese (Mn), calcium (Ca), and titanium (Ti) (Luedtke 1992). In addition, cherts also contain minor traces of other elements (e.g. strontium (Sr) and thorium (Th)) and rare-earth elements (REE). Mineralogically, they mainly consist of quartz, but other polymorphs of silica have been reported (e.g. Opal-A). Lastly, chert outcrops are commonly found intercalating host formations such as limestone, and they appear in bedded or nodular form.

11.6.1.4. Chert vs flint debate

The literature on Maltese prehistory (Malone *et al.* 2009; Vella 2008a, 2008b) has used a variety of terms – chert and flint – to describe relevant archaeological lithics recovered from the sites. Archaeologists typically call

very fine grained, homogeneous siliceous materials with a shiny lustre 'flint', and everything else 'chert'. Geological research, however, has allocated specific petrological characteristics to each of these terms (Boggs 2009; Tucker 2001) and a proper geological investigation is necessary before selecting the appropriate one.

'Chert' is a general geological term used to define all concretions, nodules and tabular layers of amorphous siliceous precipitate dominantly composed of silicon dioxide (SiO_2). Additionally, it is not age specific and can occur throughout the stratigraphic column. In contrast, 'flint' is an informal geological term, and its use must be restricted to a specific variety of amorphous SiO_2 originating within the Northwest European Cretaceous Chalk Formation.

Although there have been important attempts to bridge the gap between disciplines (Brandl *et al.* 2018; Högberg & Olausson 2007; Luedtke 1992) these terms are still used outside of their original context creating confusion. A petrologically focused paper is thus more appropriate to resolve the exact type of material found in Malta and Sicily. Until then, 'flint' (frequently misused in an archaeological context) is not an appropriate term for use in this study. This chapter will use the term 'chert' throughout, which with respect to geology, encompasses all the similar types of this rock formation.

11.7. Materials and methods

The investigation of the lithic assemblages has two parts: a) qualitative assessment of the different raw materials found within them, and b) a provenance study focused on the chert artefacts. The assessment is based on a macroscopic evaluation, while chert sourcing uses a robust interdisciplinary methodology. The latter consists of non-destructive, scientific and geologically grounded techniques, which investigate the macroscopic, mineralogical and geochemical profiles of the raw material. This suite of techniques provides reliable results that are capable of pin-pointing the actual source of the chert artefacts, with all the implications that this can have. Here, we summarize the main steps of this methodological approach, but full details can be found in Chatzimpaloglou (2019, 2020).

11.7.1. Field research

The investigation on the Maltese Islands in 2016 and 2017 undertook indoor macroscopic examination of the assemblages and fieldwork to investigate for chert outcrops and collect samples. The examination of the Neolithic chert assemblages was conducted in the Museum of Archaeology in Valletta and the University of Malta. One hundred and fifty representative samples were selected for further laboratory investigation. The fieldwork investigation, assisted by Martyn Pedley, followed the baseline provided from the Geological Map of Malta (Pedley 1993). Throughout the two field campaigns, 33 samples were collected for studying the mineralogy and geochemistry of the rocks (Appendix Table A11.6.1; Fig. 11.16).

Meanwhile, the fieldwork on Sicily was conducted in September 2016 and was a collaboration of University of Cambridge, Martyn Pedley and the Universities of Catania and Palermo. The investigation focused on the different types of chert formations and the examination of the most important chert formations. During this fieldwork, the macroscopic characteristics of the chert outcrops were recorded, and 29 representative samples were collected (Appendix Table A11.6.2; Fig. 11.17) for laboratory analysis. This was followed by a suite of laboratory methods in order to draw conclusions about the chert formations and chert assemblages from Malta and Sicily. The coding system of the samples is associated with the location/excavation site and further explanation of their coding is found in Appendix Table A11.6.3.

11.7.2. Laboratory research

The laboratory work started with the preparation of 50 rock slices for macroscopic evaluation of the rock samples on a fresh surface and re-evaluation of the macroscopic characteristics of the archaeological samples. The slices were prepared in the Charles McBurney Laboratory for Geoarchaeology (Department of Archaeology, University of Cambridge). Fourier Transform Infrared – Attenuated Total Reflection (FTIR-ATR) analyses were conducted in the same laboratory to investigate the mineralogical content of the rocks and artefacts. Representative FTIR and ATR spectra were obtained from all rock samples (n=40). The artefact samples (n=100) were only analysed with the ATR equipment to minimize the impact of this method. The ATR spectra were obtained under the same conditions as the rock samples (Chatzimpaloglou 2019).

Elemental analyses were performed using Laser Ablation-Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) to determine the composition of the major, trace and rare earth elements (Neff 2012; Speer 2014). The equipment was based in the Department of Earth Sciences at the University of Cambridge. Through this method, 42 rock samples from Malta and Sicily and 129 archaeological samples from all the assemblages were examined. The overall process of the results and the subsequent geochemical models were conducted with the use of the software GCDkit (ver. 3).

11.7.3. Chert sources of Malta and Sicily

11.7.3.1. Macroscopic examination

The chert outcrops of the Maltese Islands were in bedded and nodular forms and varied in size and shape. They are fine-grained, dull, opaque, mainly homogeneous and have a distinctive spotted feature (Appendix Table A11.6.4). The chert outcrops of Gozo (Fig. 11.18) were mainly of greyish colours (e.g. Munsell 5Y 6/1), while the outcrops of Malta (Fig. 11.19) have olive-brown colours (e.g. Munsell 5Y 4/4). The only distinctive exception is one outcrop found in Gozo, which is shiny, translucent (Fig. 11.18d; sample G2S6) and white (N9). No other chert outcrop was found to present similar characteristics (i.e. white and translucent) as these nodular cherts.

The chert outcrops of Sicily presented great diversity in their macroscopic characteristics (Appendix Table A11.6.5), but generally, they had better features in comparison with the Maltese cherts. They were fine-grained, semi-translucent, in both bedded and nodular forms; while their size, shape and colour varied significantly. (Fig. 11.20). The black and translucent cherts (Fig. 11.21) were more common and found in all the areas that were investigated. Some chert outcrops (sample S4) in east Sicily (province of Enna) have similarities with outcrops in west Sicily (sample S22p), occurring in small nodules, fragmented, with purple colour shade and inside a limestone of a similar age (Triassic).

The only exceptions were chert outcrops of west Sicily with an orange colour (sample S22r), which is a feature not reported amongst those of east Sicily. Contrastingly, the Radiolarian outcrop (Fig. 11.22; samples S6–S8) was found to be a unique formation of east Sicily with no equivalence elsewhere in Sicily and Malta. The reddish colour, the extensive outcrop and old age (Triassic) are the main characteristics that separate these cherts from the other sources.

11.7.3.2. Mineralogical examination: Malta

The chert samples of Malta present spectra with peaks that relate predominantly to silicate and carbonate minerals. The main peak in most of the spectra (n=13, 92%) falls within 1098 and 1100 cm^{-1}, which relates to the opal-A mineral (Fig. 11.23a). An additional smaller

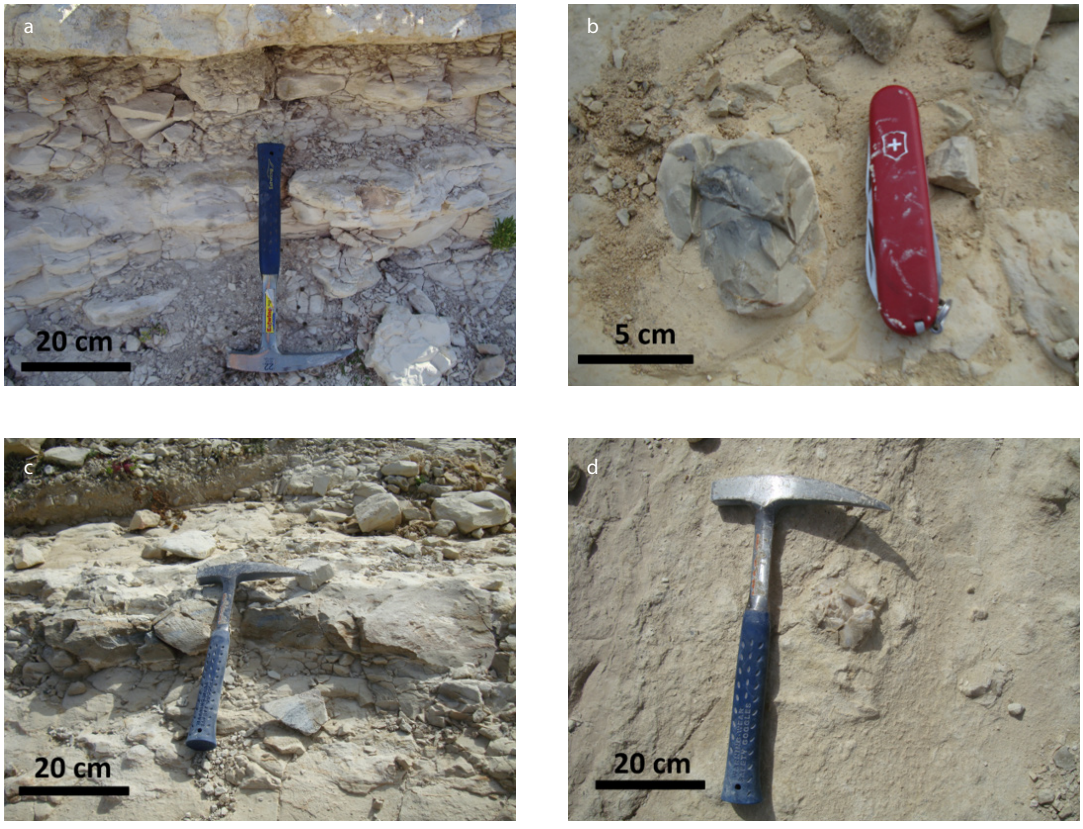


Figure 11.18. *Chert outcrops on Gozo (a to d): (a) bedded chert outcrops intercalated in middle Globigerina Limestone; (b) nodular chert; (c) bedded chert and (d) nodular chert (G2S6). The hammer is 33 cm in length.*

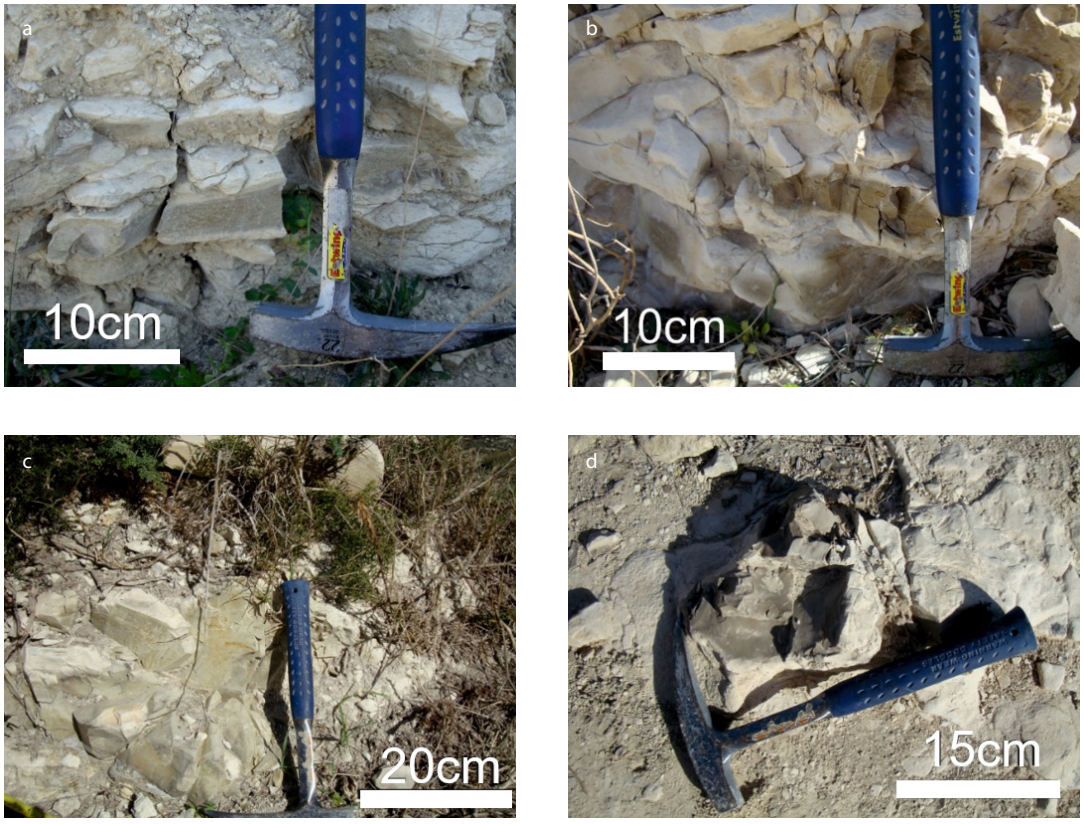


Figure 11.19. *Chert outcrops on Malta (a to d): (a) bedded chert outcrops intercalated in bedded middle Globigerina Limestone; (b) nodular chert with irregular shapes, (c) great exposure of chert outcrops and (d) nodular chert. The hammer is 33 cm in length.*

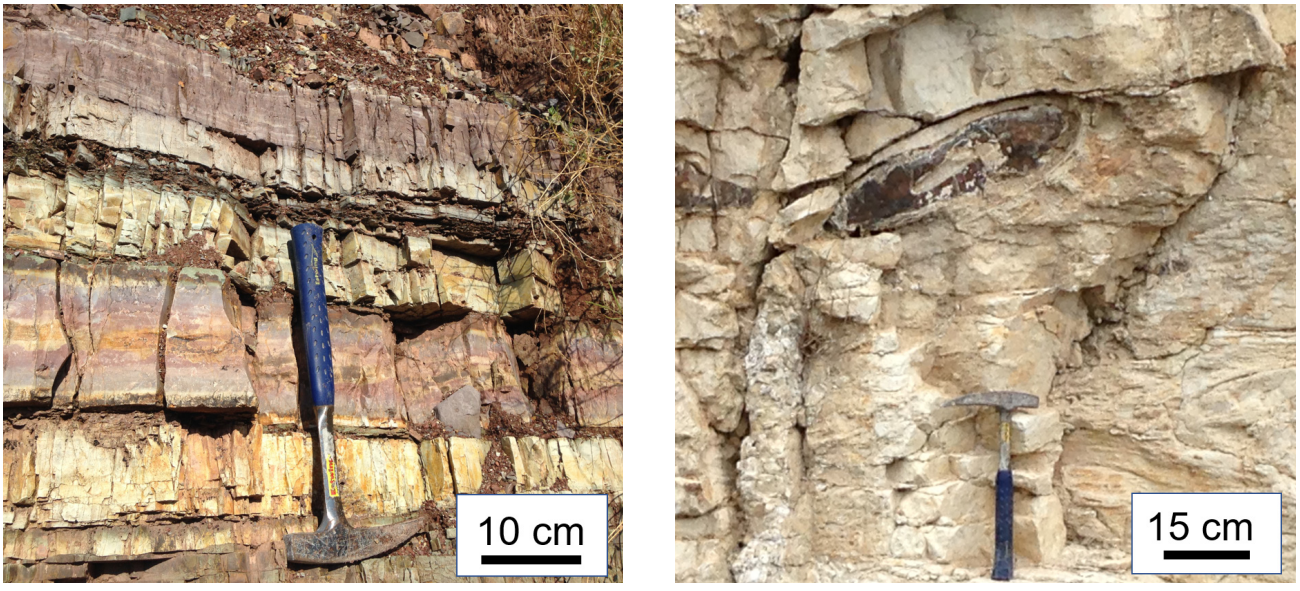


Figure 11.20. *Examples of the different form, size and shape of the Sicilian chert rocks (a and b): (a) bedded Radiolarian (reddish) outcrop along the riverbeds of Valona River (Enna province) and b) huge lens of brownish chert within limestone formation from Ragusa province (southeast Sicily). The hammer is 33 cm in length.*

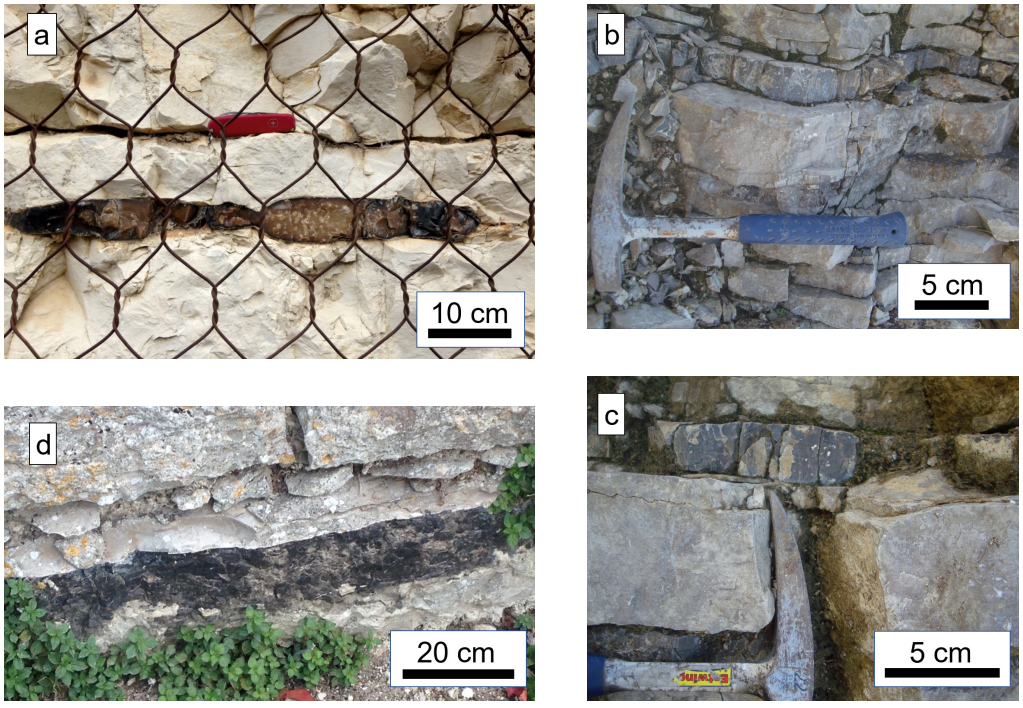


Figure 11.21. *Examples of black and translucent cherts recorded in Sicily (a to d): (a) black to brownish chert lenses outcrops, within limestone formation from Ragusa province (Southeast Sicily); (b) and (c) black bedded chert outcrops at the Monte Santo (Enna province) and (d) black bedded chert outcrop close to Santa Maria del Bosco (monastery) in Palermo province. The hammer is 33 cm in length.*

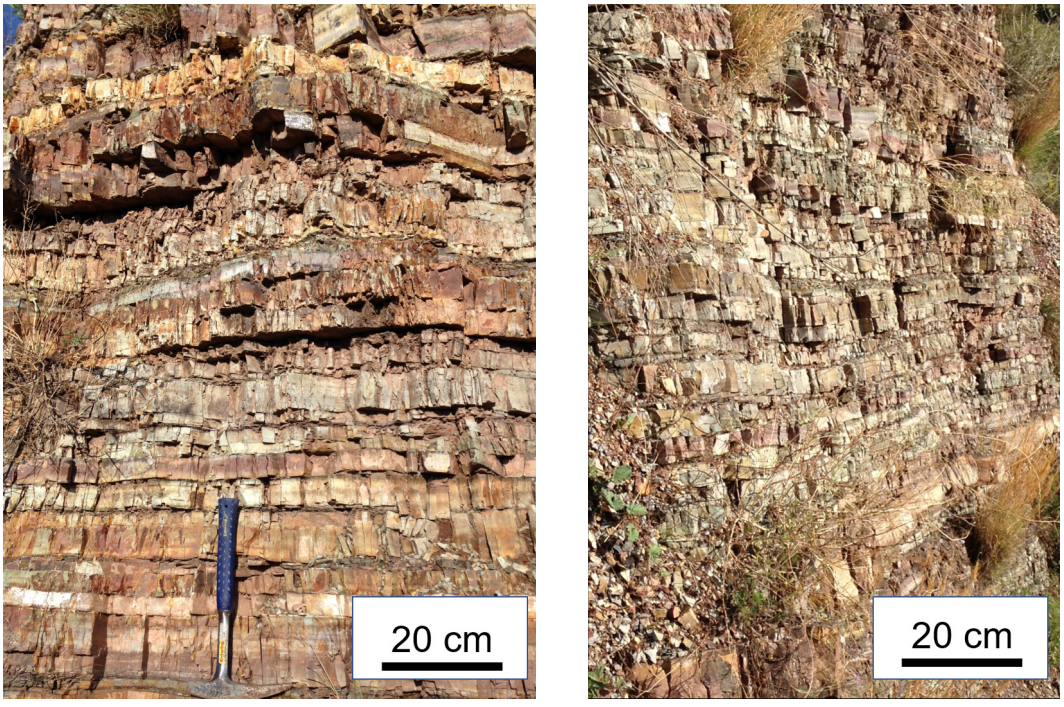


Figure 11.22. *Different angles of the sequence of Radiolarian beds on the riverbed of the Valona River in Enna province. The hammer is 33 cm in length.*

peak (about 472 cm^{-1}) within absorbance bands is also associated with this type of mineral. These findings suggest that opal-A is the predominant mineral of these chert outcrops. The secondary peaks (e.g. 1632, 789 cm^{-1}) that are recorded in the spectra signify the presence of tridymite minerals in most of the samples. There is one exception (F1S2) in which tridymite is the most common mineral (Fig. 11.23b), while no sample has quartz as the dominant mineral.

The second highest peak (1437 cm^{-1}) of the FTIR spectra, signifies the presences of calcite in all the samples (Fig. 11.23). Moreover, minor peaks (e.g. 1793, 879 cm^{-1}) are in absorbent bands, which are also related to calcite and suggest that this mineral is the second most abundant mineral after opal-A. Dolomite is the second carbonate mineral reported in the chert outcrops of Malta (Fig. 11.23b) and is identified by a minor peak (728 cm^{-1}). This mineral is found only in samples from the centre of Fomm ir-Riħ Bay (e.g. F1S2, M1S5) or close to the archaeological site (i.e. M1S9). Lastly, the FTIR examination records some minor peaks (e.g. 2854, 2003,1869 cm^{-1}), which have not been connected with specific minerals.

11.7.3.3. Mineralogical examination: Gozo

The chert samples of Gozo also present spectra with peaks related to silicate and carbonate minerals. The main peak (e.g. 1098 cm^{-1}) is found within the absorbance bands of the opal-A mineral (Fig. 11.24). This in addition to the two smaller peaks (e.g. 1637, 472 cm^{-1}) confirms the dominance of opal-A minerals in these chert samples (n=6; 100%). Tridymite is also present but only with one characteristic secondary peak (about 789 cm^{-1}). Additionally, the FTIR spectrum of only one

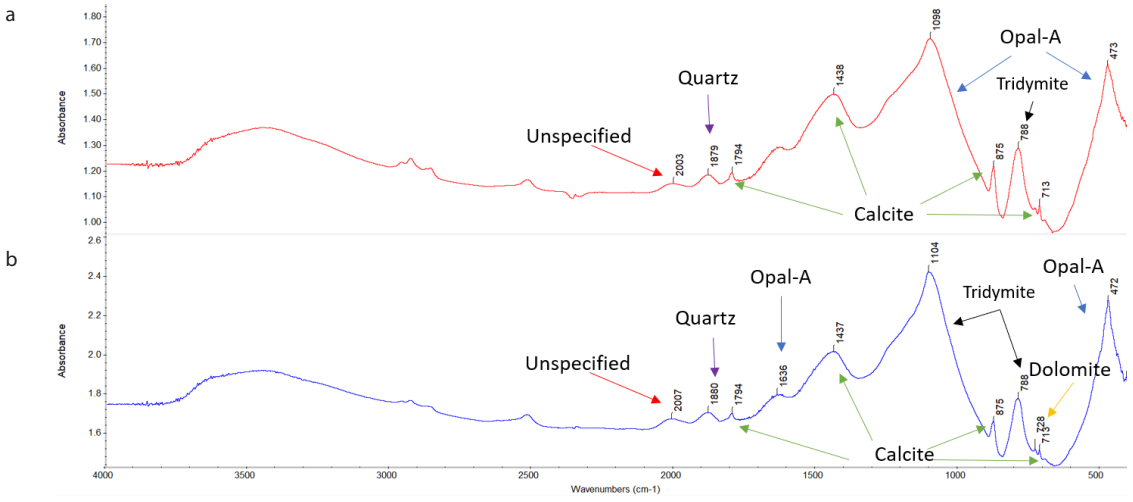


Figure 11.23. *Representative FTIR spectra of the chert samples from Malta: a) Sample M1S7; b) Sample F1S2.*

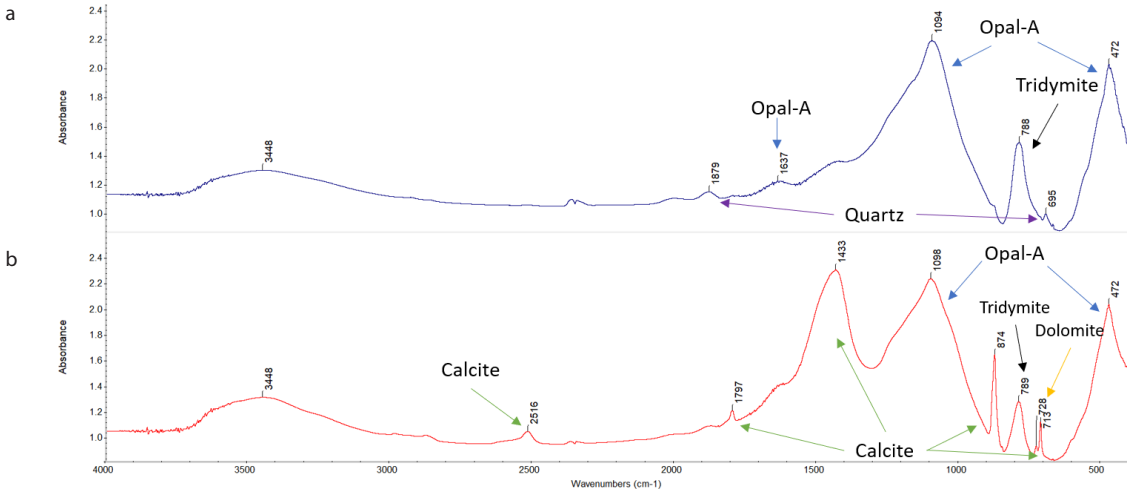


Figure 11.24. *Representative FTIR spectra of the chert samples from Gozo: a) Sample G2S6; b) Sample G2S5.*

sample (i.e. G2S6) presents peaks (i.e. 1879, 695 cm^{-1}) characteristic of quartz minerals (Fig. 11.24a).

The second higher peak of almost all the spectra falls within the absorbance bands of 1030 and 1040 cm^{-1}. This, and the two minor peaks (i.e. 874, 713 cm^{-1}) signify the presence of calcite minerals. Dolomite minerals are reported only in the chert samples collected from the lower part of the Globigerina Limestone formation. The spectra of these samples show a secondary peak (728 cm^{-1}), which is within the expected absorbance bands for dolomite (Fig. 11.24b). The only exception is one chert sample (G2S6), which does not present any peak related to carbonate minerals (Fig. 11.24a). Finally, another sample (F1S4) presents some minor peaks (e.g. 2927 and 2002 cm^{-1}) that could not be connected with specific minerals.

11.7.3.4. Mineralogical examination: Sicily

In contrast to Malta, the Sicilian samples (Fig. 11.25) are dominated by quartz (n=16, 95%), while calcite is reported in many samples in minor concentrations. The spectrum of chert samples from all the investigated areas of Sicily presents three main peaks (e.g. 1086, 797, 778 cm^{-1}), which are within the absorbance bands of quartz minerals (Fig. 11.25a). Most of the Sicilian samples also present other peaks (e.g. 1166, 694 and 457 cm^{-1}) within absorbance bands of quartz, which support the dominance of this mineral (Fig. 11.25). There are, however, some samples from east Sicily (i.e Monterosso Almo and Enna Province) that are dominated by other silicate minerals. One sample (S15) has the main peak value (1090 cm^{-1}) similar to the values of cristobalite, while the chert sample (S4) of the Triassic limestones has a main peak (i.e. 1101 cm^{-1}) related to opal-A.

Many spectra of the Sicilian samples have exhibited minor peaks (e.g. 1870, 555 and 502 cm^{-1}) that are associated with chert and jasper rocks. This is suggested from the reference library (Kimmel standards) used to interpret the spectra and although these peaks are not directly related to minerals, they are considered additional evidence of the dominance of silicate minerals in the Sicilian samples. The only exception lies in one sample (S2) from Monte Tabuto, which has a spectrum dominated by calcite. The main peaks (e.g. 1421 cm^{-1}) are within the expected absorbance bands of calcite minerals while it has only a small peak (1099 cm^{-1}), which is related to opal–A.

Calcite minerals are mainly represented in the samples with secondary or minor peaks (Fig. 11.25). Most of these peaks fall between 1420 and 1431 cm^{-1} but other minor peaks (e.g. 1794, 875 and 713 cm^{-1}) are reported in other areas of the spectra (Fig. 11.25b). The chert sample related to the Triassic limestones (S4) further presents a minor peak (i.e. 728 cm^{-1}), which suggest the presence of dolomite. This sample also presented peaks (e.g. 1048 cm^{-1}) within the absorbance bands of montmorillonite minerals. Finally, many Sicilian samples (e.g. S3 and S18) have minor peaks (e.g. 1996, 1617 and 613 cm^{-1}) that cannot be connected with specific minerals (Fig. 11.26b). Although their interpretation is yet to come, these are additional findings that confirm the distinction between Sicilian and Maltese chert sources.

11.7.4. Geochemical examination

Depending on the rock type and the focus of the research, the concentrations of specific elements are used to create models and patterns to find important information about the chert rocks (Junguo 2011; Kemkin

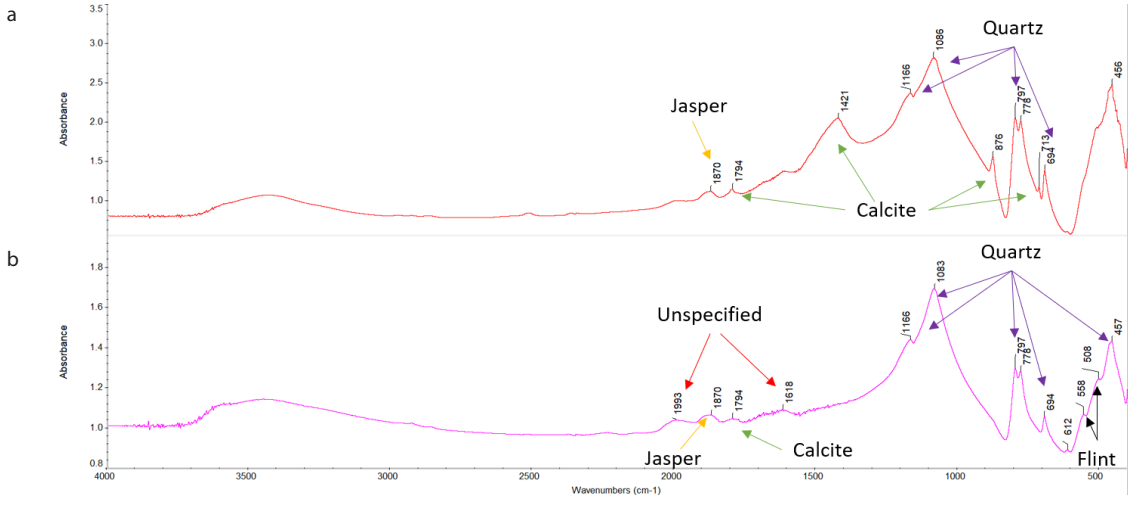


Figure 11.25. *Representative FTIR spectra of the chert samples from Sicily: a) Sample S11; b) Sample S18.*

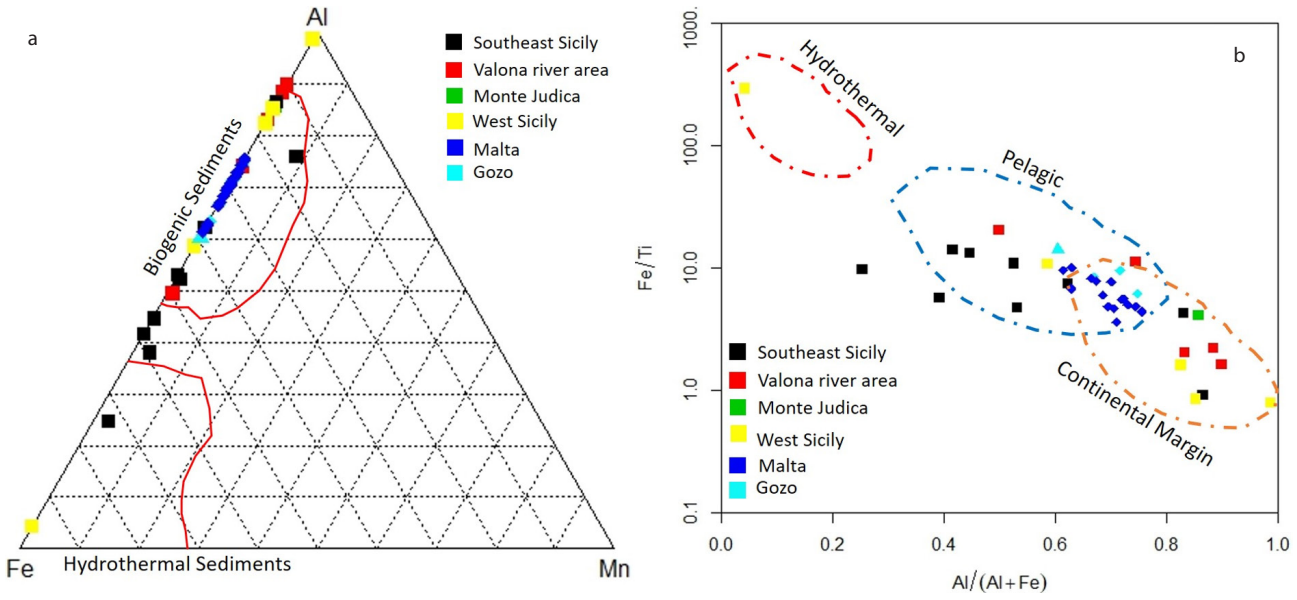


Figure 11.26. *Geochemical models (a and b): (a) Ternary diagram examining the origin of the sediments of the investigated rock samples. The line demarcations have followed the suggestion of Junguo* et al. *(2011). (b) Binary diagram examining the depositional environment of the investigated rock samples. The line demarcations have followed the suggestion of Murray (1994).*

& Kemkina 2015; Murray 1994; Murray *et al.* 1992). The current research focuses on information about the environment, the inputs and conditions under which the investigated chert is formed. Although such details seem outside the interest of the archaeological research, they are crucial factors for sourcing lithics. The importance of this information lies in the baseline principle that it would be impossible or at least unlikely that different rock sources would have the same model and pattern results. Appendix Tables A11.6.6–A11.6.9 include the elementary analyses and element ratios of the rock samples based on Chatzimpaloglou (2019).

The Maltese and Sicilian samples are plotted in diagrams, which use the concentrations of major elements (Fe, Al, Mn) (Junguo 2011; Murray 1994). The ternary model (Fig. 11.26a) shows that all the chert formations of the Maltese Islands are gathered in the zone of the biogenic sediments. The situation is similar with most of the Sicilian cherts (n=21), which are placed in the same region. It is clear, however, that the Maltese samples are clustered on a specific area of the ternary model in comparison with the Sicilian. This suggests that the Maltese samples have inputs from more homogeneous Si sources than the Sicilian samples. Furthermore, there are two Sicilian samples (S19 and S24) that have hydrothermal sources (hydrothermal sediments).

The major elements identified could also provide indications about the depositional environments of the different chert sources. The binary model uses the concentrations of major elements (Fe, Ti, Al) and classifies the chert rocks of the Maltese Islands within an intermediate environment between a pelagic and continental margin environment (Fig. 11.26b). On the contrary, the Sicilian cherts are more widespread in the model and the samples are categorized in different environments. Some of them relate to a pelagic environment (n=9), while others (n=9) are related to a continental margin environment (Kemkin & Kemkina 2015; Murray 1994). There is only one sample (S24) found in the zone that relates to a mid-ocean ridge (near or proximal) environment. It is important that the geochemical results are treated with caution and the findings are always combined with the petrological features of the rocks examined. Nevertheless, it is observed that the Maltese chert is restricted into an area where no Sicilian chert occurs (Fig. 11.26b). This is one additional difference between Sicily and Malta, and based on these geochemical data, their chert rocks are clearly different.

The findings of the REEs[2] generally confirmed the results about the nature of the depositional environment (Murray *et al.* 1992). The three ratios used (Ce/Ce*, La_n/Ce_n and La_n/Lu_n) suggest that the Maltese chert rocks were created in a continental margin environment with a strong pelagic input (Appendix Table A11.6.7). The ratio results of the Sicilian samples (Appendix Table A11.6.9) are compatible with the findings of the

depositional model. The small number of ratio values that do not agree with the findings of the model should be treated with more consideration than those of the Maltese chert. This is because many of the samples are from different chert formations, whilst the formations themselves span a timescale of hundred million years in which the depositional environment might have changed. Therefore, further investigation is necessary to ascertain the accuracy of these contradictory results.

The REEs normalized patterns provide additional information about the chert sources and their differences. The Maltese samples (Fig. 11.27a) have an almost identical and smooth pattern with concentrations on the same level (10^{-1}). Moreover, all the samples present negative anomalies (depletion) on the elements of cerium (Ce) and terbium (Tb), which are indications of a pelagic influence. These results confirm that they have been deposited in the same environment (continental margin) with similar conditions (pelagic input). The patterns of the Sicilian chert samples are significantly diverse (Fig. 11.27b–d) and different from the Maltese samples. Most Sicilian samples (n=18) have lower concentrations of REEs (10^{-2}) than the Maltese samples, while two chert samples (S6a and S19) are more enriched and show higher quantities of REE's (Fig. 11.27b & c). The latter have concentrations comparable with the Maltese samples, but their patterns present greater fluctuation.

Furthermore, the normalized patterns of the Sicilian chert samples illustrate very clearly the differences between the Sicilian regions (Fig. 11.27). Chert samples from the same regions have similar patterns, but they are plotted on different normalized concentration levels. Moreover, their pattern does not fluctuate in the same manner from element to element, which indicates minor different inputs. The samples from southeast Sicily (Fig. 11.27b) have a strong negative anomaly (depletion) of Ce which suggests a deep pelagic environment (Kemkin & Kemkina 2015; Murray *et al.* 1992). The samples from the Vallona River (Fig. 11.27c), however, present a positive anomaly (enrichment) of this element. They also show a general enrichment on

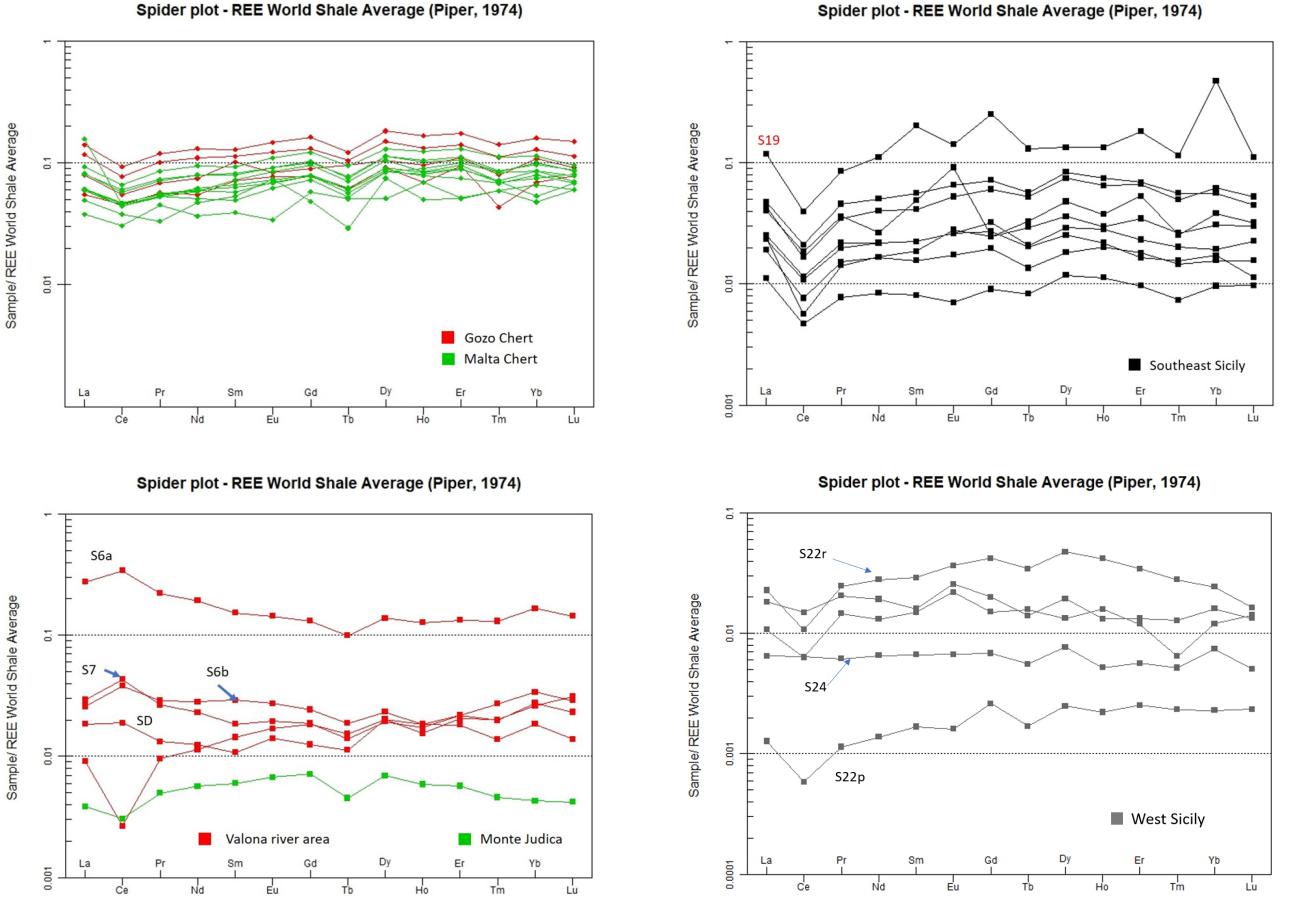


Figure 11.27. *The normalized patterns of rare earth elements of the Maltese and the Sicilian chert samples: (a) Maltese Islands; (b) Southeast Sicily; (c) Monte Judica and Valona river areas and (d) West Sicily.*

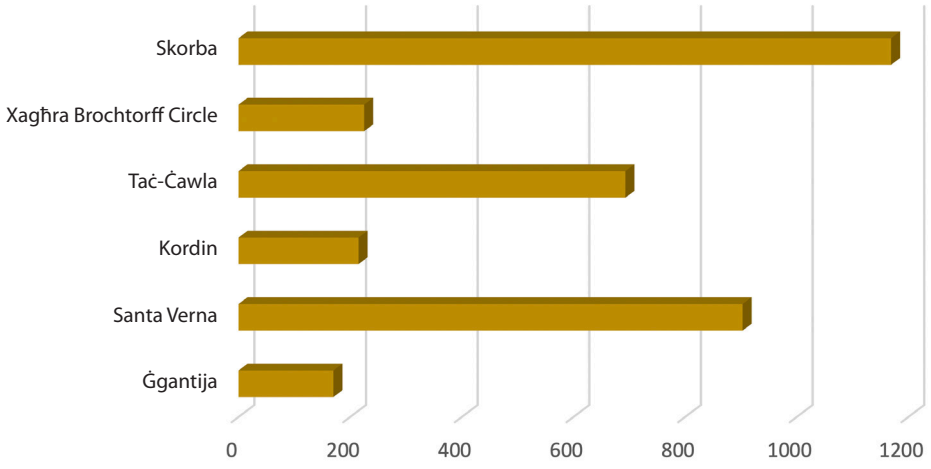


Figure 11.28. *Cluster bar diagram presenting the total number of each assemblage.*

the first group of REEs (LREE)[3] in comparison with the second group (HREE). These two features on the patterns of the Vallona River samples indicate that their depositional environment has a strong hydrothermal input (Kemkin & Kemkina 2015; Murray *et al.* 1992). Finally, one sample from west Sicily (S24) presents an almost linear REE pattern (Fig. 11.27d).

11.8. Lithic assemblages

The investigation of the Maltese assemblages has revealed that the artefacts are made from multiple lithic sources. The biggest assemblage was collected at Skorba (n=1169), followed by the Santa Verna assemblage (n=903), while Ġgantija assemblage has the fewest members (n=170) (Fig. 11.28). The site of Skorba is particularly important for the *FRAGSUS Project* and has potential to provide a better understanding of Late Neolithic Malta. The recent excavation of the Temple site/settlement (2016) was meticulous and ensured all finds (e.g. pottery, lithics) were stratigraphically correlated and therefore chronologically secure in archaeological terms. Therefore, the origin of lithics per context could reveal key aspects of the Maltese society through the occupation sequence.

The research recorded the total number of finds and divided the lithics into three categories (Appendix Table A11.6.5): a) chert, b) obsidian and c) other. The chert category includes chert materials and finds which are considered either chert cortex or highly silicified limestone. The 'other' category includes mainly limestone pieces and those which due to their macroscopic characteristics cannot be placed within the other two categories.

Most of the assemblages are dominated (> 65%) by chert artefacts (Fig. 11.29), while Santa Verna presents the lowest proportion (37%). Santa Verna, in

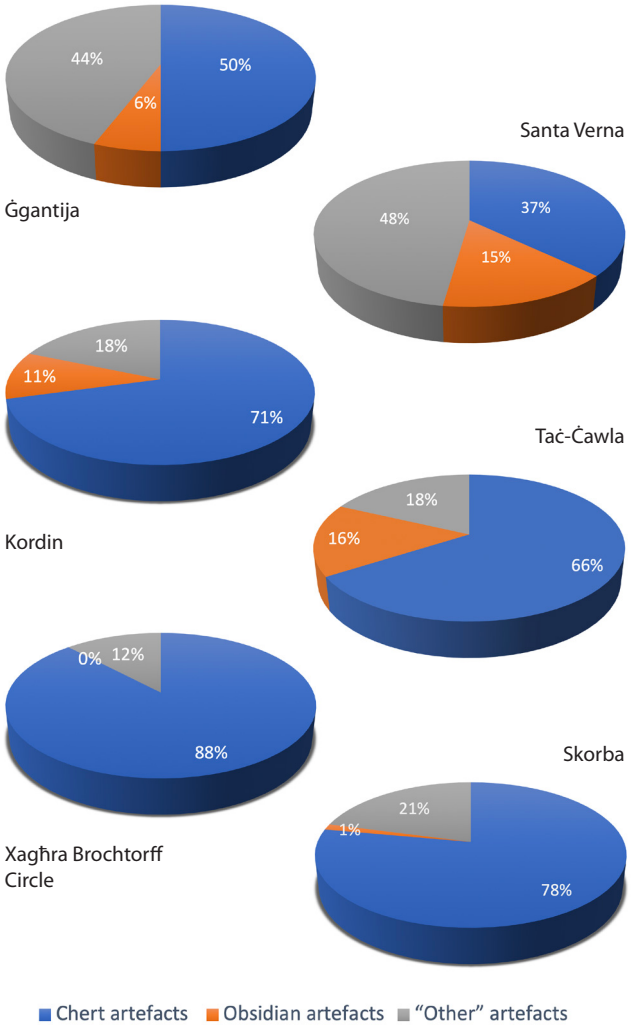


Figure 11.29. *Pie-charts showing the ratio between the different types of rock identified within each assemblage: (a) Ġgantija, (b) Santa Verna, (c) Kordin, (d) Taċ-Ċawla, (e) Xagħra Brochtorff Circle and (f) Skorba.*

contrast, has the highest proportion of 'other' artefacts (48%). Obsidian artefacts have been reported in all the assemblages but in low proportions. Santa Verna presents the highest number (n=137), while Ġgantija (n=10) and Skorba (n=15) have the lowest (Appendix Table A11.6.10). Previous research (Malone *et al.* 2009) reported quantities of obsidian artefacts from Xagħra Brochtorff Circle. The current research did not examine this material, but if the numbers are accurate then obsidian finds constitute 36% of the recorded lithic assemblage. The research then focused on the chert finds recording the macroscopic characteristics of the artefacts in Malta (Appendices A11.9 & A11.10), and selecting representative samples from each assemblage for further analysis. These samples ensured a range of different types of artefacts to demonstrate the main craft techniques (Appendix Table A11.6.13).

11.8.1. Macroscopic examination

The chert artefacts can be divided into three major groups with distinctive macroscopic features. The first group is characterized mainly by brown colour shades (e.g. 10YR 4/2, 6/2), high homogeneity and density, while they varied in terms of translucency, shine and grain size. The artefacts are mostly of substantial size (length and width >3 cm), but small artefacts are also reported such as flake and flake scrapers (Fig. 11.30). Most of the finds in the Xagħra Brochtorff Circle and Ġgantija assemblages are made from this type of chert material (Appendix Table A11.6.11), while just a few are from Santa Verna (<15%). This is an interesting observation, and is odd considering that the three Gozitan sites are in very close proximity (walking distance) to each other (Fig. 11.16a).

The key point that distinguishes and puts all these artefacts in the same group are the finds from the Ġgantija assemblages, and especially those from Context (1019) (Fig. 11.30). The artefacts from this context are made from the same core/nodule chert that allowed the recording of the full range of the macroscopic characteristics from this source. This finding has thus eliminated the possibility that the members of this group could derive from different sources. There are, however, artefacts (i.e. BR89/S395/L449 and BR91/S745/L845) with distinguishing characteristics (e.g. the level of translucency) that may have been made from another source. Such factors show the difficulties of solely macroscopic investigation and highlight the importance of a holistic approach. In addition, it demonstrates the necessity of having reference sources by which to compare the lithic assemblages (Chatzimpaloglou 2019).

The second group of artefacts includes mainly opaque, dull and spotted materials (Fig. 11.31), which are macroscopically identical to the local chert sources. The latter feature (i.e. spotted) especially is the trademark of the Maltese chert formations, and examination has recorded that these irregular white spots were carbonated fossils. The fossil 'spots' consistently appear on both the artefacts and the local chert sources, and provide the key macroscopic evidence that connects these artefacts with the Maltese chert sources. An additional common characteristic is their colour, which varies between grey (e.g. 5Y 6/1) and brown shades (e.g. 10YR 6/6), while many of the members of this group have a semi-smooth texture (Appendix Tables A11.6.11 & A11.6.12).

An important feature of the Skorba assemblage is that all of the excavated stratigraphic layers included



Figure 11.30. *Representative samples of the fist group of artefacts found in Context (1019) at Ġgantija.*



Figure 11.31. *Representative samples of the second group of artefacts. The purple arrows point out the characteristic spots.*

lithics made from this type of chert rock (Appendix Table A11.6.12). By contrast, the Ġgantija and Taċ-Ċawla assemblages had limited numbers and variety of artefacts related to this chert source. Generally, the assemblages from Gozitan sites had fewer artefacts from the spotted grey-brown chert group in comparison with those from Skorba on Malta. The only exception is the Santa Verna assemblage, which had the highest number of artefacts. This must not be a coincidence, considering that this assemblage had the lowest representation of artefacts related to the brown group. This was either related to restricted access to raw materials or preference, although no further claim can be made at this stage (Chatzimpaloglou 2019).

The last group of chert artefacts includes predominantly small (length and width <2.5 cm), homogeneous, shiny, fine-grained and highly translucent material. The significant diversity of colours, however, and the different level of translucency makes this group partly heterogeneous (Fig. 11.32). These artefacts have been grouped together because they are completely different from the members of the other two groups. Moreover, none of the subgroups of artefacts has sufficient numbers to form an independent and distinctive group. Indeed, the macroscopic examination has recorded many single artefacts with different characteristics from all the other members. The artefacts all come under the umbrella of the four common characteristics stated above, but these are insufficient to consider these artefacts as having been made from the same chert source. Common macroscopic characteristics do not necessarily suggest a common source.

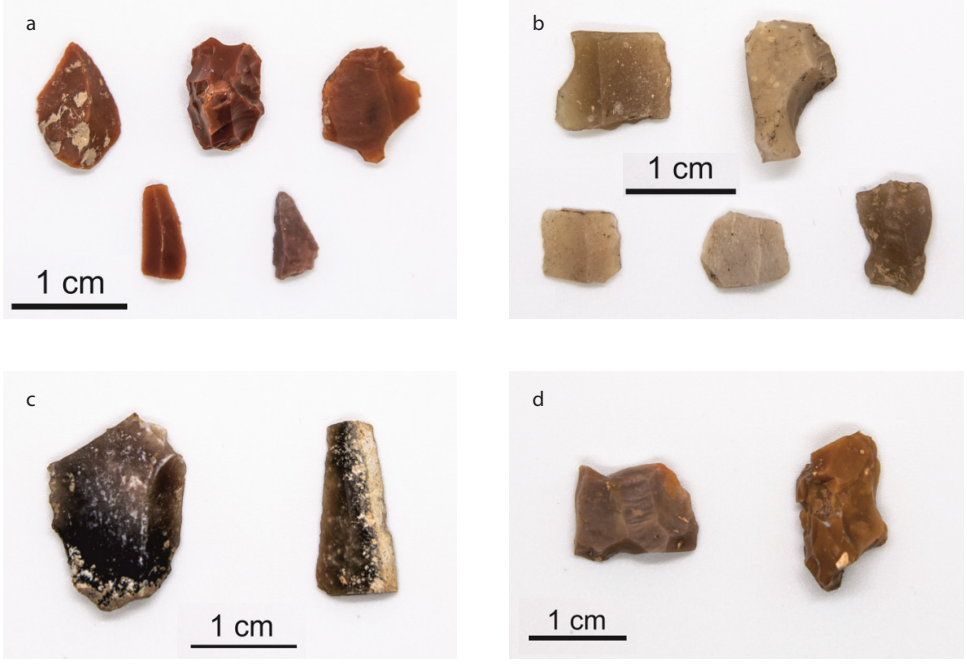


Figure 11.32. *Representative samples of the macroscopically diverse third group of artefacts (a to d): (a) Red (5R 4/6 and 10R 3/4), homogeneous, shiny, semi-translucent and fine-grained artefacts. Three are from Skorba, one from Ġgantija and one from Santa Verna; (b) white (N9), shiny (pearly), translucent and fine-grained; (c) black (5YR 2/1) heterogeneous, shiny (silky), semi-translucent, fine-grained and spotted artefacts, which had residues of a chalky cortex. One is from the Taċ-Ċawla (left) and one from the Xagħra Brochtorff Circle (right) and (d) homogeneous, shiny (pearly), smooth, opaque and fine-grained artefacts. The purple (left) is from Xagħra Brochtorff Circle while the orange (right) from Taċ-Ċawla.*

11.8.2. Mineralogical examination

The artefact samples have been analysed with the ART equipment to minimize the effect of this technique. The spectra, however, are less accurate than FTIR and the peak-values associated with minerals are slightly different. This research analysed the rock samples with both types of equipment (FTIR and ART) in order to be able, through cross-examining FTIR and ATR spectra, to interpret accurately the ART results of the artefacts (Chatzimpaloglou 2019). The different peak-values recorded through this process and the minerals related to them can be found in Appendix Tables A11.6.14 and A11.6.15 respectively.

The results of this technique (Chatzimpaloglou 2019) demonstrated that most of the artefact samples (75%) consist mainly of quartz. The samples presenting this mineralogical content have macroscopic features that allocated them into the first or the third group. The artefact members of these groups present incompatible macroscopic characteristics with the Maltese chert. These findings in combination with the recorded mineralogical difference (Fig. 11.33a) make it clear that these two groups of artefacts are not related to local cherts. The Sicilian chert sources are dominated by quartz which makes them a suitable candidate, but the macroscopic results are controversial. There are only

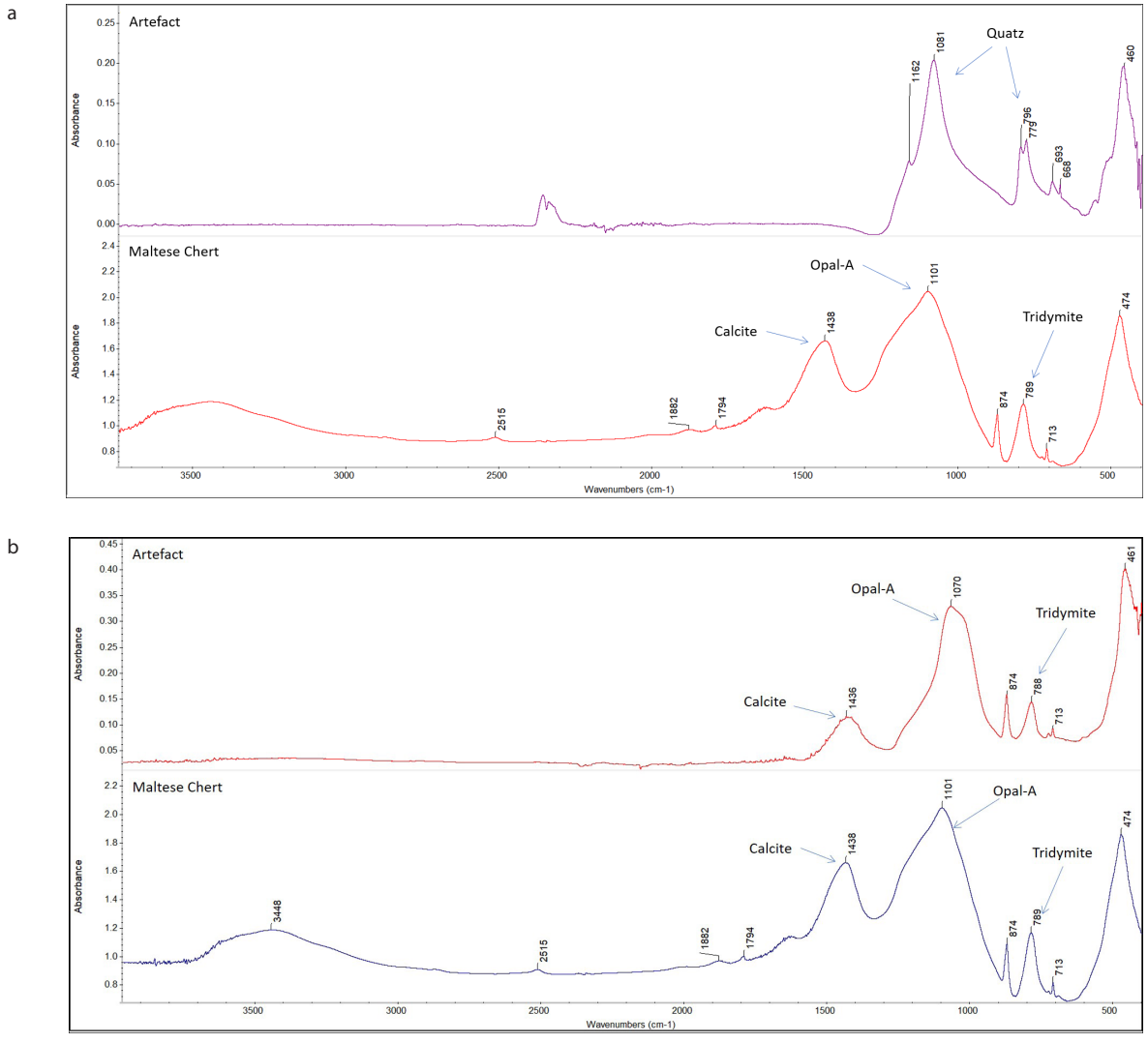


Figure 11.33. *a) Comparison FTIR-ATR spectra between a representative artefact (GGWC15/L1019/S6sb) from the first group (above) and the chert sources (M1S3) of Malta (below); b) Comparison FTIR-ATR spectra between a representative artefact (BR91/S566/L622) from the second group (above) and the chert sources (M1S3) of Malta (below). The difference in the actual value of the main peak (opal–A) is because the artefact was analysed through ATR, producing slightly different values in silicate minerals.*

a few of outcrops (e.g. Monterosso Almo) that present similarities with artefacts of the third group, but none of the Sicilian sources have macroscopic characteristics similar to the first group and this casts doubt on their possible Sicilian origin. This problematic situation can be resolved with the geochemical data, which provides further information on the actual sources of these artefacts and their connection with Sicilian sources.

Meanwhile, there is a substantial amount of artefact samples (n=31; 22%) from all of the assemblages, which consisted mainly of opal–A and that have a noticeable presence of tridymite. These artefacts also contained calcite which is a characteristic mineral reported in the Maltese chert samples (Fig. 11.33b). The artefact samples presenting this mineralogical content have all been placed in the second group of the macroscopic analysis. These findings enhance the likely connection of this group with the local chert source, while at the same time making it clear that they are not related to the Sicilian sources.

11.8.3. Geochemical examination

This section follows the process presented at the relevant chert-sources subchapter and the elementary analyses and ratios of the artefact samples are included in Appendix Tables A11.6.16–A11.6.22.

11.8.3.1. Group 1 (Brown chert artefacts)

The samples of group 1 are plotted with the Sicilian chert samples in the ternary diagram (Fig. 11.34a). Most of the artefacts (n=21) were related to biogenic sedimentation and were plotted in the same part of the model with some samples from southeast and west Sicily (S17, S18, S22r). There is only one artefact (a thick flake end-scraper) from the Taċ-Ċawla assemblage (i.e. TCC14/S176/L100) that falls in the hydrothermal sedimentation area of the diagram and also close to one sample (S19) from southeast Sicily. Regarding the depositional environment, most of these samples (n=13) accumulated in the area of a pelagic environment (Fig. 11.34b). Some samples deviated from the rest, but since it is uncertain whether they all come from the same source, it is difficult to interpret these results accurately. Although these uncertainties require further research, it is still certain that the source/s of this group has not been deposited in a hydrothermal or continental margin environment. As such, the Sicilian chert sources related to these environments are excluded from the list of possible candidates. On the contrary, these findings support a connection between specific outcrops (S17, S18, S22r) from Sicily and the majority of the artefact samples of this group (n=15). They also confirm a relationship between one sample from the Taċ-Ċawla assemblage (TCC14/S176/L100) and the outcrops from southeast Sicily (S19).

The REEs normalized patterns of the artefact samples enhanced the previous findings and strongly suggest a common origin for this group of artefacts (Chatzimpaloglou 2019). A closer examination of the patterns has even distinguished artefacts from the different assemblage (BR93/S854/L897, a microblade; SV15/S1/L16, a blade; SKB15/S131/L211, a scraper; and

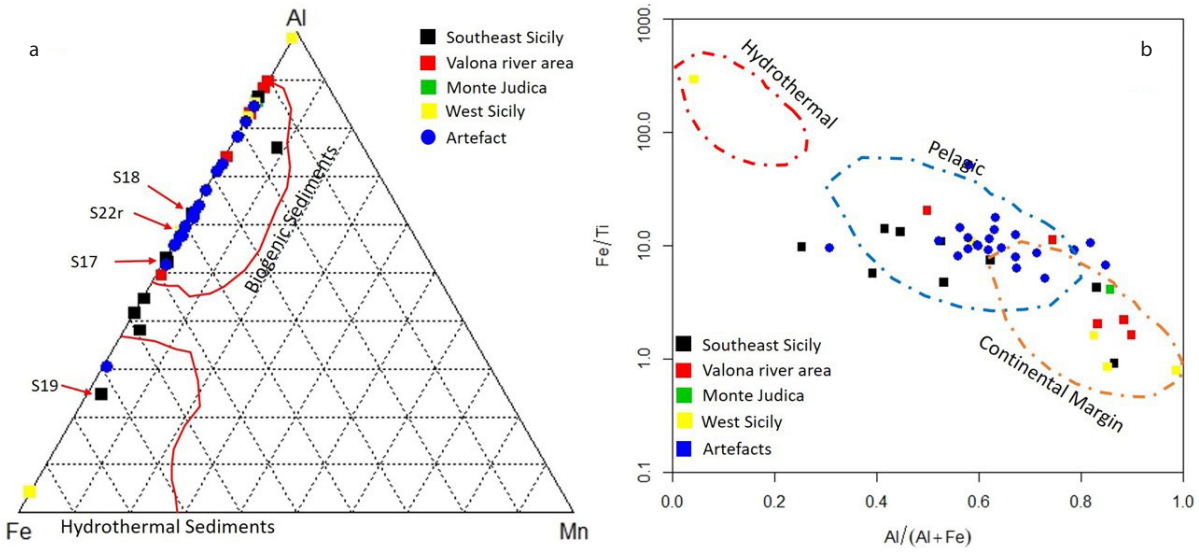


Figure 11.34. *Geochemical models cross-examining the Sicilian cherts and the artefacts of group 1: a) Ternary diagram examining the type of sediment. The line demarcations have followed the suggestion of Junguo* et al. *(2011); b) Binary diagram examining the depositional environment. The line demarcations have followed the suggestion of Murray (1994).*

KRD15/S141/L150, a flake tool) that demonstrated a very similar REEs normalized pattern (Fig. 11.35a). The diversities and fluctuations reported are still features that need clarification, but until the actual source is identified these questions cannot be resolved. Whilst there are similarities between these artefacts and the Sicilian chert formations, there are still major differences and uncertainty of sources that do not allow them to be regarded as their sources. The difference can be better illustrated with the REEs normalized patterns (Fig. 11.35b) of the artefacts (e.g. SV15/S1/L16) and Sicilian chert (S17, S18, S22r) that are linked to the previous models. Although the normalized concentrations are at the same level, the sharp fluctuations of the artefact patterns cast additional doubt on their compatibility.

11.8.3.2. Group 2 (local chert artefacts)

The artefacts of the second group show strong indications for compatibility with the chert sources of the Maltese Islands, and cross-examination of their geochemical signature confirms their connection. The majority of the artefacts (n=58) were related to biogenic sedimentation (Fig. 11.36a) and were plotted in exactly the same way as the local raw chert samples. There were only two samples from the Skorba assemblage (S3/L12b & S10/L13) that indicate a different type of sedimentation; however, no further explanation is yet forthcoming.

The artefacts from Group 2 demonstrated some interesting findings regarding their concentrations of major elements (Appendix Tables A11.6.16–A11.6.18 & A11.6.20–A11.6.22). The binary model shows that the samples were divided mainly into two subgroups that were near to each other (Fig. 11.36b). The first subgroup was placed in the exact same region as the Maltese chert samples, which is additional evidence that most of the artefacts of this group are made from local sources. The second subgroup is placed in an unspecified area, but very close to the first. Checking their position in the diagram and the concentrations of Fe, Ti and Al, it seems clear that this subgroup is made from raw material depleted in Ti (Chatzimpaloglou 2019).

The idea of a special outcrop is promoted because there is still not enough evidence to suggest a different source. The validity of this interpretation is also supported from the REESs ratios (Ce/Ce*, La_n/Ce_n and La_n/Lu_n), which are more reliable indicators of the depositional environment (Murray *et al.* 1992) than the major elements (e.g. Ti). The values of these ratios (Appendix Tables A11.6.16, A11.6.17, A11.6.19–A11.6.21, A11.6.23) demonstrates that all the samples of this subgroups have been deposited in exactly the same environment as the other Maltese chert rocks. The data for the second subgroup belongs to samples from the Skorba assemblage (Appendix Table A11.6.22), mostly in Context (10) of the 2016 excavation (a fairly superficial deposit of mixed Temple Period Neolithic material) (n=10; 52%). This suggests that especially during that time of occupation/usage of the site, the Skorba community had access to a chert outcrop with a lower than usual concentration of Ti.

The REEs normalized patterns can provide further supportive results on the connection between this group of artefacts and local material. The pattern diagrams demonstrate that the artefact samples were

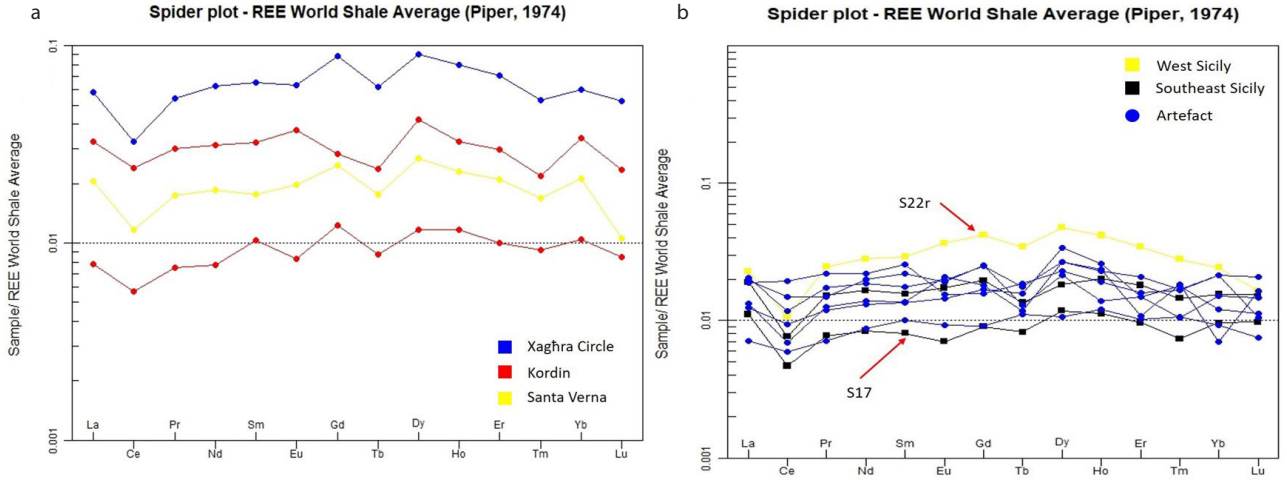


Figure 11.35. *Comparable spider plots of the REE concentrations: a) artefact samples of this group from all the assemblages with the most similar pattern; b) between artefact samples of common origin and selective Sicilian chert outcrops.*

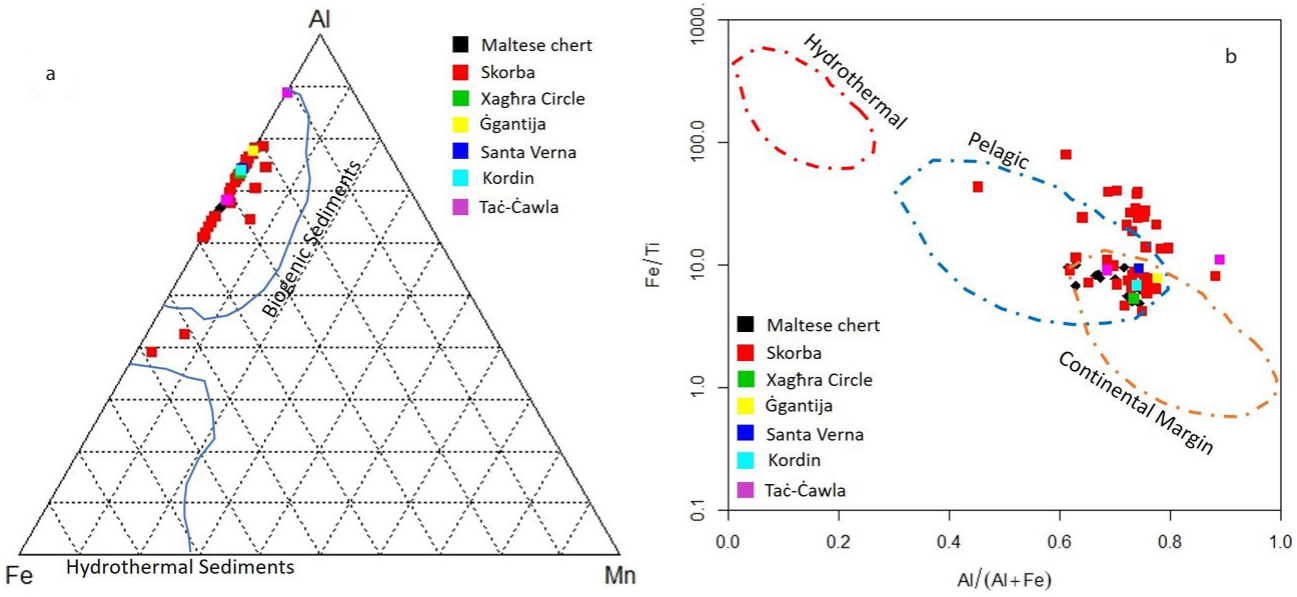


Figure 11.36. *Geochemical models cross-examining the Maltese cherts and the artefacts of group 2: a) Ternary diagram examining the type of sediment. The line demarcations have followed the suggestion of Junguo* et al. *(2011); b) Binary diagram examining the depositional environment. The line demarcations have followed the suggestion of Murray (1994).*

plotted at the same level of concentrations (close to 10^{-1}) and recorded a negative anomaly (depletion) on the Ce and Tb elements (Chatzimpaloglou 2019). They were also characterized from minimal fluctuation along the normalized concentrations of those elements (smooth pattern). These characteristics were found in samples from all the assemblages (Fig. 11.37a), and the same as those obtained from the Maltese chert source/outcrops. This is best illustrated in the comparable spider plots which include samples of the Maltese outcrops and the examined assemblages (Fig. 11.37b). Furthermore, the compatibility of artefacts from the different contexts of

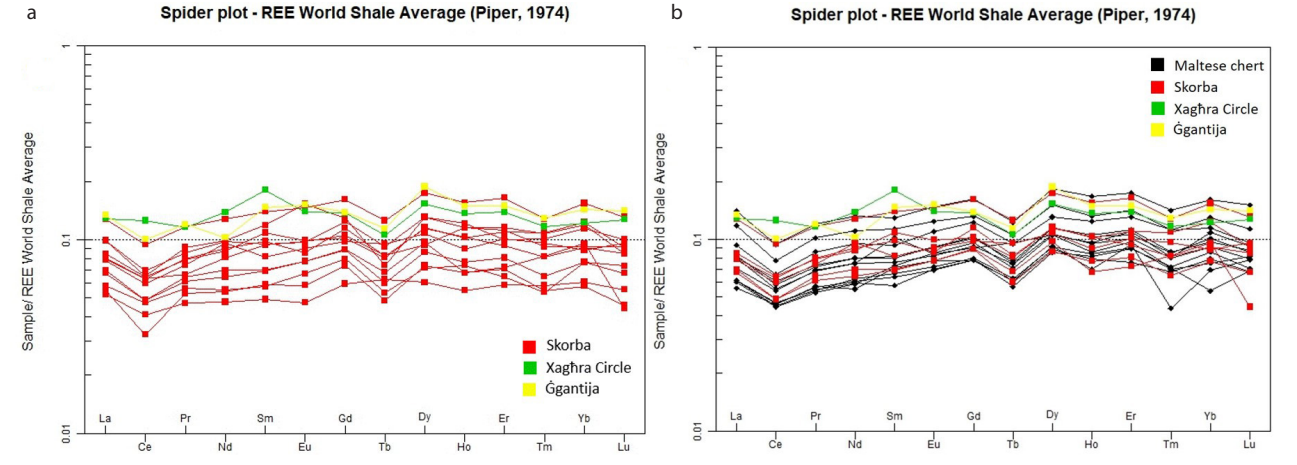


Figure 11.37. *Comparable spider plots of the REE concentrations (a and d): (a) between representative artefact samples from all the examined assemblages which are considered of common local origin. The artefacts in this plot are: one from Xagħra Brochtorff Circle (BR91/S566/L662), one from Ġgantija (GGWC15/S1/L12) and eleven from Skorba (SKB16/S2/L5, S4/L5; SKB16/S2 /L12b, S5/L12b; SKB16/S1/L16, S2/L16; SKB16/S1/L26, S6/L26, S7/L26; SKB16/S1/L30, S3/L30). (b) between representative Maltese chert samples (F1S4,G2S2,G2S1,G2S3,F1S3,M1S1b, M1S2,M1S3,M1S5,M1S4 and M1S10) and artefact samples of common local origin (BR91/S566/L662, GGWC15/S1/L12, SKB16/S2/L5, S4/L5; SKB16/S2/L12b, S5/L12b; SKB16/S1/L16, S2/L16; SKB16/S1/L26, S6/L26, S7/L26 and SKB16/S3/L30).*

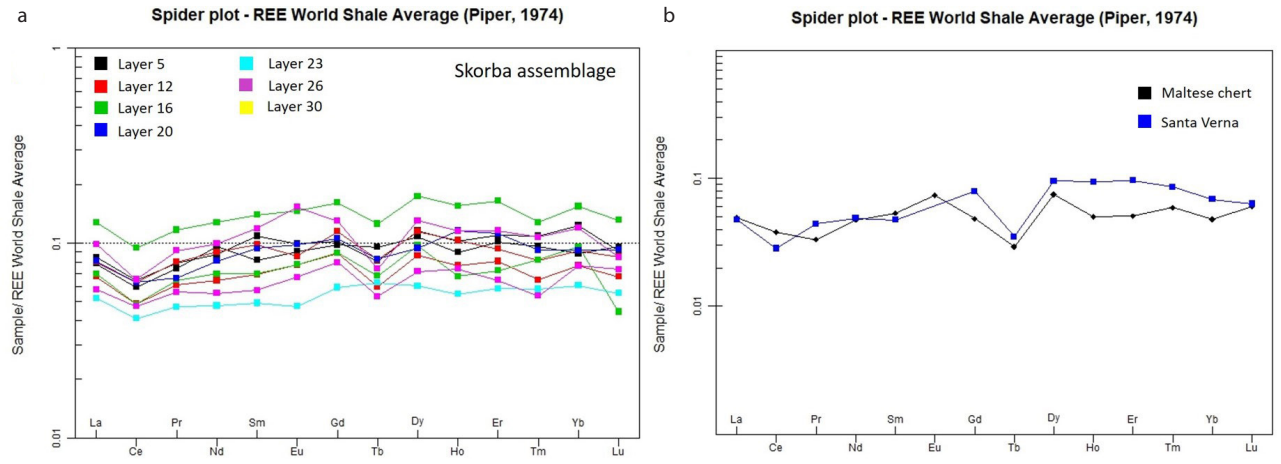


Figure 11.38. *Comparable spider plots of the REE concentrations (a and d): (a) between representative artefact samples from the different layers of Skorba excavation (SKB16/S2/L5, S4/L5; SKB16/S2/L12b, S5/L12b; SKB16/S1/L16, S2/L16; SKB16/S2/L20; SKB16/S6/L26, S7/L26 and SKB16/S3/L30), which are considered of common local origin. (b) between an artefact sample from Santa Verna (SV15/S58/L134) that present a different pattern and a Maltese chert outcrop (sample M2S4).*

Skorba suggests a consistent usage of the local source/ outcrops throughout the occupation/activity of this archaeological site (Fig. 11.38a). There are, of course, some artefact samples that present different patterns, but not outside the diversities reported for the local outcrops (Fig. 11.38b).

11.8.3.3. Group 3

The members of this group present evidence of a non-local origin and indicating they were most likely imported to Malta. The geochemical analysis further demonstrated that most of these artefact samples are not related to Sicilian sources and came from elsewhere (Chatzimpaloglou 2019). There are, however, two subgroups that show a strong connection with specific Sicilian sources.

11.8.3.4. First subgroup (black artefacts)

Group 3 Subgroup 1 includes one artefact from the Taċ-Ċawla (TCC14/S416/L178, a flake tool) and one from the Xagħra Brochtorff Circle assemblages (BR91/ S611/L712, a blade). These artefacts are black, heterogeneous, shiny, semi-translucent and fine-grained (Fig. 11.32c). Additionally, they have spots that are residues of a chalky cortex and consisted of quartz. Similar features are reported to many chert rocks from Sicily (e.g. Monterosso Almo), and these artefacts may originate from this island. It is impossible, however, to distinguish the sources of the different black cherts of Sicily, or indeed, sources elsewhere in the Mediterranean. Nor can we distinguish which artefacts might relate to them. Therefore, geochemical results are necessary to provide more conclusive evidence on the origin of these artefacts.

In the ternary model (Fig. 11.39a), the artefacts are placed in the same area and close to each other, with only two of the Sicilian cherts demonstrating such similar features. Similarly, the findings from the binary model (Fig. 11.39b) highlight a strong connection with southeastern Sicily. In contrast, the sources from Monte Judica and western Sicily are excluded as possible sources because they have presented differences in terms of sediments and depositional environment. Likewise, the single chert outcrop from the Monterosso Almo area (sample S19) also demonstrates characteristics completely incompatible with the investigated artefacts. These results are further supported by the normalized patterns of REEs (Fig. 11.40) and they create solid foundations to argue that these artefacts are related to specific chert sources from Monterosso Almo (samples S17 & S18) and the Modica area (S3). The concentration levels and patterns between artefacts and outcrops are almost identical, and thus probably represent the sources of these two artefacts.

It is difficult to define the exact location from where the raw chert material was exported to Malta. Although there is a great distance between the two areas, the rock samples were collected from a similar geological formation, which explains their proximity in the models. This research suggests Monterosso Almo was the source area, on the basis of the better quality of materials, the greater availability of resources and their easier access in that area. This observation, however,

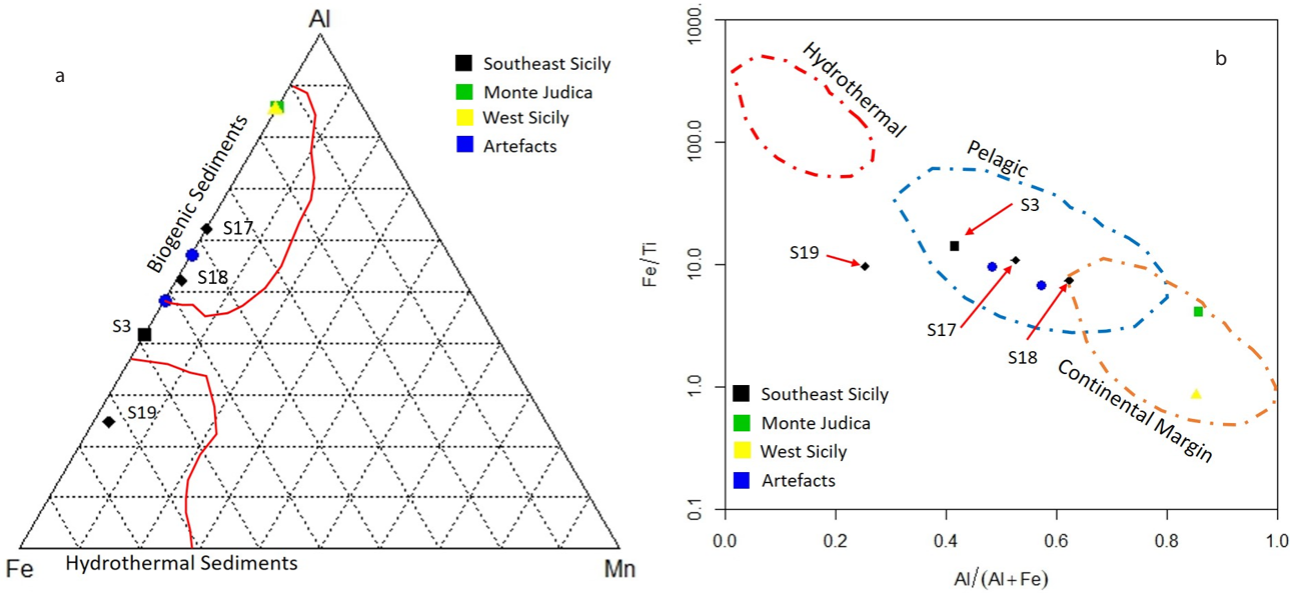


Figure 11.39. *Geochemical models cross-examining the Sicilian black chert sources and the two artefacts of subgroup 1 – Group 3: a) ternary diagram examining the type of the sediments; b) binary diagram examining the type of depositional environment of the artefact samples. The line demarcations have followed the suggestion of the literature (Junguo* et al. *2011; Murray* et al, *1994).*

must be regarded with caution, acknowledging the ability of prehistoric people to travel great distances and engage in down-the-line exchange. Nonetheless, the research has provided solid evidence that these artefacts relate to the exploitation of specific chert sources from southeastern Sicily and their export to Malta in prehistory.

11.8.3.5. Second subgroup

Group 3 Subgroup 2 includes one artefact from the Taċ-Ċawla (i.e. TCC14/S460/L273, a flake shatter) and one from the Xagħra Brochtorff Circle assemblages (BR91/S564/L662, a flake tool). They were homogeneous, shiny (pearly), smooth, opaque and fine-grained artefacts, but they presented different colours (Fig. 11.32d). The

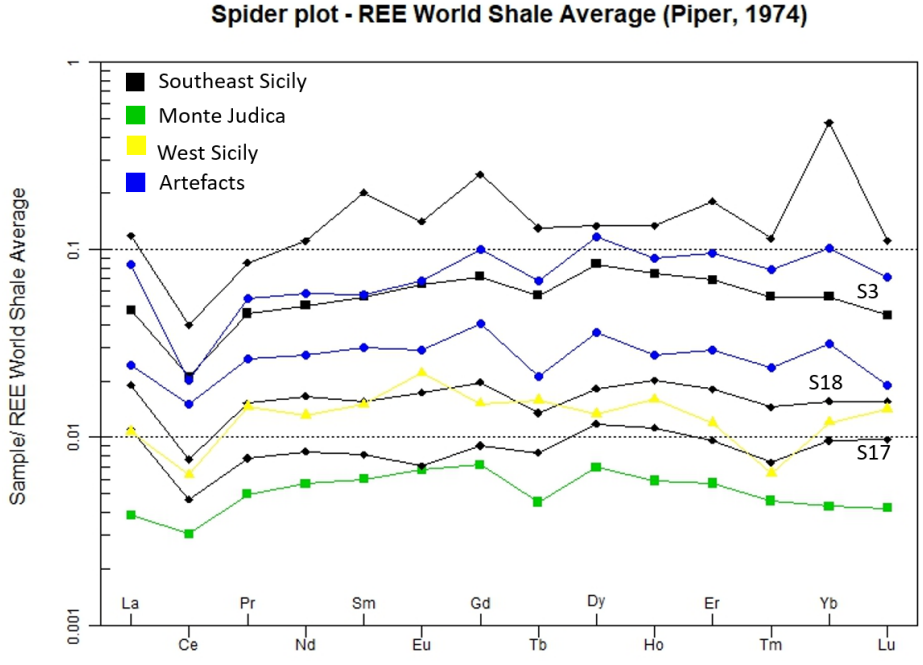


Figure 11.40. *Comparable spider plot of the REE concentrations between the Sicilian black chert sources and the two artefacts of subgroup 1 – Group 3.*

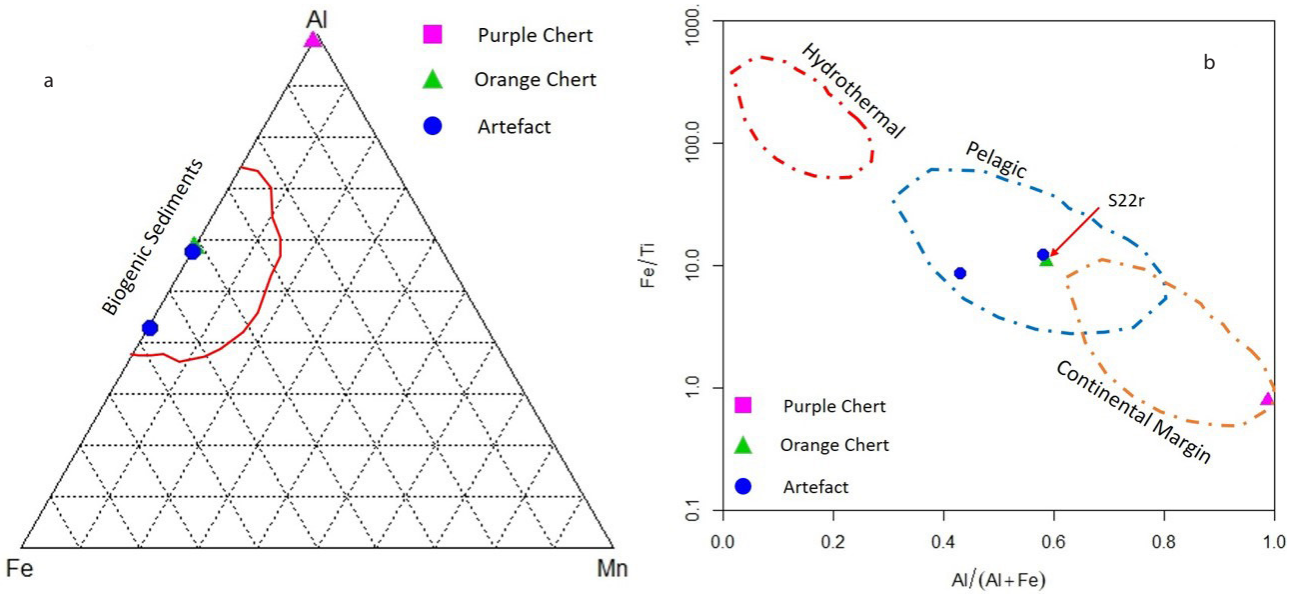


Figure 11.41. *Geochemical models cross-examining the West Sicilian chert sources and the two artefacts of Subgroup 2 – Group 3: (a) ternary diagram examining the type of the sediments; and (b) binary diagram examining the type of depositional environment of the artefact samples. The line demarcations have followed the suggestion of the literature (Junguo* et al. *2011; Murray* et al. *1994).*

sample from Taċ-Ċawla had an orange shade (5YR 5/6), while the one from Xagħra Brochtorff Circle had a purple shade (10R 6/2). The main reason that these two artefacts have been put in the same subgroup is their similarities with a source in west Sicily. The fieldwork on this part of the island (i.e. the Triona Mountain, around the sanctuary 'Madonna del Balzo') examined a limestone formation (of Triassic age), which presented chert nodules of orange or purple shades, macroscopically similar with these artefacts. Moreover, it has been recorded that the orange outcrops had been fractured in the same manner as the artefact from Taċ-Ċawla, providing additional evidence of their connection. These characteristics and their mineralogical composition (i.e. quartz) clearly exclude a Maltese origin.

The geochemical analysis is the last necessary step to secure the connection of these artefacts with the particular source of west Sicily. Unfortunately, only one sample was collected from each outcrop and the results must be treated with caution. The artefacts were placed in the same region of the ternary model (Fig. 11.41a) and close to each other, while only one of the chert rocks demonstrated similar features. This was the sample from the orange outcrop (S22r) which interestingly was plotted exactly on the same spot as the purple artefact (i.e. BR91/S564/L662). The findings were similar in the binary model (Fig. 11.41b), which also supports the connection with the west Sicilian source. The artefacts were from the same environment (i.e. pelagic) and again the orange outcrop was placed in exactly the same position as the artefact from the Xagħra Brochtorff Circle assemblage. The purple outcrop was placed at a distance from the other three samples and most likely this specific outcrop is not related to the artefacts.

Nevertheless, the connection between this Sicilian source and these artefacts cannot be excluded. A connection is also supported by the concentrations of REEs and their ratio values (i.e. Ce/Ce*, Lan/Cen). Indeed, their results (Appendix Tables A11.6.16 & A11.6.18) suggest a pelagic environment with possible influence from a ridge environment (Murray *et al.* 1992) for both the artefact and source samples. Furthermore, the link between them can be even better illustrated with the diagram of the REE normalized patterns (Fig. 11.42). The patterns of all the investigated samples were almost identical and they provide more evidence of the connection between the west Sicilian chert formation and Subgroup 2. More samples and analysis are, however, required from this outcrop to address the uncertainties and draw safe conclusions confirming that these cherts were imported to the Maltese Islands.

11.9. Summary and conclusions

Chert artifacts in Group 1 have macroscopic, microscopic and chemical characteristics that strongly suggest a common source. Although their precise

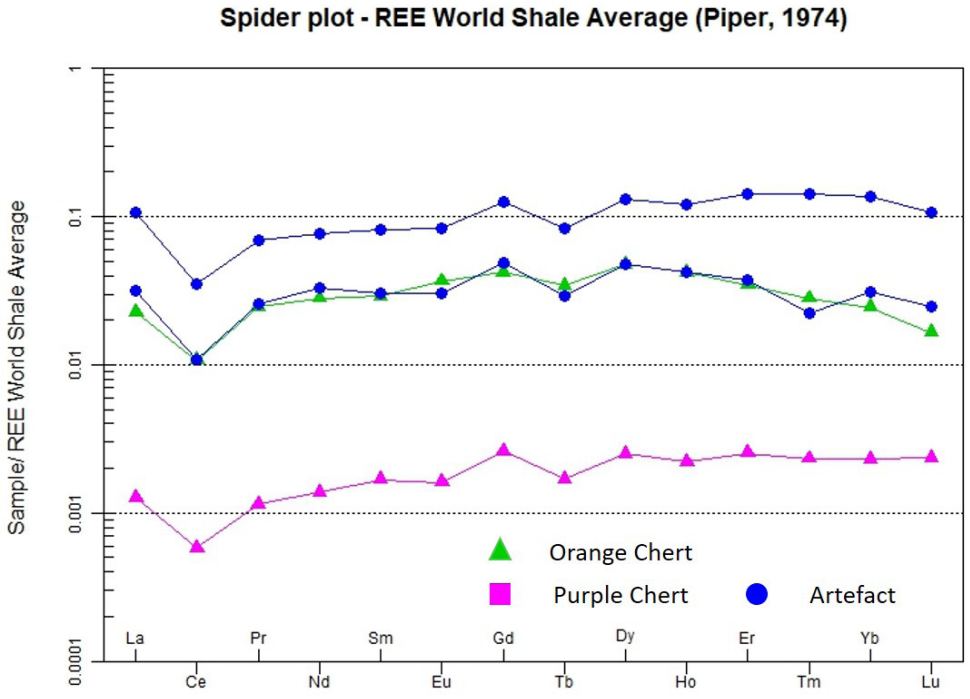


Figure 11.42. *Comparable spider plot of the REE concentrations between the West Sicilian chert rocks and artefact samples of subgroup 2 – Group 3.*

origin has not yet been identified, it is clear from the results discussed above (e.g. mineralogy) that they are not made from Maltese chert sources. There are indications for a Sicilian origin, but the comparative study between them has not provided irrefutable data indicative of such connection. An additional problem is that none of these sources presented the distinctive macroscopic features (e.g. colour) that grouped these artefacts together. Nevertheless, the geological characteristics of the chert artefacts are now known and can be used in the future to select the most promising sources from neighbouring areas (e.g. mainland Italy).

Meanwhile, Group 2 of the chert artefacts exhibit macroscopic, microscopic and geochemical characteristics that strongly support an origin from Maltese chert rocks. This identification removes any possibility of them having been imported or related to the Sicilian sources. In the previous section, the differences between these two sources have already been presented and it is impossible for any artefact to be related to both of them at the same time. If there was a Sicilian source/outcrop similar to the Maltese one, it would be highly unlikely for such materials to be imported. Fieldwork has established that there would have been sufficient resources on the Maltese Islands for artefacts and tool production. Moreover, this raw material is not of the highest quality so, it is highly unlikely that a similarly inferior material was ever worth the effort of importation.

Although it is difficult to establish the exact locations of extraction, the current Maltese outcrops are easily accessible, especially the one in Fomm ir-Riħ Bay, which is in the same part of the island as the Skorba archaeological site. It is quite possible that some outcrops have not been found in this research, as the results from Skorba suggest. The current findings indicate that the later Neolithic occupants of the site (e.g. Layer 10) had access to an unknown outcrop with lower concentrations in Ti than the rest of the local chert outcrop. Future research may yet identify the location of this outcrop, but it might have been already depleted, destroyed or obscured by later erosion processes.

Finally, Group 3 artefacts have macroscopic, microscopic and chemical characteristics that suggest they are not associated with Maltese chert sources, and the majority of the subgroups are not related to Sicilian sources. There are, however, two subgroups that present strong indications of a Sicilian origin. The first is conclusively connected with black chert sources from southeast Sicily (i.e. Monterosso Almo) and the second is associated with a particular chert source in west Sicily. The origin of the latter subgroup is not conclusive, but the chert-bearing limestone has extensive exposures and most likely the source of these artefacts is within this formation. A future project could focus on this formation and test the compatibility to these rare Maltese artefacts

The findings of these two subgroups suggest a special connection between the Xagħra Brochtorff Circle, Taċ-Ċawla site and Sicily. These Gozitan sites

are geographically closer to Sicily than those of Malta, and therefore it is possible that imported material from Sicily would arrive first on Gozo. Ramla Bay is close to these sites and is one of the few beaches on the island that offers easy access to the interior and shelter for ships/boats. Therefore, it could have been a convenient place for those sailing from Sicily to make land and unload their goods. It cannot be said that this would be the first or the only stop of a sailor to the Maltese Islands, but it certainly fulfils the requirements of a landing point of arrival.

11.10. Chaîne opératoire

The manufacturing techniques and technologies associated with the production of chert artefacts (Appendix Table A11.6.13) have also been observed and assessed to identify the crafts and traditions used by the Neolithic population of Malta (Chatzimpaloglou 2019a). This investigation followed the work of Kowta (1980), Inizan *et al.* (1999), Andrefsky (2005) and Shea (2017). Consideration of the production process alongside the sourcing and movement of raw materials, may reveal aspects of the social dynamics of the prehistoric communities of the islands and their possible relationships with neighbouring areas in the Mediterranean area.

The *chaîne opératoire* (Bar-Yosef *et al.* 2009; Perlès 1989; Sellet 1993) can address questions regarding the technical choices made by prehistoric craftspeople in the production of Neolithic chert artefacts in Malta. Such choices included raw material preference and its suitability for particular knapping techniques. Employing a single technique on different materials could suggest great skill and expertise, while multiple techniques would imply an understanding of the different properties of the materials and the ability of the craftsman to adapt to the changing conditions. Creating a variety of tools from a similar material shows how people mastered new skills, while creating specific tools from only one chert material suggests possible craft traditions and also optimization of the available resources.

The examination of the Maltese assemblages shows that the first technique of the manufacturing process is percussion flaking. It was employed on raw material (the objective piece) to create suitable detached pieces (Andrefsky 2005; Kowta 1980), which were mainly flakes. The process created many waste chips and shatter debris, which have been recorded in the assemblages (n=22), as byproducts of the knapping process. The assemblages from Skorba and Ġgantija have significant amounts of debitage that lack any modification. Similar pieces have been recorded to a lesser extent in the other assemblages. The debitage finds relate to the brown and local categories of raw material and not the third group of material. Although it is expected for the local resources to be knapped on site, such processing might not be expected for the first group, which is considered to be imported material. Intriguingly, the numbers and the variety of pieces related to this material are similar to the local chert. This finding suggests either easy and constant access to this external chert source, or the importation of this raw material to the Maltese Islands. These are strong indications for the *in situ* knapping of artefacts/tools from this type of chert. Evidence for on-site core reduction is supported by the many decortication flakes (produced during core preparation) reported in the assemblages, which were extracted to increase or create a striking platform surface. The most compelling evidence is the finds from the 2015 Ġgantija excavations and especially the lithics in Layer 1019 (Figs. 11.30 & 11.43). This layer included the full range of lithic material produced during the manufacturing process, from the beginning (e.g. raw material) to the end (e.g. blades). The identification of this complete

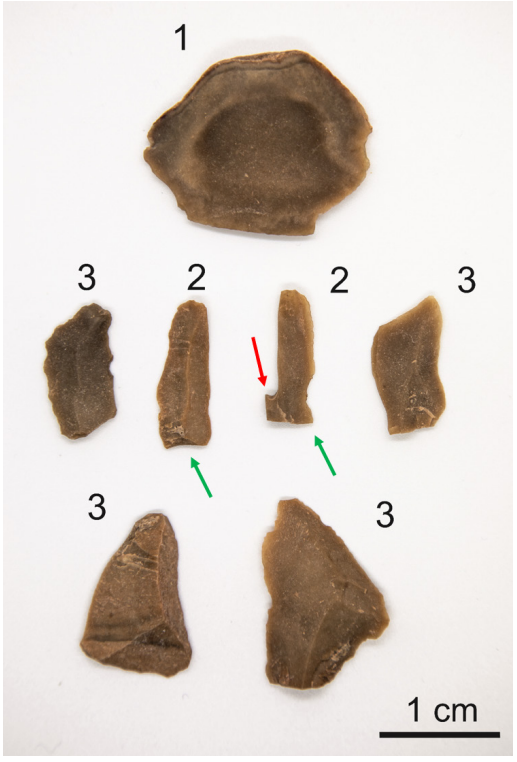


Figure 11.43. *Different flake types from Context (1019) of the Ġgantija assemblage. The top artefact (1) is a decortication, the artefacts with number 2 are blades and the ones with number 3 are unimarginal flake tools. The green arrows show the tang feature of the blades, while the red arrow shows the basal border.*



Figure 11.44. *Example of a blade from the Xagħra Brochtorff Circle (i.e. BR91/S566L662). The modifications are found only on the one side (purple arrow) and it is characterized as a unimarginal tool. Flakes have been extracted from this side (yellow arrow) which have resulted in an arris (green arrow) on its surface.*

chaîne opératoire not only confirms that the knapping was conducted locally, but also reveals the stages of production. The research does not suggest that this had been the only craft tradition on the Maltese Islands, but has contributed significantly to resolve many uncertainties for the lithic assemblages.

The further examination of the chert flakes showed indications of additional/secondary percussion (n=73; 86%) flaking, which can either aim to extract more flakes from a piece or form the final artefact. The 'arris' feature is evident in several examples and can be described as a borderline between surfaces from which material has been extracted (Fig. 11.44). Many of the flakes (n=44; 45%) had evidence of modification on their dorsal surface, while the ventral surface was untouched (see Figs. 11.9–11.15, 11.44, 11.46 & 11.48). The artefacts presenting this pattern are described as unimarginal (Andrefsky 2005), which are the predominant type of flakes and flake tools in the examined assemblages, whilst few bimarginal artefacts show modification to both surfaces. These artefacts are mostly related to Group 3, while no artefact of the local chert presents such features.

Some artefacts show no percussion other than the original strike that detached them from the core. In contrast, they have features related to pressure flaking (see Inizan *et al.* 1999), a technique that focuses on enhancing the utility of the tool and produced shaped or blunted edges. This type of flaking is particularly consistent with the members of Group 1 and is strongly connected with scrapers and flake scrapers. The edges of these tools have been modified with this technique, with the evidence found on the dorsal surface (Fig. 11.43). There are some flat flakes of this material that retain part of the cortex and they are considered decortication flakes (Inizan *et al.* 1999). The edges of these flakes were modified by pressure flaking for use as a scraper. These observations suggest that simple retouch methods were enabled from the prehistoric flint knappers to optimize their available resources. Although artefacts of this material were produced on the Maltese Islands, this technique has not been recorded on artefacts made of local chert sources (Group 2). Such findings require further investigation to assess the properties and limitations of the local chert, which also appears to have not been suitable for scraper type artefacts.

The rather simple lithic manufacturing process in Neolithic Malta appears to have lacked complexity, but it was sufficient to produce functional artefacts and tools. Many artefacts (n=42; 49%) are different types of flakes (e.g. prismatic flakes, blades) and scrapers. Yet, they are simple and lack the decoration and features that might suggest more skilful craftsmanship. Exceptions are the lithics from the Xagħra Brochtorff Circle and Ġgantija temple, which indicate better knapping techniques. The first assemblage includes a horseshoe scraper (BR91/S745/L845, Fig. 11.45) (see Malone *et al.* 2009, fig. 10.23), which most probably was made with the Levallois technique (Andrefsky 2005). Several examples of Levallois technique have been noted in scrapers from Malta. The assemblage from Ġgantija does not include such artefacts or similar techniques, but there are notable variations in the artefact assemblage. In particular, Layer 1019 contained one specific blade (GG15/S14/L1019) with special features (e.g. basal border, tang) (Fig. 11.43). Indeed, such features have not been reported anywhere else and highlight the significance of that period (represented by Layer 1019), not just in the Ġgantija temples, but within the broader Late Neolithic context of the Maltese Islands. Further interpretation of these patterns of interaction and local production awaits future research.

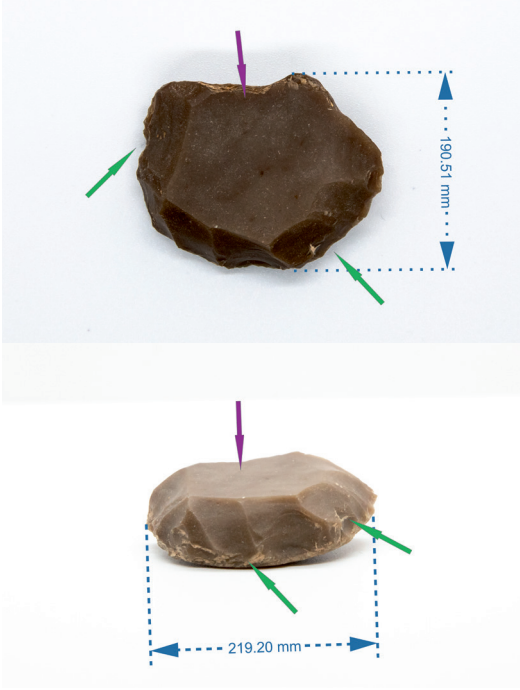


Figure 11.45. *A scraper from the Xagħra Brochtorff Circle (i.e. BR91/S745/L845). It has a flat surface from which a flake has been extracted (purple arrow) and the edges have been trimmed (green arrows). It is most likely to be created with the Levallois technique (Andrefsky 2005).*

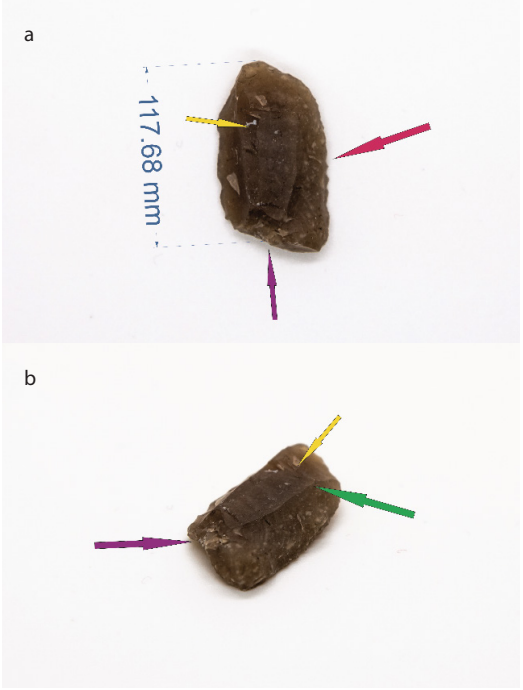


Figure 11.46. *Unimarginal flake of non-local chert (i.e. SV15/S1/L80) from Santa Verna. It has a striking platform (purple arrow), secondary flaking (yellow arrows), arris (green arrow) and evidence of serration (red arrow).*

The situation with the Group 3 artefacts is more complex, and consequently, they were treated independently from Groups 1 and 2. The exotic origin of the artefacts is proven, but their small size and number hinders clear understanding of the *chaîne opératoire* from which they emerged. They all have evidence of the finishing techniques employed, but the initial knapping action remain unclear. Some features of the initial flaking are present, but the restricted examination surfaces prevent categorization. Pressure flaking (e.g. SV15/S1/L80) is the most common technique reported (Fig. 11.46), while evidence of percussion is noted.

The small size of most Group 3 artefacts is the result of multiple retouch actions, which possibly implies their value as rare exotics to the Maltese community. Some artefacts have extensive modifications on every surface which emphasizes the ongoing efforts made to maximize their utility until they reached depletion. It is probable that the Group 3 artefacts were imported to Malta in an already complete form, since there is a total absence of any waste material macroscopically similar to these artefacts from the excavated assemblages. Nevertheless, the final or repair retouch actions were probably conducted in Malta, since many of the finds are fragments or broken tools. When comparison is made between Group 3 and Group 1, it seems unlikely they had a common origin. Although the possibility of additional sources in Sicily still remains as an option, the difficulty of accessing such raw material is clear and other possibilities must be considered. For instance, some artefacts (e.g.



Figure 11.47. *Bi-marginal flake (TCC14/S502/L301) from Taċ-Ċawla that exhibits serration at its edge.*

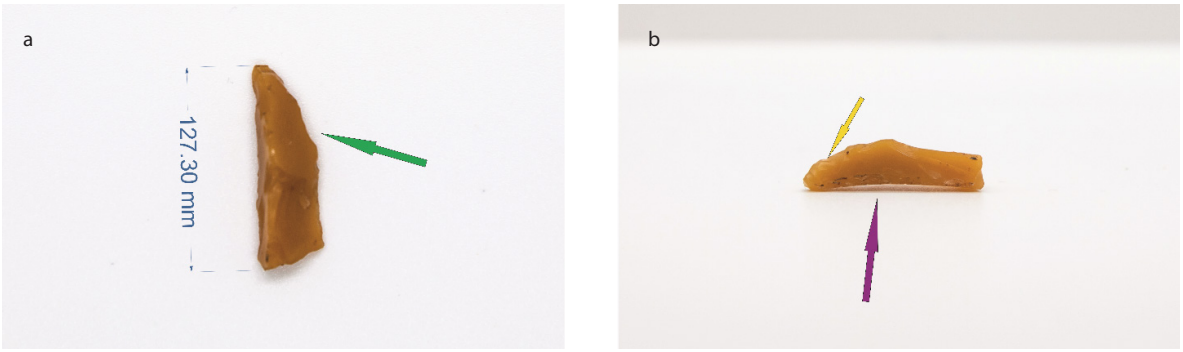


Figure 11.48. *Unhafted biface tool (i.e. TCC14/S103/L85) from Taċ-Ċawla. a) shows the polished surface (green arrow) and b) shows evidence of retouch (yellow arrow) and arris (purple arrow).*

TCC14/S502/L301) have unique features (e.g. serration), which are indicators of different techniques and skills to those present on Malta (Fig. 11.47). One artefact from Taċ-Ċawla (TCC14/S103/L85) (Fig. 11.12, SF103, a retouched point) reveals evidence of polish on the ventral surface, probably through wear (Fig. 11.48). It is the only artefact with such features and importantly the polish occurs on a specific type of chert (i.e. Subgroup 1 of Group 3), which may not be a coincidence.

11.11. Integration with *FRAGSUS* (CM)

The artefacts studied by the *FRAGSUS Project* share some important characteristic that are useful to consider in the wider discussion of the cultural dynamics of prehistoric Malta. Within the ceramic assemblage (Chapter 10) it is evident that some pottery was imported from outside Malta (mostly from Sicily or Calabria) during the Neolithic and probably in the Bronze Age too. Recent archaeometric studies have shown the importation of Maltese pottery at Licata Caduta in southwest Sicily (Barone *et al.* 2011), and Pirone's (2017) work further demonstrates movement of some fabrics/pottery between southeast Sicily and Malta. The overwhelming pattern from the pottery studies to date, however, seem to show a dominance of local production, and often imitation, even of iconic forms such as the supposed exotic Mycenaean vessel from Borġ in-Nadur, which now appears to be a local production. Although locally produced, ceramic style throughout the Neolithic does make reference to styles prevalent in Sicily, with greater similarities during the earlier Neolithic, the Żebbuġ phase and again in the Early Bronze Age. The Temple Culture stands apart between those periods with the production of unique styles, about which much has been written and debated (Chapter 10).

Pottery can be easily imitated when there are readily available sources of clay, whilst the same is not true of lithics that depend of specific materials for their production. In particular, studies of stone axes from Malta and Sicily (Dixon *et al.* 2009, 253–60; Leighton 1992; Leighton & Dixon 1992) reveal conclusively how extensive was the network of interaction that exchanged rare Greenstone and other hard igneous axes around the central Mediterranean. Probably finished axes arrived in Malta from northeast Sicily, Calabria and even from as far afield as the Maritime Alps (e.g. Xagħra Brochtorff Circle spacer bead SF365, Malone *et al*. 2009, Chapter 10). Whether they were exchanged directly or at some point further down the line we still cannot say; but over the course of time, these were reworked and reduced to little more than pendants. That level of axe reduction encountered in Malta has not been observed yet in Sicily, so it would be interesting to assess the *chaîne opératoire* in lithic assemblages. One candidate for such research could be lithics from Licata Caduta with its Maltese pottery, and compare that material with the characteristics of reduction and knapping noted in the Maltese chert assemblages.

Our study suggests the steady importation of Sicilian/exotic chert during prehistory into Malta, which worked together with the movement of obsidian. The two sources of Lipari and Pantelleria have been recorded in lithics from Skorba (Trump 1966) and the Xagħra Brochtorff Circle (Malone *et al.* 2009). A long history of research on Mediterranean obsidian (Cann & Renfrew 1964; Tykot 2011, 1997a, 1997b, 1996; Tykot & Ammerman 1997; Williams-Thorpe 1995) has revealed the extensive Neolithic exchange network, which must have integrated various lithics, including chert, that also supplied Malta. The obsidian from Lipari and Pantelleria was an important additional exotic material in the chipped stone repertoire providing particularly for sharp cutting tools and projectiles (§11.3). Together these various materials provide Malta with much needed technical ability, which the limitation of local

stone sources could not supply. We can project a complex and perhaps at times, dynamic and competitive exchange environment in prehistory, with Malta operating at the edge of the circulation network of goods within the central Mediterranean, obtaining small, but culturally and technically significant amounts of rare and functional materials.

Although much research is underway, new approaches and methods will inform on many of the questions raised here. In particular, the evidence for seafaring in early Malta is scant, and we still must rely on the distinct exotic materials described here to confirm material connections between Malta and Sicily and beyond.

Notes

1. The initials SF denote Small Find and relate to a unique site code and number. These are referenced in the Appendices for each site excavation chapter.
2. It is a group of 17 chemically similar metallic elements, including the 15 lanthanides, scandium and yttrium (Castor & Hedrick 2006).
3. The lanthanides (part of REEs explained in footnote 21) are divided into a) lower atomic weight elements from lanthanum (La) through to europium (Eu), referred to as light rare earth elements (LREE) and b) heavy atomic weight elements from gadolinium (Gd) through to lutetium (Lu) referred to a heavy rare earth elements (HREE).

Chapter 12

Megalithic site intervisibility: a novel phenomenological approach

Josef Caruana & Katya Stroud

12.1. Introduction

The first investigations of the megalithic temples on Malta in the nineteenth and early twentieth centuries often regarded each monument in isolation. Recent attention, however, has been drawn towards the spatial and structural relationships between these structures. The existence of such relationships is reasonable given their morphological similarities, and the fact that they are impressive human-made landmarks that commanded the Neolithic landscape. Here, we present a preliminary assessment of the visual links (or intervisibility) that appears to be present between the individual megalithic structures and their surrounding land and seascapes across the Maltese islands.

This research contributes to the broader landscape history studies of the *FRAGSUS Project* that are covered in Volume 1, Chapter 6. The work combines an analysis of archival records of known sites and, where possible, includes the recording of precise site location using Global Navigation Satellite System (GNSS) equipment that was then analysed using a desktop Geographic Information System (GIS).

12.2. GIS and the study of the Neolithic in Malta

12.2.1. Technical background and crucial advances in pixel coverage

In this study, rasters were used for digital elevation models, and vector points were used to store specific site locations. Whilst Grima (2005) worked with a pixel coverage of 2500 sq. m (equivalent to about one third of a football pitch), this study has utilized a Digital Elevation Model (DEM) with a pixel coverage of 625 sq. m (one eleventh of a football pitch) – a space much smaller than most of the megalithic sites under study here. Improvements in technology have therefore enabled a more detailed assessment of the prehistoric sites within their landscape.

12.2.2. Previous use of GIS in the study of Maltese temples

For two decades GIS has formed an invaluable part of the research methodology for the study of Neolithic megalithic temples in Malta, both for their landscape setting (Grima 2001, 2005) and their internal organization (Anderson & Stoddart 2007; Attard Mallia 2018). These studies addressed various topics ranging from the analysis of the relationship of finds within a particular location to site settings in the wider landscape. This included interrogation of the locations of known megalithic sites in relation to a number of environmental variables. Grima proposed a model for the choice of monument location and argued that 'the megalithic monuments played an important role in transforming natural divisions in the landscape into cultural units of organisation' (Grima 2005, 2). In the Anderson and Stoddart study (2007), GIS was applied at an intra-site scale to assess artefact visibility within a megalithic building. This confirmed earlier work (Stoddart *et al.* 1993), which showed that while stone objects, tools, chert flakes and pottery were found in the more visually accessible areas of the megalithic building, statues, horn cores, bones and models of buildings were placed in more 'hidden' locations. Attard Mallia (2018) conducted a re-examination of the data from Tarxien Temples, particularly the location of animal remains within the building in a study based on the concept of 'causality' as advocated by Juan Barcelo (Achino & Barcelo 2018). According to this concept, specific human actions, such as those carried out during a ritual, are seen as the result of their interaction with the physical space in which they occur. The study added further detail to the intentionality of the placement of artefacts and clearly found that this aspect required further analysis.

12.3. The Neolithic landscape

The study of the relationship between prehistoric sites and landscapes presents challenges for the mapping

of an accurate reconstruction of the contemporary Neolithic landscape and topography. As discussed in Volume 1, extensive study of past environments over time provides significant information that enables a reconstruction of Malta's soil and vegetation some five thousand years ago. Palynological and archaeobotanical analyses in particular evidence the distribution of flora in the landscape. Reconstructions also need to incorporate climatic and anthropogenic changes that can be identified in environmental record. These studies (e.g. Carroll 2012; Fiorentino 2012; Gambin 2016) point an environment characterized by to a typical Mediterranean scrubland with small trees and shrubs for the period of megalithic building construction and use. To quote:

> *The presence of olive associated with mastic, myrtle and buckthorn indicate a typical Mediterranean maquis environment. Remains of deciduous oak and hornbeam highlight the presence of areas characterised by residual vegetation, associated with more humid climatic conditions, while the presence of* Erica *cfr.* multiflora *may be the result of soil erosion* (Fiorentino 2012, 177–8).

The presence of a maquis environment is now further supported by the findings of the *FRAGSUS Project* as seen in the results presented in Volume 1.

12.3.1. Project aims

The aims of this GIS analysis are to shed light on the Neolithic landscape and the organization of monumental sites in relation to their views and vistas on the Maltese islands. The principal objective was to investigate what features and sites could be seen from each megalithic site, and whether their positioning within the landscape was related to the views and vistas from those specific locations.

Earlier contributions to site location studies on Malta tended to focus on sites in isolation. These noted particularly factors such as proximity to sheltered creeks or bays (Caruana 1896; Zammit 1929). Subsequent observations by Pace (1996) and analysis by Grima (2005, 94–5) showed access to the coast appeared to be significant.

Grima (2005) noted that GIS was, at that stage, insufficiently precise to investigate viewsheds in detail. He wrote that 'In the Maltese landscape, the local topographic variability that is often encountered within a 50 m cell may dramatically alter the viewshed from a nearby site. Viewshed analysis based on a single value for each 50 m cell would therefore be unreliable' (Grima 2005, 146). Since then, however, advances in satellite imagery have meant that the resolution is now sufficiently precise to reassess the viewsheds of these same sites with much greater confidence and explore the value of individual viewsheds. Meanwhile, ongoing research (Lomsdalen 2018) is using digital elevation models derived from LiDAR data that have even higher resolutions to examine the intervisibility of Maltese megalithic monuments and their visual relationships with landscape and skyscape features.

Apart from a better understanding of the Neolithic landscape, an additional expected result was an assessment of the past 'value' of the views and vistas of the megalithic sites. In the present day, these views, which are intrinsic to the values of this aspect of Malta's universal heritage, are fast being lost in the name of modern development. Thus, their understanding and appreciation becomes tantamount to the preservation of the megalithic structures themselves; and this work should enable better preservation policy development.

12.3.2. Methodology

The selection of sites included in the study was based on set criteria, inevitably excluding various potential sites which did not fulfil the following key criteria:

1. Neolithic origins
2. Megalithic structures
3. Securely known location.

Sites that could not be attributed securely to the Neolithic period were left out of this study. This list included sites such as Ras ir-Raħeb where there are megalithic remains but no stratigraphic or ceramic evidence to confirm their origins. Criterion 2 required that sites were substantial enough to indicate that they originally formed part of a megalithic structure. This criterion excluded isolated menhirs (such as Il-Ħaġra l-Wieqfa in Qala), settlements (e.g. Taċ-Ċawla and Għajnsielem) and ceramic scatters (such as ta'Ġawhar Tower in Żurrieq). The third criterion required that a site's location be securely identified to enable coordinates to be entered into GIS. Unfortunately, we only have approximate locations for some destroyed sites and the list includes megalithic remains in Luqa and Tarxien that had been recorded previously but later destroyed. Future research and fieldwork may identify lost sites and enable this study to be extended to include a better representation of the Neolithic cultural landscape. Despite these stringent criteria, this study assembled data for 31 sites (Table 12.1). Published resources (Cilia 2004; Grima 2005; Planning Authority 2017) were used in conjunction with a GNSS receiver to achieve the necessary accuracy.

Table 12.1. *Sites included in the GIS study, visibility and attributes.*

	Number of sites visible from a given location on the same island	Number of sites visible from a given location on the other island	Viewshed predominantly concerns the sea (1 = yes, 0 = no)	Number of sites a location is visible to on the same island	Number of sites a location is visible to on the other island	Site function (1 = funerary, 0 = other)	Site location (1 = Malta, 0 = Gozo)	Terrestrial viewshed at 5 m (sq. km)
Borġ l-Imramma	4	3	1	5	3	0	0	36.44
Ċnus ta' San Ġwann	5	4	0	5	4	0	0	40.11
Ġgantija	3	3	0	3	2	0	0	16.73
Santa Verna	4	2	0	3	3	0	0	33.80
Ta' Marżiena	4	0	0	2	0	0	0	13.20
Xagħra Brochtorff Circle	3	3	0	5	2	1	0	26.00
Bir Miftuħ	4	0	0	3	0	0	1	39.32
Borġ in-Nadur	0	0	1	0	0	0	1	7.93
Buġibba	1	2	1	0	1	0	1	12.59
Għajn Żejtuna	0	0	1	0	0	0	1	3.83
Ħaġar Qim	1	0	1	2	0	0	1	2.19
Ħal Saflieni	5	0	0	6	0	1	1	47.58
Ħal Ġinwi	1	0	1	1	0	0	1	8.19
Iklin	0	0	0	7	0	0	1	36.48
Kordin II	5	0	1	1	0	0	1	41.51
Kordin III	5	0	0	4	0	0	1	47.97
Kunċizzjoni	2	5	1	4	5	0	1	20.67
Kordin I	4	0	0	1	0	0	1	24.5
Mnajdra	0	0	1	1	0	0	1	0.4
Qalet Marku	0	0	1	0	0	0	1	9.06
Ras il-Pellegrin	3	5	1	3	5	0	1	36.55
Santa Luċija	8	0	0	7	0	1	1	28.83
Skorba	1	0	0	0	0	0	1	12.37
Ta' Ħaġrat	2	0	0	1	0	0	1	8.26
Ta' Raddiena	7	0	0	5	0	0	1	54.03
Ta' Lippija	2	2	1	2	4	0	1	8.46
Tal-Qadi	0	0	0	0	0	0	1	10.51
Tarxien	6	0	0	5	0	0	1	60.59
Tas-Silġ	1	0	1	1	0	0	1	27.62
Xemxija	0	0	1	1	0	0	1	11
Xrobb l-Għaġin	0	0	1	0	0	0	1	0.40

12.4. QGIS and associated analyses

For this study the open source QGIS version 3.10.7 (QGIS.org 2020) was used, together with version 1.2 of the Visibility Analysis plugin (Čučković 2020) installed in it. The DEM used in this study was the section in which the Maltese islands are located within the 'European Digital Elevation Model (EU-DEM), version 1.0' with the 'EPSG:3035 (ETRS89, LAEA)' coordinate system provided by the European Environment Agency (EEA) under the framework of the Copernicus Programme. This has a spatial resolution of 25 m (DHI GRASS 2014). The model was then clipped to contain only the Maltese islands and discard neighbouring regions to speed up data analyses. The spatial resolution of 25 m meant that a smaller site such as Skorba is covered by 2.5 cells whilst Ħaġar Qim is covered by 6.5 cells. With a validated RMSE of 2.56 m

for elevation in Malta (DHI GRAS 2012), the model was deemed to be sensitive enough for the purpose of this study. This was because the objects of interest were megalithic structures higher than the 2.56 m RMSE. The Land-Water Boundary map from the Inspire geoportal (ERA 2016) was used as a base-map.

Visibility analysis using GIS enables reconstruction of the visibility between various points and heights in the landscape within a DEM. Landscape topography generally determines a site's location, and these features can be discerned through GIS analysis, potentially illuminating phenomenological considerations about inter-site visibility and the relationships between, or functions of, megalithic sites on the Maltese islands. To achieve the analysis, four parameters were selected in constructing viewpoints and viewsheds. These parameters are detailed below. The study was conducted on the basis that whilst everything is related to each other, nearer things are more closely related than distant ones (Tobler 1970). In human experience, the nearest things might not necessarily relate to physical distance but may relate more to visibility. Objects visible from a certain location might thus be perceived as being more closely related than other structures that may be physically close, but are invisible to the viewer.

12.5. The parameters used

12.5.1. Height

The target height selected in the parameters was 5 m. This target height, with the additional DEM model's margin of error of 2.56 m RMSE, would mean that the target size is still within the building size estimated for these structures. In 1939, Carlo Ceschi, working from a facade model that was found on-site, calculated the Tarxien façade to be 10 m high, whilst the existent facade at Ġgantija reaches 7.5 m (Evans 1971). This means that the target height chosen for this analysis is lower than the existent structure at Ġgantija, even if the RMSE is included; and it is actually about the size of the highest megalith found at Ħagar Qim, where the façade reconstruction has been estimated to have been over 11 m (Psaila 2012).

12.5.2. Extent of view

The extent of view was set arbitrarily at 20 km. The distance a person can view is extensive; on clear days Sicily, 95 km away, is visible from the Maltese mainland, whilst vessels on Hurds Bank, 20 km away, can also be seen from the island. Inter-island viewshed analysis revealed that no viewable structure from another site was situated more than 7.1 km away. The furthest intra-island visibility distance observed was between the Xagħra plateau and Kunċizzjoni elevations, which are 17.5 km apart. This fact can be confirmed by personal observation today.

12.5.3. Height of observer

Height of observer was set at 1.7 m. This is because the stature range of the inhabitants of the island in the Temple Period has been assessed to have ranged from 1.52 to 1.8 m (Stoddart *et al*. 2009; Volume 3, Chapter 7). Thus, the height of the observer falls within the range of what mature adults at the time would have potentially experienced.

12.5.4. Curvature

The Earth's curvature was taken into account in the analysis as it was one of the parameters included in the calculation. Information about this was taken by the Visibility Analysis plugin from the Common Reporting Standard (CRS) (Čučković 2020). The atmospheric refraction option was enabled and left at the standard value of 0.13 in order to try to simulate real-world conditions in the analysis as far as possible.

12.6. Assumptions and limitations

A limitation to the study of archaeological viewshed analysis is that viewshed barriers formed by palaeovegetation cannot be accurately modelled. As mentioned above, however, current botanical reconstruction (Carroll 2012; Fiorentino 2012; Gambin 2016; Volume 1) suggest a primarily scrubland and maquis landscape in the Temple Period with the few densely wooded areas unlikely to have acted as barriers to views. The current information is based on the analysis of localized samples of vegetation density; but consistent results point to open scrubland flora across the Maltese archipelago, implying there was little restriction to extensive views across the landscape.

A second limitation in this study is that a single point was taken as the viewpoint of each site under investigation. Further technological advances may allow for the possibility of viewshed analysis being conducted from a polyline instead of a single point.

Thirdly, this study did not take into consideration any changes to the landscape, particularly the coastline. These changes have included land reclamation projects, building of wharves and breakwaters, as well as a rise in sea level and sedimentation. As found in previous landscape studies, however, 'for the purposes of quantitative analysis of the landscape of the entire archipelago, the coastal change that may have occurred since the Neolithic is not of a significant order of magnitude' (Grima 2005, 94). In interpreting localized observations, possible changes have been considered. For example, the destroyed site of Kordin I overlooked large stretches

of the Marsa plain, an area long subjected to anthropogenic changes. Parts of Marsa would have formed an inlet in the Neolithic, long before it was utilized as a harbour in the Roman Period (Gambin 2016, 286–7).

12.7. Results and observations

As listed in Table 12.1, 31 Neolithic megalithic sites were included in the study. Once the viewshed of each site was processed (Figs. 12.1, 12.2), Table 12.1 was constructed and populated to record and understand the data that were generated.

12.7.1. Correlation analysis

As can be observed in Table 12.2, the number of sites visible from a particular location in Malta ranges from a maximum of eight for the Santa Luċija Hypogeum, to a series of sites whose viewsheds do not include any other megalithic structures. It was observed that some correlations might exist within Table 12.2. In order to explore this, correlation analysis (Pearson's correlation coefficient) was used to determine linear correlations (Tables 12.2, 12.3).

The resulting matrices showed that a statistically significant negative correlation exists between the number of sites observable from a particular location and whether the viewshed includes the sea in that location. The same correlation also functions in reverse, with a viewshed predominantly concerning the sea meaning that the site is not visible from a large number of other sites. As an example, Figure 12.3 shows the viewshed analysis of Borġ in-Nadur, and visualizes the negative correlation. Although situated in an elevated position the viewshed seems to be more concerned with the sea than with neighbouring sites.

In order to determine that the correlations were not a random feature of the topography concerned, the same methodology was conducted with thirty-three points randomly generated on the Maltese landscape by means of QGIS. From the statistically significant correlations shown in Table 12.2 only two correlations were present at a statistically significant level in the randomly generated point study. These were: 'Number of sites a location is visible to on the same island' correlated with 'Number of sites visible from a given location on the same island'; and 'Number of sites visible from a given location on the other island' correlated with 'Number of sites a location is visible to on the other island' were present at a statistically significant level in the randomly generated point study.

Table 12.2. *Pearson correlation matrix for all sites in the study. Values in bold are different from 0 with statistical significance level alpha of 0.0071 after application of the Bonferroni correction to 0.05 alpha level (values in brackets are p-values).*

	Number of sites visible from a given location on the same island	Number of sites visible from a given location on the other island	Viewshed predominantly concerns the sea	Number of sites a location is visible to on the same island	Number of sites a location is visible to on the other island	Site function	Site location
Number of sites visible from a given location on the same island	**1 (0)**	0.1180 (0.5273)	**-0.5430 (0.00159)**	**0.6703 (0.00003)**	0.1238 (0.50709)	0.3903 (0.02994)	-0.2621 (0.15439)
Number of sites visible from a given location on the other island	0.1180 (0.52728)	**1 (0)**	0.1209 (0.51718)	0.2874 (0.11698)	**0.9502 (< 0.0001)**	0.0133 (0.94328)	**-0.4836 (0.00584)**
Viewshed predominantly concerns the sea	**-0.5430 (0.00159)**	0.1209 (0.51718)	**1 (0)**	**-0.4917 (0.00496)**	0.1576 (0.39714)	-0.3169 (0.08235)	0.3110 (0.08862)
Number of sites a location is visible to on the same island	**0.6703 (< 0.0001)**	0.2874 (0.11698)	**-0.4917 (0.00496)**	**1 (0)**	0.2712 (0.13995)	**0.5189 (0.00278)**	-0.2936 (0.10890)
Number of sites a location is visible to on the other island	0.1238 (0.50709)	**0.9502 (< 0.0001)**	0.1576 (0.39714)	0.2712 (0.13995)	**1 (0)**	-0.0541 (0.77236)	-0.4214 (0.01823)
Site function	0.3903 (0.02994)	0.0133 (0.94328)	-0.3169 (0.08235)	**0.5189 (0.00278)**	-0.0541 (0.77236)	**1 (0)**	-0.1158 (0.53498)
Site location	-0.2621 (0.15439)	**-0.4836 (0.00584)**	0.3110 (0.08862)	-0.2936 (0.10890)	-0.4214 (0.01823)	-0.1158 (0.53498)	**1 (0)**

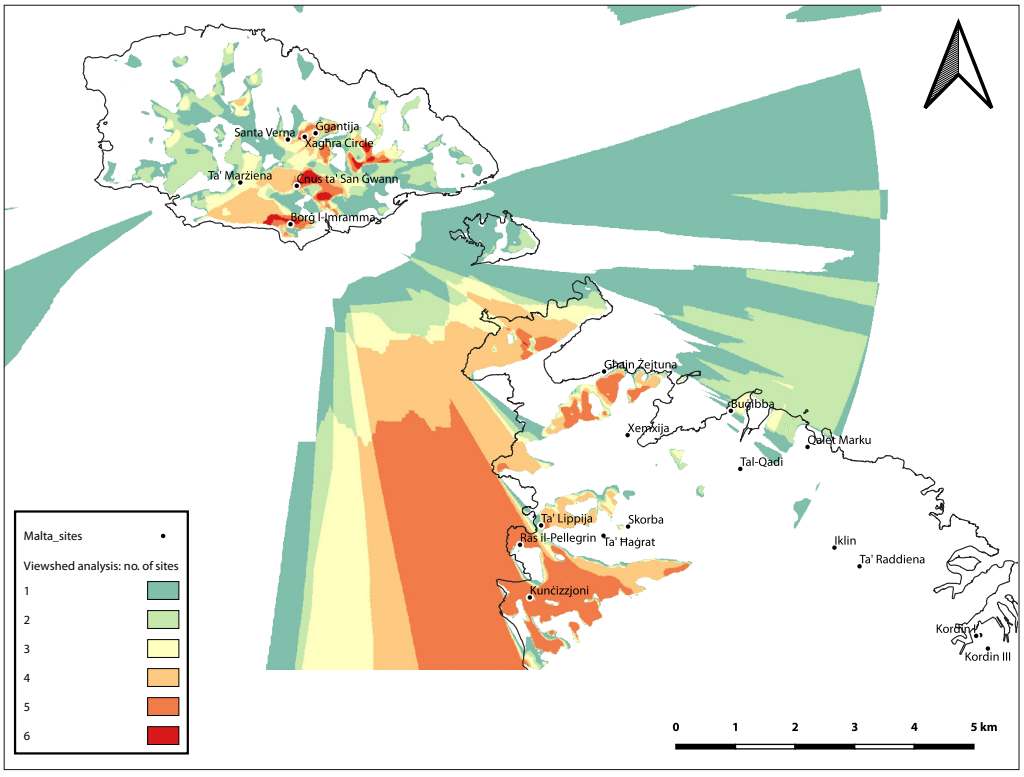


Figure 12.1. *Viewshed analysis of selected prehistoric sites in Gozo.*

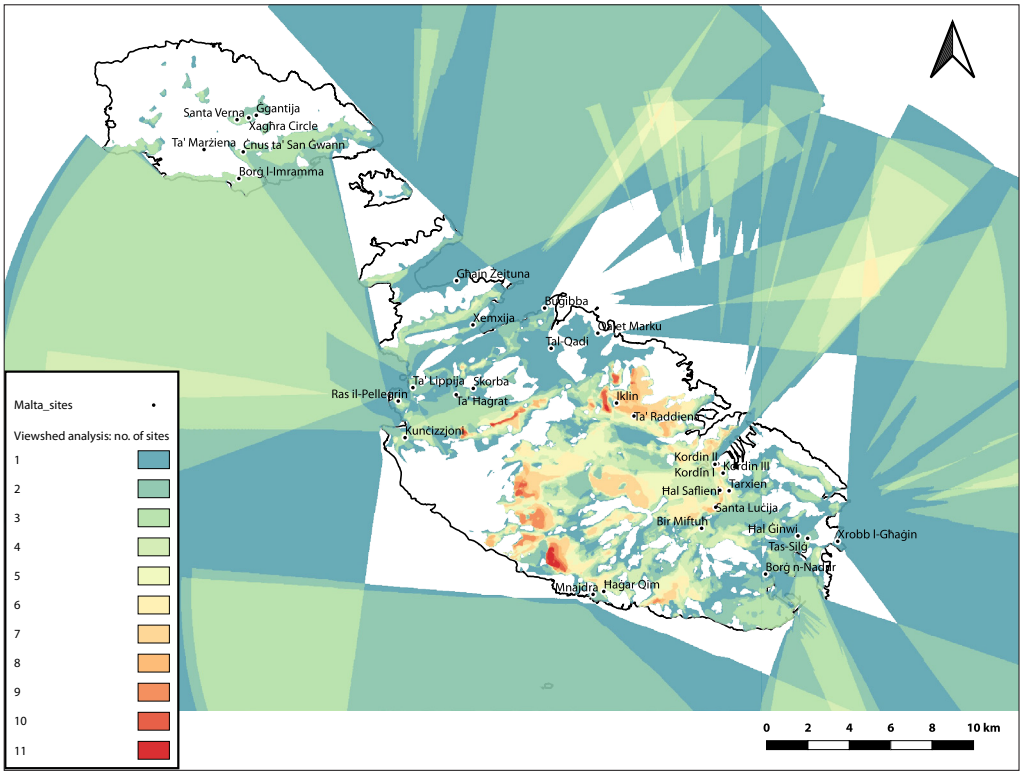


Figure 12.2. *Viewshed analysis of selected prehistoric sites in Malta.*

Table 12.3. *Pearson correlation matrix for sites in Malta. Values in bold are different from 0 with statistical significance level alpha of 0.0083 after application of the Bonferroni correction to 0.05 alpha level (values in brackets are p-values).*

	Number of sites visible from a given location on the same island	Number of sites visible from a given location on the other island	Viewshed predominantly concerns the sea	Number of sites a location is visible to on the same island	Number of sites a location is visible to on the other island	Site function
Number of sites visible from a given location on the same island	**1 (0)**	-0.0172 (0.93492)	**-0.5468 (0.00467)**	**0.6653 (0.00028)**	-0.0087 (0.96726)	0.5076 (0.00959)
Number of sites visible from a given location on the other island	-0.0172 (0.93492)	**1 (0)**	0.3504 (0.08590)	0.1023 (0.62642)	**0.9567 (< 0.0001)**	-0.1166 (0.57891)
Viewshed predominantly concerns the sea	**-0.5468 (0.00467)**	0.3504 (0.08590)	**1 (0)**	**-0.5271 (0.00678)**	0.3492 (0.08711)	-0.3327 (0.10418)
Number of sites a location is visible to on the same island	**0.6653 (0.00028)**	0.1023 (0.62642)	**-0.5271 (0.00678)**	**1 (0)**	0.1161 (0.58063)	**0.5604 (0.00357)**
Number of sites a location is visible to on the other island	-0.0087 (0.96726)	**0.9567 (< 0.0001)**	0.3492 (0.08711)	0.1161 (0.58063)	**1 (0)**	-0.1162 (0.58030)
Site function	0.5076 (0.00959)	-0.1166 (0.57891)	-0.3327 (0.10418)	**0.5604 (0.00357)**	-0.1162 (0.58030)	**1 (0)**

This indicates that the other statistically significant correlations made with regard to the analysis of the Neolithic sites included in this study are not an abstract representation of the Maltese landscape.

Several sites seem to be more visually linked to the sea than to other sites inland. Analysis indicates that the surrounding seascape was extensively covered by the viewsheds of megalithic structures under study in the island of Malta. This trend implies that vessels could not approach the island without entering one of the viewsheds (Fig. 12.2), whether the target height is 5 m or 2 m. A viewshed for a 2 m target height was constructed in order to take into account vessels that may have had a lower profile. Yet, the results showed that no substantial difference in the visibility of approaching sea craft was discernible between the two models.

The same correlation test was conducted with only sites in Malta (Table 12.3), and the same correlations (in bold) were statistically significant. Intervisibility between sites situated in Gozo is more prominent than in Malta, since all Gozitan sites have at least another three sites on the island in their viewshed. This observation was not present in the random dataset.

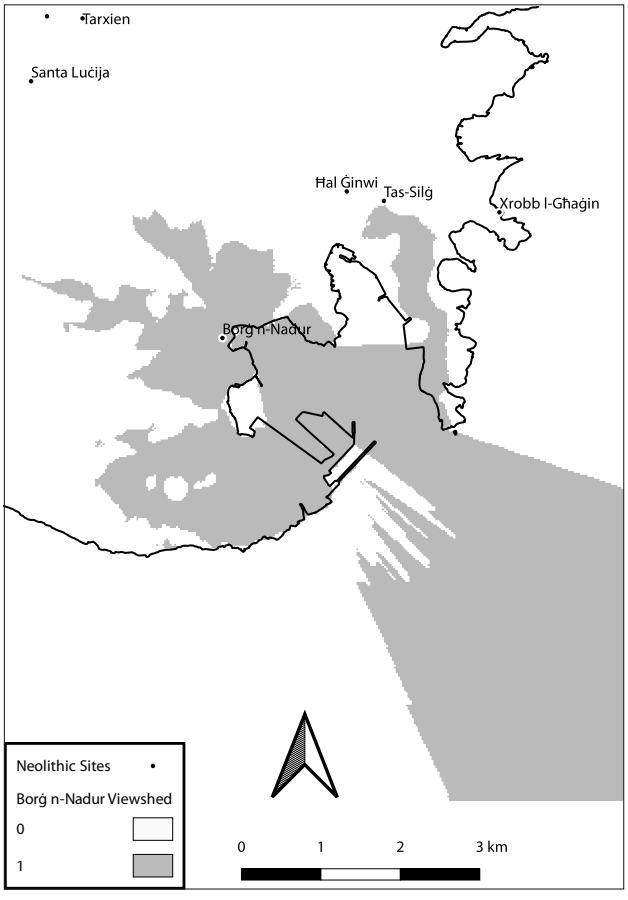


Figure 12.3. *Viewshed analysis of Borġ in-Nadur.*

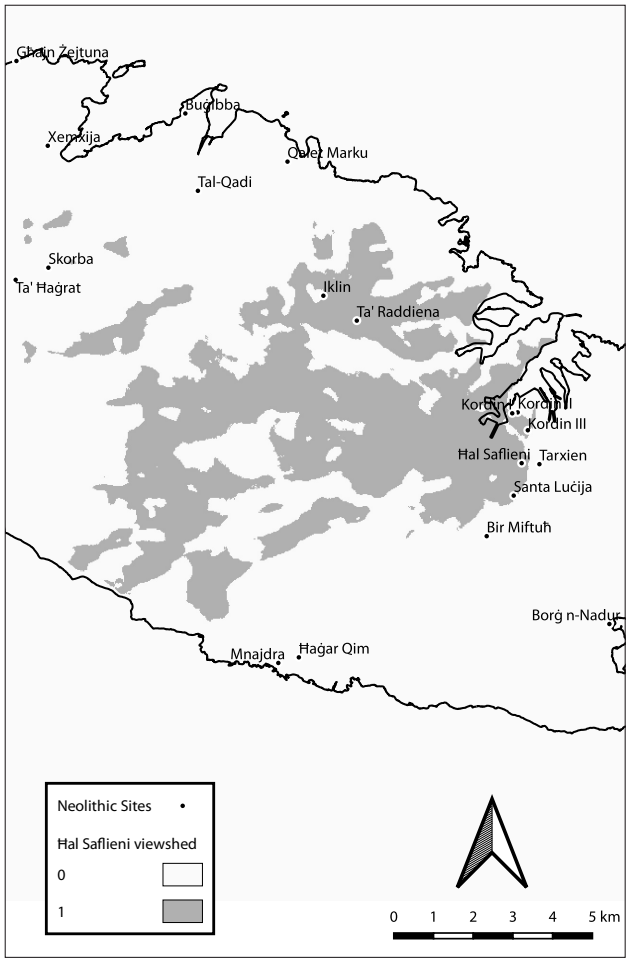


Figure 12.4. *Viewshed analysis of the Ħal Saflieni Hypogeum.*

The inter-islands visibility between Gozo and the north of Malta is also an interesting outcome that should be explored further. Only one site in Gozo, Ta' Marżiena, does not have a Maltese site within its viewshed, and is invisible from any site in Malta. The visual link between the rest of the sites in Gozo and some of the sites in the north of Malta might hint at relationships that are not based on physical proximity, but rather on visual proximity.

The funerary sites present an interesting correlation for their visual relationship with other sites in Malta. A positive correlation exists between the number of sites a location is visible to and whether that location is a funerary structure. It is statistically significant that funerary sites were positioned to be visible to other sites. This indicates that these structures were a focal point in the Neolithic landscape as has already been discussed in relation to the conspicuous nature of the land on which they were positioned in Grima (2005). An example of this positive correlation can be seen in the Ħal Saflieni Hypogeum, which seems to have been constructed in order to face inland (Fig. 12.4), and to be visible from a large stretch of the island and six megalithic structures. A similar observation has been made for the funerary circle on the Xagħra plateau (Grima *et al*. 2009, 57).

12.8. Agglomerative hierarchical clustering

The outcome of the GIS study results in both positive and negative correlations with regards to intra-site visibility. The level of intervisibility of a site overlooking the sea raises the question of whether different megalithic structures might have served different roles in the organization of the Neolithic landscape. In order to explore this observation, agglomerative hierarchical clustering was conducted using covariance to calculate similarity (Fig. 12.5). The results show that sites group into four major clades, or groups. The similarities within the clades can be interpreted as:

A. Sites overlooking the sea that are visible from Gozo: Buġibba, Ta' Lippija, Kunċizzjoni, Ras Pellegrin.
B. Sites with viewsheds more focused on the inland and inlets of the island than towards the open sea: Tal-Qadi, Skorba, Ħal Ġinwi, Ta' Ħaġrat, Bir Miftuħ, Kordin III, Ħal Saflieni, Tarxien, Ta' Raddiena and Santa Luċija. The exception is Ħal Ġinwi, which has viewsheds covering both large stretches of land and sea.
C. Sites from which a maximum of one other site is visible: Tas-Silġ, Ħagar Qim, Iklin, Xemxija and Mnajdra. It is interesting to note that apart from Iklin, all of these sites overlook large stretches of the surrounding sea.
D. Sites overlooking the sea and that are not visible from any other Megalithic structure: Xrobb l-Għaġin, Borġ n-Nadur, Qalet Marku and Għajn Żejtuna.

12.9. Conclusion

Taking into consideration the above results, it appears that the choice of site location was not only dependent on access to the sea and proximity to natural resources, but was also partly influenced by views and vistas. This preliminary viewshed analysis has shown that on the island of Malta, the Neolithic megalithic structures were intentionally located either in association with other sites and inland views, or with seaward views and limited association with other sites. Ongoing research using higher-resolution data made possible by technologies such as

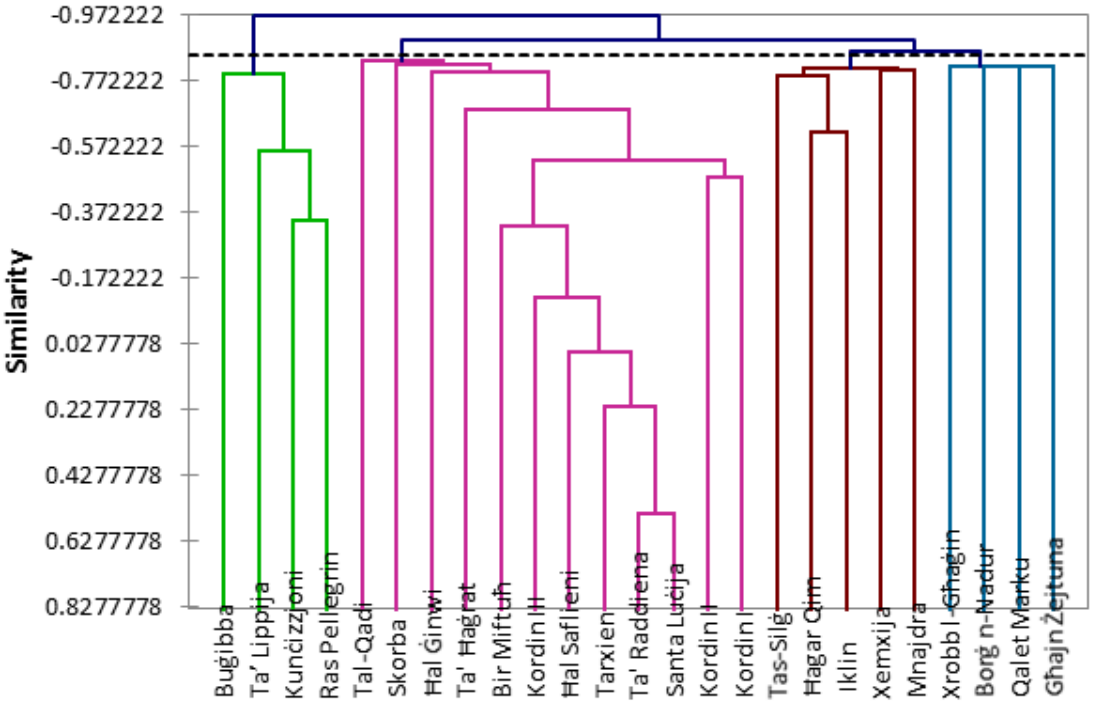


Figure 12.5. *Dendrogram showing the sites in Malta divided into four major clades (branches) based on similarity by agglomerative hierarchical clustering.*

LiDAR (Lomsdalen 2018), whilst having their own drawbacks, is expected to refine and further the observations in this study.

Grima (2005), in his analysis of the location of megalithic structures, concludes that intervisibility with the shoreline as well as intervisibility with the sea were not a determining factor in the choice of location of the sites. He bases this on the fact that there are clear examples where buildings would be visible from the shoreline if they had been placed a few metres away from their actual location (Grima 2005, 136). That observation, together with the results obtained through this current study, show that there was an element of intentionality in positioning these structures in the landscape according to the desired views and vistas; and that, in certain instances, these views and vistas may have excluded the seascape.

This proposal is based on a preliminary study with certain limitations as discussed above, and the results will be tested against on-site observations from various points of view. The addition of more sites (once their exact location is identified), together with a refined chronology will make the results more representative of the original Neolithic landscape. Gozo clearly warrants further study since the results reveal differences in trends to those observed in Malta.

These preliminary results also point towards elements that may reveal aspects of Neolithic cosmology, one concerned with the experience of the land and sea. These concerns have been noted before in relation to Neolithic megalithic structures. Grima (2001) identified some of the principal devices used to define spaces within the megalithic complexes prompting various observations. He discovered a consistent grammar of relationships between devices of elevation, screening and surface treatment that are used systematically and repeatedly across the sites considered. He found a 'systemic and meaningful demarcation between apses and court' (Grima 2001, 56) representing two cosmological domains. Together with the relationship between the iconography used in these two 'domains', this suggested that 'the cosmological domains that are being represented here are land and sea, perhaps the most inevitable components of an islander's cosmology' (Grima 2001, 56).

Prehistoric representations of sea vessels as well as traces of burning between the two spaces in some temples, indicate that the boundary between the represented domains was an important focus of ritual activity. At Mnajdra, a representation of the facade of a temple building on the screen between the two internal spaces 'may have been a reference to the location of the

temple itself, along the boundary between land and sea' (Grima 2001, 62). Furthermore, concentrations of animal bones and burnt remains were also found to be concentrated at points in the architecture at Tarxien temples that could be seen as boundaries between the two types of spaces (Attard Mallia 2018, 172). In Grima's model, these would have been at the boundary between the two components of the Neolithic cosmology. This interpretation appears to be borne out by these results on a macro scale, where megalithic structures with mainly seaward vistas that are not visually linked to the inland structures may be assuming similar roles to those of the boundaries within the megalithic structures. When considered in this way, it becomes apparent that the Neolithic megalithic structures on the Maltese islands acted as gateways between sea and land.

Chapter 13

Conclusions

Caroline Malone, Catriona Brogan, Reuben Grima, Eóin W. Parkinson, Rowan McLaughlin, Simon Stoddart & Nicholas Vella

13.1. Introduction

Five years of intensive fieldwork and post-excavation analysis in Malta have yielded several important new insights into Maltese prehistory which we summarize and put into a broader thematic context below. A number of innovative approaches to archaeological fieldwork were attempted as part of this *Project* in our quest to tackle the five major questions of the research programme. We now have the opportunity to assess their effectiveness in enabling advances on our initial research questions. We pose some new questions that have arisen for future scholars to consider.

13.2. Excavation, sampling and some lessons learnt

13.2.1. Challenges and opportunities

The recurring difficulties in the excavation of prehistoric sites everywhere, but especially in the Maltese islands are those of (i) visibility, (ii) residuality and (iii) the finite resource of a small island's cultural heritage. In the field, our excavations were undertaken with these factors very much in mind.

The issue of the **visibility** of ancient remains and materials has been assessed though a number of surface surveys and geophysical prospection. Prospection and non-invasive survey are needed to locate sites, but the results are often frustrating. We applied extensive ground-penetrating radar surveys with only limited success (Fig. 13.1a & b). More successful was a traditional surface survey approach. Building on the Cambridge Gozo survey of the late 1980s and early 1990s, surveys located a spread of pottery in 2014 at Santa Verna that subsequently led us to identify valuable early soils and a related sixth millennium BC occupation, which we uncovered in 2015. This result is immensely encouraging for the Maltese islands, because a number of us feared the moment for effective surface survey had passed with growing urban development and agricultural enclosure. These results suggest that, at least on Gozo, the less developed of the two major islands, intensive surface survey is still an invaluable technique for ground-truthing archaeological evidence. That said, it should also be recognized that the disturbance caused by modern development has had an impact on our understanding of prehistoric exploitation of different parts of the landscape. For example, the central plain of Gozo, which today offers some of the best agricultural land, is also characterized by the most intensive agricultural activity, as well as loss to modern roads, building activity and even a race course. As a result, only very limited new evidence of prehistoric human activity could be gathered from this region, one that was most likely very significant to the prehistoric economy of Gozo.

Our experiments with remote sensing techniques were not exhaustive and there will be significant opportunity in the future to refine the application of integrated and scaled suites of technologies. This can be tested by intensive activity on the ground, including keyhole, heritage-sensitive, excavation that responds directly to research questions. One of the most successful approaches has been the almost 'remote' recording through laser scanning of inaccessible sites, such as Ta' Marżiena and Borġ in-Nadur (Figs. 13.2 & 13.3). One key lesson was to employ experienced personnel who understood not only the essentials of data collection, including flexible, portable equipment, which could enter the small cavities of a silo or a prehistoric tomb, but also the more complicated task of how to take data collection through to both research analysis and digital display. These images did not replace excavation recording, but added another level of detail to the record. The recording, during fieldwork, of the changing nature of archaeological sites adds another dimension to

Table 13.1. *Dating implications and changing time range.*

Cultural phase	Evans 1953	Trump 1966	Trump 2002	Malone *et al.* 2009	*FRAGSUS* dates – start (cal. BC)		*FRAGSUS* dates – end (cal. BC)	
	Period	BC	BC	BC	Lower	Upper	Lower	Upper
Early Neolithic GH GSKB RSKB	Ia[1]	*c.* 4000–3200	5000–4300 4500–4400 4400–4100		5570	5340	4975	4645
Fifth millennium hiatus					4975	4645	4060	3640
Żebbuġ	Ia[2]	3200–	4100–3700	4200–3500	4060	3640	3695	3540
Mġarr	Ia[1]	2800	3800–3600		3695	3540	3600	3200
Ġgantija	Ib	2800–	3600–3300	3650–3050	3600	3200	3080	2760
Saflieni	Ic	2400	3300–3000		3080	2760	2850	2660
Tarxien			3000–2500	3000–2230	2850	2660	2445	2340
Break in sequence? Thermi				2300–2230	2445	2340	2390	1990
Tarxien Cemetery	IIa	2000	2400–1500	2140–1730	2170	1830	1920	1670
Borġ in-Nadur	IIb	1500–850	1500–700		1675	1225	900	660
Baħrija	IIc	850–700	900–700					

our study. These images provide an insight into the excavation process, the visibility of contexts and features that sometimes show poorly in plans or section records and offer a long-term record of decisions made in the field, and these data can usefully impact on later interpretation of the work. Even where excavation did not take place, the images produced from these surveys provide a vital early twenty-first century record of structures that still remain to be fully recorded. From this work, an archive of imagery is now provided, adding to the heritage resources of Malta.

Residuality has emerged as a problem for the chronological interpretation of many Maltese sites. Funerary contexts have the advantage of sometimes representing intentional actions sealed inside deposits that have seen relatively little change. Open sites in contrast saw constant reworking of the ground around settlements and temple structures. This is especially the case in Malta where reuse of place and structure was commonplace. The prospect of understanding the very mixed ceramic assemblages from most sites was daunting, because, until now, pottery typology was considered the principal means to identify phases of occupation and approximate age (Table 3.1). *FRAGSUS* has faced this problem though a combination of careful fieldwork, experienced site supervision, and detailed post-excavation analysis. In particular, samples for phasing and actual dating have been identified using AMS radiocarbon dates of plant and animal remains, coupled with ceramic phases. Careful cleaning, recording and analysis of pottery was a key element in the study, showing conclusively that calendrical time does not always coincide with long-lived potting traditions. Some pottery styles, however, display new and innovative characteristics, such as the grey Thermi style, identified at Taċ-Ċawla, and clearly linked to new episodes of social interaction and settlement occupation that were new and different in the Maltese past. Taċ-Ċawla was the most extreme example that we encountered of residuality. Whereas previous watching briefs had suggested early Neolithic emphasis or much later use, the current work suggested a peak of activity in the Żebbuġ phase based on pottery counts, a peak in the 'Earlier' Ġgantija phase based on radiocarbon dates and an intact stratigraphy dated largely to Tarxien and Thermi phases. All of these perspectives carry useful information about the past, depending on how the information is processed, employing the reflexive approach taken throughout the current programme of work.





Figure 13.1. *a) Remote sensing at Ġgantija; b) Georadar across the landscape seeking geological faults and depths.*

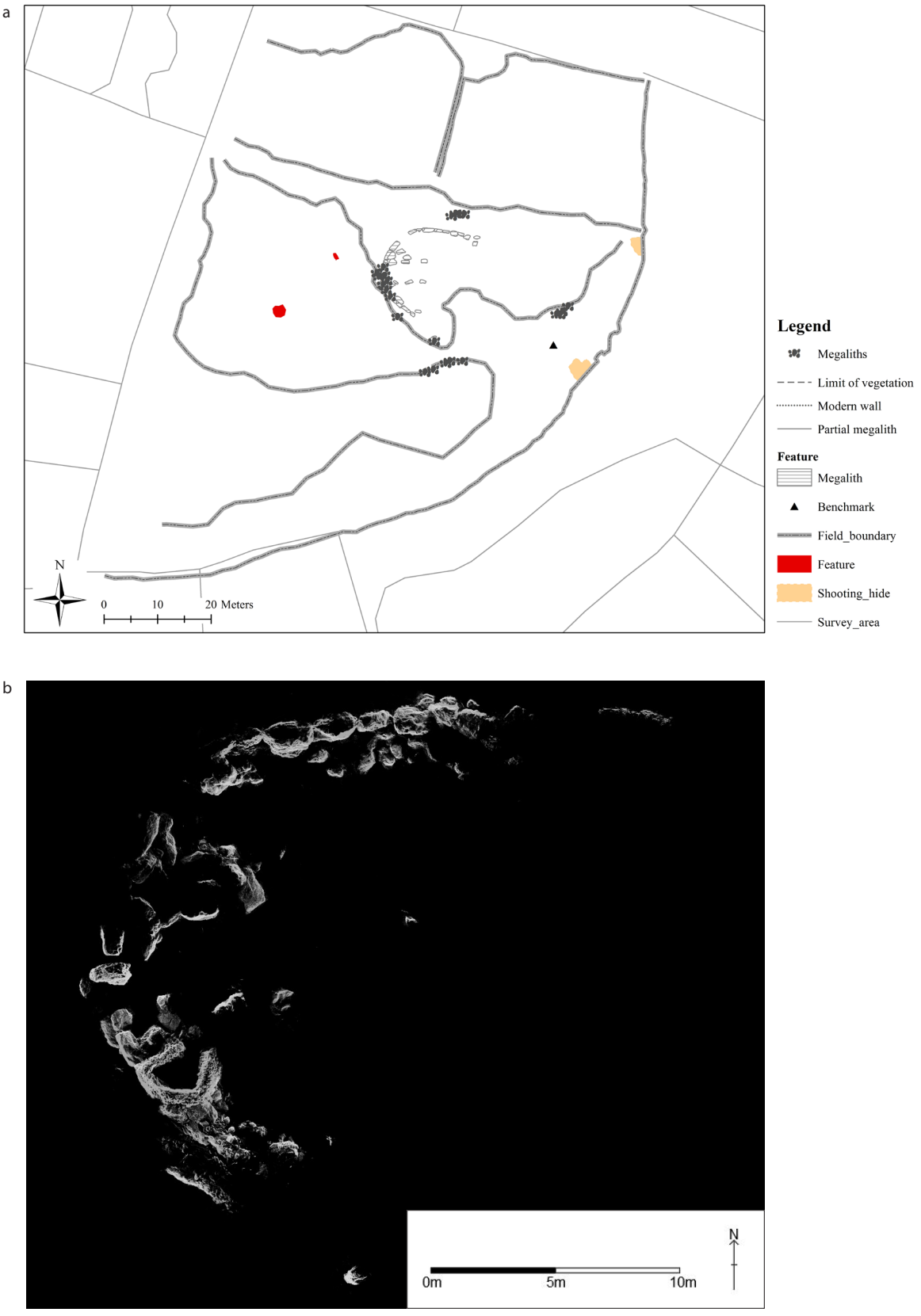


Figure 13.2. *Ta' Marżiena: a) plan; b) digital scan.*

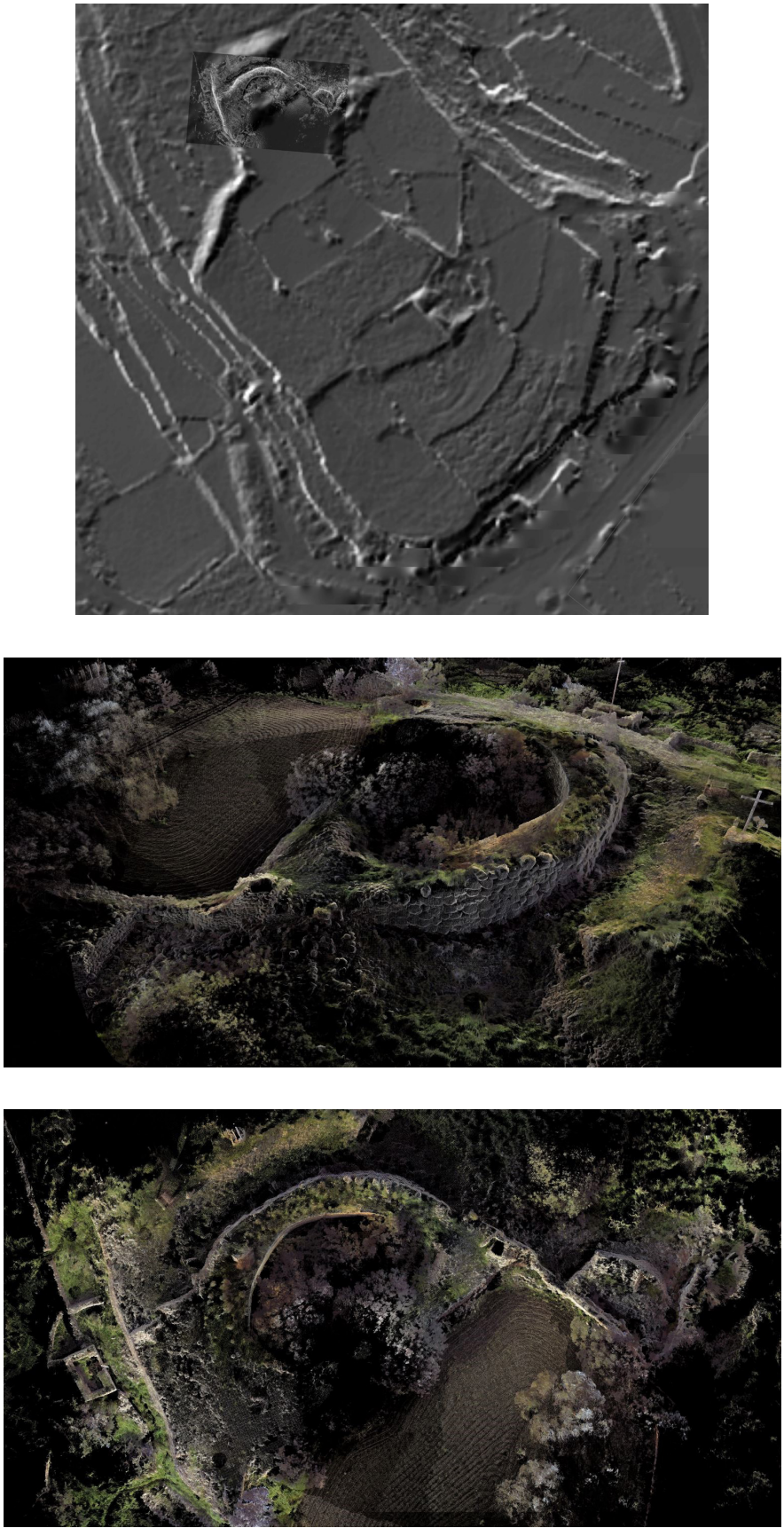


Figure 13.3. *LiDAR and digital scan images of Borġ in-Nadur from different angles.*



Figure 13.4. *Dating advances – the Skorba section and its layers dated with both AMS radiocarbon and OSL.*

At the other sites, the problem of residuality was never far away, as most of the contexts we explored represented multiple events, and thus contained a mixture of material that had encountered multiple pathways *en route* to their final place of deposition. In spite of these issues, reasonably stable patterns emerged from the data. This stability is thanks in part to the programme of AMS radiocarbon dating, and the modelling of the results. Modelling of these rich data is one of the key successes of the *FRAGSUS Project* (Fig. 13.5). Dating is something of critical importance for all future work in the central Mediterranean, since reliable and relatable chronology is still a slow growing resource in a region long sceptical of the value of absolute dates (see Table 3.1). The Maltese chronology has the capacity to inform on, and to increase the many cross-cutting cultural datasets of later prehistory in the area. We also built on techniques that we had initiated at Troina in nearby Sicily to date the actual formation process of the stratigraphy through OSL dating. In this way, an independent and comparative chronological control was implemented that was dependent essentially on the last exposure of the sediments to sunlight, rather than on the indirect date of material that happened to be included in the deposits (Fig. 13.4).

The **finite resource** of Maltese heritage was also uppermost in the decisions made to explore the sites and landscapes studied in *FRAGSUS*. As noted in Chapter 1, Malta is a very small place, densely packed with important history and heritage, and inhabited by a very dense modern population as well. Open land is constantly under pressure for urban development, coupled with ongoing erosion and landscape degradation. Prehistoric sites are extremely vulnerable given the shallow depth of surface rock and thin soil cover. This, coupled with ongoing threats that frequently remove soil cover to bedrock in the clearance of construction sites (with less than adequate record in many cases), spells destruction and extinction of many sites now and in the future. A particularly significant observation, however, made during the project is the identification of locations of preserved pockets of ancient landscape, soil and prehistoric occupation – a fact that our team had prepared for in the past, in the equally dissected uplands of central Sicily. This factor of preservation was understood by Evans and Trump more than half a century ago, with their programmes of exploring beneath the floors of the temple structures. *FRAGSUS* has re-examined some of those earlier exploration trenches, reopening them, recording the deposits afresh, and sampling them for dating and environmental materials, and using the understandably more advanced techniques now available. Such re-examinations, however, are only useful when a significant, even if limited, new excavation of adjoining deposit can be studied alongside them; where the vital association of samples with deposit/structure/site can be properly recorded in detail. The work of the past invariably has removed too much of the microscopic data that today form the base of any new interpretation. Re-examination of formerly opened sites took place at Ġgantija, Taċ-Ċawla, Kordin, Skorba and Santa Verna. Indeed, the only completely new intervention was Silo 2 at In-Nuffara, which proved to be an undisturbed deposit in a settlement that had already been investigated in the 1960s by David Trump and Joseph Attard Tabone. The value of these comparative interrogation studies is evident. Old interpretations tested, new samples taken, and new debate prompted and enabled us to assess our current understanding of a particular site, phase, feature, interpretation and theoretical model. We applied the same principle to the data from our earlier work by the team at the Xagħra Brochtorff Circle (1987–94), enabling the human remains to be further assessed by a fresh team which can check and enhance our initial findings (Volume 3).

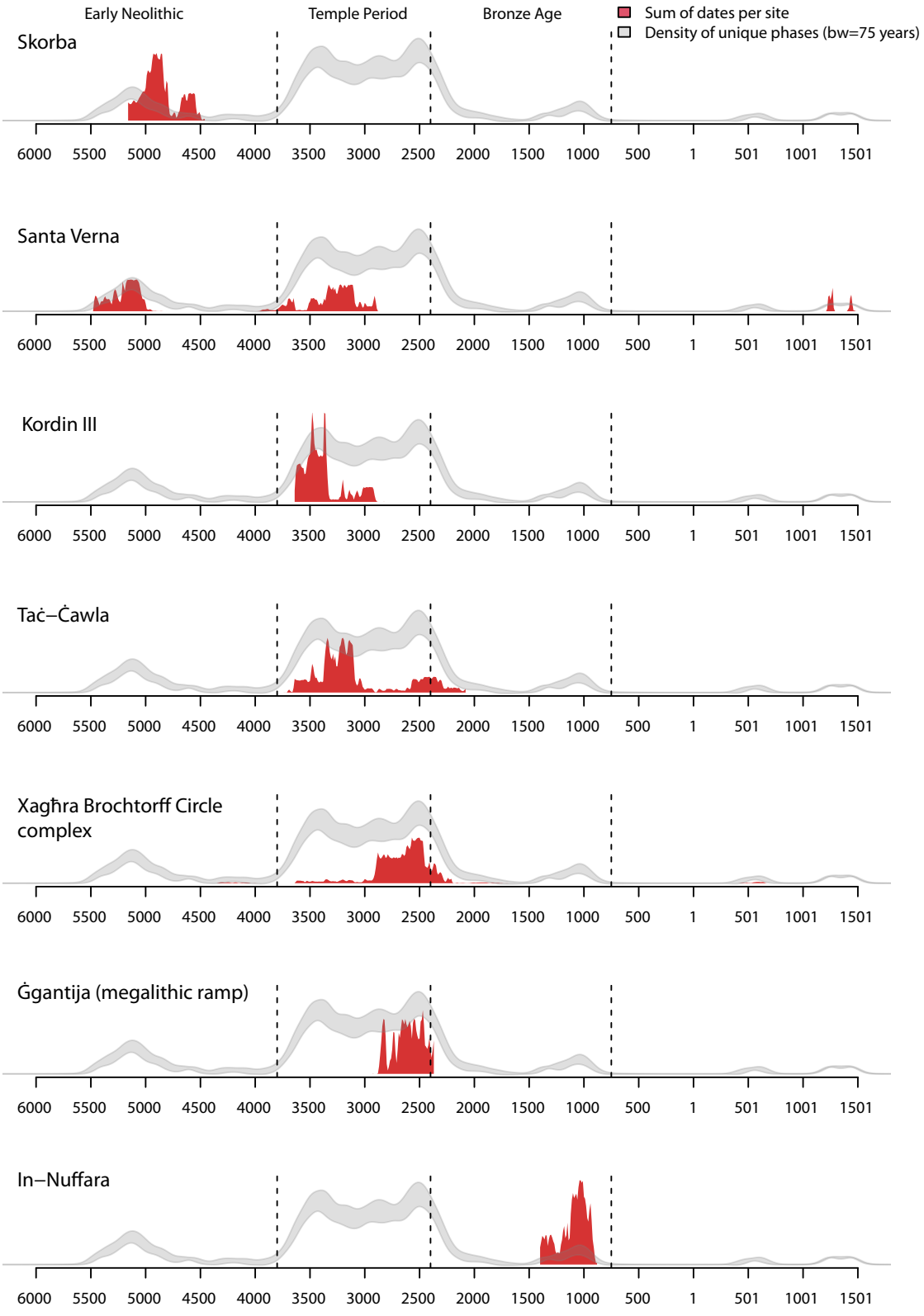


Figure 13.5. *Summed radiocarbon probability plots for sites studied by the FRAGSUS project compared to the overall density of dated material from all sites in Malta, indicating the time frame of human activity detected by the project at each location.*

Protection of Malta's finite archaeological resource was also addressed in a practical manner (see below) through public engagement, open days on sites under excavation, media presentations and films and a very well attended public conference and exhibition in Valletta. Through these means the team hoped to engage public interest in the precious Maltese past, since Malta's inhabitants are, of course, the best custodians of the resource for the longer-term future.

13.2.2. Excavation and recording methods

The application of laser scanning allowed us to record our sites in three dimensions at millimetre resolution. We have thus produced an archive of each excavation that captures the excavation trenches digitally at an unprecedented level of precision (Fig. 13.6). This digital resource will be lodged with the authorities in Malta and will enable anyone in the future to virtually revisit our excavations, take new measurements



Figure 13.6. *Laser scan of Taċ-Ċawla walled structure, vertical and horizontal record.*



Figure 13.7. *John Meneely and Simon Stoddart scanning Tać-Ċawla in 2014.*

from the trenches, and critically assess some of the conclusions we have drawn from the archaeology. Since we were engaged in close work, often in small spaces, the Faro 360 laser scanner equipment operated by John Meneely proved to be very effective, far more so than the bulkier systems often employed for large scale landscape work (Fig. 13.7).

On a related note, since our pioneering application of Structure from Motion (SfM) photogrammetry at Tać-Ċawla in 2014 (Barratt *et al.* 2014) the use of this technique has exploded in archaeology around the world and is fast becoming a standard technique for excavation recording. The 3-D models produced by SfM are less expansive in scope than laser scans but they can be even more detailed. We have found them particularly useful for the recording of small, relatively deep excavation units (such as Skorba, Chapter 7), or particular features (e.g. the 'smashed threshold' at Kordin, §6.4.2.1). Like laser scans, these models can be revisited at any time in the future and the data has been lodged as part of our site archives. In addition to their function in site recording, the 3-D models from laser scans and SfM have proved very useful in compiling the excavation reports, allowing us to virtually step back into the field, for example to measure features or take levels. We commend their use to all archaeologists in the field.

The interdisciplinary approach of the *FRAGSUS Project* has involved a scientific team spread across a number of sub-disciplines that have explored aspects of the ancient and current environments of Malta (Volume 1). Indeed, the multi-proxy approach has been central to our method. Archaeologists are conscious of the complexity and limitations of their datasets in ways that could be understood more effectively by modern-day economists and epidemiologists alike. The deployment of multiple techniques has strengthened our arguments. Theoretical models and remote sensing are not enough to attack the complexity of important and potentially informative problems that *FRAGSUS* has approached. It is important to trace and test the evidence first-hand from the details of the sediment, its signatures and its content. Statistics are vital for interpretation, but 'number theatre' (Spiegelhalter 2019; Bulman 2020) can result if the underlying data are not carefully collected and considered. We fully expect the next generation of scholars to test our results by applying new suites of complementary techniques. For instance, ongoing research may fill the apparent fifth millennium BC gap in the settlement sequence, calibrate the level of connectivity of the Maltese islands in prehistory, or analyse what food was served in the extensive repertoire of Maltese pottery.

In spite of these reservations, the application of geoarchaeology and geochemistry in particular, has been a very successful strand of *FRAGSUS*. There is clear indication from detailed studies gathered across the Maltese islands that the soils of the past differed from those of today. The significance of this perhaps rather simple observation lies at the heart of our entire study. Without productive soil there is little prospect, in a prehistoric setting, at least for the vital vegetation cover and productivity required to support the nutritional needs of ancient communities. In the constrained island setting, this issue has formed an effective focus of research. Our most fundamental questions, as set out in Chapter 1, focused on the economy and viability of island life set against changing environmental conditions. We asked whether a small island landscape had the capacity to sustain dense populations. Our findings vindicate those important questions, as they reveal the story of gradually degrading soil fertility and viability and thus help to explain culture change and economic modifications over the millennia in early Malta. The further question of whether these changes were dramatic or slow has been tackled with detailed dating and chronology building. An additional question, however, asks to what extent early Maltese people developed strategies and technologies to cope with such change and this question opens up the vital role of archaeology (see below).

At Ġgantija, we located buried palaeosols that provided important insights into soil development processes on the island of Gozo during the mid-Holocene, and these developments could be phased and dated. At Santa Verna and Skorba, profiles of buried deposits revealed evidence for landscape that once supported a completely different ecology, one of scrub, small trees, and productive humic soils that retained moisture and supported invertebrates that can no longer survive in much of the present landscape. From these studies, it is also clear that prehistoric communities understood their environment and had developed techniques that preserved its precarious fertility to a large extent. Ġgantija had evidence for manuring and soil improvement, whilst the survival of midden deposits at Taċ-Ċawla and Kordin III, demonstrate rubbish was carefully placed around and in sites, perhaps with the intention of spreading it on horticultural/agricultural plots.

Even at In-Nuffara, where the soil surface was all but eroded away, the wealth of data from the deeply stratified silo deposit provided a unique and very important glimpse into the changed environment and economic world of late second millennium BC Malta. The ability to extract pollen from these dry and difficult contexts is one that has transformed palaeoecological work in the Mediterranean and is a technique that must be applied more readily in prehistoric sites across the region (Appendix A8.3.1; Fig. 13.9).

13.2.3. Public engagement

We believe that while the Past does not predict the Future, there are nevertheless important illustrations and even lessons from the story of human impact on the environment and landscape with which the modern public can engage. Visitors to Malta and permanent residents alike can see the rapidly changing landscape and we have been able to illustrate in many ways what this meant to earlier inhabitants and how their resilience coped with the problems of the Past. A record of these problems and their resolution is held in the living archive that is the cultural heritage of Malta. For practitioners of modern sustainable tourism there are important analogies to be drawn with the past, since the attractive nature of Malta brings pressures through the numbers of visitors that inevitably lead to a decrease in its touristic value (Butler 2017; Conrad & Cassar 2012).



Figure 13.8. *The multidisciplinary* FRAGSUS *team meeting in Magdalene College Cambridge in 2016.*

Modern-day custodians of Malta's precious heritage (alongside the curators and scholars) are the residents and visitors combined, since they provide the impetus for preservation and public display of the remains and the information that they convey. Without this public support, perceived minority interests such as archaeology can rarely hold their own in the face of other economic demands on the landscape. To counter this ongoing issue in Malta, the *FRAGSUS Project* included a programme of public outreach and dissemination. The then Minister for Justice, Culture and Local Government, Dr Owen Bonnici, paid a private visit to see the works for himself at Taċ-Ċawla in 2014; and visitors included the Malta High Commissioner from London, the Hon. Norman Hamilton (Fig. 13.10b), the Times of London Correspondent for Archaeology, Professor Norman Hammond, and a flow of eminent and interested Maltese visitors who heard of the work. Public engagement was treated as a high priority on all the sites excavated during the project, and members of the team were always ready to take time to explain and demonstrate the slow process of excavation, even to casual visitors. Public Open Days, namely a two-day event at Taċ-Ċawla in July 2014 and an Open Day at Kordin III in July 2015 (Fig. 13.11a and b), were attended by hundreds of visitors. The excavation at In-Nuffara in its inaccessible location was too short in duration to organize formal visits, whilst the short programme and tiny trench at Skorba enabled only very limited public viewing (Fig. 13.4). That was countered by opportunities for the public visitors at the neighbouring temple Mġarr to talk to the team during soil processing that took place within the monument precinct. During the fieldwork, additional efforts were made to engage with local communities, including schools and young people, some of whom experienced fieldwork as volunteers for a day or two.

Ġgantija in both 2014 and 2015, as the most visited ancient site in the islands, provided ample opportunity for spring visitors to view the ongoing works and ask questions. The Santa Verna excavations saw regular visitors throughout the work, although its slightly remote location prevented a more formal Open Day. This was substituted by the short film made by Rupert Barker, 'A day on the dig', which recorded the experiences of the team, and was placed on YouTube and viewed in the National Museum of Archaeology (https://youtu.be/cGNOGpq746I).

The culmination of public outreach was achieved in two further ways. The first was through public talks and conferences. In spring 2016, an evening was devoted to the presentation of the work about the Gozo sites in Rabat, Gozo. Another evening talk was presented to the Malta Archaeological Society in 2014. Outside Malta, a long list of talks and conference presentations in the UK, Turkey, Lithuania, France, Italy, Spain, Japan, Canada, Australia and Ireland ensured there was effective knowledge transfer of the new discoveries and general engagement with both academic and popular audiences. The *Project* had always planned a collaborative exhibition with the curatorial staff of the National Museum of Archaeology in Malta and this took place at the close of the ERC *Project*, in spring 2018 (Fig. 13.12). A gallery off the entrance hall of the Auberge de Provence, the home of the National Museum of Archaeology in Valletta, was set up with exhibits that told the story of environmental change and the impact this had on early populations of Malta (see Figs. 13.9 and 13.12). Panels were interspersed with objects from the excavations, together with information and films. The exhibition opened on the same day as the final conference on 17 March 2018, and it ran for some three months reaching an audience of many thousand visitors in a busy year which coincided with Valletta's term as European Capital of Culture. The conference was open



Figure 13.9. *The Pollen Team with magnified 3-D-printed pollen grains (Farrell, Coyle-McClung, Meneely and Hunt).*



Figure 13.10. *a) Launch meeting at the University of Malta, May 2013 (L to R, Bonanno, Schembri, Vella, Pro-Rector for Research, Prof. Richard Muscat, Malone, Stoddart, Grima and Hunt); b) The Launch meeting and the team with the Malta High Commissioner the Hon. Norman Hamilton at Queen's University Belfast January 2014.*



Figure 13.11. *Open days at Kordin III, 2015.*

to the general public and held in Fort Saint Angelo in Birgu, where a full day of illustrated talks by the team presented the new discoveries. Distinguished guests included the then Minister for Justice, Culture and Local Government, Dr Owen Bonnici; the Rector of the University of Malta, Prof. Alfred J. Vella; the CEO of Heritage Malta, Noel Zammit; and the Superintendent of Cultural Heritage, Dr Anthony Pace. Guest speakers at the event included Prof. Lord Colin Renfrew and Prof. Jean Guilaine, who provided important context to the role of *FRAGSUS* and its intellectual contribution to Neolithic European studies (Fig. 13.13).

Since the formal end of *FRAGSUS* further outreach has been enabled by the making of a full-length



Figure 13.12. *Exhibition at the National Museum of Archaeology, Valletta March 2018 and the launch event: a) exhibits; b) Eóin Parkinson explaining human remains to visitors.*



Figure 13.13. *The final public Conference in Fort Sant'Angelo, March 2018 from Left -Right: Anthony Bonanno, Caroline Malone. Simon Stoddart, Anthony Pace, Jean Guilaine and Colin Renfrew.*

Smithsonian Films documentary film and two further films (made by Tile Films of Dublin). The Smithsonian documentary was released in the USA in late 2018 and has since been screened on innumerable occasions as part of the Sacred Sites Season and is about to receive a new themed edition of two further programmes, enabled by the current Covid-19 shut down. At least 30 million viewers in North America saw the series in its first year and since then many more around the world have viewed it as the series was repeated.

One aspect of the research programme that is worth noting is the involvement of younger scholars in the work, and the opportunities some took to use the material and data in their dissertations. No less than six PhD projects were based around the material, namely Jess Thompson at the University of Cambridge (UoC) on burial taphonomy, Volume 3; Eóin Parkinson at UoC on human physical adaptations to activity, using Xagħra burial material, Volume 3; Jeremy Bennett at UoC on the evolution of terraces, Volume 1; Petros Chatzimpaloglou at UoC on chert studies, Volume 2; Robert Barratt at Queen's University Belfast (QUB) on digital reconstructions of temples and buildings; and Bruno Ariano at Trinity College Dublin worked on aDNA with Dan Bradley on skeletal material from the Xagħra Brochtorff Circle (see Volume 3). Several Masters dissertations were also undertaken, including Conor McAdam at UoC on the geoarchaeology of Taċ-Ċawla; Stephen Armstrong at QUB on the silos of In-Nuffara; and Tiomoid Foley at QUB on the megalithic stones of Santa Verna. These studies, collectively, have enabled deeper research into various themes around the core work of the *Project*. In the spirit of the goals of the European Research Council, the *FRAGSUS Project* encouraged the involvement of the next generation of scholars in research fieldwork. To that end, Dr Catriona Brogan was awarded a Marie Sklodowska-Curie Independent Fellowship 2018–2020 to pursue her research on early Maltese ceramics at the University of Malta; and in 2020, Dr Eóin Parkinson takes up a two-year Leverhulme Trust fellowship to research on the antiquarian contributions to prehistory made by Ashby, Peet and others, also at the University of Malta. Such ongoing collaborative research is a solid sign of an enduring partnership by the extensive teams of the Cambridge Gozo and *FRAGSUS Projects*.

13.3. New discoveries

13.3.1. Prehistoric settlement

The *FRAGSUS Project* excavations have shed significant light on the earliest known periods of human settlement on the Maltese Islands. Domestic evidence for prehistoric Malta has always been lacking, when compared with the wealth of artefacts and sites known from the ritual sphere. The 2015 fieldwork at Santa Verna represented the first major excavation of pre-Temple Period and early Temple Period archaeological remains on the Maltese Islands for over 50 years, shedding important light on the early human occupation and subsequent development of megalithic architecture on the Maltese Islands. The discovery of a sixth millennium BC Early Neolithic structure beneath the Late Neolithic megalithic structures of Santa Verna confirmed Trump's (1966) model of settlement to ritual monumentalization. It also substantially refined the chronology and continuity of the Maltese prehistoric sequence (Fig. 13.14).

Our 2016 excavations at Skorba also presented an opportunity to reconsider the 'Għar Dalam' wall first identified by Trump (1966) (Fig. 13.15). The early Neolithic wall structure at Skorba was possibly associated with settlement and may possibly have enclosed a large area containing huts, forming an important point of comparison with the many hundreds of wall- and channel-enclosed settlements in southern Italy and Sicily. In the five decades since Trump's (1966) landmark publication of Skorba, so much more is now known about the Neolithic of Sicily and southern Italy, where it is clear that the village was central to Neolithic life and embedded in symbolic and social meanings. The evidence from the early Neolithic settlement at Skorba stands as an important record of Malta's place at the very edge of the rich, vibrant and dynamic Neolithic worlds of Sicily and south Italy. Close parallels between southern Italy/Sicily and Malta's pre-Temple Neolithic have always been acknowledged and discussed, but should now no longer be confined to parallels between material culture. Instead, they should actively recognize and address the important relationships that are apparent in settlement, economy, society, and above all, chronology.

At Taċ-Ċawla, the excavation of a heavily truncated late Temple Period structure, with secondary occupation spanning the Thermi phase, has raised further important questions on the end of the Temple Period on Malta. The excavations established that the settlement was built near a seasonal water source that eventually disappeared around 2300–2200 BC, and provided a wealth of data on the economy of late Neolithic Malta. In spite of the stratigraphic complexity of the Taċ-Ċawla site, making its duration of use and chronology harder to discern, the spatial arrangement of postholes and evidence for extramural structures stemming from the main oval hut also forms an important point of comparison with the Għajnsielem Road house (Fig. 13.16), excavated during the Cambridge Gozo Project. This structure is the only other recently excavated Temple Period domestic structure on the



Figure 13.14. *Santa Verna Temple structure, partly revealed in 2015.*



Figure 13.15. *David Trump attending the 2016 January meeting of the team in Cambridge, 9 months before his death.*



Figure 13.16. *a) Ghajnsielem Road section in 1986, the first 'house' excavation with David and Bridget Trump and Joe Attard-Tabone inspecting; and b) the excavated house plan in 1987 (modelled by Steven Ashley and Sophie Jackson).*

Maltese Islands and they both suggest that division of space was just as integral in domestic architecture as it was in funerary hypogea and megalithic architecture.

At In-Nuffara, the retrieval of valuable economic data is an important step towards a greater understanding of Bronze Age settlement and every-day life on the Maltese Islands. Five radiocarbon dates from the site, the first to be obtained for this culture phase, place the settlement between 1100 and 900 BC, spanning the Middle-Late Bronze Age Borġ in-Nadur phase (II B2-II B3), according to Tanasi & Vella's (2011) chrono-cultural scheme. The evidence from In-Nuffara reflects a time when the community on Malta was on the brink of blossoming into the rich network of maritime interconnectivity that now defines the islands and the wider Mediterranean.

13.3.2. 'Temples' and their evolution

One of the major questions that *FRAGSUS* set out to answer was the role of megalithic monuments in sustaining complex and dense populations. The new dating framework that has been made possible by *FRAGSUS*, recapitulated below, may also help resolve some long-standing conundrums regarding the emergence of megalithic monumental architecture in Malta. The first long-standing question was why megalithism seemed to have emerged so suddenly across the archipelago sometime around 3600 BC, apparently after over more than two millennia of human settlement. The second question was why the pottery sequence suggested a new cultural cycle from the Żebbuġ phase (Bonanno *et al.* 1990; Trump 2004), apparently half a millennium before the sudden emergence of megalithism. The results of *FRAGSUS* have presented an elegantly parsimoniuous explanation to both these problems (see Volume 1, Chapter 6). The appearance of the new cultural cycle represented by Żebbuġ phase pottery and the emergence of megalithism now appear to be broadly contemporary, both roughly dateable to around 3800–3700 BC, and followed a prolonged hiatus in the material cultural record. The appearance of megalithism therefore appears to have been integral to a new wave of cultural intensification and reappropriation of the islandscape, and was integral to a new way of perceiving that islandscape and making it habitable.

New light has also been shed on the subsequent evolution of the megalithic monuments that were investigated. All the megalithic sites we have studied had evidence for successive expansions and rebuilding. At Santa Verna, we obtained definitive evidence for a Żebbuġ phase megalithic structure, as well as five phases of elaboration in the period 3700 to 3200 BC. At Kordin III, fragments of an earlier, Mġarr-phase temple were found, as was a thick layer of waste material containing animal bone and pottery dating to around 3400 BC that was built over, probably shortly afterwards, early in the Ġgantija phase.

Santa Verna also yielded the plan of a large five-'apsed' temple structure that held several architectural and structure parallels with Ġgantija, and at least five phases of remodelling. Indeed, the relatively obscure and battered site of Santa Verna would once have been a prominent and important component of a larger megalithic landscape that incorporated the Xagħra Brochtorff Circle and Ġgantija Temples, and other megalithic structures on the Xagħra plateau. Above all, the excavations at Santa Verna highlight the wealth of information that can be revealed from the exploration of smaller sites that have remained protected by their obscurity.

The detection of a geological fault and associated spring running beneath the temple structure at Ġgantija, and the discovery of fertile soils, has provided further evidence that temples were located in close proximity to important resources that were vital to early agricultural societies. These megalithic monuments appear to have been an integral presence in the taskscapes of daily life of the Neolithic inhabitants.

13.3.3. Dating and the culture sequence

The Maltese Islands now have good claim to be the best-dated prehistoric cultural sequence in the central Mediterranean. The results of the *FRAGSUS* dating programme have brought new chronological resolution to the phasing of Maltese prehistory and the architectural traditions of the islands; but they have also identified new problems and drawn out exciting new questions, some of which have genuine implications for our understanding of the later prehistory of the entire central Mediterranean region.

The chronology of Malta's early Neolithic has frequently been used as a vital reference point for understanding the poorly dated cultural sequences of the Sicilian and south Italian late and final Neolithic and the early Copper Age periods. Although providing greater resolution for the Maltese sequence, the *FRAGSUS* dating programme has highlighted significant incongruencies between the absolute chronologies of the parallel ceramic traditions of Għar Dalam and Stentinello ware, and Skorba and Diana-Bellavista ware. As the Maltese Islands set out on their increasingly divergent and insular archaeological course throughout the fourth and third millennia BC, the chronology of the Temple Period perhaps becomes less meaningful for adjacent areas of the central Mediterranean. Therefore, it is perhaps on this point that the most significant contribution was made by the

FRAGSUS Project to the wider central Mediterranean. The Maltese case-study demonstrates how important and transformational the systematic application of radiocarbon dating can be to our understanding of the past, and how all areas need to focus on obtaining robust absolute chronology.

The refined chrono-cultural sequence of the Temple Period and its architectural traditions has also 'put to bed' some of the questions that have dominated Maltese prehistory over the last five decades. Pushing the emergence of megalithic architecture back to 3700 cal. BC during the Żebbuġ phase is just one such example; one that further emphasizes the power of radiocarbon dating to address some of the major problems we encounter in archaeology. Major questions, however, still remain regarding the meaning and interpretation of the Mġarr and Saflieni cultural phases, the precise relationship of Thermi ware to the adjacent Tarxien and Tarxien Cemetery phases, and indeed, how they relate to the tempo of human settlement on Malta. The peaks and troughs of anthropogenic activity that are so apparent in the radiocarbon data (Chapter 2) serve to demonstrate just how sensitive, dynamic and resilient human populations are over long periods of time.

From Themistocles Zammit's (Fig. 13.17) first identification of 'sterile earth' between the Temple Period remains and Bronze Age cemetery deposits at Tarxien, to John Evans' 'missing' Diana-Bellavista phase, and David Trump's 'break' at the end of the Temple Period (§2.1.2), the prehistoric sequence of the Maltese Islands has always been a punctuated narrative. In some ways, the work of the *FRAGSUS Project* dating programme has continued this tradition, identifying three phases with limited evidence for human activity on the Maltese Islands during the fifth, third and second millennia BC (Table 13.2). Questions that had been asked by twentieth-century scholars, such as whether these hiatuses relate to actual phases of partial or full abandonment, or reflect a lack of excavated and sufficiently dated sites, or represent as yet unidentified cultural phases, should remain a principal focus for future research on Maltese prehistory.

Multiple perspectives on chronological data are possible using the various software tools now available to analyse the data. In the field, samples were taken strategically so that any radiocarbon date obtained from them could be incorporated into Bayesian chronological models. At Santa Verna (Chapter 4) and Kordin (Chapter 6) these models allowed us to date structural aspects of the 'temples' with high precision. A Bayesian approach was taken to modelling the cultural sequence (Chapter 2), leading to a refined chronology (Table 12.1). Defining the boundaries between these phases, however, is a somewhat subjective task, as it is likely that there was an overlap between the use of various forms of pottery, and geographical heterogeneity in the pattern of its use. Time-series modelling (Chapter 2, §2.3.12) allows the data to be compared with other regions, and the dynamics found in Malta that echo other European regions will provoke interesting research in the future.

The new excavations at Ġgantija and Santa Verna add significantly to the results from previous work at the Xagħra Brochtorff Circle, confirming the status of the Xagħra Plateau as one of the most important

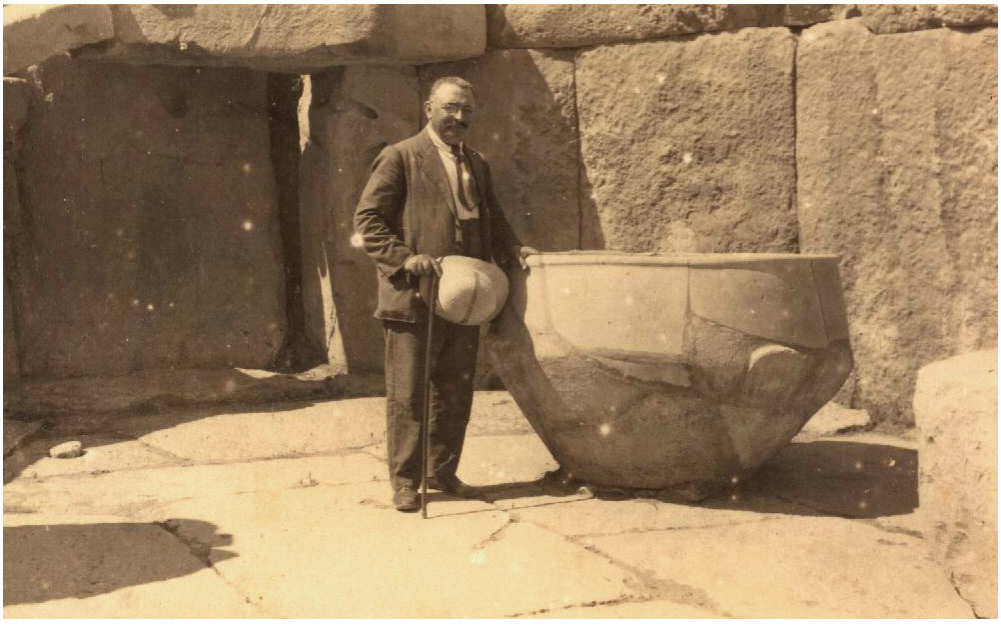


Figure 13.17. *Temi Zammit with the reconstructed great stone bowl of Tarxien (reproduced with permission from the National Museum of Archaeology archives).*

Table 13.2. *The updated chronology of Maltese prehistory that emerges from the* FRAGSUS Project *work.*

Period	Phase	Trump 2009		*FRAGSUS*	
		Start	**End**	**Start**	**End**
Neolithic	Għar Dalam	5000 BC	4300 BC	6000 BC	5400 BC
	Skorba	4500 BC	4100 BC	5400 BC	4800 BC
	Fifth millennium hiatus	n/a		4800 BC	3800 BC
Temple Period	Żebbuġ	4100 BC	3700 BC	3800 BC	3600 BC
	Mġarr / transitionary phase	3800 BC	3600 BC	3600 BC	3400 BC
	Ġgantija	3600 BC	3100 BC	3400 BC	3100 BC
	Saflieni	3300 BC	3000 BC	3100 BC	2800 BC
	Tarxien	3100 BC	2400 BC	2800 BC	2400 BC
Bronze Age	Thermi	n/a		2400 BC	2200 BC
	Third millennium hiatus	n/a		2200 BC	2000 BC
	Tarxien Cemetery	2000 BC	1500 BC	2000 BC	1700 BC
	Second millennium hiatus	n/a		1700 BC	1500 BC
	Borġ in-Nadur / Baħrija	1500 BC	700 BC	1500 BC	750 BC

localities for surviving prehistoric archaeology in the Mediterranean. Inevitably there are now several burning questions about other sites on the plateau that can only be satisfactorily answered by more fieldwork. Here, we might mention the 'cave' sites on the peripheries of Santa Verna and Ġgantija, the threatened earlier Neolithic sites (e.g. Is-Sruġ) and the date and function of the other burial monuments and megalithic structures noted in the locality during previous surveys (Evans 1971). The relationship of the Xagħra Plateau to the wider landscape setting likewise presents a series of questions that have yet to be conclusively addressed. How did the monumental sites on the plateau relate to the agricultural land on the plain below, much of which is intervisible with Ġgantija? The discovery of a possible monumental ramp giving access to the platform at Ġgantija (Chapter 5) has shed new light on the question of how pathways and processional routes connected these sites to each other, and raises new questions on how they were connected to the wider landscape, and to embarkation points and gateways to the outside world, such as Ramla Bay. All these questions bode well for future work by the next generation of scholars, whose models and interpretations will no doubt continue to build upon the results of the *FRAGSUS Project*.

13.3.4. Material culture

Archaeologists have a traditional responsibility to categorize and illustrate the material culture they find, be it the enclosing structures or the portable elements that are found within. This volume has made considerable efforts to undertake this important task in a manner and format that will allow comparison (through publication and open access) for scholars to register their future discoveries. We particularly celebrate the revised presentation of the ceramic sequence, pottery representing one of the creative achievements of the prehistoric inhabitants (Chapter 10). We have been happy to acknowledge the general viability of the original ceramic scheme developed by John Evans and later by David Trump, and to enhance their scheme with the many illustrations of pottery presented in Chapters 8 and 10. This task in itself is large with almost 900 sherds drawn, inked, reduced, set into figures and analysed. These add considerably to the material presented previously in the Xagħra Brochtorff Circle volume in 2009 (Malone *et al*. 2009). We have also attempted to draw together all the subtle characteristics of each phase of pottery and its particular stylistic and material features. We are grateful to Alastair Ruffell for undertaking a series of ceramic thin sections to assess the mineral and organic content of the clay makeup of the pottery over time. Evidently, as shown by other recent scholars (e.g. Pirone 2017), local sources of clay were the most exploited throughout prehistory. It becomes very clear that a huge and largely untapped resource remains to be examined from all the other known sites that have produced collections of material culture. Yet, what we have tried to do is to set out the possibilities and the guidelines upon which future scholars will add ever more detail and perhaps contradictions as well.

In the study of ceramics, we have also tried to be more ambitious than merely presenting the descriptive facts of material culture in this study, and highlight two interconnected areas that directly relate to material things. We identify these as *ceremonial cuisine* and the *club houses* or 'temples' where this

cuisine was practised. The food that the prehistoric inhabitants of Malta consumed, essentially barley and mutton (stew?) on feast days was repetitive, but the vessels from which these foods were served were crafted, elaborate, symbolic and set within ceremonies that gave flavour and meaning to the contents. Our related work (Barratt *et al*. 2018) has proposed, by a combination of evidence from the material record and ethnographic comparison, that 'Time' and consumption were elaborately organized. They were supported by the intensive horticultural enclaves placed around the club house temples themselves, and it is proposed that these buildings performed the function of 'club houses'. The prehistoric inhabitants, by a combination of resilience (Volume 3) and creativity shaped an enchanted landscape of elaborate cuisine that bears comparison with what we know from much more recent examples of Japan, with its myriad of serving vessels and food rituals, or indeed the Etruscans and Greeks with their ritualized drinking 'Symposium'. These analogies imply that food/drink presentation is often more important than the contents themselves.

For the first time, we also have some measure of what happened to the prehistoric inhabitants for most of their lives outside these elaborate clubhouses, which were most probably visited on a carefully regulated seasonal schedule. Domestic structures were modest and included impermanent constructions partly made out of mud and wood. The peoples' limited foods were heavily processed to make them edible and doubtless, baking and processing was involved as well to preserve food. One possibly new technology for processing these limited foods was the oven, a form of controlled cooking for which evidence is increasing across the Mediterranean at this time (Albore Livadie 2002; Palio *et al*. 2019). Our Taċ-Ċawla example provides an insight into the Maltese adoption of this expanding technology.

Alongside the pottery assemblages from the six sites excavated by *FRAGSUS*, a representative sample of artefacts were also recovered, recorded, drawn, photographed and analysed. These are summarized in Chapter 11, Part 1, with illustrations of many objects and lithics. We have also attempted to assess the lithic assemblages by quite basic recording and quantification of different materials (chert or obsidian) and the proportions of different tools and flakes. Some sites such as Taċ-Ċawla and Santa Verna, with their more extensive trenches enabled a fairly systematic collection, whereas others with small sondages and reopened old trenches inevitably incorporated material that had been recycled as backfill. Very few contexts that were explored in the *Project* genuinely represented totally intact archaeology. As such, the material culture presented here is a representation of a typical situation, one where the deposits are rarely undisturbed; and this is a factor of many prehistoric sites in Malta today. Nevertheless, we have recorded these objects, drawn the most important and the entire assemblages remain in the National Museum collections for future scholars to analyse again. Querns, grindstones, stone objects such as sling stone, discs, lamps and fragments of carvings all add to this important collection and to the general archive of material. An important addition to the study of lithics in Malta is presented in Chapter 11, Part 2, with the geological assessment of the raw materials used for lithic production in Neolithic Malta. What is particularly intriguing is the new understanding of the degree to which the inhabitants relied on exotic chert, obsidian and hard stone to make the tools they needed. Even though good quality material appears to have been sourced outside Malta, and was highly prized, local rather low-grade chert was available and in regular use. Such material was not suitable for much reworking, retouching or shaping, hence we see in Malta a tradition of rather lumpy, thick crude flaked objects for the most part, which were supplemented by exquisite points and knives. A similar situation was observed in Sicily at the Casa Solima site of Troina (Ashley *et al.* 2007) where a local silicaceous sandstone was exploited for general purpose tools and supplemented by fine materials brought from great distances. This shared factor of connectivity in prehistoric Malta is one that we shall explore below and in Volume 3.

The location and the resources that were favoured by the Temple Culture inhabitants has been a theme of particular interest in this study, and we are now able to assess when some of these resources were particularly valued. We have been able to show that not only soil, water and aspect played a part, but also the visible lines of connectedness between the many small communities who inhabited the islands. As the GIS study reported in Chapter 12 reveals, intervisibility between sites may have played a significant role in the choice of locations where major monuments were built. The islands of Malta may be small and restricted, but there are immense landscapes and views to be had from almost all parts. Yet, not all parts or places were chosen, and as the work shows, some significance was placed on the ability to view the neighbours and to perhaps feel a connection between what otherwise were quite dispersed communities in the intimate microlandscapes of Malta. Those viewsheds evidently changed over time, with the increased clearance and desiccation of the landscape, resulting in few trees, and a sparse maquis vegetation by the Bronze Age in the second millennium BC. In tandem with the landscape reconstruction explored in Volume 1, the Maltese landscapes of prehistory set the scene for the socio-economic

inquiry that underpins *FRAGSUS*. We have now a greater measure of how this prehistoric island world changed from a ceremonially focused late Neolithic society (albeit not as suddenly as we first expected), into a world challenged by more modern concerns of connectivity, defence and storage (McLaughlin *et al.* 2019). These new themes are visible in the material record, with shared networks of ceramics and metals, and a preoccupation with larger vessels and silos for safe and concealed storage. Although not a central part of the *Project*, we have also taken a measure of the intensified Roman agricultural practices in the form of trenching and ditching for growing tree crops that occurred on some of our prehistoric sites in the Roman period.

13.4. The bigger picture

Aside from our work on archaeological sites, palaeo-environmental research and modelling studies carried out by the *FRAGSUS Project* have revealed how important people have been in maintaining the landscape ever since farming first flourished on the islands (Volume 1). The Maltese landscape is a monument to the many generations of people who made productivity possible through soil management, terracing, and manuring (Volume 1, Chapter 8). At no time, however, were people immune from environmental catastrophe, and the risk of erosion and damage to crops has always been present. For relatively small and isolated islands, this ever-present risk is a major problem, and the elaborate culture that evolved in Malta and Gozo during the Temple Period can be seen as a response. The key to making a success of life in prehistoric Malta was that the human capital, the actual inhabitants of the islands, seem to have achieved an equilibrium in how resources were exploited through new management practices of social resilience. This exploitation was embedded in what have traditionally been named 'temples', but which we can retitle as 'club houses' in special, culturally constructed, places in the landscape. These practices were very likely inseparable from the network of social resilience which complement the mixed subsistence strategies and which appear to have centred around the megalithic monuments. For the moment, we cannot speculate too far, but it is probable



Figure 13.18. *The team Easter 2015 Santa Verna, beside the Xagħra Windmill, Gozo.*

that these 'central' places in the local community acted to moderate, organize and indeed control how people exploited the land and perhaps even the society itself.

A leit-motif in the shaping and exploitation of the islands across time has been the adoption of mixed subsistence strategies to take advantage of the different opportunities offered by the different micro-environments that make up the highly fragmented landscape. For the early modern period, eloquent evidence has been documented for the careful management of crop cultivation and grazing side by side, in a delicate balancing act that put even the least promising terrain to productive use (see Volume 1, Chapter 9). The evidence captured by the *FRAGSUS Project* has also provided clear indications that animal grazing as well as crop cultivation were being practised from the earliest known settlement of the archipelago (see Volume 1, Chapter 3; this volume, Chapter 9), suggesting that mixed subsistence strategies that exploited the highly variable patchwork of affordances offered by the fragmented landscape were already being practised, and were integral to the sustainability and resilience of island life.

Intensification is another leit-motif of small island environments supporting dense populations. Evidence of intensification is most ubiquitous for Malta's early modern landscape, which is characterized by terracing on a monumental scale. Development-driven archaeology is daily revealing more evidence of agricultural intensification in the ancient world, usually in the form of rock-cut trenches to permit horticulture and viniculture in spite of the sparse soil cover. The results of *FRAGSUS* have yielded evidence of intensive exploitation of the productive landscape from the Neolithic onwards, and have suggested that even by the Temple Period, over-exploitation and soil degradation of some environments was leading to the exploitation of more marginal settings.

At no time were people immune from environmental catastrophe, and the risk of erosion and damage to crops has always been present. Several strands of evidence captured by *FRAGSUS* have in fact suggested increasing environmental degradation, aridification, and poorer nutrition in the early to mid-third millennium BC (see Volume 3).

13.4.1. The FRAGSUS *questions revisited*

In Table 13.3, we revisit the core questions we posed at the outset of the project, and here we interrogate them against this final chapter's themes in this volume – the material culture, the economy and the role of the temples and their apparent ritual activity.

From these short replies to the core questions and from those at the end of each site report (Chapters 3–8) it becomes clearer that the Temple Culture and its Neolithic evolution on the Maltese Islands was an extraordinary process, quite unprecedented in terms of its level of sophistication when compared with other islands of the Mediterranean. Crete, Cyprus and the interlinked archipelagos of the Aegean represent very different opportunities and constraints to those of isolated Malta. What we see on Malta is the emergence of a robust and effective economic and social system that adapted to the constraints. That adaptation was effective for centuries, and it appears to have been modified at times to ensure survival. Only when too many factors coincided – as they appear to do in the latter centuries of the third millennium BC, does the system begin to fail. It fails first in its ability to obtain sufficient meat, probably a response to the inability to secure sufficient abundance in crops and fodder. We see this in the nutritional evidence that is evident in the later Neolithic population (Volume 3). The failure also appears to show in the focus on extravagant temple building, perhaps a futile attempt to substitute spiritual for material food, but perhaps this is too poetic an ending. Nevertheless, let us go further with the aid of Edward Lear.

The first chapter of Malta's history requires archaeology as we have demonstrated, piecing together systematically and forensically pockets of sometimes disordered information from a rich and intense past. The next chapter of Malta's history drew on a new level of connectivity and the evidence of documentary history to produce the picture that greeted Edward Lear and still greets the traveller today:

> *As for the country, there is none; stone walls & stone houses & stone terraces for miles, & villages as far as you can see – so that you may say that all Malta is a great heap of stone in the Mediterranean with a little ground here & there for cultivation.*
> Edward Lear, 9 April 1848, to his sister Ann from Dumford's Hotel, Valletta.

To capture the landscape of prehistoric Malta, you need to visit Gozo, the less developed of two main islands to share the vision of Edward Lear:

> *Did I tell you of my visit to Oudesch, vulgarly called Gozo? It was a most pleasant one, and with the help of Giorgio I drew every bit of it, walking fifteen or twenty miles a day. Its coast scenery may truly be called pomskizillious and gromphibberous, being as no words can describe its magnificence.*
> Edward Lear, 13 April 1866, to Lady Waldegrave (Cremona 2016).

Table 13.3. *The* FRAGSUS *questions and themes.*

FRAGSUS questions	Material culture	Economy	Temples and ritual
1a. What was the impact of human settlement on Malta?	Pottery, lithic exploitation as settlement became established.	Introduction of cereals, weeds of cultivation.	Initially, little evidence of burial or ritual.
1b. How rapid was the process of deforestation, erosion and degradation?	Axes, fire, use of wood in structures, pottery firing.	Farming plots, tree clearance.	Deep soils beneath some temples shows that prime land was chosen for later ritual sites and early settlement.
1c. When did technical mechanisms to manage the environment develop – such as terracing, water and food storage?	Pottery storage, clay ovens, kilns and firing pits, quarries, lithic sources exploited from cliffs and valleys.	Food processing, cheese preserved milk products, dried foods(?), salted foods, smoked foods.	Terraces key part of temple construction, with forecourts for large gatherings and ceremonials. Water source often evident in site location.
1d. Were such mechanisms in place before or after the Temple Culture collapsed?	From the outset people had to manage landscape impact, soil loss, vegetation, cultivation.	From the outset, people imposed agriculture and intensive production on landscape and required manuring and crop rotation to succeed. Digging, ploughing and general cultivation had to develop effectively from the start to support a dense population.	Sites with good water (Ġgantija) survive almost continuously, others shorter lived.
2a. How did a very small island community in prehistoric times manage to sustain dense, complex life over millennia, and what specific social, economic and ritual controls emerged to enable this?	Interaction and connectivity represented by exotic lithics, pottery from Sicily, perhaps some cultural and population exchange.	Intensive crops which included pulses to replace meat products, stored grain, cooking and storage processes, cheese production?	Temples may play a role in monitoring, managing and organizing community activity, farming, and food redistribution. Seasonal rituals and calendrical controls may have guided the farming year and its productivity.
2b. Were the monumental temples instrumental in the process of sustaining cultural life?	Pottery and architecture highly sophisticated and concentrated within temple buildings.	Most likely temples were part of the system of regulation, control, redistribution, land tenure and food sharing. Seasonal abundance celebrated and stored.	Cultural life centred on the temples, as focus of material culture deposition, art and ritual activity.
3a. What sort of agriculture was used, and what did people eat, especially as the landscape became increasingly degraded and the environment more unpredictable?	Scant evidence for farming tools such as adzes, but lithics suggest crop harvesting, and grinders imply crop processing.	Mixed cereals and pulses, barley dominant at times, good for drought conditions. Sheep main meat and milk production cattle for milk, traction and feasts, stock animals – goat for rough grazing, and pig in wet and woodland, and human waste. Supplemented by shellfish and birds.	Grinding and ritual cooking and killing seems to take place at or close to temples. Residues, querns, fire pits, quantities of pottery and storage vessels, ritual rubbish all clustered. The display of animal parts and art implied value and rarity of meat feasts. Could be a mechanism to control mass feeding and redistribution.
3b. Were there failures in the food supply?		Decline in meat use, lack of sea foods, dependence on cereals and pulses, barley especially, shown in diet and nutrition in the late Temple Period.	The storage issue – implied by the pottery and the temple buildings and the food processing facilities in temples suggest food focus.
3c. What impact did diet, disease and stress have on the population?		Early on good nutrition, but later rickets, poor teeth, nutritional issues become more evident in the late Temple Period.	Food made into a special ritual involving huge investment, and perhaps by implication, scarce.
4a. What was the size and nature of the early Maltese population?	Huge quantities of pottery vessels do imply large groups, probably dense village life.	5000–10,000 at most, dense and intensive.	Some later temples are much larger than earlier ones, bigger forecourts and facilities might imply larger gatherings, larger groups?

Table 13.3 *(cont.).*

FRAGSUS questions	Material culture	Economy	Temples and ritual
4b. What role did demographic connectivity (immigration) play in maintaining island sustainability?	Successive immigration over centuries shown in rich material culture origins.	Importation of new crops such as Faba beans in the Bronze Age show importance of connectivity. Earlier on probably introduction of various wheat and barley, pea and lentil types.	Immigrants evident in the temples as burials (TXC) and Xagħra Brochtorff Circle – Africans and Thermi. New peoples vital for population success, perhaps integrated through temple activities.
5a. Was there social-economic or environmental failure at the end of the Temple Culture, and what may have caused society to collapse or change so drastically?	Abandonment of temples, iconoclasm and excessive elaboration of buildings in the final Temple Period rather imply desperation and failure.	Probably decline in animal products and milk and traditional farming, with little fodder available. Animals become highly ritualized by the end of Temple Period.	Lack of much activity in temples implies little interest by Bronze Age communities who focused on other parts of landscape, defence and trade.
5b. Was there a hiatus between the Temple Culture and later Bronze Age settlers?	Material culture changes drastically between Tarxien/Thermi and the Tarxien Cemetery and again in the Borġ in-Nadur phases. Little continuity in material culture really shown.	Farming systems show little change at the broad scale, although fish become frequent by the Bronze Age, with different dietary norms, and Faba beans introduced.	Temples largely unused by 2000 BC. Much more short-lived cultural episodes in the Bronze Age, with few centuries for each phase indicated, and possible breaks between each of these.
5c. Are other hiatuses apparent in the sequence, such as between the earlier Neolithic and the Temple Period?	No evident material culture yet identified between *c*. 4800 and 3800 BC.	Sparse evidence for continuity of farming but some pollen indicates cereals continued in the fifth millennium BC.	No evidence known for settlement, monuments, burials or material culture from the fifth millennium BC.

13.5. Postscript
Katya Stroud and Sharon Sultana (Heritage Malta)

When in 2012 Heritage Malta was approached with a proposal to investigate aspects of fragility and sustainability in the Maltese islands in the Neolithic, the project was welcomed as much-needed research. The questions posed doubtless played a crucial role in the evident resilience of the Temple culture as well as in its eventual demise. The project brought together different disciplines to address age-old questions on the reasons why a long-standing thriving culture appeared to come to a sudden end; a question that is relevant to numerous cultures around the world, but which appears to be more pronounced in an island context. The research focused on various facets through archaeo-environmental techniques that investigated prehistoric land-use, economy, soil erosion, landscape degradation, environmental change and population. This is a refreshing approach considering that since the nineteenth century, studies of Malta's Neolithic have revolved primarily around discussions of the megalithic structures built between the fourth and third millennia BC. These megalithic buildings, clearly conspicuous in the Neolithic landscape, not only feature prominently in the national iconography, but were the primary focus of scholarly discussion and exploration of the Neolithic since the very start of archaeological investigations on the Maltese islands. *FRAGSUS* has been key in shedding light on how this culture was sustained and how erosion, landscape degradation, environmental instability and over-exploitation may have played a role to bring about a drastic cultural change in the third millennium BC. This volume has presented the way in which the *FRAGSUS Project* took up the research started through the Cambridge Gozo Project (1987–95) and addressed these questions. The results of the excavations presented in this volume have led to a revision in the dating of Malta's Neolithic. In addition, this volume has also presented the many new objects and ideas that have been brought to light through this fieldwork, and which will ultimately play a crucial role in future interpretation, conversation, debate and research design for Malta's Neolithic.

The innovative research approach brought by *FRAGSUS* has also rekindled public interest in the Neolithic with the main themes addressed being relatable to contemporary society. The results were disseminated to the public in a manner that makes such research accessible to everyone. One of these events was a three-month temporary exhibition held at the National Museum of Archaeology, which was inaugurated on 17 March 2018. The exhibition was divided into four equal sections representing the four main areas of research, namely: *The Science of Uncovering the Past*, *Landscape and Environment*, *Archaeology and Sites*, and *The Human Story*. The interpretation panels along with some key artefacts recovered during the research were supplemented by audio visuals to facilitate interpretation. The exhibition was free of charge to encourage more locals to visit. The second platform used was that of a full-day conference held at Fort St Angelo, during which representatives from each group of researchers presented their findings to a packed hall, full of local researchers, students and the general public. Not only has this project addressed a long-standing lacuna in Maltese Neolithic research, but it has also identified future directions for research. Furthermore, thanks to the *FRAGSUS Project* as well its follow-up outreach activities, the collaboration between various Maltese experts and respective entities has been strengthened, paving the way for future local partnerships.

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Temple places

The ERC-funded *FRAGSUS Project* (*Fragility and sustainability in small island environments: adaptation, culture change and collapse in prehistory, 2013–18*) led by Caroline Malone (Queen's University Belfast) has focused on the unique Temple Culture of Neolithic Malta, and its antecedents and successors through investigation of archaeological sites and monuments. This, the second volume of three, presents the results of excavations at four temple sites and two settlements, together with analysis of chronology, economy and material culture.

The project focused on the integration of three key strands of Malta's early human history (environmental change, human settlement and population) set against a series of questions that interrogated how human activity impacted on the changing natural environment and resources, which in turn impacted on the Neolithic populations. The evidence from early sites together with the human story preserved in burial remains reveals a dynamic and creative response over millennia. The scenario that emerges implies settlement from at least the mid-sixth millennium BC, with extended breaks in occupation, depopulation and environmental stress coupled with episodes of recolonization in response to changing economic, social and environmental opportunities.

Excavation at the temple site of Santa Verna (Gozo) revealed an occupation earlier than any previously dated site on the islands, whilst geophysical and geoarchaeological study at the nearby temple of Ġgantija revealed a close relationship with a spring, Neolithic soil management, and evidence for domestic and economic activities within the temple area. A targeted excavation at the temple of Skorba (Malta) revisited the chronological questions that were first revealed at the site over 50 years ago, with additional OSL and AMS sampling. The temple site of Kordin III (Malta) was explored to identify the major phases of occupation and to establish the chronology, a century after excavations first revealed the site. Settlement archaeology has long been problematic in Malta, overshadowed by the megalithic temples, but new work at the site of Taċ-Ċawla (Gozo) has gathered significant economic and structural evidence revealing how subsistence strategies supported agricultural communities in early Malta. A study of the second millennium BC Bronze Age site of In-Nuffara (Gozo) likewise has yielded significant economic and chronological information that charts the declining and changing environment of Malta in late prehistory.

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