

Report 5

LYDIAN ARCHITECTURE

ASHLAR MASONRY STRUCTURES AT SARDIS

Archaeological Exploration of Sardis

*Sponsored by
Harvard Art Museums
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Andrew Ramage*

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ASHLAR MASONRY STRUCTURES AT SARDIS

By Christopher Ratté

with a contribution by Michael H. Ramage and Robert H. Tykot

Archaeological Exploration of Sardis

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FOREWORD

This fifth Report on the results of the Archaeological Exploration of Sardis is the first to present monumental architecture of the Lydian and Persian periods, representing some of the most significant discoveries made by the Sardis Expedition over the last half century. The volume focuses on monuments built of finely carved ashlar masonry. As the author shows, beginning in the reign of Alyattes in the early sixth century B.C., walls of carefully fitted squared blocks of limestone, marble, or sandstone became hallmarks of high-status Lydian buildings. These gleaming structures must have been among the grandest sights of Lydian Sardis: gated entrances to the city; rising terraces that transformed natural slopes of the city center and the Acropolis into crisp, vertical planes; tomb chambers buried within some of the largest tumuli in the world. This style of building is closely tied to the transformation of Sardis from a regional to an imperial capital and to its new civic aspirations as the seat of the major power in western Anatolia.

These ashlar monuments belong to a building tradition that broadly spanned the later second and first millennia B.C. in the eastern Mediterranean and western Asian worlds. This tradition attests to the high technical skill of local builders as well as the close cultural contacts and exchanges among these regions. The Lydians, bound by political and cultural ties to the Greek city-states and to the major powers of Egypt and the Near East, were intimately involved in the same networks of technological exchange that lie behind the early development of both Greek and Near Eastern architecture. As patrons of Greek sanctuaries, the Lydians played important roles in the construction of such temples as the Artemision at Ephesus and the temples of Athena at Assesus near Miletus. After the fall of Lydia to the Achaemenid

Persians, Sardis provided models for the grand terraces and other buildings at Cyrus's capital at Pasargadae, and Lydian masons are named among those who built the palace of Darius at Susa. Such connections beyond the regional and temporal boundaries of Lydia made Lydian masonry not just a Sardian but an international phenomenon.

The Archaeological Exploration of Sardis was begun in 1958 by Professor George M. A. Hanfmann, of Harvard University, and directed by him until 1976. Professor Crawford H. Greenewalt, Jr., of the University of California-Berkeley, directed the expedition until 2008. With the exceptions of the Tomb of Alyattes, known to scholars since the nineteenth century, the Pyramid Tomb, excavated and published by Howard Crosby Butler, and the terrace walls at Acropolis North, uncovered in 1922 but not published, all the monuments discussed in this volume were discovered under the direction of Hanfmann and Greenewalt. The study of Lydian masonry, therefore, is still young; while the architecture of the Greeks, Egyptians, Mesopotamians, Persians, and other neighboring cultures are familiar to scholars after a century or more of research, the buildings presented here have been known only for a relatively short time. Recent discussions by authors such as Boardman (2000) have brought the Lydians into their analysis of this international milieu; we hope that the present volume will go far to make Lydian contributions more widely known.

A member of the Sardis Expedition since 1980, Christopher Ratté was the chief excavator of the "Byzantine Fortress," the best-preserved of the ashlar terraces that graced central Sardis and among the most important of the monuments here discussed. Between 1983 and 1991 he directed the excavations of this hill, revealing its well-preserved terrace wall and

the long stratigraphic history of structures on top of and around the terrace. His doctoral dissertation at the University of California-Berkeley, supervised by Crawford H. Greenewalt, Jr., was inspired in part by this excavation and encompassed many of the monuments and problems treated in the present volume. He now includes all the major ashlar monuments of the city and many of the tombs of Bin Tepe, with a catalogue of known architectural fragments of the Lydian and Persian periods, forming a comprehensive survey of the great works of Lydian ashlar construction. Michael Ramage, coauthor with Robert Tykot of the appendix on the sources of stone for Lydian buildings, was a member of the Expedition from 1993 to 1995; we are very grateful to both of them for their valuable contribution.

A great many individuals and institutions have made this study possible, and over the past half century, the Sardis Expedition has accumulated too many debts to list or repay. We are first and most profoundly grateful to the Republic of Turkey, to the Ministry of Culture and Tourism, and to the General Directorate of Cultural Resources and Museums for the privilege of working at the site. Many individuals in the Ministry and General Directorate have been instrumental in granting permissions and making excavation and research possible. In thanking the present Minister of Culture, Ertuğrul Günay, and General Director Murat Süslü, we wish to extend our gratitude to their predecessors as well.

The directors of the Archaeological and Ethnographic Museum in Manisa, Müyesser Tosunbaş, Hasan Dedeoğlu, Kubilây Nayır, and Kemal Ziya Polatkan, have been continually supportive of research at Sardis, and we have enjoyed sharing in their scholarly interest, collegial manners, and personal good will.

Thomas Lentz, director of the Harvard Art Museums, and the previous directors of the museum have most generously provided the Sardis Expedition a welcoming and intellectually stimulating home and supported research and publication since the project was founded. Cornell University, a cosponsor of the Sardis Expedition, has had a particular interest in the architecture of the city since Professor Henry Detweiler, associate dean of the College of Architecture at Cornell, joined Hanfmann as a founding director.

The author thanks the architects and photographers who worked on illustrations for this publication, and we join him in expressing our gratitude. We also want to acknowledge and thank the many talented architects, photographers, archaeologists, conservators, and others at Sardis, too numerous to list individually, whose smaller but significant contributions made

in the routine course of excavation are incorporated here.

Series editor Katherine Kiefer and editorial assistant Sheila Nightingale read the manuscript and studied the drawings and photographs with extraordinary care. Their hard work and selfless devotion are sometimes evident, sometimes not, but always deeply appreciated. Additional copyediting and proofreading were done by Julia Gaviria, and the index was assembled by Kate Mertes with the assistance of Lydia Herring-Harrington. Michael O'Grady, Richard Swartz, and others helped with many tasks in preparing the manuscript. Güzin Eren translated the abstract into Turkish. The volume was designed and laid out by Heather Foley and production assistance provided by Richard Denzer, Denise Constant, Taylor Clark, and their colleagues at Capital Offset of Concord, New Hampshire.

Excavation, conservation, research, and publication at Sardis have been made possible by the financial support of the Harvard Art Museums and Cornell University, and by many generous individuals and foundations. Among these donors are the Bollingen Foundation, the Ruth Covo Family Foundation, the Ford Foundation, Dr. and Mrs. David Greenewalt and the David Greenewalt Charitable Trust, Dr. Richard Hamilton, the John M. Kohler Foundation, Dr. Edwin H. Land and Mrs. Land, Mr. Thomas B. Lemann, the Loeb Classical Library Foundation of Harvard University, the Charles E. Merrill Trust, the Old Dominion Foundation, Mr. Donald I. Perry, the John and Emma Quint Memorial Fund, Mr. John J. Roche, the Billy Rose Foundation, the Rowland Foundation, the Eleanor Ransom Swift Trust, Richard and Genevieve Tucker, the Vila B. Webber Charitable Trust, and the estate of W. C. Burriss Young, as well as several anonymous donors. Between 1962 and 1965 fieldwork was supported by a series of grants from the U.S. Department of State, and between 1966 and 1990 by the National Endowment for the Humanities.¹ The Samuel H. Kress Foundation has supported conservation at Sardis for many years, contributing to both the study and preservation of some of the structures presented here.

The Supporters of Sardis, a generous group of friends and colleagues, has provided essential support, financial

¹ Department of State grants in Turkish funds to Harvard under the Mutual Educational and Cultural Act Public Law 87-256 and Agricultural Trade Development and Assistance Act, Public Law 480 as amended (SCC 29-543). National Endowment for the Humanities grants to Harvard for work at Sardis and general publication work in the Cambridge office: H67-0-56, H68-0-61, H69-0-23, RO-111-70-3966, RO-4999-71-171, RO-6435-72-264, RO-8359-73-217, RO-10405-74-319, RO-20047-81-0230, RO-20607-84, RO-21414-87.

help, and friendly advice, for the excavation, study, and publication of all these and many other monuments of the city over the years. It is with great pleasure, finally, that we gratefully acknowledge their interest and encouragement.

A NOTE ON GRIDS AND LEVELS AT SARDIS

Since the early years of the expedition, excavations at Sardis have been organized using a local grid based on a corner of the Roman Bath-Gymnasium building known as Building B, hence the B-Grid. That corner was given an arbitrary elevation of *100.00, indicated with an asterisk before the number. The system of grid and elevations is explained in previous Sardis publications.² A particular complication that concerns the present volume is that the initial survey in the 1980s of “Sardis East,” the region that includes

the “Byzantine Fortress,” the Wadi B temple, Field 49, and other monuments of central Sardis, used an incorrect datum and/or faulty surveying equipment. When coordinates and levels were reestablished using a total station since 2004, it was discovered that elevations recorded in the excavation of those sectors were significantly too high.³ Elevations in the text and illustrations of this volume have been corrected to reflect the current survey. These will not correspond, however, to elevations on previously published plans and sections or to finds from those sectors published in earlier reports.

Nicholas Cahill
Director, Archaeological Exploration of Sardis
Madison, Wisconsin

² See Hanfmann and Waldbaum, *Survey* (Sardis R1), 7–11; Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), x–xi; Rotroff and Oliver, *Hellenistic Pottery* (Sardis M12), 5; Cahill, “Mapping Sardis.”

³ At the northeast corner of the ByzFort terrace, the discrepancy is 14.43 m, and that figure has been adopted for the whole sector. At other sectors, however, the discrepancies are different.

AUTHOR'S PREFACE

This study grows out of a long association with the Sardis Expedition, and it is based on a rich store of communal observations and ideas. I would like to thank the past and present field directors of the expedition, Crawford H. Greenewalt, Jr., and Nicholas D. Cahill, for their encouragement, and I am grateful to David G. Mitten, Andrew Ramage, V. Judson Harward, Thomas N. Howe, Barbara K. McLauchlin, and D. Neel Smith, among many other Sardinian colleagues, for the benefit of their friendship and expertise. Research at Sardis is undertaken with the permission of the General Directorate of Antiquities and Museums of the Republic of Turkey and with the support of numerous Turkish colleagues and friends. I am particularly indebted to Hasan Dedeoğlu, former director of the Manisa Museum, for bringing important new discoveries to my attention. George M. A. Hanfmann, the founding director of the Sardis Expedition, and Jane A. Scott, its executive director for many years, are no longer with us, but I am ever mindful of my debt to them.

The Sardis Office at Harvard University and its editorial staff and administrators especially have given freely of their time and resources. I owe a special debt of gratitude to Katherine Kiefer and Sheila Nightingale, who have spent many, many hours on this book and made it much better than it was. I am also particularly grateful to Elizabeth Gombosi, Laura Gadbery, Kathryn A. Martin, Daniel J. Pullen, and Bahadır Yıldırım. Except where otherwise noted in the list of credits, all the photographs and most of the drawings are taken from the Office archives, and they are reproduced here with the permission of the Sardis Expedition. For special photographic work, my thanks are due to Cédric de Boucaud, Micah Fink, Michael Hamilton, Helen Human, Richard S. Kanaski, and Richard Taylor. The

maps, Figs. 1–5, are by Felipe Rojas (Fig. 2) and Nicholas D. Cahill (Figs. 1 and 3–5). Architectural drawings made especially for this study include Figs. 6, 11–14, 19, 21–25, 46, 156, 157, 160, and 165, by Claire Zimmerman; Figs. 7–10, 31, 221, 225, 227, 229, 231, 235–38, 245, 246, 248, 250, and 261, by Catherine S. Alexander; Figs. 20, 44, 45, 114, 159, 163, 164, and 179 by Philip Stinson; Fig. 43, by Felipe Rojas; Figs. 151, 152, and 158, by Monte Antrim; and Fig. 178, by Troy Thompson.

This study began many years ago as a doctoral dissertation, and I thank the members of my dissertation committee, J. K. Anderson, Crawford H. Greenewalt, Jr., and David Stronach, for the tolerant advice and helpful criticism they gave me as a graduate student. In the years since it was initially completed and submitted for publication, several independent treatments of related subjects have appeared, most notably John Boardman's *Persia and the West*. Readers of chapter 2 of that very useful book and Chapter 5 of the present study will find that they cover much of the same ground. For the sake of completeness, however, and because my conclusions are not exactly the same as Boardman's, I have left my chapter relatively unchanged, although I have updated it to take account of and respond to Boardman's contributions. I am very grateful to Professor Boardman for a fruitful exchange of letters. Kenneth G. Sams also read an early version of the entire manuscript, and I thank him for his many very helpful suggestions.

My greatest debt is to Crawford H. Greenewalt, Jr. For his careful guidance in every phase of this study, and for entrusting me with a subject to which he has devoted much of his own energy, heartfelt thanks.

Christopher Ratté
Ann Arbor, Michigan

ÖZET

MÖ altıncı yüzyıldan dördüncü yüzyıla kadar Lidya'nın Batı Anadolu bölgesi, belirgin bir yerel kesme taş yapı geleneğine ev sahipliği yapmıştır. Kesme taş işçiliğine Lidya'nın bütününde tümülüs mezar odalarında ve Lidya İmparatorluğu'nun başkenti olan Sardis'te hem mezarlarda hem de kentsel yapılarda rastlanır. Bu çalışma, Sardis ve çevresindeki anıtları, inşa tekniklerini anlayabilmek üzere özellikle inşası tamamlanmamış yapılardan gelen kanıtlara dikkat ederek, değerlendirmektedir.

Sardis civarında tarihlendirilebilir en erken kaliteli kesme taş yapı örneği, MÖ 560'da ölen Kral Alyattes'in mezarıdır. Diğer Lidya mezarlarının büyük çoğunluğu, altıncı yüzyılın ortalarındaki Pers istilası sonrasına ait görünmektedir. Lidya kentsel mimarisindeki bilinen kesme taş örnekleri, Sardis'in şehir kapısı ile surlarının öğelerini ve anıtsal iki teras duvarını içermektedir. Tarihsel değerlendirmeler ve tabakalanma delilleri, bu anıtların tümünün Pers istilası öncesine ait olduklarını belirtmektedir. Daha geç döneme ait bir yapı ise Artemis civarındaki sunaktır.

Lidya mimarisindeki kesme taş yapı inşasının tipolojik paralelleri, Ön Asya'ya işaret etmektedir fakat inşa yöntemleri bakımından Lidya taş inşası en çok Yunan mimarisine yakındır. "Megalitik" kesme taş yapı inşası, ilk olarak yedinci yüzyılda Yunanistan'da ortaya çıkmıştır ve Lidya, özellikle İyonya'da, bu teknolojinin gelişmesine ön ayak olmakta etkili olmuş olabilir. Altıncı yüzyılın ortalarından sonra İran'da Lidyalı ve İyonyalı duvar ustalarının varlığı, yazılı belgelerle olduğu kadar arkeolojik deliller ile de doğrulanmıştır ki bilhassa Lidya, Akamenid yapı çeşitlerinin, örneğin anıtsal platformların, gelişmesinde katkı sağlamış olabilir. Lidya mimarisinin çalışılması bu nedenlerle Anadolu'daki kraliyet geleneklerini, Lidya, Yunanistan ve Ön Asya arasındaki teknoloji alışverişini ve Pers imparatorluk mimarisinin kökenlerini aydınlatmaktadır.

INTRODUCTION

The land of Lydia has no natural marvels worthy of note, such as other countries have, beside the gold dust carried down from Mt. Tmolus. But it does contain one man-made monument, which is by far the greatest that there is, apart from those of the Egyptians and the Babylonians. This is the Tomb of Alyattes, father of Croesus; its crepis is made of large stones, the rest of mounded earth. . . . The circumference of the tomb is six stades and two plethra; its width is thirteen plethra. (Hdt. 1.93)¹

The Tomb of Alyattes still commands the attention of every traveler who passes through the Hermus River valley. The largest of three great mounds, it towers over scores of lesser tumuli in an area now called Bin Tepe (“One-Thousand Mounds”; Figs. 3, 15). Sardis, Lydia’s capital city, lies 10 km to the south, at the base of Mount Tmolus (Figs. 1, 3–5, 16). In addition to the tumulus itself, a modern visitor may inspect a marvel that Herodotus never saw: a tomb chamber buried deep inside the mound. The chamber is built of limestone and marble blocks weighing up to 16 tons each but nonetheless precisely cut, finely dressed, and exquisitely fitted—the work of an accomplished team of master builders.

The only ancient textual reference to Lydian builders is the Persian inscription known as Darius’s Foundation Charter, a record of workers employed in the construction of the Great King’s palace at Susa. “The stonecutters who wrought the stone,” it says, “these were Ionians and Sardians.”² The hand of the Lydian stonecutter has also been detected both at Pasargadae and at Persepolis, but Lydia itself is the best place to examine the fine workmanship that won Lydian builders their international reputation.

The tomb chamber in the mound of Alyattes was discovered in the mid-nineteenth century; since then, comparable chambers have been revealed in numerous tumuli throughout Lydia. In addition to tombs, impressive public works built of limestone and sandstone blocks have been discovered at the city site of

Sardis including, among other monuments, a fortified gate on the edge of the Hermus plain and a series of elegant retaining walls high on the steep slopes of the Acropolis.

The hallmark of the building tradition represented by these monuments is fine ashlar masonry—construction using squared blocks of stone, laid in courses, and tightly fitted without mortar. The term *Lydian*, used to describe this tradition, serves both as a regional and as a cultural epithet. Thus, Lydian architecture is architecture built in Lydia during the reigns of the Mermnad kings and the first few generations of Persian rule, the heyday of the indigenous Anatolian culture. This period coincides with and slightly outlasts the Archaic period in Greece, and I use the term *Archaic* as a synonym for *Lydian* to distinguish it from later (e.g., Hellenistic) architecture at Sardis.

Ludwig Peter Spiegelthal, a Prussian consul at Smyrna, inaugurated the modern study of Lydian architecture in 1853. Following Herodotus (and modern travelers), Spiegelthal measured and mapped the Tomb of Alyattes and tunneled into the south side of the mound; the results of his investigations were published five years later by J. F. M. von Olfers.³ Spiegelthal was followed in the 1870s and 1880s by George Dennis, author of *Cities and Cemeteries of Etruria*. Dennis opened several Lydian tombs at Bin Tepe, and although he did not report his findings, he did remove two marble reliefs, now in the

1 Author’s translation.

2 Kent, *Old Persian*, 142–44.

3 Olfers, “Königsgräber.” On Olfers, see Greenewalt et al., “Campaigns of 1979 and 1980,” 39 n. 20; idem, *City of Sardis*, 40. On earlier modern visitors to Bin Tepe, see McLauchlin, “Graves,” 5–8.

British Museum.⁴ The last of the first generation of explorers was the French architectural historian Auguste Choisy, who visited Bin Tepe in 1875 and published an article on Lydian tombs in the following year.⁵

The research of Spiegelthal, Dennis, and Choisy at Bin Tepe marks an initial phase in the study of Lydian architecture. With the founding of the American Society for the Exploration of Sardis in the early twentieth century, the focus of research shifted to the city site and urban necropolis on the banks of the Pactolus River. In five seasons of excavation from 1910 to 1914, the director of the expedition, Howard Crosby Butler, and his colleagues emptied more than 1,100 tombs of the Lydian and later periods, in addition to freeing the Hellenistic Temple of Artemis. Most of the tombs were rock-cut, but a few were built of ashlar masonry; they are published in Butler's narrative account of the excavations, *Sardis I*. In addition to Lydian tombs, Butler and his team uncovered what they believed to be a Lydian altar in the sanctuary of Artemis, also described in *Sardis I*, and one of the Archaic retaining walls on the Acropolis, not published until it was rediscovered in 1960.⁶

The activity of the first Sardis Expedition was arrested by World War I, then brought to a close after one postwar season by the Graeco-Turkish conflict in 1922.⁷ Sardis, and the study of Lydian architecture, lay fallow for the next generation, until George M. A. Hanfmann launched a third phase of research in 1958 with a new American expedition to Sardis, sponsored by Harvard and Cornell Universities. The project was directed by Crawford H. Greenewalt, Jr., from 1976 to 2008 and

is now under the supervision of Nicholas D. Cahill. Among many other projects, especially the excavation and reconstruction of the Roman Bath/Gymnasium, the Harvard-Cornell Expedition has reopened the Tomb of Alyattes and investigated nearly a dozen other tumuli at Bin Tepe; at the city site, several of the tombs discovered by the first Sardis Expedition have been revealed anew, and other built chamber tombs in the Pactolus valley have been uncovered for the first time since antiquity. The expedition has renewed excavation of the altar in the sanctuary of Artemis and of the Lydian terrace walls on the Acropolis. In the last two decades, parts of other public buildings have also been revealed in the lower part of Sardis at the edge of the Hermus plain. These and other discoveries are treated in regular preliminary reports published in either the *Bulletin (BASOR)* or the *Annual (AASOR)* of the American Schools of Oriental Research or more recently in the *American Journal of Archaeology (AJA)*, in final reports in the Sardis Report and Monograph Series, and in Hanfmann's synthetic overview, *Sardis from Prehistoric to Roman Times*, which appeared in 1983.⁸

Sardis remains the only place in Lydia where public buildings as well as tombs of the Archaic period have been discovered. Over the last generation, however, built chamber tombs similar to the tombs at Bin Tepe and Sardis have been found scattered singly or in clusters throughout Lydia. Although grave robbers have anticipated archaeologists in every case, and none of these monuments is fully published, some have been cleaned and recorded by archaeologists associated with the provincial museums in Manisa and Uşak or with the Department of Monuments and Museums in Ankara.⁹ A catalogue of Lydian tombs is included in Barbara K. McLauchlin's doctoral dissertation, "Lydian Graves and Burial Customs," completed in 1985, and new surveys of tumulus tombs throughout Lydia are currently being undertaken by Christopher H. Roosevelt and Christina Luke.¹⁰

The present study concentrates on monuments excavated by the Harvard-Cornell Expedition at Sardis and in the local cemeteries both at Bin Tepe and in the Pactolus valley. These monuments are representative of

4 Surviving records of Dennis's investigations around Sardis include long excerpts of a letter written by Francis Bacon (architect of the American expedition to Assos) to Charles Eliot Norton (Professor of Fine Arts at Harvard College) in September of 1882, quoted in Butler, *Sardis I*:1, 10. The reliefs are catalogued in Hanfmann and Ramage, *Sculpture (Sardis R2)*, 156, nos. 230, 231. On Dennis, see Rhodes, *Dennis*, including selections from Dennis's own correspondence regarding Sardis and Bin Tepe; see especially pp. 100–109, 127–52.

5 Choisy, "Tombeaux." Choisy's account is paraphrased in Perrot and Chipiez, *History of Art*, 267–73. Choisy did not clear the chambers himself, and in his article, he does not identify the excavator. Barbara K. McLauchlin has suggested the tombs studied by Choisy were probably among those originally discovered by Dennis (McLauchlin, "Graves," 8). On Choisy, see Middleton, "Choisy," 37–42 (reference supplied by C. H. Greenewalt, Jr.).

6 On the Lydian tombs, see Butler, *Sardis I*:1, 158–70; on the Lydian altar, see *ibid.*, index entries for "Lydian Building"; *idem*, *Sardis II*:1, 3–4. The first Sardis Expedition also conducted one season of excavation at Bin Tepe, but it was "barren of results" (*Sardis I*:1, 156; see, however, p. 11, fig. 3).

7 Shear, "6th Preliminary Report." An unpublished report by E. R. Stoeber on the 1922 season is on deposit in the Department of Art and Archaeology, Princeton University.

8 For the *BASOR*, *AASOR*, and *AJA* reports, see the bibliographical entries for individual campaigns under Greenewalt, Hanfmann, and Ramage; for the Sardis series, see entries under individual authors; for Hanfmann's overview, see Hanfmann, *SPRT*.

9 For a choice selection of tombs in northern and eastern Lydia, see Özgen and Öztürk, *Lydian Treasure* (with references).

10 McLauchlin, "Graves"; Roosevelt, *Lydia*; *idem*, "Settlement"; *idem*, "Tumulus Survey"; *idem*, "CLAS 2005"; Roosevelt and Luke, "CLAS 2006."

Lydian masonry overall, and they supply a more reliable basis for a chronology of the Lydian building tradition than do the discoveries of grave robbers. A few crucial structures at the city site of Sardis are firmly dated on stratigraphic evidence, and some of the scientifically excavated tombs nearby are datable by other criteria independent of architectural character: by potsherds incorporated in the fabric of a tumulus, by grave goods found inside a burial chamber, or, in the case of the Tomb of Alyattes, by the evidence of an ancient description that matches the surviving monument.

As the subtitle indicates, this study is not a comprehensive survey of Lydian architecture. It does not examine monuments outside Sardis in detail, nor does it give detailed consideration to all aspects of Lydian architecture at Sardis. Its purpose, rather, is to present in full the results of the Sardis Expedition's investigations of a single coherent and closely related set of monuments—ashlar masonry structures at Sardis—and to examine these monuments in their larger architectural and historical contexts. This has meant that certain subjects, such as domestic architecture, and certain important monuments, such as the Lydian fortification partially uncovered at sector MMS, are discussed only in general terms: domestic architecture in part because it has already been examined in a monograph in this series, the Lydian fortification because it is still under investigation and because a full presentation of this monument requires a separate, self-contained monograph.¹¹ This study is undertaken now in the belief that the monuments it examines deserve publication, that they represent a building tradition that is, in important respects, independent of other branches of Lydian architecture, and that enough is currently known about them to draw some general conclusions about their significance.

Of necessity, this volume concentrates on architectural methods rather than on architectural forms. Although nearly two dozen built chamber tombs of different shapes and sizes are known, it would be difficult to arrange them in a relative chronological sequence on typological grounds alone. Analysis must rely at the outset on the craftsmanship rather than the design of Lydian tombs—that is, on Lydian masonry. Of buildings other than tombs, only foundations, retaining walls, and isolated ornamental fragments remain.

Fortunately, a rich source of comparative material lies close at hand. Greek architecture and Lydian architecture were closely allied, and the treatment of

Lydian building technology attempted here is loosely modeled on the comprehensive studies of the materials and construction techniques of Greek architecture by Roland Martin and Anastasios K. Orlandos; it is also much influenced by J. J. Coulton's *Ancient Greek Architects at Work*.¹² The Near Eastern architectural tradition is hardly less rich or relevant than the Greek, and as an example of a study that marries the history of technology with the history of culture, Carl Nylander's *Ionians in Pasargadae* has been particularly useful.

This study is divided into two parts: text and catalogue. While the two are complementary, it is hoped that each will also be of some use on its own—that the text will offer a reader a general overview of Lydian architecture independent of the catalogue, and that, conversely, it will be possible for a reader to look up a given monument in the catalogue quickly, without having to check in several places in the text. The catalogue consists of a detailed inventory of surviving structures, followed by a list of architectural and ornamental fragments. The text that precedes the catalogue comprises five chapters. The first chapter is an introductory survey of the monuments included in the catalogue. The second and third chapters treat Lydian building materials—marble, limestone, and sandstone—and Lydian building methods, from the preparation of blocks to the treatment of finished wall surfaces, from the organization of labor to, in one case, the identification of a specific team of masons. The fourth chapter is a review of the evidence, historical, archaeological, and architectural, for the chronology of Lydian masonry. The study closes, in the fifth chapter, with an investigation of the origins and early development of the Lydian building tradition during the adolescence of the Lydian empire, and of its later development and influence on other regions from the golden reign of Croesus through the first generations of Persian rule. Lydian architecture is examined in relation to other evolving building traditions, and in terms of the interaction between Lydia and her cultural neighbors, from Iran to Italy, Egypt to Armenia.

11 On domestic architecture, see Ramage, *Lydian Houses* (Sardis M5); the Lydian fortification is discussed below, Ch. 1.

12 Martin, *Manuel*; Orlandos, *Matériaux II*; Coulton, *Architects*; see now also Adam, *Roman Building*.

PART I
TEXT

Chapter One

SURVEY OF THE MONUMENTS

A walk around the top of the Acropolis of Sardis would bring all the monuments examined in this study into view. To the north, the Tomb of Alyattes stands out amid the lesser mounds of Bin Tepe (nos. 1–9 on Fig. 3 and below in the “Catalogue of Monuments”). Mount Tmolus rises to the south, its foothills dotted by small, modern villages. In Keskinler, one such village southwest of the Acropolis, lie a number of small Lydian tumulus tombs, on the east side of the Pactolus valley; the burial chamber of one of these tombs was revealed by grave robbers in the 1970s and remains accessible (Figs. 3, 4, no. 10). Downstream, on the west bank of the Pactolus and across from the Acropolis, stands the so-called Necropolis hill, honeycombed on its east side by Lydian tombs. Most of these are rock cut, but some include masonry-built elements (Figs. 4, 5, nos. 12, 14). Other tombs are found on both sides of the river nearby (Figs. 4, 5, nos. 11, 15), as well as on the north side of Necropolis hill (Fig. 4, no. 13).

An elegant complex of Lydian retaining walls is located just beneath the top of the Acropolis on its northwest side (Fig. 5, no. 16). Farther north, on the lower slopes of the Acropolis, is the “Byzantine Fortress,” a large terrace encased in limestone masonry on top of a natural promontory (Fig. 5, no. 17). Other structures including fortifications built of limestone and sandstone are located on the edge of the Hermus River plain to the north and west (Fig. 5, nos. 18, 19).

Tombs, at Sardis, Bin Tepe, and elsewhere in Lydia, form the largest class of Archaic monuments in the region. Apart from tombs, Lydian ashlar masonry is mostly confined to terraces and retaining walls at Sardis.

In this chapter, the monuments included in the catalogue are introduced, beginning with the burial mounds at Bin Tepe, then proceeding to the sepulchral and other monuments of Sardis. Related topics, not treated in detail in this study, are touched on at the end of the chapter. These include large-scale rubble and mudbrick architecture, literary and epigraphic references to specific Lydian buildings, architectural ornament, and representations of architecture in Lydian art.

TOMBS: BIN TEPE

Though partly worn away by centuries of wind and rain, the tumuli of Bin Tepe still rise up clearly from the Hermus River plain; the largest of them, long identified as the Tomb of Alyattes, dominates the landscape for miles around (no. 1; Fig. 17). The identification of this mound rests primarily on its size and location. Herodotus says the Tomb of Alyattes is the largest monument in Lydia, that it is a tumulus, that its diameter measures 13 plethra and its circumference 6 stades and 2 plethra, and that it is situated near the lake called Gygaea. The mound under consideration, approximately 1,120 m in circumference and 60 m high (Fig. 19), is indeed the largest monument in Lydia, in fact the largest tumulus in Asia Minor;¹ it is considerably larger than any of the other tumuli at Bin Tepe by the shores of the Gygaean Lake. Its circumference

1 These measurements are based on a 1:2,000 scale survey of Bin Tepe and Sardis (Salihli [Serdes] Örenyeri), produced between 1981 and 1985 by the Turkish General Directorate of Maps (Harita Genel Komutanlığı). They correspond closely to the measurements taken by Spiegelthal in 1853: Olfers, “Königsgräber,” 545.

also seems to match the circumference given in Herodotus's text. If the foot standard on which the historian's measurement is based was the conventional Attic-Ionic foot of 0.294 m, for example, then Herodotus's figure of 6 stades (units of 600 ft.) and 2 plethra (units of 100 ft.), or 3,800 ft., would equal 1,117.20 m. The Attic-Ionic foot is the smallest foot-measure commonly used in the architecture of ancient Asia Minor, and even if Herodotus's figure was based on a larger unit, it matches this tumulus better than any other Lydian burial mound.²

The correspondence between this mound and the two other details of Herodotus's description—that it rests on a base of large stones and is crowned by five inscribed markers—is less certain. The mound is heaped on top of a natural limestone ridge, which rises from south to north; outcroppings of bedrock are visible in several places on the north side of the mound. On the south side, moreover, a thick stone packing has been exposed both on the slopes and at the bottom of the tumulus. Either of these features—the bedrock outcroppings or the stone packing—might plausibly be mistaken for, or described as, a base of large stones (see Appendix 2). It is also possible that this mound was once surrounded in whole or in part by a low masonry crepis wall comparable to walls associated with some other tumuli, both Lydian and non-Lydian (such as the Etruscan burial mounds at Caere), and that this wall has been buried or robbed out. As we shall see, every Lydian crepis wall known today was previously buried and was brought to light only through extensive excavation.

As for the five inscribed markers mentioned by Herodotus, there is in fact one enormous limestone “phallic” marker toppled over on the summit of the

tumulus under consideration (Fig. 18),³ but this bears no trace of an inscription, and in fact all known Lydian inscriptions are in marble, not limestone. This marker is the only such object ever found in situ at Bin Tepe. A second marker, reported by the German explorer Ludwig Peter Spiegelthal near the bottom of the mound but now lost, was also uninscribed.⁴ It is possible that Herodotus's account is partially incorrect on this point—that, for example, there were originally five markers on top of the tumulus but that they were not inscribed. It is also possible that the two extant “phallic” markers were originally supplemented by markers of another type, such as marble stelae, which were inscribed as Herodotus says.

In spite of these uncertainties, the identification of this tumulus as the Tomb of Alyattes seems secure. On the basic facts—the relative size and location of the mound—the correspondence between Herodotus's description and this monument is exact; it is only in details, which the historian is more likely to have gotten wrong and the accident of preservation more likely to have obscured, that uncertainties arise. Most striking is the correspondence between the circumference of this mound and the figure recorded by Herodotus. This measurement is perhaps the most compelling of the details the historian provides; it is not a particularly significant or memorable figure, and it is hard to see how it could be the result of misinterpretation or exaggeration. It is possible, of course, that Herodotus was mistaken as to the occupant of this monument, but the apparent accuracy of the rest of his account lends weight to his identification of the tomb.

The Tomb of Alyattes is the only identifiable monument of Lydian architecture specifically mentioned in an ancient source and the only monument directly associated with a dated historical figure. Alyattes became king of Lydia ca. 610 B.C. and ruled for half a century, until his death ca. 560. The chronology of his reign is discussed in greater detail in Chapter 5, below, but general parallels in funerary architecture, such as the pyramids of Egypt and the Mausoleum of Halicarnassus, would suggest that work on his tomb had been begun, at least, while Alyattes was still alive. Thus, the feature of this

2 The startlingly close correspondence between this figure and the present circumference of the mound is not itself significant, since Herodotus's figure is only an approximate one, expressed as it is in units of 100 ft. Thus, any figure between about 1,100 m (3,750 ft.) and approximately 1,130 m (3,850 ft.) would be an equally good match. On the Lydian foot as derived from “standard sizes in Lydian buildings,” see Ramage (*Lydian Houses* [Sardis M5], 6), who postulates a foot of 0.295–0.296 m. Herodotus or his source may also have used a longer foot of 0.34 m, apparently used in early structures of the Artemision at Ephesus (Bammer, *Heiligtum*, 174–84, on the “Hekatompedos”; see also Bammer, “Plinius und der Kroisostempel,” 13–14; Bammer and Muss, *Artemision*, 44). A foot of 0.347–0.348 m was apparently used at Persepolis, possibly also at Pasargadae (Roaf, “Persepolitan Metrology”). Six stades and 2 plethra, or 3,800 ft., multiplied by 0.34 equals 1,292 m; but since the tumulus excavated by Spiegelthal is larger than any other, it is still the best fit. The next largest mound (Kir Mutaf Tepe) has a present diameter of about 300 m (circumference ca. 950 m, as recorded by McLauchlin [“Graves,” 254] and measured off the new map cited above, n. 1); it may also have had a crepis (Hanfmann, “6th Campaign [1963],” 55–56; Greenewalt and Rautman, “Campaigns of 1994 and 1995,” 499–500), but if so, the diameter of the crepis would have been even smaller. In any case, 950 m converted to stades and plethra based on a foot of 0.294 m equals 5 stades and 2 plethra, a full stade short of Herodotus's measurement.

3 Olfers, “Königsgräber,” 546. On these markers generally, see McLauchlin, “Graves,” 126–31. Spiegelthal suggested that the markers were originally elevated on a platform of brick. Exploratory excavations carried out by Nicholas D. Cahill around the base of the marker in 1983 failed to reveal any such platform (Greenewalt et al., “Campaign of 1983,” 20–22). Scattered bricks are still visible on the summit of the mound, but Cahill suggests they probably belonged “to a post-Lydian structure . . . perhaps a guard- or watch-station at the top of this strategic point” (*ibid.*, 22).

4 Olfers, “Königsgräber,” 546.

tomb that is of greatest interest to this study, the tomb chamber—which is buried near the center of the mound and would have been among the first parts of the tomb constructed—was probably built before ca. 560 B.C.

The discovery of this tomb chamber in 1853 was the crowning achievement of the German explorer Spiegelthal's investigations. Spiegelthal attacked the mound by tunneling into a broad gash in its south side. He soon encountered a complex of earlier tunnels, presumably dug by ancient or medieval tomb robbers. One of these led him to the tomb chamber, located about 30 m from the center of the mound at a level roughly even with the top of the bedrock on the mound's north side (Figs. 19, 20). Spiegelthal explored a number of other ancient robber's tunnels but encountered no other built structures. His entry tunnel was rediscovered by the Sardis Expedition in 1962.

The chamber is oblong in plan and is connected by a doorway to an open space or forecourt at one end (Figs. 21, 22). The walls of the chamber are built of four courses of smoothly finished marble blocks. The ceiling beams are limestone. The floor, now buried, was apparently also paved with stone slabs, either limestone or marble. When discovered by Spiegelthal, the doorway was closed by a wall of rusticated marble blocks, which are still largely intact. Of the facade of the chamber, the left-hand (west) doorjamb, the lintel, and a corner of the right doorjamb are all that remain visible (Figs. 24, 25, 27). The lintel is enormous, 3.90 m wide, 1.11 m high, and 1.45 m thick. The forecourt is bordered on both sides by huge limestone blocks, resting on a limestone floor (either paved or cut out of the native bedrock). Open at its outer end, it was never roofed (Fig. 23).⁵

When Spiegelthal discovered the chamber, it had already been thoroughly looted. He was able, however, to recover numerous fragments of alabaster alabastra, several nearly complete ceramic lydia (small perfume bottles), and scattered potsherds. These particular finds were illustrated by Olfers (Fig. 34); of Spiegelthal's finds, the only surviving object is "the upper half of a XXVI Dynasty [664–525 B.C.] alabastron, now in the Ashmolean Museum" (Fig. 35).⁶ Other potsherds have been retrieved

by members of the Harvard-Cornell Expedition (Figs. 36–39). The finds are not precisely datable, but all could belong to the first half of the sixth century.

These artifacts thus supply corroborating archaeological evidence for the identification of this mound as the Tomb of Alyattes. Other sections of this study will show that the masonry of the tomb chamber is comparable to the masonry of other monuments independently dated to the first half of the sixth century.

The triplet of great mounds at Bin Tepe, the largest of which is the Tomb of Alyattes, stretches out along a ridge running roughly parallel to the Hermus River. The Tomb of Alyattes is the easternmost and largest of these three tumuli. The westernmost tumulus (Kır Mutaf Tepe) remains largely unexplored,⁷ but the central mound, known as Karnıyarık Tepe, was the subject of several seasons of investigation by the Harvard-Cornell Expedition in the mid-1960s. Investigation of this central mound was renewed in 1992.

Karnıyarık Tepe ("Split-Belly Mound," no. 2) takes its name from a prominent gash in its south side, which faces Sardis (Fig. 41). Although smaller than both the Tomb of Alyattes to the east and Kır Mutaf Tepe to the west, Karnıyarık Tepe is situated on an elevated ridge and rises higher in absolute elevation than all the other mounds at Bin Tepe. The tumulus is roughly 220 m wide and 50 m high.

From 1964 to 1966, the Harvard-Cornell Expedition explored this mound, driving a long tunnel into the gash in the south side of the mound (Fig. 43). The excavators quickly found, as Spiegelthal had in the Tomb of Alyattes, that ancient, probably Roman grave robbers had preceded them, and the expedition's tunnels partly follow those dug by ancient explorers. Sixty-five m from the outer edge of the mound, a curving limestone wall was encountered; it consists of two courses of squared blocks surmounted by a large crowning molding, or "bolster" course (Fig. 42). This wall was eventually traced over a total distance of about 100 m in branch tunnels dug to the east and west of the main tunnel. As exposed, it describes about one-third of the circumference of a circle approximately 90 m in diameter and concentric with the outside of the tumulus. It is thus apparently the crepis of an earlier and smaller tumulus, buried beneath the present mound.

5 The apparent barrel vault in the drawing published by Olfers ("Königsgräber," pl. 4) is certainly an unfortunate fantasy. The forecourt was filled in and buried as the mound was heaped up above it, and the rubble shown in the drawing is simply the fabric of the tumulus, hollowed out by thieves and explorers, including Spiegelthal himself.

6 Olfers, "Königsgräber," 549–50, pl. 5; Hanfmann, "5th Campaign," 56–57; Greenewalt, "Campaign of 1976," 71, fig. 19. On the alabastron, now in the Ashmolean Museum, see Hanfmann, *SPRT*, 56. The museum inventory number of the fragment is 1919.51.

7 Remains of an apparent crepis wall had been observed at the base of the mound in 1963: Hanfmann, "6th Campaign [1963]," 55–56. A small trench was dug on the south side of the mound in 1995 to investigate this wall: Greenewalt and Rautman, "Campaigns of 1994 and 1995," 499–500.

The masonry of the wall is rusticated (Figs. 44, 45, 50–55). Individual blocks have narrow, chisel-drafted borders enclosing rough-dressed central panels. The treatment of the roughened panels exhibits considerable variation. Gaps in the wall and other indicators that the crepis is unfinished suggest an explanation for this unevenness; several different stages in the finishing process are represented. This crepis was thus abandoned while still under construction and left incomplete when the mound was enlarged to its present size. Investigations of the interior of the mound, within the confines of the early crepis, failed to locate the burial chamber or chambers.

The finds from the tunnels dug by the Harvard-Cornell Expedition provide useful dating evidence of two kinds. First is a pottery assemblage (Figs. 63–66), probably workmen’s rubbish, recovered from a layer on top of the crepis wall. Datable to the late seventh or early to mid-sixth century, this assemblage not only provides a terminus post quem for the enlargement of the tumulus but also suggests, although it cannot establish, a terminus ante quem of the late seventh or early to mid-sixth century for the construction of the interior crepis. Second are several fragments of an early to mid-sixth-century painted dish (Figs. 75, 76) recovered from the stone fill packed up behind the crepis exposed in the abortive Roman robber’s tunnel “O” (Fig. 43). This dish, which provides a terminus post quem for the construction of the crepis wall, is similar in date to the objects found outside the wall, suggesting that the interval between the construction of the crepis and the enlargement of the mound was relatively short—a conclusion also indicated by the fine condition of the crepis itself.⁸

Attempts to identify Karniyarık Tepe have been based on general historical assumptions and two specific pieces of evidence—one epigraphic and one literary—that have suggested to some that this tumulus is the tomb of the famous Gyges, founder of the Lydian dynasty (ca. 680–644).⁹ Taking the identification of the Tomb of Alyattes as a starting point, it is sometimes argued that the other two unusually prominent mounds at Bin Tepe should probably also belong to the era of Lydian independence rather than a later period, and that

they are the tombs of Lydian kings.¹⁰ There is a degree of common sense to this idea, but it is by no means certain. Many Lydian tumulus tombs clearly postdate the Persian invasion, and there is other evidence that the Persians were generous conquerors, who allowed their Lydian subjects to continue to possess and display great wealth. Particularly striking is the career of Pythes or Pythius, a Lydian contemporary of Xerxes, who was second only to the Great King in wealth and who was supposedly buried in a tumulus—presumably a large one—near Celaenae in Phrygia.¹¹

Size alone is not sufficient evidence, therefore, for dating this tomb to the pre-Persian era, much less for identifying it as a king’s tomb. The evidence for identifying Karniyarık Tepe specifically as the tomb of Gyges is even less substantial. This identification is partially based on a symbol inscribed in at least 26 places on the face of the interior crepis wall:  (Figs. 44–46, 57). George M. A. Hanfmann read this symbol as a monogram for the Assyrian transliteration of the Lydian name “Gyges” inscribed in Greek letters, that is, “Gugu.”¹² However, this reading, while ingenious, is forced; the interpretation of the symbol as the mark of the occupant of the tomb, rather than as a mason’s mark or apotropaic sign, is unlikely.¹³ The second piece of evidence for attributing this tomb to Gyges is a fragment of a poem by Hipponax, which mentions a number of tombs or grave monuments as landmarks found along the road through Lydia, among them the *σῆμα Γύγω* (monument of Gyges).¹⁴ The attempt, however, to identify these monuments with specific

10 Strabo 13.4.7 (derived from Herodotus, quoted in Pedley, *Literary Sources* [Sardis M2], 77, no. 279); Hanfmann, *SPRT*, 56–58; McLaughlin, “Graves,” 42–50.

11 On Pythes/Pythius’s wealth, see Hdt. 7.27–28; on his tomb, see Plut. *Mor.* 262D–263C.

12 First proposed in Hanfmann, “7th Campaign,” 34.

13 Ratté, “Not the Tomb of Gyges.” It is equally unlikely that it is an abbreviation for Alyattes, as suggested by G. M. Browne (“Alyattes”). For this and other reasons discussed above, his further suggestion that Karniyarık Tepe is the tomb of Alyattes is also most unlikely.

14 Degani, *Hipponactis testimonia et fragmenta*, fr. 7:

† τέαρε[. . .]δεύει† τὴν ἐπὶ Σμύρνης
ἴθι διὰ Λυδῶν παρὰ τὸν Ἀττάλεω τύμβον
καὶ σῆμα Γύγω καὶ †μεγάστρυ† στήλην
καὶ μνῆμα Τῶτος, Μυτάλιδι πάλυδος,
πρὸς ἥλιον δύνοντα γαστέρα τρέψας.

< . . . > toward Smyrna
go through <the land> of the Lydians past the tomb of Attales
and the monument of Gyges and the stele < . . . >
and the memorial of Tos, king of Mytalis
having turned your belly toward the setting sun.

See also Pedley, *Literary Sources* (Sardis M2), 77, no. 280. For discussion of this text, see Ratté, “Not the Tomb of Gyges.”

8 In 1992, a ground-penetrating radar survey of the tunnels in the interior of the mound was conducted in the hope of locating the tomb chamber in this way: Greenewalt et al., “Campaigns of 1992 and 1993,” 24–32. In 1995, the results of this survey were tested by a program of drilling and coring, but the tomb chamber continues to elude discovery: Greenewalt and Rautman, “Campaigns of 1994 and 1995,” 504–5.

9 On the dates, see Spalinger, “Gyges”; reference supplied by Cahill.

tumuli at Bin Tepe is conjectural, like Hanfmann's reading of the symbol inscribed on the face of the crepis wall.

Certainly neither of these pieces of evidence is strong enough to require reevaluation of the dating of the pottery found both behind and in front of the crepis, pottery that indicates a date at least a half century later than the death of Gyges and further is contemporary with the reigns of Alyattes or Croesus, if not later. Conceivably, Karniyarık Tepe was intended, in its original as well as in its enlarged form, for a royal consort or beloved child rather than a king. If there is any historical reality behind Herodotus's story of the death of Croesus's favorite son, perhaps this is the tomb of that unfortunate prince.¹⁵ It is also possible that the tomb is that of a nonroyal nobleman, or noblewoman, and, whatever the lineage of its occupant, that it postdates the Persian invasion of 547 B.C. In subsequent chapters of this volume, however, it is clear that the masonry of the crepis wall at Karniyarık Tepe, as well as of the Tomb of Alyattes, is similar to the masonry of other monuments dated independently to the first half of the sixth century.

In addition to the Tomb of Alyattes and Karniyarık Tepe, the Harvard-Cornell Expedition has investigated seven other built chamber tombs within tumuli at Bin Tepe. All seven have ashlar masonry chambers, but none has evidence of a crepis wall.¹⁶ About 20 similar tombs are reported by Spiegelthal, Choisy, and Butler, or have been noted but not excavated by the Expedition. A total of 117 tumuli at Bin Tepe have been recorded by the Central Lydia Archaeological Survey, directed by Christopher H. Roosevelt. Of these, seven previously undocumented mounds possessed accessible burial chambers, which will be published by Roosevelt.¹⁷

A chamber complex within a small tumulus near the mound of Alyattes, called BT62.4 (no. 3; Fig. 77), is a particularly fine example of a built chamber tomb. It comprises a chamber like that in the Tomb of Alyattes, an antechamber similar to an enclosed version of the forecourt of the Tomb of Alyattes, and a dromos set out

along the same axis as the chamber and antechamber. The dromos is unpaved and unroofed; its walls are built of rough-trimmed limestone blocks (Figs. 78, 79). Both chamber and antechamber, however, are built entirely of limestone ashlar masonry. The walls of the antechamber consist of four courses of squared blocks, the faces of which are finely point dressed (Fig. 81). A doorway connecting the antechamber to the chamber was originally closed by a door plug fitted up against the front of the chamber (Fig. 79). The walls of the chamber are built of slightly larger blocks than the walls of the antechamber, arranged in three courses and smoothly chisel dressed (Figs. 82–84). Many of the floor slabs of both the chamber and antechamber are tied together by staple clamps embedded in butterfly-shaped settings (Fig. 80), and the ceilings over both rooms are flat, like the ceiling of the chamber in the Tomb of Alyattes (Fig. 85). The excavation of this tomb yielded only a few potsherds and other objects, all datable to the Archaic period (Figs. 86, 87).

The six remaining tombs investigated by the Harvard-Cornell Expedition at Bin Tepe (nos. 4–9) are comparable to BT62.4. One, BT63.2, is much simpler, consisting only of a chamber with no doorway (no. 4; Figs. 88–90); another, BT66.1, is just as elaborate, with dromos, antechamber, and chamber (no. 5; Figs. 94–98). The majority of the rest have dromoi but no antechambers. Potsherds and fragments of other objects apparently deposited as grave goods suggest that many of these tombs were built between the sixth and fourth centuries, although the dating of some is complicated by the presence of secondary burials.

Most of the other known chamber tombs at Bin Tepe are similar. Some are partially carved out of the native rock, with the floors and bottom registers of the walls rock cut rather than built (see especially no. 8; Figs. 109–11). In cases where the entire chamber is artificially constructed, the walls invariably rest on top of the floors. Wall blocks and ceiling beams are usually squarish in section and impressive for their size and weight. As for layout, chambers are always rectangular, sometimes square, sometimes oblong. Where present, doorways are centered, generally in one of the short sides of an oblong chamber. As a rule, antechambers and dromoi are disposed symmetrically along the axis of the doorway, but the compass orientation of this axis is variable. A multiple-chamber tomb in the southwesterly region of Bin Tepe at Kestelli Köy is unusually complex.¹⁸ It has a dromos, antechamber, and three chambers, one on either

15 Hdt. 1.34–46; quoted in Pedley, *Literary Sources* (Sardis M2), 31, no. 89. Kır Mutaf Tepe, the third great mound at Bin Tepe, is another possibility; the point here is less to propose a serious identification of the mound than to suggest another option to identifying this mound as the tomb of a Lydian king. See also McLauchlin, "Graves," 337–38 n. 61; independent evidence for the date of Kır Mutaf Tepe is examined in *ibid.*, 52.

16 Note, however, Butler's report of the remnant of a sandstone crepis girding a tumulus near Sardis (*Sardis* I:1, 165) and the remains, noted above, of an apparent crepis wall at the base of Kır Mutaf Tepe. For the limestone crepis wall of a tumulus near Köprübaşı northeast of Sardis, explored by the Manisa Museum in the summer of 1988, see discussion in Ch. 5, below.

17 Roosevelt, "CLAS 2005," 136–44.

18 Excavated by the Manisa Museum. Greenewalt, "Campaign of 1976," 70; Greenewalt et al., "Campaigns of 1981 and 1982," 88–89 n. 5; McLauchlin, "Graves," 190–92.

side of the antechamber and one at the end, opposite the dromos. In addition to its uncommon layout, the tomb is remarkable for combining flat and pitched ceilings over the chambers and antechamber—flat ceilings for the side chambers (and dromos), pitched ceilings above the antechamber and the chamber opposite the dromos. This tomb has the added distinction of being the only known tomb at Bin Tepe besides the Tomb of Alyattes constructed partly of marble. Other multiple-chamber tombs and tombs with pitched or corbelled ceilings, as well as tombs built partly of marble, are known in outlying cemeteries near Akhisar, Manisa, and Uşak.¹⁹ A limestone tomb discovered near Sardis in 1999 has a pitched ceiling decorated on its underside with an astonishingly well-preserved painted representation of a timber roof framework.²⁰ Special mention should also be made of a tomb called Aktepe 1, located in the vicinity of Güre near Uşak, notable for its false barrel vault and exceptionally fine masonry.

TOMBS: SARDIS

In addition to the nine tombs explored at Bin Tepe, the Harvard-Cornell Expedition has excavated six Lydian masonry tombs in the immediate environs of Sardis. Four are variants of the same tumulus-tomb type regularly encountered at Bin Tepe and described above. These include the tomb at the mountain village of Keskinler (BK71.1, no. 10; Figs. 118–22), a tomb on the east side of the Pactolus just north of the precinct of Artemis (T77.1, no. 11; Figs. 125–31), another just south of the precinct of Artemis on the west side of the Pactolus (T82.1, no. 12; Figs. 139–41), and a fourth farther west of the Pactolus on the north side of the Necropolis hill (T89.11, no. 13; Figs. 143–46). Three of these tombs (BK71.1, T77.1, T89.11) are equipped with

dromoi, in all cases built largely of sandstone or schist, not of limestone like the dromoi at Bin Tepe. Tomb T89.11 is also supplied with an antechamber. The fourth (T82.1, no. 12) has a shallow porch but no dromos. The chambers of all four tombs are built of squared limestone masonry (with an admixture of limestone and conglomerate blocks in the case of T89.11), and the few potsherds and other objects found in the fill removed from tombs BK71.1 (Figs. 123, 124) and T82.1 (Fig. 142) are dated to the sixth or fifth century. Probes sunk beneath the floors of both the chamber and the dromos of T77.1 uncovered a layer of limestone chips, presumably deposited during the construction of the tomb (Fig. 126). The pottery recovered from this construction layer and earlier occupational strata below suggests a date in the sixth century (Figs. 132–38). The pottery from the chamber of T89.11 is mostly Hellenistic (Fig. 147), but this probably represents a secondary interment.

The other two tombs are more unusual. Both were originally uncovered by the first Sardis Expedition and were subsequently rediscovered and reexcavated by the Harvard-Cornell Expedition. The first is a rock-cut chamber tomb in the Necropolis on the west side of the Pactolus River (Tomb 813, no. 14; Figs. 148–50). Alone among the more than 1,100 known tombs in this vast cemetery, it is distinguished by a monumental entranceway: a flight of four smoothly finished limestone steps flanked by a pair of limestone stelae. The interior of the tomb consists of two unadorned rock-cut chambers. Butler restored a pedimental facade at the top of the steps; but it is more likely that the steps led simply to a conventional Lydian rock-cut tomb facade—a vertical cliff with a narrow doorway—and it is quite possible that other rock-cut tombs in the city's Necropolis had comparable monumental entranceways.²¹ The contents of the tomb in question, including an Attic black-figure oinochoe and an Achaemenid cylinder seal, date it to the early fifth century.²²

The remaining tomb, known as the Pyramid Tomb (no. 15; Figs. 151, 152, 154), is unique. This structure is located on the north side of a high ridge running between the Acropolis of Sardis and the Pactolus River, north of the Artemis precinct and just across from

19 On Manisa and Uşak, see McLauchlin, "Graves," 80–86, 256–74; using McLauchlin's catalogue as a guide, I was able to visit most of these tombs in the summer of 1987. For fuller treatment of tombs near Manisa discussed by McLauchlin, see Nayır, "Alahıdır"; idem, "Alibeyli." On more recently discovered tombs near Manisa, see Dedeoğlu, "Lydia'da bir Tümülüs Kazısı"; Bilgin et al., "Temizlik Kazısı." For tombs near Uşak and near Kırkağaç in northern Lydia (including both tombs discussed by McLauchlin and tombs unknown to her), see İzmirli, "Selçikler"; Özgen and Öztürk, *Lydian Treasure*; Dedeoğlu, "Harta Abidintepe." On Akhisar, see Greenewalt et al., "Campaigns of 1990 and 1991." For a more recent survey of all the known tumulus tombs in Lydia (approximately 600), see Roosevelt, "Settlement"; idem, "Tumulus Survey." See also Dinç, "Lydia Tümülüsleri."

20 The tomb (known as Lale Tepe, located near the village of Ahmetli) was looted in January 1999 and subsequently excavated by archaeologists associated with the Manisa Museum: Roosevelt, "Lale Tepe: Excavation"; Stinson, "Lale Tepe: Architecture"; Baughan, "Lale Tepe: Klinai."

21 Butler, *Sardis* I:1, 161, fig. 178. Alternatively, Greenewalt et al. ("Campaign of 1984," 50 n. 42) have suggested that "repairs to an existing two-chamber tomb, the original conglomerate facade of which had been damaged or destroyed (perhaps from erosion or inept digging of the outer chamber), could explain the built facade."

22 Greenewalt et al., "Campaign of 1984," 37.

T77.1 (Fig. 153). As preserved, it is a stepped platform, built of limestone masonry around a core of earth and rubble. In all, six steps remain in situ. A pavement in the center of the monument at the level of the fifth step and two displaced wall blocks are all that remain of the chamber. Butler proposed two reconstructions, suggesting, on the one hand, that the burial chamber may have been a freestanding “aedicula . . . of the same type as the so-called Tomb of Cyrus the Elder at Pasargadae” and, on the other, that the monument as a whole may have been a stepped pyramid, concealing the chamber within its upper half.²³ The former reconstruction (see Fig. 160) is much more likely than the latter, which, though intriguing, is both structurally and stylistically implausible.²⁴

It is uncertain, however, that construction of the tomb was ever completed. The treads of the surviving limestone steps are rough except for a smoothed band at the back of each step and the occasional smoothed strips running from the back of the step to the front (Figs. 151, 154, 156). This treatment suggests that the monument as a whole is incomplete. The dressing of the risers of the steps is similar to the dressing of the treads, and it is likely that the risers are also unfinished (Figs. 152, 155, 156).

The only stratified find associated with the Pyramid Tomb is a fragment of a “streaky-glazed” skyphos of sixth-century type, recovered from a layer of limestone chips, presumably working chips, on the west side of the tomb. Other unstratified finds are all generally of late Archaic or early Classical date (Fig. 161). Hanfmann proposed that the tomb might be associated with the romantic story of Abradatas, a Persian warrior felled in the conquest of Sardis in the mid-sixth century and buried in a tomb on a ridge by the Pactolus (Xen. *Cyr.* 7.3.2–16).²⁵ The architectural parallel drawn by Butler to the Tomb of Cyrus at Pasargadae as well as similarities to Persianizing monuments in Anatolia are discussed elsewhere in this volume (see below, Ch. 5).

CIVIC STRUCTURES

Apart from tombs, most examples of Lydian ashlar masonry are terracing walls, and unlike tombs, all these lie within the apparent city limits of Lydian Sardis (see also Appendix 3). The first such monument discovered is a complex of terracing walls on the north side of the

Acropolis (AcN, no. 16; see Figs. 5, 167), uncovered by the first Sardis Expedition in 1922 and subsequently rediscovered and reexcavated on a larger scale by the Harvard-Cornell Expedition between 1960 and 1975.

Located just below the top of the Acropolis, on the edge of a precipitous decline, the complex consists of several walls arranged in two tiers. The lower tier is built partly of limestone (Wall 3), partly of sandstone (Wall 2); the upper tier (Wall 1) is constructed almost entirely of limestone. Cuttings in the masonry of the lower tier show that a stairway originally tied the two tiers together (Figs. 163–65, 168). The complex seems to have belonged to a series of terraces revetting the northwest corner of the knoll, which forms the highest level place on the north side of the Acropolis. The ultimate purpose of these terraces remains unknown. They occupy a strategic point overlooking one of the only two places where it is possible to climb up to the Acropolis, but the external stairway suggests they are not fortifications.

The limestone section of the lower tier (Wall 3) is composed of nine courses of ashlar masonry, which range in height from roughly 0.20 to 0.40 m. Each course steps in slightly, about 2 cm, from the course below. The faces of the blocks are rusticated with fine, chisel-drafted borders enclosing delicately point-dressed central panels (Figs. 168, 172). The sandstone section (Wall 2) is built of smaller blocks, irregularly coursed with slightly pulvinated faces (Fig. 169). The limestone masonry of the upper tier (Wall 1) is similar to that of the lower tier, but the former is less finely dressed—the central panels are rough projecting bosses, engraved in many places with letters or other symbols—and it may be unfinished (Figs. 170, 173). All three walls of the terrace system are retaining walls: in some places they are built directly up against bedrock, while in others they are backed by an artificial packing of earth and rubble. Thus, only the faces of the walls are built of squared blocks, and the backs of the facing blocks are rough dressed.

The best independent dating evidence for the whole complex comes from a layer of limestone chips on top of the bedrock at the foot of the upper limestone wall (Wall 1, Fig. 171). Potsherds included in this layer “represent wares typical of the late seventh to early fifth centuries” (Figs. 174, 175).²⁶ The deposits excavated in front of Walls 1 and 2, however, were disturbed.

The ruins of monumental complexes similar to the limestone walls on the Acropolis have been discovered at three other locations: sectors ByzFort, MMS/N, and

23 Butler, *Sardis* I:1, 169–70.

24 Ratté, “Pyramid Tomb.” Kleiss (“Pyramid Tomb”) has suggested an alternative restoration, along the lines of a Persian tower tomb.

25 Hanfmann, “3rd Campaign,” 31 n. 45: “[this] story is apparently apocryphal, [but] it may indicate the existence of an important Persian tomb” in the Pactolus valley.

26 C. H. Greenewalt, Jr., excavator’s final report (unpublished).

Mound 2 (nos. 17–19 on Fig. 5).²⁷ Like the Acropolis walls, the other complexes feature squared limestone or sandstone blocks laid in regular and very slightly staggered courses; each course is set back a few centimeters behind the line of the preceding course. The trimming of the blocks is also similar, with smooth borders enclosing roughened and in some cases projecting panels. In none of these complexes does the ashlar masonry compose a freestanding wall. It functions rather as a monumental facing, retaining or revetting a core of rubble or, in one case at sector MMS/N, mudbrick.

The grandest of these complexes is a large terrace on the lower north slope of the Acropolis (no. 17; Figs. 176–94). The core of this terrace is a commanding hill that projects from the side of the Acropolis overlooking the Hermus plain. This promontory, called the “Byzantine Fortress” or “sector ByzFort” after later structures, was enlarged and regularized in the Lydian period with a combination of retaining walls and landfills that enclose it on its free east, north, and west sides. Excavation began in 1983 and continued intermittently until 1991.

The north or front end of the terrace is rectangular in plan and 28 m wide. Toward the south, the terrace grows much wider, like the hill it embraces. From front to back, the terrace is at least 150 m long. The face of the terrace has been revealed in several places, most extensively at the northeast corner (Figs. 178, 179, 181, 183). It is built of limestone masonry, not as finely dressed as that on the Acropolis but no less carefully constructed. Eight roughly isodomic courses are preserved at the northeast corner. Individual courses range in height from 0.50 to 0.59 m. The ashlar masonry rests on top of three courses of rough-trimmed blocks and retains an interior packing wall composed mostly of large schist rocks. As preserved, this packing wall rises several meters above the limestone masonry. It retains earth and rubble dumped up against the sides of the promontory. Excavation on top of the promontory has revealed the fill retained by the packing wall at elevations approximately 12 m above the bottom of the terrace.

Before excavation, much of the face of the terrace at the northeast corner was buried by a series of layers of limestone chips (Figs. 179, 182, 184). These layers are important for two reasons: first, because they show that most of the surviving masonry belonged not to the visible part of the terrace but to its foundations; and second, because objects sealed beneath them must have been

deposited during or before the construction of the terrace. The finds from these crucial layers included fragments of both local and imported pottery, as well as other objects (Figs. 195–98).²⁸ The latest datable object was a sherd of an Attic black-figure amphora of the mid-sixth century (Figs. 195:b, 196:b).²⁹

In addition to the rubble fill retained by the terrace, excavation on top of the hill revealed traces of at least two earlier building phases (Fig. 177). The first of these is represented by a large square pit, perhaps the basement or cellar of a freestanding structure. The structures of the second phase are built into or on top of the fill of this cellar. These include a massive rubble wall, oriented roughly north–south, and, west of this wall and perpendicular to it, a narrow foundation, probably a stylobate, built of squared sandstone and marble blocks (Figs. 192–94). The fill of the limestone-faced terrace ran up against the massive rubble wall, showing that the former cannot be earlier than the latter, and since the orientation of the rubble wall and the sandstone and marble stylobate is slightly different from that of the terrace, these structures probably represent an entirely different and earlier building phase. The stylobate consists of a marble plinth, with a circular anathyrosis-like cutting on top, flanked by paving stones of marble and sandstone. It is unclear whether the rubble wall and stylobate were part of a single structure; the stylobate may have belonged to the porch of a small building or pavilion, and if the rubble wall was associated, it may have been part of an anta-like wing flanking one side of this porch.

In a speculative article published in 1975, before excavation had revealed the Lydian terrace at the Byzantine Fortress, Hanfmann suggested that the palace of Croesus may have been located on this promontory. Hanfmann also suggested, as an alternative, that the terrace walls on the Acropolis may have belonged to Croesus’s palace, or that the Lydian king may have had two palaces, one at each location.³⁰ Hanfmann’s proposals were conjectural, and the trenches dug behind and on top of the Acropolis walls and on top of the Lydian terrace at the Byzantine Fortress have failed to reveal structures contemporary with the terraces themselves. Previously

28 Particularly notable were the architectural terracottas, some of which are illustrated in Fig. 198. For full publication, see Ratté, “Architectural Terracottas.”

29 Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Att 5, attributed by Dietrich von Bothmer to the Painter of Louvre F6; Beazley considered this artisan an “old-fashioned companion of Lydos” (Beazley, *ABV*, 123), whose career is dated between 560 and 540 (Boardman, *Athenian Black Figure Vases*, 52–54).

30 Hanfmann, “Palace of Croesus.”

27 A fourth structure, a terrace wall built of limestone masonry, was discovered in 2009 (too late to be included in this study) on the west side of the spur adjacent to sector ByzFort (Field 49).

mentioned evidence for an external stairway associated with the Acropolis walls suggests that these walls are not fortifications. The same is probably true of the Lydian terrace at the Byzantine Fortress, whose size and location as well as other features seem inappropriate for a Lydian defensive structure.³¹

The Acropolis walls may have belonged to a complex system of terraces supporting a number of buildings, rather than a single monument. The same may also have been true of the Byzantine Fortress, although the main part of the terrace seems more isolated and self-contained and may have been built to support some particular edifice, such as a palace or temple. Both sets of terraces may also have been associated with other kinds of “public works,” such as gardens.³²

For these reasons, the temptation to identify these structures with specific monuments should probably be resisted. Nevertheless, the chronological assumptions implicit in proposals such as Hanfmann’s are still worth considering, and it remains generally true that ambitious building projects such as these are more characteristic of what we know of the Lydian kingdom than of what we know of Sardis after the fall of Croesus. Although it is impossible to rely on this kind of reasoning, it would be unwise to discount it entirely in the absence of evidence to the contrary; excavation in other sectors of the city site does suggest that building activity in the late sixth and subsequent centuries until the Hellenistic period was relatively modest.³³

The next monument discussed does belong, unlike the terraces on the slopes of the Acropolis, to a defensive fortification. The excavated sections of this massive stone and mudbrick wall, broken by a gateway clad in limestone and sandstone ashlar masonry, lie on the edge of the Hermus River plain, in the vicinity of the modern road that skirts the Acropolis of Sardis (at sectors MMS [Monumental Mudbrick Structure] and MMS/South on the south side of the road, MMS/North on the north side [no. 18; see Fig. 199]). The structure was discovered in 1976 and is still under investigation.³⁴

31 It seems unlikely that a defensive structure would unfold as grandly as this on the natural topography; it also seems unlikely that ashlar masonry would have been used on this scale in a Lydian defensive structure. On these topics generally, see Hanfmann, *SPRT*, 69–75, and the discussion below of the Lydian city gate.

32 On Lydian and later gardens at Sardis, see Pedley, *Literary Sources* (Sardis M2), 80, and, especially, Xen. *Oec.* 4.20–24; Greenewalt, “Sardis in the Age of Xenophon,” 131–32.

33 See, however, the architectural fragments discussed below and the literary evidence, also discussed below, for a Classical Metroon at Sardis.

34 The fortification was formerly referred to in excavation reports as the “Colossal Lydian Structure.” See Greenewalt and Rautman (“Campaigns of 1994 and 1995,” 471–74) for a summary of research.

Three or more major phases in the history of this fortification are apparent.³⁵ The original structure was built, probably in the late seventh century B.C., of mudbrick and what I will call “megalithic” rubble masonry, that is, masonry that uses large stones, sometimes worked and laid in courses, but not squared blocks. At some later date, huge earthen embankments were built up against both the east and west sides of this structure. The fortification was largely destroyed in the Persian conquest of Sardis ca. 547 B.C.; later in the sixth century, a crude limestone wall was built on top of the ruins of the earlier structure.

The gate is situated on the north side of the modern road, at sector MMS/N (Figs. 200–202). It consists of a narrow passage approached by a large trapezoidal court. Both the north and the south sides of the passage are faced in limestone ashlar

The fortification is now buried beneath an enormous mass of burnt and broken mudbrick, its superstructure violently destroyed. Also buried by this debris was part of a Lydian domestic and industrial structure, built up against the base of the fortification and abandoned along with all its contents. A number of objects recovered from the mudbrick debris layers and from the floor of the house/workshop at the base of the wall are datable to the mid-sixth century, leading to the conclusion that the fortification was destroyed during the Persian sack of 547. For a general treatment, see Greenewalt, “Empire.” Diagnostic finds are listed in Cahill and Kroll, “Coin Finds,” 599–601; Greenewalt, “Empire,” 254, 257 n. 15; and Greenewalt and Rautman, “Campaigns of 1994 and 1995,” 474 n. 6. Closely datable Attic pottery from the mudbrick debris layers includes Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Att 1 (fragment of an amphora in the manner of Sophilos) and Att 55 (fragment of a Little Master cup). A fragment of a Fikellura amphora from the mudbrick debris layers is published in Greenewalt et al., “Campaigns of 1981 and 1982,” 73, 76, fig. 22; Schaus, “Two Fikellura Vase Painters,” 255, no. 34. Corinthian, Attic, and Lakonian pottery from the house/workshop at the base of the wall includes Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Cor 123 and Cor 124 (Middle Corinthian aryballois), Att 46 and Att 85 (for Attic black-figure cups, see also Ramage, “Two New Attic Cups”), and Lak 5 (Lakonian black-figure cup). Diagnostic pottery found in recent seasons (and not published in Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* [Sardis M10]) includes fragments of Corinthian, Attic, and Lakonian pottery from the house/workshop at the base of the wall (Greenewalt et al., “Campaigns of 1992 and 1993,” 18) and several fragments of an Attic band cup in destruction debris (Greenewalt and Rautman, “Campaigns of 1994 and 1995,” 490–91 n. 35). For coins, see Cahill and Kroll, “Coin Finds.” In addition, radiocarbon analysis of charcoal from the Persian destruction layer at sector MMS yielded a date of 570 ± 50 B.C.: Greenewalt et al., “Campaign of 1984,” 29. In addition to the gate (discussed below), parts of the wall exposed to the south in sectors MMS and MMS/S are also built of stone. One example is a sandstone wall revealed in sector MMS/S: Greenewalt et al., “Campaign of 1983,” 9, fig. 11. The masonry of this wall verges on ashlar, even incorporating squared blocks with drafted borders framing roughened panels on the faces. It is closer to the “megalithic” rubble construction of some of the walls mentioned below, however, and omitted from the catalogue for this reason. The same is true of a section of the stone foundation of the wall exposed in 1999, approximately 300 m south of the main exposure (sector CW32).

35 See Cahill and Kroll (“Coin Finds”) for the most complete treatment of the phasing and chronology of the fortification.

masonry (Figs. 203:C; 204, 206, 208), while the walls of the court are clad in limestone on the south and east sides (Figs. 203:B; 204) and in sandstone to the north (Figs. 203:A; 207). The existing ashlar masonry is thought to belong to the second of the three construction phases outlined above (the appearance of the gateway above the level of the foundations in the first phase is uncertain). Pottery, including fragments of Corinthian skyphoi recovered from a layer of limestone chips running up against the foundations of the limestone masonry, gives an independent terminus post quem of about 590 B.C. (Figs. 210–12).³⁶ Detritus from the Persian destruction, including weapons and pottery dating to the mid-sixth century B.C., was found on the final pavement of the road running through the gate, establishing an important terminus ante quem of about 547. After the Persian destruction, the gate was blocked by a casemate wall and further destruction debris was piled up against both the blocking wall and the gate.³⁷

The limestone masonry of this elaborate gate varies in quality, but in places it is comparable to the very fine masonry of the lower limestone wall on the Acropolis (no. 16; cf. Figs. 206, 172). The sandstone masonry is rougher, partly because the stone is coarser, partly because, like the upper limestone wall on the Acropolis—which it also resembles in the numerous “mason’s marks” engraved in the faces of most blocks—this wall may be unfinished (Figs. 203:A; 207). It is unclear how high the limestone and sandstone ashlar masonry originally rose, to the full height of the walls of the gate or only to some intermediate level, in which case it would have been surmounted by a superstructure in some other material, perhaps mudbrick. Several fragments of faceted limestone wall base moldings (discussed below) were found incorporated into later structures in the surrounding area; if the ashlar masonry of the gate was in fact only a very elaborate stone socle, it is possible that these moldings rested on top of it, marking the transition between the ashlar masonry and the superstructure of the gate.

Only one other Lydian ashlar masonry structure at Sardis remains to be discussed. This is another limestone wall that, like the walls at MMS/N, may belong to the fortification system of Lydian Sardis. Before excavation, the Lydian fortification at sector MMS resembled a low hillock or mound. A chain of

similar mounds (Mounds 1–4) runs along the edge of the Hermus plain to the northeast (Fig. 213). Surface reconnaissance of one of these mounds (Mound 2, no. 19; Figs. 214–16) led to the observation that, like the hillock that concealed the Lydian fortification, it is partially composed of burnt and broken mudbricks, together with a sprinkling of Archaic sherds and other artifacts.

A pair of trenches dug in the west side of this mound in 1985 revealed part of a large structure faced in limestone ashlar masonry. The masonry is comparable to that of the upper limestone wall on the Acropolis. Seven courses were exposed, ranging in height from 0.36 to 0.46 m, but the bottom of the wall was not reached. A schist wall resting directly on top of the masonry as preserved may be an addition, built after the original superstructure had been destroyed. In any case, the mass of rubble above and in front of the masonry suggests that the schist wall was once much taller. Archaeological dating evidence is “meager . . . a few Archaic sherds” recovered from the lower levels “and beside the face” of the limestone masonry.³⁸ It has been suggested that Mounds 1 to 4 may all be part of a line of Lydian buildings or defense works connected to the Lydian fortification at sector MMS, and the debris that covers the limestone wall at Mound 2 is indeed reminiscent of the Persian destruction layer at sectors MMS and MMS/N.³⁹ Thus, the ashlar masonry structure at Mound 2 may be contemporary with the limestone and sandstone walls at sector MMS/N.

All the monuments included in the catalogue have now been introduced. Ashlar masonry is attested, in Archaic Lydia, in a relatively small number of elaborate tombs and civic structures, and many other substantial and important buildings are not considered in this study. Rock-cut tombs, for example, are far more numerous than built masonry tombs. Lydian builders used the same methods employed in the construction of the interior packing wall at the Byzantine Fortress to build “megalithic” rubble retaining walls of sandstone and schist in several locations on the Acropolis and its foothills;⁴⁰ part of

36 Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Cor 114.

37 Greenewalt and Rautman, “Campaigns of 1994 and 1995,” 487–94.

38 A. Ramage, excavator’s final report.

39 Greenewalt and Rautman, “Campaigns of 1994 and 1995,” 473. Recent excavation in the area of these mounds has revealed more remains of the Lydian fortification but no more ashlar masonry.

40 Examples include a group of walls discovered on the south side of the Acropolis between 1971 and 1973 (Hanfmann, “16th Campaign [1973],” 31–33), a wall near the Pyramid Tomb (Greenewalt et al., “Campaigns of 1979 and 1980,” 20–22), and a wall near the Byzantine Fortress (in Field 49: Greenewalt et al., “Campaigns of 1981 and 1982,” 64–68).

the Lydian fortification at sector MMS is built in the same way.

Lydian chamber tombs at Sardis and Bin Tepe are numerous enough that the known examples probably constitute a representative sampling of their kind. It is less certain, however, that the surviving evidence gives a balanced picture of the ways ashlar masonry was used at the Lydian city site. Not a single freestanding ashlar wall has been discovered, and the evidence suggests that Lydian builders used ashlar masonry only in terrace walls, in fortifications, and in the substructures of monumental buildings completed in mudbrick. The palace of Croesus, singled out by Vitruvius and Pliny for its mudbrick architecture, may have been an example of this type of construction.⁴¹ Freestanding walls, however, are by nature both less stable and more easily dismantled than retaining walls, and therefore are less likely to be preserved. Fortunately, there does exist some secondary evidence for lost building forms. Literary and epigraphic references, architectural fragments in stone and terracotta, and representations of architecture in Lydian sculpture can all provide evidence for types of buildings not otherwise preserved in the archaeological record.

LITERARY AND EPIGRAPHIC REFERENCES

Ancient references to the Tomb of Alyattes and the palace of Croesus have already been discussed. Few other buildings of sixth- or early fifth-century Sardis are mentioned in the ancient sources. Herodotus says that the sanctuary (ἱρόν) of Cybele was burned in the Ionian revolt (Hdt. 5.102) and that this provided a pretext for the destruction of Greek sanctuaries by the Persians in the wars that followed. It is not clear whether the sanctuary of Cybele contained a temple or other sacred building or buildings; in any case, no identifiable architectural fragments belonging to this sanctuary have been found (with the possible exception of a marble threshold block). While at Sardis a generation later, Themistocles visited a temple or sanctuary of the Mother (ἱερὸν μητρὸς [Plut. *Vit. Them.*, 31]), which may have been a replacement for the “ἱρόν” of Cybele. Of great interest in this respect is a series of marble blocks found in the Roman Synagogue that bear Hellenistic inscriptions, one of which specifies that it is to be inscribed on the “parastade of the temple [νάος] that is in the sanctuary [ἱερὸν] of the Mother.”⁴² The parastades are presumably

41 Vitruvius, *De arch.* 2.8.10; Pliny, *HN* 35.172 (both passages quoted in Pedley, *Literary Sources* [Sardis M2], 81).

42 On the Metroon, see Hanfmann, *SPRT*, 110–12; Greenewalt, “Sardis in the Age of Xenophon,” 129–30.

the antae of the temple, an identification compatible with the form of the surviving blocks.⁴³ The date of the blocks is uncertain but unlikely to be earlier than the fourth century. Whatever their date, the building they belonged to was of moderate size (the blocks are approximately 0.75 m wide) and thoroughly Greek in execution.⁴⁴

The only other certainly Classical or earlier building documented in the ancient sources is the altar (βωμόν) of Artemis, on which the traitor Orontas swore fealty to Cyrus, as recorded by Xenophon in the *Anabasis* (1.6.6–7). An altar uncovered by the Butler Expedition in the sanctuary of Artemis may well be the altar mentioned by Xenophon (see Appendix 3). The date of this structure is uncertain—suggestions range from late Archaic to late Classical—but its construction sets it apart from the other monuments examined in this study.⁴⁵

ARCHITECTURAL AND ORNAMENTAL FRAGMENTS

Architectural and ornamental fragments of the sixth and early fifth centuries found by the Harvard-Cornell Expedition at Sardis include wall base moldings, a threshold block, fragments of decorated altars (?) and of the crowning ornaments of large bases or pedestals, grave stelae, pieces of stone “furniture,” and architectural terracottas.

Fragments of faceted limestone wall base moldings have been found at sectors MMS and MMS/N (**App. 1, no. A1a–g**; Figs. 217–31), at the Byzantine Fortress (**App. 1, no. A2**; Fig. 232), and in eastern Sardis (**App. 1, no. A3**; Fig. 233). The fragment from MMS was reused in a wall apparently built in the second half of the sixth century, shortly after

43 In 1990, Greenewalt (“Campaign of 1987,” 20–21) suggested that the blocks found in the Synagogue did not belong to antae but to engaged piers of some kind. This reconstruction was used by Gauthier (*Nouvelles inscriptions de Sardes II*, 53–54) and Knoepfler (“Métroon”), but it was later retracted by Greenewalt (Greenewalt et al., “Campaigns of 1990 and 1991,” 22), on analogy with the marble antae of Andron B at Labraunda. This analogy might suggest that apart from the antae, the walls of the Metroon were of a different stone, like those of Andron B at Labraunda.

44 The faces of the blocks are dressed with a claw chisel in a manner typical of Classical and later Greek architecture. The tops and bottoms have neatly cut anathyrosis joints and numerous large dowel holes. See below, “Architectural and Ornamental Fragments,” for fragments of Ionic capitals possibly associated with these blocks. According to William Aylward (personal communication), the lewis cuttings on the blocks indicate a date in the fourth to second centuries.

45 Butler, *Sardis I*:1, index entries for “Lydian Building”; idem, *Sardis II*:1, 3–4; Hanfmann and Waldbaum, *Survey* (Sardis R1), 88–95. On the pre-Hellenistic sanctuary in general, see Greenewalt, “Sardis in the Age of Xenophon,” 130.

the Persian conquest.⁴⁶ These fragments are comparable to East Greek wall base moldings, for example, at Larisa and Phocaea.⁴⁷ They may have marked the transition between the lower and upper parts of a stone wall, or between a stone socle and a mudbrick superstructure.

The threshold block was reused in the Roman Synagogue, near sector MMS/N (App. 1, no. A4; Figs. 234–38). It was identified by Crawford H. Greenewalt, Jr., as a threshold because of its carved rosette pattern, which resembles the decoration of Assyrian thresholds, and because of its worn condition.⁴⁸ An Anatolian parallel is a paving stone from the Archaic tomb at Kızılbél near Elmalı in Lycia.⁴⁹ The date of the block from Sardis is uncertain, but it may postdate the Persian invasion. If an Assyrian model does indeed lie behind this threshold, it could have come to Lydia by way of Persia rather than directly from Mesopotamia.

The possible altar fragments include a marble corner volute finial, found in the Roman Synagogue (App. 1, no. A5; Fig. 239), and a second simpler finial (not a corner piece), found on the outskirts of Sardis (App. 1, no. A6; Fig. 240); both are comparable to finials from the altar of Poseidon at Monodendri near Miletus.⁵⁰ A fragment of a large limestone egg-and-dart molding found in the precinct of Artemis (App. 1, no. A7; Figs. 241, 261) is also similar to moldings from the Monodendri altar.⁵¹ Hanfmann dated this fragment to the second half of the sixth century on the basis of comparison with the ornament of the Archaic Artemision at Ephesus.⁵²

Several fragments of a large marble block or blocks carved with a Lesbian leaf pattern on three sides (App. 1, no. A8; Figs. 242–46, 248) were found in the Roman Synagogue as well. As suggested by Aenne Ohnesorg,

46 On this wall, see Greenewalt et al., “Campaigns of 1979 and 1980,” 6–8, fig. 7; Greenewalt and Rautman, “Campaigns of 1994 and 1995,” 474, 488, fig. 14 (“Post-destruction wall” in sector MMS).

47 Serdaroğlu, “Bautätigkeit in Anatolien,” 347–56.

48 The rosette pattern is of course also a familiar element of the Greek ornamental repertory (and occurs on Lydian architectural terracottas as well), but its appearance on a threshold, in apparent imitation of a carpet, is unusual.

49 Mellink, *Kızılbél*, 19–20, 39–40.

50 Gerkan, *Milet I:IV*; compare the corner fragment to pls. 5.2, 19, 20; compare the other fragment to pl. 21; see also the reconstruction drawings on pls. 25, 26. For similar finials from Miletus, see Koenigs, “Bauglieder II”; idem, “Reste.”

51 As a crowning molding either for an enclosure wall or for an altar itself; cf. Gerkan, *Milet I:IV*, pls. 5.1, 25, 26.

52 Hanfmann and Waldbaum, *Survey* (Sardis R1), 94. Two smaller marble fragments of late Archaic architectural ornament from the Sanctuary of Artemis are a fragment of an egg-and-dart molding (ibid., fig. 208) and a fragment of a lotus-palmette frieze (ibid., fig. 209; Hanfmann and Ramage, *Sculpture* [Sardis R2], 77 and fig. 161).

these pieces are probably also part of an altar,⁵³ perhaps the crowning molding or capital of one of the antae of an “anta-altar,” comparable to the “Rhoikos-altar” in the Heraion at Samos. The fragments are dated by Ohnesorg and by Stefan Altekamp to the late sixth or fifth century.⁵⁴ A similar crowning molding, albeit much smaller and plainer, was reused in the Roman period as a stele base in the precinct of Artemis. Identified by Lucy Shoe Meritt as a pier or anta capital (App. 1, no. A9; Figs. 247, 248), it may also have belonged to some kind of base, perhaps of a votive monument. The block was dated by Meritt to the second half of the sixth century.⁵⁵ Another architectural fragment of uncertain purpose, found in a Roman house at sector MMS, is a carved marble “drum,” which resembles the top half of an Archaic Aeolic base or capital (App. 1, no. A10; Figs. 249, 250). This fragment did not necessarily belong to a column, however, but might rather have been part of a smaller monument, such as a freestanding pedestal or altar.

Categories of related but less strictly architectural stone carving include the decoration of grave markers and funerary couches or klinai. Marble and limestone grave stele finials form the largest class of ornamental stone carvings from Sardis (Figs. 251, 252).⁵⁶ These Lydian gravestones are mostly of East Greek type and seem to follow East Greek fashions closely. The only stelae found in situ are those from Tomb 813 (Figs. 148, 149); others may be dated on the basis of style to the second half of the sixth and fifth centuries. Another type of grave marker, the so-called phallic marker, seems to be of local rather than Greek type. Although sometimes finely shaped, Lydian “phallic” markers have no ornamental carving, beyond a simple astragal. The only dated example is the marker on top of the Tomb of Alyattes (Fig. 18). “Symbolic door stelae” are another category of architectural elements that have been treated elsewhere and so are not discussed here.⁵⁷

Examples of funerary furniture include the leg of the limestone kline in BK71.1, carved with a double

53 My warm thanks go to Dr. Ohnesorg, who examined the fragments in the summer of 1998, for generously sharing her ideas with me: Ohnesorg, *Altäre*, 161–65. For the “Rhoikos-altar” in Samos, see Gruben, *Tempel*, figs. 269–71; Ohnesorg, *Altäre*, 142–45.

54 Altekamp, *Zur griechischer Architekturornamentik*, 154–56. Much gratitude is also owed to Dr. Altekamp, who examined the fragments on a visit to Sardis in the summer of 1988, for this and other useful information.

55 Hanfmann and Waldbaum, *Survey* (Sardis R1), 70.

56 These stelae have been fully published and so are not included in Appendix 1. See Hanfmann, “On Stelai,” in Hanfmann and Ramage, *Sculpture* (Sardis R2), 23–28; Ratté, “Anthemion Stelae.”

57 Roosevelt, “Symbolic Door Stelae.”

volute pattern (no. 10; Fig. 122). This is the only carved kline found by the Sardis Expedition. Other examples, made of marble as well as limestone, have been found in tombs at Bin Tepe and in the hinterland of Lydia.⁵⁸ Like Lydian gravestones, they are decorated in a Greek style, with motifs such as the volute, lotus, and palmette combined in various elegant patterns.

Pieces of stone “furniture” from the city site of Sardis include a fragment of a delicate little marble “anthemion,” which resembles the upper part of a kline leg and may have belonged to a nonfunerary couch or table or possibly to a door or window frame (App. 1, no. A11; Figs. 253, 261), and a larger marble fragment, possibly an altar or table support (App. 1, no. A12; Figs. 254, 261), that is similar to a small Ionic pilaster capital. This second fragment is one of the few ornamental pieces of stone carving from Sardis found in an Archaic context. It was included in the construction deposits of the Lydian terrace at the Byzantine Fortress and should not be later, therefore, than the mid-sixth century. It resembles early Ionic capitals from Cyprus in the way the “cushion” that connects the volutes dips down in the middle.⁵⁹

Architectural terracottas—decorated simas and revetment plaques—seem to appear in Lydia in about 570 B.C.⁶⁰ Two relatively large deposits have been found. One is a group of tiles from uncertain contexts on the west bank of the Pactolus River across from the Temple of Artemis; the other is a collection of fragments included in the fill of the limestone-faced terrace at the Byzantine Fortress. Scattered fragments have been found in other sectors, from the Acropolis to Mound 2. They are decorated for the most part with ornamental patterns and figural compositions familiar from Greek art and architecture, such as the egg and dart and the mistress of animals, but they are notably smaller on average than their Greek counterparts, perhaps because they were used exclusively on smaller buildings.

58 Baughan, “Klinai,” 460–524 (a catalogue of funerary beds and couches in Lydia); McLauchlin, “Graves,” 142–45; Özgen and Öztürk, *Lydian Treasure*, 42, 54, 70, no. 6; Baughan, “Lale Tepe: Klinai.” For the suggestion that all Lydian funerary klinai postdate the Persian conquest, see Dusinger, *Achaemenid Sardis*, 132–38; Greenwalt, “Sardis in the Age of Xenophon,” 133. For an opposing view, see Baughan, “Klinai,” 314–79.

59 Karageorghis, “Kypriaka VII,” 209–13. I am grateful to Elizabeth McGowan for calling my attention to this parallel. See also the “poros acroterion” from Gordion illustrated and discussed in Young, “The Campaign of 1955 at Gordion,” pl. 92, fig. 41.

60 On Lydian terracottas generally, see Shear, *Sardis X*; Ramage, *Lydian Houses* (Sardis M5); Billot, “Terres cuites architecturales”; Ratté, “Architectural Terracottas”; Hostetter, *Lydian Architectural Terracottas*.

These architectural and ornamental fragments, though few in number, are interesting both for what they do and for what they do not demonstrate. On the one hand, they show that from at least the mid-sixth century onward, East Greek architectural ornament was very much at home in Lydia, especially as applied to monuments such as gravestones. Anthemion stelae, for example, appear in Aeolis, Ionia, and Lydia in the mid-sixth century, at more or less the same time. In later generations, the stylistic development of stelae from each of these regions is closely linked. The same is true of architectural terracottas. On the other hand, none of these objects need necessarily have belonged to a monumental ashlar masonry building, such as a temple or a stoa. The limestone wall base moldings, the marble threshold block, and the numerous architectural terracottas may all have come from structures built largely of mudbrick or of rubble masonry; perhaps for this reason, Lydian architectural terracottas never reached the size of their Greek counterparts. The remaining fragments come either from independent monuments such as grave markers or votives or from small, open structures such as altars.⁶¹ Thus, while Lydian builders were clearly interested in Greek architectural carving and in decoration in a Greek style of architectural accessories ranging from roof tiles to stone furniture, they were not necessarily interested in Greek building forms or, for that matter, in all-stone construction apart from tomb chambers and small monuments. Before the mid-fifth century, at any rate, there are no certain fragments of columns or other architectural members that would necessarily have belonged to any of the freestanding roofed building types with which ashlar masonry was particularly associated in Greece.

This picture begins to change in the mid or later fifth century, as shown by parts of two Ionic capitals reused in the Roman Synagogue and by the two pediment blocks from a small mausoleum, found in the Pactolus River. The capital fragments are pieces of the corner volutes of two corner capitals, identical in size and so from the same building (App. 1, nos. A13, A14; Figs. 255–58). These capitals would have been of moderate size, appropriate for a tetrastyle or hexastyle

61 The only altar certainly of Archaic date known at Sardis (apart from the less certainly dated altar in the Sanctuary of Artemis) is the altar of Cybele near the Lydian gold refinery on the east bank of the Pactolus River: Ramage and Craddock, *King Croesus' Gold* (Sardis M11), 72–80. The altar is built of rubble masonry, its corners originally decorated with small marble statues of lions: Hanfmann, “On Lions,” in Hanfmann and Ramage, *Sculpture* (Sardis R2), 2, 27–29.

prostyle temple, for example.⁶² If they did belong to such a building, the discovery of fragments of two corner capitals, and no standard capitals, would be somewhat less surprising.⁶³ The carving and design of the capitals, with convex channels and a sagging line connecting the volutes, are Classical in style, but it is difficult to date them more precisely. They are comparable in scale to the parastades of the Metroon, also reused in the Roman Synagogue (see above, “Literary and Epigraphic References”), and it is possible that they belonged to that building. The mausoleum pediment blocks (App. 1, no. A15; Figs. 259, 260) probably come from a small freestanding monument such as the Pyramid Tomb or one of the temple tombs of Lycia. Like the latter, they combine Persian influence with Greek ideas and conventions (e.g., the cornice; Fig. 260) in a typically Graeco-Persian style. On the basis of the pedimental sculpture, Hanfmann dated these blocks to the second half of the fifth century.

The two buildings represented by these capitals and pediment blocks mark a clear departure from precedent, in that both were probably “megalithic” structures of types better known outside Lydia. Nevertheless, both buildings were relatively small and might have been built entirely by foreign craftsmen. Not until the Hellenistic period, with the construction of the Temple of Artemis, is there any certain evidence for the existence of a truly colossal building of conventional Greek type at Sardis.

62 Parts of the corner volutes of both capitals are preserved. The diameter of the eye of the volute of the better-preserved example is 0.047 m, the horizontal diameter of the entire volute, 0.29 m. Using Vitruvian proportions (*De arch.* 3.5.5–7), the former measurement would yield a column 7.61 m high: $0.047 \times 9.500 = \text{height of capital}$; $(2 \times \text{height}) \text{ divided by } 19/18\text{ths} = \text{lower diameter of column}$; lower diameter $\times 9 = \text{height of column}$. The latter would yield a column 6.71 m high: $(0.29 \text{ divided by } 7.00) \times 9.50 = \text{height of capital}$; the remaining calculations as above. At a guess, then, the capitals from Sardis might have belonged to columns between 6.70 m high (the height of the columns of the east porch of the Erechtheum) and 7.60 m high (the height of the columns of the north porch of the Erechtheum; Erechtheum measurements as given in Dinsmoor, *Architecture*, 340).

63 It is also possible, as suggested by C. H. Greenewalt, Jr., that the fragments belonged to a “diagonal” capital, with four corner volutes, on the analogy of the corner capitals of the Nereid Monument; see Coupel and Demargne, *Fouilles de Xanthos* III, 77–78.

REPRESENTATIONS OF ARCHITECTURE IN LYDIAN SCULPTURE

Two marble naiskoi, or shrine models, recovered in the excavation of the Synagogue are another possible source of evidence for buildings and building types not otherwise documented at Lydian Sardis. The so-called Cybele naiskos is elaborate and well preserved (Fig. 262).⁶⁴ It is a block of marble, roughly 0.50 m on each side, carved in relief in the form of a columnar shrine. An image of the goddess is depicted on the front of the naiskos, perhaps to suggest a cult statue inside; mythological scenes in three registers fill the spaces between the columns on the other three faces. Engaged Ionic columns occupy the four corners, and three additional engaged columns are midway between the corners on the back and both sides. Hanfmann dated the Cybele naiskos on the basis of its sculpture to 540–530 B.C.

The other shrine, dated ca. 560 B.C. (Fig. 263), is similar to the Cybele naiskos but simpler and less well preserved.⁶⁵ Hanfmann has suggested that both shrines are copies of actual structures (or of the same structure) built at Sardis during the reign of Alyattes or Croesus.⁶⁶ Uncertainties abound. The Cybele naiskos is post-Persian in date and could reflect a post-Persian building, but neither shrine necessarily reflects an actual structure, at Sardis or elsewhere. They are, in fact, examples of a relatively common type of monument, well known from Greek cities such as Miletus.⁶⁷ Even if the shrines were faithful copies of actual buildings, they could represent structures built of mudbrick on stone foundations, with stone additions such as columns or ornamental moldings, like the temple of Athena at Old Smyrna.⁶⁸

64 Hanfmann and Ramage, *Sculpture* (Sardis R2), 43–51, no. 7. See also Rein, “Kybele.”

65 Hanfmann and Ramage, *Sculpture* (Sardis R2), 42–43, no. 6.

66 See Boardman, *Persia and the West*, 37–39.

67 See Naumann, *Kybele*.

68 Akurgal, *Alt Smyrna* I; Cook and Nicholls, *Temples of Athena*.

Chapter Two

MATERIALS

The building stones used in Lydian ashlar masonry are marble, limestone, and sandstone. Of these, marble is the rarest, limestone the most common. It is possible that marble was used more extensively than the surviving evidence suggests, as marble was preferred by Hellenistic and Roman builders, who may have regularly dismantled earlier structures in search of building stone (see above, Ch. 1). Sandstone occurs widely, together with schist and quartz, in rubble walls at Sardis, but it is less common in ashlar masonry than limestone.¹ All these materials are found locally, although the source of the marble used in Lydian architecture is uncertain.

The lower slopes of Mount Tmolus south of Sardis are composed largely of blue gray schist interleaved with quartz and other rocks such as marble.² The Acropolis of Sardis and its twin, the Necropolis hill, are formed out of sediments carried down from the Tmolus massif.

1 On rubble masonry in domestic architecture, see Ramage, *Lydian Houses* (Sardis M5), 4–6.

2 The first scientific report on the geology of Sardis was published in 1922: Warfield, “Appendix 1: Report on the Geology of Sardis,” in Butler, *Sardis* I:1, 175–80. Since then, geologists, geomorphologists, sedimentologists, and palaeobotanists, sponsored by the Turkish Minerals Institute or in association with the Harvard-Cornell Expedition, have reexamined Sardis and environs from each of their various perspectives: *Türkiye Mermer Envanteri*; Belknap, “Geomorphology and Sedimentology at Sardis: 1978,” in Greenewalt et al., “Campaign of 1978,” 7–15; Sullivan, “Environmental Studies,” in Greenewalt et al., “Campaigns of 1981 and 1982,” 53–57; Hanfmann, *SPRT*, 2–4. Earlier scientific studies of Lydian marble and clay have also appeared in publications on the sculpture and terracottas found by the Harvard-Cornell Expedition: Hanfmann and Ramage, *Sculpture* (Sardis R2), 4–7; Kamilli, “Mineral Analysis of the Clay Bodies,” in Ramage, *Lydian Houses* (Sardis M5), 12–14.

Here, the lower geological strata are composed of yellow and purplish sandstones, the upper strata of the reddish conglomerate that glows so richly in the Lydian sunset.³ The Pactolus and other streams have cut into these hills, carrying sediment out into the Hermus valley, where it combines with the surface deposits of the Hermus River floodplain, a rich source of brick earth to this day. North of Sardis, the floor of the Hermus valley is relieved by a limestone ridge between the modern river course and the Gygaean Lake in the region of Bin Tepe. The Turkish name for the Gygaean Lake is Marmara Gölü, or “Marble Lake,” and substantial outcroppings of marble are found near the town of Gölarmara to the northwest.⁴

A geological study of the building stones used in Lydian masonry was undertaken by Michael Ramage and Robert Tykot in 1994 and 1995. The results of their study are presented in Appendix 4 and incorporated into the discussion that follows.⁵

MARBLE

The marble used in the chamber of the Tomb of Alyattes (no. 1) is white, streaked with gray.⁶ This chamber is the

3 “I have heard it called the ‘Hill of Blood’”: Butler, *Sardis* I:1, 17.

4 Waldbaum, *Metalwork* (Sardis M8), 5–6.

5 Ramage, “Provenance”; Tykot and Ramage, “Importation.”

6 This description is based on autopsy both of the masonry in situ and of fragments removed from the tumulus and examined in broad daylight. In Olfers’s report on the original discovery of the chamber in 1853, the marble is described as “gray-white, crystalline, and grainy” (Olfers, “Königsgräber,” 548). Hanfmann, in his report on the rediscovery of the chamber in 1962, described the marble

only certain example of marble masonry in any tomb built before the fall of the Lydian kingdom. Fragments of worked marble were found in 1964 in one of the robber's tunnels burrowed into Karnıyarık Tepe (no. 2), but they may not be architectural.⁷ Marble blocks, at least some of them reused, are incorporated into the walls of the triple-chamber tomb near Kestelli Köyü on the western edge of Bin Tepe, and another fragment of marble, possibly part of a kline or door plug, lies in the dromos of a second tomb nearby. Both tombs are undated.⁸ Another undated tumulus tomb chamber, built entirely of marble, is located northwest of Bin Tepe near Sarıçalı between Gölarmara and Akhisar; this chamber is similar in many respects to the chamber of the Tomb of Alyattes and may be of the same epoch.⁹ Other tomb chambers built partly or wholly of marble lie farther afield, near Manisa or Uşak, but all these probably postdate the Persian invasion.¹⁰ Marble objects without specific provenience from Bin Tepe include the reliefs found by George Dennis, now in the British Museum,¹¹ an enigmatic architectural fragment found near a tumulus on the north side of the Gygaean Lake,¹² and a statue of a lion.¹³ In addition to the Archaic and early Classical marble architectural fragments discussed in Chapter 1, the city site of Sardis has yielded many examples of Lydian and Persian marble sculpture.¹⁴ The only known Lydian masonry structure built partly out of marble remaining in situ at the city site is the small stylobate or column foundation on top of the Byzantine Fortress hill. A number of marble blocks reused in a foundation predating the Lydian Terrace at the Byzantine Fortress attest to the use of

marble in earlier structures as well, but in what contexts is unknown.

There are two known local sources of marble. The nearest is a group of quarries in the foothills of Mount Tmolus about 4 km southwest of Sardis. Butler believed that the marble used in structures such as the Temple of Artemis was carried down from these quarries. The quarry workings, located on both sides of a ravine called Mağara Deresi, are extensive,¹⁵ and traces of an ancient quarry road are visible along the pathway approaching the quarries. Unfinished marble blocks are abundant at the bottom of the ravine and in the mouths of the quarries themselves, while separating trenches cut in the process of extracting the blocks are apparent on examination of the quarry faces. George M. A. Hanfmann and Nancy Ramage also believed that Mağara Deresi was the source of the marble used in most Lydian and later sculpture at Sardis.¹⁶ The marble has been described by geologists as "light white with coarse-grained crystals and generally homogeneous structure."¹⁷ It is visually similar to the marble used in the Tomb of Alyattes, sometimes exhibiting the same gray streaks or bands. This banding is attributed to contact between interleaving layers of marble and schist.¹⁸ The second local source of marble is located at the modern town of Gölarmara, about 20 km northwest of Bin Tepe.¹⁹ The quarries at Gölarmara contain white, red, and streaky yellow marble.²⁰ They were clearly worked in antiquity and are still in use today.

In 1994 and 1995, Michael Ramage took a series of marble samples from three archaeological monuments at Bin Tepe (the Tomb of Alyattes, the fragment of marble found in Karnıyarık Tepe, and a marble kline from another nearby tomb), two at the Byzantine Fortress (the stylobate and an unfinished architectural block, possibly a crowning molding, reused in another structure predating the Lydian terrace), and from the two known quarries (Mağara Deresi and Gölarmara). Isotope analysis was then performed by Robert Tykot on these samples in an effort to determine if the stone used in any of these five archaeological monuments came from one or both of the two local sources. The results of this analysis were intriguing. All the archaeological samples had similar isotopic signatures

as "gleaming white" where broken (Hanfmann, "5th Campaign [1962]," 55).

7 C. H. Greenewalt, Jr., excavator's field report (unpublished). One original surface is preserved. It is point dressed and could be, for example, part of the back of a stele.

8 Greenewalt, "Campaign of 1976," 70; McLauchlin, "Graves," 191–93.

9 Greenewalt, et al., "Campaigns of 1990 and 1991," 31–33.

10 On two tombs near Alibeyli northeast of Manisa, see McLauchlin, "Graves," 262–65; Nayır, "Alibeyli." On one tomb near Selçikler southeast of Uşak, see McLauchlin, "Graves," 268–70; İzmirligil, "Selçikler."

11 Both of "white marble": Hanfmann and Ramage, *Sculpture* (Sardis R2), 156, nos. 230 and 231.

12 *Ibid.*, 76–77, no. 50.

13 My thanks to Hasan Dedeoğlu, former director of the Manisa Museum, where this statue (found in winter 1987–1988) is now installed, for bringing it to my attention.

14 Cf. Hanfmann and Ramage, *Sculpture* (Sardis R2), 40–73, for sculpture found between 1958 and 1975.

15 Butler, *Sardis* I:1, 19, 176.

16 Hanfmann and Ramage, *Sculpture* (Sardis R2), 4–7.

17 *Ibid.*, 5.

18 *Ibid.*

19 Hanfmann, *SPRT*, 243 n. 30.

20 Hanfmann and Ramage, *Sculpture* (Sardis R2), 6.

forming a reasonably well-defined isotopic field; it is possible, therefore, that they all derive from the same quarry. Eight samples were taken from Mağara Deresi, and their isotopic signatures also cluster together to form a single isotopic field or perhaps a pair of neighboring fields. These signatures are significantly different from those of the archaeological samples, however, suggesting that the marble from these monuments does not come from the quarries sampled at Mağara Deresi.²¹ The evidence from Gölmarmara, though less decisive, points in a similar direction. Twelve samples were taken, and while the isotopic field that they can be seen to define does overlap slightly with the field defined by the archaeological samples, it is still largely distinct.

Isotope analysis thus suggests that the marble used in the archaeological monuments sampled—most importantly the Tomb of Alyattes, because it is most closely dated—probably does not come from Mağara Deresi; the possibility that it comes from Gölmarmara, though not clearly ruled out, also seems unlikely. Two alternative possibilities remain: that the marble used in the Lydian monuments comes from one or more other unknown local quarries, or that it is not local in origin.

The archaeological samples are few in number, and most are from Bin Tepe. It is initially surprising that the Mağara Deresi quarries were not used for monuments such as the Tomb of Alyattes, since these are the closest known quarries and they do seem to have been used for sculpture in the Archaic and Classical periods. But it should also be observed that the Gölmarmara quarries are in fact only slightly farther from Bin Tepe than Mağara Deresi (approximately 20 as opposed to 15 km), and in other ways the road between Gölmarmara and Bin Tepe is the easier one. The terrain is less hilly,²² and it may also have been possible to transport stone part of the way by raft across the Gygean Lake. It is also possible that Lydian builders used other, closer quarries, whose locations are unknown. Indeed, a regional survey undertaken by Christina Luke and Christopher Roosevelt has located two ancient marble quarries near the village of Haciveliler, just west of the Gygean Lake and much closer to Bin Tepe than

21 As noted above, the quarries at Mağara Deresi are extensive and are located on both sides of a deep ravine. It is possible that different parts of the quarries have different isotopic signatures, and indeed this is the explanation given by Ramage for the way his samples defined two neighboring isotopic fields: one cluster comes from one part of the quarries, one from another part. It seems unlikely, however, that the range of isotopic signatures would be so great as to include those of the archaeological samples.

22 Even though the trip from Mağara Deresi to the Hermus plain is mostly downhill, it must have been difficult to transport heavy blocks of stone across those rocky slopes.

Gölmarmara.²³ Marble was apparently never widely used at Bin Tepe, and a relatively small quarry—now perhaps exhausted—may have supplied all the stone that was needed.

It seems less likely that Lydian builders turned to external sources. Their abundant use of local limestone demonstrates their ability to quarry stone, and the Mağara Deresi marble quarries may have been used as early as ca. 600.²⁴ Although these quarries were apparently not used for building stone, they show that the inhabitants of Sardis were aware of the existence of local sources of marble. The possibility that a royal monument such as the Tomb of Alyattes may have been built partly out of imported marble cannot, of course, be entirely dismissed; indeed, the marble from the tomb chamber is visually similar to Proconnesian marble, and the isotopic field defined by M. Ramage and R. Tykot's archaeological samples partly overlaps, as Ramage and Tykot themselves noted, with one of the isotopic fields defined by the quarries at Ephesus.²⁵ These similarities raise tantalizing possibilities; but all things considered, it still seems most likely that Lydian builders used one or more local sources of marble, most likely in the region of the Gygean, or, to use its modern name, the "Marble" Lake.

LIMESTONE

The same variety of limestone is used both at Sardis and at Bin Tepe, both for masonry and for architectural and ornamental stone carving. It is moderately hard, generally fine grained, and may be creamy white when fresh. Nevertheless, it erodes easily with exposure to the wind and rain, which also tends to dull its color. When uncovered after a long interval of burial, the stone may turn chalky and brittle.

This is the limestone that makes up the Bin Tepe ridge. It is visible in outcroppings near the Tomb of Alyattes and in many other areas. Evidence that the local stone was used in tomb architecture at Bin Tepe is plentiful, especially in cases of tombs whose chambers were partially carved out of the native rock, partially built (e.g., BT66.2, no. 6; BT66.4, no. 8). The Karniyarık Tepe crepis wall (no. 2) is also founded on and partially

23 Roosevelt and Luke, "CLAS 2006," 312; the results of isotopic analysis are awaited.

24 For discussion of the early history of Lydian sculpture, see Hanfmann and Ramage, *Sculpture* (Sardis R2), 14–18.

25 If the Hermus was a navigable stream in antiquity, imported stone such as Proconnesian marble might have been carried from as far away as Marmara Denizi (the Sea of Marmara) to the shores of Marmara Gölü (the Gygean Lake) almost entirely by water.

carved out of the limestone bedrock. In one place, the crepis is interrupted by a natural outcropping of stone, which has been cut back to a vertical quarry face (Figs. 48, 49). Quarry platforms are also visible near Karnıyarık Tepe and other mounds; some of these platforms may be modern, but most are probably ancient.²⁶

It is geologically possible that outcroppings of the same limestone occur in the lower slopes of Mount Tmolus, but no such outcroppings and no quarries, ancient or modern, have been positively identified. Thus, the limestone used at the city site of Sardis was probably imported, as Butler thought, from Bin Tepe.²⁷ This is the unanimous opinion of the local population and it is supported by M. Ramage and R. Tykot's geological analysis.

As part of their study of Lydian building stones, Ramage took a total of 71 samples from five different limestone quarry areas at Bin Tepe, and 35 samples from different archaeological monuments—the Tomb of Alyattes (no. 1), Karnıyarık Tepe (no. 2), Kır Mutaf Tepe (the third great mound at Bin Tepe), the Pyramid Tomb (no. 15), Acropolis North (AcN, no. 16), the Byzantine Fortress (no. 17), MMS/N (no. 18), and a number of limestone “phallic” markers. Petrographic analysis of thin sections of these samples yielded 13 matches between specific monuments and quarries. As was to be expected, these matches suggest the stone used in each of the three largest mounds at Bin Tepe (Tomb of Alyattes, Karnıyarık Tepe, and Kır Mutaf Tepe) came from quarries located near these mounds. More interesting were matches between the quarries near Karnıyarık Tepe and the limestone masonry at sectors MMS/N and AcN, and between the quarries near Kır Mutaf Tepe and the Pyramid Tomb (as well as two limestone “phallic” markers found in the Pactolus valley). Ramage makes the intriguing suggestion that Lydian builders may have used only one quarry at a time, in which case these matches would suggest that Karnıyarık Tepe and the limestone walls at sectors AcN and MMS/N are roughly contemporary, and that Kır Mutaf Tepe was built at more or less the same time as the Pyramid Tomb.²⁸ It can plausibly be argued, however, that the three largest mounds of Bin Tepe are all, like the Tomb of Alyattes, pre-Persian in date.

26 See Hanfmann, “5th Campaign (1962),” 52; idem, “6th Campaign (1963),” 53–54.

27 Butler, *Sardis* I:1, 170.

28 Ramage, “Provenance” 25.

SANDSTONE

Sandstone occurs rarely in tomb architecture at Bin Tepe, and only in two known ashlar masonry structures at the city site, but is common in large rubble walls at Sardis.²⁹ A sandstone block incorporated into the packing at the base of the Tomb of Alyattes is similar to sandstone seen in a natural outcropping close to the mound. The sandstone used in the city site ranges in hue from purple to green and in consistency from pebbly to fine; every variety is locally available in the hills behind and on either side of the Acropolis of Sardis and on the slopes of the Acropolis itself. The stone incorporated in the Lydian sandstone wall at sector MMS/N is pale reddish brown in color and fine enough to retain chisel marks and a crisp profile. The stone used in the sandstone wall on the Acropolis is coarser and purplish in color.

QUARRYING

The marble quarries at Mağara Deresi and Gölarmara are not precisely datable, but the Hellenistic and Roman workings could have eradicated every trace of earlier activity. The limestone quarry face buried beneath Karnıyarık Tepe is exceptional not only because it is dated on stratigraphic evidence but also because burial has preserved it against erosion, unlike the quarry platforms elsewhere at Bin Tepe. This face is a natural outcropping of stone that a team of pickmen has cut back vertically in preparation for quarrying. The quarriers would presumably have proceeded, if the crepis wall had not been abandoned, to extract rows of squared blocks from the face.³⁰ No sandstone quarries have been identified.

TRANSPORT

Mağara Deresi and Bin Tepe were presumably each linked to the city site of Sardis by regular transport routes for marble and limestone. Sandstone was prob-

29 In addition to the terrace or retaining walls on the Acropolis (no. 16) and at sector MMS/N (no. 18), sandstone is used for the masonry of a group of three tumulus tombs near the village of Alahıdır west of Sardis (McLauchlin, “Graves,” 257–59; Nayır, “Alahıdır”).

30 On Greek quarry methods, see Martin, *Manuel*, 146–55; Orlandos, *Matériaux* II, 15–20. A number of useful new studies on Greek and related quarry methods have been published in recent years by Marc Waelkens and others, including Waelkens et al., “Quarries”; Waelkens, *Pierre*; Waelkens et al., “Quarrying Techniques.” Some of the “mason’s marks” carved in the faces of blocks in the Karnıyarık Tepe crepis and in other monuments may actually be quarrier’s marks (discussed below, in Ch. 3).

ably never carried across to Bin Tepe (where limestone was plentiful) but was restricted to use where locally available at the base of Mount Tmolus. The only way to convey marble from Mağara Deresi to Sardis would have been to cart it ca. 4 km overland. As noted above, traces are still visible of an ancient road leading down from the quarries, but the road may be post-Lyidian. No ancient roads running directly from Sardis to Bin Tepe have been found, but Roman roads have been identified running north from Sardis on both sides of the Gygaean Lake.³¹ It is possible that marble was carried from the region around Gölarmara to Bin Tepe partly by raft across the Gygaean Lake, as mentioned above. Recent geomorphological studies have raised the intriguing if unlikely possibility that stone could also have been moved at least part of the way between Bin Tepe and Sardis by raft along the Hermus River. The Hermus is typically a meandering stream; in antiquity, it may have run hard by the Acropolis of Sardis, then wound its way across the plain until it was diverted by the limestone ridge of Bin Tepe.³² If so, and if the stream were navigable, the cost of transport would have been dramatically reduced.³³

31 Hanfmann and Waldbaum, *Survey* (Sardis R1), 18–19.

32 Investigations in 1982 suggested to geomorphologist Donald Sullivan that at one time “the river flowed just to the north of the mound northeast of the Gymnasium-Bath complex”; Greenewalt et al., “Campaigns of 1981 and 1982,” 55. This conclusion is based on vegetation patterns and on the evidence of obsolete river channels penetrated by sediment cores near the modern village of Sart Mahmut. The river channels are difficult to date but are said to be short-lived, and Roman pottery found in one of the cores suggests that the river flowed nearby as long or as recently as 1,500–2,000 years ago.

33 On Greek methods of transporting stone, see Martin, *Manuel*, 163–72; Orlandos, *Materiaux* II, 21–31. Methods of transporting stone along rivers may also be represented in Assyrian art; see Layard, *Nineveh*, pls. 10–17; pls. 12, 13, 15 are reproduced and discussed in Naumann, *Architektur*, 36–37, figs. 15–17. See, however, Russel (“Bulls”), who argues that two distinct scenes are represented on these reliefs: on the one hand, stone quarrying and transport; and on the other, irrigation of arable land. See now also Reade, “Carrières.”

OTHER MATERIALS

Lydian masons worked with iron tools and used clamps made of iron and lead. Both metals were available near Sardis in antiquity.³⁴ Wood was needed for scaffolding,³⁵ and wooden beams or battens were sometimes also used to help stabilize a packing of rubble or mudbrick retained by ashlar masonry.³⁶ There is no evidence for the use of wooden tie beams incorporated in the masonry itself.³⁷ Clamps may sometimes have been made of wood as well as metal, though apparently neither wood nor metal dowels were used by Lydian masons. The kinds of lumber used by Lydian builders included oak and possibly poplar (favored for scaffoldings by modern builders). In tumulus tombs, layers of charcoal incorporated in the fill of the tumulus may have been used to draw off water from over the top of a tomb chamber.³⁸ Lime mortar was used as a waterproofing agent, and the interiors of tombs were sometimes coated with lime plaster.

34 Waldbaum, *Metalwork* (Sardis M8), 5–6.

35 Evidence for the use of scaffolding includes putlog holes in the face of the Lydian terrace at the Byzantine Fortress (no. 17).

36 On wood incorporated in the core of the limestone-faced structure at Mound 2 (no. 19), see Greenewalt et al., “Campaign of 1985,” 83. On the use of wood to stabilize the mudbrick fortification wall at sector MMS, see Greenewalt, “Campaign of 1977,” 23, fig. 28; Greenewalt et al., “Campaign of 1978,” 18.

37 Cf. Martin, *Manuel*, 14–15.

38 Charcoal layers occur above the ceilings of the chambers in the Tomb of Alyattes (no. 1; identified as oak), BK71.1 (no. 10), Aktepe 1 and İkiztepe near Güre (McLauchlin, “Graves,” 266–67; Tezcan, “İkiztepe”), Abidin Tepe near Kirkağaç (information supplied by C. H. Greenewalt, Jr.; see Özgen and Öztürk, *Lydian Treasure*, 36–39), and a tumulus tomb at Sarıçalı near Akhisar (Greenewalt et al., “Campaigns of 1990 and 1991,” 31–33). Hanfmann (“5th Campaign [1962],” 55) suggested that the layer of charcoal on top of the chamber in the Tomb of Alyattes was part of the king’s funerary pyre. McLauchlin (“Graves,” 157–58) proposed more generally that the charcoal was deposited as a result of “ceremonies conducted at the tomb site.” The interpretation of charcoal as a means of drawing off water was first suggested by Nicholas D. Cahill and Andrew Oliver, and Cahill points out that an open fire such as a funerary pyre would leave a residue of ash, not charcoal.

Chapter Three

TECHNIQUES OF CONSTRUCTION

The techniques of stonecutting and construction discussed in this chapter are the same for all three types of building stone—marble, limestone, and sandstone—used in Lydian ashlar masonry at Sardis. Unfinished monuments are the best sources of evidence for these techniques, especially the Karniyarık Tepe crepis wall (no. 2), the subject of much of the discussion that follows, which is divided into eight sections. The first section introduces Lydian stonecutting tools. The second and third sections concern the preparation and placement of blocks. Joining techniques and finishing processes are treated in the fourth and fifth sections, and the sixth section addresses a distinctive and illuminating detail of many Lydian monuments, namely the practice of cutting fine bevels in the edges of the blocks. In the seventh section, the Karniyarık Tepe crepis wall is examined for evidence of the organization of labor on a Lydian building project. The last section addresses the relationships between ashlar masonry and other techniques of construction such as mudbrick and rubble masonry in Lydian architecture.

STONECUTTING TOOLS

Toolmarks suggest that Lydian masons worked with the same basic range of tools as Greek masons.¹ They used

picks, hammers, points, droves or large flat chisels, claw chisels, and abrasives. They do not seem to have used saws or mechanisms for turning blocks of stone such as lathes. Although there is no direct evidence for the use of drills, they probably were employed for hollowing out clamp cuttings and for some architectural carving.

The pick, which leaves a characteristic furrowlike mark, was apparently the tool used to prepare the limestone quarry face buried beneath Karniyarık Tepe (Figs. 48, 49). Picks would also have been used for leveling off quarry platforms and for digging the separating trenches that defined individual blocks of stone. Pick marks sometimes occur on the rough central panels of rusticated blocks as well. Since the pick was an unwieldy tool, only practical for rough work, these marks are probably traces of the original quarry dressing rather than evidence for the use of the pick outside the quarry.

Hammers seem to have been the tools used by Lydian masons for shaping blocks of stone after they had been detached from their quarry beds. This tool is similar to but smaller than a pick, and instead of a pointed head, it has a broad, blunt blade, like that of a coarse chisel or modern pitching tool. Unlike the pick, which was used to dig away at a surface, the hammer

1 On Greek masons' tools, see Martin, *Manuel*, 179–89; Orlandos, *Matériaux*, 45–58; Ginouvès and Martin, *Dictionnaire*, 66–75. The terminology of Ginouvès and Martin has been used throughout this discussion. On Persian masons' tools, see Nylander, *Ionians*, 23–28. The excavations at Sardis have yielded nearly 50 iron tools, ranging from small chisels to a sledgehammer, but only a few were found in Archaic or Classical levels, and many are both

fragmentary and corroded: Waldbaum, *Metalwork* (Sardis M8), 47–54, nos. 127–71. Even when ancient tools are found in good condition, it is still often difficult to tell how they were used, for what purpose, or by what sort of craftsman. “Axes and adzes can be used in farming as well as carpentry, and a chisel can be used by carpenter, mason, or smith, depending on size and weight”: *ibid.*, 47. Depending on circumstance, any one of these artisans might also have used the same tool in several different ways.

was used to strike more direct blows, causing large flakes of stone to spall off. Examples of hammer dressing in Lydian masonry include the faces of blocks used in the walls of several dromoi at Bin Tepe (Figs. 78, 79, 97) and the jagged surfaces of some blocks in terrace walls and fortifications at Sardis (Figs. 170, 173, 183, 216).

Points were used for trimming pick- and hammer-dressed surfaces more finely. Unlike the pick and the hammer, both of which had handles, the point was held to the stone by hand and struck with a mallet. When held at or near a perpendicular angle to the stone, it makes a distinct pockmark; when held at a more acute angle, it leaves a short irregular furrow. The delicately stippled surfaces of some rusticated masonry (Fig. 172) were probably trimmed with a fine point or possibly with a light pick.

The neat drafting of the margins of the blocks in rusticated walls is one of the most characteristic features of Lydian masonry (Figs. 58, 172). These margins are usually marked by fine striations, closely spaced and perpendicular to the edges of the blocks (i.e., horizontal in the vertical margins, vertical in the horizontal margins, sometimes meeting at the corners as if in a miter joint). These striations were cut with a flat blade, and the precision and regularity of the marks suggest that the blade employed was handheld rather than hafted.² The striations are generally about 0.05 m wide, presumably corresponding to the standard width of the blade used to cut them.

This tool, a large flat chisel or drove, was held to the stone like a point and struck with a mallet again and again as a mason worked his way along a draft;³ by examining the toolmarks closely, it is usually possible to tell in which direction the mason was working—important evidence for determining when, in the building process, the drafted margins were cut.⁴ The flat chisel was used to dress the sides, top, and bottom of a block as well as the face—sometimes the whole face was worked, sometimes only the margins. Some of this work, such as the preparation of the bottom of a block, had to be finished before a block was built into a wall, but much chisel work was not done until after the blocks had been set in place. In addition to the large flat chisel or drove, smaller chisels were used for more delicate jobs, such as beveling the edges of a block, possibly cutting holes for patches or clamps, and carving architectural ornament.

2 On a visit to Sardis in the summer of 1984, however, the sculptor Peter Rockwell suggested that the drafted edges of the masonry of the Lydian terrace at the Byzantine Fortress might have been cut with an ax.

3 According to Ginouvès and Martin (*Dictionnaire*, 71), a blade less than 0.04 m wide should be called a chisel, a wider blade, a drove.

4 See Rhodes, “Early Stoneworking.”

In Greek architecture, the fine point and the large flat chisel were superseded after the mid-sixth century by a more efficient tool, the claw or toothed chisel.⁵ The date of the introduction of the claw chisel in Lydia, a crux in the chronology of Lydian masonry, is discussed below, in Chapter 4. In Lydian architecture, claw-chisel marks occur only in tombs (Fig. 83). They are found not only on exposed surfaces but also on the sides, top, and bottom of a block, both on the contact surfaces and on parts of the block that were never in contact with other blocks, such as on the hollowed-out area within an anathyrosis frame as well as on the contact bands creating the frame. Two different types of claw chisels were used, one with six or seven pointed teeth (e.g., on BT62.4, no. 3; Fig. 83) and one with six or seven broad, flat teeth, more closely spaced (e.g., on Aktepe 1 near Güre; the crispness of the marks on this tomb shows that they were not made by a worn example of claw chisel with pointed teeth, but by a separate type of tool). Both types of chisels were about 0.05 m wide, which is equal to the standard Lydian flat chisel or drove.

Stone surfaces on architectural moldings and the interiors of tomb chambers were sometimes smoothed off after construction with various types of abrasives. The marks of these abrasives are light parallel lines or swirls, resembling the marks of sandpaper on wood, and they were presumably caused by rubbing with a metal rasp or an abrasive material such as emery.

PREPARATION OF BLOCKS

Once a block of stone had been separated from a natural outcropping, roughed out in the quarry, and delivered to a construction site, it was squared off and prepared for building (see Fig. 6). The drafted edges of rusticated blocks in Lydian masonry seem to be partly the by-product of the method used to convert the rough stone into a squared block.⁶ The first surface of the block to be prepared was the bottom. The mason defined the plane of this surface by cutting flat strips around the edges or margins: first the margins along the front and back of the block, checking with “boning blocks” (Fig. 7) and straight edges (Fig. 8) to make sure the margins

5 See Nylander, *Ionians*, 53–56; idem, “Toothed Chisel.”

6 The technique apparently employed in Archaic Lydia and described below is set out in handbooks of masonry published in England and the United States at the beginning of the twentieth century: Barham, *Masonry*, 15–20; Phillips and Byrne, *Masonry Construction*, 72–73. For a parallel in present-day Israel, see Shiloh, *Proto-Aeolic*, pl. 31. See also Pedersen, *Mausolleion* 3, app. 2, “Marginally Drafted Masonry: A Brief Account of Its Pre-Hellenistic History,” 175–88. A very different method of preparing blocks is described in Clarke and Engelbach, *Egyptian Masonry*, 96–109.

were in the same plane, then the margins along the sides (Fig. 9); he would then use the margins as guides for trimming away the excess stone in the middle of the block. Once the bottom was finished, the mason could define the front and sides of the block in relation to the bottom, cutting strips around the margins of each surface and using a mason's square to make sure each surface was perpendicular to the bottom (Fig. 10). In the case of the front or face of the block, the strips around the margins would be useful not only for defining the plane of the surface but also, when the block was built into a wall, for lining it up with the other blocks around it. It was unnecessary, however, to trim away the rough stone in the middle of the face of the block, since this surface, unlike the sides and bottom, would never be in contact with another surface.

Thus, the rusticated masonry typical of Lydian terrace walls was originally the product of economy. In some cases, the central panels of the faces of the blocks were not trimmed at all beyond their original quarry dressing, as in the Lydian terrace at the Byzantine Fortress (no. 17; Fig. 183). On other monuments, such as the lower limestone wall on the Acropolis (no. 16; Figs. 168, 172), the central panels were more finely trimmed, although probably not until after the blocks had already been built into the wall.

Unfinished monuments show that only the bottom of a block was completely dressed before the block was set in place. The front, sides, and top were finished in situ (see Fig. 52 for a block whose top and left side have not yet been finished). The sides were left unfinished so that they could be custom-fitted to neighboring blocks, and it was more accurate to level off the tops of a series of blocks in situ than to finish them individually on the ground. In addition, masons were concerned about the risk of damaging finished surfaces—on the sides, top, or face—while lifting and shifting blocks into position; untrimmed stone served as a protective layer or “mantle” to be trimmed away from the final surface of the block once the risk of damage had been lessened.

For these reasons, some blocks in unfinished walls are partly pick or hammer dressed, while other blocks exhibit a finer and more uniform treatment (see Fig. 11). The former are preserved in the condition in which they were laid in place; the latter had already been trimmed in situ. In the case of the Karniyarık Tepe crepis wall, every stage of work is represented, and it is clear some blocks are completely finished, while others are largely unfinished. In other monuments, where the different stages of work are less clearly represented, it is sometimes more difficult to tell whether a roughly dressed wall is finished and intended to be roughly dressed or

unfinished and meant to be more finely dressed. The unfinished wall blocks of the chamber of the Pyramid Tomb (no. 15) provide the best evidence for this method of construction in Lydian architecture.

The walls of tomb chambers, which were usually smoothly dressed, were in some cases initially built out of rusticated blocks. Later on, the entire face of such a wall would be trimmed back to a continuous vertical surface. Masons usually cut this final surface a few centimeters deeper than the original margins of the blocks (rather than simply trimming the center of each block back to the plane of the margins), partly so that the final dressing would erase any damage that the edges of the blocks might have suffered during construction (see Fig. 12). To dress the entire faces of the walls of a tomb chamber after construction was a difficult and time-consuming process. In order to conserve labor, Lydian masons sometimes seem to have finished the faces of individual blocks on the ground, when it was still relatively easy to maneuver around the blocks and to dispose of working debris. These blocks were presumably squared off in the same way as other blocks, differing only in the additional preparation they received. Partly in order to protect the edges of the blocks against chipping, however, masons would finish only a central panel in the middle of the block, leaving a rougher projecting border around the edges. The result was the opposite of a conventional rusticated block: instead of a block with recessed margins and a rough projecting central panel, one with projecting bands around the edges of a sunken, smoothly dressed panel was produced (see ideal reconstruction in Fig. 13). These projecting bands are conventionally called “protective lips.” They are usually about 1–2 cm wide and 1–2 cm high. In some cases, probably only the vertical borders of prefinished blocks (not the top or bottom) were supplied with protective lips. Once a block had been built into a wall, the mason trimmed the protective lips away, together with the protective lips on the surrounding blocks.⁷

7 For protective lips in Greek masonry, see Martin, *Manuel*, 192, pls. 17.1, 18.1. For protective lips in Persian masonry, David Stronach provides the following references: Stronach, *Pasargadae*, 302–4, pls. 186, 187; Tillia, “Apadana,” figs. 6, 10–12, 24. As noted below, the clearest examples of the use of protective lips in Lydian masonry are on the undersides of the ceilings of tomb chambers (e.g., the Tomb of Alyattes [no. 1] and BT62.4 [no. 3]) and on the steps of the Pyramid Tomb (no. 15). It is less clear how common this method was in the construction of vertical walls; what appear to be protective lips do survive in several places on the walls of BK71.1 (no. 10), and chisel marks crossing the vertical joints between blocks in other tombs may represent the trimming away of protective lips. It is possible, however, that these walls were built according to the other method described above, in which the entire surface of a wall was trimmed back after construction. By this theory, the masons dressing down the surface of the wall would have trimmed the

As noted, one of the purposes of the protective lips was to safeguard the edges of the blocks against chipping—more noticeable in smoothly dressed walls than in rusticated walls. But the risk of chipping the edges of a block during construction concerned the builders of rusticated walls as well. This and other issues were addressed by beveling the edges along the bottoms and in most cases one side of the block. The bevels along the bottoms must have been cut before the blocks were laid in place. The bevels in the sides were cut in situ, and for this reason, discussion of these bevels is reserved for later sections (for a good example of a vertical bevel in the side of a block, see Fig. 51; see also Fig. 6).

To sum up, the nature of the preliminary dressing of a block was determined by the type of building under construction. In terrace walls, rusticated blocks, sometimes with beveled edges, were the rule (Fig. 11). In walls intended to be trimmed smooth, such as the interiors of tomb chambers, blocks were sometimes finished in advance except for protective lips around the edges (Fig. 13). Ceiling blocks in tomb chambers were usually prepared in the same way as wall blocks, with protective lips running along the joints; floor blocks, however, were mostly rough on top when laid, with only a few smoothly dressed bands marking the intended final surface. The dressing of the step blocks of the Pyramid Tomb (no. 15) combines both systems: the lower halves of the risers have been finished in advance except for protective lips on both sides, while the upper halves are rusticated, as if intended for a retaining wall. This method of preparing step blocks is discussed in the section below, “Finishing Processes.”

PLACEMENT OF BLOCKS

This section addresses three questions: How did Lydian builders raise architectural blocks from the ground and into position in a wall? How did they shift blocks back and forth in the process of adjusting them to neighboring blocks? And how did they determine the alignment of a block in relation to other blocks in the same course and in the courses below?

central parts of individual blocks first, leaving narrow borders at the edges (since the greatest risk of causing unsightly damage came in the trimming of the joints between blocks), and in some cases neglecting in the end to trim these narrow borders away.

Lifting

The largest known blocks in Lydian architecture are the ceiling beams of the chamber in the tumulus of Alyattes (no. 1). The lintel, the biggest of all, is 3.90 m wide, 1.11 m high, and 1.45 m thick; it probably weighs about 16 metric tons (Figs. 24, 25, 27).⁸ The ceiling blocks of other tombs are smaller, usually about 2.00–2.50 m long, 0.50–1.00 m wide, and 0.25–0.50 m high, weighing between 1.50 and 3.00 metric tons (Figs. 114, 115). Paving slabs are comparable in height and width but are generally not as thick. The wall blocks of the forecourt in the Tomb of Alyattes are nearly as massive as the ceiling beams; the one measurable block is 2.5 m high, 2 m wide, and 1 m thick; its estimated weight is ca. 13 metric tons (Figs. 21–23). The blocks used in the walls of the actual chamber and in other Lydian chamber tombs are generally smaller, approximately 0.50 m high, 0.50–1.50 m wide, and 0.50 m thick. This size of block, which weighs about half a ton, is also typical of Lydian retaining walls such as the Karnıyarık Tepe crepis (no. 2; 0.60–0.70 m high, 0.90–1.90 m wide) and the limestone walls on the Acropolis (no. 16; 0.30–0.40 m high, 0.50–1.70 m wide). The step blocks of Tomb 813 (no. 14) and the Pyramid Tomb (no. 15) are considerably smaller; some of them could have been moved by just two men. Thus, while Lydian masonry is undeniably megalithic, few blocks are as enormous as the architrave blocks regularly lifted 10 m and higher by Greek temple builders.⁹

As a rule, the builders of Lydian tumulus tombs probably heaped up the mound outside a tomb chamber at the same time that they laid the actual stones of the chamber. With the addition of every new course of blocks, they would have raised the height of the tumulus to the height of the top of that course. By coordinating the construction of the chamber with the construction of the tumulus, it would have been possible for a team of masons to build the whole chamber without ever having to lift a block of stone any great height, for they could always have pulled the blocks up the sides of the tumulus and into place.

Not much is known about the crepis walls of Lydian tumuli, but it is possible that one important purpose

8 This calculation assumes the stone weighs about 160 lbs. per cubic ft. (ca. 2,600 kg per cubic m), the average weight of limestone regarded suitable for modern building. See Lafond et al., *Industrial Minerals*; reference kindly supplied by Karen Campbell, library assistant at the Lindgren Library of the Massachusetts Institute of Technology.

9 See the dimensions (for interaxials and column heights) quoted in Dinsmoor, *Architecture*, “Chronological List of Greek Temples,” following p. 340.

of these walls was to create a level base at the bottom of a mound in cases when the bedrock, on which most Lydian tumuli (at least at Bin Tepe) were apparently founded, was higher on one side of the mound than on the other. In such cases, the crepis on the low side of the mound may have risen only as high as the bedrock on the high side, and it would have been possible for builders to move blocks into position by dragging them from the high side (where in many cases the stone for the crepis was presumably being quarried) across the unfinished mound and into place in the crepis.¹⁰ Likewise, in the case of some of the terrace walls built on uneven ground at the city site of Sardis, builders may have been able to avoid much lifting of blocks by dragging them into position by way of higher ground.

A different method of raising blocks into position would have been required for freestanding structures built on level ground, such as the towers, terraces, and platforms at sector MMS/N (no. 18) and Mound 2 (no. 19). The absence of lifting cuttings in Lydian masonry is one indication that cranes were not used—not surprising since the crane was probably not introduced, at least into Greek architecture, until the late sixth century.¹¹ Earlier Greek architects managed to circumvent the problem of lifting blocks by heaping a ramp up against the face of a wall when necessary, then pulling blocks up the ramp and into position. When the wall was complete, the ramp was dug away, freeing the finished structure. Lydian builders probably used the same method. Pliny claims this technique was used by Chersiphron, architect of the temple of Artemis at Ephesus, which was built, according to Herodotus, with the financial assistance of the Lydian royal house.¹²

Lydian building ramps may have resembled the massive earthen embankment heaped up against the west side of the Lydian fortification at sector MMS.¹³ This embankment is presumably not a building ramp, but it is interesting in this context for its similarity to the Egyptian building ramp once heaped up against the

entrance to the hypostyle hall at Karnak.¹⁴ The Egyptian ramp consisted of a mass of earth stabilized by a casematelike network of light mudbrick retaining walls. The embankment at Sardis seems to have contained a similar network of simple stone and mudbrick walls.

In addition to providing a way of raising blocks into position, building ramps also offered a working surface for masons trimming blocks in situ. When a building ramp was impractical, for example, for a terrace wall on a steep slope, a ladder or scaffolding would have been necessary, not for raising blocks, which could be moved into position by way of higher ground, but for supporting the masons working on the wall. No Lydian building ramp survives, and so we can only speculate about their use. But a unique series of putlog holes in the face of the Lydian terrace at the Byzantine Fortress (no. 17) shows that this wall was partially exposed during construction, not buried by a building ramp (Figs. 181, 183, 188, 190). The cuttings interpreted here as putlog holes are rectangular sockets in the tops of the blocks, about 0.05–0.10 m along a side and 0.30 m deep. These sockets occur in vertical columns at 3 m intervals and in horizontal rows 1 m apart—one row for every other course. They cannot be weep or lifting holes, for they do not go all the way through the blocks.

These putlog holes are unparalleled in Lydian masonry. In most cases, Lydian builders probably relied where necessary on freestanding scaffoldings, which were not attached to the wall in any way. The Lydian terrace at the Byzantine Fortress may have been treated as a special case because it was taller than most Lydian terraces, requiring unusually high scaffolding, or because the ground at the base of the terrace was exceptionally uneven.

Shifting

Once a team of masons had set a block more or less in place, they would have to shift it more exactly into position. In the next section of this chapter, we see that in the process of fitting blocks to one another, adjacent blocks might be pushed together, pulled apart, and pushed together again several times. In Greek architecture, the tradition closest to the Lydian, evidence for the methods used by builders to shift blocks back and forth includes pry holes and handling bosses (see Fig. 6).¹⁵ Pry holes are cuttings in the top of a block that give a purchase to the end of a crowbar

10 In any case, no Lydian crepis wall seems to have risen more than approximately 2 m high. For a list of 28 Lydian tumuli with crepis walls, see Roosevelt, “Settlement,” 154–55. The heights of those for which measurements are available (excluding Karniyarık Tepe) range from 0.50 to 1.40 m.

11 Coulton, *Architects*, 48, 144; idem, “Lifting.” On lifting generally in Greek architecture, see Martin, *Manuel*, 199–219; Orlandos, *Matériaux*, 31–44, 87–98; Ginouvès and Martin, *Dictionnaire*, 119–23.

12 Plin. *HN* 36.21.95–97; Hdt. 1.92.

13 Greenewalt et al., “Campaign of 1984,” 21–22; idem, “Campaign of 1985,” 72. For a possible Lydian siege mound at Old Smyrna, see Nicholls, “Old Smyrna.”

14 Clarke and Engelbach, *Egyptian Masonry*, 91–93 and figs. 87, 88. The ramp has now been removed.

15 Martin, *Manuel*, 234–38; Orlandos, *Matériaux*, 57–58; Coulton, *Architects*, 48; Nylander, *Ionians*, 38–42.

being used to push the blocks of the next course into position. Handling bosses are rough oval or rectangular projections on the face of the block, usually centered between the sides, frequently closer to the bottom than the top. Their purpose was to give a purchase to the crowbar on the face of the block. Builders must have intended to trim the handling bosses away, but they frequently neglected to do so.¹⁶

Both pry holes and handling bosses occur in Lydian architecture—pry holes with some regularity, handling bosses less frequently. Pry holes are visible on most monuments where the tops of the blocks are exposed, including the Karniyarık Tepe crepis (no. 2; see Figs. 53, 54), some chamber tombs (T77.1, no. 11; T82.1, no. 12), and the terrace walls on the Acropolis (no. 16) and at sector MMS/N (no. 18). Handling bosses are comparatively rare. They occur on two blocks in the Karniyarık Tepe crepis (see Fig. 45), on several blocks in one of the chamber tombs at Duman Tepe (BT66.3, no. 7), on one block in the upper limestone wall on the Acropolis (see Fig. 170), and on several blocks in the Pyramid Tomb (no. 15; see Figs. 152, 155).¹⁷ There are at least two possible reasons why handling bosses are less common than pry holes. First, bosses on blocks built into smoothly dressed walls, such as those of a tomb chamber, would usually have been trimmed away. Second, handling bosses may have been unnecessary, except under special circumstances, in the rusticated masonry typical of Lydian terrace walls, for the rough central panels of the blocks used in these walls could have served as large handling bosses themselves.

A different method of shifting blocks may have been used in the construction of the Lydian terrace at the Byzantine Fortress (no. 17). Neither pry holes nor handling bosses occur on this monument, but numerous cuttings in the face of the terrace—one or two on every block—may have been used for the same purpose as handling bosses. These cuttings are always located along the bottom of the block, one in the center of most blocks, two symmetrical cuttings in especially large blocks (Figs. 181, 188). They are arc shaped, approximately 0.02 m high, 0.07 m wide, and 0.07 m deep. The cuttings were presumably intended

to receive the end of a crowbar, inserted in the cutting and used either to pry the block up or (more likely) to push it back.¹⁸

Alignment

Setting lines are preserved on only two Lydian monuments at Sardis: the Pyramid Tomb (no. 15) and the limestone masonry on the south side of the gate at sector MMS/N (no. 18).¹⁹ As mentioned above, in Chapter 1, a rectangular chamber was located on top of the fifth step of the Pyramid Tomb. Although only a couple of wall blocks survive, the plan of this chamber may be reconstructed from the setting lines, carefully incised on the surviving paving stones. Similar setting lines may have been engraved on the floor blocks of more traditional Lydian chamber tombs, but the only way to reveal them would be to dismantle the tombs. Engraved setting lines were apparently not used to lay out the steps of the Pyramid Tomb.²⁰ At sector MMS/N, a setting line is preserved on several blocks of the topmost surviving course (running across the joints between the blocks); the line runs parallel to the edge of the course, about 2 cm behind it, and is apparently a setting line for the next course of blocks. This limestone face was thus slightly battered, as is also true of the limestone masonry on the north side of the gate.

Setting lines are not preserved on any other Lydian retaining walls; they may have been drawn or painted rather than incised. In addition to, or instead of, setting lines, Lydian builders may also have used the bevels cut in the edges of most blocks in the Karniyarık Tepe crepis and similar walls to maintain the alignment of the blocks. Incised guidelines marking the inner edges of partially cut bevels on unfinished blocks in at least two monuments show that these bevels were cut in situ (see Fig. 53).²¹ It is not known how the masons determined where to cut the inner edge of the bevel on a given block, but the use of incised guidelines suggests that its position was important. One possible method would

16 On some buildings, handling bosses were intentionally retained for decorative effect. An example brought to my attention by Bonna D. Wescoat is the temple of Athena at Assos, where the bosses have been recarved in various ornamental shapes; see Clarke et al., *Assos*, 143, fig. 2.

17 Handling bosses are also found on the limestone corner quoins of the salient corner of a large niche built into the east face of the Lydian fortification wall in sector MMS, uncovered in 1995; this wall is built largely out of megalithic coarse stone masonry, but in this case and some others, the corners are composed of squared blocks.

18 For a similar but slightly different system, see Adam, *Roman Building*, 54, fig. 121.

19 Greek setting lines are discussed in Martin, *Manuel*, 231–34; Orlandos, *Matériaux*, 79–83.

20 Another early monument at Sardis exhibiting setting lines is the “Lydian Altar” in the precinct of Artemis, on which the builders fixed the positions of the corners of the fifth step of the platform (now missing) with L-shaped marks engraved on the corner blocks of the fourth (uppermost surviving) course. Similar setting marks may have been used to place the corner blocks of every step of the platform above the euthynteria: see Appendix 3.

21 These guidelines are preserved on several blocks in the Karniyarık Tepe crepis and on at least one displaced step block from the Pyramid Tomb.

have been to lay a straight edge along the line defined by the inner edges of the bevels of the last two blocks in the course. The inner edge of the bevel on the block in question would then be cut back to this line (Fig. 14).²² If this method were used, it would have had the effect of defining a theoretical plane just a few millimeters behind the actual faces of the blocks. This plane would have been extended with the addition of every new block. It would also have provided the masons with a way of maintaining the alignment of a series of blocks without having to line up the edges of the blocks precisely, either with each other or with a setting line marked on the top of the course below; the bevels in the edges of the blocks would have had the added effect of making minor differences in the alignment of adjacent blocks less noticeable.²³

JOINTS

In this section, it is useful to distinguish between joints—the seams in the face of a wall that separate courses and adjacent blocks (the former known as horizontal or bedding joints, the latter as vertical or rising joints)²⁴—and the joining surfaces (the sides, top, and bottom) of a block. Three different subjects are addressed: first, the types of joints found in Lydian masonry; second, the methods used to prepare the joining surfaces of blocks; third, the use of clamps to secure the joints between adjacent blocks in some monuments.

Types of Joints

Different methods of preparing the sides, top, and bottom of a block result in different types of bedding and rising joints, depending on how much of the joining surface is in actual contact with the adjoining block.²⁵ In “plane-dressed” joints (sometimes also called “flat” or “flush” joints), blocks are in contact over the entire surfaces of both adjoining sides;²⁶ in “hollow” joints (also called “oblique” or “edged” joints), blocks

are in contact only at the edges.²⁷ Between these two extremes, there is a wide range of what are known as “banded” joints, where blocks touch along “contact bands,” behind which the surfaces of the blocks are more roughly dressed. A specific type of banded joint is the Greek “anathyrosis” joint, characterized by smoothly dressed contact bands cut to regular widths and clearly distinguished from the rest of the “joining surface,” which is usually roughly dressed and slightly recessed.²⁸

In Lydian, as in Greek, masonry, most bedding joints are essentially plane dressed and most rising joints are banded. Banded joints in Lydian masonry, however, exhibit considerable variation in treatment. On the Lydian terrace at the Byzantine Fortress, for example, the contact areas of the joining surfaces differ in width from block to block and are coarsely trimmed; in the walls of the Tomb of Alyattes, however, the contact areas have been worked to a glassy surface at the front of the joint, giving way to an only slightly less finely chiseled (and not recessed) surface behind. The joining surfaces of the blocks of the Karniyarık Tepe crepis are more typical (see Fig. 51). The contact bands are smoothly worked and always at least as wide as the standard Lydian flat chisel or drove (i.e., ca. 0.05 m), but they can be much wider. The surface of the block behind the contact band is usually point dressed but is occasionally chisel dressed; it is sometimes recessed, but frequently it is worked in the same plane as the contact band, only less finely. Banded joints are found in the walls, floors, and ceilings of tombs, in addition to the walls, and also in the stepped platform of the Pyramid Tomb.

These joints resemble conventional Greek anathyrosis joints, but they differ in several interesting respects: the variation in the width of the contact bands, the indistinctness of the transition between the contact band and the rest of the block, the variation in the dressing of the latter area, and the way both areas are frequently worked in the same plane. The distinction is not a sharp one, but it is significant nevertheless; the deliberate hollowing out of the middle of the block in an anathyrosis joint and the dressing of the contact bands to specific predetermined widths bespeak a sophistication that makes less systematically cut banded joints seem haphazard and uneconomical by compari-

22 In the case of the Karniyarık Tepe crepis, a curved template would have been used.

23 On this subject, see Hodge, “Bevelled Joints”; elsewhere, Hodge (“Greek Architecture”) suggests generally that in Greek masonry, “their purpose seems to be to set a datum line or point of reference from which measurements could be taken during the laying of the stones and the dressing back of protective surfaces.”

24 Ginouvès and Martin, *Dictionnaire*, 103.

25 On joints, generally, in Greek and Persian architecture, see Martin, *Manuel*, 192–99; Orlandos, *Matériaux*, 99–100; Nylander, *Ionians*, 35–38, 58–62; Ginouvès and Martin, *Dictionnaire*, 103–7.

26 On plane-dressed joints in Egyptian masonry, see Clarke and Engelbach, *Egyptian Masonry*, 100–105.

27 Illustrated, e.g., in Nylander, *Ionians*, 59, fig. 18.

28 On the interpretation of the term *anathyrosis*, see Martin, *Manuel*, 194 n. 1.

son.²⁹ Banded joints such as the rising joints in the Tomb of Alyattes and the Karniyarık Tepe crepis are in some ways closer to the spirit of plane-dressed joints than to that of anathyrosis. True anathyrosis does occur in Lydian architecture, but only in a few monuments. The sole example in Lydian civic architecture is the stylobate on top of the Lydian terrace at the Byzantine Fortress; tombs exhibiting anathyrosis joints include BT62.4 (no. 3) and T77.1 (no. 11).³⁰ The absence of anathyrosis in some monuments and its presence in others may be due to differences in building tradition, to differences in the date of construction, or to a combination of these two factors. These issues are discussed below, in Chapters 4 and 5.

Preparation of Joining Surfaces: Rising Joints

The sides and tops of many blocks in the Karniyarık Tepe crepis wall are rough dressed, showing that these surfaces were prepared in situ and not before the blocks had been set in place. This procedure was apparently universal in Lydian masonry. In many structures, the rising joints are often not exactly vertical, sometimes not even straight. Irregular joints such as these can only occur when adjacent blocks have been custom fitted to each other, presumably in situ rather than before placement. Thus, the only surface of a block completely finished before placement was the bottom. Because, in the preparation of the remaining surfaces, the sides of a block (the rising joints) were finished off before the top, rising joints are discussed first, bedding joints second.

The unfinished sections of the Karniyarık Tepe crepis provide the most detailed record of how the adjoining surfaces of adjacent blocks were prepared (Figs. 47, 50–56; see Fig. 11). In the discussion of this procedure, the following special terms are used: of any two adjacent blocks, the block that was laid first is called the “stationary” block; the block laid up against the first or stationary block is called the “new” block. As a rule, Lydian masons first trimmed the joining surface of the stationary block, then trimmed the joining surface of the new block to fit the stationary block. In the course of preparing every rising joint in the wall, a light bevel was

cut in the edge of the stationary block; the edge of the new block was not beveled. The evidence that shows that the bevels record the direction of laying in this way is discussed in a section below, “Organization of Labor.”³¹

The first step in preparing the side or joining surface of the stationary block was to cut a smooth band at the front edge (Fig. 53). After this band was finished, the masons marked the inner edge of the bevel with an incised line and then cut the bevel, which is usually only a few millimeters deep and cut at approximately a 45-degree angle to the face of the block. (Possible purposes of these bevels are discussed in this section and under “Finishing Processes”; see also the discussion of the alignment of blocks in the section above, “Placement of Blocks.”) The final step would be to trim back the rough area behind the smooth band.

Once the stationary block was ready, the new block was laid up against it. The joining surface of the new block was prepared in the same way as the joining surface of the stationary block, with some omissions and additions. For instance, the edge of the new block was left plain, not beveled like the edge of the stationary block; in addition, the contact band of the new block had to be adjusted to fit the already finished contact band of the stationary block. Red stains in many of the joints of the Karniyarık Tepe crepis suggest that a method common in Greek architecture of testing the fineness of the joint between blocks was also used in Lydia. In this procedure, the contact band of the stationary block was coated with red pigment, and the new block was pushed up against it. When the blocks were pulled apart, any projecting parts of the contact band of the new block would be stained red and could be trimmed back. The process would be repeated until the whole of the contact band of the new block was stained, showing that the joint was flush.³²

One advantage of this system, in which joining surfaces were not prepared until the last possible moment, was to minimize the risk of damage to the edges of the blocks. The bevels carved in the sides of the stationary blocks, and in the bottom of both the stationary and the new blocks, might also have served in part to reduce the risk of damage to these vulnerable edges. This is a common explanation of the function of

29 The significance of anathyrosis as an economizing device in Greek architecture is one of the subjects investigated by Howe, “Invention,” 326.

30 Tombs at Sardis with anathyrosis joints include BT62.4 (no. 3), BT66.4 (no. 8), T77.1 (no. 11), and T82.1 (no. 12). Tombs outside Sardis with anathyrosis joints include Aktepe 1 at Güre near Uşak; a tomb at Sariçam near Manisa (McLauchlin, “Graves,” 265–66); a tomb at Alibeyli near Manisa (ibid., 262–64; Nayır, “Alibeyli”); and a tomb at Abidin Tepe near Kirkağaç (information supplied by C. H. Greenewalt, Jr.). Many other tombs whose joints are not exposed probably also have anathyrosis joints.

31 That similar bevels record the direction of laying in Greek architecture was first observed by Hodge, “Bevelled Joints.”

32 For this technique and other techniques of verifying joints using red paint, see Martin, *Manuel*, 189, 197; Orlandos, *Matériaux*, 66–68; Nylander, *Ionians*, 37–38; Ginouvès and Martin, *Dictionnaire*, 77–78. As pointed out to me by Andrew Ramage (personal communication), the principle behind this technique will be familiar to any reader who has ever had a dental filling.

similar bevels in Greek architecture.³³ The bottom edges of a block would be especially susceptible to damage as the block was shifted back and forth; the bevel would lessen the risk by blunting the edge (and if the inner edge of the bevel was chipped, the chip would be less noticeable). In rising joints, the joining surface of the stationary block was at greater risk of damage than the joining surface of the new block, because it had to absorb the shock of the new block being pushed up against it. Perhaps this was one reason for beveling the joining surface of the stationary block.

Although the bevels probably served other purposes as well, the Lydian terrace at the Byzantine Fortress, in which none of the edges of the blocks were beveled, shows how vulnerable to chipping the edges of the blocks were. Numerous joints are marred by chips that must have occurred when the blocks were pushed together. In at least one case, the chip was so disfiguring that the damaged area was reworked as a sunken panel.

The practice of custom-fitting adjacent blocks—for all types of banded joints including anathyrosis—also enabled masons to maintain essential flexibility. By postponing the preparation of rising joints until the last moment, masons circumvented the difficult task of preparing a joining surface that is both perfectly flat and perfectly vertical. It did not matter if the side of a block was neither plumb nor plane; the side of the block pushed up against it would be carved to mirror its inaccuracies. This kind of custom fitting is never attempted in modern masonry, where mortar is used to correct or compensate for minor irregularities in the shape of a block.³⁴

Preparation of Joining Surfaces: Bedding Joints

Many blocks in the Karniyarik Tepe crepis wall are rough on top, indicating that the tops of the blocks, like the sides, were regularly dressed in situ (see Fig. 50). Evidence that the tops of blocks in other Lydian monuments were also prepared in situ includes (1) variation in the heights of the courses of a wall, and (2) deposits of working debris occurring both in the fabric of a wall, that is, behind the face, and in the fill of construction trenches in front of a wall. The Lydian terrace at the Byzantine Fortress exhibits both forms of evidence. The eight courses preserved at the northeast corner of the terrace range in height from 0.50 to 0.59 m. It would be hard to account for this relatively slight

variation on the theory that the blocks in each course were either quarried or cut to these precise heights before laying; more likely, the blocks were first quarried or cut to roughly the same height, then laid in place, and only after that leveled off, so that the precise height of each course was not determined until the laying of the course had begun.

As mentioned above, in Chapter 1, the limestone wall at the Byzantine Fortress is actually a retaining wall, masking a massive rubble terrace. As now preserved, the rubble masonry stands to a greater height than the limestone. Evidence that the limestone wall originally hid all the rubble masonry is seen in layers of limestone chips, occurring at regular half-meter intervals in the exposed rubble face (Figs. 178, 179). These layers would seem to correspond to the horizontal joints between the courses of the original limestone facing, now stripped away; they may be compared to the layers of limestone chips found in front of the foundations of the terrace, where the limestone masonry is preserved (Figs. 178, 179, 182, 184).³⁵ The limestone chips are at least partly “working chips,” deposited in the course of stonemasonry in situ. The chips include large, nearly fist-sized chunks in addition to much finer flakes, suggesting that the mass of stone trimmed away was substantial. The only kind of trimming that would leave a thick blanket of chips both behind and in front of the face of the wall would be the trimming of the tops and sides of the blocks (but not the front).³⁶

The upper two courses of the Karniyarik Tepe crepis suggest that masons were allowed considerable leeway in deciding how and when to prepare the top of a course of blocks to receive the next course.³⁷ At one end of the central section of the wall, the bolster course stops six

35 The identification of most of the surviving masonry as foundations is based on the presence of these layers: Greenewalt et al., “Campaign of 1985,” 76–78.

36 This is a somewhat oversimplified explanation. In reality, at least some of these chips probably did not have anything directly to do with stages of trimming in the construction of a wall but solely with the establishment of a stable stone packing behind the masonry and a firm earthen packing in front of it. The chips might have been raked up at the stoneyard as a kind of limestone gravel, for example, then deposited at intervals coinciding with each course both as a leveling agent and to facilitate drainage or to minimize settling. The best explanation probably lies between and combines these two. A great volume of stone waste was certainly deposited in preparing the top of any and every course for the next course to come; this waste was then probably spread about and redistributed as useful gravel.

37 The bottom course may have been a special case, for not only did it determine the circuit of the crepis but, founded unevenly on bedrock, it also established the first level surface at the base of the mound. For these reasons, the builders may have leveled off the whole bottom course at once before starting on subsequent courses, a practice that may have been standard.

33 E.g., Dinsmoor, *Architecture*, 173.

34 On custom fitting in ancient architecture, see Coulton, *Architects*, 49.

blocks short of the end of the middle course (Fig. 52). The tops of all six blocks are unfinished. At the other end of this section of the crepis, the bolster course again stops six blocks short of the end of the middle course (Fig. 42). In this case, the tops of the first three blocks are already finished, while the tops of the remaining three are still unfinished. In two other spots in the middle of the wall, there are spaces big enough for just one block, between two sections of the bolster course (Figs. 44, 53, 54). The top of the middle course in both spaces is still partly rough.

Thus, some master masons seem to have followed one procedure, and others a different procedure, either out of personal preference or as the terms of their assignments dictated. If, for example, a team of masons was assigned the jobs of both laying a stretch of blocks and leveling off the tops of the blocks, the master mason might decide either to lay all the blocks first, then level them off all at once, or to level them off one by one as they were laid. In a case where the team of masons in charge of laying the blocks was not required to level off the tops, this task might fall to the masons responsible for laying the blocks of the next course. The master of this team might then decide either to level off a stretch of blocks first, then lay the blocks of the next course, or to proceed block by block.³⁸ These questions and the general issue of the division of labor in Lydian architecture are discussed further in a section below, "Organization of Labor."

Although blocks in different courses were not custom fitted to each other in the same way as adjacent blocks, the practice of waiting until a block was set in place to dress the top is related to the practice of custom fitting. It would have been difficult to cut both the bottom and the top in exactly parallel planes in advance. It was more economical to concentrate first only on planing the bottom; the top of the block could be trimmed later, when the block had been firmly set in place, and when it was possible for the mason to check the accuracy of his

38 There were distinct advantages to leaving the trimming of the bedding joints until the last minute as an ad hoc procedure, whereby only as much of the top of the wall as was needed for the next block was trimmed at a time; in this way, masons could maintain flexibility for longer and sidestep some of the difficulties inherent in building according to any independent principle, such as horizontality. It was not necessarily important, for example, for the bedding joint for a given block to be exactly level, so long as it was flat, because the discrepancy could be made up in the next block. Thus, it was not necessary to expend the effort required to make a long stone surface absolutely level; if one block was a bit off, the error could always be corrected with the next block, but masons could not trim the whole surface of a course unevenly at one go, for then the blocks to go on top would not rest evenly.

work with a level, as well as in relation to the plane of the bottom. In this way, masons would also avoid having to measure the height of each block precisely in advance and then having to make the inevitable adjustments that would be required once a block was actually laid.³⁹

Clamps

Once the top of a block or series of blocks had been prepared, a final, optional step remained before the next course of blocks could be laid. This was to secure the rising joints between adjacent blocks with metal clamps.⁴⁰ The only actual clamps (as opposed to clamp cuttings) that survive are in the chambers of Lydian tumulus tombs. Clamps were not used in the Karniyarık Tepe crepis or in the retaining walls at the city site of Sardis, with exceptions of the Lydian terrace at the Byzantine Fortress and in special cases such as wall base moldings or stringer courses (to judge from cuttings in a number of displaced blocks). Most of the clamps used in Lydian architecture were not intended to be visible, but in some cases, where clamps were used to tie adjacent floor blocks together, they may have been considered visual ornaments in their own right.

Two basic types of clamps and clamp cuttings are found in Lydian architecture. The first is the plain butterfly; the second, the combination butterfly and staple clamp.⁴¹ The materials used are iron and lead and possibly wood or bronze.⁴² A third type of clamp, the simple staple clamp, is securely attested

39 This practice would also enable masons to include irregularly sized blocks if desirable. Rabbet joints, for example, are not uncommon in Lydian masonry. They were probably incorporated not for stability, however, but to accommodate unusually large blocks, when it was less work to accommodate the block than to replace it or to trim it down to size.

40 When clamps were used, it was presumably the normal practice to trim the top of each new block immediately after placement, so that it could be clamped to the stationary block before the next block was laid in place. This would have had two advantages over waiting until a whole series of blocks had been laid before clamping them together. First, builders could have pushed the new block up against the stationary block from the side and held it in place before inserting the clamp. Second, the clamp would then have served to protect the block from shifting during construction. It would also have been possible to insert a whole row of clamps at the same time, and in one case at Sardis, clamps were apparently inserted before the top of a course of blocks had been prepared (T77.1, no. 11).

41 See BT62.4 (no. 3) for "fish" clamps, variants of butterfly clamps.

42 On clamps generally in Greek and Persian architecture, see Martin, *Manuel*, 238–79; Orlandos, *Matériaux*, 100–111; Nylander, *Ionians*, 42–45, 63–67; Ginouvès and Martin, *Dictionnaire*, 108–12.

only in monuments such as the altar in the precinct of Artemis, which seems to belong to a different and later building tradition.⁴³

Plain butterfly clamps or clamp cuttings are known from both tombs and civic monuments: the Tomb of Alyattes (Figs. 30, 31), the Lydian terrace at the Byzantine Fortress, several blocks reused in the Lydian city gate at sector MMS/N (Fig. 205) as well as three stray blocks found out of context in the excavation of the Lydian fortification, and the tomb near Güre known as Aktepe 1. Only in the Tomb of Alyattes and the Lydian terrace at the Byzantine Fortress do the actual clamps, made of solid lead, survive. The former are 0.11 m wide at the widest point, 0.12–0.14 m long, and 0.035–0.038 m thick. On the Lydian terrace at the Byzantine Fortress, the cuttings are 0.07–0.08 m wide, 0.21–0.24 m long, and 0.02–0.03 m deep.

The clamps are missing from the blocks reused in the Lydian city gate or found out of context nearby, but the cuttings are fully exposed in plan. Those of the former group are unusually small, on average 0.05 m wide and 0.06 m long; one is only 0.035 m wide. The latter group includes two fragmentary wall base moldings (App. 1, no. A1a, Figs. 217–19; App. 1, no. A1b, Figs. 220, 221). The cuttings on the better-preserved example, App. 1, no. A1a, are 0.15–0.2 m long, 0.04–0.06 m wide, and 0.03–0.04 m deep. Also found in sector MMS (reused in a wall of the Persian period) was a broken rusticated wall block with a plain butterfly clamp cutting on its one preserved edge. The cutting measures 0.13 m wide and 0.10 m long, and is 0.025 m deep.

The combination butterfly/staple clamp is the most common type employed by local masons (e.g., the clamp to the left in Fig. 80; Fig. 130). The clamp cuttings are comparable in size to the cuttings for plain butterfly clamps, and the depth of the staples ranges from 0.02 m to 0.03 m. This type of clamp occurs at Bin Tepe, at the city site of Sardis, and in the hinterland of Lydia. Many examples of the actual clamps as well as the cuttings are preserved, and they consist without exception of iron staples encased in lead. The two ends of the staple were inserted into the cuttings, and molten lead was poured in around the iron staple, filling the butterfly-shaped cutting in the surface of the block. The leaden butterfly continued to perform the same function as the plain butterfly clamp, but it also served to fix the position of the iron staple and perhaps also to protect the iron from

moisture, which could cause corrosion and swelling damaging to the stone.

The basic purpose of the different types of clamps was the same—to maintain tight joints. Little else can be said about plain butterfly clamps, because the evidence for their use is so meager; the discussion that follows concentrates, therefore, on butterfly/staple clamps, which give a much fuller picture of the various uses of clamps in Lydian masonry.⁴⁴ As we see in Chapter 4, the use of one type of clamp rather than another may also have chronological implications.

Before proceeding, it should be noted that it is possible, if perhaps unlikely, that simple staple clamps were also used in the Lydian era. In the stylobate of the temple of Athena at Assos in northwestern Asia Minor, elaborate combination butterfly/staple clamps were used to tie blocks together between columns, while simple staple clamps were used to tie together blocks hidden by columns.⁴⁵ It would be interesting to know whether a similar system was ever used in Lydian architecture.⁴⁶ Most well-preserved Lydian clamps are found in the floors of tombs, and these are invariably combination butterfly/staple clamps. Clamps were used in the walls of tombs as well as in the floors; but in most cases, the clamps between wall blocks have been revealed by tomb robbers, who for one reason or another have removed the actual clamp, often obscuring the shape of the clamp cutting in the process.⁴⁷ It is possible that in some cases, combination butterfly/staple clamps were used in visible positions (i.e., in the floors) and plain staple clamps in invisible positions (i.e., in the walls), as in the temple of Athena at Assos—but combination butterfly/staple clamps were used in the walls of at least two tombs at Sardis (BT66.4, no. 8, and Tomb 77.1, no. 11; see Fig. 130). The earliest known use of the simple staple clamp at Sardis is in the Altar of Artemis. The dating of this monument is uncertain, but it may be as late as the later fifth century, and it is possible that this type of clamp was not in fact introduced until this period.

44 Hanfmann and Waldbaum, *Survey* (Sardis R1), 93.

45 Pointed out by Bonna D. Wescoat, whose publication of the temple is forthcoming.

46 The only evidence suggesting this possibility is the use of what may be two different types of butterfly/staple clamps in tomb BT62.4 (no. 3; see Fig. 80, showing a conventional butterfly/staple clamp on the left, and a possible variant, in which the lead setting does not completely fill the cutting, on the right); it is likely, however, that the differences between these clamps are due to shortage or shrinkage of lead rather than to any decorative impulse.

47 In addition to the Tomb of Alyattes, the Lydian terrace at the Byzantine Fortress, and the Lydian Altar, monuments where clamps in walls have been revealed in plan include: BT66.4 (no. 8), a triple-chamber tomb near Kestelli Köyü at Bin Tepe, T77.1 (no. 11) at Sardis, and Aktepe 1 and İkiztepe near Güre.

43 The clamps seen in the Lydian Altar consist merely of an iron staple inserted in an oblong slot and encased in lead. In plan, this type of clamp resembles a simple bar with slightly swollen ends. The staples used in the Lydian Altar are of the same size as the staples used in the combination butterfly/staple clamps.

An idea of the system or “rhythm” of clamping characteristic of a monument as a whole can be formed in a few instances. In the floor of BT62.4 (no. 3), the symmetrical arrangement of the clamps in relation to each other and to the masonry raises the possibility that their visual appearance was an important factor in determining where they were placed (see Fig. 77). Not every block is clamped to its neighbor, however, and the main factor in the placement of the clamps is the position of a given floor block, or pair of floor blocks, in relation to the walls. Adjacent floor blocks being subjected to different kinds of downward pressure are clamped together, whereas adjacent floor blocks being subjected to identical pressures are not. For example, since the threshold of the antechamber is composed of two blocks meeting in the center of the threshold, these two blocks are clamped together, as the pressure of the two jambs might have tended to push both blocks down at opposite ends, opening up the joint between them. For the same reason, the two blocks, one now removed, that originally met along the longitudinal axis of the chamber up against the back wall were also clamped, whereas the two longer paving slabs that span the full width of the front two-thirds of the chamber are not clamped together, for the downward pressure of the walls, being identical on both blocks, would not have tended to push or pull them apart at the joint.

In the Tomb of Alyattes, all the visible joints between wall blocks (four in total) are clamped. In the chamber of Tomb 77.1 (no. 11), every wall block now visible in plan was also clamped to its neighbor, with the sole exception of the two blocks meeting to form the southwest corner of the tomb (see Figs. 125, 127). Too little is known about the clamps between wall blocks in other monuments to reveal the clamping systems employed. Nevertheless, the forces pressing down on the wall blocks of a structure are more uniform than those to which floor blocks are subject, and it is therefore likely that if any wall blocks in a structure are clamped together, then most or all the wall blocks of that structure are probably also clamped to their neighbors.

In Greek architecture, vertical clamps or dowels were sometimes used to secure bedding joints, in addition to the lateral clamps securing rising joints. There is no evidence for the use of vertical clamps or dowels in Lydian masonry. Although it is possible that they were used in the better-preserved tomb chambers, such as the Tomb of Alyattes, they are not found in any of the terrace walls or in those chamber tombs, such as BT66.3 (no. 7), BT66.4 (no. 8), T77.1 (no. 11), and T82.1 (no. 12), whose walls are not preserved to their full height.

FINISHING PROCESSES

As discussed above, the preliminary dressing of the face of a block was determined by the type of finish eventually desired, according to the requirements of the building under construction. Thus, blocks intended for rusticated terrace walls received a different preliminary treatment from blocks intended for the smoothly dressed interiors of tomb chambers. The final dressing of the blocks in different kinds of walls was also clearly different. The various finishing processes found in Lydian masonry are examined in this section, to determine which of the monuments included in the catalogue are unfinished and which were completed as intended.⁴⁸

Rusticated Walls

The masonry of Lydian terrace walls and other exterior facings is always rusticated; at least one unusual tomb chamber also has rusticated walls (BT63.2, no. 4). In rusticated masonry (see Fig. 11), the faces of individual blocks have chisel-drafted margins enclosing rougher point- or hammer-dressed central panels. As we have seen, the margin along the bottom of a block was probably always cut before placement, while the margins along the sides and top were prepared during construction. The margins could be trimmed further after construction (i.e., after the block in question and all the surrounding blocks were in place), but for the most part, the final trimming of individual blocks was limited to the central panels.

The Lydian terrace at the Byzantine Fortress is the only known terrace wall whose blocks may never have been intended to receive any further dressing after placement (see Fig. 183). The rough treatment of the central panels of these blocks, which are mostly only hammer dressed, suggests that whatever the builders' intentions, in fact little if any trimming of the faces in situ did take place. The masonry of this wall is also less fine in general than that of other known Lydian masonry structures. None of the vertical or the horizontal joints are beveled, and the chisel drafting of the margins is noticeably cruder than usual. The construction layers that buried the lower courses of the surviving masonry at the northeast corner show that these courses were certainly finished as intended. These were of course foundation layers, but the masonry of the upper courses at the northeast corner (as well as

48 On finishing processes in Greek masonry, see Martin, *Manuel*, 297–99; Orlandos, *Matériaux*, 74–77. See also Kalpaxis, *Hemiteles*.

that of the superstructure of the terrace as exposed in other areas) is identical to the masonry of the lower courses, and it is likely that the upper parts were also finished as intended. In this and other respects, such as the putlog holes and shifting cuttings in the faces of the blocks and the absence of bevels in the edges of the blocks, the Lydian terrace at the Byzantine Fortress is exceptional and seems to represent a specific type of masonry construction.

A different and more common system is seen in the Karniyarık Tepe crepis, where the contrast between finished and unfinished sections shows that the faces as well as the joints of individual blocks were trimmed extensively in situ. A crucial piece of evidence, which shows how the Karniyarık Tepe crepis was meant to appear when finished, is the dressing of a narrow strip that runs along the bottom of the face of every block of the bolster course. Although the dressing of the upper surface of the face of the bolster varies from block to block, the treatment of the strip along the bottom is the same throughout, being finely point dressed except for the chisel-drafted borders of individual blocks (see especially Fig. 52). The uniform dressing of this strip suggests that it was finished in advance on every block, and indeed it would have been awkward, if not impossible, to trim this part of the faces of the blocks after they had been laid in place. The treatment of this strip shows that the point dressing is the final dressing, and that the rusticated appearance of individual blocks was intentional.

This evidence, combined with evidence presented in previous sections, suggests that the three stages of the dressing of the bolster blocks were as follows: before placement, the masons cut the blocks roughly to size and finished the bottom beds and the point-dressed strips together with the drafted margins along the bottoms of the faces; during placement and in the process of joining the blocks to their neighbors, the masons cut the drafted borders along the sides; after placement, the masons reduced the central panels on the faces of the blocks, working up from the finished strips along the bottoms. The unfinished portions of the crepis show that, in some cases, a different team of masons was responsible for each one of these three stages. The blocks in the lower courses of the crepis were probably dressed in the same three stages as the bolster blocks, except that only the bottom borders (i.e., the chisel-drafted margins) of the faces of the lower blocks were prepared in advance; the central panels, which were easier to trim in situ in these courses, were not finished (even along the bottom) until after the blocks had been laid.

One Lydian terrace wall that, unlike the Karniyarık Tepe crepis, seems to be entirely finished as intended is the lower limestone wall on the Acropolis (Figs. 168, 172). The dressing of this wall is similar to the dressing of the finished parts of Karniyarık Tepe crepis. The foundation course, originally buried, is less carefully dressed, with rough projecting central panels on the faces of the blocks; the margins of these blocks, however, are as finely chiseled as the margins of the blocks higher up. After construction but before the final dressing, all the blocks probably looked like the foundation blocks. In the upper courses, the blocks were then presumably dressed in the same sequence of steps as the blocks in the Karniyarık Tepe crepis.

The stepped profile of this wall is typical of Lydian masonry at the city site of Sardis. The main reason for building terrace walls with stepped profiles was probably to increase their stability; but by stepping every course back a few centimeters from the edge of the course below it, builders also avoided having to line up the bottom of a given course exactly with the top of the course underneath. Thus, the effort to avoid visible imperfections in the bedding joints was probably a supplementary reason for building walls with stepped profiles. A similar explanation may account in part for the bevels cut in the edges of the rising joints in this and other walls.⁴⁹

The masonry of the upper limestone wall on the Acropolis resembles the masonry of the foundations of the lower wall; the margins of the faces of the blocks are finely trimmed, but the central panels are coarsely dressed (Figs. 170, 173). Since this wall is in other respects similar to the lower limestone wall, it is probably unfinished. Mason's marks engraved in the central panels on the faces of many blocks support this conclusion (Figs. 163, 173). Similar marks are engraved in the faces of numerous unfinished blocks in the Karniyarık Tepe crepis (Fig. 57) but seldom in the finished blocks (a different class of marks neatly engraved in the margins of finished blocks [Figs. 44–46, 58] is discussed below, under "Organization of Labor"). When these marks are visible on the finished blocks, they are less distinct, probably because they are in a sense unintentional—that is, they are the traces of marks that were originally cut a bit too deeply in the central panels and then largely but not entirely erased during the finishing of the blocks. Only one mason's mark is visible on the upper courses

49 In a wall with a stepped profile, bevels whose only purpose was to hide overlapping joints were not strictly necessary on the top or bottom of a block, but only on one of the sides; this is in fact the system of beveling employed in one of the sections of the fortifications at Eleusis: Wrede, *Attische Mauern*, pls. 37–39.

of the lower limestone wall on the Acropolis, and that is also relatively indistinct, as if it too were originally cut in the block's protective mantle, then incompletely erased.

The limestone walls on the north and south sides of the gate at sector MMS/N are also similar to the lower limestone wall on the Acropolis—finely dressed in the upper courses (preserved only on the north side), somewhat more roughly dressed in the lower courses; thus, they are probably also finished structures (Figs. 203:B, C; 206, 208). Like the upper part of the Acropolis wall, the limestone masonry on the north side of the gate bears a single, shallow mason's mark, carved in the face of one block (Fig. 203:C). The sandstone masonry at MMS/N, however, is apparently unfinished (Figs. 203:A, 207). Despite its coarse material, the fine drafting of the margins of the blocks, the beveled edges, and the mason's marks engraved in the rough central panels place this wall in the same category as the Karniyarık Tepe crepis rather than with the Byzantine Fortress. Originally, the masons probably intended to trim the central panels back to the same plane as the margins of the blocks. This wall shows, however, that the term *unfinished* sometimes applies only in a technical sense; the sandstone wall was clearly built before the construction of the limestone wall, which was, as we have seen, a finished structure. Furthermore, independent evidence suggests that the limestone wall was built a generation before it was apparently destroyed in the Persian siege of Sardis.⁵⁰ Thus, the structure to which the sandstone wall belonged was probably functionally complete; its builders simply never bothered to finish off the parts that have been exposed.

Only a small portion of the face of the one other ashlar masonry retaining wall at Sardis, in Mound 2 (no. 19), was exposed, and it has now been reburied (Figs. 215, 216). Some important details, such as whether or not the edges of the blocks are beveled, are unknown, but the masonry resembles that of the upper limestone wall on the Acropolis and also features a deeply incised mason's mark on the central panel of one of the blocks. These characteristics suggest that it is unfinished and that in its finished state, it would have looked like the lower limestone wall on the Acropolis. The schist wall on top of the limestone masonry might have been built in haste to complete the structure in anticipation of enemy attack (such as that of the Persians).

Only one Lydian tomb chamber at Sardis has rusticated walls: BT63.2 (no. 4; Figs. 88–90).⁵¹ Because this tomb, like the wall at Mound 2, is now no longer accessible, it is difficult to tell whether it is finished or unfinished. Photographs suggest that the central panels of the blocks have been trimmed back to the same plane as the margins, like the finished parts of the Karniyarık Tepe crepis, although the trimming of BT63.2 is much cruder. The bottoms of the blocks also seem in the photographs to be beveled, another point of similarity with the Karniyarık Tepe crepis. This evidence suggests that this tomb is a finished but relatively crude example of the type of masonry found in the Karniyarık Tepe crepis and similar walls.

Rusticated walls at Sardis, therefore, fall into two classes. The terrace at the Byzantine Fortress, a finished monument whose blocks were not trimmed at all after placement, is the only member of the first class. Walls of the second class are built of finely rusticated blocks with beveled edges; usually only the centers of the blocks were trimmed after placement. The Karniyarık Tepe crepis shows that, in some cases, the blocks in one course were finished before the blocks in the next course had been laid. Other unfinished monuments, such as the upper limestone wall on the Acropolis, the sandstone wall at MMS/N, and possibly the limestone masonry at Mound 2, suggest that Lydian builders sometimes waited until after several courses were in place or even until after a whole structure was built before finishing off individual blocks.

The reasons for not finishing the central panels of the blocks in advance or immediately upon laying were presumably to protect the faces of the blocks during construction (the margins were placed at risk partly because they were needed to determine the plane of the face of the block, partly because they were needed for the alignment of the blocks), and probably also to ensure greater uniformity in the dressing of the blocks. The rusticated appearance of masonry of this second class is decorative, inasmuch as care was taken both to make the appearance of the central panels neat and to ensure clean, tight joints. Still, Lydian masonry is very different from the rusticated masonry typical of later fifth- and fourth-century Greek architecture, where the dressing of the faces of the blocks is combined with regular jointing patterns, in which the blocks are all equal in width and the vertical joints are precisely centered over the blocks below, to achieve a distinctive visual texture. There are also important technical differences between rusticated

50 The latest datable pottery associated with the construction of the limestone wall is a Corinthian skyphos of ca. 590 B.C.: Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Cor 114.

51 Another example of rusticated masonry in a chamber tomb is the dromos of a tomb at Alibeyli near Manisa: McLaughlin, "Graves," 262–64.

masonry in Archaic Lydia and rusticated masonry in later fifth- and fourth-century Greek architecture. In the latter, for instance, the central panels usually project slightly in a flat plane from the surrounding margins (while in Lydian masonry, the central panels are often cut back to the same plane as the margins); the central panels are also usually claw-chisel dressed (not point dressed as in Lydian masonry) and the margins are narrower than in Lydian masonry, and without obvious toolmarks (in Lydia, however, the width of the margins was determined by the width of the flat chisel used to cut them, and the marks of this flat chisel were never erased).

Smoothly Dressed Walls

Most Lydian tumulus tomb chambers have smoothly dressed walls, floors, and ceilings; the steps that gave access to Tomb 813 (no. 14) are also smoothly dressed, and the steps of the Pyramid Tomb (no. 15) were probably intended to be smoothly dressed as well. We have seen that Lydian builders prepared blocks for smoothly dressed walls in two different ways: by finishing the faces of the blocks in advance, except for raised bands or protective lips around the edges; or by leaving a protective surface or mantle—an extra centimeter or so of stone—intact over the whole face of the block. In both cases, the protective lips or mantle would eventually be trimmed away after construction.

Walls and other surfaces (especially ceilings) built out of blocks that were finished in advance except for their protective lips are most common in tumulus tombs, although this method of preparing blocks was also sometimes used in other types of structures, as shown by a wall base molding block from sector MMS (App. 1, no. A1a; Figs. 217–19). The final dressing of this type of masonry was largely limited to trimming away the protective lips after construction. Evidence for this method of preparing and finishing blocks includes protective lips that for some reason were never removed and flat-chisel marks crossing the joints between blocks where the protective lips were trimmed away.

Masons sometimes overlooked the job of removing protective lips in places where the lips would have been invisible in the finished structure—hidden by a funerary couch, for example—or in places where it was apparently very difficult to trim them away, especially between ceiling blocks and in reentrant angles such as the corners of a chamber or the angle between the tops of the walls and the ceiling. Protective lips between ceiling blocks and along the tops of the walls, forming in

the latter case a continuous raised border like a molding, are such common features that it may be incorrect, except in a technical sense, to call tombs where they are retained “unfinished.” It was probably standard practice to smooth off the walls of a tomb chamber before laying the ceiling blocks, because it would have been much harder for the masons to see what they were doing and to dispose of working debris after the ceiling was in place. The protective lips along the uppermost course of blocks were kept, however, because they were still necessary to protect the tops of the walls from damage when the ceiling blocks were lowered into place. But once the ceiling was finished, these lips became nearly invisible, and in many cases, masons clearly did not consider it worth the effort to trim them or the protective lips between ceiling blocks away.

The most complete record of the finishing processes used in this kind of masonry is the tumulus tomb chamber at Keskinler (BK71.1, no. 10), south of Sardis. The lower four courses of the walls of the chamber are neatly finished, except for protective lips between adjacent blocks in the bottom course of the side walls (see Fig. 118). On one side, these protective lips were hidden by the couch or kline still in situ when the tomb was discovered. The protective lips on the opposite wall suggest there might originally have been some other piece of furniture, such as an offering table, on this side of the chamber as well. The upper two courses of the chamber walls are more coarsely trimmed. Whereas in the lower courses, the chisel marks showing where the protective lips were trimmed away between blocks are always perpendicular to the joints, in the upper courses, these chisel marks are less regularly oriented. And while the protective lips in the corners of the bottom part of the chamber were all trimmed away, most of the protective lips in the corners of the upper part still remain (see Fig. 121). In addition, the protective lips of two adjacent blocks in the top course of one of the side walls have apparently been overlooked (see Fig. 118). The contrast between the treatment of the protective lips in the lower and upper parts of the chamber (together with other evidence, discussed in the catalogue entry) suggests that after building about two-thirds of the chamber, the masons stopped construction to finish off the faces of the blocks; the rest of the chamber is less carefully built, perhaps because of time constraints or because the original masons were replaced by another, less-skilled team.

In general, both at Keskinler and in other tombs, the protective lips along the tops of the walls are roughly cut except for the upper surfaces, which are neatly

beveled so that the angle between them and the ceiling is about 30 degrees. These bevels presumably made it easier for the masons to trim the protective lips away after the ceiling blocks had been set in place. The bevels would of course reduce the effectiveness of the protective lips but would not eliminate it completely; the thickened and blunted edges of the blocks would still be strengthened against the risk of chipping and spalling. The vertical protective lips in the corners of a chamber are usually beveled in a similar fashion. The upper two courses of the side walls of the tomb at Keskinler, for instance, abut the lintel; the blocks pushed up against the lintel retain their protective lips on the sides that adjoin the lintel, and these lips are beveled in such a way that the beveled surface meets the face of the lintel at about a 30-degree angle.

The protective lips between ceiling blocks also tend to be beveled at the joints but sometimes on only one side of a joint. In the Tomb of Alyattes, for example, the protective lip on the north side of every ceiling block is beveled, and that on the south side is left unbeveled. This suggests, if the bevels were cut in situ like the bevels in terrace walls (see above, “Joints,” and below, “The Purposes of Beveled Edges”), that the blocks were laid from south, the front of the chamber, to north, the back of the chamber. As one might expect, then, the lintel over the doorway was the first block of the ceiling to be laid. The bevels are cut back precisely as far as the finished plane of the underside of the ceiling. By beveling the edge of one of every pair of protective lips in this way, masons avoided having to prepare a fine joint between them, a labor-saving measure that would not affect the final appearance of the ceiling, since the protective lips were at least theoretically meant to be removed.

The protective lips on the lower parts of the risers of the Pyramid Tomb (discussed below; **no. 15**) are beveled in the same way as those between ceiling blocks, and presumably for the same reason. It is uncertain whether the protective lips between wall blocks were ever beveled in this way, but this may have been an “optional” measure, reserved for especially large and difficult blocks, such as ceiling blocks, or for especially fine monuments, such as the Pyramid Tomb.

The only tomb included in the catalogue that is entirely finished is the tumulus tomb BT62.4 (**no. 3**). The walls of the antechamber of this tomb reveal an interesting variation on conventional finishing processes. Tool marks suggest the blocks were laid with protective lips on the sides of the blocks only; the tops and bottoms of the blocks, presumably less susceptible to damage, were not protected. The faces are finely point dressed, rather than flat-chisel dressed, and the contrast

between the chiseled bands on the sides of the blocks (where the protective lips have been trimmed away) and the point dressing elsewhere gives the wall a rusticated look. The walls of the chamber proper were finished with abrasives, but some tool marks remain, showing that certain surfaces were prepared with a claw instead of a flat chisel; only the flat chisel was used to trim away the protective lips.

Protective lips are preserved at Sardis in the Tomb of Alyattes (**no. 1**) and T82.1 (**no. 12**), as well as in other Lydian tombs outside Sardis.⁵² The interior of the chamber in the tumulus of Alyattes is mostly finished. It is not clear how all the wall blocks were prepared, but there are protective lips along the tops of the walls as well as along the adjoining edges of the ceiling blocks (Figs. 26, 28, 32). The ceiling blocks of T82.1 are missing, but the protective lips along the tops of the walls remain. The nearby T77.1 (**no. 11**) is an anomaly. The walls of the chamber are smooth, but the bearing surfaces of the surviving blocks in the top course were not all finished (see Fig. 131), and there are no traces of protective lips on the top edges of these blocks. The grave goods found in the tomb show that it was used, and so must have been roofed, but it does not seem to have been properly finished.

The second method of producing a smoothly dressed masonry surface is found only in the Pyramid Tomb and a small number of tumulus tomb chambers (BK71.1 and possibly the Tomb of Alyattes). In this system, a layer of excess stone that functioned as a protective mantle was left on the face of each block during construction; then, after all the blocks of a wall or other surface were in place, the entire surface was trimmed back, thus removing the protective mantle at one go (see Fig. 12).

The tomb at Keskinler (BK71.1, **no. 10**) provides a good example of an unfinished floor prepared in this way. The surface of the floor is rough except for a smoothed band around the perimeter and smoothed patches under the legs of the kline. This kind of pavement would have been constructed in three steps. First, the blocks, still rough on top, were laid in place. Second, the bearing surfaces—such as the band around the perimeter—were finished in situ. The rest of the floor was left rough during the construction of the other parts of the tomb. Finally, when the rest of the tomb was finished, the floor would have been

52 McLauchlin, “Graves,” 26–27. See also the Tomb of Cyrus at Pasargadae, which has a protective lip running around the tops of the walls: Stronach, *Pasargadae*, 40 and pls. 36, 37; connections between Lydian and Persian architecture are discussed below, Ch. 5.

smoothed off, but this last step was never accomplished in the Keskinler tomb.

In this tomb, the two different methods of preparing a smoothly dressed surface were combined: one method for the walls and ceiling, the other for the floor. This combination of techniques may have been a common practice. The wall and ceiling blocks were finished in advance, except for protective lips around the edges, while the floor blocks, which were at greatest risk of damage during construction, were not finished until the rest of the tomb was complete. In other cases, however (e.g., the Pyramid Tomb, discussed below), the walls as well as the floor were supplied with a protective mantle. It is unclear why one method was used in some cases, another in others. It is possible that one method is earlier than the other (see below, Ch. 4); if, however, the two techniques were in use at the same time, the choice between them may have been determined by the funds available (the former method, in which the wall blocks were finished in advance, was presumably less expensive) and the quality of finish desired (the latter method presumably produced a finer surface).

One structure built entirely according to the latter method is the chamber of the Pyramid Tomb (Figs. 154, 158, 159). The floor is similar to the floor of the tomb at Keskinler, though somewhat more complex. In addition to the smoothed band around the perimeter, there are smoothed strips running both lengthwise and crosswise across the chamber. These strips served several purposes. They helped the masons who were trimming the smoothed bands around the perimeter to keep these bands in the same level plane; later on, they functioned as guides for the masons whose job it was to trim away the protective mantle.

Only two wall blocks survive, but they show that the walls were dressed in almost the same way as the floors: unfinished except for smoothed bands around the edges (i.e., the bottom and both sides; the tops of the walls may have been furnished with protective lips). The horizontal bands along the bottoms of the walls were finished before placement, both to facilitate lining up adjacent blocks and because it would have been difficult to trim the bottom of the wall in situ without damaging the surface of the floor. Because these bands were finished in advance, rather than trimmed after placement, they were probably furnished with protective lips on both sides of every (vertical) joint. The vertical bands along the right and left sides of the walls (i.e., in the corners of the chamber) were finished in advance for the same reasons (and also because every other block was bonded into one of the corners) and were supplied with similar protective lips on both sides of every (horizontal) joint.

These finished bands are sunken to a depth of about 0.01 m behind the plane of the protective mantle; after construction, the whole surface of the wall would have been dressed back to the plane of these bands.

The protective mantles of the wall blocks are much more neatly trimmed than those of the floor blocks, each one having a rusticated face with chisel-drafted margins and a point-dressed central panel. There are numerous, mutually complementary explanations for this, the most obvious being that the wall blocks, unlike the floor blocks, were all partially finished in advance.⁵³ Nevertheless, it is at first surprising that the builders would have dressed the protective mantles so carefully, if they were going to trim them away later on. This seems less surprising, however, when one remembers that the normal way of obtaining a plane surface was to draft the margins of that surface, then, if desired, to trim the center back to the plane of the margins. On the walls of the Pyramid Tomb, the builders clearly wanted to ensure that the protective mantle was of uniform thickness (i.e., they defined a plane parallel with the plane of the finished band along the bottom or side of the block), and it was for this reason that the margins of the protective mantles were drafted.

This type of dressing, in which blocks were first neatly rusticated and later smoothed off, is typical of Greek walls; a famous example is the masonry of the mid-fifth-century Propylaea of the Athenian Acropolis.⁵⁴ The walls of the forecourt and chamber of the Tomb of Alyattes, to judge by the unfinished masonry of the forecourt (Figs. 21–25, 27), may have been prepared in the same way.⁵⁵

53 This is analogous to the construction of a wall, in which the faces of the blocks are much more nearly finished in advance than the top beds.

54 See Orlandos, *Matériaux*, 73–75, figs. 67, 69.

55 Early Greek and Persian structures that raise some of the same questions as the Pyramid Tomb have been collected by Nylander, *Ionians*, 89–91, figs. 28, 29. They include the Archaic temple of Artemis at Ephesus, the Tall-i Takht at Pasargadae, and the foundations of the older Parthenon on the Athenian Acropolis: Penrose, *Athenian Architecture*, 18–20, pl. 9. The temple of Artemis is particularly interesting. Blocks identified by Hogarth (*Ephesus*, 256–58, pl. 11) as belonging to the south wall of the cella resemble the wall (and step) blocks of the Pyramid Tomb in three main ways: the rustication of an upper panel and the smooth dressing of a lower panel, the presence of protective lips framing the edges of the lower panel, and the beveling of the edges of the blocks. See also Bammer and Muss, *Artemision*. The dressing of the unfinished masonry of the sixth, seventh, and eighth courses of the face of the Tall-i Takht and of the parapet on top is similar: Stronach, *Pasargadae*, 13–15, pls. 6, 7. On the facade, the contrast between the smoothed band along the bottoms of the courses (interrupted by protective lips between blocks) and the rusticated panels of the faces would probably have been retained for decorative effect. It is more likely that the parapet was eventually meant to be smoothly dressed.

The stepped platform of the Pyramid Tomb was dressed in the same way as the chamber. Like the chamber, the steps are obviously unfinished, for the treads are only roughly dressed (like the floor of the chamber), except for a smoothed band along the back of each step and occasional strips running from the back of each step to the front (Figs. 151, 154, 156). The tops of the steps (i.e., the treads) were left rough during construction to protect them from damage.⁵⁶ The band along the back of each tread was finished, however, before the next step was laid in place, both to provide a proper resting surface for the step on top and because it would have been awkward to trim up against the riser of the next step after construction.

The dressing of the risers above foundation level (Figs. 152, 155, 156) is similar to that of the treads—and to the dressing of the chamber walls. There is a smoothed band running along the bottom of each riser, corresponding to the smoothed band that runs along the back of every tread; likewise, the upper part of every riser, like the front of a tread, retains its protective mantle, here, as in the wall blocks, carefully rusticated. Because the smoothed bands running along the bottoms of the blocks were apparently prepared in advance, protective lips were left on both sides of every joint. The protective lips are cut in the same vertical plane as the drafted margins of the protective mantle on the upper part of every riser, and the outer edges of the protective lips are beveled back to the plane of the smoothed bands. The close parallel with the wall blocks suggests that both the protective lips and the protective mantles would eventually have been trimmed away, leaving the risers as well as the treads absolutely flat.⁵⁷

The only other surviving flight of steps in Lydian architecture is that in front of Tomb 813. Both the risers

and the treads of these steps are smoothly dressed (Fig. 149), and horizontal chisel marks crossing every vertical joint show clearly that the masonry was trimmed after placement. It is possible that the preliminary dressing was the same as that of the steps of the Pyramid Tomb, but it is also possible that individual blocks were entirely finished in advance except for protective lips, which were later trimmed away in situ.⁵⁸

A final step in the finishing of smoothly dressed walls and other masonry surfaces was to rub them down with iron rasps and abrasives. This was probably a regular procedure, though frequently not bothered with. The marks of abrasives are hard to detect, but they are exceptionally well preserved in the soft limestone of Aktepe 1 at Güre near Uşak (see above, “Stonecutting Tools”). A less-common option was patching, also seen at Aktepe 1. Here, numerous chips and scars were excised by means of neat, squared cuttings, which were then filled with carefully fitted stone plugs. There is no evidence that these patches or plugs were ever clamped or fixed in any other way in the slots cut to receive them, although it is likely that they were glued in with some sort of fine mortar.⁵⁹

Smoothly dressed walls are found mostly in tombs, and a reconstruction of the basic construction and finishing sequence of a typical Lydian tomb chamber is now possible. First, the floor blocks were laid, still rough on top. Then the bearing surfaces for the walls and other interior features were smoothed off. Next, the walls were built and, after construction, smoothed off (with the removal of the protective lips or mantles, except for the protective lips running along the tops of the walls). This was followed by the laying of the ceiling blocks, in most cases probably finished in advance except for protective lips. The final step was the smoothing off of the floor, postponed until after the rest of the chamber was complete.

Plastered Walls

One final class of walls remains: walls of tomb chambers that are only roughly dressed, in some or all cases because they were meant to be coated with plaster. The five built chamber tombs of the Duman Tepe ridge (nos. 5–9) probably all belonged to this class, although it is hard to be sure, since they are now inaccessible. To judge from the photographs, the masonry of these

56 For Greek parallels, see Martin, *Manuel*, 191–93, figs. 77, 78, pl. 17:1. On steps in Greek architecture generally, see *ibid.*, 350–51.

57 It would, therefore, be a mistake to conclude that the upper parts of the risers of the steps were meant to be trimmed back only to the plane of the drafted margins; this problem is discussed at greater length in Ratté, “Pyramid Tomb.” Other unfinished examples of stepped monuments constructed in the same way are the A and B Staircases of the Tall-i Takht at Pasargadae: Stronach, *Pasargadae*, 15–20, pls. 8–14. Both staircases are flanked by walls on either side. The dressing of the step blocks that abut these side walls is especially revealing. In every case, the smoothed band along the bottom of the riser continues up the outer edge of the block (i.e., the edge that abuts the wall) and the tread is finished both along the back and along the side next to the wall. These finished areas show that both the risers (including the roughly dressed or rusticated upper parts of the blocks as well as the protective lips between adjacent blocks) and the treads were intended to be smoothly dressed. The flanking walls are also unfinished, except for smoothed bands in front of each riser and on top of each tread. These bands show that the side walls would also have been smoothly dressed in their finished state.

58 Bonna D. Wescoat (personal communication) has pointed out that the steps of the stylobate of the temple of Athena at Assos were laid with protective lips along the joints both on the risers and on the treads. See Clarke et al., *Assos*, 143, fig. 2.

59 On patches in Greek architecture, see Martin, *Manuel*, 302–4.

tombs is unusually coarse; the faces of the blocks are roughly point dressed all over, without even the finely chiseled bands of rusticated masonry; and the joints are correspondingly less crisp, for the most part, than in terrace walls or smoothly dressed tomb chambers. Most likely, the blocks were roughly squared off before placement, further reduced at the same time as they were fitted to neighboring blocks, and then barely, if at all, trimmed again after placement. In at least one case (BT66.1, **no. 5**), a plaster coating survives on the walls of the chamber (Fig. 96), suggesting that all these chambers may originally have been plastered. Tomb 89.11 (**no. 13**) is similar both in the presence of plaster on parts of the walls and in the dressing of the masonry where the plaster is not preserved.

THE PURPOSES OF BEVELED EDGES

An interesting and unusually well-preserved detail of Lydian masonry is the beveling of the edges of the blocks in terrace walls and also in some tomb chambers. This feature occurs in Greek masonry as well and is the subject of a fundamental article by A. Trevor Hodge.⁶⁰ The discussion that follows, which is heavily indebted to the preliminary observations of the excavator of Karniyarık Tepe, Crawford H. Greenewalt, Jr., builds on Hodge's treatment in the rich new light of the Lydian evidence.

The finished sections of the Karniyarık Tepe crepis wall show not only that the rustication of the blocks in this wall was intentional but also that the bevels in the edges of the blocks (usually the right or left edge of every block, as well as the bottom edge of the blocks in the middle course) were a permanent and not a temporary feature of the wall. In previous sections, we have seen how these bevels helped to protect the edges of blocks from chipping during placement, and perhaps also to make it easier for masons to set blocks properly in a wall. If the bevels were unnecessary once these functions had been carried out, the masons could have "erased" them after placement by trimming the whole face of every block back to or beyond the inner edges of the bevels. This practice is attested in Lydia by the Pyramid Tomb and in Greek architecture by unfinished sections of the Propylaea of the Athenian Acropolis.⁶¹ But many other Greek walls that seem to be finished as intended, such as the north wall of the Athenian Acropolis or the

fifth-century fortifications of Eleusis,⁶² resemble the Karniyarık Tepe crepis and other Lydian terrace walls in that the bevels in the edges of the blocks were never trimmed away and were apparently never meant to be. Why were bevels retained in these structures?

The simplest answer to this question is that it was not worth the effort to trim the bevels away. In an intact wall face, these bevels are nearly invisible.⁶³ The Lydian terrace at the Byzantine Fortress shows, however, how obvious the chipping of the edges of the blocks can be when they are not beveled. Thus, while the builders of the Karniyarık Tepe crepis and other structures may have thought it worthwhile to bevel the edges of the blocks to prevent unsightly chipping, they may not have considered the bevels noticeable enough to justify the very considerable expenditure of labor that would have been required to erase them once the blocks were in place.

There were also more positive reasons for retaining the bevels. Not only did they protect the edges of the blocks from damage during construction, but when they were retained in a finished structure, they also disguised any chipping that might have occurred, for most damage would have been confined to the nearly invisible inner edges of the bevels. Moreover, the bevels might have disguised imperfections in the trimming and alignment of the blocks. In other masonry traditions, as we have seen, mortar may be used to make up for irregularities in the shape of a block being joined to its neighbors.⁶⁴ Another advantage of mortar is that it enables masons to compensate for minor inaccuracies in the alignment of blocks, for the seams of mortar in a wall separate individual blocks from their neighbors so that no two adjacent or superimposed blocks ever actually make contact at the front. Thus, if two blocks are not precisely aligned, so that when pushed snugly together, the edge of the one would overlap the edge of the other, the mortar that separates them disguises the fact that they do not lie in exactly the same plane. This is true for bedding joints as well as rising joints.

In dry ashlar masonry, there was no such medium to keep adjacent blocks from touching. The difficulty of cutting and laying every block so precisely that there were no misaligned joints in a masonry face is one of the

62 Observations made in September 1987 and May 1988. See Wrede, *Attische Mauern*, pls. 32, 33 (north wall of the Acropolis), 37–39 (walls at Eleusis). Another group of Athenian walls composed of rusticated blocks with beveled edges is the fourth-century wall complex of the Kerameikos: see *ibid.*, pls. 49–51.

63 See Ginouvès and Martin (*Dictionnaire*, 135–36) on the important distinction between this kind of bevel and the more noticeable kind of bevel common in pulvinated Greek masonry.

64 Coulton, *Architects*, 49.

60 Hodge, "Bevelled Joints."

61 On the final dressing of the Pinakothekē, see Orlandos, *Matériaux*, 73–75, figs. 67, 69.

problems addressed in the walls of Lydian tombs by the system of laying the blocks with protective lips around the edges, then trimming these protective lips away in situ. The Egyptian and Greek practice of dressing the whole face of a wall in situ also evolved at least partly in response to this problem. Rather than trying to match up the edges of finished blocks, Egyptian and Greek masons would pay less attention during construction to aligning the faces of individual blocks than to dressing the joints, making sure that all the contact surfaces between blocks were flush at least to a certain plane, so that once every block in the wall had been laid, the face could be trimmed back in a single operation.⁶⁵

It is precisely because it was so difficult to build an absolutely plane wall face that bevels may have been used to maintain the alignment of a series of blocks during construction. But the bevels continued to have a beneficial effect in this respect after construction, similar to that of mortar between the joints. This is possibly another reason why the bevels were retained. It has also been suggested that the bevels were kept to draw attention to the joints by casting them in shadow, but this explanation is less satisfactory.⁶⁶ In the first place, these bevels are almost invisible (not only in the Karniyarık Tepe crepis, where they are not at present exposed to the sun, but also in terrace walls at Sardis), and in the second place, one would expect, if the purpose of the bevels was to draw attention to the joints, that both sides of every joint (i.e., both edges of the two adjoining blocks) would be beveled.⁶⁷ In rising joints in the Karniyarık Tepe crepis and similar Lydian and Greek walls, however, only one of the edges of any pair of adjoining blocks is ever beveled—always the first of the pair to be laid (i.e., the stationary as opposed to the new block). But for the purpose of disguising minor inaccuracies in the joints, it was sufficient that only one side be beveled; we have seen above that the same need to disguise imperfections in jointing may also partially explain the stepped profiles of Lydian terrace walls.

Thus, the bevels had several different functions, each independent of the other. First and probably most important, they protected the edges of the blocks from chipping and they made any chipping that did occur less

noticeable. Second, they may have been used by builders to maintain and check the alignment of the blocks in a wall. Third, when retained in the finished wall face (as in most Lydian terrace walls), the bevels disguised imperfections in the trimming and alignment of the faces of the blocks. Alternatively, after construction, masons sometimes trimmed the whole face of a wall back to the plane defined by the bevels (as was intended in the Pyramid Tomb); by trimming back to this plane rather than a deeper plane, they could avoid trimming the actual joints between blocks, which would always have entailed the risk of revealing an invisible flaw in the joint.⁶⁸ It is uncertain whether the bevel was originally designed to serve just one of these functions or several. Whatever their functions, the bevels also provide very useful incidental evidence for the construction process and the organization of labor.

ORGANIZATION OF LABOR: THE EVIDENCE OF BEVELS AND MASON'S MARKS ON THE KARNIYARIK TEPE CREPIS

In rising joints in Lydian terrace walls, only one of the adjoining edges of any pair of adjacent blocks is ever beveled. As already noted, the unfinished sections of the Karniyarık Tepe crepis show that the beveled edge is always that of the first block of the pair to be laid (i.e., the stationary as opposed to the new block).⁶⁹ Thus, these bevels record the directions in which the blocks were laid, and from that evidence, it is possible to reconstruct the approximate number of masons' teams working on the wall simultaneously and to measure the progress of each team in relation to the other teams. On the Karniyarık Tepe crepis wall, the evidence of the bevels is supplemented by the evidence of numerous mason's marks engraved in the faces of many of the blocks (see Figs. 44, 45).

The bevels on the Karniyarık Tepe crepis occur in runs, alternating between stretches of blocks all beveled on their right sides and stretches of blocks all beveled on their left sides (Fig. 46). Each run starts from a block beveled on both sides and continues until it meets either a block with no bevels or an unfinished portion of the wall. In other words, as Hodge has shown for Greek

65 This is also one of the problems addressed by the invention of anathyrosis, which does ensure that every joint is true to a certain predetermined plane.

66 This was Hanfmann's opinion regarding the Karniyarık Tepe crepis. On this technique in Greek architecture, see Martin, *Manuel*, 389.

67 One would also expect that the jointing would be more regular (e.g., so that the joints in every other course were aligned); but this does not ever seem to have been much of a concern to Lydian builders.

68 Greek masons, however, sometimes did trim the whole face of a wall back to a deeper plane than the one established by the bevels (e.g., in the Propylaea).

69 In most cases, only the right or left edge of a block is beveled. In the few cases where neither edge is beveled, the blocks on both sides are always beveled on the edges adjoining the block without bevels. In the few cases, conversely, where both of the vertical edges of a block are beveled, neither of the adjoining edges of the blocks on either side is beveled.

masonry,⁷⁰ the blocks were laid in stretches beginning with a block beveled on both sides. Subsequent blocks were laid in two distinct series on the right and left sides of this block; the beveling of a block on a particular side, therefore, shows the direction of laying, as blocks to the right of the initial block are beveled on their right sides, and blocks to the left, on their left sides. A series of blocks comes to an end either when it meets an independent series headed in the opposite direction, in which case a block with no bevels is inserted between the two series, or when, together with the building project as a whole, it is abandoned incomplete. In addition to the Karniyarık Tepe crepis, the limestone retaining walls on the Acropolis, the limestone and sandstone wall facings at sector MMS/N, and the Pyramid Tomb (Fig. 157) all preserve this type of beveling pattern. Similar patterns may occur on other monuments at Bin Tepe (BT63.2, no. 4) and the city site (Mound 2, no. 19), both of which are now inaccessible. As in Greek architecture, the evidence of the bevels is corroborated by the evidence of pry marks where they are visible.

The Karniyarık Tepe crepis wall, as exposed, is broken by two gaps into three sections: a western section, a central section, and an eastern section (see Fig. 44). Only the central section has been entirely exposed. The blocks of the bottom course of the central section are all beveled on their right sides. This section was thus laid as a single series beginning at the west end. The starting block is, exceptionally, not beveled on both sides, simply because there was no block immediately to the left of it. Only a short stretch of the face of the western section of the wall was uncovered, and only one rising joint in the bottom course was revealed. The block on the left side of this joint was beveled on its right side, showing that the bottom course of this section was laid from left to right, from some point farther around to the west, in the direction of the gap. The eastern stretch of the wall was also exposed for a short stretch only, and again only one rising joint in the bottom course was revealed. In this case, the right-hand block is beveled on its left side, showing that the bottom course of this section was laid from right to left, from some point farther around to the east, in the direction of the gap. Since in both the eastern and the western sections of the wall, the bottom course was laid in the direction of the central section, and since the central section makes up approximately one-third of the total circumference of the wall, it seems possible that the bottom course was laid in just these three sections and that the eastern and western sections were each laid in a single series of blocks, like the central

section, starting from the same point and working in opposite directions.

The bottom course was in one sense the most important course in the wall, for it defined the circuit of the crepis, and it established the first level surface at the base of the mound. This is perhaps the reason it may have been laid in only three long stretches. The middle and bolster courses, however, were apparently laid in much shorter stretches by many teams of masons working simultaneously, maybe even on both courses at once. Other details emphasize the differences between the bottom course and the upper two courses. In the bottom course, for instance, the dressing of the blocks is more uniform and generally finer than in the upper two courses, suggesting that the bottom course was both laid and finished in its entirety (including the leveling off of the top of the course [see above, "Joints"]) before work on the upper two courses began.

The positions of the bevels in the upper two courses are shown in Figure 46. There are four starting blocks (beveled on both sides, labeled 1–4) in the middle course and three stoppers (with no bevels, marked with Xs). It is remarkable that the endpoints of this section of wall were not used as starting points by the masons working on this course or on the bolster course. Instead, the workmen chose starting points about 22 blocks from the gap on the west side and about 10 blocks from the outcropping on the east side. The other two starting points are located between these outer points. The beveling pattern on the bolster course is similar to the pattern on the middle course. There are only three starting blocks in this course, but two of them are located directly on top of starting blocks in the middle course, and the third is located between the middle course's other two starting blocks. There are only two stoppers or, rather, places for stoppers, since both blocks are missing, but they are again located in close relation to the positions of their counterparts in the course below.

The diagram (Fig. 46) illustrates a possible reconstruction of the distribution of labor involved in building the wall. This reconstruction postulates six working teams (Teams A, C–G) that started simultaneously on the middle course; two pairs of teams worked in opposite directions away from each other at the two westerly starting points (points 1 and 2), while the remaining two teams worked from west to east starting at the two easterly starting points (points 3 and 4). A seventh team (Team B) began work on the bolster course at the same time. In the middle course, Team A started at point 1, working to the left. Teams C and D started at points 1 and 2, working toward each other. Team E started at point 2, like Team D, but worked in the

70 Hodge, "Bevelled Joints."

opposite direction. Team G started at point 4, working to the right in a somewhat idiosyncratic fashion: beginning with a starting block beveled on both sides, this team proceeded to lay both a single block to the left and a long series of blocks to the right. Meanwhile, Team F started work more or less midway between Teams E and G at point 3 and worked to the right. In the bolster course, Team B started at point 1, working to the left in the same way as Team A in the course below.

Team A had apparently just reached the end of the middle course (the westernmost block is unfinished on its left or west side; Fig. 55) when the crepis wall was abandoned. Team B had not yet finished its section of the bolster course. Teams C, D, and E, after completing their sections of the middle course, had returned to their respective starting points and begun to lay the bolster course. It is also possible that these teams worked on both courses simultaneously. Team F, which would have finished its section of the middle course before any other team, may then have been assigned to some other job, instead of starting on the bolster course. Team G, after laying the easternmost section of the middle course, had returned, like Teams C, D, and E, more or less to its starting point and begun to lay the bolster course in the same idiosyncratic way as before, beginning with one block on the left side of the starting block and continuing with a run of blocks on the right.

This reconstruction, from the point when work on the middle course was begun up until the abandonment of the project, would account for 23 1/2 blocks by Team A, 14 1/2 each by Teams B, C, and D, 19 1/2 by Team E, 7 by Team F, and 18 1/2 by Team G (including shared starters and stoppers as one-half block). Thus, roughly the same numbers of blocks were laid by Teams B, C, D, E, and G. Team F, as already suggested, may have begun work on some other project after finishing its section of the middle course. Team A, however, may have been able to lay more blocks than the other team, because, unlike teams that worked on the bolster course instead of or as well as on the middle course, this team did not have to level off the tops of any blocks.

The five different types of mason's marks engraved on the faces of many blocks in the Karniyarık Tepe crepis are also illustrated in Figure 46. Several patterns in the distribution of the marks are apparent.⁷¹ The mark  (Fig. 57) occurs only to the left of starting point 1 or

between points 3 and 4. Marks , , and  each occur only once,  next to one of the few blocks with no bevels, and  on the block immediately below it. The swastikas  (Fig. 58) occur in two pairs, one pair at the starting point of a stretch of wall, and one more or less at the end point of the same stretch. Unlike any of the other marks, the swastikas are picked out in red paint.

The  marks are difficult to understand, for they occur intermittently on the left side of starting point 1 but in a packed cluster between points 3 and 4. Most of these marks are carved in the central panels of the blocks, but some are carved in the drafted borders and must have been engraved in situ. Thus, they cannot all be quarrier's marks, and they are not obviously mason's marks. Roberto Gusmani has suggested that they are apotropaic signs of some kind, and this may be correct. The mark  occurs only once in isolation on the bottom course. It may be a quarrier's mark, for it is upside down, suggesting that it was carved before the block was set in place. Marks , , and  make sense as signs inscribed to guide the mason laying blocks in place or as symbols engraved by the masons themselves to mark the completion of an allotted task. Mark  is engraved on the bottom course midway between points 1 and 2 to mark the place where Teams C and D, working on the course above, were expected to meet, the implication being that these teams of masons were assigned stretches of wall as units of piecework. Mark , engraved on the middle course, would serve the same purpose as  but this time for the bolster course. Mark , always engraved in the borders of the blocks, is unique to the right half of the stretch of the wall between starting points 1 and 2; it would seem to be the trademark of the team responsible for this section, in this case Team D. As such, it would be an identifying characteristic analogous to the way of laying blocks peculiar to Team G. Marks  and  might also have been engraved by the finicky masons of Team D.

This reconstruction is proposed only as an example of the kind of pattern that can be inferred from the evidence of the Karniyarık Tepe crepis; any reasonable solution will have to resemble this one in that it must postulate the existence of several different teams of masons working simultaneously. A team of masons might be as small as two men, responsible for the trimming and joining of blocks already more or less in place, in which case all five or six pairs of masons might have been served by a single auxiliary team of three or four men responsible for moving blocks into position. But if a force of more than 10 men was required to address only the tasks most demanding of skill on this

71 On mason's marks, generally, see Martin, *Manuel*, 221–31; Orlandos, *Matériaux*, 84–87. On Lydian mason's marks in particular, see Gusmani, “Steinmetzmarken”; Boardman, “Seals and Signs.” On Persian mason's marks on the Tall-i Takht at Pasargadae, see Stronach, *Pasargadae*, 21–22. Here, as on Karniyarık Tepe, the marks help make it possible to distinguish between working teams.

one section of the crepis, encompassing roughly one-third of the total circumference, then the labor force involved in the construction of the tumulus as a whole must have been very considerable; for it would have had to include not only masons but also workmen laying the rubble packing wall behind the ashlar face and heaping up the earthen fill of the tumulus.

ASHLAR MASONRY IN LYDIAN ARCHITECTURE

On most Lydian construction projects, the stonecutters, quarriers, carters, and haulers involved in ashlar masonry composed only a small part of a workforce made up largely of diggers, bricklayers, and rubble-wall builders. Ashlar masonry seems to have been a specialized technique of construction, used only for a few specific purposes and always in conjunction with other building methods.

Every Lydian tumulus tomb chamber known is built of squared blocks, as are all the known crepis walls. Thus, ashlar masonry was a standard feature of Lydian tumulus tombs. Otherwise, its appearance in Lydian tomb architecture is exceptional. The flight of steps in front of Tomb 813 is the only known instance of ashlar masonry construction associated with a Lydian rock-cut tomb, and the Pyramid Tomb is, as we see below, in Chapter 4, an example of a building type that only appears in Anatolia as a consequence of the Persian invasion.

In the nonsepulchral architecture of Sardis, there are no known building types that, like Lydian tumulus tomb chambers and crepis walls, are normally built of ashlar masonry. Instead, ashlar masonry seems to be used only for the more prominent parts of structures built largely of other materials or for the more important examples of building types that are sometimes built of rubble masonry. The one exception is the Lydian

Altar, which, like the Pyramid Tomb, is probably not an indigenous building type and postdates the Persian invasion (see below, Ch. 5). The Lydian fortification at sector MMS is composed largely of earthworks, mudbrick, and “megalithic” rubble masonry; only the structures associated with the gateway, a focal point in the Lydian defenses, are built of squared blocks. The ashlar masonry at Mound 2 is probably associated with the Lydian fortifications of Sardis, but very little of that structure has been exposed. Terraces and platforms are examples of building types that are sometimes faced with “megalithic” rubble masonry, sometimes with ashlar masonry. Although the earliest examples of the former are earlier than the earliest examples of the latter, the major reason for building an ashlar terrace in one place and a rubble terrace in another was probably the relative importance of the monuments supported by them.

As represented by the excavated monuments, ashlar masonry in Lydia is found only in the specialized context of tomb architecture, and in terraces, platforms, and fortifications. It is largely a technique of facing structures composed of earth, rubble, or mudbrick—in most cases substructures. Even tomb chambers are like substructures, for they are essentially stone-lined open spaces, similar to basements, within solid mounds of earth. In freestanding structures, with the partial exception of the Pyramid Tomb, the ashlar masonry itself is never freestanding but always applied to a solid mass, and there are no known structures built entirely of squared blocks. In these respects, Lydian masonry is comparable to stone masonry in many vernacular architectural traditions, where stone is used for the foundations of structures built largely of mudbrick or wood, and is thus more like Near Eastern than Egyptian or Greek masonry.

Chapter Four

CHRONOLOGY

The chronology of Lydian masonry depends principally on historical and archaeological data, already introduced in the first chapter of this study, and on specific architectural techniques, such as the development of clamp types and joining methods (especially anathyrosis) and the introduction of the claw chisel. The use of these technical criteria as dating evidence depends on the assumption that the Lydian mason's craft developed in a reasonably consistent and coherent fashion. This assumption seems fair in the main, although only with the important proviso that changes in Lydian masonry practice must always have been gradual, so that certain masons may have taken much longer to adopt a new technique than others, for example. A third possible form of dating evidence is the type of limestone used in certain monuments, if Michael Ramage is correct in suggesting that structures built out of stone from the same quarry are roughly contemporary (see above, Ch. 2).

TECHNICAL DATING CRITERIA

Greek and Near Eastern parallels suggest that of the clamp types occurring in Lydian masonry, the plain butterfly is the earlier type; the combination butterfly and staple followed; the plain staple, not found in the monuments examined in this study, is later still.¹ This relative sequence is generally consistent with historical and other independent evidence for the chronology of Lydian architecture. At Sardis, plain butterfly clamps

occur in the Tomb of Alyattes (no. 1; Figs. 30, 31), in the Lydian terrace (no. 17; Fig. 191), in blocks reused in the gate at MMS/N (no. 18; Fig. 205), and in displaced blocks from the MMS complex (including wall base moldings [App. 1, no. A1a; Figs. 217–19; App. 1, no. A1b; Figs. 220, 221] and a single wall block); all—the Tomb of Alyattes, MMS/N, and the Lydian terrace at the Byzantine Fortress certainly, and the blocks from the MMS complex probably—belong to the first half of the sixth century.² The known examples of combination butterfly and staple clamps, however, may all postdate the Persian invasion. The earliest monument where plain staple clamps occur, the altar in the precinct of Artemis, may be as late as the fifth or fourth century (see Appendix 3).

The number of Lydian monuments in which clamps are found is small, and it is uncertain what chronological significance should be attached to the presence or absence of clamps in otherwise similar structures. The plain butterfly clamp, in particular, may have been an optional feature. After the introduction of the more effective butterfly and staple clamp, however, the use of clamps seems to have become the norm in fine tomb architecture. If this were indeed the case, then the use of combination butterfly and staple clamps would indicate a later date than either the absence of clamps or the use of plain butterfly clamps—even if the latter two criteria are not chronologically diagnostic with respect to each other. Clamps were not used in the preserved portions

¹ See above, Ch. 3, n. 42, for references.

² A plain butterfly clamp in Aktepe 1 at Güre is exceptionally late (late sixth century).

of most Lydian terrace walls (although they apparently were used in the buildings supported by the terraces, as at ByzFort); nor were they used in stepped monuments such as Tomb 813 (no. 14) and the Pyramid Tomb (no. 15). Thus, the absence of clamps in terrace walls and stepped monuments is probably not a chronological indicator.

The introduction of anathyrosis and, above all, the use of the claw chisel are potentially more useful criteria for dating Lydian architecture. Both techniques were apparently invented in Greece and both became standard procedures soon after their introduction.³ Achaemenid Persia provides a model for the adoption of these techniques in another culture; in Persia as in Greece, both techniques became common soon after their introduction.

Anathyrosis appears in Greece in the seventh century; in Persia, it is a standard feature of the monuments of Pasargadae, including the Tomb of Cyrus and other structures that should precede Cyrus's death ca. 530.⁴ In Lydia, true anathyrosis is found only in the stylobate on top of the Lydian terrace at the Byzantine Fortress and in a few tomb chambers (BT62.4 [no. 3], BT66.4 [no. 8], T77.1 [no. 11], T82.1 [no. 12]). It is not present in any of the other civic structures at Sardis or in the Tomb of Alyattes. These latter monuments exhibit a kind of partial anathyrosis, as we have seen; although the basic principle of anathyrosis was clearly understood, it was not applied consistently or systematically. If the technique of anathyrosis did eventually become standardized in Lydia as it did in Greece and Persia, then the presence of partial anathyrosis, in which the contact bands at the fronts of the joints are of variable width and the centers of the joining faces are roughly dressed but not recessed as opposed to true anathyrosis, might be an indicator of earlier date. The stylobate at the Byzantine Fortress shows that anathyrosis was known in Lydia in the first half of the sixth century, but its absence from at least one tomb independently dated to after the Persian invasion (BK71.1, no. 10; based on the evidence of Achaemenid bowls found in the fill of the dromos) suggests that it may not have become standard until

3 For the view that the claw chisel was introduced into Greece from Egypt, see Palagia and Bianchi, "Claw Chisel." Evidence for the use of the claw chisel is found in Egypt in monuments dated to the mid-seventh century, and it is indeed possible that the tool as used in Greece is of Egyptian origin. But there is a 100-year gap between its attestation in Egypt and the earliest evidence for its use in Greece. Thus, it also seems possible that it was independently invented in Greece at this time.

4 The excavators have identified "edge anathyrosis" in the early (first half of the seventh century) temple of Poseidon at Isthmia; see Gebhard and Hemans, "Isthmia, 1989." On anathyrosis in Persia, see Nylander, *Ionians*, 58–62.

later.⁵ The role of Lydia in the development of Persian masonry is examined in the last chapter of this study.

The claw chisel was first used in Greek sculpture sometime before the mid-sixth century.⁶ Carl Nylander has shown that it does not appear in the architecture of Ionia until the second half of the sixth century, but that after that, its use is general.⁷ In Persia, the claw chisel was not used in the initial construction of the monuments at Pasargadae, and its use does not become widespread until the end of the sixth century.⁸ In Lydia, the claw chisel appears in sculpture as early as 560–550 B.C.⁹ In architecture, its first and only recorded appearance among the monuments studied here is at BT62.4 (no. 3), but it is found in other tombs (not excavated by the Sardis Expedition) at Bin Tepe and elsewhere in Lydia,¹⁰ and it may have been used on monuments that the writer was unable to examine, such as BT63.2 (no. 4) and the Duman Tepe tombs (nos. 5–9). The latest securely datable monument on which the claw chisel was not used is Tomb 813 (no. 14), dated to the early fifth century.¹¹

CHRONOLOGICAL SURVEY

A tentative chronology of the Lydian monuments is suggested in the Chronological Table (p. 116). As the table indicates, tombs and civic structures may be arranged in more or less independent sequences, with the exception of the Karniyarik Tepe crepis, which is closer in technique to the masonry of terrace walls than to that of tomb chambers.

The earliest datable Lydian masonry tomb is the chamber discovered by Spiegelthal in the tumulus of Alyattes (no. 1). Alyattes died ca. 560, and the pottery and other objects found inside the tomb are consistent with this date. This evidence suggests that the construction of the tomb chamber—which would have been one of

5 On the introduction of the Achaemenid bowl form to Sardis, see Dusinger, "Achaemenid Bowls," 76–78.

6 For a recent review of its possible use on the Athenian acropolis, see Kissas, *Archaische Architektur*, 100–104.

7 Nylander, *Ionians*, 53–56; idem, "Toothed Chisel." For much earlier use of a "serrated tool" at Gordion, see Sams, "Sculpted Orthostates."

8 Stronach, *Pasargadae*, 99–100.

9 Hanfmann and Ramage, *Sculpture* (Sardis R2), 7–9.

10 These include Aktepe 1 near Güre and the crepis of a tumulus near Köprübaşı.

11 The contents are dated to the first quarter of the fifth century, but the masonry of the tomb may be slightly earlier. See Hanfmann and Ramage, *Sculpture* (Sardis R2), 75; Greenewalt et al., "Campaign of 1984," 37.

the first parts built of this enormous monument—took place during the lifetime or shortly after the death of the king. It is conceivable that the tomb chamber is significantly earlier than 560, but the unfinished details of the masonry (surviving protective lips, rusticated blocks of the forecourt) would argue against this. The Tomb of Alyattes is crucial to establishing the chronological significance of the technical details of its masonry, such as the plain butterfly clamp and the absence of both true anathyrosis and use of the claw chisel.

The chamber in the tumulus of Alyattes is also the only Lydian tomb chamber known that must, if correctly identified and dated, precede the fall of Croesus. BT63.2 (no. 4), which contained four nearly restorable vessels, all datable to the sixth century, could also predate the Persian invasion. It does not, that is, contain vessel types such as Achaemenid bowls that clearly postdate the invasion; conversely, the pottery found inside the tomb does not contradict a later sixth-century date. In any case, since this tomb was reburied after excavation, further examination of technical details that might enable more precise dating is not currently possible. The other tombs included in this study all probably postdate the conquest of Lydia.

The contents of BK71.1 (no. 10), as already noted, date this tomb to the second half of the sixth century (Figs. 123, 124). The Pyramid Tomb (no. 15) is probably contemporary, apparently a product of the “Graeco-Persian” movement, and as such should postdate the Persian invasion.¹² The pottery found in the excavation of the tomb, both stratified (fragments of a streaky-glazed skyphos) and unstratified (fragments of Achaemenid bowls), is at least consistent with a date in the second half of the sixth century (Fig. 161). Neither BK71.1 nor the Pyramid Tomb exhibits clamps, anathyrosis, or claw-chisel marks.

There is no independent evidence for the date of Tomb 82.1 (no. 12), but if the presence of anathyrosis in a tomb chamber does indicate that it is later than similar monuments without anathyrosis joints, then this tomb, in other respects similar to BK71.1, should be later in date. Tomb 77.1 (no. 11) is another tomb in which anathyrosis is present but claw-chisel marks are absent. The pottery found beneath the floors of the chamber and dromos of this tomb is not precisely datable (Figs. 132–38), but the use of clamps in the walls of the tomb may indicate that it is later than Tomb 82.1, where clamps are not used. The clamps in Tomb 77.1 are combination butterfly and

staple clamps and may be among the earliest known examples of this type in Lydia.

Tomb 813 (no. 14) is more securely dated, as noted, by the style of its stelae and its rich assemblage of finds, to the early fifth century.¹³ The blocks (at least of the top step) were not clamped, but this may be due to the unusual form of the monument—a flight of steps—rather than to its date. The joining surfaces of the step blocks are not visible, and it is uncertain whether or not anathyrosis is present. Claw-chisel marks on BT62.4 (no. 3) suggest this tomb is later than all the preceding tombs (Fig. 83); in addition to claw-chisel marks, BT62.4 exhibits butterfly and staple clamps between the floor blocks and true anathyrosis joints.¹⁴

Since the Duman Tepe tombs, like BT63.2 (no. 4), are currently inaccessible, they are harder to date by architectural criteria, and toolmarks are not consistently recorded. For dating purposes, the only useful find from the excavations of BT66.1 (no. 5) is the foot of a cup found in a construction layer on top of the ceiling of the dromos (Figs. 99, 100). This fragment may be as early as the late sixth century or as late as the fourth century. BT66.2 (no. 6) yielded more finds, although from less useful contexts (Figs. 103–5). A largely complete jug may have been a grave offering; it is not, unfortunately, diagnostic. The other finds include an Achaemenid bowl, indicating a date between the mid-sixth and fourth centuries, and a neck fragment of a lekythos, possibly Attic, which may be more closely datable to the late sixth or early fifth century. The proximity of BT66.1 to BT66.2 might suggest that the two tombs are contemporary; they are also similar in terms of construction technique, and the chambers of both are approximately equal in size.

There is no independent evidence for the date of BT66.3 (no. 7), but the destruction of the tomb has revealed the tops of the surviving wall blocks, showing that clamps were not used. This tomb is cruder than most, however, and the absence of clamps may not be significant. The finds from BT66.4 (no. 8) are consistent with the finds from BT66.1 and 66.2 (Figs. 112, 113). Combination butterfly and staple clamps were used in this tomb, and anathyrosis is also present; in photographs, the tomb seems most comparable to T77.1 (no. 11). The finds from BT66.6 (no. 9) are also consistent with the finds from BT66.1 and BT66.2 (Figs. 116, 117). All the Duman Tepe tombs, therefore,

13 Ratté, “Anthemion Stelae.”

12 Ratté, “Pyramid Tomb.” See also Kleiss, “Pyramid Tomb”; Boardman, *Persia and the West*, 53–55. For another unusual, early Graeco-Persian tomb (also discussed by Boardman), see Cahill, “Taş Kule.”

14 Other Lydian tombs with clamps between floor blocks include İkiztepe near Güre (McLauchlin, “Graves,” 266–67) and a triple-chamber tomb near Kestelli Köyü at Bin Tepe (McLauchlin, “Graves,” 191–92).

may be roughly contemporary. None is necessarily later than the late sixth or early fifth century, and the tombs may make up a family group spanning no more than perhaps a couple of generations.

T89.11 (no. 13) on the west side of the Pactolus River near Sardis contained an interesting assemblage of Hellenistic vessels, but these probably represent a secondary reuse (T77.1 was reused in the Hellenistic period; BT66.1, in the Roman and Byzantine periods). The tomb is, in terms of construction technique, most similar to the Duman Tepe tombs; its pitched ceiling is a major difference and may be a sign of later date. Thus, this tomb could be as early as the fifth or early sixth century, or as late as the third century.

The most securely dated example of ashlar masonry in Lydian civic architecture is the limestone- and sandstone-faced gate in sector MMS/N (no. 18). The limestone masonry is dated by construction and destruction layers to between 590 and 547, and the sandstone masonry is either contemporary with or earlier than the limestone masonry. The notable similarity between the masonry of this structure and the masonry of the Lydian terraces on the Acropolis (no. 16) and of the structure at Mound 2 (no. 19) may indicate that all three monuments are contemporary. The rarity of clamps in these structures may be a consequence of the building type rather than a chronological indicator;¹⁵ all three structures apparently predate the introduction or at least the general adoption of both anathyrosis and the claw chisel. The independent archaeological evidence for the upper limestone wall on the Acropolis is consistent with a date in the middle of the first half of the sixth century.

The Karniyarık Tepe crepis wall (no. 2) is also technically similar to the masonry at sectors MMS/N, AcN, and Mound 2 at the city site. The historical arguments and the archaeological evidence that indicate a date in the first half of the sixth century for this structure are discussed above, in Chapter 1. The similarities between the limestone from Karniyarık Tepe and the stone used in the Lydian walls at sectors AcN and MMS/N may further indicate that these three monuments are all contemporary.

The technical differences between these monuments and the Lydian terrace at the Byzantine Fortress (no. 17), with its putlog holes and shifting cuttings, are intriguing. The archaeological evidence establishes a terminus post quem of 560 for the latter structure, and it is possible

that the unusual features of this terrace represent an influx of new architectural techniques in the last years of Lydian independence. It is also conceivable that this and other structures were built by or under Persian satraps rather than Lydian kings. Xenophon's story of the pride of Cyrus the Younger in his Lydian gardens shows that the Persians had begun to make their mark on the landscape of Sardis at least by the late fifth century;¹⁶ a structure such as the Lydian terrace at the Byzantine Fortress may even have been financed by a local grandee such as the famous early fifth-century historical figure Pythius.¹⁷ Nevertheless, this structure need not, on archaeological grounds, be later than the mid-sixth century, and it is architecturally similar to earlier buildings, as we have seen. Even if monuments such as the Lydian terrace at the Byzantine Fortress were built by the Persians, however, they probably would have been built in the local tradition, for grand terraces and platforms of this type were alien to Persian architecture before the second half of the sixth century. Chapter 5 of this volume considers the hypothesis that this building type was actually introduced to Persia from Lydia.

CONCLUSIONS

Limestone from Bin Tepe is the most common building material in Lydian monumental architecture, and Bin Tepe may have been the site of Lydia's first experiments with ashlar masonry. The earliest datable example of ashlar masonry at Bin Tepe is the Tomb of Alyattes, probably built shortly before ca. 560. Across the Hermus plain at the city site of Sardis, the earliest datable ashlar masonry structure is the gate at sector MMS/N (no. 18), built between 590 and 547. This structure is apparently an extension of the Lydian defense work at sector MMS. Although the date of the initial construction of this defense work is uncertain, it probably falls within the reign of Alyattes.¹⁸ That Alyattes would be responsible for such a project is entirely consistent with the impression given by historical sources of his imperial ambitions. Not only the ashlar masonry structures at sector MMS/N but also the terraces or towers on the Acropolis and at Mound 2 may belong to a larger building program, including the fortifications, initiated by Alyattes toward the end of his reign. Croesus, after becoming king, might have carried on his father's program, completing

16 Xen. *Oec.* 4.20–24, quoted in Pedley, *Literary Sources* (Sardis M2), 80, no. 289.

17 Hdt. 7.27–28; Plut. *Mor.* 262D–63C.

18 Greenewalt, "Campaign of 1977," 25; Greenewalt et al., "Campaign of 1978," 19–20; Cahill and Kroll, "Coin Finds," 591.

15 Plain butterfly clamp cuttings are preserved, however, on a number of blocks from Sectors MMS and MMS/N, which may have belonged to the city gate. These include limestone wall base moldings (App. 1, nos. A1a, A1b) and a single rusticated wall block.

unfinished structures and starting new buildings such as the Lydian terrace at the Byzantine Fortress (see below, Ch. 5, on Alyattes's and Croesus's building programs in East Greece, especially at Ephesus).

Thus, ashlar masonry as a component of Lydian architecture was possibly introduced in the tomb architecture of Bin Tepe, perhaps even with the Tomb of Alyattes itself, then transferred to Alyattes's and later Croesus's building programs at the city site of Sardis. With the Persian conquest, the construction of unusually large tumuli at Bin Tepe and monumental public works at the city site abruptly stopped.¹⁹ The ashlar masonry tradition was maintained, however,

¹⁹ There is no good dating evidence for Kır Mutaf Tepe, the third of the three great tumuli at Bin Tepe. But since the other two such mounds, the Tomb of Alyattes and Karnıyarık Tepe, seem to predate the Persian invasion, and since these three tombs form a distinct group separate from all the other mounds at Bin Tepe, I would argue that Kır Mutaf Tepe too should date to the first half of the sixth century.

with the construction of numerous smaller tombs—at Bin Tepe, at Sardis itself, and throughout Lydia. Most and possibly all of these tombs postdate the Persian conquest. This may be due to an accident of preservation, but it is also possible that before the fall of Croesus, skilled stonemasons were allowed or available to work only on royally sponsored building projects. Under Persian rule, the Lydian building tradition lasted at least until the early fifth century, but by the end of the Classical period, if not well before, it like many other local traditions had faded away.

Implicit in this timeline is the assumption that fine ashlar masonry was introduced to Lydia from some other source. The marble and limestone chamber in the Tomb of Alyattes, in particular, is a sophisticated structure, and there is no evidence for the development of fine stone masonry in Lydia before the construction of this tomb. Possible sources of influence on Lydian architecture are considered in the next chapter.

Chapter Five
HISTORY OF THE LYDIAN BUILDING TRADITION

This chapter is divided into two parts, the first dealing with the origins and early development of the Lydian building tradition, the second focusing on the later development and heritage of this tradition during and after Persian rule.¹

ORIGINS AND EARLY DEVELOPMENT

The history of the Lydian building tradition begins with the earliest and most closely datable monumental structures at Sardis: the Tomb of Alyattes (no. 1; before ca. 560 B.C.) and the Lydian city gate (no. 18; between ca. 590 and ca. 547).² To understand the origins of this tradition, we must examine the architectural predecessors of these two monuments, the cultural institutions that lie behind them, and the historical circumstances of their erection. It is useful to begin by considering two different strands of development separately, namely, building typology and building technology. Building typology concerns the appearance in Lydian architecture of the building types in which ashlar masonry is used and the actual use of ashlar masonry in these types of buildings. Building technology, however, refers to the invention or adoption of the specific techniques

of stonecutting and construction that characterize the Lydian tradition.

Typological Forerunners

Anatolia supplies the closest parallels for the building forms in which ashlar masonry occurs in Lydia, although not for the use of ashlar masonry in these structures; interesting examples of ashlar masonry in comparable buildings are found in Cyprus, Syria-Palestine, and Mesopotamia. The Tomb of Alyattes is not only the earliest datable example of ashlar masonry in Lydia; it is also the earliest datable Lydian tumulus tomb. Little is known of Lydian burial customs before the sixth century.³ Of the more than 1,100 rock-cut chambers explored by H. C. Butler in the Pactolus valley, most had been looted, and although some probably belonged to the seventh and earlier sixth centuries, the artifacts recovered all date to the late sixth century or later.⁴

Both the tumulus tomb and the rock-cut chamber tomb do, however, have long histories in Anatolia preceding their appearance in Lydia. Phrygia in particular provides an instructive model for the appearance of unusually large and elaborate tumuli in conjunction with the rise of a local principality to

1 Both subjects have previously been discussed in detail by John Boardman; see Boardman, *Persia and the West*, especially 20–44. See also Ratté, “Lydian Contributions.”

2 Spolia such as the marble architectural blocks reused in the early foundation at the Byzantine Fortress, while they show that the Tomb of Alyattes and the Lydian city gate are not the earliest stone monuments at Sardis, do not provide conclusive evidence for the masonry construction techniques that are the principal focus of this study.

3 The following discussion owes much to McLauchlin, “Graves,” especially 158–61. See also Fedak, *Monumental Tombs*, 29–64; Roosevelt, “Settlement,” especially 120–200; idem, *Lydia*, 135–83.

4 The main features of the layout of these tombs as well as particular details, such as the shapes of the door stones, are similar to those of the tumulus tomb chambers discussed in this study. McLauchlin, “Graves,” 54–66; Butler, *Sardis* I:1, 158–65.

prominence. The tumulus cemetery at Gordion is the second largest in Anatolia after Bin Tepe, and the earliest Phrygian tumuli predate the Tomb of Alyattes by as many as three centuries.⁵ Rock-cut chamber tombs occur alongside tumulus tombs as a more common form of burial in Phrygia and many other areas of Anatolia.

The origins of Phrygian tumuli are uncertain; they are directly related to the tumuli of prehistoric and Iron Age Thrace and perhaps indirectly related both to Greek tumuli of the Mycenaean era and to Macedonian tumuli of the Archaic and later periods.⁶ Later Anatolian parallels include the tumuli of the Hellenistic kingdoms of Pergamon and Commagene.⁷ A cultural element common to most of these examples is the institution of kingship, and this core institution probably also lies behind the early development of the tumulus tomb in Lydia, as well as many other aspects of the new Lydian building tradition.

Phrygian tumuli differ from Lydian tumuli in important respects, however; they do not have crepis walls, and their tomb chambers are mostly made of wood, not stone. Barbara K. McLauchlin has shown that Lydian (and other Anatolian) burial customs are indebted in a general way to the heritage of the Near East, as demonstrated, for example, by the wording of Lydian funerary inscriptions.⁸ The Near East also supplies interesting Iron Age parallels for tomb chambers built of ashlar masonry.

Of special note are the early Archaic tumuli and built chamber tombs of Cyprus, associated with the rise of local principalities at Salamis, Tamassos, and other places.⁹ The earliest of these tombs date to the late eighth or early seventh century. They have masonry chambers built out of large squared limestone or sandstone blocks, with flat or pitched ceilings, approached by stone-walled dromoi. The masonry of the tomb chambers is sometimes smoothly dressed,

sometimes rusticated (Fig. 273). Of special interest (and unparalleled in Lydia) are Aeolic pilaster capitals flanking the entrance to two of the sixth-century “royal” tombs at Tamassos (Fig. 274). Other Iron Age built tomb chambers in the Near East are found in Syria and Urartu, and in the seventh and sixth centuries, in the Phoenician colony of Carthage.¹⁰

Despite the striking parallels between Lydian and Cypriote tumulus tombs, it is still possible that the Lydian tomb chamber was a local innovation, without direct antecedents apart from the traditional example of an open space inside a tumulus and the traditional shape of a rock-cut tomb. The chamber in the tumulus of Alyattes is a simple, generic solution to the problem of building a stone room within a mound of earth, and it may have been devised by masons who had no prior experience in building this precise type of structure. As for the ashlar masonry crepis wall (more closely related, in terms of both construction technique and building type, to terrace walls than to tomb chambers), this too, at least insofar as it appears in Lydia, may have been a local innovation.

The earliest datable examples of ashlar masonry in nonsepulchral Lydian architecture are the limestone and sandstone walls that flanked the gateway in the Lydian fortification at sector MMS/N. The ninth-century defenses of Gordion are analogous to the fortification as a whole, including a mudbrick circuit and a massive stone gate.¹¹ The stone masonry flanking the gate is built out of relatively small, loosely fitted blocks, however, and the only good contemporary typological parallels for the use of ashlar masonry in such a structure are much farther east. In Assyria, for example, limestone ashlar masonry is used in the late eighth and seventh centuries as a facing for towers at Assur, Nimrud, and Nineveh (Fig. 275).¹² Here, as at Sardis, the fortifications

5 On the chronology of Gordion, see DeVries et al., “New Dates.”

6 Young, *Three Great Early Tumuli*, 269–72; Muscarella, “Phrygian or Lydian?”; idem, “Iron Age Background.” Generally, see McLauchlin, “Graves,” 86–97, 100–108. On Macedonian tumuli, see Andronicos, *Vergina*, 25–30.

7 On Anatolian tumuli generally, see Mellink, “Nemrud Dag”; idem, in Özgen and Öztürk, *Lydian Treasure*, 31–35; Roosevelt, “Settlement,” 122–26; Rose et al., “Granicus,” 72–74. On tumuli at Pergamon, see Radt, *Pergamon*, 296–99.

8 McLauchlin, “Graves,” 290–317.

9 On Cypriote architecture and masonry in general, see Wright, *Cyprus*, 519–23. On Iron Age Cypriote tombs in general, see Gjerstad, *SCE IV:2*, 33–42, 239; Westholm, “Built Tombs in Cyprus.” On Salamis, see Karageorghis, *Salamis I*, 121–24; idem, “Relations.” On Tamassos, see Buchholz, “Tamassos, 1970–72,” 322–37; idem, “Tamassos, 1973,” 578–89; idem, *Tamassos*, 34–41; Betancourt, *Aeolic Style*, 47–48; Walcher, *Tamassos*.

10 McLauchlin, “Graves,” 158–61. On Syria, see Stucky, *Ras Shamra*, 19–26. On Urartu, see Forbes, *Urartian Architecture*, 108–13; Özgüç, *Altintepe II*, 10–27, 65–72. On Carthage, see Benichou-Safar, *Tombs puniques*, 135–70, 355–71; see also Gauckler, *Necropoles puniques*, pls. 3–9, 16, 113; Cintas, *Manuel*, 266–84. The Carthaginian tombs are a cross between built tombs and stone-lined shaft tombs, a tomb type widespread in Cyprus and the Levant.

11 Young, *Gordion*, 23–26 (Phrygian gate), 42–44 (Küçük Höyük, probably built during the era of Lydian domination). On stone architecture at Gordion, see Young, “Phrygian Construction”; idem, “Phrygian Construction II.” See now also Sams, “Sculpted Orthostates”; idem, “Early Phrygian Architecture.”

12 On Assur, see Andrae, *Festungswerke*, figs. 57, 58, 67, 68. On Nimrud, see Mallowan, *Nimrud II*, fig. 305. On Nineveh, see Stronach, “Nineveh.” Megalithic stone walls with wooden clamps were also found at Babylon; see Koldewey, *Babylon*, 174–75, figs. 109, 110 (in German edition, pp. 379 ff., figs. 109–12). On external parallels for the Lydian defense work generally, see Greenewalt, “Campaign of 1977,” 25–26.

are largely built out of mudbrick, with stone used only at important points such as gates. In the Assyrian examples, however, it is clear that the stone is used as a facing for mudbrick, rather than for rubble; the same may have been true, as we have seen, of the sandstone masonry at Sector MMS/N. The Assyrian masonry is very similar to that of the Lydian terrace at the Byzantine Fortress, using large, well-fitted blocks with rusticated faces.

Very similar masonry is also used in monumental terraces in Assyrian architecture, such as the palace platform at Khorsabad, and in related structures, such as Sennacherib's aqueduct at Jerwan (Fig. 276).¹³ In Syria-Palestine, rusticated limestone ashlar masonry also appears as early as the ninth century in palace structures, terraces, and possibly also fortifications at Samaria and other sites (Fig. 277).¹⁴ Ashlar masonry is seldom found in Cyprus in the Iron Age outside of tombs. The best example, from a palace at Kouklia (Old Paphos), is dated to the late sixth or fifth century and may be associated with the Persian conquest of the island.¹⁵

There are also clear Lydian antecedents for the monumental terrace as a building type. The hill crowned by the Byzantine Fortress is only one of a series of hills projecting from the north side of the Acropolis. The hill immediately east of the Byzantine Fortress also bears a monumental terrace wall, but the facing of this wall is composed of "megalithic" rubble instead of ashlar masonry and is dated to the late seventh or early sixth century.¹⁶ There is also evidence of earlier "megalithic" rubble terracing in the area of the hill crowned by the Byzantine Fortress itself.¹⁷ Structures like the ashlar masonry terrace at the Byzantine Fortress may, therefore, simply be modernized versions of an old local building form, the only difference between them and their predecessors being the masonry of the facing.

In Chapter 4, it was suggested that the introduction of ashlar masonry in Lydia was an expression of Lydia's growing imperial power during the reign of Alyattes. It is entirely consistent with this idea that the closest external precedents, both for the structures in which ashlar masonry appears in Lydia and for the use of ashlar masonry in these structures (in

the construction of buried tomb chambers and as a facing for monumental fortifications and terraces or platforms), should be found in Phrygia and the Near East. Phrygia provided a local role model for the emergent Lydian kingdom, and for the use of royal tombs and monumental fortifications as a way of legitimating and reinforcing the institution of kingship, while both Anatolian principalities aspired in a general way to the status and privileges of the great powers of the Near East. The Mermnad dynasty's attempts to take advantage of Near Eastern traditions of kingship began with the reign of Gyges, who sent to Assyria for help against the Cimmerians in the mid-seventh century B.C.; in the early sixth century, according to Herodotus, a long conflict between Alyattes and the Medes was resolved through the mediation of Nebuchadnezzar, king of Babylon, together with the king of Cilicia, which suggests that by this time Lydia had been accepted as an important local power.¹⁸ The construction of fortifications, terraces, and platforms faced in ashlar masonry would have symbolized that importance by endowing Lydian Sardis with some of the architectural trappings of a Near Eastern capital. Lydian ashlar masonry, therefore, may be seen partly as the product, from a typological and ideological point of view, of the imperial ambitions of the Lydian kings, as they evolved in emulation of the heritage of Phrygia, and against the general background of contemporary Near Eastern traditions.

Technical Forerunners

External parallels thus point to both Anatolian and Near Eastern origins for the building types in which ashlar masonry is used in Lydia. Was the Near East also the immediate source of the techniques of stonecutting and construction found in Archaic Lydia? This certainly could have been the case, and two potential avenues of transmission—via Phoenicia or via Mesopotamia—are discussed below. But it is not possible to understand the origins of Lydian ashlar masonry without also looking to the west. From a technological as opposed to a typological point of view, the Lydian building tradition is most closely related to the architecture of Archaic Greece, especially of the East Greek cities of the Aegean coast and islands.

To be more precise, while the closest typological parallels for the use of ashlar masonry in Lydian architecture are the Archaic tombs of Cyprus and the

13 Loud, *Khorsabad* 2, pls. 11, 12; Jacobsen and Lloyd, *Sennacherib's Aqueduct*, especially pl. 9.

14 Generally, see Shiloh, *Proto-Aeolic*; Van Beek, "Masonry"; Laperrousaz, "Remarques"; Wright, *South Syria and Palestine*. On Samaria, see Reisner et al., *Excavations at Samaria*, vol. 1, 102–12; vol. 2, pl. 27; Crowfoot et al., *Samaria-Sebaste I*, 5–9, 25–27. On Megiddo, see Lamon and Shipton, *Megiddo I*, 12–13, 21, 41.

15 Maier, "Palaces."

16 Greenewalt et al., "Campaigns of 1981 and 1982," 64–68.

17 Greenewalt et al., "Campaign of 1985," 79–80.

18 On Gyges and the Cimmerians, see Pedley, *Literary Sources* (Sardis M2), 82–83, nos. 292–3. On Alyattes and Nebuchadnezzar, see Hdt. 1.74.

fortifications and monumental terraces of the Assyrian heartland, there are significant technical differences. No Cypriote masonry is comparable to the smoothly dressed megalithic marble wall faces of the Tomb of Alyattes, and while the rusticated masonry of the Lydian terrace at the Byzantine Fortress has close parallels in Assyria, the same is not true of the finer treatment—the beveled edges and decorative rustication—found in monuments such as the limestone masonry of the Lydian city gate and the terrace walls on the Acropolis. There are, however, exact parallels both for the treatment of the walls of the Tomb of Alyattes and for Lydian decorative rustication in contemporary East Greek architecture.

The type of masonry characteristic of the Lydian tradition—that is, masonry using large blocks, precisely cut to standard sizes and tightly fitted without mortar—also appeared in the Greek world for the first time in the late seventh or early sixth century. Before this time, Greek walls as seen in monuments such as the early temples at Isthmia, Corinth, Samos, Ephesus, and Old Smyrna were composed of relatively small blocks, less accurately joined than in later structures.¹⁹ Old Smyrna is of special interest because of its proximity to Lydia and because it documents the “pre-megalithic” architecture of the seventh-century East Greek world unusually well. The earliest ashlar masonry at the site is found in one of the towers of the ninth-century fortifications. The tower is built in part out of saw-cut limestone blocks and was compared by the excavators to contemporary masonry in Syria-Palestine.²⁰ More significant, however, is the limestone ashlar wall of the terrace of the seventh-century temple. This wall is built out of medium-sized squared blocks, closely fitted with finely point-dressed faces—more finely pointed around the edges than in the middle but without true chisel-drafted edges (Fig. 278).²¹

The appearance of “megalithic” ashlar masonry was a breakthrough that led to the standardization of Greek building methods and helped make it possible for Greek architects to build the first canonical, all-stone Doric and Ionic temples. The building boom that

accompanied this development saw the establishment of a number of different local building traditions—in Magna Graecia, Corinth, Athens, the Cyclades, and East Greece, among other places—all related but also in many ways independent.²² In East Greece, this architectural revolution reached its spectacular apogee with the construction of colossal buildings such as the temple of Artemis at Ephesus, which was one of the largest Greek temples ever built and one of the first planned entirely in marble. The temple of Artemis also provides the closest apparently contemporary parallels with Lydian masonry of the first half of the sixth century. The upper parts of the walls of the temple were surely smoothly dressed, like the walls of the Tomb of Alyattes, although the former survive only in fragments. Still in situ at the bottoms of the cella walls, however, are large, squared, marble blocks with drafted margins, point-dressed central panels, beveled edges, and smoothed bands along the bottoms, similar to the step blocks of the Pyramid Tomb at Sardis.²³ Similar though less finely dressed blocks are incorporated into the foundations of the naiskos of the Archaic temple (Fig. 279).²⁴ These same techniques of fine rustication are also attested in buildings in other regions of Greece, but only later; a famous example is the euthyteria of the early Parthenon (490–480 B.C.).²⁵ Other early examples of Ionian ashlar masonry include the city wall of Phocaea, comparable in treatment to the platform of the temple at Smyrna but built out of larger blocks,²⁶ and the altar of Poseidon at Monodendri near Miletus, with rusticated masonry very similar to that in Lydia and Ephesus but probably dating to the second half of the sixth century (Fig. 280).²⁷

These parallels are important for a number of reasons: first, because the Ephesian evidence is closely contemporary with the Lydian material; second, because

19 Coulton, *Architects*, 35–37. On Isthmia, see Broneer, *Isthmia I*; for recent work, see Gebhard and Hemans, “Isthmia, 1989,” especially 23–40 (on the Archaic temple). On Corinth, see Rhodes, “Early Corinthian Architecture”; idem, “Early Stoneworking.” On Samos, see Buschor, “Frühe Bauten,” 34–39 (seventh-century temple), Beilage 3.2, 7.1, fig. 13; for recent work, see Kienast, “Topographische Studien,” 174. On Ephesus, see Bammer and Muss, *Artemision*, 30–38. On Old Smyrna, see Cook and Nicholls, *Temples of Athena*; for recent work, see Akurgal, “Archaic Wall.”

20 Nicholls, “Old Smyrna,” 68–71, 96–98; Cook and Nicholls, *Temples of Athena*, 191.

21 Cook and Nicholls, *Temples of Athena*, 12–24, 92–98.

22 Coulton, *Architects*, 43–50; Howe, “Invention,” 320–27; Barletta, *Origins*. For the developments leading up to this revolution, see Mallwitz, “Architektur.” For a useful collection of papers on the Cycladic and East Greek (as well as other) traditions, see des Courtils and Moretti, *Grands ateliers*. On the Cyclades in particular, see now Gruben, “Naxos und Delos.”

23 Hogarth, *Ephesus*, pl. 11; Boardman, *Persia and the West*, 35, fig. 2.16; Ohnesorg, *Kroisos-Tempel*, 11–22.

24 Bammer and Muss, *Artemision*, 33–38, figs. 34, 35; 58, fig. 67; 88, fig. 114 (masonry attributed by author to Cretan influence).

25 Penrose, *Athenian Architecture*, 18–20, pl. 9.

26 Özyigit, “Phokaia.” Conveniently illustrated in Boardman, *Persia and the West*, 35, fig. 2.15. If this wall is the one built, according to Herodotus (1.163), with the assistance of Arganthonius, king of the Tartessians, it should predate the Persian invasion.

27 Gerkan, *Milet I:IV*. On the date of ca. 530, see Koenigs, “Bauglieder II,” 65–66.

Lydia and East Greece are near neighbors; and third, because other evidence attests close links between the two regions' building traditions. A fourth point, worth emphasizing now, is the way rusticated masonry is used in both the Lydian and the East Greek traditions in places where it would certainly have been visible.

As we have seen, the rusticated appearance of an individual block is a by-product of the techniques used in squaring it off, and it seems certain that the same techniques were used in megalithic construction throughout Greece as well as Lydia in the early sixth century. It is a distinctive feature of Lydian architecture that blocks in fortifications and terrace walls were regularly and consciously left in this state. Only in tomb chambers was it normal practice to smooth off the face of a wall entirely. In Archaic and early Classical Greece, however, where megalithic masonry was used mainly for sacred buildings, smoothly dressed wall surfaces were the rule.

Only in East Greece do we find examples of decorative rustication comparable to the Lydian evidence as early as the early and mid-sixth century. This common characteristic adds to the evidence for close relations between Lydian and Ionian builders, and it may clarify the origins of certain megalithic masonry techniques as they are found in western Asia Minor. It is important to emphasize, however, that later examples of decorative rustication in Greek architecture are not necessarily related to these early buildings. Because rustication is so closely related to the techniques used in squaring off a block, it could have arisen independently in different places at different times. Its popularity in the architecture of Classical Athens, for example, has been variously explained as arising either from a vogue for an "unfinished look" in the wake of the Persian wars—because so many buildings under construction when war broke out stood unfinished for so long²⁸—or from a conscious desire to reveal the intricacies of the mason's craft.²⁹

The best evidence for the date of the temple of Artemis at Ephesus is a claim recorded by Herodotus (1.92) that most of its columns were paid for by Croesus, a statement supported by inscriptions apparently naming Croesus on the columns themselves.³⁰ The temple is thus roughly contemporary with the pre-Persian monuments of Lydia, but its date is in some ways less secure than those of the Lydian buildings. Construction of the

temple probably began before the reign of Croesus, and fragments of architectural ornament from the upper parts of the building show that it continued for decades if not generations afterward. Nevertheless, the rusticated blocks mentioned above come from the lower parts of the building, and while it is uncertain whether the cella walls were built before or after the colonnades, it is very likely that at least the naiskos was a relatively early component of the temple as a whole. For these reasons, it seems logical to leave open the question of whether or not the specific techniques of decorative rustication appeared first in Lydia or in Ionia.

The archaeological evidence, especially of the temple of Artemis at Ephesus, thus shows both that Lydian and East Greek masonry techniques were very similar to each other and that these techniques appeared in both places at approximately the same time. The combination of archaeological and textual evidence for Lydian sponsorship of the Artemision at Ephesus, moreover, also shows that the Archaic architectural traditions of Lydia and East Greece were closely related. Any investigation of the technical origins of Lydian masonry must therefore include a consideration of the origins of similar masonry techniques in the Greek world. Before proceeding to carry out this investigation, however, it is useful first to look briefly at the cultural background for Lydian sponsorship of Greek architectural projects.

Cultural and Historical Context

There is considerable literary and historical evidence for relations between Greece and Lydia during this period, when Lydia grew to be the dominant power in western Asia Minor, ruling directly or indirectly over many of the most important cities of East Greece. Most interesting for our purposes are references to Lydian patronage of Greek sanctuaries and, in particular, of Greek religious building projects. Alyattes built a pair of temples to Athena at Assesus near Miletus, and Croesus helped finance the temple of Artemis at Ephesus; in addition, Alyattes dedicated a famous iron stand at Delphi, and Croesus commissioned Theodorus of Samos to make a silver krater, also dedicated to Apollo at Delphi. This same Theodorus is also associated directly or indirectly with the construction of both the temple of Artemis at Ephesus and the temple of Hera on Samos.³¹

28 Hodge and Tomlinson, "Temple of Nemesis," 191–92.

29 Kalpaxis, *Hemiteles*, 141–42.

30 Muss, *Bauplastik*, 23; Bammer and Muss, *Artemision*, 46; Kerschner, "Lydische Weihungen," 263; Ohnesorg, *Kroisos-Tempel*, 127–29.

31 On Assesus, see Hdt. 1.19–22. On Ephesus, see Hdt. 1.92. On dedications at Delphi, see Hdt. 1.25 (Alyattes; see also Athenaeus, *Deipnosophistae*, 5.210.b–c; Plut. *Mor.* 436A; Paus. 10.16.10–2; references kindly supplied by C. H. Greenewalt, Jr.); Hdt. 1.51 (Croesus). On Theodorus at Samos, see Vitruvius, *De arch.* 7.12. Other Greek sanctuaries where Croesus made dedications are Thebes, Ephesus, the sanctuary of Athena Pronaia at Delphi, and Miletus:

Croesus's dedications at Delphi follow an example set long before by Midas, the great eighth-century king of Phrygia, and Gyges, the founder of the Mermnad dynasty of Lydia.³² Indeed, the practice of making dedications at Greek sanctuaries may be seen as another one of the traditions of Anatolian kingship, like burial in enormous tumulus tombs. Lydian patronage of Greek religious building projects takes this tradition a step further, with interesting consequences both for the patrons and for the clients. For just as Croesus gained access to Greek skills in metalworking through his patronage of Theodorus of Samos, so his patronage of the Artemision at Ephesus gave Lydian builders access to Greek skills in stoneworking and construction techniques. At the same time, Lydian involvement in projects such as the construction of the Artemision may have influenced the development of East Greek architecture in significant ways.

The question of the origins of the masonry construction techniques initially found in the first half of the sixth century in both Greece and Lydia must now be considered in greater detail. The principal innovations, once again, in masonry construction of this period include the use of considerably larger stones, the technique of squaring individual blocks that leaves chisel-drafted margins around the faces of the blocks, and the practice of sometimes maintaining the rusticated appearance of the block both to save labor and for decorative effect. Also new in this period are certain other technical details, such as the use of clamps as well as the practice of smoothing off the whole face of a wall after construction. While it is not impossible that all these techniques were invented independently in the Aegean region in the late seventh or early sixth century, their sudden, fully developed appearance across a large geographical area suggests that they were at least in part copied or adapted from other building traditions. Much of the ground covered in the next several paragraphs is already well traveled, and an exhaustive survey is not needed here; especially useful is Boardman's discussion in *Persia and the West*.³³

Hdt. 1.92. Greek oracles consulted by Croesus include, in addition to Delphi, Abae in Phocis, Dodona, the oracle of Amphiaraus at Thebes, the oracle of Trophonius at Lebadea, and Miletus: Hdt. 1.46. See, in general, Kerschner, "Lydische Weihungen." On the identification of the site of Assesos, see Lohmann, "Assesos"; Kalaitzoglou, *Assesos*. For the possibility that Croesus also helped to finance the Archaic temple of Apollo at Didyma, see Niemeyer, "Zierde Ioniens."

32 Hdt. 1.13–14.

33 See also Van Beek, "Masonry"; Pedersen, *Mausolleion* 3, 175–88 (appendix 2: "Marginally Drafted Masonry: A Brief Account of Its Pre-Hellenistic History").

The introduction of megalithic ashlar masonry in Greece is often attributed to Greek contact with Egypt and observation of Egyptian building methods. Egypt was, after all, the home of an ancient all-stone building tradition, and Egyptian influence is apparent in Greek building forms such as the Doric column. Egypt also offers the closest external precedent for the technique of first building a wall and then dressing its entire face after construction.³⁴

It is also clear, however, that Egypt was not the only source of external influence on Archaic architecture in the Aegean and Anatolian world. The origins of the Ionic and Aeolic orders in Greek architecture clearly lie in the Near East, although principally in the decorative arts rather than in architecture; the Near East also supplies better parallels than Egypt for certain masonry practices, such as rustication and the use of clamps. Although the plain butterfly clamp, for example, is common in Egypt, the combination butterfly and staple clamp is better attested during the early Iron Age in the Near East.³⁵ In general, Near Eastern masonry techniques were more economical than Egyptian—involving less custom fitting and more mass production—and perhaps also better suited to the softer stones available in the Aegean world (Egyptian masonry techniques having been developed in significant part for harder stones such as granite). As noted above, the Near East also supplies the best typological parallels for the use of ashlar masonry in Lydian architecture.

Interestingly, the closest parallels for finely rusticated masonry in the Near East lie in the Bronze Age, especially in the temple and palace architecture of late Bronze Age Cyprus. Ashlar masonry is also found in Bronze Age Cypriote tomb architecture and in the architecture, both sepulchral and nonsepulchral, of Ugarit, on the Levantine coast opposite Cyprus.³⁶ But as in the Aegean and Anatolian worlds, which had their own traditions of ashlar masonry construction in the Bronze Age, so too in the eastern Mediterranean there is a break of at least several generations between the evidence for this type of construction in the Bronze Age and its earliest appearance in the Iron Age.

Megalithic ashlar masonry construction does,

34 For general comments on Egyptian influence, see Coulton, *Architects*, 43–50; Howe, "Invention," 320–27.

35 Coulton, *Architects*, 49; Koldewey, *Sendschirli* II, 164, fig. 75; Naumann, *Architektur*, 109–11.

36 On Bronze Age ashlar masonry in general, see Hult, *Bronze Age Masonry*. On Cyprus in general, see Wright, *Cyprus*, 519–23; Karageorghis, *Late Bronze Age*. On Kition, see Karageorghis and Demas, *Kition* V:1, 277. On Paphos, see Maier and Karageorghis, *Paphos*, 81–102. See also Astrom, "Hala Sultan Tekke." On Ugarit, see Schaeffer, *Ugaritica* I, 77–89.

however, resurface much earlier in the Near East than it does in Greece or Anatolia. As we have already seen, rusticated ashlar masonry is found in the ninth century at Samaria and other sites in Syria-Palestine; it makes its appearance in Mesopotamian fortifications and monumental terraces in the eighth and seventh centuries, and its reappearance in Cypriote tomb architecture in the late eighth or early seventh century. More or less contemporary with Syro-Palestinian ashlar masonry, although not as similar to Archaic Greek and Anatolian masonry, are the orthostat walls of the Neo-Hittite cities such as Carchemish. Another building tradition less closely related either typologically or technically to those of Greece and Lydia is that of Urartu in far eastern Anatolia, where ashlar masonry appears in the eighth and seventh centuries.

The question of the relationships among these various building traditions—in Syria-Palestine, Cyprus, Mesopotamia, and Urartu—is a vexed one, and it remains possible, despite the lack of direct evidence, that in some places continuous traditions of ashlar masonry did survive from the Bronze Age. The two best candidates for continuity are North Syria and the Levant. In the Neo-Hittite cities of North Syria, fine stone masonry occurs most distinctively in orthostats running along the bases of mudbrick walls belonging to gateways or to palace or temple platforms, and in the foundations for these orthostat courses, an architectural form of clear prehistoric origins.³⁷ It should be noted, however, that despite the obvious typological similarity to the use of orthostats in Greek temple architecture, North Syrian masonry is not technically very closely related to Archaic Greek or Lydian stonecutting.

The main reasons for arguing for a continuous tradition in masonry construction in South Syria and Palestine are the ninth-century walls of Samaria mentioned above and a number of references in the Hebrew Bible to the activity of Phoenician masons, most famously in the construction of Solomon's Temple, in the mid-tenth century.³⁸ Boardman has cautioned against overinterpretation of the biblical references, and it is possible the Israelite tradition as represented by the archaeological evidence was homegrown.³⁹ Certainly there is little clear archaeological evidence either in Phoenicia itself or in Phoenician settlements

overseas for fine ashlar masonry construction at an early date.⁴⁰ Still, the biblical references are our earliest evidence for stone masonry in the Iron Age, and they are also suggestive of mechanisms of technological exchange that may have been widespread through the ancient Near East.⁴¹

A further word is needed here on Iron Age ashlar masonry in Cyprus. Leaving aside a ninth-century Phoenician palace at Kition, which seems to have been built at least in part out of the remains of Bronze Age structures, ashlar masonry is a relative latecomer in Cyprus, not widely used until the late eighth or early seventh century.⁴² The built chamber tombs of the seventh and sixth centuries are impressive, however, and strikingly similar to Anatolian tumuli. It is possible that the masonry techniques used in the construction of these tombs developed locally, but the lack of evidence for local forerunners suggests it was at least in part a foreign import. A likely source is the Levant, and the use of Aeolic pilaster capitals in some Cypriote tombs certainly points in that direction.⁴³ Another possibility, suggested by Vassos Karageorghis, is that Cypriote tomb architecture was modeled after that of contemporary Anatolia.⁴⁴ The similarities between stone tomb chambers clearly designed to imitate timber construction in Cyprus and actual wooden tomb chambers in Phrygia are indeed suggestive; but the redating of the Karnıyarık Tepe crepis wall from the mid-seventh to the mid-sixth century makes it clear the Anatolian ashlar masonry is later, not earlier, than Cypriote masonry, so the technical as opposed to the formal influence would have gone from Cyprus to Anatolia. Other possible relationships between Cyprus and Archaic architecture in Lydia and Greece are discussed below.

Assyria and Urartu are both areas where it is clear that the Iron Age traditions of stone masonry construction were new developments, independent of local Bronze Age precedent. The areas that have been proposed as possible sources for Assyrian ashlar masonry are, not surprisingly, North Syria and Phoenicia. North Syria and Assyria were geographically and politically closely

37 See, generally, Naumann, *Architektur*. Earlier discussions include Koldewey, *Sendschirli II*, especially 193–96; Woolley, *Carchemish II*, 142–56, pls. 4–20.

38 1 Kings 5.

39 Boardman, *Persia and the West*, 27–29.

40 On Phoenician masonry in general, see Van Beek, “Masonry”; Hult, *Bronze Age Masonry*; Shiloh, *Proto-Aeolic*; Wright, *South Syria and Palestine*; Sharon, “Construction Techniques.” A useful early discussion is Reisner et al., *Excavations at Samaria*, vol. 1, 102–12, vol. 2, pl. 27.

41 See Zaccagnini, “Mobility” (reference supplied by Nicholas Cahill).

42 Boardman, *Persia and the West*, 26.

43 Betancourt, *Aeolic Style*, 47–48.

44 Karageorghis, “Relations.”

related, but the only good Near Eastern precedents in either the Bronze or the Iron Ages for the fine ashlar masonry seen in structures such as the fortifications of Assur lie farther south, in the Levant. In addition to Phoenicia, it is certainly possible that the kings of Assyria drew on expertise in stonecutting from some other source, such as ancient Israel.⁴⁵

Urartian architecture is likely to have been influenced by both North Syria and Mesopotamia.⁴⁶ Urartian fortifications and terraces are generally similar to their Mesopotamian contemporaries. More distinctive, and probably the result of local development, is the masonry of Urartian palace and temple architecture, which differs from Mesopotamian (and from Greek and Lydian) masonry in several respects. These structures are often built out of a hard, dark-colored andesite, and the shapes of the blocks are generally more square than oblong.

The issue of how Egyptian and Near Eastern techniques of masonry construction may have been introduced in Anatolia and Greece—more specifically, in Lydia and Ionia—must also be examined. Who was responsible for the adoption of these techniques, the Greeks or the Lydians, and what were the mechanisms of transmission? As has been seen, the Near East supplies the best earlier parallels for the building types in which ashlar masonry is used in Lydian architecture, and given the technical similarities between Near Eastern and Lydian Iron Age masonry, it would be logical to argue that Lydian builders “imported” certain masonry techniques from the Near East. I have previously suggested that Alyattes may have employed stonemasons, perhaps slaves, from Phoenicia in the construction of the fortifications of Sardis and of his monumental tomb.⁴⁷ Boardman has shown that the case for Phoenician masons is an uncertain one and has argued for direct Mesopotamian or North Syrian influence on Lydia.⁴⁸

Boardman’s point is well taken, and just two comments on the subject of Phoenician masons must be added. First, the means of the transmission of new techniques of stonecutting is more important, in a general sense, than the ethnic identity of the Near Eastern masons who may have taught Lydian and Greek builders these

new techniques. As important local rulers, the kings of Lydia may have had access to the kinds of court traditions of technological exchange attested in the story of the construction of Solomon’s Temple, and these traditions may lie behind the transmission of Near Eastern masonry techniques to the west. If so, the two positions outlined above are not necessarily contradictory; it could have been the kings of Assyria, for example, who sent Phoenician masons to Lydia. Of course many other scenarios are also plausible, including the possibility that western masons learned Near Eastern techniques of construction in the Near East, by observation of local building projects, rather than through the activity of Near Eastern masons in the west.

A second comment concerns once more the relevance of Cypriote tomb architecture. As in Lydia, the introduction of the practice of burial in stone tomb chambers beneath tumuli is associated with a process of state formation focused on the institution of kingship, although on a much smaller scale in Cyprus than in Lydia. And as is also the case in Lydia, the cultural traditions that lie behind this development are varied and complex. Formal influences on Cypriote tomb architecture may have included contemporary Anatolian practice, as well as the local Mycenaean heritage. Technological influences may have included stonecutting techniques best attested, in the vicinity of Cyprus, in Syria-Palestine. It is of course possible that the Cypriote and the Lydian practices developed largely independently of each other. But if, as also seems possible, the development of Lydian stone tomb chambers was at all influenced by the Cypriote precedent, then the relevant masonry tradition may have been one local to the Cypro-Levantine region, which of course includes Phoenicia.

If Lydia was in fact instrumental in the introduction of Near Eastern masonry techniques in the west, then clearly these techniques were quickly improved upon in building projects both in Lydia itself and, at the same time, in the East Greek cities of Ionia. As noted above, there is considerably more evidence for stone architecture before the development of megalithic masonry in the Greek world than in Lydia, and even if Lydia did play an important role in the adoption of Near Eastern masonry techniques in Ionia, Greek skill in stoneworking was surely decisive in the refinement of those techniques. It is also possible that the Greeks rather than the Lydians were principally responsible for the adoption of Near Eastern techniques of construction in western Anatolia. Indeed, the fact that stone architecture was already much better established in the Greek world than in Lydia may seem a priori to favor this hypothesis.

45 For the hypothesis that Mesopotamian masonry is based on the Phoenician tradition, see Moorey, *Materials*, 335–47; Mallowan, “Samaria and Calah-Nimrud.”

46 On Urartian architecture in general, see Forbes, *Urartian Architecture*; Kleiss and Hauptmann, *Topographische Karte*. For Urartian built tombs at Altintepe, see Özgüç, *Altintepe II*, 10–27, 65–72.

47 Ratté, “Lydian Contributions,” 10.

48 Boardman, *Persia and the West*, 27–44.

The kinds of contact that might have facilitated the transfer of building technology from Egypt or the Near East to the Aegean world are also better attested for Greece than for Lydia. While textual evidence indicates high-level communication between Egypt and the kings of Lydia, similar kinds of contact are also attested between Egyptian kings and certain Greek cities and sanctuaries; in addition, Greek traders had settled at Naucratis in the Nile Delta by the end of the seventh century, giving Greek craftsmen the opportunity to observe Egyptian stone carvers and stonecutters in their own homeland.⁴⁹ Greek traders had also settled at an early date in the Near East, at places such as Al Mina in Syria, and would have had the same opportunities they had in Egypt to observe local craftsmen at work.⁵⁰ If Phoenicia was in fact the home of an important masonry tradition, Greek builders may also have come into contact with Phoenician craftsmen who had traveled to Greece, or to one of the Phoenician settlements in the western Mediterranean.

Let us now review the results, in some places unavoidably inconclusive, of this brief investigation into the origins of megalithic ashlar masonry in western Anatolia and Greece. First, the sudden appearance of new masonry techniques in early sixth-century Lydia and throughout the Greek world suggests that these techniques were adopted or adapted from some external source. Second, differences between these new techniques and masonry practices in Egypt, a well-known source of influence on Greek architecture and sculpture in general, indicates that other sources besides Egypt were responsible. Third, a brief survey of ashlar masonry in the Near East in the Iron Age shows that masonry techniques similar to those found in Lydia and East Greece were well established at an early date in a number of different regions, especially in Cyprus, Syria-Palestine, and Mesopotamia. Fourth, other evidence suggests two of the possible ways in which these techniques could have been transmitted to the west, either through courtly exchange between the kings of Lydia and their Near Eastern counterparts or by observation of Near Eastern building projects

by Greek traders, travelers, and settlers. To my mind, the preponderance of the evidence weighs in favor of the view that Greek builders were the primary agents of this transmission. This evidence includes the presence of “premonumental” stone architecture in Greece, more advanced than that in Lydia; Greece’s international contacts, more widespread than Lydia’s; and other evidence for Greek innovation, such as the adaptation of the Phoenician alphabet, which was adopted in Lydia via Greece.

It should be noted, however, that these masonry techniques could have been adopted independently in a number of different places, in different ways, and at different times. They were widespread in the Near East, and their utility would have been obvious to premonumental builders throughout the Aegean world once they became aware of them. One must imagine this technological exchange taking place against the background of a complicated web of cultural interrelationships, as closer and closer connections were developed between the north-central and eastern Mediterranean, on the one hand, and between different parts of the “Graeco-Anatolian” world, extending from Sicily to Lydia, on the other. Once Near Eastern building methods had been introduced through the kinds of direct contacts envisioned here, possibly at different places and at different times, awareness of these methods would have spread quickly through secondary contact between the various regional traditions in the Graeco-Anatolian sphere—no doubt leading in some cases to the establishment of new direct contacts with the Near East. It is important to emphasize that the hypothesis that Near Eastern masonry techniques were introduced in Lydia and Ionia by direct contact with the Near East does not imply that the other regional building traditions in the Greek world necessarily learned these techniques from Lydia or Ionia. Nevertheless, some of the distinctive features of Archaic masonry in western Anatolia (including both Lydia and Ionia), such as the maintenance of the rusticated appearance of blocks in a number of different architectural contexts, suggest that the development of new building methods in this region was in some ways independent of other nearby regional traditions—possibly because it was due at least in part to direct contacts with the Near East and not entirely to the influence of architecture in the mainland of Greece, or in the Cyclades or Magna Graecia. It may, for example, have been specifically due to a desire on the part of Alyattes and Croesus to build fortifications at Sardis that were similar in appearance to those of a Mesopotamian capital.

49 For contact between Egypt and Lydia, see Pedley, *Literary Sources* (Sardis M2), 82, no. 292 (Rassam Cylinder), on assistance given by Gyges to the king of Egypt against Assyria. There was Egyptian building activity in the region around Naucratis during the seventh and sixth centuries, and it is argued that exposure to this activity was what sparked the borrowing of Egyptian techniques of construction and finishing processes by Greek builders: e.g., Coulton, *Architects*, 32; on Naucratis, see Boardman, *Greeks Overseas*, 118–33; Möller, *Naucratis*, 32–38 (on Greeks in Egypt in general), 89–135 (on the archaeology of Naucratis).

50 Boardman, *Greeks Overseas*, 38–54; Hodos, *Local Responses*, 25–88.

For the purposes of this study, however, an equally important point is this: interaction between Lydian and Greek builders played a crucial role in the adoption and development of new masonry techniques in both Lydia and East Greece in the early sixth century, whatever their ultimate sources or mode of introduction. Whether or not Lydia played some role in the transmission of Near Eastern building methods to East Greece, and whether or not Lydia was instrumental in the development of other specialized building techniques, such as the construction of large earthworks,⁵¹ in a larger sense the most important aspect of Lydia's participation in East Greek architecture was the Lydian kings' patronage of Greek building projects. The construction of megalithic ashlar masonry structures required more advance planning and larger labor forces—especially before the invention of labor-saving devices such as the crane—than earlier Greek architecture had required.⁵² In many Greek cities, such as Corinth and Samos, the development of these new techniques of construction was partly due to the emergence of a new type of building patron—the Greek tyrant—who was able to marshal the resources necessary for a large building project in unprecedented ways. In East Greece, this role was sometimes played by the kings of Lydia, either through direct patronage of building projects such as the temple of Artemis at Ephesus or indirectly through the sponsorship of local tyrants. Alyattes and Croesus commanded greater resources than any individual Greek tyrant or city-state, however, and their patronage may help to explain some of the differences between East Greek architecture and architecture in mainland Greece, such as the East Greek tradition of building unusually large, all-marble temples.

At the same time, Lydian involvement in Greek architectural projects was surely also crucial to the development of a new building tradition in Lydia itself. Once again, the particulars of this technological exchange are uncertain—Lydian builders may have participated in the construction of monuments such as the temple of Artemis at Ephesus and then applied their experience to building projects back in Lydia; Greek craftsmen, possibly slaves, may have been brought from Ephesus and other such places to Sardis; or craftsmen of Near Eastern origin may have worked in both East Greece and Lydia.⁵³ By the mid-sixth

century, in any case, an independent local building tradition had been firmly established in Lydia.

The mutually profitable exchange that took place between Lydia and Greece in the area of stonemasonry may be seen in many other areas as well. In another field of architecture, for example, it is clear that Lydian architectural terracottas are closely related to those of East Greece. Of particular interest is the occurrence of roof tiles of a distinctive Laconian type at Sardis and at a number of East Greek sites in the mid-sixth century. To explain the introduction of these tile types to Asia Minor, Nancy Winter has suggested that Croesus may have been given an actual tile roof (or part of one) by Sparta, in exchange for the gifts he sent the Spartans when he was seeking their assistance against Persia; the Laconian system would then have spread from Sardis to neighboring and allied cities.⁵⁴ If this explanation is correct, it would provide a striking example of how the patronage of the Lydian kings both facilitated the development of new building methods in East Greece, in this case a specific roofing system, and brought about the transmission of Greek building methods to Lydia. In another area of stoneworking, it is clear that Lydian sculpture developed in many ways out of the East Greek tradition.

In the field of metalworking, as already mentioned, Croesus commissioned a bronze krater from a Greek artisan, Theodorus of Samos. Theodorus was apparently famous for pioneering new techniques of bronze casting in Greece, and he may have helped to introduce these methods to Lydia.⁵⁵ But the Lydians were also pioneers in metalworking, responsible for the invention of coinage (like ashlar masonry, an adaptation of much older eastern Mediterranean technology) and of the cementation process for separating gold from silver.⁵⁶ The mechanism by which these inventions were transmitted from Lydia to Greece was probably the same tradition of patronage—Lydian patronage of local Greek tyrants—by which Greek and Near Eastern methods of stoneworking were transmitted to Lydia.

It is apparent that the traditional notion of cultural influence can give only a partial account of the interaction between Greece and Lydia in general and between the Greek and the Lydian architectural traditions in particular. It is difficult to explain the appearance of megalithic ashlar masonry in Lydia entirely in terms of Greek influence, when Lydia may

51 For speculations on these subjects, see Ratté, "Lydian Contributions."

52 Coulton, *Architects*, 48, 144; idem, "Lifting."

53 On these subjects, see Muss, *Bauplastik*, 93–94.

54 Winter, "Kroisos' Role"; idem, *Greek Architectural Terracottas*, 235.

55 On Theodorus, see Stewart, *Greek Sculpture*, 244–46.

56 See Balmuth, "Remarks"; Ramage and Craddock, *King Croesus' Gold* (Sardis M11), especially 200–211.

have played a very real part in the establishment of these techniques of construction in the cities of East Greece. Similarly, it would seem at first far-fetched to speak of Lydian influence on Greek architecture, but without Lydian patronage of East Greek building projects, the Archaic Ionic tradition might have developed along significantly different lines. Lydian architecture as represented by the great tumuli, terraces, and fortifications of Sardis is primarily an Anatolian phenomenon, grounded in the traditions of Anatolian kingship. As a result, ashlar masonry was used in Lydia in ways it was not used in Greece, and it should not be surprising that there is no evidence that the kinds of sacred buildings that were the principle vehicles for ashlar masonry construction in Greece were ever built in Archaic Lydia. The cultural tradition that made the king's tomb the Anatolian building form par excellence was quite unrelated to the combination of political and religious institutions that gave the temple as a building form its architectural preeminence in Greece.

The Lydian building tradition, to sum up, developed partly out of the conventions of Anatolian kingship, including the construction of enormous royal tombs and civic embellishments such as monumental city gates, partly as a result of technological developments inseparable from Lydian involvement in contemporary East Greek architecture. As such, it adds interesting new details to our understanding of the architectural revolution that swept through Greece and neighboring regions in the late seventh and early sixth centuries. Ashlar masonry first appears as an important component of Lydian architecture midway through the reign of Alyattes, perhaps after that king's return from the Median war ca. 585 B.C.⁵⁷ Initially, it was probably used only for royal tombs and public works of certain kinds. By the mid-sixth century, a local tradition firm enough to survive the downfall of the Lydian kingdom had been established, and ashlar masonry became a regular component of aristocratic tomb architecture.

It may be useful to conclude this discussion of the pre-Persian history of Lydian architecture with a brief glance forward to the post-Persian period, for the same blending of cultural imperatives and opportunities that gave birth to the Lydian building tradition continued in western Asia Minor in subsequent centuries. The classic product of this rich cultural interaction is the Mausoleum at Halicarnassus, a king's tomb in the grand Anatolian tradition, built

by Greek architects in a Greek architectural idiom—an idiom deployed, however, in a revolutionary new way. Mausolus's building program, including not only the construction of his enormous tomb but also the monumental redesign of his capital city, harks back in some ways to Alyattes's and Croesus's building program at Sardis and looks forward in others to the building programs of the Hellenistic kings of Pergamon.⁵⁸ Like Sardis and Halicarnassus, Pergamon was a royal city in a region not traditionally Greek, governed by a local dynasty that maintained close relations with the Greek cities of Ionia and Aeolis; the main difference was that the rulers of Pergamon were themselves also Greeks. Like the Hellenistic kings of Egypt, however, they maintained—or fell into—many of the traditional customs of the land: burial in large tumulus tombs in full sight of the city, lavish patronage of traditional centers of Greek culture, and grand programs of public works characterized at Pergamon as much by the creation of distinct monumental civic areas through the construction of great terraces as by the construction of single monuments such as temples. At Pergamon, of course, the background to many of these traditions, especially tumulus burial, was not Anatolian but Macedonian. Anatolian and Macedonian traditions of kingship may in fact share elements of a common heritage, brought to Anatolia from Thrace or the Balkans by the Phrygians. And independent of any actual connection, it is not surprising that Anatolian and Macedonian relations with Greece would have evolved in some respects along similar lines, since both are regions located on the periphery of Greece in areas where kingship was a dominant cultural institution. In any case, the fact remains that in behaving like Macedonian kings, the rulers of Pergamon were also behaving like Anatolian kings, and in this way carrying on a tradition as recent as the reign of Mausolus and as ancient as the reign of Midas.

THE PERSIAN PERIOD

In about 547, Cyrus the Great took Sardis by siege and destroyed the Lydian city walls.⁵⁹ The downfall of the Lydian kingdom may have put an end to the local tradition of using ashlar masonry in civic structures such as terraces and fortifications at Sardis, both of which

58 Martin, *Urbanisme*, 146–51. For more recent research, see Pedersen, *Mausolleion* 3; idem, “Ionian Renaissance” (with criticism of Martin's views).

59 Ramage, “Two New Attic Cups”; Greenewalt, “Empire”; Cahill and Kroll, “Coin Finds.”

57 See Ratté, “Lydian Contributions,” 5.

were closely associated with the Lydian monarchy. Local builders maintained the tradition of ashlar masonry construction, however, in tombs at Sardis and throughout Lydia. We have seen that most Lydian tombs excavated by the Sardis Expedition postdate the Persian invasion (nos. 3–15). The majority of these tombs, both at Bin Tepe and on the banks of the Pactolus, show little typological or technical development from the example set by the Tomb of Alyattes. But some tombs, at Sardis and in other parts of Lydia, exhibit interesting typological and structural variety. They may, for example, have as many as three chambers arranged side by side, and the chambers may have pitched roofs instead of flat ceilings (such as Tomb 89.11 [no. 13] and Lale Tepe) or flat ceilings crowned by “relieving triangles.”⁶⁰ Aktepe 1, particularly elaborate, has a false barrel vault and a monumental doorway complete with carved and painted consoles.

All these tombs apparently belong to the later sixth or fifth century, and it is possible that they reflect a general trend toward greater complexity in tomb design under the Persian administration. Before the fall of Croesus, both the tumulus tomb type and the technology used to build tumulus tomb chambers may, as already suggested, have been restricted to the court of Sardis. If this were the case, a high level of standardization in tombs of the first half of the sixth century would not be surprising; nor would it be surprising, when the tumulus tomb type and techniques of ashlar masonry became widespread in Lydia after the fall of Croesus, to encounter more variety than before, as techniques of masonry developed and as vernacular traditions were allowed to assert themselves and local variants began to appear.⁶¹

Other differences between earlier and later Lydian

60 McLauchlin, “Graves,” 80–97; Stinson, “Lale Tepe: Architecture.” Many Lydian rock-cut tombs at Sardis also have multiple chambers and pitched roofs; see McLauchlin, “Graves,” 54–66. On tombs with relieving triangles, see McLauchlin, “Graves,” 266–67 (on İkištepe near Güre, see Tezcan, “İkištepe”), 268–70 (on tumulus near Selçikler, see İzmirilgil, “Selçikler”). Interesting parallels for this type of construction are found in Punic tombs in the cemetery of Dermech at Carthage (see Benichou-Safar, *Tombes puniques*, 135–70, 355–71). On the Persian-period tombs at Güre and in Lydia in general, see also Özgen and Öztürk, *Lydian Treasure*; Roosevelt, *Lydia*, 148–51.

61 On the distribution of Lydian tumulus tombs, see Ramage and Ramage, “Burial Mounds”; Roosevelt, “Settlement.” See Ratté (“Athemion Stelae”) for speculations on possible changes in Lydian burial custom following the Persian invasion. Other, not mutually exclusive, explanations of the increasing prevalence of tumulus burial in Persian Lydia include Dusinger’s suggestion that it reflects a desire on the part of local families to emphasize their Lydian identity in an age of foreign domination (Dusinger, *Achaemenid Sardis*, 141–43; idem, “Achaemenid Bowls”) and Roosevelt’s proposal that the nobility of the royal court at Sardis was redistributed around the Lydian countryside in the wake of the Persian conquest, just as Persian rule brought with it unprecedented stability and prosperity and a relaxation of earlier “feudal” obligations resulting in a sizeable increase in the

tumulus tomb chambers, such as the painted walls and architectural ornamentation of the doorway of Aktepe 1 and Lale Tepe, the false door stones from nearby İkištepe, and the paintings on the walls of at least one other tomb, are probably due to the new importance of Persia in western Anatolian cultural life and the growing cultural domination of Greece.⁶² Like their typology and structural design, the masonry of these “provincial” Lydian tombs varies: Aktepe 1 is sophisticated, with anathyrosis joints, claw-chisel dressing, and, perhaps because of the softness of the stone, extensive patching. The nearby tombs of Selçikler are much cruder.⁶³

The gradual disappearance of Lydian ashlar masonry as the hallmark of an independent building tradition—exhibiting a very consistent level of craftsmanship—is clearly seen in tomb chambers such as those of the Duman Tepe tombs (nos. 5–9) at Bin Tepe and Tomb 89.11 at Sardis, which are built out of irregularly sized blocks, relatively imprecisely fitted, and covered with plaster instead of being smoothly dressed on the interior. Another interesting example of the dissolution of the Lydian tradition is the treatment of the rusticated masonry of a crepis wall discovered in the summer of 1988 near Köprübaşı northeast of Sardis.⁶⁴ Unlike the rustication of earlier Lydian walls, which is the direct result of Lydian stonecutting techniques, the rustication of this wall is artificial. The drafted margins of the faces of the blocks were cut with a claw chisel, and they are separated by thin, shallow grooves from coarsely point-dressed central panels, worked in the same plane as the borders. The rising joints have anathyrosis and the contact bands are also claw-chisel dressed. Gone is the neat flat-chisel hatching of the drafted borders, gone the delicate point stippling of the central panels, the precisely cut bevels in the edges of the blocks, and the less systematic but much more careful preparation of the joints. The masonry of the Köprübaşı crepis is pseudo-isodomic, and a halfhearted attempt was made to line up the rising joints of alternate courses.

disposable wealth of this noble class: Roosevelt, “Settlement,” 345–51.

62 On false door stones, see McLauchlin, “Graves,” 121–22 (generally), 85, 266–67 (İkištepe); Roosevelt, “Door Stelae.” Only traces of the wall paintings can be made out at Aktepe 1; traces of wall painting can also be seen, according to Greenewald and Cahill, in the chamber of the tomb at Abidin Tepe near Kırkağaç. Wall paintings and architectural sculptures from these tombs were exhibited for the first time in Ankara in 1994 and are published in Özgen and Öztürk, *Lydian Treasure*.

63 İzmirilgil, “Selçikler.”

64 My heartfelt thanks go to Hasan Dedeoğlu, the excavator of this tumulus, for showing it to Greenewald and me on August 13, 1988. The chamber of the tumulus was not located.

The transformation of the Anatolian tradition in the Persian period is especially clear in the emergence of freestanding mausolea.⁶⁵ The Pyramid Tomb presages the appearance of this distinctive tomb type in Lydia; a more canonical example of the type is represented by the two halves of a marble pediment (or perhaps of separate pediments) found in 1968 and 1974 in the bed of the Pactolus (App. 1, no. A15). Its clearly Graeco-Persian form and architectural ornament place this tomb, dated on the basis of the sculpture of the pediments to the late fifth century, well outside the indigenous tradition.

What little is known about nonsepulchral architecture at Sardis in the Persian period also attests the attenuation of traditional Lydian culture, not surprising since the royal building program was now a thing of the past. The earliest substantial building preserved, the pre-Hellenistic altar of Artemis, is more East Greek than Lydian in most respects, including architectural form and perhaps also architectural ornament, as well as technical details such as the clamp type (see Appendix 3).⁶⁶ The Greek or Graeco-Persian associations of the architectural fragments listed in Appendix 1 and of the parastades of the Metroon, if these blocks are not Hellenistic, were reviewed in the first chapter of this study. Notable are fragments of at least two other altars of East Greek type, in Appendix 1 (App. 1, no. A5 [Fig. 239] and App. 1, no. A6 [Fig. 240]).

Besides the Metroon, the only civic monument attested in the ancient sources for the Persian period at Sardis are gardens, especially the gardens of Cyrus the Younger.⁶⁷ The earliest Persian gardens known are those of Cyrus the Great at Pasargadae, and they set a precedent that the younger Cyrus's "paradise" probably followed; in a forthcoming study of the evolution and legacy of the gardens at Pasargadae, David Stronach suggests that a lasting contribution of these gardens to later landscape design was their use of ashlar masonry, which is an ironically interesting point in the context of the present study because, as Stronach and others have shown, the origins of ashlar masonry in Persia are partly to be found at Sardis.⁶⁸

Darius's Foundation Charter, quoted at the beginning of this study,⁶⁹ says that the masons employed in the construction of Darius's palace at Susa were "Ionians and Sardians." This document is principally a statement of the Great King's power and prestige, as demonstrated by his ability to command skilled labor from far and wide.⁷⁰ Thus, Ionians and Sardians are mentioned not only because they were skilled masons but also because their homelands were so impressively distant from Persia. There is, however, no reason to doubt the truth of Darius's claims, and indeed the archaeological evidence shows that masons from western Asia Minor clearly did work on Persian building projects, and well before the reign of Darius.

Pasargadae was Persia's first imperial city, its monuments mostly erected between Cyrus's return from the conquest of Lydia and his death ca. 530. These monuments include, in addition to the royal gardens, palaces, and other buildings, the Tall-i Takht—a great platform sheathed in ashlar masonry—and the Tomb of Cyrus himself. Numerous parallels, including the rusticated masonry of the Tall-i Takht and the cyma reversa molding of the Tomb of Cyrus, show that the masons who built these monuments were schooled in the traditions of the Tomb of Alyattes and the Artemision at Ephesus. These masons were possibly prisoners of war taken to Persia by Cyrus.⁷¹

Darius's Foundation Charter groups Ionians and Sardians together, and since Sardis was the capital of the satrapy that included Ionia, it is conceivable that even the Greek inhabitants of that satrapy could be referred to as Sardians, raising the possibility that all the masons employed by Darius and his predecessor were actually Greeks rather than Lydians. The archaeological evidence suggests, however, that the simplest reading of the text is probably correct.

The distinctive imprint of the Lydian as opposed to the Ionian building tradition in Persia is clearest in two monuments at Pasargadae. First is the Tomb of Cyrus.⁷² The external form and architectural ornament of this structure exhibit a blend of Greek and local traditions, but the correspondence between the proportions and dimensions of Cyrus's burial chamber and those of the chamber inside the tumulus of Alyattes, already noted

65 See Kurtz and Boardman, *Greek Burial Customs*, 283–86; Cahill, "Taş Kule"; and the bibliography for entry App. 1, no. A15.

66 Hanfmann and Waldbaum, *Survey* (Sardis R1), 88–95.

67 Pedley, *Literary Sources* (Sardis M2), 80; especially, Xen. *Oec.* 4.20–24.

68 Stronach, "Royal Garden." On Persian masonry at Pasargadae and its debt to the architecture of western Asia Minor, see Nylander, *Ionians*; Stronach, *Pasargadae*. Robin Hägg's bibliography to Nylander (*Ionians*) is extensive; more recent studies include Tillia, *Persepolis*; idem, *Persepolis II*; idem, "Discoveries"; Nylander, "Masons' Marks"; Boardman, *Persia and the West*.

69 P. 000.

70 See Nylander, "Achaemenid Imperial Art."

71 Guépin, "Achaemenid Rule." On other evidence for Lydians in Persia, see the bibliography to Nylander (*Ionians*) and the following more recent studies: Schmidt, *Persepolis III*, 152–53; DeVries, "East Meets West"; Roaf, "Subject Peoples," especially 126–27; idem, "Texts"; Nylander, "Anatolians."

72 Nylander, *Ionians*, 91–102; Stronach, *Pasargadae*, 24–43.

by George Rawlinson in the notes to his translation of Herodotus, requires some other explanation.⁷³ The former is 3.17 m long, 2.11 m wide, and 2.11 m high, while the latter is 3.32 m long, 2.37 m wide, and 2.33 m high. Both chambers also feature protective lips on the tops of the walls. George M. A. Hanfmann suggested that the same masons employed in the construction of Alyattes's tomb also worked on the construction of Cyrus's, but it is perhaps more likely that different teams of masons, schooled in the same tradition, used the same method for determining the size of both chambers;⁷⁴ in any event, the Tomb of Cyrus seems to be directly related to the Lydian building tradition.

Second and equally significant is the Tall-i Takht. The similarities between the masonry of this structure and the masonry of monuments ranging from the Karniyarik Tepe crepis to the foundations of the older Parthenon on the Athenian Acropolis have been discussed at length by Carl Nylander and Stronach.⁷⁵ Nothing about the stonecutting itself necessarily indicates a Lydian rather than a Greek origin. The form of the structure and the use of ashlar masonry are more suggestive. This building form has no clear local forerunners and, like the masonry, it was probably adopted to signify Persia's new

imperial status. Greek temple platforms may be among its antecedents, but another close parallel is the Lydian terrace at the Byzantine Fortress at Sardis (no. 11).⁷⁶

This type of structure sits naturally in the Sardian landscape, with its fanlike alluvial terraces, cut by occasional wadis, spreading out at the base of the Acropolis. We have seen that similar platforms supported by massive rubble walls preceded the appearance of ashlar masonry in Lydia, and that after the introduction of ashlar masonry, probably in the first instance for use in tomb architecture, the new technique was soon adopted as a way of adding grandeur to these terraces, befitting Sardis's new status as an imperial capital. The development of this tradition was cut short by the fall of the Lydian empire. But both the building type and the building technology were apparently transferred to Iran and to the service of the Persian kings. In this way, the history of the Lydian building tradition comes full circle, for the Tomb of Cyrus and the Tall-i Takht, structures that combine elements of several different architectural traditions to express the new imperial status of Persia, are products of the same rich and varied cultural interaction between the Near East, Greece, and Asia Minor that produced the Tomb of Alyattes and the Lydian fortifications of Sardis.

73 Rawlinson, *Herodotus* I, 180 (note to Bk. 1, Ch. 93); Hanfmann, *SPRT*, 57; Stronach, *Pasargadae*, 40–41 n. 48.

74 On this subject, see Nylander, *Ionians*, 96–97; Roaf, "Persepolitan Metrology."

75 Nylander, *Ionians*, 75–91; Stronach, *Pasargadae*, 11–23. On the dressing of the masonry of the outer face of the platform and of the inner parapet and staircases, see the discussion of finishing process used on the steps of the Pyramid Tomb above, in Ch. 3.

76 Greenewalt et al., "Campaign of 1985," 78. Stronach (*Pasargadae*, 20–23) earlier observed that the Tall-i Takht is also comparable to the Lydian terraces on the Acropolis of Sardis (no. 16), suggesting that "Cyrus's own unfinished design for an elevated residential palace was based, in part at least, on the signal model of the Lydian royal Acropolis at Sardis" (p. 23).

PART II
CATALOGUE
of
MONUMENTS

Catalogue of Monuments

This catalogue includes all the ashlar masonry structures excavated or reexcavated by the Sardis Expedition at Sardis and Bin Tepe between 1958 and 2009. The locations of the monuments are shown on Figures 3–5. Each catalogue entry includes a brief history of the exploration of the monument in question, a list of the main dimensions, a description, a discussion and list of associated finds, the proposed date, and a basic bibliography (with sources listed in chronological order).

TOMBS: BIN TEPE

(the tumulus cemetery north of Sardis)

1. TOMB OF ALYATTES: THE CHAMBER COMPLEX (Figs. 17–40)

INTRODUCTION

The tomb identified as that of Alyattes is an enormous burial mound approximately 355–60 m in diameter and 60 m high (Figs. 17, 19). It rests on top of a natural outcropping of limestone, still visible in places, and may have also had an artificial stone base of some kind; on the summit is a single large limestone marker (Fig. 18). The identification depends on correspondences between this mound in its present state and Herodotus's description of the Tomb of Alyattes. This evidence is discussed above, in Chapter 1; the stone base is discussed below, in Appendix 2. Most striking is the correspondence between the circumference of the Tomb of Alyattes as given by Herodotus and that of the mound in question. Herodotus recorded the former as 6 stades and 2 plethra, which, if based on an Ionic foot of 0.294 m, would equal 1,117 m; the circumference of the mound identified as the king's tomb is 1,120 m. The description that follows concentrates exclusively on the chamber complex buried beneath the tumulus, near the center of the mound. This complex consists of a large oblong chamber, oriented north–south, with an open forecourt at its south end (see Figs. 21–33).

HISTORY OF EXPLORATION

The Tomb of Alyattes was identified by Robert Wood in 1750. Its interior was first explored in modern times by Ludwig Peter Spiegelthal, who dug a tunnel into the south side of the mound in 1853 (Fig. 20; see above,

Ch. 1). Spiegelthal's tunnel led him to a network of ancient robber's tunnels, one of which brought him to the chamber complex, unfortunately already looted. Spiegelthal also explored and recorded a number of the other robber's tunnels but encountered no other built structures (several of these tunnels are now blocked; all those that remain accessible were reexplored in 1993).

The tunnel that leads to the chamber complex comes upon the northeast corner of the chamber at ceiling level. Spiegelthal apparently gained access to the chamber by crawling through a space between the southernmost two ceiling beams, both of which are broken and displaced (see Fig. 26). He then dug out the forecourt to the south. Both the chamber and the forecourt have now been reexamined by the Sardis Expedition. The complex was discovered anew in 1962. At that time, the forecourt was choked with debris and was completely inaccessible, the chamber more than half filled with earth and stones. The only way of entering the chamber was by crawling, like Spiegelthal, between the southernmost two ceiling beams. Between 1962 and 1976, the chamber complex was visited several times, and the condition of both the chamber and the forecourt remained the same. When the mound was next entered, in 1980, treasure hunters had apparently shifted the rubble filling the forecourt into the chamber, rendering the forecourt accessible—from the top of the chamber—for the first time since the complex was rediscovered but filling the chamber to within half a meter of the ceiling. From 1980 to 1992, the condition of the chamber complex remained the same. Between 1992 and 1993, however, some of the rubble in the chamber was moved back into the forecourt, so that

both forecourt and chamber were somewhat more than half filled with rubble.

DIMENSIONS

Forecourt: W. 2.43 m.

Entrance to chamber: H. 2.33 m, W. 1.23 m, D. 0.87 m.

Chamber: H. 2.33 m., W. 2.37 m, L. 3.32 m

DESCRIPTION

As is clear from Figures 23–33, the condition of the masonry of the chamber complex is not good. The walls of the forecourt and the facade of the chamber all tilt markedly to the east. All the ceiling beams are broken, and many of the blocks of the chamber walls are cracked and have lost large spalls. Spiegelthal suggested this damage was caused by earthquakes, and this is not unlikely; it is also possible that it is due to settling, if the foundations of the chamber complex were inadequate (unless the complex is founded on bedrock, a possibility discussed below).

Forecourt. The forecourt is an unroofed space in front of the chamber, open at its outer (south) end and bordered on both sides by huge limestone wall blocks aligned with the side walls of the chamber (see Figs. 21–27; see above, Ch. 1, on Spiegelthal's mistaken notion that the forecourt had a vaulted ceiling). The floor of the forecourt is limestone, not marble as recorded by Spiegelthal. Only a few patches were exposed, and it is unclear whether the floor is an artificial pavement, as Spiegelthal claimed, or a surface hewn out of the native rock. Both the western wall block and the west side of the facade of the chamber appear to rest on top of the floor, but this does not mean the floor is not an artificial pavement; in several other Lydian tomb chambers, the walls are built on top of the floors, without any special foundation (see above, Ch. 3). The floor is apparently level across the threshold of the entranceway, but it seems to slope up to the south, from the doorway toward the outer end of the forecourt (Fig. 23).

The limestone block that forms the western wall of the forecourt is 2.08 m wide, 2.51 m high, and 0.90 m thick, with an estimated weight of 12 metric tons. Chisel dressed on its bottom and right-hand margins, it is point dressed elsewhere, as indicated in Figure 23. The upper right-hand corner of the block is broken away, and the reconstruction in the isometric views in Figures 21 and 22 is conjectural. The eastern block is visible in only a few places, and no side is fully exposed.

The facade of the chamber consists of marble doorjambs and a limestone lintel block (Figs. 24, 25,

27). While the western doorjamb is fully exposed, only one corner of the eastern jamb is visible. The lintel block, now broken, is 3.90 m wide, 1.11 m high, and 1.45 m thick (as measured along the underside); it has an estimated weight of over 15 metric tons.

The dressing of the western doorjamb is similar to the dressing of the western wall block, except that the doorjamb consists of four separate blocks (matching the four courses of the chamber walls; see below). The bottom and left-hand margins of the jamb as a whole are smoothly dressed, while on the bottom three blocks, the part above or to the right of these margins is rusticated—it consists of a panel that projects about 0.015 m from the smoothly dressed areas and has chisel-drafted margins enclosing rougher, point-dressed central areas. The topmost block is somewhat different, in that the area to the right of the smooth-dressed band is not rusticated but rather point dressed all over. In all, the dressing of the jamb produces the effect of a textured vertical bar enclosed on its bottom and left side by a smoothed L-shaped frame.

The dressing of the upper part of the jamb displays some irregularities. One of these is a vertical band on the right-hand side, rather coarsely chisel cut, that extends from the top of the jamb to a point halfway down the second block; this strip is cut back to the same plane as the margins of the rusticated panels but is considerably wider. A second irregularity is the way the top of the point-dressed area on the topmost block extends to the left in a strip 0.15 m wide and 0.10 m high.

These and other details indicate the masonry of the forecourt is unfinished (see above, Ch. 3). Originally, the builders probably intended to smooth off both the wall blocks and the doorjambs entirely. The smoothed bands that run around the edges of the western wall block and the western doorjamb indicate the intended final surfaces of both walls. The chiseled strip in the upper right-hand corner of the doorjamb shows where the masons have started the final dressing of the facade. The top block is treated differently from the lower blocks partly because it bore the weight of the enormous lintel block directly; thus, the upper margin of this block was left rough to protect it from chipping while the lintel block was laid in place, and the point-dressed strip that extends into the smoothed band on the left-hand side of the jamb is like one of the protective lips that run around the tops of the walls of the chamber (see below).

The western doorjamb is slightly displaced, so that it leans backward and to the right. This displacement has revealed the surface that the western wall block abutted—a good example of a banded joint (see above,

Ch. 3). The joining surface is worked with a chisel in a single plane, but there is a clear distinction between the fine chiseling of the contact bands at the front of the joint and the somewhat coarser chiseling of the area behind the contact bands (see discussion below and Fig. 32, for the similar treatment of the joints between the chamber wall blocks).

The doorway itself was blocked with masonry. Nine marble blocks remain in situ, filling the bottom third of the doorway and rising all the way up to the lintel on the right side. The stones that filled the upper left-hand corner of the doorway have presumably been removed. Where the inside of the left-hand (western) doorjamb is exposed, it is smoothly dressed. Most of the blocking stones are broken, but the faces of individual blocks, where preserved, are all dressed in generally the same way, with chisel-drafted margins and point-dressed centers. All the blocks are smoothly dressed on top and bottom. In the first two courses, the sides of the blocks are only roughly worked, and there are gaps of several centimeters between adjacent blocks. In the third and fourth courses, however, the rising joints are straight and fine; the joint between the two preserved blocks of the fourth course is also beveled on its right side. The one block remaining in the fifth course is broken on every visible surface.

When the tomb chamber was closed, the unroofed forecourt was presumably filled in and buried beneath the mound. By the mid-nineteenth century, it seems to have been completely hollowed out, either by Spiegelthal or by the tomb robbers who had preceded him. In its current state, the forecourt is more than half filled with earth and debris. Much of the debris has fallen from above or been moved around by treasure hunters, but some large stones seem to be in their original positions. These include the roughly dressed but squared block visible on the right-hand side of Figure 27, about midway between the floor and the top of the doorway; the block is level on top and aligned with the facade of the chamber. This and other blocks seem to represent a rather haphazard but intentional filling—with earth, rubble, and the occasional carefully placed block. It is uncertain whether these blocks—or those used to close off the entrance to the chamber—were left over from the construction of the chamber, were originally intended for some other unbuilt structure (such as a dromos south of the forecourt), or were brought in specifically as filling material.

Chamber. The floor of the chamber is no longer visible today; according to Spiegelthal, it is paved with marble slabs, but this testimony must be regarded with caution.

The walls are built up in four courses of squared marble blocks, roughly but not precisely equal in height. The ceiling is composed of five great limestone beams (including the lintel spanning the doorway).

The walls of the chamber are smoothly dressed, except for protective lips running along the top of each wall (see Figs. 26, 28–30, 32; on protective lips, see above, Ch. 3). The protective lips are 0.070 m high and 0.035 m thick. They stop just short of the ends of the walls, so that masons trimming them away would not have to cut against the inner or reentrant corners of the chamber; in addition, the tops of these protective lips are beveled, or cut at an angle, so that they do not come into contact with the ceiling blocks (see Fig. 32). This detail was designed in part to make it easier for the masons to remove the protective lips after construction, in part also to reduce still further the risk of chipping when the ceiling blocks were laid in place. The treatment of the protective lips at the joints between adjacent blocks is preserved in only two places, on the north and east walls (Figs. 28, 32). In both places, the protective lip on the right side of the joint is beveled—on the east side in the north wall (Fig. 28) and on the south side in the east wall. The protective lip on the adjacent block in the north wall is straight, while the protective lip on the adjacent block in the east wall is not preserved. As on many other Lydian monuments, the beveled edges probably indicate the direction of laying (see above, Ch. 3), that is, from left to right. Therefore, the top course was probably laid in one stretch starting from the southwest corner and working around the chamber to the southeast corner.

Similar protective lips are also preserved at the joints between ceiling blocks (combined width of protective lips 0.070 m, thickness 0.013 m). Just as the protective lips on top of the walls stop short of the corners, so the protective lips on the underside of the ceiling stop short of the walls of the chamber. Close examination of the joints between the ceiling blocks also shows that in every case the protective lip on the north side of the joint is beveled, while the protective lip on the south side of the joint is not beveled; this evidence establishes that the lintel spanning the doorway was, not surprisingly, the first block of the ceiling to be laid, and that the other blocks were laid up in sequence against it.

The survival of these protective lips, like the survival of the protective mantles on the walls of the forecourt, shows that the tomb chamber is at least technically unfinished. Why then are the walls of the chamber so much more finished than the walls of the forecourt? The most likely explanation is that the builders tried to finish the chamber walls as much as possible before laying in the ceiling blocks; if they had

waited until after the ceiling was in place, it would have been harder for them to see their work and to dispose of working debris, considerations that did not apply to the unroofed forecourt. Before their final dressing, the chamber walls probably resembled the facade as now preserved. The ceiling blocks were finished in advance, however, except for protective lips at the joints, for some of the same reasons that the chamber walls were finished before the ceiling blocks were laid in place and because it would have been difficult to work on them from below.

One other protective lip does survive, on the northeast corner of the western doorjamb (see Fig. 29; 0.040 m wide, 0.013 m thick, beveled on east side, i.e., at the actual corner). The corresponding corner of the eastern doorjamb is not preserved. Although these salient corners are not joints, they were similarly susceptible to damage during construction, and it is possible that protective lips were left on the corners of both doorjamb for that reason.

Both the walls and the ceiling are damaged in many places, revealing the joints between adjacent blocks (only rising joints are exposed; see Fig. 32). The joints are banded in the same way as those of the forecourt, described above. Of great interest is a large clamp visible at the top of the wall in the northwest corner of the tomb (Figs. 30, 31; see also Olfers, "Königsgräber," pls. 3, 4). The purpose of this clamp was presumably to tie the north wall to the west wall at this corner (the latter abuts on the former in an elaborate interlocking joint; see reflected ceiling plan on Fig. 26, Fig. 30); the corner of the west wall has been broken away, however, and with it, half the clamp. The clamp is thus revealed in cross-section as it projects from the north wall, though enough remains of the cutting in the west wall to show that it is butterfly shaped (the width of the cutting at the widest is 0.11 m). As exposed, the clamp itself is a bar, nearly square in section, of solid lead; it is 0.035 m thick and would have been approximately 0.130 m long. At least three other clamps are visible, one more in the northwest corner (in the third course from the bottom) and one each in the north and east walls, and it is possible that all the wall blocks were clamped; the ceiling blocks do not appear to be clamped, and, as already noted, the floor is no longer visible.

A layer of oak charcoal, 0.25–0.30 m thick in places, rests on top of the ceiling blocks of the chamber (Fig. 33). Spiegelthal and Olfers suggested that this layer was a remnant of a funeral pyre, but the purity of the layer, which contains no ash or any other inclusions, indicates that it served an architectural function, perhaps as a waterproofing agent of some kind (see above, Ch. 2).

Areas North and Southwest of Chamber. The area north of the chamber was explored by Spiegelthal, who reported that the northwest corner of the chamber abutted an outcropping of native rock—a reddish white limestone—and that the spaces between this outcropping and the chamber were filled with rubble and earth. In 1962, Hanfmann reported that gaps had opened up on both sides of one of the blocks in the second course of the north wall (now inaccessible), and that it was possible to see through these gaps to what he identified as the face of a second thickness of blocks (see plan of tunnels on Fig. 26). Hanfmann ("5th Campaign [1962]," 55) also reported that there were "additional large marble blocks northwest of the chamber." These were apparently visible through a crack in the northwest corner of the chamber, now also largely inaccessible. Hanfmann suggested that these blocks, together with the second thickness of blocks behind the north wall, belonged to a second burial chamber to the north.

Hanfmann identified one other potential feature in the vicinity of the chamber: "The possibility of yet another structure is suggested by a mighty stone beam visible for 1.20 m in length and 1 m high lying at the south end of the tunnel west of the chamber, on a level much higher than the roof of the chamber" (Hanfmann, "5th Campaign [1962]," 55–56; see Fig. 20, "limestone outcropping"). This tunnel is still accessible and was explored in 1993; the feature identified by Hanfmann as a stone beam is instead clearly an outcropping of native limestone.

In their descriptions of the features north of the chamber, Spiegelthal and Hanfmann were likely referring to the same things; what Spiegelthal took to be a native outcropping, Hanfmann thought was a man-made wall, and what Spiegelthal thought was a rubble packing, Hanfmann also took to be a masonry structure. It is difficult without access to all the evidence to decide between these two interpretations, but Spiegelthal's seems the more inherently plausible. Lydian tomb chambers are often built on or up against outcroppings of bedrock, and there is at least one outcropping of bedrock nearby, which was mistaken by Hanfmann for a stone beam. Although it would be surprising to find large blocks used in a rubble packing, it is not clear from Hanfmann's notes how large or carefully worked the blocks to the northwest of the chamber are—and at any rate, large squared blocks were certainly included in the filling of the forecourt, where it is clear that they did not serve any other architectural purpose.

Hanfmann, noting that the tomb chamber is not exactly centered in the mound (see Fig. 19) and having

identified what he believed to be two other possible structures nearby, suggested that “other chambers or chamber complexes” may be situated either in the center or in other parts of the mound (Hanfmann, “5th Campaign [1962],” 56). The evidence, however, for other structures in the vicinity of the known chamber complex is tenuous, as we have seen. Furthermore, if Spiegelthal was correct in identifying the rock surface north of the chamber as an outcropping of bedrock, the presence of this outcropping might explain why the chamber was located slightly off-center. That is, the spot may have been chosen precisely so that the chamber could be built up against bedrock, like several other tumulus tomb chambers (e.g., BT 66.2, 3, 4, and 6 [nos. 6–9]), while the center of the mound may have been determined by more general topographical considerations—and this is not the only eccentrically situated Lydian tumulus tomb chamber. No other Lydian tumulus is known to have more than one chamber complex, and though the possibility cannot be dismissed that the Tomb of Alyattes is exceptional in this as in other respects, it is more likely that the tomb chamber described above is indeed the one and only chamber buried beneath this great mound.

FINDS

As noted in Chapter 1, Spiegelthal found several fragments of alabaster and ceramic vessels in the debris filling the chamber. In addition to these finds, the Sardis Expedition has recovered several other pottery fragments at the entrance to Spiegelthal’s tunnel, in the tunnel itself, and in the tomb chamber. Finally, excavations at the base of the mound in 1993 yielded an unusual small limestone “plug.” A catalogue of both Spiegelthal’s and the Sardis Expedition’s finds is given below.

A. Pieces found by Spiegelthal, all apparently from the chamber.

1. Skyphos, fragment of foot and lower body. Dark bands on white (?) ground on exterior. Olfers, “Königsgräber,” pl. 5:1. Fig. 34.
2. Skyphos, body fragment. Dark bands on white (?) ground on exterior. Olfers, “Königsgräber,” pl. 5:2. Fig. 34.
3. Skyphos, fragment of foot and lower body. Dark bands on white (?) ground on interior and exterior. Olfers, “Königsgräber,” pl. 5:3. Fig. 34.
4. Skyphos, rim fragment. Dark glaze with reserved bands (?) below rim on exterior. Olfers, “Königsgräber,” pl. 5:4. Fig. 34.
5. Lid, fragments preserving entire profile from rim to ring handle in center of lid. Concentric light circles on dark ground. Olfers, “Königsgräber,” pl. 5:5. Fig. 34.
6. Skyphos, fragment preserving part of rim and one handle. Dark glaze on handle zone, below, light bands on dark ground. Olfers, “Königsgräber,” pl. 5:6. Fig. 34.
7. Lydion, fragment of foot and lower body. Decoration uncertain. Olfers, “Königsgräber,” pl. 5:7. Fig. 34.
8. Lydion, almost complete. Decoration uncertain. Olfers, “Königsgräber,” pl. 5:8. Fig. 34.
9. Lydion, almost complete. Decoration uncertain. Olfers, “Königsgräber,” pl. 5:9. Fig. 34.
10. Alabaster alabastron, body fragments preserving two lug handles. Olfers, “Königsgräber,” pl. 5:10. Fig. 34.
11. Alabaster alabastron, body fragments preserving one lug handle, round bottom of vase. Olfers, “Königsgräber,” pl. 5:11. Fig. 34.
12. Alabaster alabastron, fragment preserving rim, opposing lug handles, and upper part of body of vase. Hanfmann, *SPRT*, 56. Ashmolean Museum 1919.51. Fig. 35.

B. Pieces found by the Sardis Expedition, specific find spot noted for each piece.

13. Lydion, fragment of foot and lower body. Red glaze on exterior. Found in front of Spiegelthal’s tunnel in 1959. Uninventoried. Figs. 36:a, 37:a.
14. Lydion, fragment of foot and lower body. Streaky glaze on exterior. Found in front of Spiegelthal’s tunnel in 1959. Uninventoried. Figs. 36:c, 37:c.
15. Lydion, fragment of foot and lower body. Red glaze on exterior. Found in front of Spiegelthal’s tunnel in 1962. P62.250:4539. Figs. 36:d, 37:d.
16. Lydion, fragment of foot and lower body. Streaky glaze on exterior. Found ca. 50 m down the tunnel in 1962. P62.379:4719. Figs. 36:b, 37:b.
17. Skyphos, body fragment. Dark bands on white ground on exterior. Found in the chamber in 1976. Uninventoried. Figs. 38:a, 39:a.
18. Lydion, fragment of rim and neck. Streaky glaze on interior and exterior; bands on neck. Found in the chamber in 1976. Uninventoried. Figs. 38:b, 39:b.
19. Lydion, body fragment. Red glaze on exterior. Found in the chamber in 1976. Uninventoried. Figs. 38:c, 39:c.
20. Barrel-shaped limestone “plug.” L. 0.13 m, diam. 0.08 m. Found at base of mound in 1993. S93.7:10101. Fig. 40.

DATE

610–560 (the years of Alyattes's reign).

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2. KARNIYARIK TEPE (BT63.1): THE CREPIS WALL

(Figs. 41–76)

INTRODUCTION

Karniyarik Tepe is a large tumulus approximately 220 m in diameter and 50 m high (Fig. 41). It was identified by Hanfmann as the Tomb of Gyges, but this identification now seems incorrect (see above, Ch. 1). No burial chamber in this mound has ever been located. Exploration of the interior of the mound has, however, exposed a curving limestone wall, composed of three courses of finely dressed blocks—apparently the crepis or retaining wall of an earlier and smaller tumulus, buried beneath the present mound (Figs. 42, 43). The description that follows concentrates exclusively on this crepis wall.

HISTORY OF EXPLORATION

Karniyarik Tepe was the major focus of the Sardis Expedition's work at Bin Tepe from 1963 to 1966. Investigation of the tumulus began in 1963 with trenches dug to look for a perimeter wall on the south side of the mound, a program of drilling down from the top in search of the burial chamber, and a series of electrical resistivity tests. The digging and drilling were unproductive, but the resistivity testing yielded interesting results. Neither a chamber nor a perimeter wall was detected, but measurements on the southeast side of the mound "showed a constant resistivity high which . . . fell at nearly the same altitude . . . [as] the limestone ridge on which the north side of the mound rests" (David Greenewalt in Hanfmann, "6th Campaign [1963]," 58). This level seemed to correspond to the level

on top of the bedrock on the north side of the Tomb of Alyattes, which was the same as the level of the chamber inside, suggesting that in both cases, the mounds were heaped up over leveled bedrock terraces.

The crepis wall was discovered in 1964, in a tunnel dug in at ground level from the south side of the mound (Figs. 42, 43; see above, Ch. 1; it had already been partly exposed by ancient robber's tunnels). Digging eventually revealed about one-third of the circumference of the crepis wall, which is approximately 90 m in diameter and concentric with the outside of the tumulus. Continued tunneling to and around the center of the mound failed to locate a burial chamber, and in 1966, the exploration of the mound was brought to a halt.

Renewed investigation of Karniyarik Tepe began in 1991, with a new study of the crepis wall buried beneath the mound. In 1992, a georadar survey of the tunnels in the center of the mound (within the perimeter of the crepis wall) was carried out in the hope of locating a burial chamber in this area without further tunneling; in 1995, the results of this survey were tested by a program of drilling and coring. In the end, however, these efforts were in vain, and the burial chamber remains undiscovered.

The tunnels inside Karniyarik Tepe remain open and in good condition, so that the wall is still accessible. When the crepis wall was discovered in 1964, many of its limestone blocks had already been displaced, perhaps by earthquakes or by settling. Some additional settling seems to have occurred, but the wall remains in excellent condition overall. Between 1992 and 1994, however, the condition of the wall deteriorated noticeably, though not seriously—the major damage being numerous small chips in the edges of the blocks. A moderate earthquake

shook this area in the winter of 1992/93, a possible cause of the new damage.

DESCRIPTION

The three courses of the crepis wall vary slightly in height (Figs. 44, 45). The bottom course is founded on an uneven surface, and although the top of the course is level, the heights of individual blocks range from 0.56 to 0.67 m. The middle course is 0.57 m high. The upper, or “bolster,” course, a large crowning molding about two-thirds round, ranges from 0.52 to 0.57 m in height, depending on the relative finishing of the individual blocks; blocks that retain their protective mantles are taller than blocks on which the protective mantles have been trimmed away (see below, on the varied state of the completion of the wall). The maximum height of the wall is thus 1.81 m. The thicknesses of the blocks in all three courses tend to be equal to or slightly greater than their heights, and the lengths vary from 0.85 to 1.90 m. The crepis is built as a retaining wall, founded on bedrock or on a layer of limestone flakes on top of bedrock, and built up against either bedrock or an artificial packing of earth and stones. Thus, the back of the wall, which was never meant to be exposed, is roughly worked (Figs. 47, 56), while the faces of individual blocks are more or less carefully rusticated (Figs. 42, 47, 50–55).

The wall as revealed is divided by gaps into three parts: a western, a central, and an eastern section. The gap between the central and eastern sections is about 12 m wide and is caused by a natural outcropping of limestone that interrupts the circuit of the wall. The masonry breaks off in irregular steps on both sides of the gap (Figs. 44, 47, 50), suggesting that the builders eventually intended to close the gap by connecting the two sections of the crepis wall. The eastern end of the central section is partially bedded on the limestone bedrock. In the gap between the two sections, the bedrock that interrupts the wall has been trimmed back to a vertical quarry face (Figs. 48, 49). The builders may have left the gap open temporarily to be able to quarry the rock within the perimeter of the crepis wall for use in the ongoing construction of the wall.

The gap between the central and the western sections is 5.56 m wide (located just to the left of the point where the main north–south tunnel intersects the wall on Fig. 43). The crepis wall ends in straight joints on both sides of this gap, raising the possibility that the gap was intentional (see Figs. 55, 56; the west end of the central section is unfinished, and, except for a short stretch of the face, only the back of the east end of the western section was exposed). The excavator suggested that the gap might have been left open as the entrance

to an exceptionally broad dromos. If so, the dromos was never finished, for the bedrock rises up immediately behind the gap to above the level of the top of the crepis wall. It is also possible that the straight joints on either side of the gap do not have any special significance; the gap may have been left open for the same reason the gap between the central and eastern sections of the wall was left open—to maintain access to the bedrock (although the bedrock here is softer and coarser than the bedrock to the northeast)—and the builders may have eventually intended to close it.

The gaps show that the crepis wall as a whole was never finished, and the masonry of the central section is also unfinished. The bolster course, in particular, stops six blocks short of both ends of this central section, so that the bearing surfaces of the first and last six blocks of the middle course are exposed. At the eastern end (Fig. 50), the tops of all six blocks are still rough; at the western end, the three westerly blocks are also rough on top, although the bearing surfaces of the other three blocks have already been finished. There are also three gaps in the middle of the bolster course (Fig. 44). One of these gaps (the western gap) was apparently caused by Roman robbers who must have pried a block out of place to tunnel in toward the center of the mound; but in the other two gaps (the central and eastern gaps), the joining surfaces of the blocks on both sides are still rough, as are the bearing surfaces of the blocks underneath, showing that in both places, the blocks that would have filled the gaps were never laid in place (Figs. 53, 54).

In addition to these gaps and unfinished joints, the treatment of the faces of the blocks is extremely varied. All the blocks are rusticated, with chisel-drafted margins enclosing more roughly dressed central panels. In some places, however, such as the bottom course, long stretches of blocks are neatly and consistently trimmed, while in other places, especially the bolster course, the blocks are relatively roughly worked (see especially Fig. 52, for an example of variation in the trimming of a single block; see also Fig. 45). The other evidence that establishes that the wall is unfinished suggests that several different stages in the process of trimming the faces of the blocks are represented. In Figure 52, for example, the finely point-dressed area that runs along the bottom of the bolster block is finished, while the upper part of the block retains its protective mantle.

The interpretation of this evidence is discussed above, in Chapter 3, together with various other technical details, including pry holes, handling bosses, the treatment of the joints, bevels in the edges of the blocks, and mason’s marks (see Fig. 45). The bevels and the mason’s marks are of particular interest. In the bottom course, the top edge

of every block is beveled, as is the bottom edge of every block in the middle course. In addition, the right side of every block in the bottom course of the central section is beveled, and either the right or the left side of most blocks in the middle and bolster courses is also beveled (see Fig. 51 for a good example of a vertical bevel). Only two blocks of the bottom course of the east and west sections were revealed. In both cases, the block next to the gap has no vertical bevels and the adjoining block is beveled on the side closer to the gap. A few blocks of the middle and bolster courses also have no vertical bevels, and a few others are beveled on both sides. The positions of the vertical bevels in the middle and bolster courses are shown in Figure 46, together with the positions of the mason's marks engraved on the faces of some blocks in all three courses (some mason's marks are illustrated in Figs. 57 and 58). The bevels preserve a record of the sequence and direction in which the blocks were laid, and, in at least one case, the mason's marks identify a specific working team. The significance of this evidence for reconstructing the organization of labor in the building of the crepis wall is also discussed above, in Chapter 3.

The tumulus defined by the crepis wall was about 90 m in diameter, as noted above. According to the excavator, "an attempt was apparently made to observe the curve of the wall in some of the longer blocks. This was not a mathematically calculated refinement, . . . however, for the curves on individual stones form arcs of much smaller radii than that described by the wall" (Crawford H. Greenewalt, Jr., excavator's field report). It was not clear from the tunnels dug behind the crepis wall how high the mound encircled by the crepis wall had been raised before it was abandoned. It is also unclear how long the crepis wall was exposed before it was buried beneath the larger mound. The excellent condition of the stone suggests that the interval was not long.

FINDS

The list of selected finds that follows is divided into five sections. The first four sections (A–D) cover the four years of large-scale investigation in the 1960s: the exterior of the mound in 1963 and the interior from 1964 to 1966. The most important group of sherds recovered during these years (as discussed above, in Ch. 1) was found in 1965 in "a vein of ashy debris," probably workmen's rubbish, which lay above the central section of the crepis wall, and must, therefore, have been deposited after the construction of the wall; these are nos. 9–14 in section C of this list. The fifth

section (E) has only one item, a fragmentary "fruit dish" found in 1991, also discussed above, in Chapter 1. This object was recovered from the stone fill packed up behind the crepis wall, and so must have been deposited during the construction of the wall.

A. 1963.

1. Lydion, fragment of rim and neck. Red glaze. Found in trenches in side of mound. P63.181:5214. Figs. 59, 60.

B. 1964.

2. Jar, shoulder fragment. Wave-line decoration. Found in Main Tunnel. P64.50:6028. Figs. 61:a, 62:a.
3. Oinochoe, rim fragment. Streaky glaze. Found in Main Tunnel. P64.234:6296. Figs. 61:b, 62:b.
4. Skyphos, rim fragment. Streaky glaze. Found in a robber's tunnel. P64.276:6360. Figs. 61:c, 62:c.
5. Jar, fragment of ring foot. Red slip on exterior. Found in a robber's tunnel. P64.321:6435. Figs. 61:d, 62:d.
6. Skyphos, fragment of foot. Streaky glaze. Found in back dirt. P64.447:6581. Figs. 61:e, 62:e.
7. Jug, almost complete. Plain. Found in a robber's tunnel. P64.365:6480.
8. Fragments of white marble, one surface point dressed. Found in a robber's tunnel. Uninventoried.

C. 1965.

9. Lamp fragments. Found in a "vein of ashy debris" above the central section of the crepis wall. L65.4:6656. Figs. 63:a, 64.
10. Oinochoe, many body fragments. Petals with white dots at tips on shoulder. Found in rubble fill of tunnel around crepis wall and in a "vein of ashy debris" above the central section of the wall. P65.17:6606 and P65.51:6652. Fig. 63:b.
11. Coarse flat-bottomed dish, fragmentary. Found in a "vein of ashy debris" above the central section of the crepis wall. P65.50:6651. Figs. 65:a, 66:a.
12. Dish, rim fragment. Red brown glaze on interior and exterior. Found in a "vein of ashy debris" above the central section of the crepis wall. Uninventoried. Figs. 65:b, 66:b.
13. Lydion (?) or table amphora (?) rim fragment. Streaky glaze. Found in a "vein of ashy debris" above the central section of the crepis wall. P65.48:6649. Figs. 65:c, 66:c.
14. Skyphos, body fragments. Streaky glaze. Found in a "vein of ashy debris" above the central section of the crepis wall. P65.53:6654. Figs. 65:d, 66:d.

15. Jar, fragment of shoulder. Wave-line decoration. Found in tunnel around crepis wall. P65.81:6694. Figs. 67:a, 68:a.
 16. Olpe (?) body fragment. Black glaze. Found in tunnel around crepis wall. P65.18:6607. Figs. 67:b, 68:b.
 17. Globular lekythos (?) fragment of shoulder with handle. Wave-line decoration. Found in tunnel around crepis wall. P65.19:6608. Figs. 69:a, 70:a.
 18. Jar (?) fragment of shoulder. Band with added white dots at juncture of shoulder and neck; below, pendant hooks. Found in tunnel around crepis wall. P65.79:6693. Figs. 69:b, 70:b.
 19. Dish, rim fragment. Bichrome decoration. Retrieved from dump. Uninventoried. Figs. 71:a, 72:a.
 20. Oinochoe, shoulder fragment. Petals painted in red glaze on shoulder, below, two lines; body glazed. Found in robber's tunnels in center of mound, 0.80 m above bedrock. P65.92:6710. Figs. 71:b, 72:b.
 21. Dish (?) or lid (?) rim fragment. Red glaze on exterior, interior plain. Found in robber's tunnels. Uninventoried. Figs. 71:c, 72:c.
 22. Skyphos, rim fragment. Streaky glaze, reserved band below lip on exterior. Found in tunnel around crepis wall. P65.49:6650. Figs. 71:d, 72:d.
- D. 1966.
 23. Skyphos, rim fragment. Streaky glaze, reserved band below lip on exterior. "From tumulus debris." P66.71:7093. Figs. 73:a, 74:a.
 24. Large closed vessel, body fragment. Streaky glaze band in plain ground. Found in interior of mound. P66.91:7121. Figs. 73:b, 74:b.
 25. Dish, rim fragment. Black-on-red decoration. Found in interior of mound. P66.88:7118. Figs. 73:c, 74:c.
 - E. 1991.
 26. Dish, fragments of rim and stem. Black-on-red decoration. Found in packing behind crepis wall. P91.9:9857. Figs. 75, 76.

Date

Early to mid-sixth century. Robbed in Roman Imperial times (date of robbing given by find no. 7).

Bibliography

- Hanfmann, "6th Campaign (1963)," 53–55.
 Idem, "7th Campaign (1964)," 27–35.
 Idem, "8th Campaign (1965)," 27–30.
 Idem, "9th Campaign: 1 (1966)," 43–47.
 McLauchlin, "Graves," 250–52.
 Ratté, "Not the Tomb of Gyges."

3. BT62.4

(Figs. 77–87)

INTRODUCTION

BT62.4 is a small tumulus tomb, situated approximately three-quarters of a kilometer southwest of the Tomb of Alyattes. The diameter of the tumulus is estimated to have been about 35 m, but the mound is now much reduced by farming and it rises only ca. 4–5 m above the surrounding fields. Near the center of the mound is an elaborate tomb chamber, complete with dromos and antechamber, oriented roughly north–south with the entrance at the south end (Fig. 77). The top of the ceiling of the chamber is approximately 1.50 m below the present ground surface.

HISTORY OF EXPLORATION

The tomb was apparently penetrated by grave robbers in the spring of 1962; when first brought to

the attention of the Expedition, it was referred to as *para bulunduğu tepe*, "the mound where money was found." The robbers entered by digging down to the roof of the chamber, then prying two of the ceiling beams apart. The Sardis Expedition conducted three weeks of rescue excavation in August of the same year. The ceilings of the chamber and antechamber and the side walls of the open-air dromos were exposed, and the interior of the tomb and entranceway were cleaned out. After excavation and recording were finished, the doorway connecting the dromos to the antechamber was walled in, and the dromos was filled. The ceiling over the antechamber, which had been damaged before excavation, was repaired and covered with earth. Access to the tomb was maintained, however, through the gap opened up by the robbers in the ceiling over the chamber. Alone among the smaller tombs excavated by the Sardis Expedition at Bin Tepe, this tomb may still be visited. It remains in good condition, although the chamber and the

antechamber have begun to fill back up with earth and the floors are no longer visible.

DIMENSIONS

Dromos: H. 1.67–1.68 m, W. 1.06–1.10 m, L. 4.49 m.

Entrance to antechamber: H. 1.67 m, W. 1.40 m, L. 0.46–0.48 m.

Antechamber: H. 2.03 m, W. 1.75 m, L. 1.75 m.

Entrance to chamber: H. 1.43 m, W. 0.76 m, L. 0.57 m.

Chamber: H. 2.16 m, W. 2.15–2.16 m, L. 2.47 m.

DESCRIPTION

Dromos. The walls of the dromos rest on a floor of limestone chips, and, as already noted, there is no roof. The outer end was blocked by a stone packing that filled the last 0.82 m of the corridor and extended 0.95 m beyond the ends of the walls (Fig. 78). The walls are built of rough-trimmed limestone blocks set in a mud mortar mixed with some limestone chips. Individual blocks are in most cases roughly squared off with hammer-dressed faces.

Antechamber. The long walls of the dromos abut the entrance wall to the antechamber (concealing the antechamber's front, or south, face; Figs. 78, 79). The east and west walls of the antechamber itself, which abut the north face of the front wall of the chamber, consist of four courses of limestone ashlar masonry. In the bottom three courses, the southeast and southwest corners of the antechamber are mostly turned by L-shaped blocks, whose shorter east–west projections make up the doorjambs of the entranceway; the lintel spanning the doorway falls at the level of the fourth course (Fig. 81). The walls rest on a pavement of limestone slabs and carry two limestone ceiling beams, one of which had been broken apart before excavation.

The dressing of the wall blocks is uniform. They are finely point dressed except for the vertical borders, which are trimmed with a flat chisel. The chisel marks cross the joints between adjacent blocks, showing that the chiseling was done in situ. Probably the blocks were laid with protective lips on both sides; after the adjacent blocks had been laid in place, the protective lips were trimmed away. In the more carefully built walls of the chamber (see below), the wall blocks may have been laid with protective lips around all four borders.

The walls are damaged in several places, revealing the joints between adjacent blocks. The technique used for both rising and bedding joints is anathyrosis. The contact bands are chisel dressed and 0.06 m wide; the nonjoining surfaces behind the contact bands are point dressed and slightly recessed.

The floor blocks of the antechamber are smoothly dressed and systematically clamped (Fig. 77). All the clamps are iron staple clamps, embedded in lead in butterfly-shaped cuttings. In some cases, as seen in Figures 77 and 80, the lead settings do not completely fill the butterfly-shaped cuttings but instead are rounded off at one end, so as to resemble a child's schematic drawing of a fish. The threshold consists of two blocks end to end, with the joint between them occurring along the axis of the doorway. This joint is held tight by two clamps, one butterfly-shaped, one fish-shaped (Fig. 80). Inside the antechamber, the floor consists of three rows of long blocks perpendicular to the axis of the tomb. Each block is clamped to its neighbor along adjacent long sides. The first block is connected to the threshold by a single "fish clamp," the second block is tied to the first by two "butterfly clamps," and the third block, which runs under the front wall of the chamber, is connected to the second block by two fish clamps. The purpose of the clamping was to prevent gaps, caused by the downward pressure of the walls, from opening up between adjacent slabs. The alternation between butterfly- and fish-shaped settings, which are functionally equivalent, raises the possibility that settings of different shapes were used partly for purposes of decoration; it is more likely, however, that the alternation between settings is coincidental and that the fish-shaped settings are due solely to shortage or shrinkage of lead (otherwise, one would expect the cuttings, as well as the settings, to be of different shapes). The clamp cuttings are regularly 0.22 m long, 0.09 m wide at the ends and 0.04–0.05 m wide in the middle. The one visible staple is 0.16 m long and 0.01 m thick; its depth is uncertain (see above, Ch. 3, for further discussion of these clamps).

The southern ceiling beam, which remained in situ, is 0.34 m thick, point dressed on the underside, and roughly quarry cut on top. At its south end, the height of the ceiling has been raised by hollowing out the underside of the ceiling block. The ceiling was raised to compensate for a minor discrepancy in the relative heights of the walls, which are approximately 0.03 m lower at this end of the antechamber than at the other (Fig. 81). The northern ceiling beam was found in pieces. The dressing on the underside is the same as on the southern ceiling beam, but the top of the beam has been carefully cut so that it is triangular in section, presumably to reduce its weight without weakening its tensile strength. A similar ceiling beam is found in BT66.2 (no. 6).

Chamber. As noted above, the side walls of the antechamber abut the front wall of the chamber, which is built together with the chamber's side and back walls out of three courses of limestone ashlar masonry; the lintel over the doorway falls at the level of the third course. Like the antechamber, the chamber is paved with limestone slabs, which carry the walls, and covered with limestone ceiling beams. The floor of the chamber lies at the same level as the floor of the antechamber, and in fact the front wall of the chamber rests on top of the northernmost block of the floor of the antechamber, which is clamped to the southernmost block of the chamber floor.

A threshold block, 0.07–0.08 m thick, is slotted into the doorway in the front wall. The door plug used to block this opening was found on the floor of the antechamber (Fig. 79). The outer or south face of the front wall of the chamber is point dressed, like the side walls of the antechamber, except for a smoothly chiseled frame, 0.08–0.10 m wide, running around the doorway. This frame is like a contact band; it was cut to receive the flanges of the door plug, which were fitted up against it. Thin, vertical red lines are visible running down the smoothed bands on both sides of the doorway (on the west side, the line is preserved to a height of 0.67 m above the level of the floor, 0.08 m from the edge of the jamb). These lines may be traces of red pigment used in testing the fit between the door plug and the doorframe (this technique is discussed above, in Ch. 3). The underside of the lintel and one side of the door plug were trimmed with a claw chisel.

The walls of the chamber are built of ashlar masonry in three courses, as already noted. The faces of the walls, as well as the east and west faces of the doorjamb, are smoothly dressed (Fig. 84). Chisel marks crossing both the horizontal and the vertical joints show that the blocks were trimmed in situ. Two systems of dressing may have been used (see above, Ch. 3). One possibility is that the blocks were finished in advance, except for protective lips around all four margins, and that the protective lips were then chiseled off after construction; they would probably have been trimmed off all at once, except along the tops of the walls, after the walls were built but before the ceiling blocks had been lowered into place. Alternatively, the workmen may have left protective mantles on the blocks during construction, then finished off the whole surface of each wall afterward. In both cases, a mason trimming across either a vertical or a horizontal joint would always have held his chisel perpendicular to the joint, leaving the same kinds of toolmarks; thus, it is unclear what method was used. Whatever the method, the chisel marks

crossing the horizontal joints seem, where the stone is not damaged, to stop a few centimeters before each corner, indicating that the protective lips or protective mantles also stopped short of the corners, as they do on other tombs where they have not been chiseled away (e.g., the Tomb of Alyattes, no. 1; the Pyramid Tomb, no. 15). After the protective lips or protective mantles had been trimmed away, the entire surface of the wall was apparently smoothed with abrasives, erasing most evidence of tooling. What toolmarks remain suggest that the middles of the blocks are also, for the most part, trimmed with a flat chisel, but traces of claw chiseling are visible in the back corners of the chamber and along the back wall (Fig. 83), where the surfaces of the walls were partially obscured by the funerary couch (see below).

As in the antechamber, anathyrosis was used for both bedding and rising joints in the walls; the contact bands, where measurable, are as great as 0.08 m in width.

Discoloration on the back wall and parts of both side walls together with rough patches on the side walls show that a couch about 0.50 m high and 0.80 m deep occupied the full width of the north end of the chamber (Fig. 82). Fragments of the bed of the couch, a flat limestone slab hollowed out in a shallow oval on top, were found in the fill.

Earlier reports on the tomb erroneously suggest that the walls were coated with lime plaster. It is not unusual to encounter a thin layer of encrustation on the faces of limestone masonry at Sardis, caused by minerals traveling to the exposed surfaces of the blocks; just such a natural deposit is still present on the walls of the tomb, and it was probably this layer that was mistaken for an applied coating in this instance.

The floor of the chamber, now no longer visible, was smooth. In addition, many of the floor slabs in both the chamber and the antechamber were clamped together where necessary to prevent gaps from opening up between them. The clamps are staple clamps embedded in butterfly settings. A paving block has been removed from one corner of the tomb, showing that the joints between pavers are similar to the joints between wall blocks: anathyrosis with contact bands 0.08 m wide. The height of the floor slabs bordering on the missing slab is 0.33 m.

The underside of the ceiling is as finely smoothed as the walls, and chisel marks across the joints show that the ceiling blocks, like those of many other Lydian tombs, including the Tomb of Alyattes, were laid with protective lips at the borders, which were trimmed away in situ (in the case of the ceiling, as opposed to the walls, it seems much less likely that the whole surface

was trimmed back after construction; see above, Ch. 3). The nature of the joint between the middle and southern ceiling blocks is revealed where the blocks have been pulled apart: anathyrosis with contact bands 0.07 m wide at both the top and the bottom of the joint (Fig. 85). These blocks are 0.55 m thick. A last feature of the ceiling is the rebating of the tops of the blocks as seen in section (see Fig. 77). The excavator suggested this was done as a waterproofing measure, the resulting channel or trough being filled with an impermeable mixture of lime, mud, and limestone chips (as in BT63.2, no. 4). It is also possible that the masons cut these notches in the tops of the blocks simply to facilitate matching up the joining surfaces of adjacent blocks.

FINDS

The only artifacts recovered were seven sherds and an iron spear butt, none from good contexts.

1. Round-mouthed oinochoe, rim fragment. Bichrome decoration. Found in excavation down to ceiling blocks, i.e., on or above roof. P62.350:4669. Figs. 86:a, 87:a.

2. Skyphos, two fragments of rim and body. Black glaze on exterior with reserved band below lip; on interior, thin black and white bands. Found in fill. P62.422:4781. Figs. 86:b, 87:b.
3. Amphora or hydria, body fragment. Wave-line decoration. Found in fill. P62.424:4784. Figs. 86:c, 87:c.
4. Jar, shoulder fragment. Pendant hooks or semi-circles above broad band painted (black glaze on plain ground with some added white) on shoulder. Found in fill. P62.423:4783. Figs. 86:d, 87:d.
5. Closed vessel, two body fragments. Traces of three white bands on matt brown glaze on exterior. Found on floor of antechamber. P62.378a,b:4716.
6. Iron spear butt. Found on floor of antechamber. M62.73:4718. Waldbaum, *Metalwork* (Sardis M8), no. 16.

DATE

Late sixth or early fifth century.

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McLauchlin, "Graves," 179–82.

4. BT63.2

(Figs. 88–93)

INTRODUCTION

BT63.2 is a tumulus tomb located about 300 m east-southeast of Karniyarık Tepe. The mound is roughly 4 m high and 30 m across (Fig. 88). In the center of the mound is a simple tomb chamber, oriented east–west, with no doorway or accessory features. The ceiling of the chamber lies approximately 5 m below the top of the mound.

HISTORY OF EXPLORATION

This tomb was chosen for excavation in the summer of 1963 on the basis of electrical resistivity tests conducted by David Greenewalt. The tomb chamber was located by trenches dug down from the top of the mound. The chamber proved to have been looted by robbers who had tunneled sideways into the mound, encountered the ceiling, and then entered the chamber through a hole broken in one of the ceiling beams. The Sardis Expedition exposed the whole ceiling and then shifted one ceiling beam aside to permit easier entry to the chamber. At the end of the summer, the tomb was reburied

and has remained inaccessible for the last generation. The entry that follows is thus based entirely on field records, including the excavator's report, and drawings and photographs made at the time of excavation.

DIMENSIONS

Chamber: H. 1.35–1.37 m, W. at floor level 1.35 m, L. 2.88 m.

DESCRIPTION

The walls of the chamber, composed of three courses of limestone masonry, rest on top of a pavement of five limestone floor slabs and support a ceiling of four limestone ceiling beams. The height of the chamber (1.35–1.37 m) is nearly identical with the width at floor level. The side walls lean in as they rise, however, so that at ceiling level, the chamber is only 1.31 m wide.

The walls are neatly tied together. At the level of the bottom course, the short sides are bonded into (i.e., pass behind) the long sides; in the second course, the long sides are bonded into the short sides; and in the third course, the long side is bonded into the short side at the northeast and southwest corners, while the other two corners are turned by L-shaped blocks. It is notable that the two blocks of the top course of the

north wall were bedded at slightly different levels—so that the top of the course below steps up slightly to the west.

The faces of the blocks are rusticated, with chisel-drafted borders enclosing point-dressed central panels, trimmed back to the same plane as the margins (Figs. 89, 90). According to the excavator, the edges of the blocks are beveled: “all the edges of the horizontal joints are slightly beveled, but those of the vertical joints are irregular, though most are beveled” (John G. Pedley, excavator’s field report). The irregularity in the beveling of the vertical joints may be due to the same procedures evident in the Karnıyarık Tepe crepis (no. 2) and in Lydian retaining walls, discussed above, in Chapter 3.

Four square cuttings in the floor of the chamber (see Fig. 88) have been interpreted as sockets cut to receive the legs of a wooden sarcophagus. Fragments of the sarcophagus were found by the excavator of the tomb, together with pieces of iron fittings bearing textile pseudomorphs (M63.44:5638), studied by Crawford H. Greenewalt, Jr., and Lawrence J. Majewski.

The ceiling is composed of four beams, generally 0.30 m thick. They are rough picked on the underside (except where they rest on the walls; see Figs. 89, 90) and even more roughly dressed on top. The upper edges are beveled back, creating triangular channels at each joint, which were subsequently filled with a mud mortar tempered with limestone chips, understood by the excavator to be a waterproofing agent (Fig. 88; cf. BT62.4, no. 3).

Excavation below the level of the top of the tomb was carried on outside the east wall of the chamber, revealing a rubble packing behind the undressed exterior face of the masonry wall. It is unclear whether chunks of rock wedged in between the wall blocks at the back played

any structural role, for example, in supporting the wall blocks. If they did, it is possible that one of the reasons for beveling the bedding joints in the face of the wall was to make it easier to tip a block back and forth until the desired inclination of the face had been achieved, and rubble had been jammed in behind the block to maintain its position. Excavation stopped at bedrock at the level of the chamber floor.

FINDS

Four largely restorable vessels were found in the excavation of the tomb. They are presumably grave offerings, discarded by the tomb robbers.

1. Amphora, neck and mouth missing. On shoulder, swirls in white paint on plain ground, below, white lines on band of streaky glaze; on body, wave-line in streaky glaze on plain ground, lower body and foot glazed. Found in excavations on top of ceiling. P63.402:5540. Fig. 91, right.
2. Lydion. Gray monochrome. Found in excavations on top of ceiling. P63.444:5593. Fig. 92.
3. Lekythos. Streaky glaze. Found inside chamber. P63.443:5592. Fig. 91, middle.
4. Lekythos. Streaky glaze. Found inside chamber. P63.446:5595. Fig. 91, left.
5. Skyphos. Streaky glaze. Found inside chamber. P63.445:5594. Fig. 93.

DATE

Mid- or later sixth century (on the basis of the pottery).

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- Hanfmann, “6th Campaign (1963),” 55.
 Greenewalt and Majewski, “Textiles.”
 McLauchlin, “Graves,” 182–84.

5–9. TOMBS: BIN TEPE (DUMAN TEPE GROUP)

GENERAL INTRODUCTION

Duman Tepe, or “Smoke Mound,” is a low-lying limestone ridge situated roughly 1,300 m north-northeast of the Tomb of Alyattes, between that mound and the Gygaean Lake (mist from the lake presumably accounts for the ridge’s local name). The ridge is some 350 m long, running east–west and rising about 10 m above the surrounding farmland. Six Lydian tombs are spread out along this ridge. Five of these are tumuli (in some cases almost entirely eroded away), equipped with tomb chambers built wholly or partially out of limestone ashlar masonry (nos. 5–9). Nos. 5 and 6 are two distinct mounds known as the Çifte Tepeler (Twin Mounds) located at the eastern end of the ridge. Nos.

7 through 9 are clustered near the western end of the ridge. The sixth tomb, also located near the western end, is a simple rock-cut cist. All the tombs were disturbed, not only by modern robbing but also by ancient (Hellenistic and Roman) reuse.

HISTORY OF EXPLORATION

The Duman Tepe tombs were discovered by grave robbers in the spring of 1966. The Sardis Expedition conducted several weeks of rescue excavations in July and August of the same year. After excavation, the tombs were reburied; when last visited, by Christopher H. Roosevelt, in 2005, they were still inaccessible. The entries that follow are thus based entirely on field records, including excavators’ reports, and drawings and photographs made at the time of excavation.

5. BT66.1

(Figs. 94–100)

INTRODUCTION

The chamber complex in BT66.1 includes a dromos and an antechamber as well as a chamber; it is oriented east–west, with the entrance at the west end (Figs. 94, 95). The tomb was reused in the late Roman and Byzantine periods; according to the excavation report, approximately 150 skeletons and some 50 lamps were recovered.

DIMENSIONS

Dromos: H. 1.60–1.80 m, W. 1.00 m, L. 10.75 m.

Entrance to antechamber: H. 1.11 m, W. 0.65 m, L. 0.34 m.

Antechamber: H. 2.03 m, W. 1.75 m, L. 1.75 m.

Entrance to chamber: H. 1.53–1.55 m, W. 1.02–1.05 m, L. 4.35 m.

Chamber: H. 1.90 m, W. 2.00 m, L. 2.00 m.

DESCRIPTION

Dromos. The walls of the dromos are built of hammer-dressed chunks of limestone, resting on a floor of limestone chips, and spanned by limestone ceiling beams (Fig. 97). The ceiling bore a packing, 0.5 m thick, of rocks and clay. A single sherd found incorporated in this packing is the only independent evidence for the date of the tomb (Figs. 99, 100).

Antechamber. The doorway between the dromos and the

antechamber is flanked by rough-dressed monolithic posts and capped by a rough-dressed monolithic lintel block. A door plug cut to fit this opening was found in the excavation of the dromos.

The side walls of the antechamber are built of squared limestone blocks, but they are not smoothly dressed or finely joined, and every surface—walls, floor, and ceiling, including the exterior of the doorway—was originally coated with a thick layer of lime plaster (Fig. 98). On the walls, the plaster survives only at the bottom, revealing the coursing of the blocks, which is unusually irregular, perhaps because the stone was quarried nearby. The plaster on the floor is better preserved, but it is broken in places, exposing an underbedding composed of close-set flakes of limestone.

Chamber. The doorway between the antechamber and the chamber is almost exactly the same size as the doorway between the dromos and the antechamber, and it is constructed in the same simple way. The chamber is roughly square in plan and 2.00 m along a side at floor level, but the side walls incline slightly as they rise, so that the area of the ceiling is somewhat less. The walls of the chamber are built of four courses of limestone blocks. The floor and ceiling are also built of limestone masonry. The faces of the wall blocks (including the doorjamb and lintel block) are point dressed, some more finely dressed at the edges than in the middle (Fig. 96). Like the antechamber, the interior of the chamber was coated with plaster.

Two special features of the chamber are a bench, slotted into the back and side walls, and a semicircular opening cut into one of the two ceiling beams at the joint. A packing of limestone chips and mud is visible above the opening.

FINDS

Only one object associated with the construction of the tomb was recovered. Objects associated with the reuse of the tomb are not listed.

1. Small cup or bowl, fragment of the lower body and ring foot. Pinkish fabric, dull black glaze. Found in stone packing 0.50 m above ceiling of dromos. P66.56:7063. Figs. 99, 100.

DATE

Late sixth to fourth centuries.

BIBLIOGRAPHY

Hanfmann, "9th Campaign: 1 (1966)," 47–50.
McLauchlin, "Graves," 184–87.

6. BT66.2

(Figs. 101–5)

INTRODUCTION

The chamber complex in BT66.2 consists of a dromos leading directly to a chamber, oriented roughly north–south, with the entrance at the south end (Figs. 101, 102).

DIMENSIONS

Dromos: H. 1.60 m, W. 1.00 m (outer end) to 1.33 m (inner end), L. 7.50 m.

Entrance to chamber: H. 1.01 m, W. 0.77 m.

Chamber: H. 2.00 m, W. 2.00 m, L. 2.00 m.

DESCRIPTION

Dromos. The dromos slopes down toward the chamber, so that the floor at the entrance to the tomb is 0.5 m lower than the floor at the outer end of the dromos. The dromos survives to its original height only at the inner end, where two ceiling beams remain in place. The walls are built of rough-hewn chunks of limestone, set in mud mortar mixed with limestone chips, most closely fitted at the inner end of the corridor. The floor of the dromos is bedrock.

Chamber. As found, the doorway to the chamber was closed by a fitted plug, apparently never disturbed (the robbers entered through the roof). The door plug was removed in excavation.

The chamber is roughly 2.00 m by 2.00 m in plan, but as in the preceding tomb (BT66.1, no. 5), the side walls lean in slightly. The walls of the chamber are partially built, partially carved out of the bedrock. The bedrock has been leveled off at about the height of the bottom of the walls of the dromos. Below this level,

the front half of the chamber has been hollowed out to a depth of 0.62 m (the north end of the dromos has also been partially cut out of the bedrock). The back half of the chamber, however, was left as a bench or couch. Above the leveled bedrock, the walls are built of two courses of limestone blocks, with the lintel over the doorway in the front wall falling at the level of the second course.

The faces of the wall blocks are point dressed, some with drafted edges. According to the excavator's notebook, "several of the joins have been touched up with white plaster, and some holes have been filled" (Andrew Ramage, excavator's fieldbook). The bedrock floor and the rock-cut parts of the walls are more roughly dressed. The ceiling consists of three limestone beams. The ceiling blocks are smooth underneath but coarsely dressed on top, except for one unusual block, which is triangular in section (cf. no. 4 for a comparable block). The ceiling was originally buried beneath a packing of limestone chips, removed in excavation.

FINDS

The following is a list of selected finds from various contexts.

1. Lekythos, fragment of shoulder and neck. Pink fabric and fine black glaze suggest Attic manufacture. Found in fill of dromos. P66.49:7034. Figs. 103:a, 104:a.
2. Dish, rim fragment. Streaky glaze. Found in fill above ceiling of chamber. P66.46:7031. Figs. 103:b, 104:b.
3. Achaemenid bowl, many joining fragments. Coarse red glaze. Found in fill of dromos. P66.48:7033. Figs. 103:c, 105:b.
4. Jug. Plain except for a graffito on the shoulder. Found in fill of dromos. P66.47:7032. Fig. 103:d, 105:a.

5. Alabaster alabastron, rim fragment. Found inside chamber. S66.12:7089. Fig. 103:e.
6. Glass alabastron, body fragment. Found inside chamber. G66.8:7088. Saldern, *Glass* (Sardis M6), no. 1.

DATE

Late sixth or early fifth century (primarily on the evidence of the lekythos, find no. 1).

BIBLIOGRAPHY

Hanfmann, "9th Campaign: 1 (1966)," 50–51.
McLauchlin, "Graves," 201–3.

7. BT66.3

(Figs. 106–8)

INTRODUCTION

The chamber complex in BT66.3 consists of a dromos leading directly to a chamber, oriented northeast–southwest, with the entrance at the southwest end. The tumulus that presumably once buried the chamber has almost entirely disappeared, and even the chamber is only partially preserved (as is also true of BT66.4, no. 8).

DIMENSIONS

Dromos: W. 0.95–1.05 m, L. 3.50 m.

Entrance to chamber: W. 0.62 m, L. 0.27 m.

Chamber: W. 2.00 m, L. 1.70 m.

DESCRIPTION

The dromos is unroofed, its floor cut into the bedrock, its side walls built largely of limestone rubble masonry (Figs. 106, 107). The doorway to the chamber is flanked by two orthostat-like jambs, at least one of which was especially cut to receive the lintel block (Fig. 108). The maximum preserved height of the doorjambs is 1.02 m; the height of the actual doorway must have been somewhat less. In the chamber itself, the back wall abuts the side walls,

and the side walls abut the doorjambs. The back and side walls consist as preserved of a single course of limestone blocks, ranging from 0.46 to 0.49 m in height. The dressing of the faces of the blocks is hard to discern from the photographs; the jambs were said by the excavator to be chisel dressed. Four of the six surviving wall blocks and one of the jambs have handling bosses centered in the face of each block, 0.10 m above floor level. The floor of the chamber is paved with rough-picked limestone slabs, 0.30 m thick, laid without clamps. The doorjambs rest on the front two slabs, which actually project about 0.40 m into the dromos.

FINDS

The only small finds retrieved were apparently deposited with secondary burials.

DATE

Sixth to fourth centuries?

BIBLIOGRAPHY

Hanfmann, "9th Campaign: 1 (1966)," 51–52.
McLauchlin, "Graves," 187–89.
Rotroff and Oliver, *Hellenistic Pottery* (Sardis M12), 15.

8. BT66.4

(Figs. 109–13)

INTRODUCTION

The chamber complex in BT66.4 consists of a dromos leading directly to a chamber, oriented east–west, with the entrance at the east end (Fig. 109). As in BT66.3 (no. 7), the tumulus that presumably once buried the chamber has almost entirely disappeared, and even the chamber is only partially preserved.

DIMENSIONS

Dromos: L. 3–4 m.

Entrance to chamber: Preserved H. 1.09 m, W. 0.53 m, L. 0.37 m.

Chamber: Preserved H. 1.10–1.13 m, W. 1.78–1.79 m, L. 1.86–1.88 m.

DESCRIPTION

Dromos. The floor of the dromos, on or carved out of the bedrock, is preserved to a length of between 3 and

4 m. At its outer end, it is uneven but fairly level over a distance of about 2 m. At a point approximately 1.20 m from the front of the chamber, the floor of the dromos steps down 0.60 m into a flat-bottomed trench. The sides of this trench form the lower parts of both walls of the dromos. Above this level, the walls, rubble built but including at least one squared block, are almost entirely destroyed (Fig. 110).

Chamber. The doorway to the chamber was closed by a fitted plug, still in situ when the tomb was excavated (Fig. 111). The floor of the chamber, hollowed out of the bedrock, lies at the same level as the floor of the inner end of the dromos. The native rock has been used for the lower 0.54 m of all four walls of the chamber (the doorway being cut through the front wall); above this level, there survives a single course of ashlar limestone masonry. Six blocks remain in situ; a seventh, which belonged to the front wall, was found displaced.

The faces of the blocks seem to be finely and evenly point dressed. The rising joints, where exposed, display anathyrosis. Every surviving block is tied to its neighbor by a combination butterfly and staple clamp. The clamps themselves have been removed, and the cuttings are damaged, but a fragment of an iron pin wrapped in lead survived in one cutting at the southwest corner (length of cutting, 0.26 m, width at ends, 0.07 m, width at middle, 0.025 m, depth of pin, 0.08 m). A slot in the top of the rock-cut part of the back wall may have been cut to receive a bed slab or other couchlike feature.

Evidence for the ceiling of the tomb consists of two large blocks (0.35–0.40 m thick) retrieved from the fill of the chamber and a fragment of a third (0.40 m thick)

found lying to the north of the chamber. One block is rectangular, another triangular in plan. The excavator, Metin Kunt, suggested that the triangular block, which forms a roughly isosceles triangle, 1.83 m along the bottom and 1.00–1.10 m along the short sides, may indicate that the ceiling was constructed in the same way as the ceiling in the middle chamber of the tumulus at Belevi, where triangular blocks placed at each corner apparently served to reduce the space that had to be spanned by monolithic slabs (see Perrot and Chipiez, *History of Art*, 276, fig. 185; Kasper, “Belevi,” fig. 8, pl. 2). It is also possible that this block was a tympanum block supporting one end of a pitched ceiling, as found in Tomb 89.11 (no. 13).

FINDS

Selected finds from fill.

1. Amphoriskos, body fragment. Black glazed, with two incised (?) lines. Found in fill of chamber. P66.104:7141. Figs. 112:a, 113:a.
2. Lydion, fragment of the lower body and foot. Plain. Found in fill of chamber. P66.102:7138. Figs. 112:b, 113:b.
3. Fragment of glass vessel. G66.9:7140. Saldern, *Glass* (Sardis M6), no. 5.

DATE

Late sixth century?

BIBLIOGRAPHY

Hanfmann, “9th Campaign: 1 (1966),” 52.

McLauchlin, “Graves,” 203–5.

Rotroff and Oliver, *Hellenistic Pottery* (Sardis M12), 15.

9. BT66.6

(Figs. 114–17)

INTRODUCTION

BT66.6 contains a simple chamber, oriented north–south, without a true dromos or entranceway (Fig. 114).

DIMENSIONS

Entrance to chamber: H. 0.70–1.00 m, W. 0.72 m, L. 0.30 m.

Chamber: H. 1.55 m, W. 1.32–1.39 m, L. 2.55–2.56 m.

DESCRIPTION

The doorway to the chamber, in the north wall, is approached by a rough chute cut into the native rock

(Fig. 115). The facade of the chamber consists only of two pillarlike doorjamb, a lintel spanning them, and, partly supported by the lintel, the forwardmost ceiling block of the chamber. The builders of the tomb did not bother to level off the bedrock as it passes through the doorway, so that the door “sill” slopes down from east to west (and the footing of the eastern doorjamb is consequently higher than the footing of the western jamb). The lintel block is 0.30 m high, as is the ceiling block on top of it. The exposed surfaces of both jambs, the lintel, and the ceiling block are all rough dressed. A plain door block was found, fallen out of place, in front of the doorway.

As in some other tombs, the side walls of the chamber lean slightly toward the center. The walls, like the doorjambs, are built up in five courses of limestone blocks. The heights of the courses are unusually low, ranging from 0.24 to 0.34 m. The dressing of the blocks is rough; according to the excavator's notes, the "edges of all the blocks [are] more finely trimmed, but the surfaces of many blocks are not trimmed" (Metin Kunt, excavator's fieldbook). The floor of the chamber was partially hollowed out of the bedrock, partially composed of blocks fitted into sockets cut into the bedrock. The ceiling was composed of four rough-trimmed beams, 2.00 m long, 0.25 m thick, and varying in width.

FINDS

The following is a list of selected finds from various contexts.

1. Lydion, rim fragments. Surface abraded. Found in fill of chamber. P66.160a,b:7216. Figs. 116:a, 117:a (P66.160a only).
2. Lydion, body fragment. Surface abraded. Found in fill of chamber. P66.163:7219. Figs. 116:b, 117:b.

3. Lydia, fragments of rims and bodies. Traces of marbling preserved on some sherds. Found in fill of chamber. P66.147a–c:7202 and P66.160c, d:7216. Figs. 116:c (all five sherds), 117:c (P66.147a only).
4. Skyphos, rim fragment. White lines on streaky glaze; reserved band below lip on exterior. Found in fill of chamber. P66.148:7203. Figs. 116:d, 117:d.
5. Cup, rim and body fragments. Black glazed. Found in fill of chamber. P66.106:7143 and P66.153:7209. Figs. 116:e, 117:e.
6. Lydion, fragment of neck and body. White bands on dark red streaky glaze. Found in earth on ceiling slabs. P66.95:7131. Figs. 116:f, 117:f.

DATE

Late sixth century?

BIBLIOGRAPHY

- Hanfmann, "9th Campaign: 1 (1966)," 52.
 McLauchlin, "Graves," 189–91.
 Rotroff and Oliver, *Hellenistic Pottery* (Sardis M12), 15.

TOMBS: SARDIS

10. BK71.1

(Figs. 118–24)

INTRODUCTION

BK71.1 is a tumulus tomb high in the hills behind Sardis. It is located a few kilometers south of modern Sartmustafa, in the small village of Keskinler (Fig. 119)—one of a group of villages known collectively as Başlıoğlu Köyü (thus the abbreviation, BK). The chamber complex is oriented north–south, and it consists of a rubble-built dromos, leading at its north end to a small porch and a chamber built of squared limestone blocks (Fig. 118). The tumulus heaped up around the chamber is about 25 m in diameter and 3 m high as preserved.

HISTORY OF EXPLORATION

Robbers ransacked the tomb in the winter of 1970/71. The chamber and the space in front of the doorway were cleared of earth and debris in seven days of rescue excavation early in the following summer. Although the chamber has partially filled in again with earth and rocks, it remains in good condition and accessible today.

DIMENSIONS

Dromos: H. 1.90 m, W. 1.30–1.40 m, L. at least 5.20 m.
 Entrance to chamber: H. 1.92 m, W. 1.25–1.28 m, L. 0.74–0.78 m.
 Chamber: H. 1.25–1.28 m, W. 1.51 m at ceiling level, 1.71–1.72 m at floor level, L. 2.76–2.77 m.

DESCRIPTION

Dromos. Excavation of the dromos was limited to the area in front of the doorway. Except at the south end, the dromos was unpaved and unroofed, enclosed by side walls built of rough lumps of schist, and intentionally filled with rubble after construction. A section of the east wall of the dromos was exposed in a robber's trench 5.20 m from the doorway; the original length of the dromos is unknown.

Porch. The dromos terminates in a shallow porch flanked by two pierlike walls of squared limestone blocks, built up against the front of the chamber (Fig. 120). The eastern pier consists of seven superimposed blocks, the western pier of six blocks. The faces of the blocks are smoothly dressed except for horizontal protective lips on the upper edges of the topmost blocks on both sides and vertical protective lips on the south side of every block, that is, on the side abutting the front of the chamber. The piers rest on top of a floor of limestone slabs, and they carry a single limestone ceiling beam. The floor is finely dressed at the edges, that is, along the sides and back of the porch, rough picked in the middle. The underside of the ceiling beam is smooth.

Chamber. The entrance to the chamber is flanked by monolithic doorjambs and capped by a single lintel block. The lintel block is unusual in that it runs up into the ceiling instead of supporting a separate ceiling beam. The doorway was closed by two blocks, one on top of the other, rough dressed on the exterior but with rebated edges framing a finely finished plug on the interior. The plug was slightly wider and slightly taller than the actual doorway, and it was fitted into notches cut in the corners of the jambs and the bottom of the lintel. Two rounded holes in both of the pierlike walls of the porch in front of the doorway must have been intended to receive bars, presumably of wood, inserted to keep the door blocks in place. The holes are approximately 0.09 m in diameter and 0.16 m deep. Since the porch is approximately 1.30 m wide, two bars as long as 1.60 m each (the depth of both holes combined plus the width of the porch) could theoretically have been slotted into the holes on opposite sides. But since in fact no provision was made for inserting bars greater in length than the width of the porch (such as slanting cuttings in the sides of the holes), and since the holes on opposite sides do not correspond in level, the excavator Andrew Ramage suggested they were cut to receive four shorter bars or plugs that would not have extended all the way across the doorway. These shorter bars, if tightly fitted, would still have secured the door blocks effectively.

The side walls of the chamber itself lean in toward the center, so that the width of the chamber at ceiling level is 0.20 m less than its width at floor level. The side and back walls consist of six courses of limestone ashlar masonry. The doorjambs and lintel make up the front wall (Fig. 121). The bottom four courses of the side walls apparently continue behind the doorjambs, while the upper two courses abut the doorjambs and lintel. Three stages of construction may thus be inferred: (1) partial construction of side and back walls of chamber, (2) placement of doorjambs up against faces of side walls and placement of lintel over doorway, and (3) completion of side and back walls of chamber.

The walls of the chamber rest on limestone floor slabs and carry limestone ceiling beams. Four ceiling beams survived when the tomb was discovered (there are now only three); a fifth, which would have been the southernmost block, had been removed. A couch is built up against the west wall of the chamber. It is made of three pieces of limestone—a horizontal slab supported at both ends by upright blocks. The outer faces of the uprights are carved with a double volute pattern (Fig. 122).

Chisel marks crossing both the rising and the bedding joints in the walls of the chamber and porch suggest that many or most of the blocks were laid with protective lips on all four borders (see above, Ch. 3). The chiseling technique and other details help to clarify the construction sequence of the chamber in particular. As noted above, the positions of the blocks show that the chamber walls were built in three separate units: first, the lower four courses of the side and back walls; then the doorway; and then the upper two courses of the side and back walls. The trimming of the blocks, however, suggests that these three units were built in two major building phases: first the lower sections of the walls, then the doorway and upper sections of the walls.

The lower four courses are all approximately equal in height, and the joints between them are neatly and, for the most part, consistently trimmed. It is surprising, therefore, that the protective lips on both sides of all the rising joints in the bottom course on the side walls (except the corners) have not been trimmed away. This is less puzzling on the west wall, where these joints were hidden by the couch, than on the east wall; perhaps another piece of furniture, such as an offering table, would originally have concealed the joints on this side as well.

Many more protective lips survive on the doorway and the upper two courses of the walls. The western doorjamb retains protective lips on the top and bottom edges and on the western side (i.e., the side abutting the west wall of the chamber). The lintel has a protective

lip on the bottom edge in both places where it is in contact with the jambs. Both of the blocks abutting the lintel in the west wall of the chamber and one of the corresponding blocks in the east wall retain protective lips on their north sides (i.e., on the sides abutting the lintel). The southernmost blocks in the fifth course of both side walls also retain protective lips on the sides abutting the back wall, and the protective lips on both sides of one joint in the sixth course of the west wall survive as well. In addition to these protective lips at rising joints, the protective lips running along the tops of the back wall and both side walls are also intact.

The survival of so many protective lips is one feature that sets the doorway and the upper two courses apart from the lower four courses of the walls. But the difference between the two sections is even more striking where the protective lips have been trimmed away. In the lower four courses, the chisel marks crossing joints are neat, regularly spaced, and always perpendicular to the joints. In the upper two courses, however, the chisel marks are rough, irregular in length and spacing, and frequently cross the joint at a diagonal.

A final difference between the upper and the lower sections of the walls is perhaps the most obvious. The lower four courses are built of neatly squared blocks almost uniform in height, while the upper two courses are comparatively irregular. Both courses are smaller than the lower courses, and the sixth course is smaller than the fifth. The blocks are less carefully shaped, and in the east wall in particular, the bedding joint between the fifth and sixth courses is not level; as a result, the blocks are not square, and the masons had to correct by stepping the joint up a few centimeters at one point.

All these details indicate, as already noted, that the lower four courses were built and trimmed in a single building phase, and the doorway and upper two courses were added on in a second phase, apparently in some haste, as the careless trimming of the joints in particular suggests.

The upper left-hand block of the back wall is missing, exposing the joining surfaces of the surrounding blocks. These surfaces are "banded": more finely finished at the front than at the back, but without the clear articulation of anathyrosis between a contact band and a nonjoining surface behind (see above, Ch. 3).

The floor of the chamber is treated in the same way as the floor of the porch in front of the doorway—smoothly dressed at the edges and around the couch supports, rough trimmed elsewhere. Had the tomb

been entirely finished, the dressing of the edges would presumably have been extended throughout, removing the protective mantle in the center of the floor. The undersides of the ceiling beams retain protective lips along both borders, in every case stopping short of the side walls of the chamber. The northernmost block preserves a protective lip on the side pushed up against the lintel as well. The joining surfaces between ceiling blocks are prepared in the same way as the joining surfaces between wall blocks. The tops of the blocks are rough trimmed.

Just above the ceiling at the south end of the tomb, the excavator encountered a thin layer of charcoal (0.02 m thick); the same layer was also noticed "at the east side and at the west, but [it] could not be found over the ceiling blocks themselves. At the east, this layer could be traced some way out from the center following the contour of the mound" (A. Ramage, excavator's field report).

FINDS

Selected finds from fill.

1. Alabaster alabastron, rim fragment. Found in fill of dromos. S71.1:8125. Fig. 123:a.
2. Alabaster alabastron, rim fragment. Found in fill of dromos. S71.2:8126. Fig. 123:b.
3. Achaemenid bowl, fragmentary (nine sherds, including rim sherds). Poor red glaze. Found in fill of chamber. Uninventoried. Fig. 124:a.
4. Achaemenid bowl (?), three body fragments (probably from same vessel as no. 3). Poor red glaze. Found in fill of chamber. Uninventoried. Fig. 124:b.
5. Achaemenid bowl (?), three joining sherds including part of concave bottom. Poor red glaze. Found in fill of chamber. Uninventoried. Fig. 124:c.
6. Lid or dish (?), rim fragment. Red glaze on exterior, smoothed but not glazed on interior. Found in fill of chamber. Uninventoried. Fig. 124:d.
7. Coarse dish or bowl (?), rim fragment. Found in fill of chamber. Uninventoried. Fig. 124:e.

DATE

Second half of the sixth century.

BIBLIOGRAPHY

- Ramage, "14th Campaign (1971)," 11–15.
 McLauchlin, "Graves," 197–200.

11. TOMB 77.1

(Figs. 125–38)

INTRODUCTION

Tomb 77.1 is situated east of the Pactolus River on the south side of one of the fingerlike ridges that run down from the Acropolis of Sardis (Fig. 128). To the south lies the Pyramid Tomb (no. 15), just across a dry streambed known locally as Şeytan Deresi. Preserved is a tomb chamber, oriented east–west, with a short dromos at its west end (Fig. 125). No evidence for a tumulus survives, but the tomb probably was hidden beneath some sort of covering mound.

HISTORY OF EXPLORATION

The chamber, exposed by erosion, was first observed in 1976 and was excavated in 1977. A rich assemblage of Hellenistic pottery was found inside the chamber, presumably deposited with a secondary interment. Excavation through the floors of both the chamber and the dromos revealed thick layers of limestone construction chips; beneath the floor of the dromos were walls associated with earlier habitation levels (Fig. 126). After excavation, the tomb was partially reburied to protect the floor and the tops of the walls, but it remains visible and accessible today.

DIMENSIONS

Dromos: W. 1.25 m, L. 2.85 m.

Entrance to chamber: H. 1.00 m, W. 0.08 m, L. 0.30 m.

Chamber: W. 2.22 m, L. 2.23 m.

DESCRIPTION

Dromos. The side walls of the dromos are constructed of irregularly coursed lumps of sandstone and conglomerate (including one squared limestone block); they stand to a maximum preserved height of 1.30 m (Fig. 129). No trace of a roof survives, and the floor was not paved.

Chamber. The walls of the dromos abut the entrance to the chamber, which today consists only of two orthostat-like doorjambs; the lintel is missing, but the height of the doorway is given by the height of the jambs (1 m) and confirmed by the height of a door plug found in front of the doorway on the floor of the dromos (replaced in Figs. 127, 129). Both the doorjambs and the door plug rest on top of a limestone threshold block whose west edge is flush with the exterior face of the door plug. The threshold block is smoothly dressed where the bottom of the door plug rested on top of it, point dressed elsewhere. The faces of the jambs are point dressed on the exterior, smoothly dressed on the interior.

The side and back walls of the chamber consist of two courses of limestone ashlar masonry. The second course is preserved only on the north and east walls. Its height varies from 1.59 to 1.62 m above the floor. The walls rest on a pavement of limestone slabs; of the ceiling, nothing survives. Couches, upright support blocks spanned by long flat slabs, are built up against both side walls. The couches run the full length of the chamber, and they are precisely as wide as the blocks forming the doorjambs. The only open space in the chamber is thus a narrow corridor opposite the doorway and equal to it in width. The faces of the wall blocks and the inner faces of the doorjambs are all smoothly dressed (a shallow groove cut in the north wall is discussed below).

There are banded joints between courses and anathyrosis joints between adjacent blocks. Most of the rising joints are made good by butterfly and staple clamps (Fig. 130). Almost every exposed joint is clamped: all four corners (except the southeast corner) as well as the joints between adjacent blocks in the same wall. One of the iron staples was removed for examination. It is 0.207 m long, 0.015 m wide, and 0.046 m deep, weighing 0.330 kg. The cutting in which it was set is 0.230 m long, 0.075–0.085 m wide at the ends, 0.003 m wide in the middle. The weight of the lead poured around the staple in this cutting is 2.345 kg.

Pry holes are visible in several places—on the threshold, on both doorjambs, and on top of some of the wall blocks. The pry hole on top of the northern jamb was filled with lead, according to the excavator.

A drafted band running along the upper edge of the north wall probably indicates the level to which the top of this wall was to have been smoothed off, but this step was never taken (Figs. 125–27, 131). Indeed, the bearing surfaces on top of all the blocks of the second course of the chamber walls are not completely finished. The clamps that tie individual blocks together in this course are thus unconventional (presumably Lydian masons did not usually insert the clamps until after the tops of the blocks had been trimmed). The height of this second course in relation to the floor suggests that it was the top course of the walls (taller walls would have resulted in an abnormally high ceiling), but it has obviously not been prepared in the usual way to receive the ceiling beams. The presence, however, of a door stone and the reuse of the tomb in later periods suggest that the tomb was roofed, and so it must have been completed before it was properly ready; perhaps the unexpected death of their patron upset the builders' original plans.

A last puzzling feature is a shallow horizontal groove in the face of the north wall near the northeast corner,

0.50 m above the top of the couch (Figs. 126, 131, near the bottom of the picture). This groove is too regular to be a natural flaw, and it does not seem to be a weathering mark. It may have been cut, either by the original builders or by later users (the tomb was reused at least twice in the Hellenistic and Roman periods), to delineate some kind of panel.

FINDS

The selected objects listed below are divided into four groups: (A) sherds found in construction layers beneath the floor of the dromos, (B) sherds found in construction layers beneath the floor of the chamber, (C) sherds found beneath the dromos construction layers, and (D) sherds from earlier habitation levels. Pottery from the later reuse of the tomb is not included.

A. Sherds found in construction layers beneath the floor of the dromos.

1. Skyphos, rim fragment. Streaky glaze with reserved band below lip on exterior. Uninventoried. Figs. 132:a, 133:a.
2. Small open vessel, rim fragment. Gray monochrome. Uninventoried. Figs. 132:b, 133:b.
3. Jar or pitcher, rim fragment. Bichrome decoration. Uninventoried. Figs. 132:c, 133:c.
4. Oinochoe (?), fragment of shoulder. Traces of orientalizing decoration (filling ornament and an animal's hind leg). Uninventoried. Fig. 132:d.
5. Jar, fragment of shoulder. Wave-line decoration. Uninventoried. Fig. 132:e.

B. Sherds found in construction layers beneath the floor of the chamber.

6. Corinthian (?) small (probably closed) vessel, body fragment. Red brown horizontal lines on plain

ground. Uninventoried. Fig. 134:a.

7. Cup, rim fragment. Black glaze with added purple and reserved bands. Uninventoried. Figs. 134:b, 135.
8. Large open vessel, body fragment. Orientalizing decoration (filling ornament and possibly a bird's claw). Uninventoried. Fig. 134:c.

C. Sherds found beneath the dromos construction layers.

9. Bowl, rim fragment. Black-on-red decoration. Uninventoried. Figs. 136:a, 137:a.
10. Skyphos, rim fragment. Streaky glaze, reserved band below lip on exterior. Uninventoried. Figs. 136:b, 137:b.
11. Ephesian ware lid, rim fragment. Uninventoried. Figs. 136:c, 137:c.
12. Gray monochrome dish, rim fragment. Uninventoried. Figs. 136:d, 137:d.
13. Jar, body fragment. Wave-line decoration. Uninventoried. Fig. 136:e.
14. Corinthian (?) zoomorphic aryballos (probably duck), fragment. Uninventoried. Fig. 136:f.

D. Sherds from earlier habitation levels. A selection of 16 is illustrated in Figure 138.

DATE

Second half of the sixth century?

None of these sherds need be later than the first half or middle of the sixth century, and those from the earlier habitation levels appear to belong in the seventh century.

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Greenewalt, "Campaign of 1977," 9–19.

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Rotroff and Oliver, *Hellenistic Pottery* (Sardis M12), 14.

12. TOMB 82.1

(Figs. 139–42)

INTRODUCTION

Tomb 82.1 is located about 350 m southwest of the Temple of Artemis at Sardis, on a hillslope rising above the west bank of the Pactolus River. Preserved is a simple tomb chamber, oriented north–south, with a shallow porch at the north end (Figs. 139–41). The tomb is built in a trench dug in the native sandstone rock that rises in a low mound around the site of the tomb,

creating the impression of an artificial tumulus. The excavator imagined that "the builders then heaped up a kind of crowning mound over the rest of the chamber, completing the tumulus-like impression" (Barbara K. McLauchlin, excavator's field report).

HISTORY OF EXPLORATION

The tomb had been exposed for at least 20 years before it was excavated in 1982. According to the excavator, "a local resident claims that his father used the tomb for a bunker in the early 1920s" (McLauchlin, excavator's field

report). The tomb chamber and the space in front of it were cleared in one week of excavation in August 1982. The tomb remains in good condition and accessible.

DIMENSIONS

Entrance to chamber: H. 1.30 m, W. 0.80 m (bottom) to 0.67 m (top), L. 0.40 m.

Chamber: H. 1.82 m, W. 1.85–1.95 m, L. 2.84–2.87 m.

DESCRIPTION

The entrance to the chamber is flanked by monolithic limestone doorjambs. The doorjambs are broken and the lintel block is missing, but the height of the doorway is given by slots cut to receive the lintel block in the side walls of the chamber. The doorjambs rest on a limestone threshold block that extends just in front of the doorway, where it is adjoined by a similar limestone paving slab. On top of the east side of this slab rests a single block, 0.92 m long, perpendicular to the entrance of the chamber; a shallow cutting on top of the west side of the same paving slab shows that a comparable block abutted the west side of the entranceway. A block lying nearby is a likely candidate; it is 0.91 m long, and the dressing on the top and face (see below) is the same as on the in-situ block, except that there is a handling boss on the face. The porch created by these blocks and paving slab may be compared to the forecourt of the chamber in the tumulus of Alyattes (no. 1) or to the porch in front of the doorway of the tomb at Keskinler (BK71.1, no. 10). The north end of the one in-situ block is rough, indicating that the porch did not extend to the north, while the top of the block is smooth, like a bearing surface. Other evidence suggests that the porch was roofed at the same level as the chamber, like the porch in front of the tomb at Keskinler but unlike the forecourt in the Tomb of Alyattes. The dressing of the face of the eastern wall block is rough; the paving slab and the doorjambs are relatively smoothly dressed.

A door block was found upright in front of the porch. Like other blocking stones, it is rough trimmed on one side, finely dressed with rebated edges framing a projecting plug on the other side. In its current position, the plug side is facing out, the rough side facing in toward the tomb, as if it had been tipped over and out of the doorway, then tipped up again in front of the porch. This explanation of its current position is complicated, however, by the size of the plug, which is approximately 0.08–0.10 m wider than the doorway. It is possible that the doorway was originally wider (there has been a certain amount of displacement of the walls

of the chamber; see Figs. 139, 141), and it seems unlikely that the door block has been reused from another tomb, either to block a doorway that it did not fit or to close off the north end of the porch. Bevels cut in the edges of the doorjambs show, at any rate, that the doorway had been prepared to receive a blocking stone.

As already observed, the lintel spanning the doorway extended beyond the edges of the jambs, fitting into slots cut in the side walls of the chamber. The doorjambs themselves are tied into the walls of the chamber in a similar way; both jambs are notched or L-shaped in elevation, with a projecting bar at the bottom bonded into the first course of the chamber walls and supporting the second and subsequent courses, which are laid with their faces up against the upper parts of the jambs (Figs. 139, 141).

The walls of the chamber consist of four equal courses of limestone ashlar masonry, resting on a pavement of five slabs (including the threshold block). The faces of the wall blocks are smoothly dressed with a flat chisel, as is the floor. The side walls have been somewhat displaced, but they may have leaned in toward the center intentionally, as was apparently the case with the doorjambs. Damage to the walls has exposed some of the joints, showing that the rising joints were anathyrosis joints and the bedding joints were plain, banded joints. When the tomb was last visited, in 2008, the outside of the back (south) wall of the chamber had been revealed by illicit excavators, showing that this end of the tomb was built in a trench or niche cut into the native conglomerate. The space between the edge of this trench and the back wall of the chamber is 0.30 m wide at the top as preserved and filled with earth and rubble. Lenses of limestone chips running up against the joints between courses in the wall show that this fill was dumped in layers, each layer corresponding to a course in the wall.

The ceiling does not survive, but a protective lip preserved along only the upper border of the fourth course shows that the chamber was roofed at this level. Pry holes 0.99 m apart on top of the two northernmost blocks of the west wall fix the width and position of one of the ceiling blocks (Figs. 139, 140). This suggests, assuming that the other ceiling blocks were equal in width, that the porch and the chamber were roofed together by five monolithic beams.

Two upright blocks at the south (back) end of the chamber must have been supports for a pair of couches running lengthwise through the chamber and supported at the other, front end by similar uprights, now missing. The front sides of the couch supports have irregular drafted edges framing rough-worked projecting central panels; the tops have flat-chiseled bands around the

edges, enclosing point-dressed panels worked in the same plane as the borders. The sides facing the interior of the chamber are smoothly dressed.

As described above, the doorjambs are bonded into the first course of the side walls, and the lintel block was bonded into the fourth course. The side and back walls are also bonded at the southeast and southwest corners. At the level of the bottom course, the east wall is bonded into the south wall and the south wall is bonded into the west wall. At the level of the second course, the west wall is bonded into the south wall and the south wall is bonded into the east wall. The same pattern is repeated in the upper two courses, suggesting that the builders laid the first course starting with the doorjamb at the northeast corner and working around the chamber to the opposite jamb, then started the second course at the northwest corner and worked their way back around to the northeast. The third and fourth courses would have been laid in the same way, respectively, as the first and second.

13. TOMB 89.11

(Figs. 143–47)

INTRODUCTION

Tomb 89.11 is the chamber complex of a tumulus tomb in a cemetery area known as Hacı Oğlan on the north side of the Necropolis hill. The complex is oriented north–south and includes a dromos and antechamber as well as a chamber with three built-in benches. The tumulus that presumably once covered the tomb has completely disappeared. It is unclear whether the chamber complex was built into a hole dug in the ground, as is likely, or whether it was built at ground level and then buried by the tumulus.

HISTORY OF EXPLORATION

The tomb was discovered and excavated by the Sardis Expedition in 1989, although its existence had reportedly been known for a long time to local residents. The tomb remains in good condition and is accessible today.

DIMENSIONS

Dromos: H. 1.60 m, W. 1.00 m.

Entrance to antechamber: H. 1.60 m, W. 0.80 m.

Antechamber: H. 1.65–1.75 m, W. 1.31 m, L. 1.66 m.

Entrance to chamber: H. 1.24 m, W. 0.68 m.

Chamber: H. 2.06 m, W. 2.18 m, L. 2.48 m.

FINDS

The selected objects listed below were all found out of context; they are of little use as dating evidence, but they do suggest that the tomb was reused after the initial interment.

1. Spouted vessel (?), fragment of the neck. Found in fill. Uninventoried. Fig. 142:a.
2. Hellenistic unguentarium foot. Found in fill. Uninventoried. Fig. 142:b.
3. Lamp, fragment of rim and spout. Found in fill. Uninventoried. Fig. 142:c.

DATE

Third quarter of the sixth century?

BIBLIOGRAPHY

Greenewalt et al., “Campaigns of 1981 and 1982,” 81–84.
McLauchlin, “Graves,” 195–97.

DESCRIPTION

Dromos. Only a short section of the dromos was exposed (1.10 m), and its original length remains unknown. Its rubble walls are built of crudely worked pieces of conglomerate and sandstone, and it has neither a pavement nor a roof.

Antechamber. The walls of the dromos abut the walls of the antechamber, which are built of roughly dressed and fitted conglomerate and sandstone blocks, coated with lime plaster. The entrance to the antechamber is closed by a limestone door plug, still in place (see Fig. 144). A pair of limestone slabs makes up the threshold of this entranceway; another limestone slab, apparently a reused grave stele, serves as a threshold for the doorway to the chamber (Roosevelt, “Symbolic Door Stelai,” 87, fig. 21). Apart from these slabs, the floor of the antechamber is an unpaved earthen surface. The antechamber has a flat ceiling consisting of three large blocks of coarse conglomerate, of which two remain in place.

Chamber. The entrance to the chamber was closed by a limestone door plug, found facedown on the antechamber floor (Fig. 145; the door plug was removed in excavation and thus is not visible in Fig. 143, but it was replaced in its original position at the end of the 1989 season). The plaster on the walls of the antechamber

obscures the joint between these walls and the front of the chamber, but it is likely that the antechamber was built up against the chamber; if so, the walls of the antechamber were not very carefully laid out, for, as seen in Figure 143, the orientation of the antechamber is slightly skewed to that of the chamber.

The walls of the chamber are built of four irregular courses of limestone, sandstone, and conglomerate blocks, coated, like the walls of the antechamber, with lime plaster (Fig. 145). Though somewhat more carefully dressed than the antechamber wall blocks, the wall blocks of the chamber are still not closely fitted; “in both chambers there is some chinking with small stones” (Greenewalt et al., “Campaigns of 1988 and 1989,” 31–33). The floor of the chamber was packed earth, also coated with lime plaster. The chamber has a pitched ceiling, consisting of four limestone slabs resting lengthwise on top of two triangular tympanum blocks of sandstone (one ceiling beam was removed in 1989 to improve access to the chamber, as seen in Figs. 143, 144; this block has now been replaced in its original position). A structural advantage of this type of ceiling is that it reduces the stress put on the ceiling beams, since they are supported not only at their ends but also on their downslope sides.

The three benches built into the walls of the chamber are each composed of a single slab of limestone, hollowed out to form “a rectangular trough 0.15–0.26 m deep” (Greenewalt et al., “Campaigns of 1988 and 1989,” 33). The back bench is slotted into the back and side walls at the level of the top of the second course. The side benches are slotted into the front and side walls at the same level, while their back ends overlap and are supported by the back bench (they have projecting flanges, which are slotted into cuttings in the front edge of the back bench; Fig. 146). The benches have no lower supports, and the areas beneath them are sunken 0.15 m below the rest of the floor—presumably, as suggested by Greenewalt, so that burials could be placed underneath as well as on top of the benches.

FINDS

Fragments of 30 to 40 different pottery vessels as well as three lamps and one fragmentary stone alabastron were recovered. The diagnostic pieces fall into two groups; one dates to the third century, the other to the second or early first century (Rotroff and Oliver, *Hellenistic Pottery* [Sardis M12], 14–15). The only Archaic finds

were two sherds: “a small skyphos fragment and a lekythos (body) of ‘Lydian/Samian’ type” (Greenewalt et al., “Campaigns of 1988 and 1989,” 34). A selection of finds is listed below and illustrated in Figure 147.

Figure 147, upper row, left to right:

1. Cup. Red slipped. Found in fill of chamber. P89.41:9675.
2. Echinus bowl. Found in fill of chamber. P89.43:9677.
3. Echinus bowl, fragments of rim and body. Found in fill of chamber. P89.45:9680.
4. Unguentarium. Found in fill of chamber. P89.46:9682.
5. Lagynos. Fragments of upper body, neck, and handle. Found in fill of chamber. P89.50:9690.

Figure 147, lower row, left to right:

6. Small closed vessel. Found in fill of chamber. P89.49:9689.
7. Lekythos. Found in fill of chamber. P89.42:9676.
8. Lekythos. Found in fill of chamber. P89.38:9672.
9. Lamp. Plain. Found in fill of chamber. L89.9:9670.
10. Lamp. Egg-and-dart molding around pour hole. Found in fill of chamber. L89.10:9681.
11. Unguentarium. Found in fill of chamber. P89.37:9671.
12. Marble alabastron. Found in fill of chamber. S89.2:9678.

DATE

Sixth to third centuries.

Greenewalt suggested that the tomb was “built no earlier than the fourth century” and “used in the third and second century” (Greenewalt et al., “Campaigns of 1988 and 1989,” 35). Certainly the pitched ceiling is an unusual feature, which probably appears only after the Persian invasion (see above, Ch. 5); the masonry is crude and the finds are almost all Hellenistic. Still, it is possible that the pottery represents a secondary use after a thorough cleaning, and our knowledge of Lydian architecture is not complete enough to rule out an earlier date, even as early as the later sixth century.

BIBLIOGRAPHY

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 Rotroff and Oliver, *Hellenistic Pottery* (Sardis M12), 14–15.
 Roosevelt, “Symbolic Door Stelai,” 87, fig. 21.

14. TOMB 813

(Figs. 148–50)

INTRODUCTION

Tomb 813 is a rock-cut tomb, oriented roughly east–west, in the Necropolis of Sardis west of the Pactolus River. In front of the tomb is a flight of four limestone steps flanked by a pair of limestone stelae—a monumental entranceway for which no parallel is known.

HISTORY OF EXPLORATION

The tomb was originally excavated by the first Sardis Expedition in 1912. It was rediscovered in 1980 and reexcavated in 1984. Discrepancies between the descriptions and illustrations of the tomb in Howard Crosby Butler's *Sardis I* and the state of the tomb as revealed anew in 1984 are discussed and explained by Greenewalt (Greenewalt et al., "Campaign of 1984"). The steps were reburied at the end of the summer of 1984.

DESCRIPTION

The flight of steps in front of the tomb is 1.20 m high and 2.95 m wide. Both risers and treads are smoothly dressed, except for the top step, which is partly rough trimmed. The steps are supported on a packing of fieldstones that must have been laid at the same time as the steps themselves.

The steps lead to a rock-cut chamber of equal width, connected by a narrow corridor to a second chamber in back. Sarcophagi were installed in the floors of both chambers. The level of the rock-cut floor in the tomb is not the same as the level of the top of the steps but corresponds instead to the ground level at the foot of the steps (Fig. 148). This suggested to Greenewalt that the steps were "symbolic," comparable to the false doorstones found in other Anatolian tombs. Perhaps the opening behind the steps—presumably larger now, because of erosion, than it was in antiquity—was originally closed by wooden doors.

The top step is fitted into the front end of the first chamber. The lower three steps project in front of the

chamber in a large shelf cut in the sloping bedrock of the hillside. The steps are flanked on either side by limestone stelae, which hide the sides of the staircase from view. The faces of the stelae are flush with the face of the bottom step. The northern stele, which was found dislodged, was socketed into a U-shaped block fitted up against the side of the bottom step with one bar of the U, slightly longer than the other, overlapping the face of the first step by a few centimeters and the other, shorter bar abutting the side (Figs. 148, 150). The socket so defined was 0.07–0.09 m wider than the thickness of the stele, and this discrepancy was made up by stones packed in between the back of the stele and the back of the socket and sealed by a narrow bar of lead apparently poured in situ. The stele was further supported by an L-shaped block that rested on top of the U-shaped block and that was wider at the back, so that it filled the space between the back of the stele and the back of the bedrock shelf in front of the tomb. Part of the crowning ornament of the northern stele survives intact, an anthemion of conventional late Archaic–early Classical design (fragments of the other stele were also recovered and are now stored in the Sardis Expedition's Excavation House depots).

FINDS

See the list of Butler's finds in Greenewalt et al., "Campaign of 1984," 37. Only sherds without context were found by the Harvard-Cornell Expedition.

DATE

Early fifth century, on the basis of the rich assemblage of offerings recovered by Butler.

BIBLIOGRAPHY

- Butler, *Sardis I*:1 118, fig. 124, 159–62.
 Hanfmann and Ramage, *Sculpture (Sardis R2)*, 75–76, no. 48.
 McLauchlin, "Graves," 216–20.
 Greenewalt et al., "Campaign of 1984," 36–44.
 Ratté, "Anthemion Stelae," 597–98, no. 3.

15. PYRAMID TOMB

(Figs. 151–61)

INTRODUCTION

The so-called Pyramid Tomb is a small limestone structure situated on the north slope of a high ridge

that runs down from the Acropolis of Sardis to the Pactolus River (Fig. 153). Several other tombs are located nearby, including T77.1 (no. 11), which lies ca. 200 m northwest of the Pyramid Tomb across a deep ravine known as Şeytan Deresi, and several rock-cut tombs on both sides of the ravine. The finial of an

Archaic grave stele was found in this ravine in 1966 (Fig. 251; Hanfmann and Ramage, *Sculpture* [Sardis R2], no. 46).

HISTORY OF EXPLORATION

The Pyramid Tomb was discovered in 1914 and published by Butler in *Sardis I*. It was rediscovered and reexcavated in 1960–1961, reexamined in 1969, and again in 1990. The tomb was partially reburied in 1991, to protect it from weathering and vandalism. A report on the research carried out in 1990 appeared in 1992 (Ratté, “Pyramid Tomb”); the description that follows is based on that report.

DESCRIPTION

The main surviving part of the tomb is a stepped platform, resembling the lower part of a stepped pyramid, built of limestone blocks around a rubble core. The structure is 7.50 m square at foundation level; above the foundations, it steps in on all preserved sides. The north side of the tomb has almost entirely disappeared, but six steps survive in part at the southeast corner, rising to a combined height of 1.90 m. The only remains of the superstructure of the monument are a stone pavement found by Butler in the center of the tomb (at the level of the fifth step) and two wall blocks.

The fifth and sixth step courses and the pavement in the center of the tomb were dislodged between 1914 and 1960, and the rubble core of the monument was almost completely removed. In 1990, the core of the monument was filled with earth, and the displaced blocks were restored to their original positions.

Steps. The tomb was built on uneven ground sloping down from south to north. The south side is founded on undisturbed soil (i.e., the conglomerate rock); the north side rests on two courses of foundation blocks. The blocks of the lower course are irregularly shaped and roughly dressed except on their bearing surfaces. The only two blocks of the upper foundation course that survive are on the east side. They are set in several centimeters from the edge of the lower course and are more finely trimmed, with chisel-drafted margins enclosing hammer- or point-dressed central panels.

The first proper step course (the bottom step on the south side) is less deep (0.18 m) than subsequent courses, and in this and other respects it resembles the euthynteria of a Greek building. The second and subsequent courses are all approximately 0.30 m high and 0.30 m deep. The dressing of the tops or treads of the bottom five steps is uniform; all are rough dressed except for smoothed bands running along the backs

of the steps (sunken on average a couple of centimeters below the rough-dressed areas) and occasional smoothed strips, perpendicular to these bands and trimmed to the same level, running from the backs of the steps to the front. The smoothed bands that run along the backs of the steps are all approximately equal in width (0.10–0.15 m), thus taking up one-half to two-thirds of the width of the bottom step, but only one-third to one-half of the width of the subsequent steps. The one surviving block of the sixth step is entirely smooth on top, perhaps because another block rested directly on top of this one. The treatment of the step treads shows that the monument is unfinished. When completed as intended, the rough-dressed areas, or protective mantles, would have been removed and the entire surface of each tread would have been trimmed down to the level of the smoothed bands (see above, Ch. 3, on the interpretation of this evidence).

The risers, or faces, of the blocks of the first five steps on the south side of the monument, and of parts of the first three steps on the east and west sides, have drafted margins enclosing rough-dressed central panels, like the blocks of the upper foundation course on the east side. The treatment of the faces of the remaining step blocks, however, resembles the treatment of the treads. A typical step block is illustrated in Figure 156. A smoothed band runs along the bottom half of the block, like the smoothed bands that run along the backs of the treads. Similarly, the upper part of the face of the block, like the front parts of the treads, bears a protective mantle. The face differs from the top or tread, however, in the treatment of the protective mantle, which takes the form of a projecting rusticated panel, with carefully trimmed drafted margins enclosing a hammer-dressed boss. Another distinctive feature of the face is a protective lip on the left side of the smoothed band that runs along the bottom of the block (because the block illustrated in Fig. 156 is a corner block, it has a protective lip only on one side, whereas most blocks have protective lips on both sides; see Figs. 152, 155). In most cases (as in Fig. 156), the top of the protective lip has been severed from the protective mantle, possibly to help the builders make sure adjacent blocks were correctly aligned. Like the treads, the faces of blocks treated in this way are unfinished. At a later stage, the protective lips and protective mantles would have been trimmed away, and the whole face would have been smoothly dressed in the same plane as the smoothed bands that run along the bottoms of the blocks (see above, Ch. 3).

As mentioned above, the tomb is built on uneven ground sloping down from south to north, and this slope may help to explain why some step blocks have

simple, rusticated faces instead of the more complex treatment just described. Assuming the ancient ground surface followed the present slope, the first step of the southern half of the monument, or *euthynteria*, may have been largely concealed, the second step mostly exposed, and the third step visible everywhere except at the southwest corner. Thus, the masonry of the lower courses, stepping down to the north, on the east and west sides is less finely dressed because it would have been largely invisible. As for the south side, it was also out of sight, not because it was buried but because the south side was the back of the monument; for this reason, all the masonry below the level of the tomb chamber on this side was only rusticated. Like the foundation blocks, step blocks dressed in this fashion were probably never meant to be trimmed beyond their present state.

Another difference between the rusticated step blocks of the concealed courses and blocks of the type illustrated in Figure 156 lies in the treatment of their bottom edges, which are, in the former case, always slightly but clearly beveled. These bevels are usually about 0.01 m high and 0.01 m deep; they were apparently cut before the blocks were laid in place, and their primary purpose was to protect the edges of the blocks from chipping (see above, Ch. 3). In general, builders could presumably afford to be less careful moving around blocks with beveled edges; thus, work would proceed more quickly. These bevels did, however, have the disadvantage in finely dressed masonry of drawing attention to the joints between courses. On the rusticated step blocks of the Pyramid Tomb, this was not a problem, as the faces of these blocks were never meant to be finely dressed. On the blocks eventually intended to be smoothed off, however, the horizontal bevels were omitted, requiring the builders to exercise more care in laying the blocks but giving a cleaner and less noticeable joint between the riser and the tread below.

While only the rusticated blocks are beveled on their bottom edges, almost all the step blocks of both types are beveled on one of the vertical edges, and in a few cases on both edges, in the same way, for example, as the blocks of the Karniyarık Tepe crepis wall (see above, no. 2). The functions of these vertical bevels were similar to those of the horizontal bevels, but unlike the latter, they were clearly cut *in situ* rather than before placement. For this reason, like the Karniyarık Tepe bevels, they preserve a valuable record of the construction process. The vertical bevels on the rusticated blocks were, like the horizontal bevels, probably never meant to be trimmed away; the vertical bevels on the more finely dressed blocks, however, were cut only to the depth of the finished bands that run along the bottoms of the

blocks and would presumably have disappeared with the final trimming of the masonry.

The positions of all the vertical bevels are indicated on Figure 157; the arrows show the sequence and direction in which the blocks were laid, as reconstructed from this evidence (see above, Ch. 3, for a general discussion of the interpretation of these bevels). The reconstruction of the parts of the tomb that do not survive is conjectural. The bevels show that the builders of the tomb tended to lay the corner blocks first, as would be expected, and then work from corner to corner. The most carefully laid course was the bottom step, on which the builders seem to have started by laying not only the corner blocks but also an additional block in the middle of every side; they then proceeded to lay the remaining blocks of each side in two separate series, starting from the corners and working in opposite directions toward the middle. The more normal practice, as represented by the second, fourth, and fifth courses, was to start only with the corner blocks and then to lay most of the blocks of each side in a single direction. The third course is unusual, in that the builders may have started by laying a single corner block, at the northwest corner, and then proceeded to lay all the blocks of the west and south sides in one single series and all the blocks of the north and east sides in another single series.

It is possible that every series of blocks was the work of a single team of masons, in which case there might have been eight separate teams working on the first course (two for each side) and four teams working on the second course (one for each side), while the third course might have been laid by only two teams, both starting from the northwest corner and working in opposite directions around to the southeast. It seems likely that a larger workforce was employed at the beginning, when the “footprint” of the structure had to be established, and that it grew smaller as work progressed. But it is possible that most courses, and the monument as a whole, were built by a single team of a few men, who began work on every course (except the third) by laying the corner blocks and then laying the blocks of each side separately.

Of particular interest are the blocks with no vertical bevels, which were slotted in between opposing series of blocks. A couple of the blocks of this type that survive are unusually small, and all are slightly wider at the back than at the front. Their wedge shape suggests these blocks were laid from behind rather than from the front. This practice makes sense if one remembers that these were the only blocks that had to be fitted in between two other blocks (rather than being pushed up against a single block) and that the most fragile parts of a block are the edges; by slotting the blocks in from

behind rather than from the front, the builders avoided damaging the edges of the two adjacent blocks.

One such small, wedge-shaped block belongs to the fifth course on the east side (Figs. 152, 155). This is also one of the blocks that was disturbed after Butler's excavations, and so it was possible to examine all its joining surfaces before restoring it to its original position. Although neither vertical edge of the block is beveled, fine lines have been incised on both sides of the block in exactly the places where the inner edge of a bevel would have fallen. These lines were apparently guidelines, matched up with the inner edges of the bevels of the adjacent blocks during construction. The use of these guidelines may have been peculiar to a single working team, for no comparable lines are visible on any of the other unbeveled blocks whose joints are at least partly exposed.

As noted above, the sole surviving block of the sixth step is exceptional in that it is smoothly dressed on top. It is also unusual in having a horizontal bevel cut in its upper edge as well as a vertical bevel on one side. Like the vertical bevel, the horizontal bevel is cut to precisely the depth of the finished band that runs along the bottom of the block. Together with the dressing of the top of the block, this bevel suggests that another block rested directly on top of this one—assuming that the primary purpose of this bevel was the same as that of the bevels on the vertical and bottom edges of a block, namely to protect an edge that was going to be in direct contact with another block against chipping. Supporting this interpretation is the treatment of the wall blocks of the tomb chamber, one of whose upper edge is also beveled (the upper edge of the other wall block is not preserved).

The step blocks are joined without clamps or dowels, and pry holes were apparently unnecessary; crowbars could have been braced where needed against the rubble packing behind the steps. Where the joining surfaces of the blocks are exposed, they are banded, without true anathyrosis. In some cases, a clear distinction is visible between a contact band along the front and top of a block and the rougher area in the middle; but in other cases, no such distinction can be made and most of the joining surface of the block is smoothly dressed. Other miscellaneous technical details of the masonry of the step blocks include mason's marks (two swastikas and a figure consisting of two circles connected by a horizontal bar) cut in the central bosses of three blocks in the bottom two courses on the east side (Figs. 152, 155) and four handling bosses on the sole surviving block of the sixth step.

When the Pyramid Tomb was rediscovered in 1960, the rubble foundations beneath and behind the limestone steps had been thoroughly disturbed. Only

the stones directly beneath the steps remained intact. The stones used in the rubble foundations are mostly sandstone, quartz, and schist rocks. Sandstone was preferred, probably because it was available locally—it can be quarried in many places in the Pactolus valley—and because it was easily worked. In some places, the sandstone backers laid immediately behind the step blocks have been carefully trimmed, to provide a level resting surface for the blocks of the next step. Butler's photographs indicate that the rubble foundations supporting the steps originally filled the entire core of the monument; there is no evidence to suggest, however, that the foundations beneath the actual tomb chamber were in any way reinforced.

A final detail is a series of layers of limestone chips incorporated in the rubble foundations and coinciding with the seams between the limestone steps. These are apparently construction layers, deposited when the tops of the steps were trimmed in situ, and their stratification shows that the limestone exterior and the rubble foundations of the tomb were built up, tier by tier, together.

Tomb Chamber. The pavement discovered by Butler in the center of the monument had been disturbed by the time the tomb was rediscovered in 1960. The positions of the blocks in relation to each other may be reconstructed, however, on the evidence of setting lines, incised on the surface of the pavement, for the walls of the chamber (see Figs. 151, 154, 158). Butler's plan of the pavement shows six blocks; a seventh was discovered in 1969. Butler's illustrations also show that the pavement was at least roughly centered within the perimeter of the tomb, but its exact position in relation to the stepped sides of the tomb is not certain.

The pavement is dressed in the same way as the step treads; it is rough dressed, except for a smoothed band running around the edges, where the walls stood, and two smoothed "control strips," one running north-south, the other running east-west. The positions of all four walls of the chamber are indicated by finely incised setting lines. The entrance was presumably located on the north side; either the setting line ran across the doorway or it marked the edge of a raised threshold block (cf. the raised threshold block of BT62.4, no. 3). The dimensions of the chamber as measured from the setting lines are 1.46 by 2.26 m. From these figures, it is possible to infer a foot of approximately 0.324 m. Thus, the chamber measured 4½ by 7 ft., and each of the steps of the tomb was roughly 1 ft. high and 1 ft. deep.

The walls of the tomb chamber survive only in two blocks from the bottom course (Fig. 158). They

are comparable in size to the step blocks and similarly dressed on only one face. Butler found one block in situ on the east side of the chamber; this block apparently belonged to the east wall and was bonded into the southeast corner (its right side is roughly worked). The face of the block is similar to the face of a step block, except that the smoothed band running along the bottom continues up the south or right edge; the upper edge of the block is broken away. The second wall block, found displaced in 1970, is the mirror image of the first and seems to have rested directly opposite. This block preserves two important details missing from the other. First, the upper edge of the block is beveled, as already noted, probably to protect it from chipping during the laying of the next course. Second, the vertical smoothed band running up the south (in this case the left) edge ends in a horizontal protective lip, similar to the vertical protective lips on the edges of the step blocks (and on the north edge of the first wall block; the bottom left-hand or northern corner of the block in question is broken away).

These two blocks suggest that the dressing of the inner faces of the walls resembled the dressing of the floor—unfinished except for a smoothed frame around the edges of each wall. This scheme is illustrated in Figure 159. Just as the treatment of the risers of the steps is more elaborate than the treatment of the treads, so the dressing of the walls was more elaborate than the dressing of the floor. Unlike the floor, the walls were rusticated except for the finished bands around the edges, and these smoothed bands were interrupted by protective lips at the horizontal as well as the vertical joints. When entirely finished as intended, however, both the floor and the walls would have been smoothly dressed.

The unfinished state of the surviving masonry of the Pyramid Tomb does not necessarily indicate that the tomb as a whole was not completed. It is possible that only the final dressing of the stone was left undone.

RECONSTRUCTION

Butler proposed two alternative reconstructions of the Pyramid Tomb: one as a stepped pyramid enclosing an interior tomb chamber, the other as a stepped platform surmounted by a freestanding tomb chamber. The reconstruction as a stepped pyramid is without close parallel, and any attempt to work it out in detail runs into structural difficulties. The second reconstruction raises no such problems, and it also finds a close set of parallels in the Tomb of Cyrus at Pasargadae and several other Persian tombs (see above, Ch. 5).

The reconstruction illustrated in Figure 160 thus follows Butler's second suggestion. It begins with the

assumption that if the walls of the chamber were free-standing, they would have been approximately 1.00 m thick (since both surviving wall blocks are dressed on only one face and are approximately 0.50 m wide). This is roughly the same as the distance between the setting line for the back wall of the chamber and the line of the south edge of the sixth step. At front and back, therefore, the walls of the chamber may have risen straight up from the level of the pavement. The sole surviving block of the sixth step shows that a different situation must have obtained along the east and west sides, for, as we have seen, the block on top of this one probably rested directly on top instead of being stepped back. But it seems unlikely that this block marks the outer face of the side wall of the chamber, because that would require restoring disproportionately thick chamber walls and an implausibly wide chamber structure. Thus, for want of a better solution, the reconstruction features a double step (twice the usual height and depth), with the outside of the chamber rising from the top of this step.

The height of the chamber is restored as equal to the width—4½ ft. of 0.324 m each—like the chambers of the Tomb of Cyrus and the Tomb of Alyattes (no. 1). The thickness of the ceiling beams is restored at 1½ ft.; all the subsequent courses are 1 ft. in height. The roof rises from the top of the ceiling, with an interior attic space whose function is to relieve the stress on the ceiling beams. The construction and proportions of the roof are modeled after the Tomb of Cyrus, as are the overall proportions of the monument. Thus, the height of the tomb from floor level to the apex of the roof is approximately equal to its width (10 ft.), so that, like the Tomb of Cyrus, the frontal elevation of the monument is essentially square.

FINDS

A. Objects found in 1990.

1. Three joining fragments of a streaky-glazed skyphos. Found in layer of working chips on west side of Pyramid Tomb. Uninventoried.

B. Objects found in 1960–1961 and 1969. None from good contexts. A selection is listed.

2. Achaemenid bowl, rim fragment. Found in 1961. Uninventoried. Fig. 161:a.
3. Achaemenid bowl, rim fragment. Found in 1960–1961. Uninventoried. Fig. 161:b.
4. Skyphos, rim fragment. Streaky glaze, reserved band below lip on exterior. Found in 1961. P61.80:3296. Fig. 161:c.
5. Jar, shoulder fragment. Wave-line decoration. Found in 1969. P69.69:8023. Fig. 161:d.

6. Dish, rim fragment. Found in 1960–1961. Uninventoried. Fig. 161:e.
7. Dish, fragment of stem. Black-on-red decoration. Found in 1969. Uninventoried. Fig. 161:f.
8. Jar, rim fragment. Lip streaky glazed. Found in 1960–1961. Uninventoried. Fig. 161:g.
9. Gray Ware open (?) vessel, rim (?) fragment. Found in 1960–1961. Uninventoried. Fig. 161:h.

DATE

Second half of the sixth century.

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CIVIC STRUCTURES

16. ACROPOLIS NORTH

(Figs. 162–75)

INTRODUCTION

The Acropolis of Sardis is protected on its east, north, and west sides by natural precipices. The south side is more accessible and it was secured in the Byzantine era by substantial fortification walls. The Byzantine fortifications ran from the southwest corner of the wide, level area on top of the Acropolis along the southern edge of this area out to a narrow promontory on the south side of the citadel. This southern promontory has been called Acropolis South (AcS), the larger area on top, Acropolis Top (AcT). The citadel is also accessible in one other place, by following a ridge up from the Pactolus valley to the northwest side of the Acropolis. The point where this ridge meets the Acropolis was also protected in the Byzantine era by the isolated fortifications now known as the “Flying Towers.” The gently sloping ground that leads from here to the top of the Acropolis is called Acropolis North (AcN).

Excavation has revealed Lydian ruins in all three areas: large rubble walls on the slopes below AcS, domestic construction and occupation layers on AcT, and a complex of limestone and sandstone ashlar masonry terrace walls at AcN; the last, located about 20 m below and 125 m northwest of the highest point on the citadel (see Figs. 166, 167), is the only known

Lydian ashlar masonry structure on the Acropolis of Sardis.

HISTORY OF EXPLORATION

The limestone and sandstone terrace walls at AcN were apparently discovered in 1922, during the last season of the first Sardis Expedition. The complex was rediscovered in 1960, when it was mistakenly identified as Hellenistic. Digging was resumed in 1968 and 1971 and again from 1973 to 1975. The complex is still largely visible, although pieces of it have been reburied and parts of the exposed masonry have weathered poorly.

DESCRIPTION

The complex consists of three separate retaining walls, labeled 1, 2, and 3 on the plan and elevation drawings (Figs. 162–64). Walls 1 and 3 are built largely of limestone, Wall 2 of sandstone. The walls are arranged in two tiers: Walls 1 and 2 make up the lower tier, Wall 3 the upper tier. All three walls are founded on undisturbed soil—the conglomerate rock of the Acropolis. In some places they are built directly up against the conglomerate; in others they retain an earth and rubble packing. Behind Wall 3, the upper limestone wall, the conglomerate rises steeply to a level platform nearly 5 m above the foundations of the wall; this platform was possibly the top of the terrace system.

As preserved, Wall 1, the lower limestone wall, is composed of a maximum of nine courses of ashlar

masonry, with courses ranging from 0.20 to 0.40 m in height and individual blocks from 0.50 to 1.70 m in length. Along the west face of the wall, the foundations climb upward toward the south, stepping up a total of five courses. Along the north face, the foundations rise toward the east, stepping up two courses over a distance of 3.50 m. The foundation stones (i.e., those resting directly on undisturbed soil) are rough dressed on their undersides and squared off on the other three sides; the faces are rusticated, with chisel-drafted margins and roughly dressed projecting central panels. Above the bottom course, or, in the case of the north and south faces, the bottom two courses, the central panels enclosed by the chisel-drafted margins of the faces of the blocks are much more finely trimmed (Fig. 172). They are delicately roughened or stippled with a point. In some cases, the point-stippled area is a neat oblong panel projecting a few millimeters from its borders; but in other cases, the point-stippled area is flush with the chisel-drafted borders, and the stippling sometimes even penetrates the plane of the borders.

Each of the nine courses of the wall is set back slightly, about 0.02 m, from the course underneath. Every block except those of the foundation has a horizontal bevel cut along the bottom, and most blocks have a corresponding vertical bevel cut along one side. Although the edges of the blocks are chipped in many places, the still discernible overall scheme, with the bevels occurring mostly on the right sides of blocks in the left half of the wall and on the left sides of blocks in the right half of the wall, suggests the bevels indicate the direction of laying here as on the Karniyarık Tepe crepis wall (no. 2) and the Pyramid Tomb (no. 15; see above, Ch. 3). Thus, the west face of the wall would appear to have been built by two teams of masons working from opposite ends toward each other and the middle of the wall.

As on the Karniyarık Tepe crepis, the evidence of the bevels for the direction of laying is corroborated by pry holes visible in a few places on the tops of the blocks. Both the tops and the sides of most blocks are either damaged or obscured, however, and it is difficult to see clearly how they are dressed. The joints seem to be prepared in the same way as in other Lydian monuments, with smoothly dressed bands along the front and top (not the bottom), giving way gradually to more coarsely chiseled (but not recessed) areas in the middle. The bands at the front and top are smoothed with abrasives and are the only parts of the blocks so smoothed.

The excavator noticed three mason's marks in the south face of Wall 1. Two of these are cut in the rough-

dressed central panels of foundation blocks; the third, much less deeply cut in the center of the west block of the fourth course from the bottom, may be the trace of a mark cut in the quarry face of the block and never entirely erased in the final trimming.

The west face of Wall 2, the sandstone wall, abuts the south face of Wall 1. Although the south face of Wall 1 does contain a few sandstone blocks, the two walls are not bonded. Wall 2 differs from Wall 1 in many respects in addition to material (Fig. 169). Above the foundations, the face of the wall is vertical, not stepped, and the coursing is irregular. Individual blocks are slightly pulvinated rather than rusticated. The surfaces are naturally rough, and there are no visible toolmarks. The joints are snug but not sharp. The wall is more like a rubble wall built of rectangular stones than like the essentially isodomic ashlar masonry typical of the Lydian tradition.

The foundations of Wall 2 are more roughly dressed than the upper courses, and they project from the face of the wall. The foundation stones have also been carefully chosen and placed so that each block is 0.20 m high, and the distance from the left edge of every block to the left edge of the block on top is uniform, at 0.40 m. The upper left-hand corners of all the foundation blocks thus fall on a straight line. The corners of each of a series of cuttings in the foundations of the west face of Wall 1 also fall along the same line (Figs. 163, 168). These cuttings are oblong slots, 0.60–0.70 m wide, and varying in height. In every case, they are cut down from the top of the block exactly as far back as the plane of the drafted edges of the next course of blocks; since every course steps back 0.02–0.04 m from the edge of the course underneath, these cuttings are thus between 0.02 and 0.04 m deep. Four cuttings are preserved. The upper three are clustered together, with the distance between the bottom of one cutting and the bottom of the next being 0.40 m, and the distance between the front of one cutting and the front of the next being 0.80 m. Since the intervals between the bottom cutting and the second cutting are much greater (0.06 m and 1.10–1.20 m, respectively), there may have been another slot in between these two; the face of the wall is severely damaged in this area.

The combined evidence of the projecting foundation stones of Wall 2 and the cuttings in the foundations of Wall 1 indicates that a stairway originally ran along the base of Wall 1 to a landing at the intersection of Walls 1 and 2, and then continued to climb up the base of Wall 2. The projecting foundation blocks of Wall 2 were apparently designed to support the ends of step blocks 0.20 m high ($7\frac{3}{4}$ in.; present-day architects re-

gard $7\frac{1}{2}$ in. as ideal heights for steps) and 0.40 m deep; the slots in Wall 1 were designed to receive blocks of the same size.

This stairway is restored in Figure 165. The restoration suggests that on the west face of Wall 1, there is only one slot for every other block in the case of the upper three slots, and two blocks between the bottom and second slot as preserved. If these cuttings were designed to accommodate steps identical in size to the steps that rested on the projecting foundation stones of Wall 2, why is there not a slot for every step, and why are there two different systems for joining the steps to the faces of the walls?

The courses of Wall 1 are mostly too high for single steps but not as high as two steps combined; thus, it was impossible to make the steps always coincide with the joints between courses. But in cases where a step crosses a joint in the wall, while the bottom part of the step is flush with the lower course of the wall, there is a gap between the upper part of the step and the upper course of the wall, set back a few centimeters from the edge of the lower course. Thus, the staggered profile of Wall 1 posed a problem to building a stairway directly up against the face of the wall—a problem the vertical face of Wall 2 did not pose.

This problem could be solved in at least two ways: by cutting a notch in the edge of the step or by cutting a slot in the face of the wall (more specifically, by cutting a slot in the lower course as far back as the plane of the upper course, as wide as the step is deep, and as far down as the bottom of the step). The latter solution is the one employed in Wall 1. For a series of steps extending the line of the staircase along the base of Wall 2, slots would be required only in the places where they do occur, with the addition of one slot, not preserved, between the bottom two preserved cuttings.

On Wall 2, cuttings like the slots in Wall 1 were unnecessary, because the face of the wall is vertical. It is conceivable that the projecting foundation blocks of Wall 2 are themselves the steps, broken off and eroded since antiquity, but it seems likelier that they supported independent step blocks, now lost. Thus, the steps along Wall 2 were one step higher than the steps along the west face of Wall 1, which were fitted in the slots cut into the faces of the blocks. This discrepancy would be explained if the stairway continued to climb along the south face of Wall 1, as assumed in Figure 165. The third block from the bottom at the southwest corner of Wall 1 is entirely flat-chisel dressed on its south face and on the right half of its west face; although the reason for this chiseling is unclear, it may be related to steps turning the corner of the wall and continuing along the south face.

The existence of a stairway at the base of Walls 1 and 2 may help to explain the broken outline of the walls. It is possible that the builders turned the west face of Wall 1 to the east for 1.50 m at its south end, then returned to the south with Wall 2, rather than building a single straight wall, to maintain the same slope up the stairway and to maintain approximately the same distance between it and the foundations. The existence of a stairway would not be the only reason for keeping the same gradient at the base of the wall, but the care clearly taken to preserve a gradient that is nearly ideal for a stairway suggests that the stairway was part of the original design. Certainly the projecting foundation stones of Wall 2 are original to its construction, and the cuttings in the west face of Wall 1 are probably also original rather than secondary. Thus, the evidence for the stairway at the base of Walls 1 and 2 also indicates the two walls are contemporary and built together.

Wall 3, the upper limestone wall, resembles Wall 1, except that it is apparently unfinished (Fig. 170). Five courses of masonry are preserved, each about 0.40 m in height. Along the west face, the foundations of the wall step up two courses toward the south. The dressing of the foundation stones, with chisel-drafted margins and hammer-dressed central panels, resembles the dressing of the foundations of Wall 1, but in this case, the dressing of the blocks of the second and higher courses is similar. As on Wall 1, each course is set back 0.02–0.04 m from the edge of the course below. Only the northwest corner of the wall is visible today, but each of the visible blocks is beveled on one side and, above the foundation level, on the bottom as well. The bevels are similar to the corresponding bevels on Wall 1 and must have served the same function. On Wall 3 as on Wall 1, the evidence of pry holes corroborates the evidence of the bevels for the direction of laying, suggesting that the builders started, as would be expected, from the northwest corner and worked toward the south and east.

Several different types of mason's marks are inscribed in the faces of many blocks of Wall 3 (Figs. 163, 173). On Wall 1, we have seen that mason's marks appear only on foundation blocks and in one place very faintly on an upper block. Probably the mason's marks on Wall 3 would eventually have disappeared when the central panels of the blocks were more finely trimmed (see above, Ch. 3).

The similarities in construction and layout between upper and lower limestone walls suggest they are contemporary. The best independent dating evidence for the whole terracing complex is an assemblage of pottery found in a layer of limestone chips resting directly on

bedrock at the foot of Wall 3, which was interpreted by the excavator as a layer of working chips deposited during the wall's construction (Fig. 171; similar deposits in front of Walls 1 and 2 have been disturbed).

FINDS

The sherds included in this list are a selection of the material found in the limestone chip layer at the base of Wall 3 (the upper limestone wall).

1. Jar, rim fragment. Plain except for glazed lip. Found in layer of working chips at the base of Wall 3. Uninventoried. Figs. 174:a, 175:a.
2. Krater (?), rim fragment. Bichrome decoration. Found in layer of working chips at the base of Wall 3. Uninventoried. Figs. 174:b, 175:b.
3. Dish, body fragment. Black-on-red decoration. Found in layer of working chips at the base of Wall 3. Uninventoried. Fig. 174:c.
4. Small closed vessel, fragment of neck. Narrow black bands on red brown ground. Found in layer of working chips at the base of Wall 3. Uninventoried. Fig. 174:d.
5. Dish or bowl, body fragment. Black-on-red decoration. Found in layer of working chips at the base of Wall 3. Uninventoried. Fig. 174:e.
6. Stemmed dish, fragment of foot. Gray Ware. Found in layer of working chips at the base of Wall 3. Uninventoried. Fig. 174:f.

DATE

Middle of first half of the sixth century.

The pottery is not precisely datable. The wares represented a range in date from the late seventh to the early fifth centuries; none of these fragments is necessarily earlier than the early sixth century, and none need be later than the mid-sixth century.

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17. BYZANTINE FORTRESS

(Figs. 176-98)

INTRODUCTION

The "Byzantine Fortress" crowns a commanding hill that projects from the north side of the Acropolis like a promontory overlooking the Hermus plain (see Fig. 16). It is flat on top and 28 m wide at the north end (Fig. 176). The hill grows gradually wider toward the south, until it merges with the lower slopes of the Acropolis. At this point it is about 200 m wide.

This hill is the largest of several such flat-topped promontories on the north side of the Acropolis, probably traces of an earlier Hermus valley floor level (see Fig. 16). The Hellenistic or Roman theater at Sardis is partly built up against a comparable hill. Similar formations occur around other Acropolis-like foothills below Mount Tmolus.

The Byzantine Fortress is the highest broad and level place in the "lower city" of Sardis; it offers a clear and sweeping view both up and down the Hermus valley and across the Hermus plain toward Bin Tepe. The

hill was occupied for many centuries, concluding in late antiquity with the building from which it derives its conventional nickname. But the most imposing structure in this area is much earlier: a massive limestone-faced wall of the Archaic period, which enclosed the hill on its east and north sides, turning this natural promontory into an enormous and substantially man-made terrace (Figs. 176-80).

HISTORY OF EXPLORATION

The late antique structures at sector ByzFort were mapped and studied by Robert Lindley Vann in 1972. Different surface survey teams reexamined the hill in 1976 and again in 1981. Excavations, based on the results of the 1981 survey, were begun in 1983 and were pursued intermittently through 1991.

The excavations concentrated on exposing the outlines of the terrace and on exploring the north end of the top of the hill. The northwest and northeast corners of the terrace were uncovered, as well as sections of its east face. The corners of the terrace are still visible. The masonry exposed in the trenches

dug along the east side of the hill has been either covered up or reburied for protection. The trenches dug on top of the terrace exposed several Archaic structures, but their function and the purpose of the terrace as a whole remain uncertain. A small section of an earlier “megalithic” rubble terrace wall, oriented east–west and facing north, was exposed just east of the northeast corner of the terrace (Fig. 177). For the most part, the trenches on the top of the hill remain open.

DESCRIPTION

Terrace. The limestone face of the terrace is composed of ashlar masonry, laid in regular 0.5 m courses. Where visible, the limestone facing is usually one block thick (one stretch is two blocks thick), backed by a large rubble wall, which, in turn, retains a massive rubble packing, filling the space between the terrace wall and the natural slopes of the hill. In many places, especially on the east side of the hill, this packing has remained intact even where the face of the terrace is not preserved (Fig. 186). The foundations of the terrace rest on a narrow shelf 10–15 m below the top of the hill (Figs. 178, 179).

The northeast and northwest corners of the terrace are 28 m apart (Figs. 176–78). The terrace wall is preserved to approximately the same elevation (*169.970–*170.071) at both corners; above this level, the limestone masonry has been robbed out. At the northeast corner, the face of the terrace was exposed down to foundation level at *165.57, revealing a total of eight courses of masonry (on top of a stepped foundation; Figs. 181, 183); only three courses were revealed at the northwest corner, and the footing of the wall was not reached (Fig. 185, view from above). In plan, about 3 m of the north face of the platform has been uncovered at the northeast corner and 4 m at the northwest corner. The two segments fall along the same line, and both the east and west sides return to the south at right angles. Only 1 m of the west face has been uncovered, its south end built up against undisturbed soil. Originally, the wall must have resumed at a higher elevation. The east side is better preserved. At the northeast corner, 6.50 m of the east face survive; the south end of this stretch of wall also abuts on undisturbed soil, but the wall may be traced another 5.00 m in cuttings on top of the undisturbed soil.

The east edge of the terrace was revealed in another set of trenches approximately 50 m south of the northeast corner (Figs. 176, 186). Two courses of blocks were exposed, but the footing was not reached. The elevation on top of the highest preserved course is *166.57 m, only 1.00 m above the bottom of the wall at the northeast corner. In plan, a 7 m segment of the limestone face of

the terrace was uncovered. It is not aligned with the east face at the corner but rather angled out to the southeast, following the natural contours of the hill. If the line of this segment were extended to the north, it would intersect the line of the northeast corner segment at a point about 20 m south of the corner; there is actually a bend in the side of the hill at this point, and it may have been reflected in a simple bend in the wall of the terrace (alternatively, the present outline of the hill may mirror the original outline of the terrace).

Just such a bend was found in the southernmost trenches of this sector, on the east side of the hill about 150 m south of the north face of the terrace. About 15 m of limestone masonry were revealed in plan (Figs. 187, 189): a 5 m segment oriented more or less north–south, turning to the southeast at about a 120-degree angle, then continuing for another 10 m. The masonry is preserved to an elevation of *176.57, 6.50 m higher than the masonry at the northeast corner. Six courses of blocks were revealed, but the bottom of the wall was not reached (Figs. 188, 190). It is unclear whether the north–south oriented segment uncovered in this southern set of trenches is aligned with the limestone masonry in the middle set of trenches. There is a pronounced dip or hollow in the side of the hill between these two excavation areas, perhaps due to an intentional break or opening in the side of the terrace. The Sardis Expedition dug a pair of exploratory trenches in this area between 1988 and 1991 that revealed a street of the Roman period, running uphill from northwest to southeast, and a monumental sandstone foundation of earlier but undetermined date and function. In 2010 a stretch of limestone masonry was revealed by erosion on the north side of this hollow. The following description has been kindly provided by Nicholas D. Cahill.

Located parallel to and 18 m west of the projected line of the east terrace wall, this must belong to a structure on top of the terrace. The preserved top lies about 7.6 m above the preserved top of the masonry on the northeast corner, and 1.0 m lower than the stylobate at the north side of the hill (at *177.6–*177.7 m).

Only the east edge of the structure was cleaned. It is preserved two courses high where its face is exposed, and a length of 4.25 m was revealed (seven blocks, with one missing); it originally continued to both north and south. At the southern end, the blocks rest on bedrock. The packing behind the face seems to consist of large unshaped limestone chunks.

The blocks of the face are relatively small, 0.42–0.72 m long and 0.30 high, and are roughly

worked without drafted margins or other features. One block has a rough flat-chiseled band along its upper edge. Joints are straight, without anathyrosis or separately worked contact bands.

The blocks are clamped together with butterfly clamps located 0.15–0.20 m behind the face of the wall [Fig. 191]. The cuttings are 0.07–0.08 m wide, and the clamps are about 0.21–0.24 m long where both halves are preserved; half clamp cuttings are 0.09–0.12 m long. The clamp cuttings are 0.02–0.03 m deep, and there are no cuttings for iron staples. One clamp cutting is still filled with lead, which was poured somewhat carelessly into the cutting, leaving an irregular, slightly puddled shape. The edges of this clamp were punched with a pointed tool, square in section, after the lead had set, presumably to achieve a better seal between the lead and the stone. Despite the clamp, the blocks had shifted slightly, breaking the clamp and displacing the two halves by a few millimeters.

The masonry exposed at the northeast corner is roughly isodomic (Figs. 178, 179, 181); individual courses range in height from 0.51 to 0.59 m. Each course is set back 0.03–0.07 m from the course underneath. The bottom course rests on a footing of three courses of roughly dressed slabs, mostly of schist, but including some sandstone and limestone blocks. These three courses are 0.20–0.30 m high, and each course is set back about 0.15 m from the course below. This stepped footing is present only along the north face of the terrace and at the northeast corner; on the east side, the bottom of the terrace steps up and the footing disappears.

The limestone masonry is, as already mentioned, only one block deep at the northeast corner (the average thickness of the blocks is about 0.6 m), and the massive rubble wall behind this ashlar facing is composed of large untrimmed chunks of schist (Figs. 178, 179). Along the east side of the terrace, in the middle set of trenches, an additional row of rough-trimmed limestone blocks intervened between the limestone face and the rubble wall (Fig. 186); otherwise, the construction of this segment of the terrace is identical to the construction of the northeast corner, where the interior rubble wall rises several meters above the ashlar masonry as preserved. Layers of limestone chips visible at regular half-meter intervals in the exposed face of the rubble wall suggest that the rubble wall and the limestone masonry were built up course by course together. As each course of limestone blocks was laid, the rubble wall behind it

was raised to the level of the top of the course, and when the tops of the limestone blocks were leveled off in preparation for laying the next course, a sprinkling of chips was deposited on top of the rubble masonry behind the limestone facing.

The interior rubble wall retains a fieldstone packing dumped up against the natural hillside. Excavation on top of the hill has revealed traces of this stone packing at elevations roughly 12 m above the foundations of the limestone masonry and at points within the terrace about 8 m at a perpendicular from the edges of the terrace at foundation level. In its intact state, the terrace was substantial, not only for its height and width but also for the massiveness of the stone packing that formed its core.

The limestone masonry of the terrace wall is rusticated; blocks have chisel-drafted margins enclosing hammer-dressed central panels. The margins vary in width, but the average is about 0.05 m. The chiseling of these margins is less regular than usual in Lydian masonry—the chisel marks are often diagonal, for example, rather than perpendicular to the edges of the blocks. The projection of the central panels is also irregular. Sometimes these panels project as much as 0.07 m; on a few blocks, the central panels hardly project at all. Where exposed, the joining surfaces of the blocks are banded—more finely dressed at the edges than in the middle but without the clarity of anathyrosis.

The masonry of the Lydian terrace at the Byzantine Fortress differs from the masonry of the Lydian terraces on the Acropolis and of other Lydian retaining walls in several specific respects. Some common technical details are not present; there are no pry holes, for instance, and the edges of the blocks are not beveled. Other details of this structure are unique, especially two different kinds of cuttings in the faces of the blocks. One is rectangular, usually 0.10 m wide, 0.05 m high, and 0.30 m deep. These cuttings are in most cases located in the upper right- or left-hand corner of a block. They generally occur at 2–3 m intervals in every other course (e.g., the third, fifth, and seventh courses from the bottom on the north face, Figs. 181, 183). They are probably putlog holes for a scaffolding erected to support workmen trimming the blocks as they were laid (see above, Ch. 3). A second type of cutting is arc shaped, usually about 0.20 m high, 0.07 m wide, and 0.07 m deep. These cuttings are found on every block, generally one cutting per block, centered along the bottom edge, or, for large blocks, two symmetrically placed cuttings. They seem to be “shifting cuttings,” whose purpose was to give some purchase to the end

of a crowbar used to shift the blocks into place (see above, Ch. 3).

The masonry is similar in both sets of trenches where substantial portions of the face of the terrace have been exposed—at the northeast corner and in the southern set of trenches. The only major difference is one of preservation. Where it is revealed in the southern trenches, the face of the wall is worn, as if it had been exposed to wind and rain. The face of the terrace as uncovered at the northeast corner, however, is much less weathered, if at all.

The section drawing and photograph in Figures 182 and 184 (illustrating a balk that was subsequently removed) show a series of layers of limestone chips running up against the east face of the terrace near the northeast corner. These layers are comparable to the layers of limestone chips visible in the rubble wall in back of the limestone facing, mentioned above (Figs. 178, 179). They are working chips deposited, in cases where they run up to the seams between courses, after the completion of one course and before the commencement of work on the next. These courses appear, therefore, to be foundation courses, buried after construction and never intended to be visible.

The section in Figures 178 and 184 was cut on a line running east–west up against the east face of the terrace about 5 m south of the northeast corner. The limestone-chip construction layers establish that all the surviving masonry south of the section line was intentionally buried by its builders. North of this line, the construction layers were less well defined and they sloped down toward the corner. It was difficult to follow this slope in excavation, but if, as is likely, the slope was the same as that of the uppermost construction layer shown in Figure 179, then at the actual corner, the upper two surviving courses of blocks would have become visible. The section drawing in Figure 179 shows that along the north face as exposed, at least the bottom five courses were buried.

At the northwest corner, part of the west face as preserved was also below ground level at the time of construction. This is established not by the presence of construction layers but because the masonry is actually fitted into a foundation trench cut in the bedrock. Limestone chips were included in the earth filling this foundation trench, but they were not deposited in distinct layers.

There is no perceptible difference between the preservation of blocks known to have been buried at the northeast corner and blocks that may have been visible. Perhaps the ground level at the base of the wall started to rise soon after the terrace was completed;

it is also possible that all the preserved masonry was originally buried but that the deposits in front of the wall have been disturbed above a certain level. At any rate, the masonry exposed in the southern set of trenches shows that there was no difference between the dressing of the foundation courses and the dressing of exposed sections of the terrace, although the character of the masonry may have changed at a higher level than any preserved.

In places where the construction layers slope along the face of the terrace, steeply enough to cross the seams between courses, it is obvious they were not deposited after the completion of every course but at longer and less regular intervals. Not every foundation course was buried immediately after it was laid; in some cases, several courses were laid together and buried all at once. It is unclear why the builders did not cover up every course as soon as it was finished, which would seem to be the most economical procedure. But they did not, and that is presumably why there are putlog holes even in some courses that were eventually buried. The irregularity of the construction layers also suggests the limestone chips included in them were not always simply deposited when the blocks were trimmed in place and left where they fell. In some cases, rather, they have probably been intentionally dumped, either as waste to be disposed of or to make the earth piled up against the foundations of the terrace more stable and compact.

These limestone chip layers are crucial for dating the construction of the wall, since the small finds sealed beneath them must have been deposited during the construction of the wall and not later.

Structures on Top of the Hill. Excavation on top of the terrace revealed a number of Archaic features, all poorly preserved. Three main building phases are apparent. The first is represented by a large square pit (3.50 m along a side and 2.20 m deep), perhaps the basement or cellar of a freestanding structure, dug into undisturbed soil (Fig. 177). This phase is roughly dated by pottery found in the bottom of the cellar to the mid-seventh century. The second phase is represented by a large rubble foundation, built partly into and on top of the fill of the east half of the cellar. This foundation is composed of large, roughly worked blocks of schist, sandstone, and limestone and includes some reused blocks of finely dressed marble. There is no direct archaeological evidence for the date of this phase, but it is stratigraphically earlier than the third phase, represented by the remains of the rubble packing retained by the great limestone terrace wall;

this packing clearly ran up against the large rubble foundation and may in fact have run over and buried this foundation.

The only ashlar masonry structure on top of the hill is a narrow stone foundation, probably a stylobate, resting partly on the fill of the basement or cellar of the first building phase (Figs. 177, 192, 193). This stylobate consists of a square marble plinth, which seems to have supported a column, flanked by paving stones of marble and sandstone. The west end of the stylobate rests partly on an earlier rubble wall, visible in Figure 193 (beneath the scale bar and arrow) but not shown in Figure 192. To the east, the stylobate was cut by a Roman wall; to the west, it was robbed out, but the robber's trench suggests that it originally extended at least 3–4 m farther. Excavation north and south of the stylobate did not clarify its stratigraphic relationship to the large rubble foundation of the second building phase or to the rubble packing of the third phase. When viewed in plan, however, it is clear that the stylobate and the large rubble foundation are laid out on the same grid, and that both are slightly skewed to the great limestone terrace. On this evidence, the stylobate may tentatively be assigned to the second building phase.

The paving stones on either side of the square plinth are smooth on top, but a roughly circular point-dressed patch on top of the plinth, which resembles the noncontact part of an anathyrosis joint (Fig. 192), suggests that it was meant to bear a stone column or circular column base (if the latter, the base may in turn have carried a wooden column). The ground surface south of the stylobate seems to have been level with the top of the paving stones; the dressing of the north face of the stylobate suggests that to the north, the ground surface was some 0.10 m lower. Thus, the stylobate may have acted as a kind of threshold, approached from the north. Fragments of a second marble column plinth and of a limestone paving block were found in the robber's trench to the west.

An interesting detail of the masonry of the stylobate is the piecing together of the two marble paving blocks west of the column plinth. Together with the use of three different varieties of stone, this suggests the stylobate was built from limited materials—perhaps from surplus materials from another building project. There is no evidence, however, that the blocks of the stylobate are reused.

The smoothly dressed areas of the blocks are trimmed exclusively with a flat chisel. The face of the westernmost block shows an intermediate stage in the finishing of a plane surface. The top and bottom

margins have been trimmed to the same plane, as has the upper part of the face; on the bottom half of the face, however, the mason never bothered to trim all the excess stone away, since this part of the block was below ground level. The tops of the blocks show how the final trimming was done (Fig. 192): the mason starts from a corner, then works out in widening arcs toward the center of the block. The easternmost paving block and the column plinth were removed after excavation, revealing a clear anathyrosis joint on the paving block on the west side of the plinth (Fig. 194).

The stylobate may have belonged to the porch of a small building or pavilion. The absence of any foundations beneath the stylobate suggests that the superstructure it supported was made of wood.

FINDS

These lists include imported and local pottery from layers associated with the construction of the terrace (A, B) and architectural terracottas from various contexts (C). In addition, a limestone wall base molding (App. 1, no. A2) was found in a later layer in the excavations of the northeast corner of the terrace.

A. Imported pottery.

1. Attic black-figure cup, body fragment. Male figure standing right. Attributed by Nancy Hirschland Ramage to the Heidelberg Painter. Found in fill of terrace on top of hill. P86.93:9343. Figs. 195:a, 196:a. Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Att 51.
2. Attic black-figure amphora, body fragment. Rim of a shield. Attributed by Dietrich von Bothmer to the Painter of Louvre F6. Found in construction layers at base of terrace. P85.29:9107. Figs. 195:b, 196:b. Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Att 5.
3. Corinthian aryballos, body fragment. Black glaze, vertical incisions. Found in construction layers at base of terrace. P87.106:9532. Figs. 195:c, 196:c.

B. Local pottery.

4. Lid, rim fragment. Black-on-red decoration. Found in construction layers at base of terrace. P85.53:9161. Fig. 197:a.
5. Column krater. Rim fragment. Streaky glaze, rows of white dots on lip and neck. Found in construction layers at base of terrace. P83.43:8804. Fig. 197:b.
6. Jar, rim fragment. Wave-line decoration. Found in construction layers at base of terrace. Uninventoried (1985). Fig. 197:c.
7. Gray Ware bowl, rim fragment. Found in con-

- struction layers at base of terrace. Uninventoried (1983). Fig. 197:d.
8. Dish, rim fragment. Black-on-red decoration. Found in construction layers at base of terrace. Uninventoried (1985). Fig. 197:e.
 9. Lydion, fragment of rim and neck. Black glaze, white bands on exterior. Found in construction layers at base of terrace. Uninventoried (1983). Fig. 197:f.
 10. Skyphos, rim fragment. Streaky glaze, reserved band below lip on exterior. Found in construction layers at base of terrace. Uninventoried (1985). Fig. 197:g.
 11. Jar, fragment of shoulder. Wave-line decoration with row of white dots at juncture of shoulder and neck. Found in construction layers at base of terrace. P83.50:8811. Fig. 197:h.
 12. Lydion, rim fragment. Found in construction layers at base of terrace. Uninventoried (1985). Fig. 197:i.
 13. Closed vessel, body fragment. Marbled decoration. Found in construction layers at base of terrace. Uninventoried (1983). Fig. 197:j.
 14. Skyphos, rim fragment. Marbled decoration. Found in construction layers at base of terrace. Uninventoried (1983). Fig. 197:k.
 15. Oinochoe, fragment of shoulder. Dilute glaze petals on shoulder, white dots at tips of petals. Found in construction layers at base of terrace. P83.42:8803. Fig. 197:l.
 16. Jar, fragment of shoulder. On shoulder, white band framed by black lines and filled with vertical black squiggles. Found in construction layers at base of terrace. Uninventoried (1985). Fig. 197:m.
 9. Lotus and palmette. Uninventoried (1984). *Ibid.*, no. 15.
 10. Lotus and palmette (?). T87.6:9482. *Ibid.*, no. 8.
 11. Chain of buds. T85.34:9143. *Ibid.*, no. 10.
 12. Wave or "turret" motif. T85.33:9142. *Ibid.*, no. 9.
 13. Human or semihuman figure. T86.3:9203. *Ibid.*, no. 6.
 14. Scroll. T85.32:9141. *Ibid.*, no. 16.
 15. Soffit of sima. T87.3:9432. *Ibid.*, no. 26.
 16. Soffit of sima or eaves tile. T86.16:9353. *Ibid.*, no. 27.
 17. Bottom of spout (?). Uninventoried (1989). *Ibid.*, no. 31.
 18. Molding. T89.11:9667. *Ibid.*, no. 33.
 19. Soffit of sima or eaves tile. Uninventoried (1984). *Ibid.*, no. 25.
 20. Maeander. T85.28:9129. *Ibid.*, no. 22.
 21. Palmette ornament (?). T89.10:9665. *Ibid.*, no. 29.
 22. Heraldic animal. T85.26:9117. *Ibid.*, no. 4.
 23. Heraldic animal. T85.25:9116. *Ibid.*, no. 3.
 24. Scroll. T85.31:9140. *Ibid.*, no. 18.
 25. Maeander. Uninventoried (1984). *Ibid.*, no. 21.
 26. Laconian-style antefix. Uninventoried (1985). *Ibid.*, no. 30.
 27. Volute. T87.9:9492. *Ibid.*, no. 32.
 28. Scroll. T86.10:9268. *Ibid.*, no. 17.
 29. Bird. T85.3:9031. *Ibid.*, no. 5.
 30. Star. T83.5:8744. *Ibid.*, no. 19.
 31. Star (?). Uninventoried (1985). *Ibid.*, no. 20.
 32. Volute ornament. T86.11:9269. *Ibid.*, no. 28.

C. Terracottas (Fig. 198). All are simas or revetment plaques unless otherwise noted; only basic identifications and inventory numbers given, together with references to full publication in Ratté, "Architectural Terracottas."

1. "Theseus and Minotaur." T85.23:9114. Ratté, "Architectural Terracottas," no. 1.
2. "Theseus and Minotaur." T85.36:9157. *Ibid.*, no. 2.
3. Egg and dart. T91.7:8963. *Ibid.*, no. 13.
4. Egg and dart. T85.30:9139. *Ibid.*, no. 11.
5. Rounded upper border. T86.5:9126. *Ibid.*, no. 7.
6. Maeander. T85.24:9115. *Ibid.*, no. 23.
7. Egg and dart. T89.9:9660. *Ibid.*, no. 14.
8. Egg and dart. T85.38:9164. *Ibid.*, no. 12.

DATE

The terrace may be dated to the mid-sixth century. The latest datable objects are sherd nos. 1 and 2 (560–550). On historical grounds, it seems unlikely that the structure postdates the Persian conquest of 547. The stylobate on top of the hill is probably earlier.

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18. MMS/N

(Figs. 199–212)

INTRODUCTION

Sector MMS/N is located just north of the former Izmir-Ankara highway, directly across from sector MMS (Fig. 199). Work in the sector began in 1978 in the hope of tracing the line of the Archaic fortification wall (initially nicknamed the “Monumental Mudbrick Structure,” later called the “Colossal Lydian Structure”), recently identified at sector MMS. The result was the discovery of a monumental gateway, clad partly in limestone and sandstone ashlar masonry (Figs. 200, 201).

HISTORY OF EXPLORATION

Excavations began in 1978 and were carried on through 1985; work was later resumed in 1989 and continued until 2001. The trenches in sector MMS/N remain open, except for a few isolated probes, which have been filled in.

DESCRIPTION

Building History of the Archaic Fortification. The Archaic fortification wall revealed in sectors MMS and MMS/S exhibits three main building phases (Fig. 199). The first is represented by the construction of a massive wall, approximately 20 m thick and composed of both coursed “megalithic” rubble masonry and mudbrick. Pottery from strata running underneath the foundations of this wall establishes a terminus post quem of the last quarter of the seventh century. The second phase is represented by the construction of a huge earthwork on the west side of the fortification. A terminus ante quem for this phase is established by the destruction of the fortification, in which thick layers of mudbrick debris were deposited on both sides of the wall. Buried beneath this destruction layer was a group of houses on the east side of the wall, which contained hundreds of ceramic vessels and other artifacts; the diagnostic objects were all datable to the middle or first half of the sixth century. This destruction may thus be associated with the siege and conquest of Sardis by Cyrus of Persia, dated on historical grounds to 547 B.C. The third phase is represented by the partial reconstruction of the fortifications, probably in the second half of the sixth century. The gateway uncovered in sector MMS/N exhibits the same three building phases. Only the base of the gateway is preserved, the whole area having been leveled off in the Roman period, when a colonnaded avenue ran through this same location.

South Side of Gate. The original southwest corner of the gate (i.e., the northwest end of the section of forti-

fication wall exposed in sectors MMS/S and MMS) is exposed in sector MMS/N at E136.00/S29.50 (Fig. 200). At this point, the west side of the fortification turns at an oblique angle to the east. It then extends for 13 m before turning back at an acute angle to the south. The south side of the gate is built of coursed “megalithic” rubble masonry, retaining a massive rubble fill. This stone foundation apparently belongs to the first phase in the construction of the fortification and presumably supported a superstructure of mudbrick. To the west, however, the foundation is in part surmounted by a single course of squared limestone blocks (Figs. 204, 208). The excavators attributed this limestone masonry to the second building phase.

In the second building phase, the inner face of the gate was extended to the west. Only a short length of this extension has been revealed, a wall of squared limestone blocks backed by rubble built up against the original southwest corner of the gate (slightly skewed to the line of the inner face of the gate; Figs. 200, 202). The purpose of this extension is thought to have been to support the earthwork piled up against the west face of the fortification.

The limestone blocks of the extension have chisel-drafted margins enclosing pick- and hammer-dressed central panels, resembling the blocks of the upper limestone wall on the Acropolis (no. 16; Fig. 170). The dressing of the limestone blocks incorporated into the inner face of the gate proper is similar, and this is one reason for suggesting that these limestone blocks are secondary, belonging not to the first phase of the gate’s construction but to the second phase, contemporary with the extension. This crucial question is examined in greater detail below.

A debris layer consisting of crushed fragments of baked brick was found on top of the pebble road surface associated with the second phase of the gate. Discussion of the third building phase—the construction of a large casemate wall, resting partly on this debris layer, across the gateway—follows the description of the north side of the gateway.

North Side of Gate. The northeast corner of the gate has been exposed at E160.00/S20.00 (Fig. 200). The “megalithic” rubble masonry of this corner, which forms an acute angle, resembles the masonry of the original southwest corner of the gate. It, therefore, probably belongs to the first building phase. The purpose of a secondary rubble wall built up against this corner is uncertain.

The plan of the remainder of the north side of the gate is complex. From the northeast corner, the inner

face of the gate returns along a line roughly parallel with that of the south side of the gate for a distance of 13.20 m. In this area, the gate passage is approximately 5.60 m wide. The gate then opens up into a large court, the gate wall returning to the north at a slightly obtuse angle before turning again to the west at a slightly acute angle. At this point (E133.00/S13.00), the wall returns to the north; this is, therefore, the northwest corner of the gate and is in fact situated almost directly north of the southwest corner. It is unclear whether the existing plan of the gate is original or the result of secondary elaborations and additions.

The construction of the north side of the gate is varied. As already noted, the northeast corner as preserved is built of “megalithic” rubble masonry. To the west, however, the north side of the narrow gate passage is faced with limestone ashlar masonry, similar in the lower courses to the masonry on the south side of the gate but comparable in the upper courses to the masonry of the lower limestone wall on the Acropolis (no. 16; Figs. 203:c, 206, cf. Fig. 172). This masonry rests on rubble foundations and appears to be stepping up to the east. Thus, it is possible that the “megalithic” rubble masonry of the northeast corner was also originally crowned with limestone masonry. Like the masonry on the south side of the gate, however, the limestone masonry may be secondary to the original construction of the gate.

The east face of the gate court (i.e., the northward return of the inner face of the gate passage) is also built of limestone masonry on rubble foundations (apparently including some earlier structures, as is suggested by the straight joint in the rubble masonry under the north section of the wall shown in Fig. 203:b). The masonry, however, of the northwest part of the gate (i.e., the north face of the court, and the northwest corner and return to the north; Figs. 203:A, 207) is sandstone. The dressing of the sandstone masonry is similar to but coarser than that of the limestone, with individual blocks having chisel-drafted margins enclosing pick- and hammer-dressed central panels. The nature of the juncture between the sandstone masonry and the limestone masonry at the northeast corner of the courtyard is unclear, but the latter appears to be built up against the former.

Gate Passage. The surface of the passage and court thus defined by the two sides of the gate does not seem to have been level but rather to have sloped down from east to west; this is indicated by a series of hard-packed road surfaces, found in several places on both the north and south sides of the gate, and also by the treatment of the masonry on both sides. The lower hard-packed surfaces

run under the earliest phases of the gate on both sides, showing, as is not surprising, that the existing fortification is not the earliest evidence for use of this area.

The ground level was substantially higher when the gateway was in use, at least at the time when it was faced in limestone ashlar masonry. Layers of limestone chips, apparently deposited during the construction of the limestone masonry, were found running up against the foundations of both the north and south sides of the gate, at elevations approximately 1 m above the bottoms of the foundations (thus, over 1 m above the lower road surfaces; see Fig. 209, showing the south side of the gate). If the limestone masonry is secondary to the initial construction of the gate, the original gate passage probably lay at some intermediate level, in between the limestone chip layer and the surfaces that predate the fortification. Although several hard-packed surfaces were identified in this horizon, none of these was as clearly defined as the lower surfaces, and it is not clear that any is a true road surface.

A mudbrick debris layer similar to the debris layer in sector MMS (and clearly different from the crushed brick layer described above) was found in layers stratigraphically later than the ashlar masonry on both sides of the gate. The third major phase in the construction of the gate is represented by a large casemate wall, partly buried by this mudbrick debris. The edges of this casemate wall are formed by two large rubble walls, both running north–south, one from the southwest corner of the gate to the northwest corner, the other from the northwest corner of the narrow gate passage (i.e., the point where the passage opens up into a courtyard) up against the south side of the gate (Fig. 209). The space between these walls was filled with gravel, divided into casemates by a series of poorly built rubble cross-walls. This large casemate structure thus filled the entire courtyard of the original gate; it was presumably built during a partial reconstruction of the fortifications in order to block the gate. The date of this reconstruction is uncertain but need not be later than the second half of the sixth century, and is likely to be shortly after the mid-sixth-century destruction.

Limestone Masonry. The excavators believed that the limestone masonry on both the north and the south sides of the gate was secondary to the original construction. This suggestion is based on a number of architectural and stratigraphic details: (1) the similarity between this masonry and the masonry of the westward extension of the south side of the gate; (2) the use of blocks of differing heights in the bottom course on the south side of the gate, requiring chinking stones

under the shorter blocks, in contrast to the foundations of the terrace wall at sector ByzFort; (3) the incorporation of reused blocks into the masonry on the north side of the gate; (4) the location of the limestone-chip construction layer a full meter above the bottom of the foundations on the south side (although it is possible that the foundations were buried gradually as they were built); and (5) the date of the pottery in the limestone chip layers on both sides of the gate, at least a quarter-century later than the latest datable pottery associated with the original foundations of the structure (see list of finds below). If the limestone masonry is indeed later, one would have to imagine either that the entire gate structure was stripped down to its foundations and then rebuilt or, perhaps more likely, that the mudbrick faces of both sides of the gate were cut back, then rebuilt at least partly in stone, possibly to protect the gate from being undermined (just as the east and west sides of the wall in sectors MMS and MMS/S were reinforced with massive earthworks) and also perhaps to give it added splendor. This question remains open, but in any event, the pottery found in the limestone chip layers gives a secure terminus post quem for the limestone masonry, independent of its relationship to the original construction of the gate.

On both sides of the gate (including the extension on the south side), the limestone masonry is a single course thick, backed by rubble packing. As already noted, only a single course survives on the south side of the gate (except in the westward extension, where two courses are exposed), extending from the east side of a large Roman pier (built on top of and partly into the Archaic structure) eastward for approximately 5 m. At this point, the masonry probably stepped up with the rising ground level. The masonry on the north side of the gate is better preserved than that on the south, and so the description that follows concentrates on this side (Fig. 206).

The contiguous sections of limestone masonry on the north side of the gate passage and on the east side of the court are founded at approximately the same level and survive to about the same height. The limestone masonry as preserved consists of a maximum of two courses of neatly dressed blocks resting on a third course of rougher blocks (one of the euthynteria blocks bears a single mason's mark in the shape of a theta; three of the surviving blocks on the north side of the gate bear mason's marks in the form of a circle, or omicron). Each course is about 0.30 m high. The bottom course of the limestone masonry rests on one or more courses of rough sandstone masonry, supported

in turn by rubble foundations. Each course above the rubble foundations is set back a few centimeters from the course underneath—about 0.02 m in the case of the ashlar blocks, as much as 0.10 m in the case of the lower courses (although only one limestone course survives on the south side of the gate, a setting line inscribed on top of that course, parallel with the face and set back approximately 0.03 m, indicates the line of the next course).

As noted above, the ancient ground level in this area sloped down from east to west. On the north side of the gate passage, the blocks that apparently rose above this level are almost as finely dressed as the ashlar blocks of the lower limestone wall on the Acropolis (no. 16), with neatly chiseled borders (0.04–0.05 m wide) and finely point-stippled central panels (Fig. 206). The blocks that apparently lay below ground level are less finished and resemble the masonry of the upper limestone wall on the Acropolis, with neatly chiseled borders but somewhat rougher central panels. Another similarity with the limestone masonry on the Acropolis is the beveling of the edges of the blocks (on the bottom and, generally, one side; bevels are also discernible on the left sides of three blocks on the south side of the gate; on the purposes of these bevels, see above, Ch. 3).

The tops of several blocks on the north side of the gate are visible. They are flat-chisel dressed without distinct contact bands, and there are pry holes similar to those on the Acropolis walls (no. 16) and at Karniyarik Tepe (no. 2). This section of the gate was reexamined in 2010 by Nicholas D. Cahill, who has kindly contributed the following observations:

Many of the limestone blocks of the gate are reused, particularly in the north end of the east side of the court. One block has anathyrosis on its back face, set against rubble rather than another block; an adjacent block has a finished face with drafted edges set perpendicular to the face inside the fabric of the wall; neither of these features makes sense in their current locations. The earlier structure or structures to which these blocks belonged were extensively clamped; in their secondary use in the gate, the cuttings do not match each other.

There seem to be two different types of clamp cuttings [Fig. 205]. On the short sides of five blocks are seven small, neatly cut butterfly clamp cuttings, ranging in size from a very delicate clamp only 0.035 m wide and 0.045 m long to more normal cuttings 0.08 m wide and 0.06 m long. Most of the clamps are about 0.05 m wide. The preserved depth is about 0.01–0.02 m. Since the blocks may have been trimmed in their secondary use, the

original clamps were possibly longer and deeper, but they are still significantly smaller than those in the Tomb of Alyattes [no. 1] or ByzFort [no. 17], or in the displaced wall base moldings from MMS [App. 1, A1a, A1b]. There are no traces of cuttings for iron staples.

The other type of cutting at MMS/N is longer, deeper, and more roughly worked, measuring 0.05–0.09 m wide at the end, 0.04–0.05 m deep, and up to 0.27 m long. The seven examples (preserved on five blocks, two of which each bear two cuttings) are all on the roughly worked rear faces of the blocks, and some are cut diagonally to the stone. The original purpose of these cuttings is not certain. Located on the rear of the stones, they could not have been for clamps binding together finished edges of limestone blocks. Rather, in their original use they may have held wooden clamps or tie-beams extending back into the building, to bind the limestone face to the rubble core of a structure. Such tie-beams are not found in the masonry courses preserved at MMS/N, ByzFort, Mound 2 [no. 19], but these are all low in the structure; since the limestone face in these structures was built separately from the rubble backing, some mechanism to hold the upper part of the face to the core might have been considered necessary.

A probe through the packing behind the salient corner formed by the north side of the gate passage and the east side of the court revealed that this corner is reinforced by a substantial “buttress,” composed of nine courses of “damaged, worked limestone blocks,” which the excavator considered to be “rejects” from the limestone masonry (Barbara Burrell, excavator’s final report); it is also possible that some of these blocks, like those of the limestone masonry, were reused from an earlier structure. The buttress and packing were equally deep, resting on top of an artificial earth fill; the top of this fill (i.e., the foundation level of the buttress and packing, elevation *94.30) is over 2 m below the foundations of the south side of the gate (ca. *96.50) and 1 m below the foundations (partly composed of earlier features) of the north end of the limestone masonry (ca. *95.50). It is, however, close to 1 m higher than the foundations of the west end of the sandstone masonry (ca. *93.50, discussed below). The relevance of these differences in elevation to the reconstruction of the original topography of this area is uncertain, but they do suggest that the ground sloped down from south to north as well as from east to west, and that special care was taken to strengthen this salient corner of the gate

structure (assuming that the buttress and the limestone masonry are contemporary).

Sandstone Masonry. The sandstone masonry of the north side of the court, like the limestone masonry of other parts of the gate, is one block thick; it is backed by rubble masonry, about 2 m thick, and behind that, by a packing of mudbrick, partially laid, partially just thrown in. The sandstone masonry resembles a terrace wall, therefore, retaining a platform of mudbrick.

The sandstone masonry rests on rubble foundations, of which the bottom was exposed in two places (Figs. 203:A, 207). While the top of the wall is preserved to a more or less uniform height, the foundations slope down from east to west. The face consists of a maximum of five courses of squared blocks, resting on two or three courses of rough-trimmed blocks, supported in turn by rubble foundations. The upper, ashlar blocks have rusticated faces. The lower blocks are coarser, without drafted edges. Presumably only the rusticated blocks were meant to show above ground level. If this assumption is correct, then the ground at the base of the wall sloped down from east to west at about a 14 percent grade.

The sandstone ashlar masonry is similar to Lydian limestone ashlar masonry, in both this and other monuments. The courses, roughly isodomic, range in height from 0.34 to 0.40 m. In a few places, the line of a course steps up a few centimeters to adjust to the rising ground level at the base of the wall. Each course is set back 0.02–0.03 m from the course below. The drafted margins of the blocks are neat, between 0.04 and 0.06 m wide. Sandstone does not weather as well as limestone, and toolmarks are hard to make out. Still, the margins are clearly chisel cut, with the blade held perpendicular or at a slight angle to the edges of the block. The central panels are pick and point dressed, projecting as much as 0.10 m. The roughness of these panels suggests that the masonry is unfinished; when finished, the central panels would probably have been trimmed back to the plane of the margins.

As is true of the limestone masonry of this and other monuments, the edges of the sandstone blocks are beveled on the bottom and (generally) one side. The bevels are wider and deeper than is usual on limestone blocks, probably because sandstone could not be as finely cut. The sandstone masonry also resembles the limestone masonry in the banded treatment of the joints and in the presence of pry marks on the tops of most of the exposed blocks.

Almost every ashlar block of the sandstone masonry whose face is visible is engraved with one or two

mason's marks (Fig. 203:A), which have been studied by Roberto Gusmani ("Steinmetzmarken"). Two general points are of interest: first, the marks occur only on the ashlar blocks meant to show above ground level and not on the rougher blocks below; second, the marks were apparently carved before the placement of the blocks, for some of them were partly erased by the drafted margins of the blocks, and they are also occasionally upside-down. The marks would probably have been entirely erased when the face of the wall was finished.

The limestone masonry seems to be built up against the sandstone masonry, suggesting the sandstone is at least somewhat earlier. No good evidence for the date of the sandstone masonry was recovered, however, and the best evidence for the date of the structure as a whole is pottery found in an ashy lens beneath one of the limestone chip layers that ran up against the base of the limestone masonry on the north side (the same layers are also present on the south side; see Fig. 209).

FINDS

Two important categories of objects were recovered in the excavation of sector MMS/N: architectural fragments and context pottery.

A. Architectural Fragments

Several pieces of faceted limestone wall base moldings were found rebuilt into later structures at sector MMS/N. They are listed in Appendix 1. It is possible that these blocks belonged to walls built partly of limestone, partly of mudbrick, and that they crowned the limestone portion of the wall and supported the mudbrick. Also rebuilt into a wall of the Persian period was a broken limestone block with a rusticated face and a plain butterfly clamp cutting on its one preserved edge.

B. Context Pottery

The objects listed below were sealed by the limestone chip layer, presumably a construction layer that ran up against the base of the limestone masonry on the north side of the gate.

1. Corinthian skyphos, rim and body sherds. Filling ornament on rim, duck and lion on body. P79.9:8434, P79.10:8435, P78.25:8405. Figs. 210–12:a. Schaeffer et al., *Corinthian, Attic, and Lakonian Pottery* (Sardis M10), Cor 114.
2. Jar (?), body fragment. Three black lines on plain ground: above, concentric circles on white ground; below, wavy line on white ground. Uninventoried (1979). Fig. 212:b.
3. Chiote chalice (?), rim sherd. White slip. Uninventoried (1979). Fig. 212:c.
4. Chiote chalice (?), body fragment. Uninventoried (1979). Fig. 212:d.
5. Attic (?) cup, body fragment. Black glaze (reserved band below rim). Uninventoried (1979). Fig. 212:e.
6. Aryballos (?), fragment of mouth. Poor black glaze. Uninventoried (1979). Fig. 212:f.
7. Bowl, fragments of rim and body. Plain. Uninventoried (1979). Fig. 212:g.
8. Skyphos krater, rim sherd. Black-on-red decoration. Uninventoried (1979). Fig. 212:h.
9. Gray Ware dish, rim sherd. Uninventoried (1979). Fig. 212:i.
10. Jar, rim sherd. Dilute glaze band on lip. Uninventoried (1979). Fig. 212:j.
11. Lamp, three fragments. Uninventoried (1979). Fig. 212:k (largest fragment).

DATE

590 (terminus post quem established by the Corinthian pottery listed above) to 547 (terminus ante quem established by the Persian destruction layer piled up against the limestone- and sandstone-faced structure).

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- Greenewalt et al., "Campaigns of 1979 and 1980," 13–15.
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 Greenewalt et al., "Campaign of 1984," 31–33.
 Gusmani, "Steinmetzmarken."
 Greenewalt et al., "Campaigns of 1988 and 1989," 4–6.
 Greenewalt et al., "Campaigns of 1990 and 1991," 13–18.
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19. MOUND 2

(Figs. 213–16)

INTRODUCTION

Mound 2 is one of a series of four low hills (Mounds 1–4) that run from the Roman Bath-Gymnasium Complex in an east-northeasterly direction past the Roman basilica, Building C (Fig. 213). The mounds are clearly artificial, and it has been suggested (by Andrew Ramage) that they are prehistoric in origin; in late antiquity, they marked part of the northern boundary of Sardis and they were incorporated into the city fortifications.

Before excavation, the “Colossal Lydian Structure” at sector MMS resembled a similar low mound; the discovery in 1976 of the Lydian structure buried beneath this hillock raised the possibility that Mounds 1–4 also concealed the ruins of big Lydian buildings, perhaps parts of the Archaic defenses of Sardis. Investigation of Mound 2 was begun to test this idea.

HISTORY OF EXPLORATION

A surface survey conducted in 1976 of Mounds 1–4 yielded scattered Lydian potsherds but no evidence of early architecture. A second survey party reexamined the mounds in 1985; this time it was noticed that Mound 2, like the hillock that concealed the Lydian fortifications at sector MMS, is partially composed of burnt and broken mudbricks. On the basis of this observation, and the discovery of more Lydian pottery and a fragment of an Archaic architectural terracotta, two trenches were dug into the side of the mound (Figs. 214, 215). After excavation, both trenches were filled in.

DESCRIPTION

In the first trench, excavator Andrew Ramage uncovered a mass of fallen stones beneath the mudbrick debris. This rubble proved to belong to a schist wall running roughly north–south, which in turn rested on top of at least seven courses of limestone ashlar masonry. In the second trench, the line of the limestone masonry was picked up 10 m to the north. The bottom of the wall was not reached.

A schist wall on top of ashlar masonry is surprising; the excavator considered it original, but it is possible that it represents a later repair or addition. Perhaps the

limestone masonry once rose, or was intended to rise, higher, or perhaps the mudbrick, which Ramage believed was “reserved for a parapet or decoration,” originally rested directly on top of the limestone. Whatever the original design, the mass of rubble running over and in front of the wall suggests that when it was destroyed, the fieldstone wall was much taller. Ramage estimated that the foundations of the limestone masonry may run as deep as the ground level at the bottom of Mound 2, approximately 3.50 m below the lowest exposed course.

The exposed courses of masonry range from 0.36 to 0.47 m in height (Figs. 215, 216). Each course is set back a few centimeters from the course below. The faces of the blocks are rusticated, with chisel-drafted margins enclosing hammer-dressed projecting central panels. The dressing of the blocks is neater and more regular than on the Lydian terrace at the Byzantine Fortress (no. 17), more like the treatment of the upper limestone wall on the Acropolis (no. 16) and the limestone masonry of MMS/N (no. 18). The masonry was not checked for bevels before reburial, but the overall similarity to the Acropolis and MMS/N walls would suggest that the edges (the bottom and, generally, one side) of the blocks probably are beveled (see above, Ch. 3, on the purposes of these bevels). The treatment of joining surfaces was not exposed, except for part of the top of one block in the second trench. Here, the excavator noted a thin layer of clay on top of the block, which, he suggested, might have been used “for bedding purposes” or “as lubricant to assist in maneuvering the blocks into position” (A. Ramage, excavator’s field report); it may also be mud mortar originally used in the fieldstone wall and packing above. A mason’s mark, “O,” is engraved in the center of one block.

FINDS

None from good contexts.

DATE

First half of the sixth century (by association with MMS and MMS/N).

BIBLIOGRAPHY

Greenewalt et al., “Campaign of 1985,” 80–84.

CHRONOLOGICAL TABLE

DATES	HISTORICAL EVENTS	TOMBS	CIVIC STRUCTURES
Lydian Period ca. 680 B.C.	Usurpation of Gyges		
ca. 610	Accession of Alyattes		
ca. 560	Death of Alyattes : Accession of Croesus	Tomb of Alyattes (no. 1), ca. 610–ca. 560 Karmıyarık Tepe (no. 2), early to mid-sixth century	MMS/N (no. 18), ca. 590–ca. 547 AcN (no. 16), first half or middle of the sixth century Mound 2 (no. 19), mid-sixth century Byzantine Fortress (no. 17), mid-sixth century
Persian Period ca. 547	Conquest of Sardis by Cyrus: Fall of Croesus	BT63.2 (no. 4), mid- or later sixth century BK71.1 (no. 10), second half of the sixth century PyT (no. 15), second half of the sixth century Tomb 77.1 (no. 11), second half of the sixth century? Tomb 82.1 (no. 12), third quarter of the sixth century? BT62.4 (no. 3), late sixth or early fifth century Duman Tepe Tomb no. 6 : late sixth century no. 8 : late sixth century? no. 9 : late sixth century? no. 5 : sixth to fourth centuries no. 7 : sixth to fourth centuries	
ca. 530	Death of Cyrus		
499	Burning of Sardis during Ionian Revolt		
401	Expedition of Cyrus the Younger	Tomb 89.11 (no. 13), sixth to third centuries Tomb 813 (no. 14), early fifth century	
334	Conquest of Sardis by Alexander		

APPENDIX 1:

ARCHITECTURAL AND ORNAMENTAL FRAGMENTS

Unless otherwise noted, all these fragments were reused in Hellenistic or later structures or are stray finds. The richest single source of material was the Roman Synagogue, near sector MMS/N.

A1–3. Wall Base Moldings.

Nine fragments of limestone wall base moldings have been recovered from various contexts at Sardis. Seven come from the MMS complex, one from the “Byzantine Fortress,” and one from a trench dug to investigate the Lydian city wall. The blocks are all similar in size and type: flat slabs, carved with a simple torus molding, usually fluted or faceted, on the front face. The heights of the blocks range from 0.17 to 0.26 m (with a median height of 0.20 m); where preserved, the widths range from 0.48 to 0.62 m; the median thickness or depth is 0.43 m. The blocks are smoothly dressed on top and bottom and have banded joints. In four cases, vertical protective lips are preserved at one or both rising joints, and two blocks exhibit plain butterfly clamp cuttings on top. The torus moldings on the front faces have the profiles of arcs of circles (semicircular or slightly less than semicircular). One block is plain, but all the others are carved with a flat chisel in five or (in one exceptional case) seven equal horizontal facets or very shallow flutes. Presumably these blocks marked the transition from the foundation of a wall to its upper part and, perhaps, in some cases, from a stone socle to a mudbrick superstructure.

A1a. Wall Base Molding, So8.1:12264 (Figs. 217–19).

Provenience: Sector MMS, reused in the Persian fortification.

Material: Limestone.

Dimensions: H. 0.203 m, W. 0.590 m, Th. 0.460 m.

Description: Complete block. Semicircular torus molding cut in five equal shallow flutes, separated only by sharp arrises. Protective lips (W. 0.17 m) on both rising joints: on right side, only on second and third flute from bottom; on left side, only on second flute

from bottom. On top of block, plain butterfly clamp cuttings (max. W. 0.58 m) on both sides.

Date: First half of the sixth century?

Bibliography: Unpublished.

A1b. Wall Base Molding, So8.2:12265 (Figs. 220, 221).

Provenience: Sector MMS, found fallen from the Persian fortification.

Material: Limestone.

Dimensions: H. 0.17 m, W. 0.31 m, Th. 0.21 m.

Description: Block broken at bottom and right side. Semicircular torus molding cut in five equal shallow flutes, separated only by sharp arrises; only parts of four flutes survive. On top of block, plain butterfly clamp cutting on preserved (left) side.

Date: First half of the sixth century?

Bibliography: Unpublished.

A1c. Wall Base Molding, So8.3:12266 (Figs. 222, 223).

Provenience: Sector MMS/N, reused in a Roman retaining wall (now removed).

Material: Limestone.

Dimensions: H. 0.23 m, W. 0.48 m, Th. 0.41 m.

Description: Block broken at both sides. Torus molding, slightly less than semicircular, cut in five equal facets.

Date: First half of the sixth century?

Bibliography: Unpublished.

A1d. Wall Base Molding, So8.4:12267 (Figs. 224, 225).

Provenience: Sector MMS/N, built into a Roman wall (now removed).

Material: Limestone.

Dimensions: H. 0.20 m, W. 0.30 m, Th. 0.33 m.

Description: Block broken on left side. Torus molding, slightly less than semicircular, cut in five equal shallow flutes, separated only by sharp arrises. Protective lip (W. 0.02 m) on all but bottom flute of block on preserved (left) side.

Date: First half of the sixth century?

Bibliography: Unpublished.

A1e. Wall Base Molding, So8.5:12268 (Figs. 226, 227).

Provenience: Sector MMS/N, built into a Roman wall (now removed).

Material: Limestone.

Dimensions: H. 0.26 m, W. 0.25 m, Th. 0.42 m.

Description: Block broken on left side. Torus molding, slightly less than semicircular, cut in seven equal facets. Protective lip on all but bottom flute of block on preserved (left) side.

Date: First half of the sixth century?

Bibliography: Unpublished.

A1f. Wall Base Molding, So8.6:12269 (Figs. 228, 229).

Provenience: Sector MMS/N, built into a Roman wall (now removed).

Material: Limestone.

Dimensions: H. 0.20 m, W. 0.37 m, Th. 0.43 m.

Description: Block broken on right side. Torus molding, slightly less than semicircular, smoothly carved (or very worn). Protective lip, broken at top and bottom, on preserved (left) side.

Date: First half of the sixth century?

Bibliography: Unpublished.

A1g. Wall Base Molding, So8.7:12270 (Figs. 230, 231).

Provenience: Sector MMS/N, built into a Roman wall (now removed).

Material: Limestone.

Dimensions: H. 0.21 m, W. 0.53 m, Th. 0.35 m.

Description: Block broken at both sides. Torus molding, slightly less than semicircular, cut in five equal facets.

Date: First half of the sixth century?

Bibliography: Unpublished.

A2. Wall Base Molding, So8.8:12271 (Fig. 232).

Provenience: Sector ByzFort.

Material: Limestone.

Dimensions: H. 0.17 m, W. 0.62 m, Th. 0.40 m.

Description: Complete block, very worn. Uncertain whether or not torus molding was plain, fluted, or faceted. The top of the block is dressed in two planes, a 0.13 m wide strip at the front, level with the top of the molding, which steps down 0.03 m at the back. A cutting that resembles the socket of a doorbolt at the left end of the frontal strip suggests that this treatment may not be original, but rather due to the reuse of the block as a threshold.

Date: First half of the sixth century?

Bibliography: Unpublished.

A3. Wall Base Molding, NoExo8.2 (Fig. 233).

Provenience: Near CW6.

Material: Limestone.

Dimensions: H. 0.21 m, W. 0.33 m, Th. 0.29 m.

Description: Block broken on one side. Torus molding cut in five equal facets.

Date: First half of the sixth century?

Bibliography: Unpublished.

A4. Threshold Block (?), So8.9:12272 (Figs. 234–38).

Provenience: Roman Synagogue.

Material: Marble.

Dimensions: Fragments A and B: L. 0.33 m, W. 0.45 m, Th. 0.21 m.

Description: Three fragments of the same block or series of blocks. One fragment (A) preserves a corner of the block; a second fragment (B) joins with the first. The third fragment (C) has no preserved edges, but the decorative pattern shallowly carved on the tops of all the fragments shows that fragment C belongs with fragments A and B.

This decorative pattern takes the form of rows of star-rosette panels, separated by guilloche bands that are 0.03 m thick and are spaced 0.22–0.24 m apart. The star-rosette panels, 0.16–0.17 m square, are centered between the guilloche bands and set at spacings of 0.07 m. Crawford. H. Greenewalt, Jr., identified the block to which these fragments belonged as a threshold on the basis of the similarity between this pattern and the decoration of Assyrian threshold blocks (both probably modeled on rug designs). Consistent

with this identification is the condition of the tops of the fragments, which are all considerably and uniformly worn.

A cutting for an iron staple clamp (L. 0.094 m, W. 0.024 m, with a staple hole 0.032 m deep) is preserved on one of the edges of the block. The joining sides on both preserved edges exhibit anathyrosis, with contact bands 0.09 m wide on the longer preserved edge and 0.04 m wide on the shorter preserved edge.

Date: Second half of the sixth or fifth century.

Bibliography: Hanfmann, "6th Campaign (1963)," 38; Greenewalt and Majewski, "Textiles," 134.

A5. Corner Volute Finial of Altar (?), So8.10:12273 (Fig. 239).

Provenience: Roman Synagogue.

Material: Marble.

Dimensions: H. 0.23 m, W. 0.22 m, Th. 0.11 m.

Description: Preserved are the two intersecting sides, meeting at a 90-degree salient corner, of a typical volute finial. Each side is carved with an upward-turning spiral, resembling the volute of an Ionic capital turned upside down; a seven- (?) leaved palmette issues from the corner, at the meeting point between the volutes. The borders and channels of the volutes as well as the leaves of the palmette are convex. At the base of the fragment is a simple quarter-round molding (H. 0.04 m).

Both spirals are broken off, and it is uncertain how they should be reconstructed. Possible alternatives are illustrated in Ohnesorg (*Altäre*, 4, fig. 2). The channels of the volutes may have continued horizontally along the sides of the altar, then curved up into opposing volutes at the adjacent corners, as on the altar of Poseidon at Cape Monodendri (see Fig. 280); alternatively, the channels may have terminated in larger or smaller downward-turning volutes or simply sprung vertically from the base of the finial; or they may have combined these alternatives in some asymmetrical arrangement. Indeed, while the channel of the volute on the left as seen in Figure 239 is clearly curving, the channel of the volute on the right seems to be running horizontally; but this impression of asymmetry may be due to the differential preservation of the sides of the block and to the imperfect quality of the carving.

Date: Second half of the sixth or fifth century.

Bibliography: Unpublished.

A6. Volute Finial of Altar (?), NoEx76.5 (Fig. 240).

Provenience: Dede Mezari, 1 km west of Sart Mahmut.
Material: Marble.

Dimensions: H. 0.26 m, W. 0.22 m, Th. 0.12 m.

Description: An upright slab, broken at the left end (as seen in Fig. 240). The outer contours of the slab define the edges of an upward-turning volute scroll, with lotus blossoms springing from the corner of the volute and from the outside of the volute near the top.

The spirals of the volute are carved in both faces of the block. Both the borders and the channels of the spirals are convex, as is the circular eye in the center. The lotus blossoms are schematically carved in outline. The surfaces of the thickness of the block—the space between the carved faces—are plain.

The reconstruction of the missing part of the block is uncertain, but the channel of the volute seems to be running horizontally, as if it continued along the side of the altar crowned by this finial.

Date: Second half of the sixth or fifth century.

Bibliography: Greenewalt, "Campaign of 1976," 66, figs. 10–13.

A7. Crowning Molding, So8.11:12274 (Figs. 241, 261).

Provenience: Precinct of Artemis.

Material: Limestone.

Dimensions: Pres. H. 0.28 m, Pres. W. 0.24 m, Th. 0.20 m.

Description: Block broken at top, bottom, and both sides. Face decorated in three planes receding from top to bottom: on top, a plain fascia (Pres. H. 0.054 m); in the middle, a taller, inwardly inclining fascia (H. 0.177 m), crowned by a large egg-and-dart molding (H. 0.097 m, or just over half the height of the fascia); on the bottom, a bead and reel (Pres. H. 0.049 m).

The well-rounded eggs of the egg and dart are defined by tubelike borders; the darts consist of two opposing facets with sharp ridges at the centers. The beads of the bead and reel are circular in outline. The correspondence between the egg-and-dart and bead-and-reel moldings is inexact, with the interval of the bead and reel being slightly greater than one-half that of the egg and dart.

As noted by Hanfmann and Waldbaum, the block is quite thin and must have been backed by another block, possibly as the crowning molding of a wall.

Date: Second half of the sixth or fifth century.

Bibliography: Hanfmann and Waldbaum, *Survey* (Sardis R1), 94, figs. 210, 211.

A8. Crowning Molding (possibly an anta capital of an anta altar, as suggested by Ohnesorg), So8.12:12275 (Figs. 242–46, 248).

Provenience: Roman Synagogue.

Material: Marble.

Dimensions: Fragment A: Pres. L. 0.96 m, W. 1.11 m, H. 0.21 m; fragment B: Pres. L. 0.71 m.

Description: Fragment A consists of a number of joining pieces of a large slab carved on the front and both sides with a cyma reversa molding and broken at the back. Fragment B, composed of two joining pieces, preserves part of one edge of the same block or of another block of the same monument.

The cyma of the front and sides of the block carries a Lesbian leaf pattern (H. 0.10 m), bordered above and below by bead-and-reel moldings (H. of upper bead and reel, 0.025 m; H. of lower bead and reel, 0.024 m), with a plain fascia at the top (H. 0.048 m) and a smaller plain band at the bottom (H. 0.008 m). Between the upper parts of the leaves of the Lesbian leaf pattern are circular eyes, with trilobe palmettes issuing from between the lower parts of the leaves, directly below the eyes (spaced 0.072 m apart).

Dowel cuttings at the corners of the top of fragment A may, as suggested by Ohnesorg, have been connected with acroteria. Ohnesorg further proposes that a round hole in the lower right part of fragment A (as seen in Fig. 245) may have held a pin from which a garland or fillet could have been hung. A number of other cuttings on the left side of fragment A may be secondary, as is probably also true of a lightly incised lozenge pattern visible on the front of the block (Figs. 244–46).

Date: Late sixth or fifth century.

Bibliography: Hanfmann, “6th Campaign (1963),” 38, fig. 22; Altekamp, *Zu griechischer Architekturornamentik*, 154–56; Ohnesorg, *Altäre*, 161–65.

A9. Crowning Molding (possibly an anta capital), So8.13:12276 (Figs. 247, 248).

Provenience: Precinct of Artemis (reused as one of a series of stele bases on the north side of the Lydian Altar; see Fig. 266).

Material: Marble.

Dimensions: H. 0.37 m, Max. W. 1.04 m, Max. Th. 0.62 m.

Description: Complete block, reused upside-down as a stele base, carved on the front and both sides with a cyma reversa molding, roughly finished at the back.

The profiles of the front and sides of the block consist of three elements: on top, a plain fascia (H. 0.07

m), in the middle, a plain cyma reversa molding (H. 0.18 m) above a simple astragal (H. 0.02 m), on the bottom, a plain fascia (H. 0.10 m).

Date: Second half of the sixth century?

Bibliography: Butler, *Sardis* I:1, 42, fig. 28; Hanfmann and Waldbaum, *Survey* (Sardis R1), 70, cat. no. 22, figs. 104, 107, 108.

A10. “Aeolic” Base or Capital (?), S87.10:9542 (Figs. 249, 250).

Provenience: Sector MMS.

Material: Marble.

Dimensions: H. 0.17 m, Diam. at top 0.42 m, Diam. at widest part 0.44 m.

Description: Round drum, broken at bottom, surface badly weathered.

The upper part of the block has the profile of a plain cylinder (H. 0.06 m); below this is a series of simple moldings, resembling the apophyge of a column (H. 0.034); the lower part of the block as preserved has the profile of a cyma reversa, carved with a leaf pattern resembling the decoration of an Aeolic base or capital (Pres. H. 0.076 m). The broad leaves, eight in total, are widely separated. The edges of the leaves are defined by simple grooves, but they have clearly carved central spines. Because the bottom of the block is broken off, the outlines of the lower parts of the leaves—whether concave like a Lesbian leaf or convex like the “eggs” of an ovolo—are uncertain.

Date: Sixth–fourth century?

Bibliography: Unpublished.

A11. Crowning Molding (?), S68.26:7801 (Figs. 253, 261).

Provenience: Roman Bath-Gymnasium Complex.

Material: Marble.

Dimensions: H. 0.18 m, W. 0.09 m, Th. 0.05 m.

Description: Fragment broken at bottom, right side, and back. Top and left side preserved.

The face of the piece is carved with a lotus-palmette pattern (H. 0.119 m) above an ovolo or bead and reel (the lower molding is too poorly preserved to be identified with certainty; Pres. H. 0.061 m). The two right-hand leaves of the lotus blossom are present on the left side of the fragment. To the right of the lotus is an anthemion consisting of opposing volutes (only the right volute is preserved), with palmettes issuing both upward and downward from between the

volute. The upper, larger palmette has seven leaves, the lower, smaller palmette, five. The eye and border of the volute are flat, the channel concave. The leaves of the lotus and palmette are simple raised forms.

Hanfmann suggested that the piece originally continued farther to the left and was sawed off in antiquity. This is possible, but if so, the sawing was done very precisely, and the piece certainly reused. It is also possible that the left edge is original, and either that the molding continued to the left on another block in the same plane or that it terminated in a reentrant corner.

The function of the piece is uncertain. Possibilities include the decoration of the leg of a table or couch, the crowning molding of the walls of a small building or votive monument, or the ornamental frame of a window or doorway.

Date: 520–500 (according to Hanfmann in Hanfmann and Ramage, *Sculpture* [Sardis R2]).

Bibliography: Hanfmann and Ramage, *Sculpture* (Sardis R2), 77, cat. no. 52.

A12. Table Support (?), S85.14:9150 (Figs. 254, 261).

Provenience: Byzantine Fortress, found in construction layers on top of the Lydian Terrace.

Material: Marble.

Dimensions: L. 0.12 m, W. 0.32 m, Th. 0.05 m.

Description: Finished surfaces on top, face, bottom of fragment, broken at back. The surface of the bottom of the fragment turns downward at a reentrant right angle at the back (see Fig. 261), suggesting that the fragment as preserved is the projecting crowning element of a vertical architectural member such as a table support.

The face of the fragment is carved with a double volute pattern, like the face of an Ionic capital, except that the channel connecting the volutes in the center sags dramatically, describing an almost semicircular arc. The channels of the volutes are convex, as is the eye in the center of the right-hand volute. The eye in the center of the left-hand volute is carved with a six-pointed star. The borders of the volutes are flat or slightly convex. Simplified blossoms emerge from the corners of the volutes.

Of special interest is a series of circular scratch marks, by and large concentric with the curve of the sagging channel between the volutes. A small hole resembling a pin mark lies at the center of these circles. The scratch marks could have been caused by a rasp, one end of which was fixed to this “pin hole,” used to smooth

off the area between the volutes. If so, the rasp was longer than necessary, and the channel and borders of the volutes have been trimmed back slightly as well, especially on the left side of the block.

Date: First half of the sixth century.

Bibliography: Greenewalt, “Campaign of 1985,” 79, fig. 27.

A13. Ionic Corner Capital, So8.15:12278 (Figs. 255, 256).

Provenience: Roman Synagogue.

Material: Marble.

Dimensions: Max. W. of volute 0.29 m.

Description: Two joining fragments of an Ionic corner capital, preserving parts of two adjacent corner volutes. One volute (shown in Fig. 255) is completely preserved, broken off just to the right of the volute.

The channels of the volutes are concave, the borders described by simple reed moldings. The eye is flat (Diam. 0.047 m). In the corner of the volute is a seven-leaved palmette. The treatment of the less well-preserved side of the capital is identical. In the angle between the volutes is a lightly carved anthemion featuring a seven-leaved palmette.

Date: Fifth or fourth century?

Bibliography: Hanfmann, “6th Campaign (1963),” 38, fig. 21.

A14. Ionic Corner Capital, So8.16:12279 (Figs. 257, 258).

Provenience: Roman Synagogue.

Material: Marble.

Dimensions: Max. W. of volute 0.28 m.

Description: Fragment of an Ionic corner capital, preserving parts of two adjacent corner volutes. Surface worn, broken on all sides. Carving of volutes identical to that of no. A13.

Date: Fifth or fourth century?

Bibliography: Unpublished.

A15. Funerary Pediment(s), S69.14:8047 and NoEx 78.1 (Figs. 259, 260).

Provenience: Pactolus Riverbed.

Material: Marble.

Dimensions: H. 0.60 m, combined W. of both fragments 2.60 m, Th. 0.40 m.

Description: Two blocks forming opposing halves of the pediment of a small templelike building.

The pedimental field is carved with a banqueting scene. The crowning molding of the pediment takes the form of a cyma reversa carved with a Lesbian leaf pattern above a bead and reel, with a plain fascia below. The fascia varies in height from 0.11 to 0.13 m. The crowning molding is nowhere fully preserved but seems to have been roughly equal in height. The beads of the bead and reel are sausagelike in form, slightly less than twice as long as they are high.

Date: 430–420 (according to Hanfmann and Erhart, “Pedimental Reliefs”).

Bibliography: Hanfmann and Waldbaum, “11th and 12th Campaigns (1968, 1969),” 38–40, fig. 29; Hanfmann, “Pediment”; Hanfmann and Ramage, *Sculpture* (Sardis R2), 56–57, no. 18; Greenewalt et al., “Campaign of 1978,” 24, fig. 25; Hanfmann and Erhart, “Pedimental Reliefs”; Altekamp, *Zu griechischer Architekturornamentik*, 156–57.

APPENDIX 2: THE CREPIS OF THE TOMB OF ALYATTES

The correspondence in size between the Tomb of Alyattes as described by Herodotus (1.93) and the largest tumulus at Bin Tepe suggests that if this mound is indeed Alyattes's tomb, it has not changed shape significantly since antiquity. What then has become of the crepis or "base of large stones" also mentioned by Herodotus? It is natural to assume that this crepis was a masonry wall comparable to the crepis walls associated with other tumuli in Lydia, and with tumuli in other places, such as the Etruscan tumuli at Caere; the account of the nineteenth-century German explorer Spiegelthal's researches published by I. F. M. von Olfers suggests that Spiegelthal did indeed discover such a crepis—a large masonry structure nearly 20 m high, which would seem now to have vanished without a trace (Olfers, "Königsgräber," 544–45). However, Olfers's account is problematic, and it is by no means clear from the text alone that Herodotus was referring to a masonry structure; indeed, there are other features of the mound still visible today that might also be described as forming a "base of large stones."

In its present state, the mound first appears to be made entirely of earth, but outcroppings of native limestone are visible in several places near the bottom, especially on the north side, showing that the mound was actually heaped up over a natural rock eminence; the British explorer William Hamilton, who visited Bin Tepe well before Spiegelthal, suggested that Herodotus may have mistaken these outcroppings for an artificial stone base (Hamilton, *Researches*, 145–46). On the south side, moreover, a dense rubble packing has been exposed well above the bottom of the mound in a deep furrow probably caused by a combination of grave robbing and erosion; a trench dug in 1993 on the west side of the mound revealed a similar packing near the base (Fig. 264). The edge of this packing was marked by a jumble of large stones, roughly worked and loosely but clearly aligned (Greenewalt et al., "Campaigns of 1992 and 1993," 22–24). If this feature was visible in antiquity, it may well have been described by or to Herodotus as a base of large stones. Finally, it is also possible that the mound was originally surrounded in whole or in part by a masonry wall approximately 2–3 m in height—the normal height of such walls—and that this proportionally rather small wall has been buried or robbed-out.

Thus, the discrepancy between Herodotus's account and the present state of the mound is not perhaps terribly great. The real difficulty is caused by the account of the crepis in Olfers's publication. This account has three elements. First, after noting that the mound is heaped up on top of a limestone ridge, Olfers observes that its base is composed of "stones of the same type [the local limestone] laid in a circle" (Olfers, "Königsgräber," 544). Second, in his tabulation of the measurements of the tomb, Olfers gives the diameter and height of the mound as 355.20 m and 61.46 m, respectively, at the level of the base of the crepis, and as 240 m and 43 m at the level of the top of the crepis, implying that the crepis is nearly 20 m high and tilted back at about a 20-degree angle (Olfers, "Königsgräber," 545). Third, several of the illustrations in Olfers's publication show just such a crepis, composed of large squared blocks (if drawn to scale, each course would be over 2 m high; Fig. 265). A wall of this size, tilted back at such an angle and composed of such large stones, would be unparalleled. No such wall was seen by any earlier explorer, and the American archaeological architect Francis Bacon, who visited the tomb in 1882, specifically notes in an unpublished letter brought to my attention by Crawford H. Greenewalt, Jr., that "nothing [of the crepis] was visible." The utter disappearance, however, of such a massive structure in a space of 30 years would be at the very least surprising.

It seems more likely that Spiegelthal observed the same features now visible, which are consistent both with Olfers's brief verbal description of the crepis and with the measurements he records—a rubble packing, preserved to a height well above the base of the mound, whose outer edge is marked by large stones (and perhaps by a low masonry wall, no longer visible today)—and that the illustrations in Olfers's publication simply misrepresent these features. The illustrations were engraved by someone other than the draftsman who made the original drawings, and a similar error occurs in the illustration of the area in front of the tomb chamber, where autopsy is possible and where a loose rubble packing was misinterpreted as a barrel vault. The precise nature of the crepis of the Tomb of Alyattes is uncertain, but it seems clear that the reconstruction of this structure as a battered masonry wall nearly 20 m high may safely be dismissed as fanciful.

APPENDIX 3: THE ALTAR OF ARTEMIS

INTRODUCTION

The early altar of Artemis is a small stone structure, situated at the west end of the Hellenistic Temple of Artemis, in the goddess's sanctuary on the banks of the Pactolus River, southwest of the Acropolis of Sardis.

HISTORY OF EXPLORATION

This structure, known as the Lydian Altar, or LA 1, was discovered and excavated by the first Sardis Expedition between 1910 and 1914 and reexcavated by the Harvard-Cornell Expedition in 1969 and 1970; today it remains accessible and in good condition. A final report on the altar was published by Kenneth J. Frazer and George M. A. Hanfmann (Hanfmann and Waldbaum, *Survey* [Sardis R1], 88–95). The paragraphs that follow summarize their report. A new program of study and documentation of the building was undertaken in 2006 and 2007 and will be published in connection with Fikret K. Yegül's monograph on the Temple of Artemis.

DESCRIPTION

In its present state, the altar is a stepped platform, comparable in size and appearance to the Pyramid Tomb (no. 15). As preserved, the altar consists of three steps on top of a single foundation course or euthynteria, 8.14 m wide (north–south) and 8.82 m long (east–west; Figs. 266, 267). It is built of “calcareous tufa” blocks—dark brown in color and much coarser than the Bin Tepe limestone (Hanfmann and Waldbaum, *Survey* [Sardis R1], 92)—and is a solid masonry structure. The height of the structure from the top of the foundation course to the top of the third step is 1.18 m. Individual steps are 0.37–0.41 m high. Setting marks on the northeast and northwest corners of the third step show that there was originally at least one more step above (see Fig. 269).

The structure steps in evenly on its north, west, and south sides. Each step is 0.30–0.35 m deep. The third step is the only step preserved on all four sides. It is 6.10 m wide and 6.80 m long. The altar seems to have extended farther to the east below the level of the third step, but the east sides of the first two steps and euthynteria have been cut away (Fig. 268), so that the original east–west dimension of the monument is uncertain.

The building stone is coarse, and the risers of the steps are roughly dressed in places, but the jointing of the masonry is fine. The builders generally seem to have laid the blocks of each step in a series of end-to-end rows. The somewhat wavy seams between the rows in the top course (Figs. 266, 267) show that the blocks were carefully custom fitted to their neighbors. Many of the blocks around the edges of the steps were tied to adjacent blocks with iron staple clamps set in lead in plain bar-shaped cuttings (Fig. 270). The average length of the clamp cuttings is 0.26 m, the average width, 0.02–0.03 m. The cuttings are usually slightly wider at the ends than in the middle, but they are not true butterfly clamps of the type regularly encountered in Lydian masonry. Several clamps were removed for study purposes; the iron staples have a uniform cross-section of 0.015 by 0.006 m, and the pins of the staples are 0.035–0.04 m long.

As noted, only blocks on the periphery of each step in the platform were clamped, and only some of these (see Fig. 266). In the first three courses, two patterns in the arrangement of the clamps are apparent. In places where two stretchers are laid side by side, the joint between them is nearly always clamped, but in places where two headers lie side by side, only every other or every third joint is clamped. Here, as in the case of tomb BT62.4 (no. 3), the explanation for this variation in the placement of the clamps lies in the differences in the pressure exerted on different blocks: headers are more firmly tied into the fabric of the platform than stretchers, and for this reason they are less subject to displacement and may be clamped less frequently. In every course, all the blocks are generally laid in rows running right through the platform (with the result that two opposite sides will be composed mostly of headers and the other two mostly of stretchers); consequently, on two sides of every course, most of the joints are clamped, whereas on the other two sides, half or fewer of the joints are clamped together. On the third (uppermost preserved) step, however, every block on the periphery of the platform is clamped on both sides to its neighbors, suggesting that this step was near the top of the original platform.

Because all the clamps on the structure as preserved are exposed, and because of the coarseness of the stone,

Frazer suggested that the altar originally bore an outer facing of limestone or marble blocks (Hanfmann and Waldbaum, *Survey* [Sardis R1], 92–95). There are no traces, however, of the additional foundations that such a facing would have required; nor do the preserved blocks exhibit any pry marks or other cuttings that would suggest other blocks were placed on top of them. For these reasons, it seems more likely that the current exterior of the monument is the original exterior, although it may well have been coated with plaster.

Frazer also suggested that the altar should be restored as an oblong structure after the pattern of the Greek altar of Poseidon at Cape Monodendri near Miletus (Gerkan, *Milet* I:IV). Although attractive and not implausible, any such reconstruction is of course conjectural—the same is true, after all, of the reconstruction of the Monodendri Altar itself (as noted by Hanfmann in Hanfmann and Waldbaum, *Survey* [Sardis R1], 182 n. 22).

Fragments of architectural ornament in both limestone and marble were found near the altar by both Sardis Expeditions. The most interesting of these are a large limestone egg-and-dart molding (Hanfmann and Waldbaum, *Survey* [Sardis R1], 94; here, **App. 1, no. A7**), dated by Hanfmann to the second half of the sixth or fifth century, and a late Classical or early Hellenistic marble corner volute finial (Butler, *Sardis* II:1, 76–77, fig. 90; cf. Gruben, “Artemis-Tempel,” 180, n. 76). Hanfmann suggested that the former might have belonged to the original altar, while the latter might have been attached to a later structure or to a “renovation” of the structure under consideration (Hanfmann and Waldbaum, *Survey* [Sardis R1], 95). It is not certain, however, that either fragment was associated with this monument.

As dating evidence, the pottery found in layers associated with the foundations of the structure is only slightly more helpful than the architectural fragments—it is certainly not later than the fifth century but not necessarily any later than the sixth (Figs. 271, 272; see list of finds below). As noted above, in Chapter 1, Xenophon mentions an altar of Artemis at Sardis in the *Anabasis* (1.6.6–7), and if this structure is that altar, then his reference gives a terminus ante quem of the late fifth century. An archaeological terminus ante quem is supplied by a late Classical or Hellenistic structure (LA 2) built on top of the altar (see Hanfmann and Waldbaum, *Survey* [Sardis R1], 95–103).

The altar of Artemis differs from the monuments examined in this study in several respects, including

both building material and building techniques. The “tufa” used in the altar is not found in any other monument at Sardis. The source of this stone is uncertain. It is believed to have been “deposited by action of sulphurous waters running through fissures of calcareous rocks” (Hanfmann and Waldbaum, *Survey* [Sardis R1], 92), but according to Michael Ramage (see Appendix 4), it does not come from the nearest known source of “sulphurous waters,” a group of hot springs a few kilometers southeast of Sardis, now occupied by a local resort called Sart Çamur Hamamı (Sardis Mud Bath). Whatever its source, this stone is both darker and much coarser than the limestone and marble used in Lydian architecture, and the blocks of the altar of Artemis have neither the crispness of form nor the smoothness of surface that are so characteristic of most Lydian masonry.

In addition to the building stone, the most obvious difference between the altar of Artemis and the monuments examined in this study is that it is a solid masonry structure rather than a structure built of ashlar masonry around a rubble core, like the platform of the Pyramid Tomb. Other differences include technical details such as the L-shaped setting marks on top of the third step and the use of plain staple clamps in simple bar-shaped cuttings (pi clamps), both of which are unparalleled in Lydian architecture.

It is possible that the altar represents an independent building tradition contemporary with the tradition examined in this study; it may have been built, for example, by a special team of builders brought in from some other place. It is also possible, however, that the altar of Artemis was built by local builders at some point after the time this tradition had begun to disintegrate. In any case, the altar clearly belongs to a different building tradition, and it has been omitted from the main section of this study for that reason. Of the technical details, the most diagnostic are the clamps, which are attested from the second half of the sixth century B.C., becoming more common in Greek architecture in the fourth and subsequent centuries. On balance, this structure may tentatively be dated between the late sixth and early fourth century B.C.

FINDS

Nos. 1, 3, and 4, excavated in 2006, were found in colluvial deposits running underneath the altar; no. 7, excavated in 1969, appears to have come from the same series of colluvial deposits. Of these, the column kraters (nos. 1 and 3) and the lamp (no. 7) should postdate the Persian invasion. Also definitely later than the Persian invasion, but from a mixed context, is the Achaemenid

bowl (no. 6). None, however, of these objects, nor any of the other less precisely datable finds, need be later than ca. 500 B.C.

1. Column krater, rim fragment with handle. Dark mottled slip on interior and exterior. Po6.053:12137. Figs. 271:a, 272:a.
2. Dish, rim fragment. Black-on-red decoration. P69.080:08038. Figs. 271:b, 272:b.
3. Column krater, rim fragment. Traces of red and black glaze. Po6.052:12136. Figs. 271:c, 272:c.
4. Dish, rim fragment. Red slip on interior and exterior. Po6.054:12138. Figs. 271:d, 272:d.
5. Skyphos, rim fragment. Black glaze on exterior with reserved band below lip. Uninventoried. Figs. 271:e, 272:e.
6. Achaemenid bowl, body fragment. Uninventoried. Figs. 271:f, 272:f.
7. Lamp, fragment of spout. Plain gray fabric. L69.10:8036. Figs. 271:i, 272:i.
8. Stemmed dish, body fragment. Bands of red glaze on interior and exterior. Graffito on exterior. P69.77:8033 = IN69.27. Figs. 271:g, 272:g.
9. Cup (?), three sherds, including one horizontal loop handle. Black dots on white ground. Uninventoried. Fig. 271:h.

DATE

Late sixth to early fourth century.

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APPENDIX 4:

GEOLOGICAL ANALYSIS OF LYDIAN BUILDING STONES AND THEIR QUARRY SOURCES

Michael H. Ramage and Robert H. Tykot

The geology of Lydian building stones can help illuminate ancient masonry practice. Comparison of the geological characteristics of bedrock and worked blocks can be used to identify the sources of building stones, providing useful information about quarrying and transport methods. The following analysis of Lydian building stones from Sardis has two parts: petrographic analysis by microscope of the limestone used in the majority of excavated Lydian buildings; and carbon and oxygen isotope analysis by mass spectrometer of marble, used less frequently by Lydian masons. It has been possible to show that Bin Tepe was the source of the limestone used both at Bin Tepe itself and at Sardis but that none of the sampled regional marble quarries provided the marble used by Lydian builders.

This study is based on 24 days of fieldwork in 1994 and an additional two weeks in 1995. Michael Ramage conducted the sampling and limestone analysis, while the marble analysis was done in Robert Tykot's laboratory with interpretation by Ramage and Tykot. The following discussion presents the results of the limestone analysis for the first time and builds on earlier characterizations of marble from selected objects and quarries near Sardis.¹

SAMPLING

Many limestone and marble samples were collected, both from bedrock outcroppings exhibiting clear evidence of preindustrial quarrying and from ancient buildings. Because the limestone samples are large (ca. 2 cm diameter cores) and therefore destructive, only a limited number of samples were taken from excavated monuments. Marble analysis requires only a small sample (e.g., powder from a small drill hole or insignificant chips) and is therefore less destructive, but because of the paucity both of known marble monuments and of identified sources, the number of marble samples studied was also limited.

Seventy-one limestone samples were taken from outcroppings of the fine-grained white limestone favored by Lydian builders. The limestone quarries of Bin Tepe can be divided into five main areas: one quarry region associated with each of the largest mounds (Tomb of Alyattes, no. 1; Karniyarık Tepe, no. 2; and Kır Mutaf Tepe);² one quarry near the Gygaean Lake; and an area in the middle of the Gediz (Hermus) plain, which had a number of worked but unused blocks nearby. For comparison with the quarry samples, 35 limestone samples were taken from Lydian monuments, including eight tombs, three ashlar walls, and six "phallic" markers. Not every example of limestone masonry at Sardis was sampled, but the monuments that were examined span the whole range of relevant building types and include monuments of both the Lydian and the Persian periods.

The two largest known ancient marble quarries in the region were also sampled, one south of Sardis in the steep gorge of Mağara Deresi and a lesser-known quarry near the ancient town of Mermere, now known as Gölarmarmara.³ The Gölarmarmara quarry is situated at the top of a large hill south of the modern town and has many indications of working from at least Roman times, including pick and wedge marks typical of that period.⁴ Other marble quarries in the region near Akhisar, Turgutlu, and Alaşehir were investigated but not sampled because the stone was visually dissimilar to Lydian building stone. Ongoing survey research may well identify quarries in the region that could have been sources of marble in Lydian times.⁵ It is of course possible that other quarries remain to be discovered or that small ancient sources of good stone no longer exist. For comparison with the Mağara Deresi and Gölarmarmara quarries, 11 samples were taken from the few known examples of marble in Lydian architecture. In Bin Tepe, the tomb chamber in the tumulus of Alyattes (no. 1), a worked marble piece from the rubble

2 On Kır Mutaf Tepe, see above, Ch. 1.

3 Robert, "Documents."

4 Rockwell, *Stoneworking*, 162–63.

5 Roosevelt, *Lydia*, 54.

1 Hanfmann and Ramage, *Sculpture* (Sardis R2), 6; Monna and Pensebene, *Marmi*, 177–79; Tykot and Ramage, "Importation."

fill of Karnıyarık Tepe (no. 2), and a funerary kline of the sixth century B.C. from a tomb near Kendirlik were sampled;⁶ from Sardis itself, samples were taken from an unfinished architectural block, perhaps a crown molding, and a stylobate, both from the “Byzantine Fortress” (no. 17).

LIMESTONE QUARRIES AND MONUMENTS

The limestone quarries are generally small and concentrated in Bin Tepe. Although there are limestone deposits outside the Bin Tepe area, none of them are known to have the fine-grained white limestone Lydian builders used. The quarries evaluated were selected based on evidence of use in ancient times. The indications include straight, deliberately cut edges in bedrock, cut blocks, and toolmarks, as seen around the area of Karnıyarık Tepe. Large amounts of broken stone, presumably waste from a stoneworking operation, are a third indication of ancient quarrying. Such piles of stone could be related to diagenesis or weathering, but the abundance of these stones in proximity to areas where there is ample evidence of quarrying suggests working in antiquity. (The stones since have been made into piles by modern farmers.) Not surprisingly, the three largest burial mounds of Bin Tepe, as well as some of the smaller mounds, are associated with individual quarries. This association is twofold: the mounds are situated on top of a limestone ridge and are therefore all the more imposing because of the topography, and the construction of tomb chambers within each tumulus required significant quantities of stone.

The archaeological samples come from buildings that have been dated from ca. 560 B.C., about the time of the death of Alyattes, to the fifth or fourth century. The earliest monuments studied are the Tomb of Alyattes (no. 1), Karnıyarık Tepe (no. 2), and the terraces and walls of excavation sectors Acropolis North (no. 16), Byzantine Fortress (no. 17), and MMS/N (no. 18). The other monuments follow in time, with the Lydian Altar (LA 1, see Appendix 3) in front of the Hellenistic Temple of Artemis most likely the latest. Some of the monuments sampled are not dated, such as Kır Mutaf Tepe and the “phallic” markers found in the Pactolus valley near Sardis and elsewhere.

LIMESTONE THIN-SECTION ANALYSIS

The limestone was analyzed in thin section using a petrographic microscope and plane and cross-polarized light. Unstained thin sections were compared using visual characteristics, including the texture, the degree

of dissolution and recrystallization by groundwater, the presence or absence of fossils or phosphate (the material fish scales are made of), and the presence or absence of volcanic quartz grains. The comparison based on the microscopic criteria is founded on the premise that certain areas of the limestone formation at Bin Tepe have distinct characteristics, from both original depositional differences and subsequent alteration by groundwater.

The limestone of Bin Tepe is all one formation, as shown by widespread similarities in fossil content and thin-section character. The limestone was formed during the Neogene (23.7–1.8 million years ago)⁷ and, on the evidence of the ostracod fossils⁸ and pelletization, was deposited in shallow water. The beds are about 1 m thick but are ill defined. The texture ranges from micritic, or very fine grained, to pelletal, or coarsely granular. The limestone shows evidence for recrystallization from groundwater alteration throughout the deposit, although the degree of recrystallization varies. Much of the limestone also contains volcanic quartz grains, identifiable by their angularity and because they are strain free, showing no undulose extinction under the crossed polars of a microscope.

The most useful characteristic for distinguishing between different limestones was texture. Because texture varies both in time and space, different layers in the same region may not have the same texture, making it a useful marker for local identification within a larger formation. Pellets were the easiest characteristics to identify and the first divider, after which other criteria were used to distinguish between samples. The second diagnostic characteristic was the amount of detrital quartz, which must have fallen into the basin as airborne detritus from volcanic eruptions. There are numerous Neogene volcanic provinces in the vicinity,⁹ and the presence of biotite in some samples is consistent with the idea that these pieces of quartz are volcanic in origin. Variation in the amount of detrital quartz is likely a result of differences in volcanic activity or wind during the time of deposition or in the distance the particular quartz grains were transported (smaller grains tending to travel farther). A third useful criterion for correlation was the amount and type of dissolution and recrystallization within the limestone, both a result of groundwater moving through the limestone after lithification. The results of dissolution and recrystallization appear to be fairly localized and therefore worked well to distinguish similar samples.

7 Konak, *Jeoloji Haritası* (scale 1:500,000).

8 Adams et al., *Sedimentary Rocks*.

9 Bingöl, *Jeoloji Haritası* (scale 1:2,000,000).

6 NoEx94.4. On the tomb, see Bilgin et al., “Temizlik Kazısı.”

Independently, each of these characteristics might not be decisive, but when used together, they provide a good indication of the quarry source for a particular archaeological sample. Detailed comparisons of the stones were made using visual clues from the petrographic microscope. Certain stones were matched both on the basis of similarities between two or more thin sections and on the basis of differences from the entire body of samples. The analysis was primarily visual, and thus photomicrographs of some matching samples illustrate the comparisons below (Figs. 281–84).

LIMESTONE PROVENANCE

Examination of 106 thin sections yielded 13 matches between artifacts and quarries (Table 1). The correlation between burial mounds and nearby quarries was expected, and this is the case with each of the three largest burial tumuli. Because this is a natural association supported by the geological analysis, it helps to validate the technique. Two stones from the possible crepis wall of Kır Mutaf Tepe match the bedrock in local quarries; similarly, the Karniyarık Tepe crepis wall (no. 2) matches the limestone nearby. Additionally,

the limestone used in the ceiling of the chamber of the Tomb of Alyattes (no. 1) matches the outlying bedrock, and packing from the flank of the mound, perhaps belonging to a crepis, matches sandstone outcroppings in the vicinity. In other cases, however, it is clear that limestone blocks were transported significant distances from quarries at Bin Tepe to building sites at Sardis.

Full correlations borne out by the analysis are given in Table 1, which shows the definitive matches possible among the samples taken. Some logical matches were not possible; for instance, the limestone marker on top of the Tomb of Alyattes (no. 1) has no quarry match, although it is reasonable to assume it was quarried locally. The lack of a match could indicate that it comes from an unidentified quarry or that the variability of the limestone within a quarry prevented a match. In some instances there are multiple samples from the same monument, but only one match to a quarry source. This could suggest multiple quarry sources for a single monument, but without a definitive match to different quarries, it is difficult to draw this conclusion with any certainty.

Table 1. Correlations of limestone and sandstone monuments and quarry samples

Archaeological Samples Location Sample ID	Quarry Samples Location Sample ID	Match Criteria
Alyattes tomb chamber ATC-5	Alyattes mound D	pellets, reprecipitated calcite, abundant quartz
Alyattes “crepis” BT/A 93.1	AC	quartz-biotite sandstone
Acropolis North AcN 1	Karniyarık Tepe Y	micrite, small amount of quartz
MMS/N walls MMS/N A3	KT-B	fossils, pelletal pellets
MMS/N C6	G	fossils, pelletal pellets
MMS/N D1	U, KT-DB	fossils, pelletal pellets
Karniyarık Tepe crepis KT-CB	G, U, KT-DB	fossils, pelletal pellets
KT-NEB	G, U, KT-DB	fossils, pelletal pellets
Kır Mutaf Tepe “crepis” BC	Kır Mutaf Tepe BB	phosphate, quartz, slow reaction to HCl
KMT-A	BA	recrystallized calcite, quartz
Pyramid Tomb PyT B	BB	phosphate, quartz, slow reaction to HCl
“Phallic” markers NoEx62.19	BI	quartz, dissolution, pellets
NoEx84.5	BD	micrite groundmass, recrystallized pellets, small amount of quartz

A limestone block from the Acropolis North retaining walls (no. 16, sample AcN 1) and a number of blocks from MMS/N (no. 18, samples MMS/N A3, C6, and D1) match bedrock from the area near Karnıyarık Tepe (no. 2, samples G, U, KT-B, and KT-DB). The Acropolis North wall sample (Fig. 281) matches bedrock sample Y from Karnıyarık Tepe (Fig. 282) for two reasons. Both samples are a micrite with little dissolution and little quartz. The relatively unusual texture of the rocks and the small amount of volcanic quartz are both striking features. In this case, the similarity of these thin sections, combined with their differences from the rest of the samples, establishes the match. The samples shown in Figures 283 and 284 are more characteristic of the general texture of Bin Tepe limestone.

The match between the stone used in the walls at MMS/N (sample MMS/N A3, Fig. 283) and Karnıyarık Tepe bedrock (sample KT-B, Fig. 284) is based on another feature visible in these samples. Both are pelletal limestones with moderate amounts of quartz and similar calcite recrystallization, of which the most striking feature is the fact that the pellets themselves are pelletal. This represents reworking of already pelletal limestone in the depositional environment, perhaps by waves. This feature was rare in the samples from Sardis.

In another area of Bin Tepe, there are a number of matches between Lydian building stone and the quarries around Kır Mutaf Tepe. In addition to the possible crepis wall of the mound itself, the Pyramid Tomb near Sardis (no. 15) and two “phallic” markers (NoEx62.19 and NoEx84.5) match the bedrock quarries near Kır Mutaf Tepe. A stone from the possible Kır Mutaf Tepe crepis and one from the Pyramid Tomb both match sample BB from the Kır Mutaf Tepe quarries. The basis for this correlation is the abundance of phosphatized particles containing pieces of quartz. The phosphatized particles are identified by their amber color and their isotropic nature (they appear black under cross-polarized light). The clear particles within the phosphate pellets are quartz. In addition, all three of these samples were slower to react to hydrochloric acid than many other samples from Bin Tepe.

In the region of the third and largest of the huge burial mounds, the Tomb of Alyattes, there are similarities between the Lydian structures associated with the mound and the surrounding bedrock. Inside the mound, a sample from the ceiling of the tomb chamber matches the stone in a local quarry. The worked block from the packing for the possible crepis is composed of a type of sandstone found in the vicinity of the mound of Alyattes. This correlation was made visually, without the microscope, as the sandstone is extremely rich in quartz

and biotite, making it easy to distinguish the worked block and its source from the limestone in the area.

A final stone of interest is the material used to build the Lydian Altar (LA 1)¹⁰ in the sanctuary of Artemis. This stone is not a limestone from the formation at Bin Tepe but is instead a tufa,¹¹ a soft, porous calcium carbonate deposited by springs, lakes, or groundwater. In hand specimen, the stone is much darker and softer and riddled with small, interconnected holes. The stone also appears different in thin section. There are hot springs near Sardis called Sart Çamur Hamamı, but sources of tufa such as the one used in the construction of the Lydian Altar remain to be identified. Many small sources of good stone could have been quickly worked out or easily concealed by undergrowth.

MARBLE QUARRIES AND ISOTOPE ANALYSIS

The marble quarries of both Mağara Deresi, near Sardis, and Gölarmara, across the Gediz (Hermus) plain, show extensive evidence of preindustrial working. In both places, the white, coarsely crystalline marble is criss-crossed with pick marks, and many abandoned blocks are lying about. These quarries were sampled to determine whether either one may have been a source of the marble used in Lydian monuments.

Answering this question involves the comparison of stable isotope ratios of carbon (C) and oxygen (O). Individual quarries have been found to have distinct isotopic compositions that can be compared with isotopic compositions of archaeological material.¹² The technique is based on the variations of isotopic values of carbon and oxygen in the depositional environment of a limestone, which are related to the temperature and climate conditions in the water.¹³ After metamorphism to marble, the stone retains some of the original isotopic conditions, allowing them to be distinguished. Further isotopic differences may be introduced by hydrothermal waters during metamorphosis, which also serve to homogenize isotope values within one metamorphic complex.¹⁴

The carbon and oxygen isotope content of the Sardis samples was measured by Tykot using a VG II Isogas mass spectrometer at Harvard's Archaeometry Laboratory. The samples were powdered using an agate mortar, and then a few milligrams were placed in the spectrometer's

10 See Appendix 3.

11 Hanfmann, *SPRT*, 51.

12 Craig and Craig, “Greek Marbles.”

13 Faure, *Isotope Geology*.

14 Craig and Craig, “Greek Marbles.”

autosampler. The samples were dissolved one at a time in a 100-percent phosphoric acid bath; the ensuing reaction produced CO₂, which was directed to the mass spectrometer, where carbon and oxygen isotopic values were measured simultaneously. The result is reported as a delta value (δ) between the isotopic ratio of the sample and an internationally accepted limestone standard (Pee Dee *Belemnitella*) and is calculated by:

$$\delta(x) = ((R_x - R_{std})/R_{std}) \times 10^3$$

where R_x is ¹³C/¹²C or ¹⁸O/¹⁶O of the unknown, and R_{std} is the same ratio for the standard.¹⁵

MARBLE PROVENANCE

Interpreting the isotopic compositions is a straightforward procedure. Following the example of Craig and Craig and others as summarized by Herz, the data are plotted and compared visually.¹⁶ Typical isotopic compositions are sufficiently constrained so that it is possible to draw boundaries around the data points, giving a region within the graph that corresponds to a particular quarry. It should be noted, however, that the ellipses in Figures 285 and 286 are not statistically determined. The ranges of isotopic compositions of marbles from certain quarries sometimes overlap, so that other rock properties such as grain size, streaking, and historical connections must be used to further narrow possible source areas. At Sardis, the isotopic compositions of the two quarries studied are distinct, particularly in carbon values (Fig. 285, Table 2). The authors' samples from the Mağara Deresi quarries may have two isotopic fields, but the two areas on the graph are consistent with the sampling from the gorge: the samples with δ¹⁸O values between -7 and -8‰ come from a quarry laterally distinct and topographically higher than the samples with values between -10 and -11‰. The authors' samples from Mağara Deresi have δ¹⁸O values ranging from -7 to -11‰ and δ¹³C values ranging from 2.5 to 4.5‰. In contrast, the samples from the Gölarmarmara quarry have a greater scatter of δ¹⁸O values between -4.6 and -7.6‰ but fairly constrained δ¹³C values from 0.8 to 2.5‰.

The isotope values from the archaeological samples plot in yet another isotopic field. The five samples from the tomb chamber of Alyattes have well-constrained isotopic ratios (δ¹⁸O: -5.6 to 6.4‰; δ¹³C: 0.5 to 0.7‰), which indicates that they are from the same source. The other archaeological samples have similar isotopic

compositions and are visually similar. The correlation strongly suggests that all the Lydian white marble samples come from a single quarry.

Importantly, the isotope compositions show that the archaeological samples are not derived from the Mağara Deresi quarries of the Sardis hills, nor are they sufficiently close to the isotopic range of the Gölarmarmara

Table 2. Marble samples: Stable carbon and oxygen isotope results

Site	Sample no.	δ ¹³ C	δ ¹⁸ O
Gölarmarmara quarry	GMQ-1	1.9	-7.6
Gölarmarmara quarry	GMQ-2	1.9	-5.1
Gölarmarmara quarry	GMQ-3	2.5	-7.5
Gölarmarmara quarry	GMQ-4	2.1	-5.6
Gölarmarmara quarry	GMQ-5	1.8	-4.6
Gölarmarmara quarry	GMQ 95.1*	0.8	-10.3
Gölarmarmara quarry	GMQ 95.2*	2.0	-5.8
Gölarmarmara quarry	GMQ 95.3*	1.9	-6.6
Gölarmarmara quarry	GMQ 95.4*	1.9	-6.7
Gölarmarmara quarry	GMQ 95.5*	2.0	-6.9
Gölarmarmara quarry	GMQ 95.6*	2.1	-4.8
Gölarmarmara quarry	GMQ 95.7*	1.0	-7.4
Mağara Deresi gorge	Q-1	3.4	-11.3
Mağara Deresi gorge	Q-2	2.8	-10.5
Mağara Deresi gorge	Q-3	4.0	-10.1
Mağara Deresi gorge	Q-4	4.4	-7.8
Mağara Deresi gorge	Q-5	4.3	-7.1
Mağara Deresi gorge	Q-6	4.4	-7.4
Mağara Deresi gorge	Q-7	4.3	-9.4
Mağara Deresi gorge	Q-8	3.9	-11.2
Alyattes tomb chamber	ATC-1	0.7	-5.6
Alyattes tomb chamber	ATC-2	0.6	-6.3
Alyattes tomb chamber	ATC 95.1*	0.5	-5.9
Alyattes tomb chamber	ATC 95.2	0.5	-6.4
Alyattes tomb chamber	ATC 95.3*	0.7	-6.4
Karnıyarık Tepe	KT-M1	1.3	-5.8
Sardis, Byzantine Fortress	BF9195.1 stylobate*	0.2	-7.0
Sardis, Byzantine Fortress	BF9195.2 stylobate*	0.9	-5.9
Sardis, Byzantine Fortress	BF9195.3 "crown molding"	1.8	-4.0
Bin Tepe chamber tomb	kline leg*	0.6	-6.6
Bin Tepe chamber tomb	kline top	1.0	-6.5

* indicates results as an average of two analyses

15 Anderson and Arthur, "Stable Isotopes."

16 Craig and Craig, "Greek Marbles"; Herz, "Isotopic Analysis."

quarry (Fig. 285). The data indicate that the marbles are not from the known local quarries. The Sardis samples display isotopic similarities, however, with quarries at Ephesus, Denizli, and Dokimeion (Fig. 286).¹⁷ It is possible that the Lydian marbles come from one of these quarries or that they come from an undiscovered quarry nearer Sardis.

In order to distinguish among these three possible sources, grain-size comparisons between the possible sources and the artifacts are used. In a study of ancient marble quarries,¹⁸ maximum grain size is determined to be a distinguishing characteristic among marble quarries. The maximum grain size for Dokimeion marble is 1.8 mm, whereas the largest grain size for Sardis marbles, measured from thin sections, is 2.6 mm for ATC-2, a sample from the chamber of the Tomb of Alyattes, and 2.0 mm for KT-M1, a piece of worked marble from the tunnels of Karniyarık Tepe. This suggests that Dokimeion is not a source. Furthermore, neither Denizli nor Dokimeion are sources of marble known to have been used as early as the sixth century B.C. This points to a source other than Dokimeion or Denizli, indicating on isotopic grounds that the quarries of Ephesus are a possible source. Recent archaeological surveys of the northern side of the Gediz plain, however, have located small quarries of white marble.¹⁹ These have not yet been sampled for isotope analysis but may prove to have been a more local source of white marble in Lydian times.

CONCLUSIONS

Geological analysis of Lydian building stones confirms Bin Tepe as the source of at least some of the limestone used at Sardis and environs in the Lydian and Persian periods. Specifically, the limestone of the terrace walls on the Acropolis (no. 16) and the defensive walls at MMS/N (no. 18) comes from the quarries around Karniyarık Tepe (no. 2); the stone for the Pyramid Tomb (no. 15) comes from the area around Kır Mutaf Tepe; and, not surprisingly, the masonry structures associated with each of the three large tumuli exploited quarries nearby.

The source of Lydian architectural marble remains uncertain. Based on the distinct carbon and oxygen isotope ratios in the marbles, the analysis shows that neither of the two known local marble quarries was the source of the architectural marble used in Lydian times. Distant quarries are possible sources: those at Ephesus provide an isotopic and visual match and were exploited during this period; those at Denizli and Dokimeion are isotopically similar but are more fine grained, and there is no evidence that they were active at this time. The geology of the Sardis region would suggest that there may be undiscovered ancient sources of coarse-grained white marble closer to Sardis.

17 Herz, "Isotope Ratios."

18 Moens et al., "Provenance Determination."

19 Roosevelt and Luke, "CLAS 2006," 312.

ILLUSTRATIONS

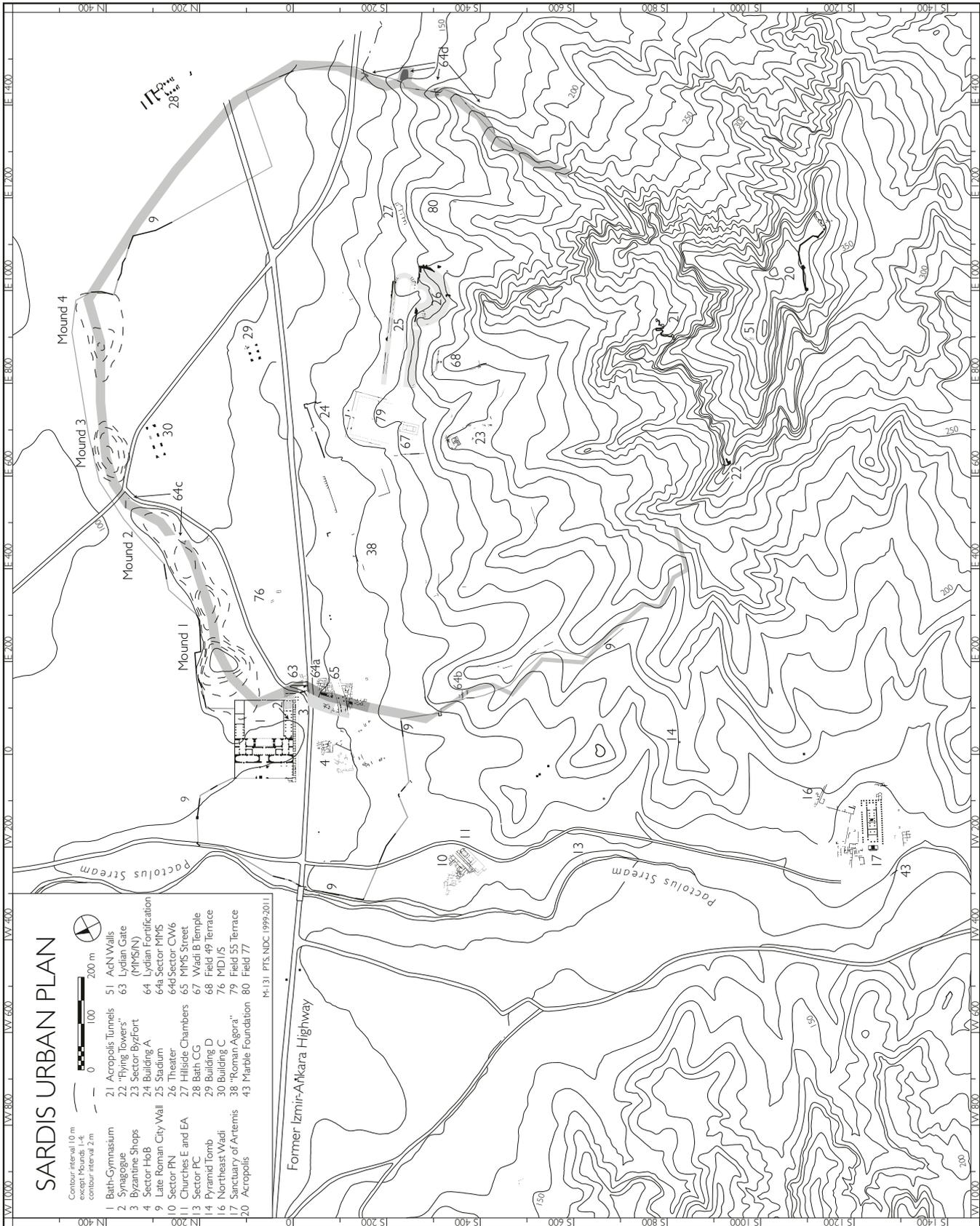


Fig. 1. Plan of Sardis

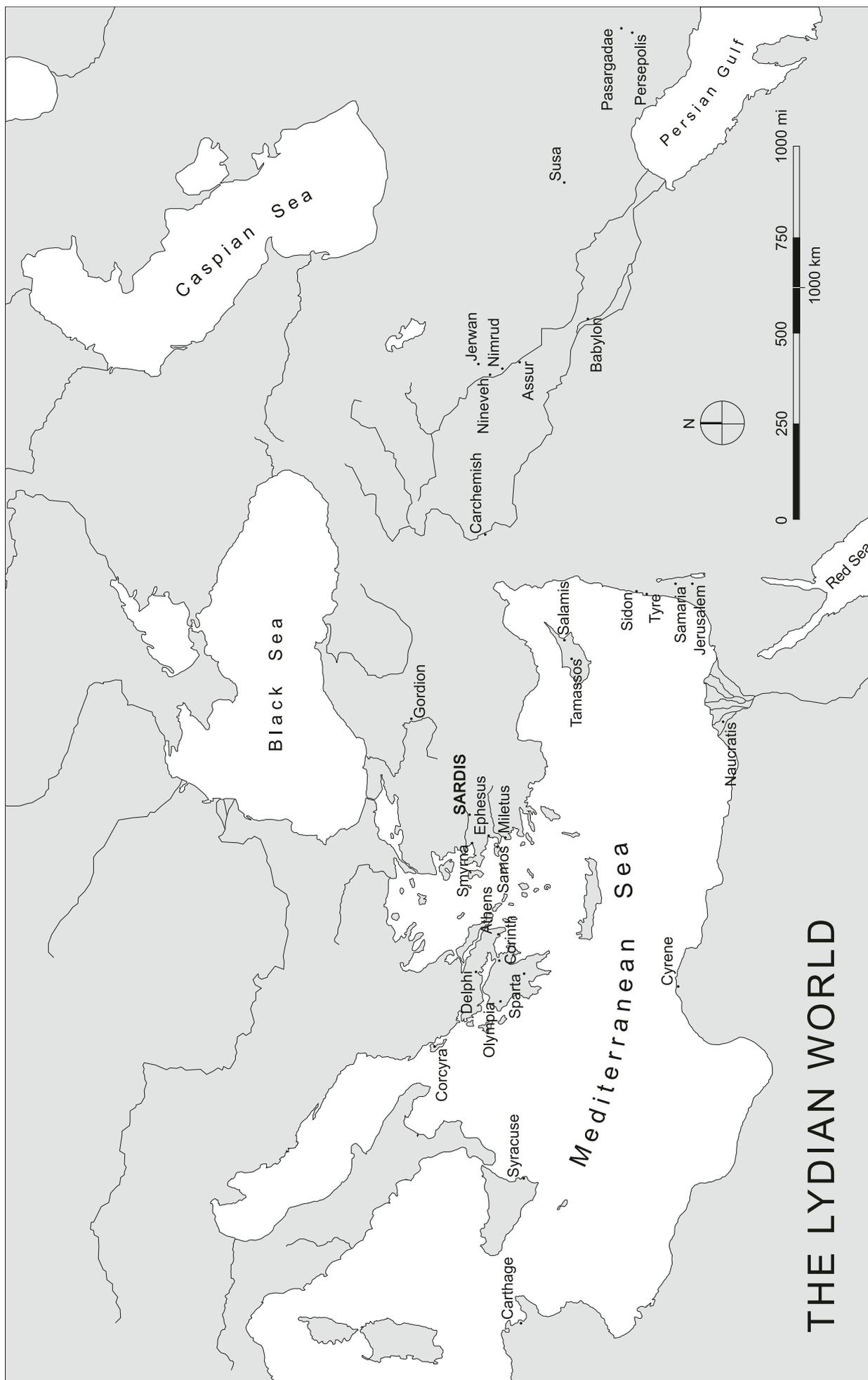


Fig. 2. The Lydian world

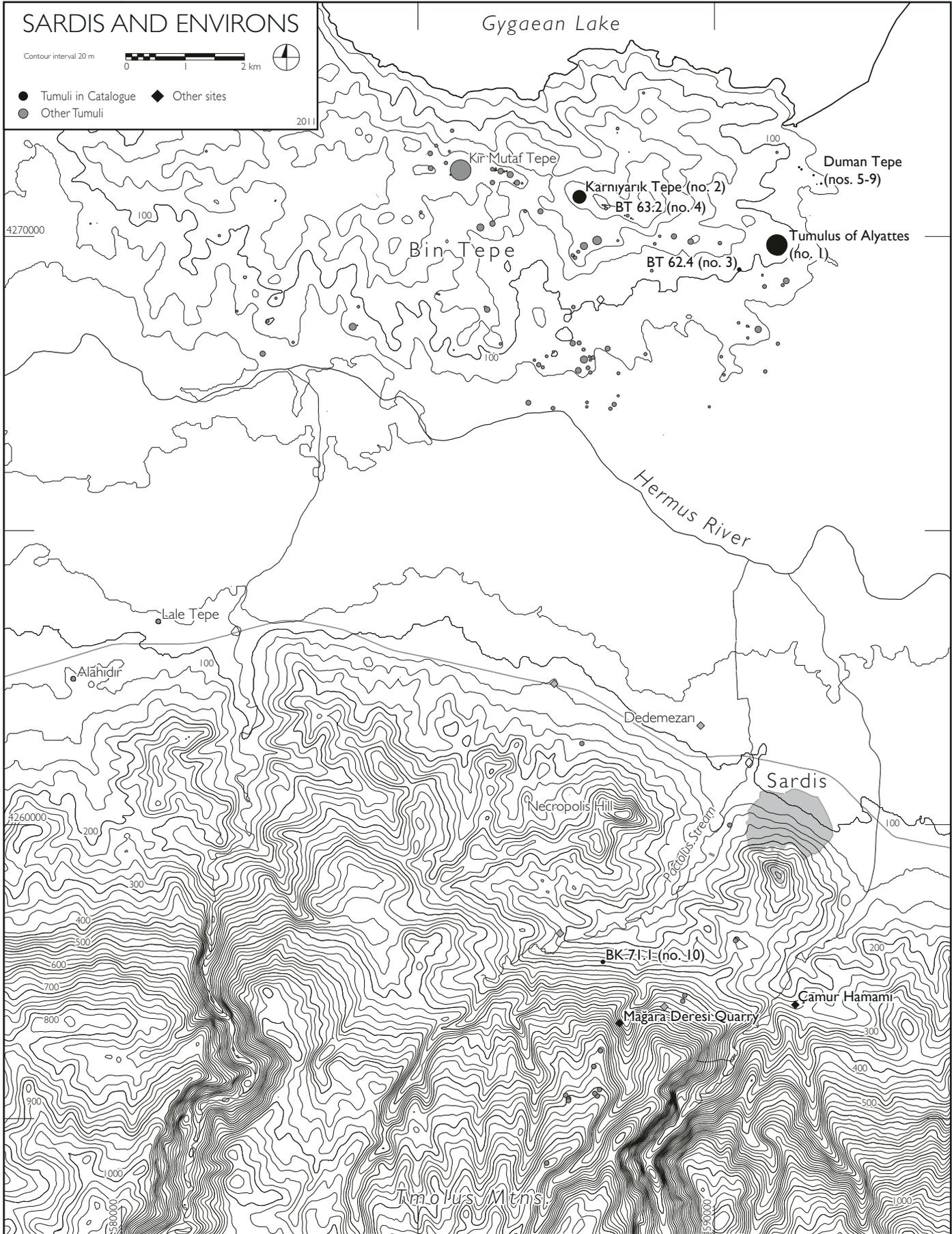


Fig. 3. Map of Sardis and environs showing locations of tombs at Bin Tepe (nos. 1-9) and Keskinler (no. 10)

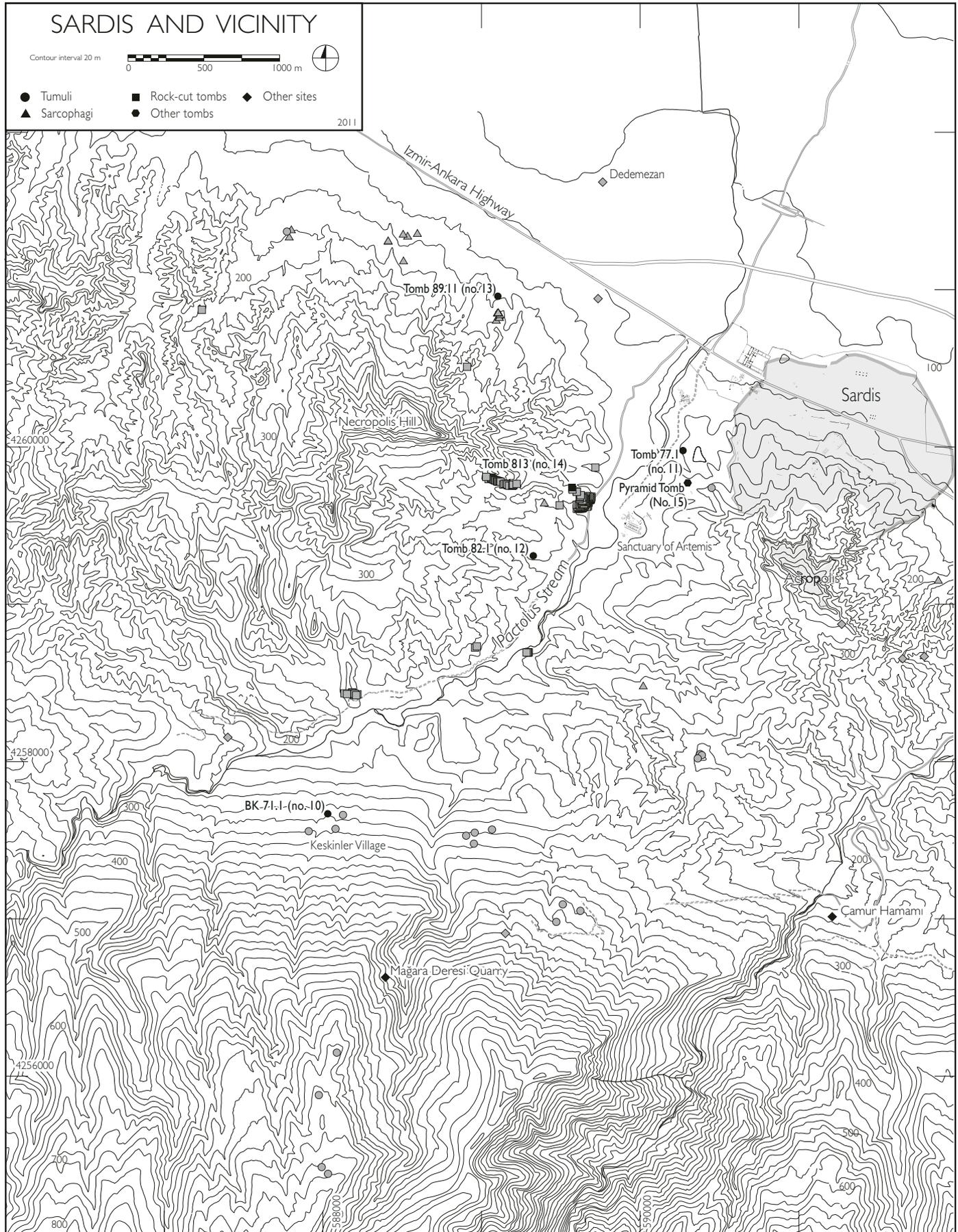


Fig. 4. Map of Sardis and vicinity showing locations of tombs at Keskinler (no. 10) and around Sardis (nos. 11–15)

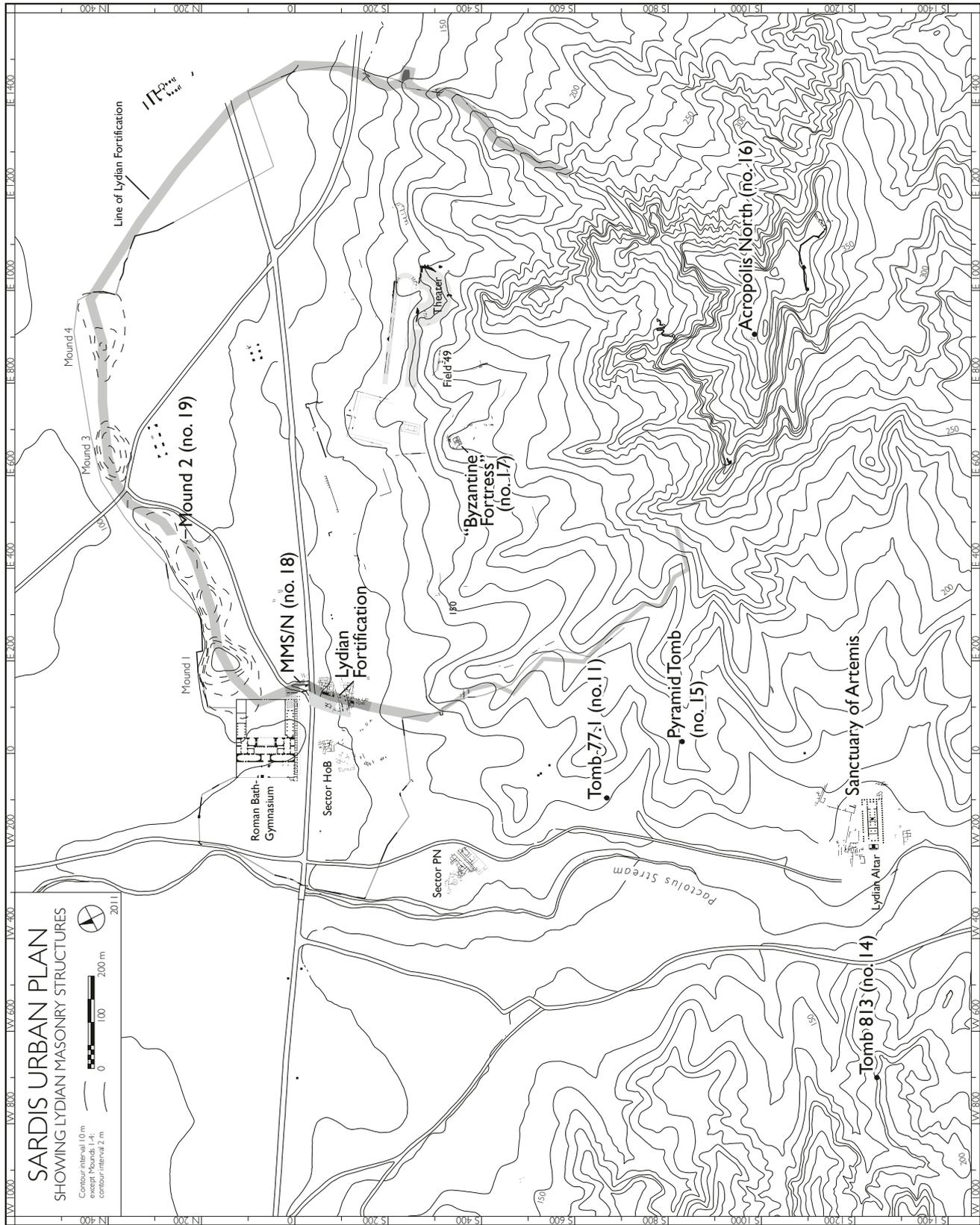


Fig. 5. Plan of Sardis showing locations of suburban tombs (nos. 11, 14, 15) and civic structures (nos. 16-19)

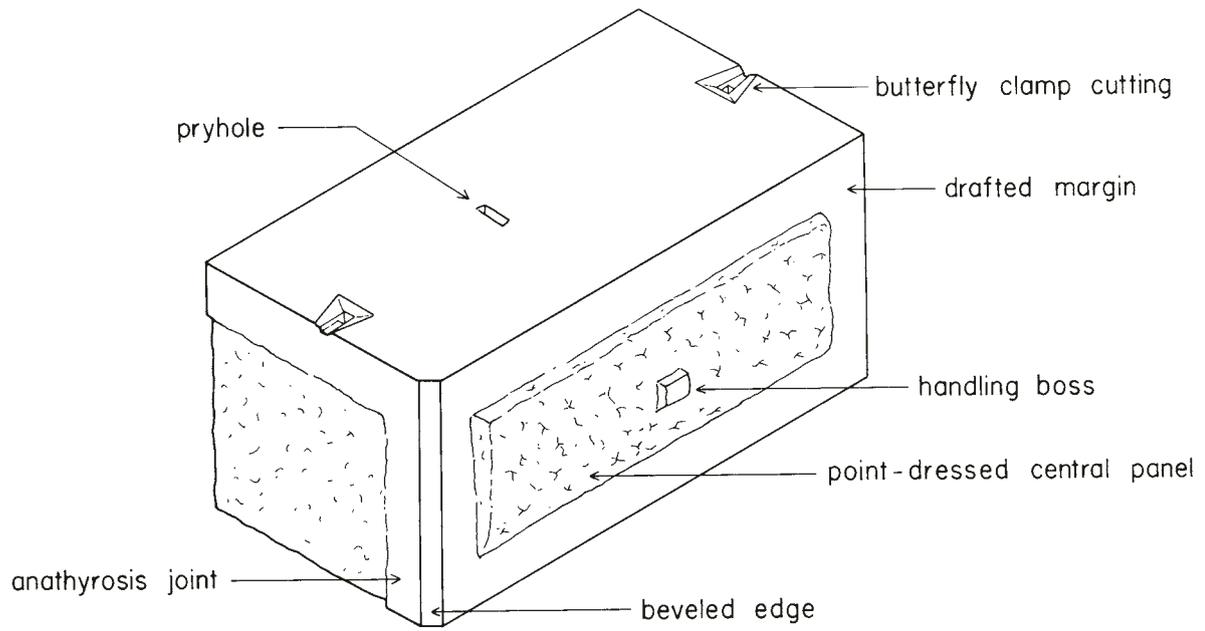


Fig. 6. Features of a typical Lydian block

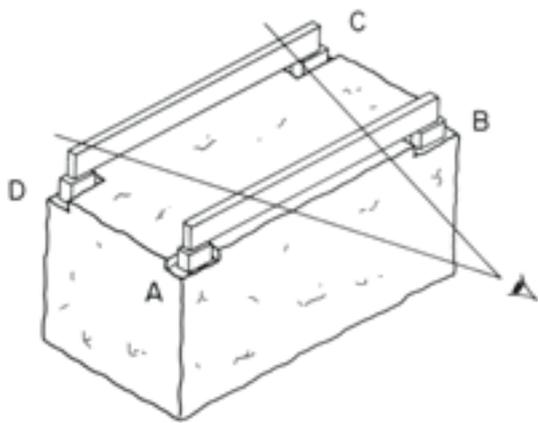


Fig. 7.

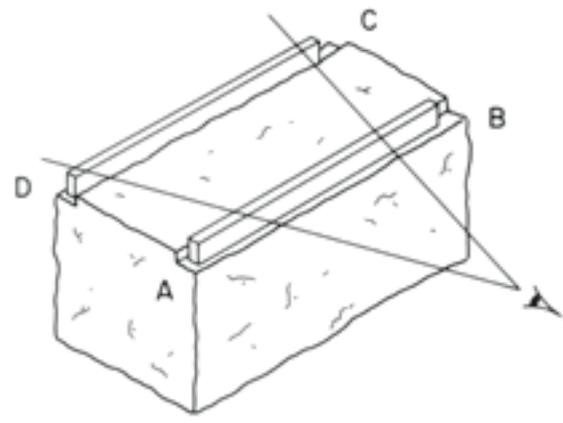


Fig. 8

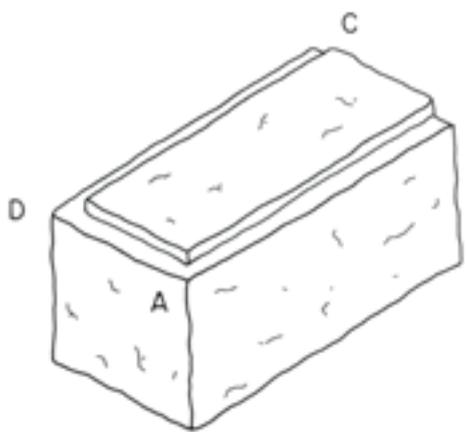


Fig. 9

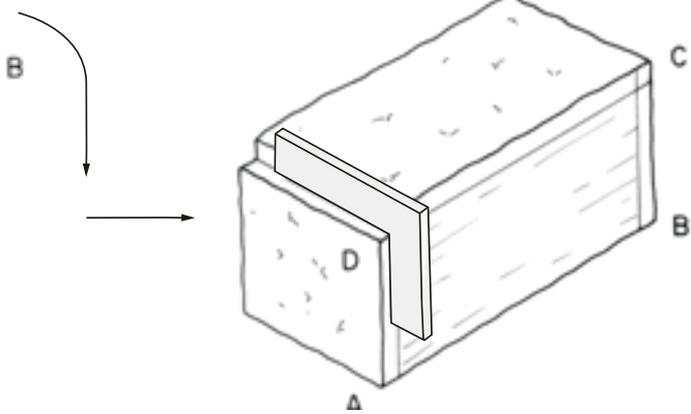


Fig. 10

Figs. 7-10. Squaring off a block

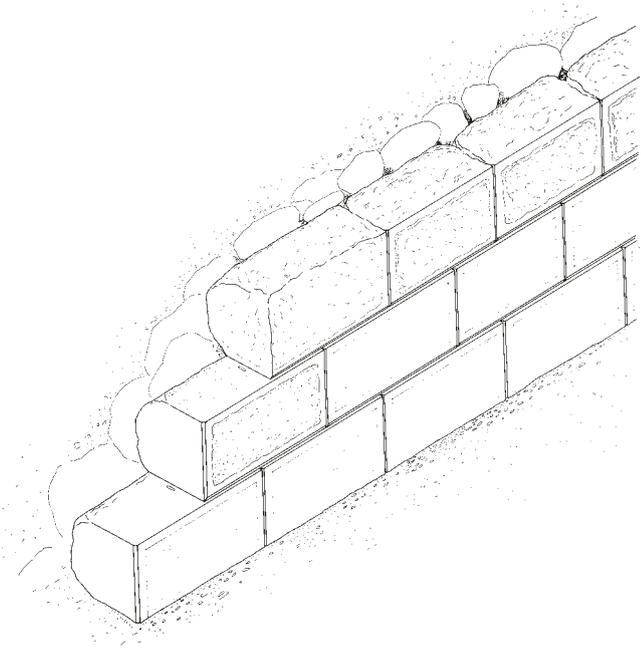


Fig. 11. Techniques of construction: 1

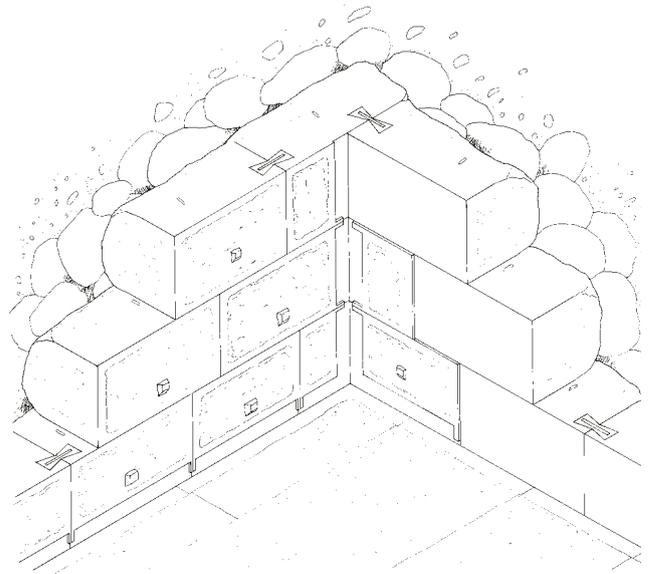


Fig. 12. Techniques of construction: 2

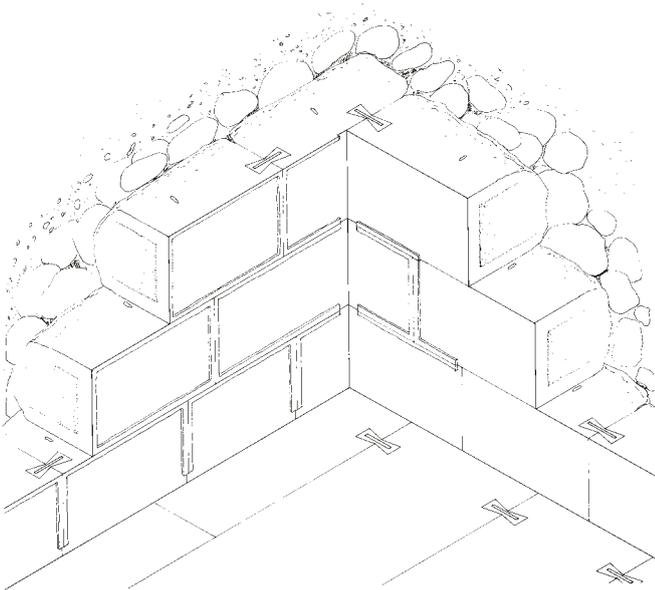


Fig. 13. Techniques of construction: 3

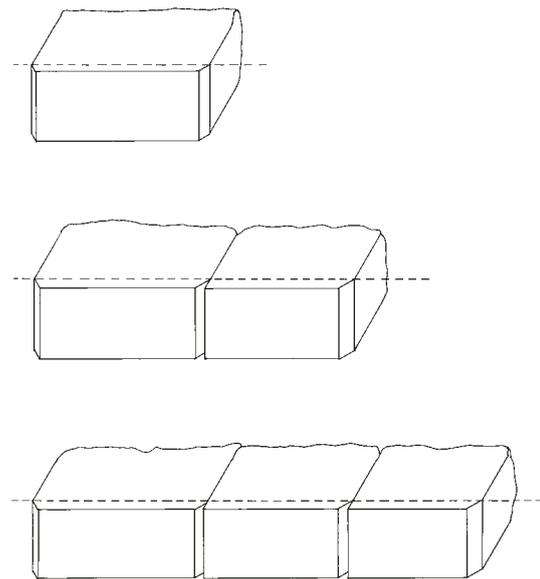


Fig. 14. A method of maintaining the alignment of a series of blocks using vertical bevels



Fig. 15. Bin Tepe



Fig. 16. Sardis



Fig. 17. Tomb of Alyattes (no. 1)



Fig. 18. Tomb of Alyattes (no. 1): Marker on top

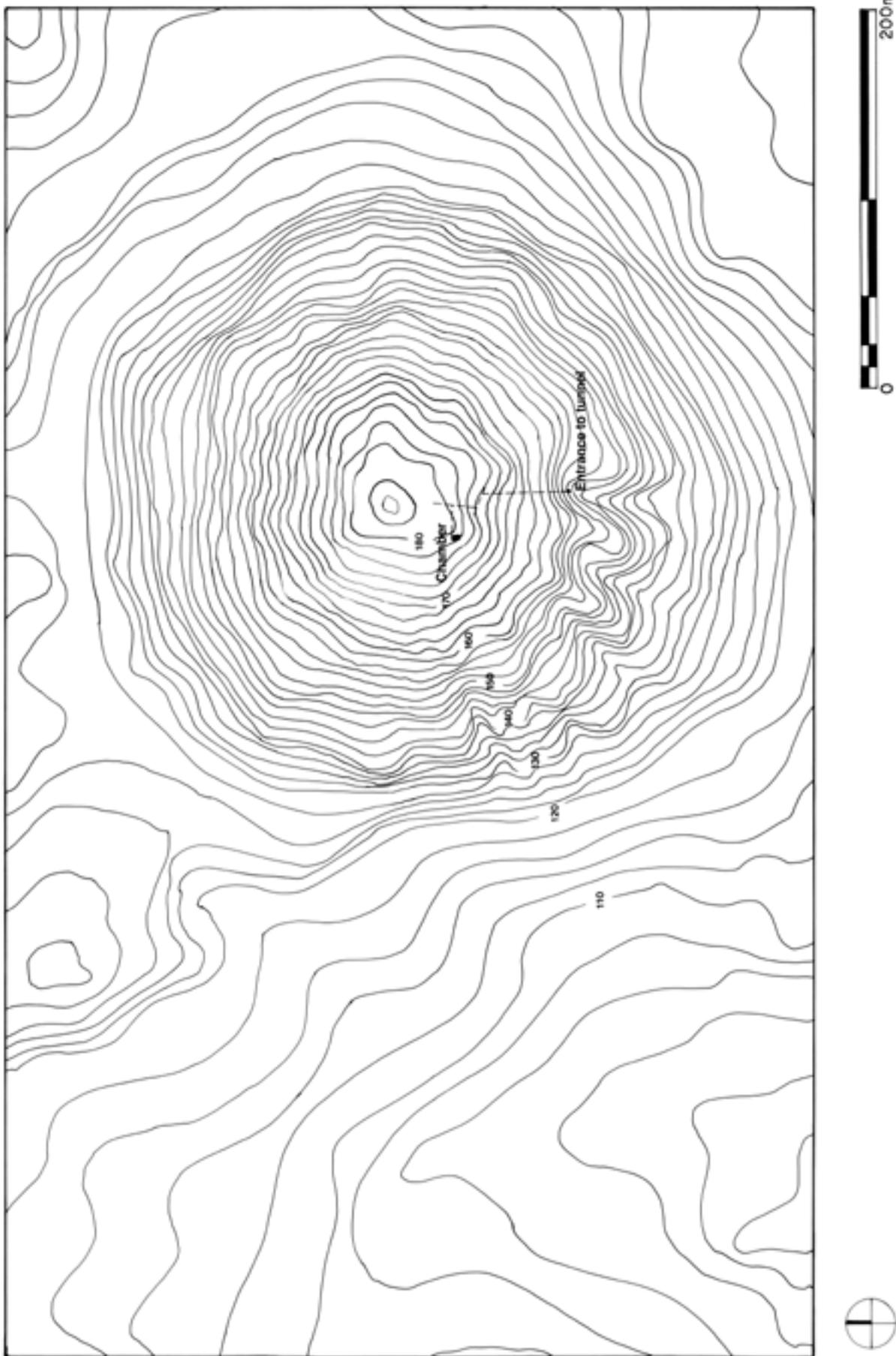


Fig. 19. Tomb of Alyattes (no. 1): Contour map (scale 1:3000)

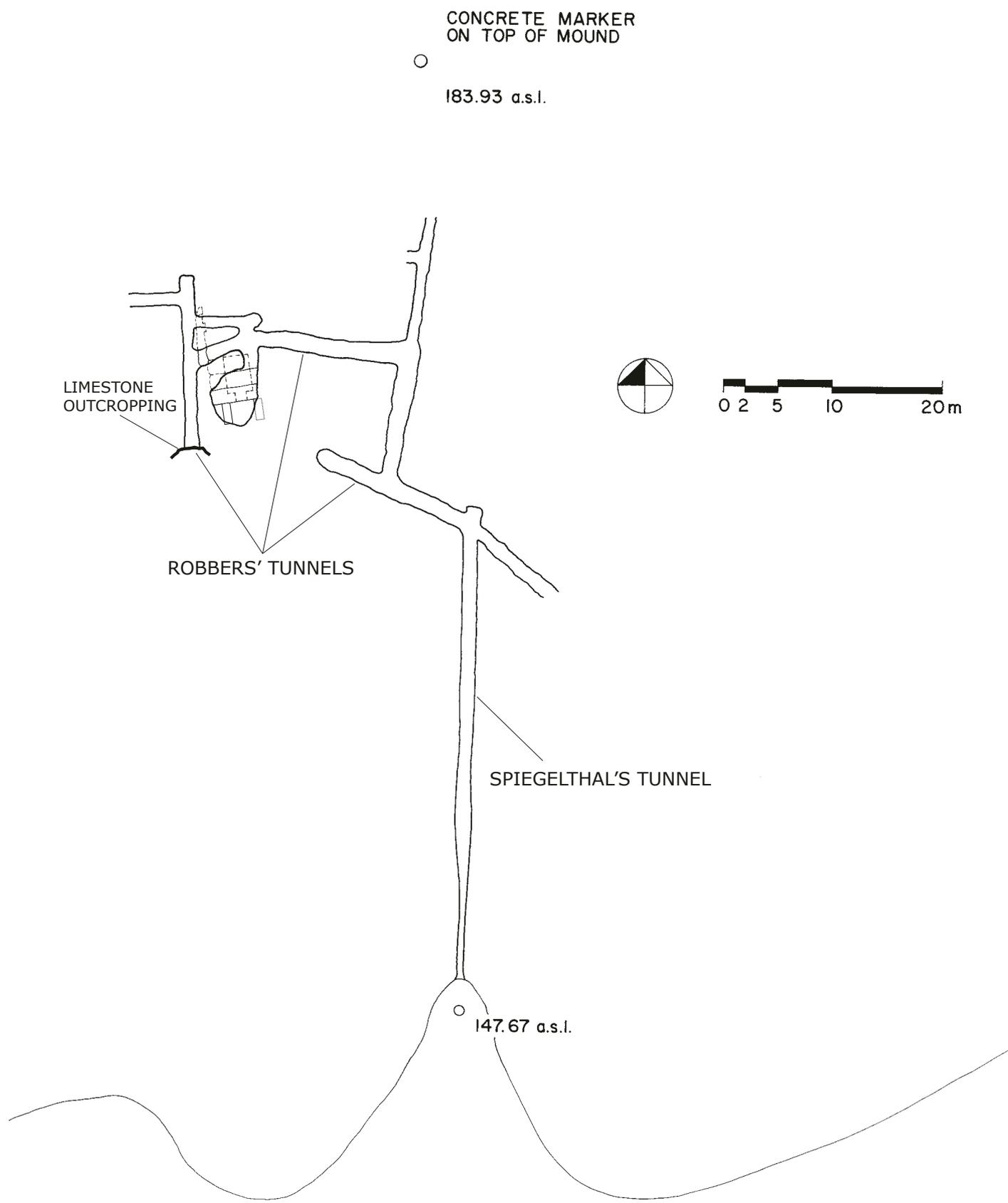


Fig. 20. Tomb of Alyattes (no. 1): Plan of tunnels

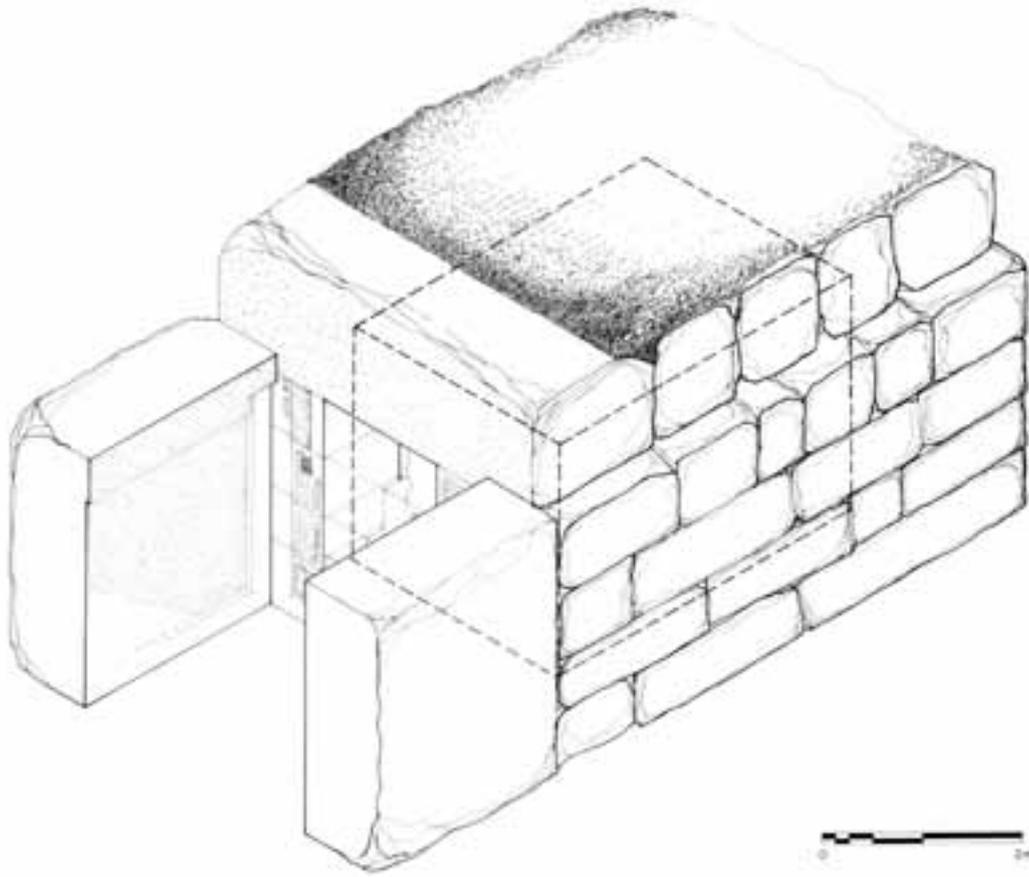


Fig. 21. Tomb of Alyattes (no. 1): Isometric view of chamber complex (scale 1:75)

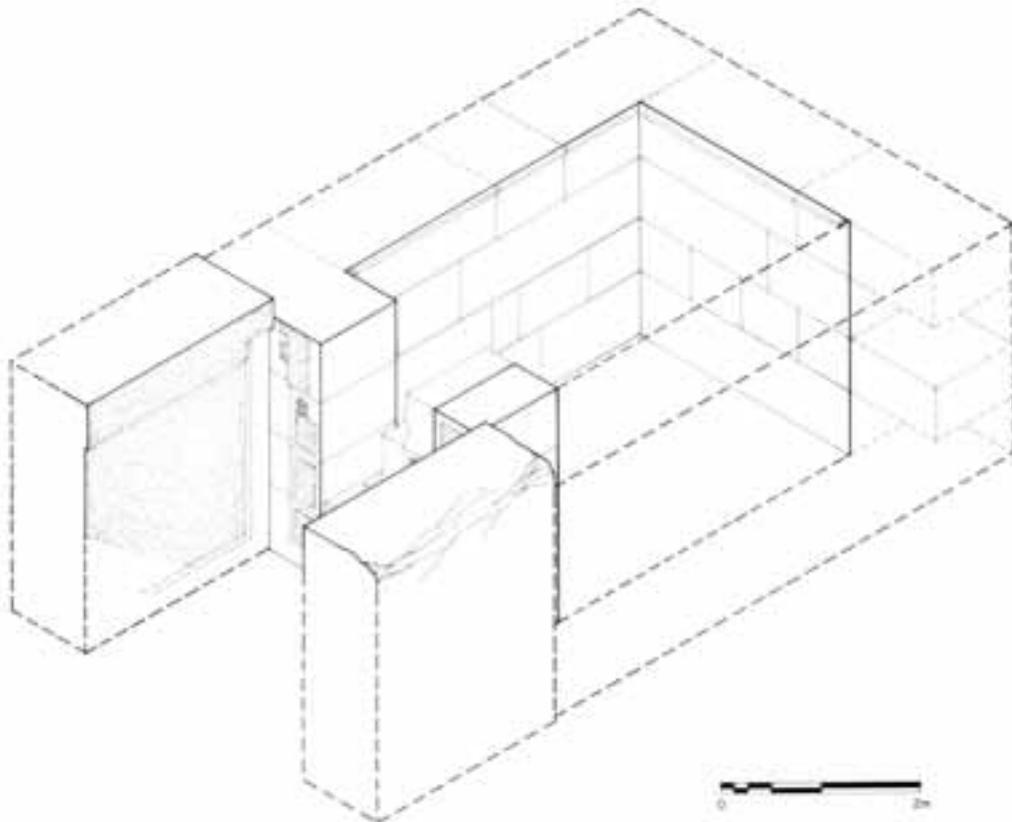


Fig. 22. Tomb of Alyattes (no. 1): Cutaway isometric view of chamber complex (scale 1:75)

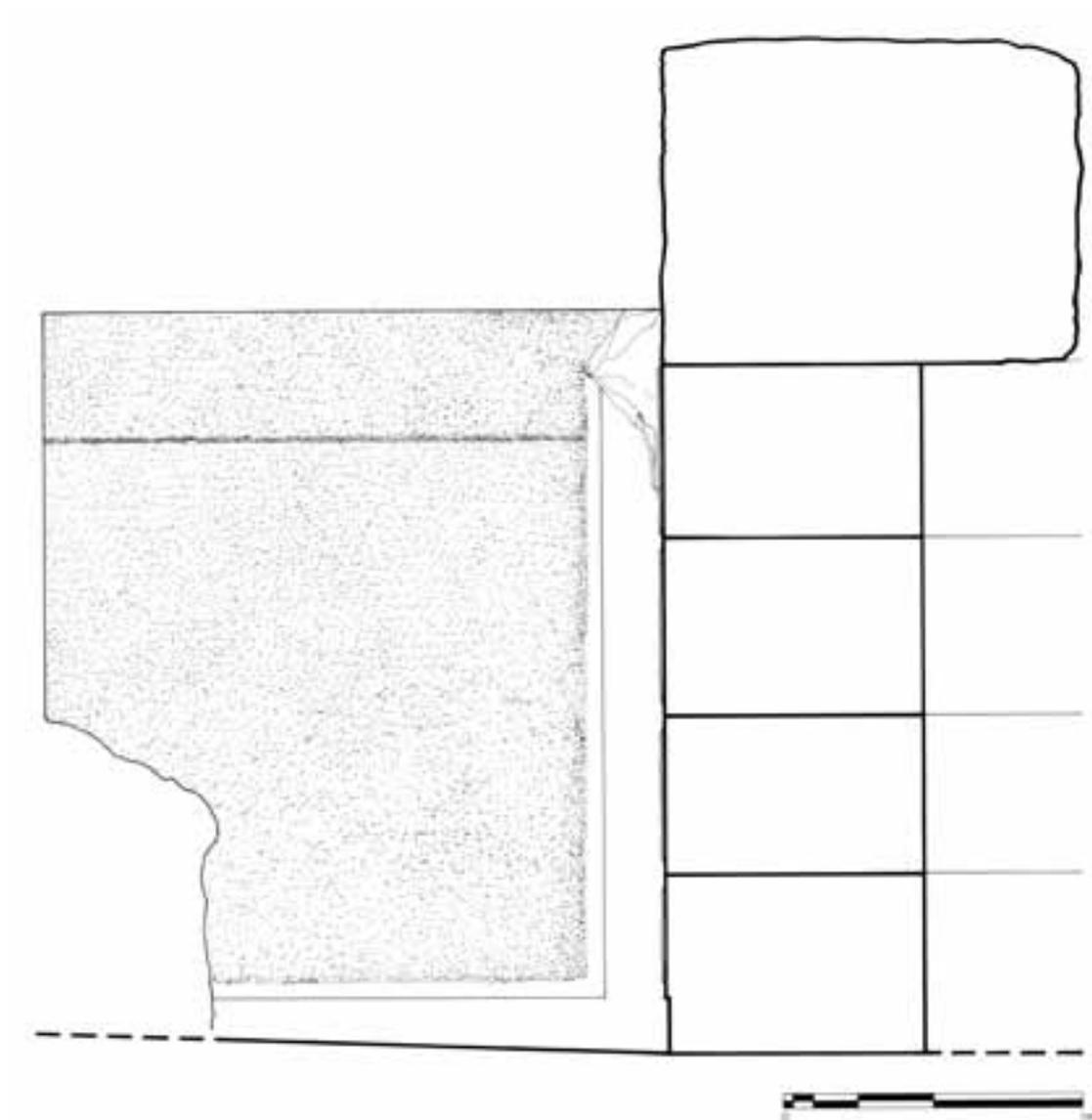
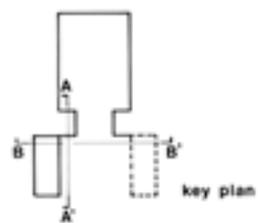


Fig. 23. Tomb of Alyattes (no. 1): Forecourt, north-south section (scale 1:25)



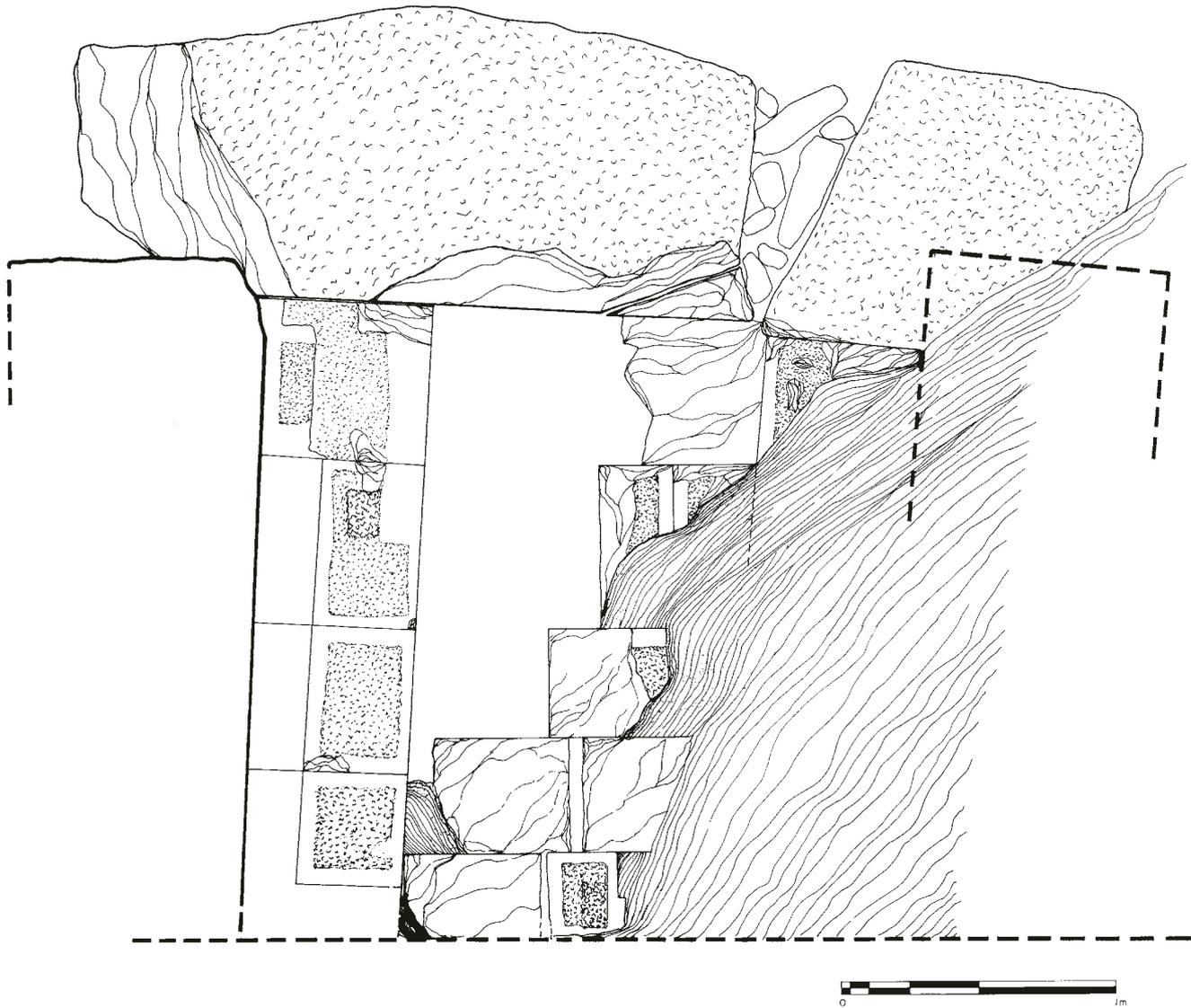
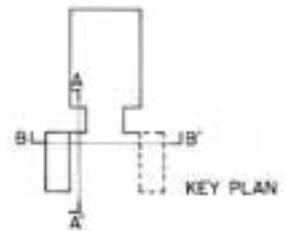


Fig. 24. Tomb of Alyattes (no. 1): Forecourt, east-west section (scale 1:25)



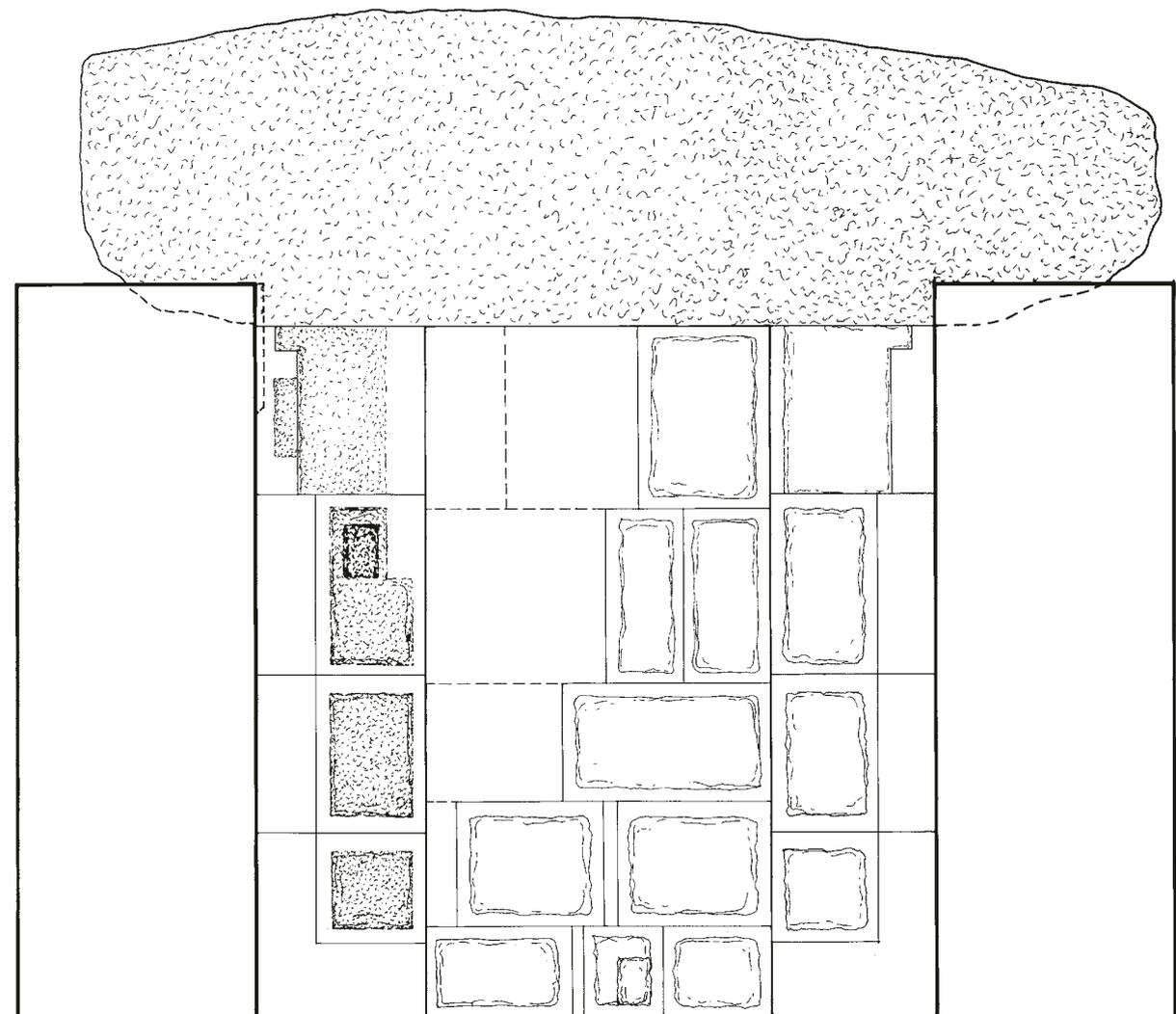
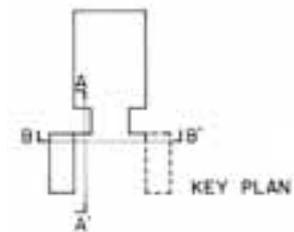


Fig. 25. Tomb of Alyattes (no. 1): Forecourt, east-west section, restored (scale 1:25)



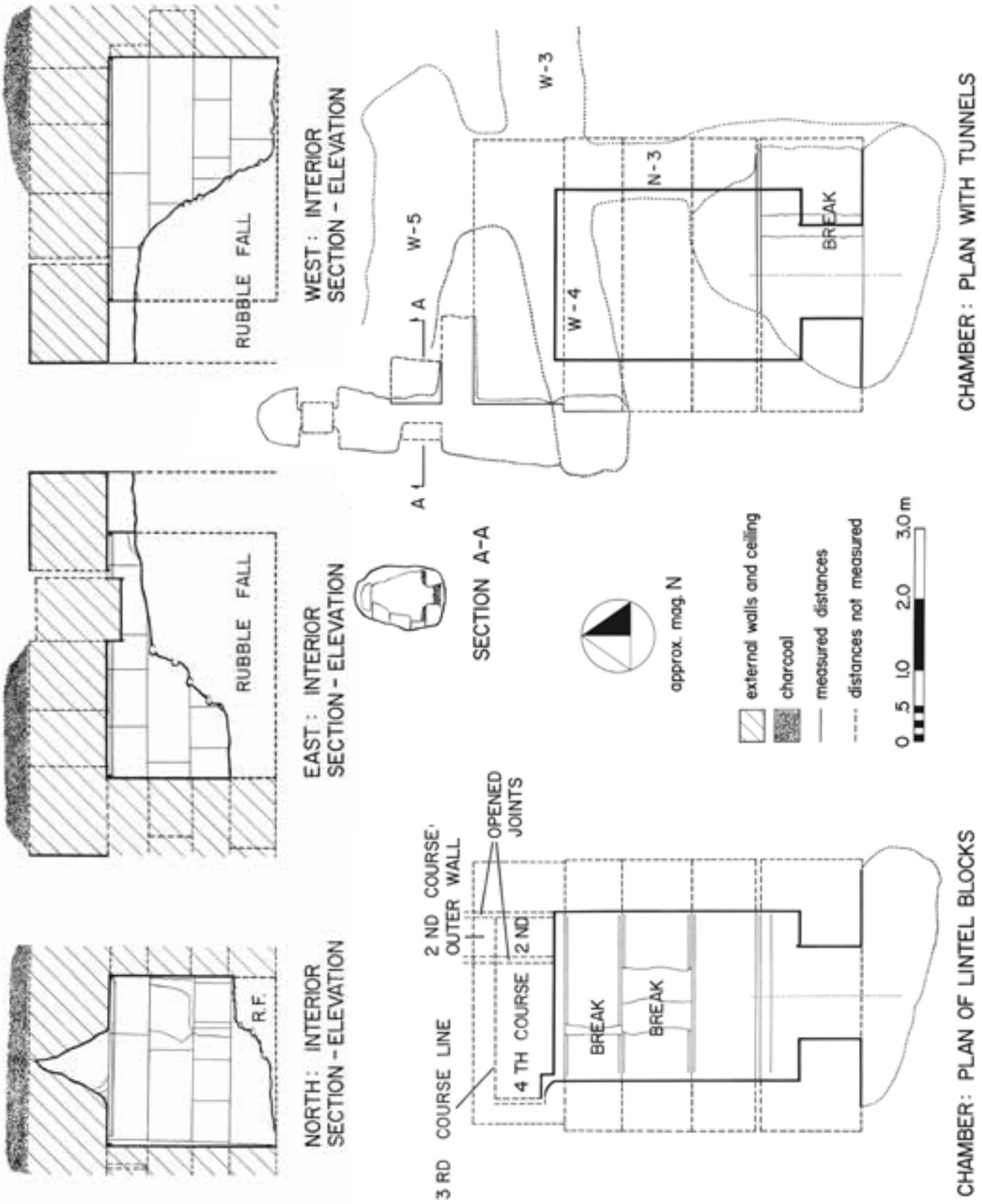


Fig. 26. Tomb of Alyattes (no. 1): Plans and sections of chamber (scale 1:75)



Fig. 27. Tomb of Alyattes (no. 1): Facade of chamber



Fig. 28. Tomb of Alyattes (no. 1): Northeast corner of chamber



Fig. 29. Tomb of Alyattes (no. 1): Southwest corner of chamber



Fig. 30. Tomb of Alyattes (no. 1): Northwest corner of chamber, detail showing clamp

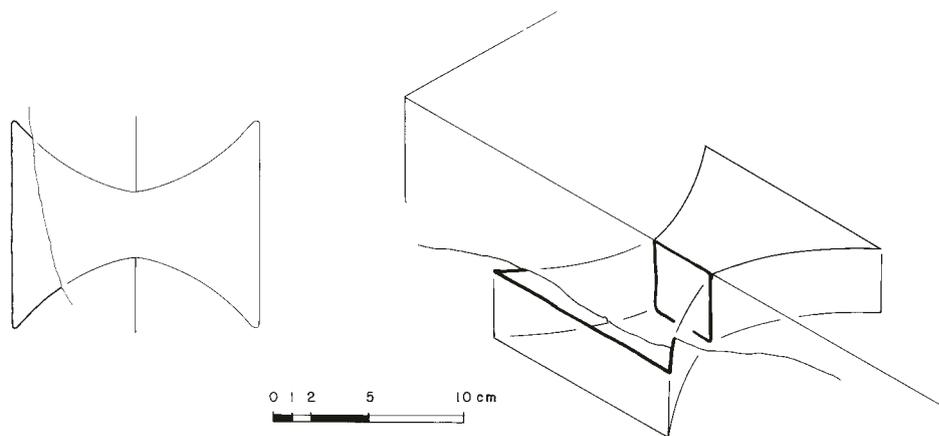


Fig. 31. Tomb of Alyattes (no. 1): Restored plan and isometric view of clamp in northwest corner of chamber (scale 1:4)

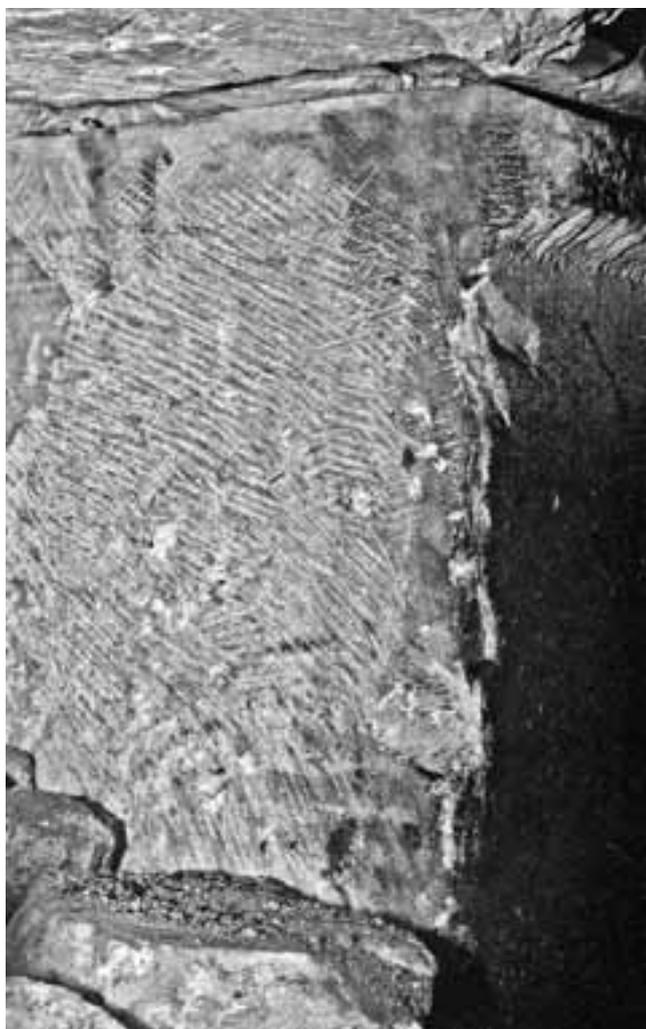


Fig. 32. Tomb of Alyattes (no. 1): East wall of chamber, detail showing joint



Fig. 33. Tomb of Alyattes (no. 1): Ceiling of chamber, detail showing charcoal layer

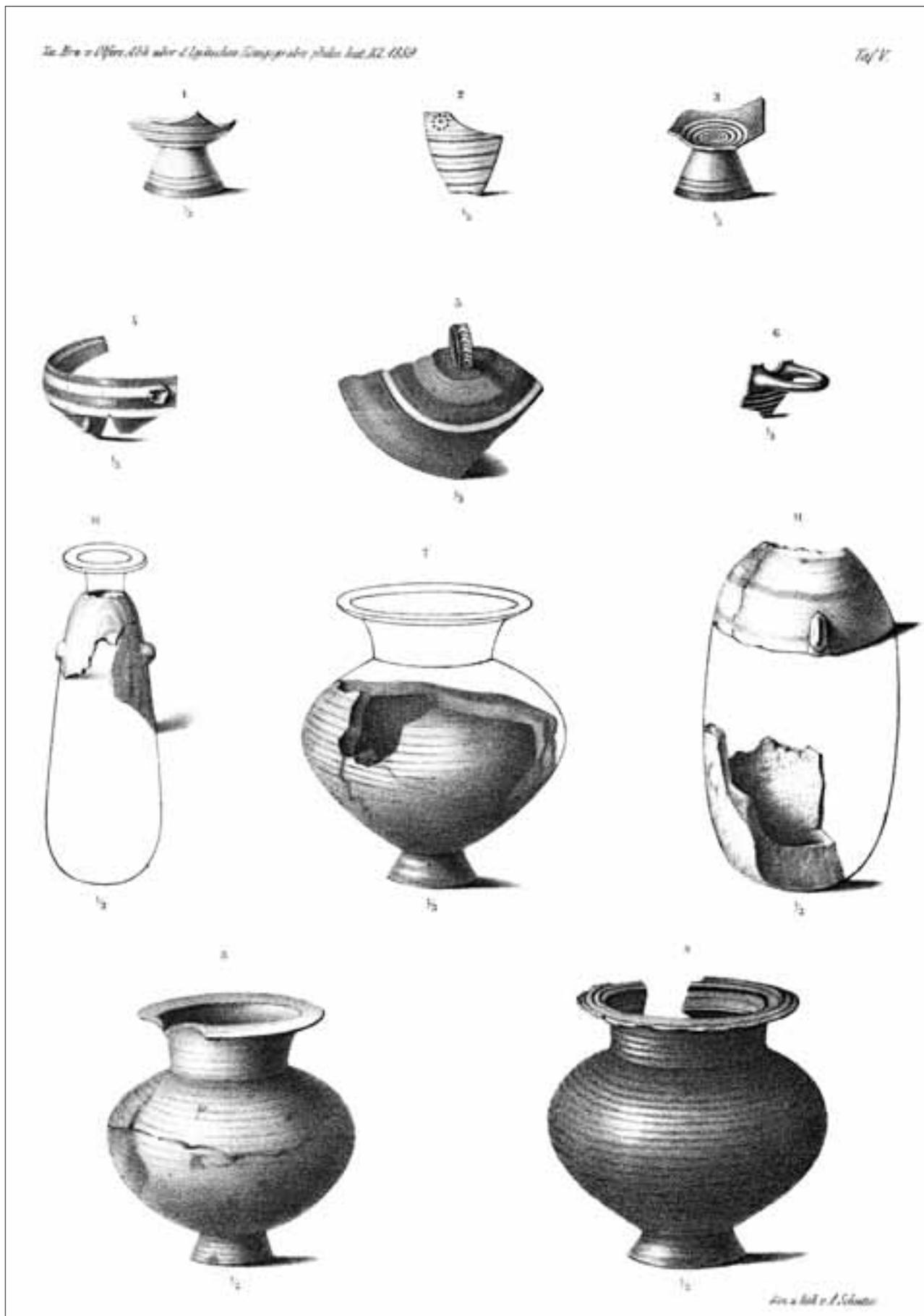


Fig. 34. Tomb of Alyattes (no. 1): Objects found by Spiegelthal (Olfers, "Königsgräber," pl. 5)



Fig. 35. Tomb of Alyattes (no. 1): Alabastron found by Spiegelthal

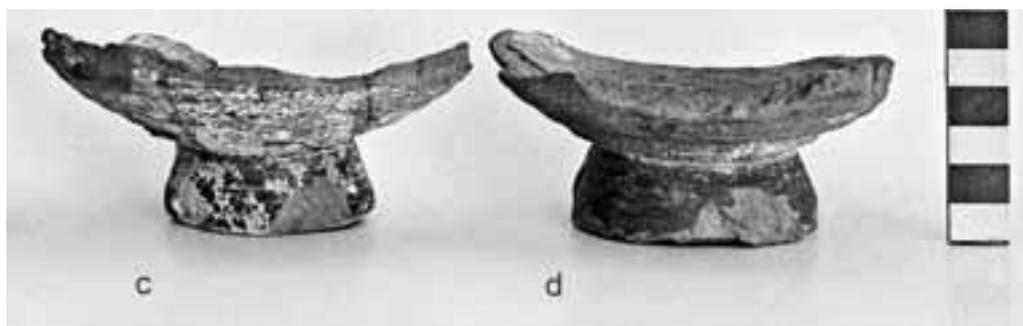
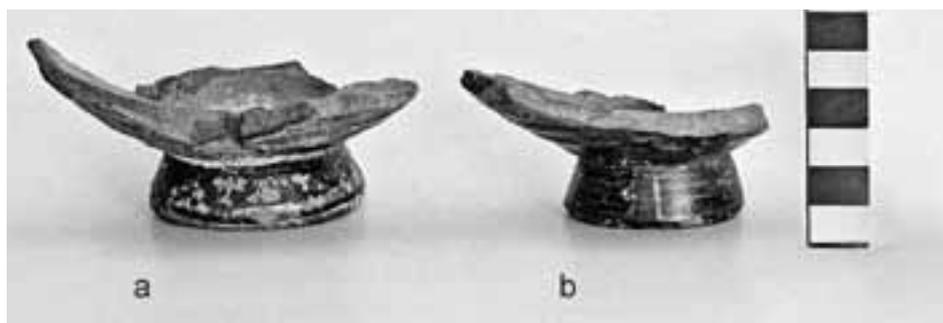


Fig. 36. Tomb of Alyattes (no. 1): Pottery found by the Sardis Expedition, lydions

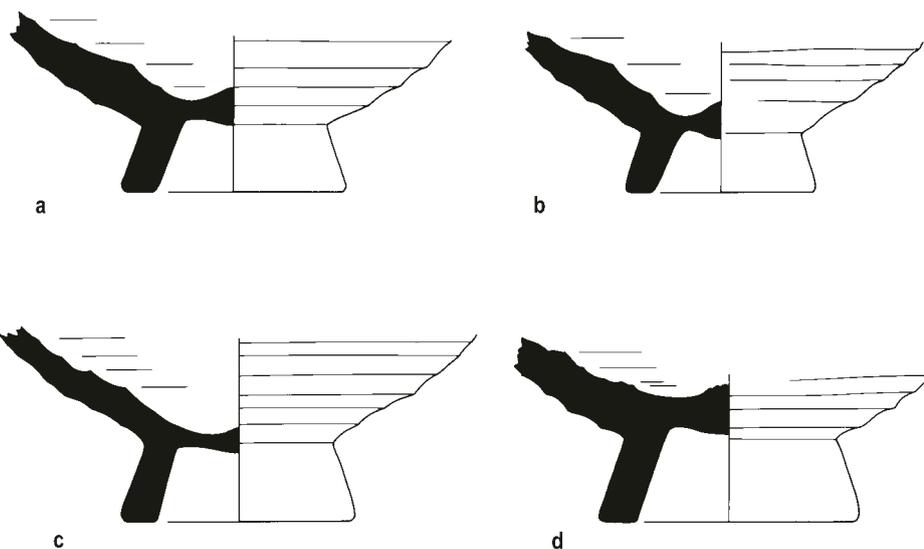


Fig. 37. Tomb of Alyattes (no. 1): Pottery found by the Sardis Expedition, lydions (scale 1:2)

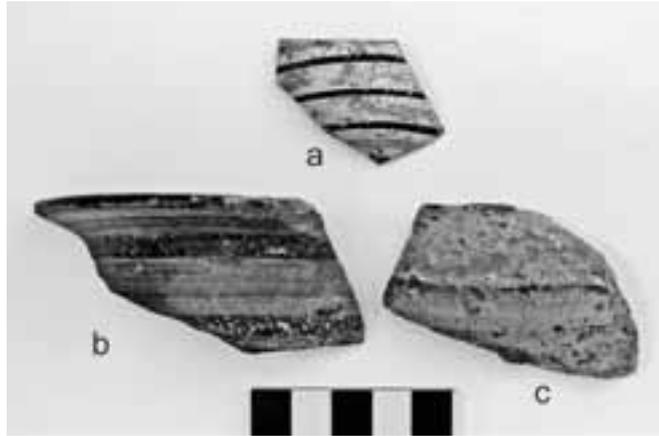


Fig. 38. Tomb of Alyattes (no. 1): Pottery found by the Sardis Expedition, miscellaneous sherds

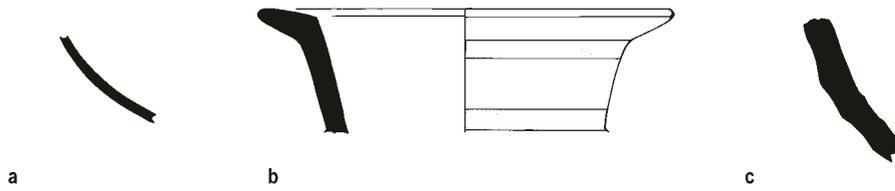


Fig. 39. Tomb of Alyattes (no. 1): Pottery found by the Sardis Expedition, miscellaneous sherds (scale 1:2)



Fig. 40. Tomb of Alyattes (no. 1): Barrel-shaped limestone "plug"



Fig. 41. Karnıyarık Tepe (no. 2)

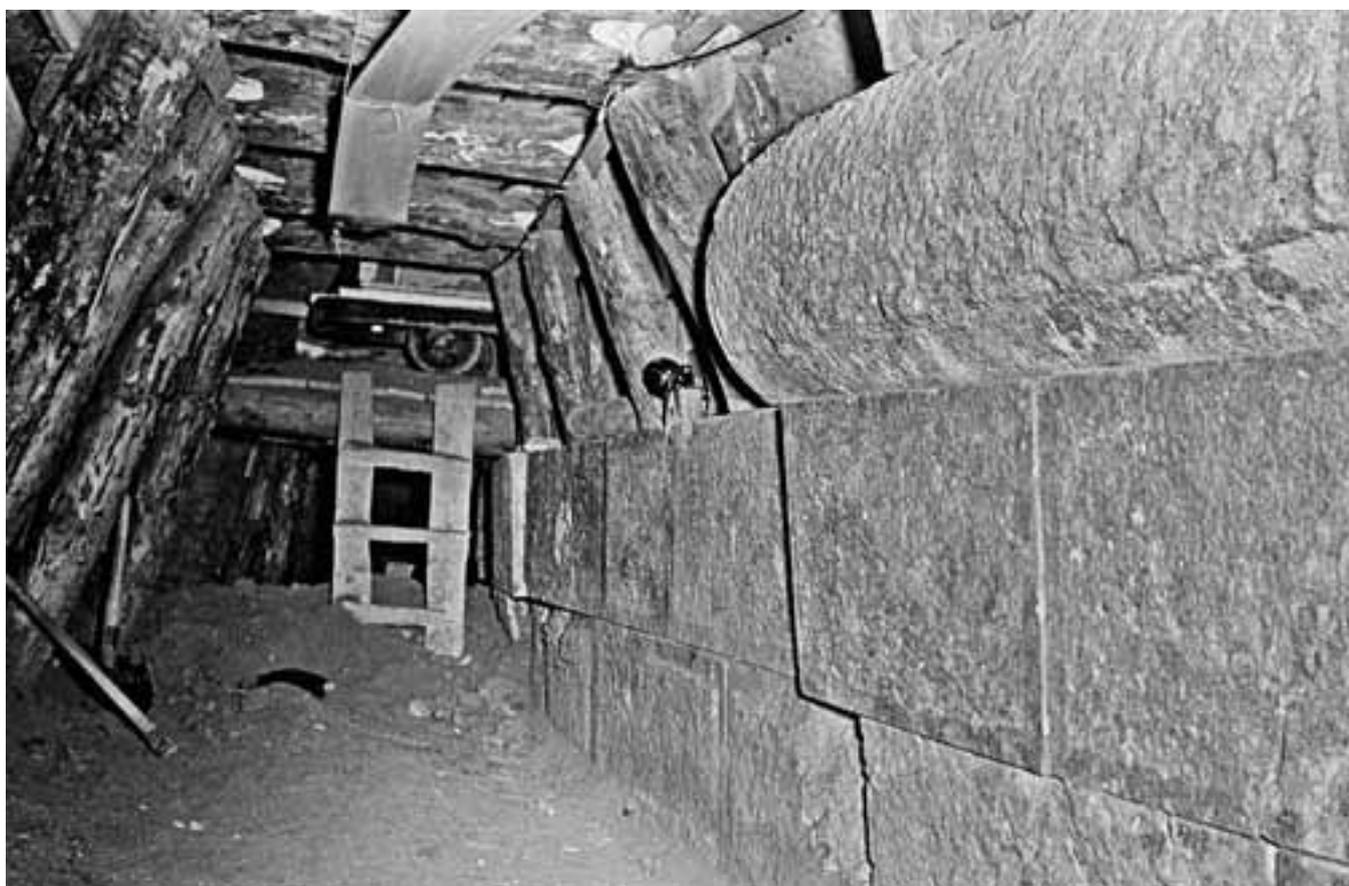


Fig. 42. Karnıyarık Tepe (no. 2): Overall view of crepis wall

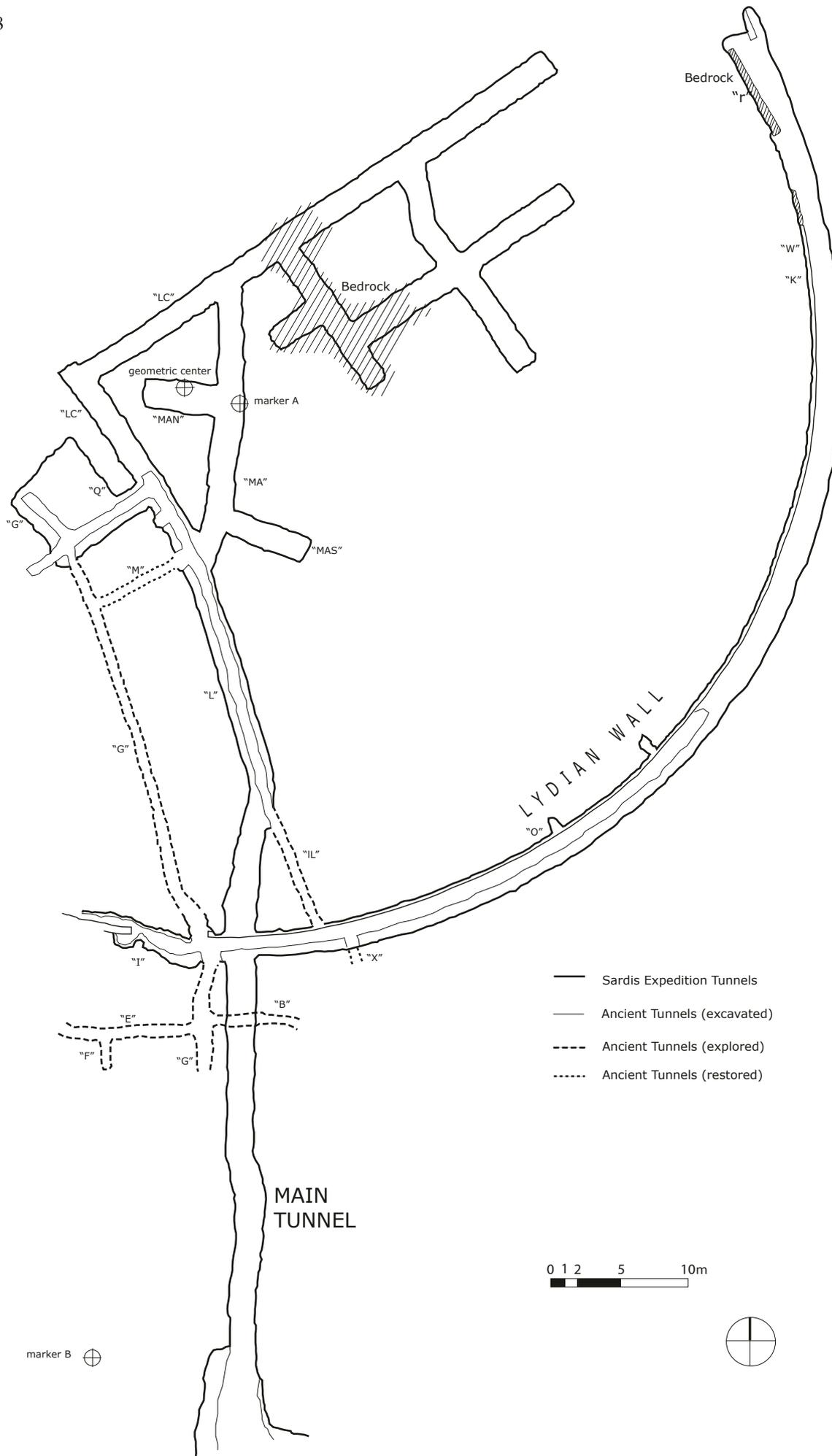


Fig. 43. Karniyarik Tepe (no. 2): Plan of tunnels (scale 1:400)

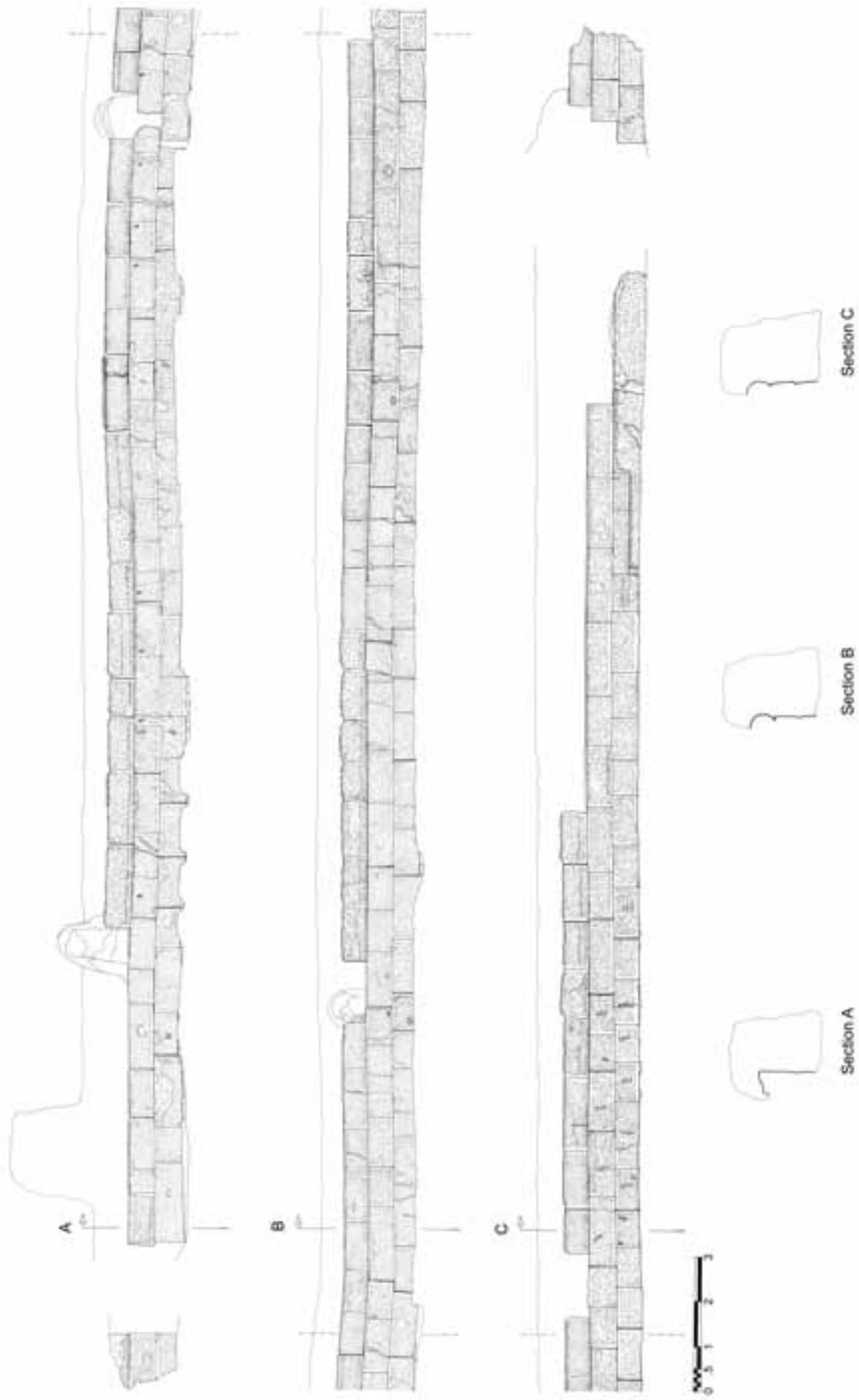


Fig. 44. Karnıyark Tepe (no. 2): Elevation of crepis wall (scale 1:125)

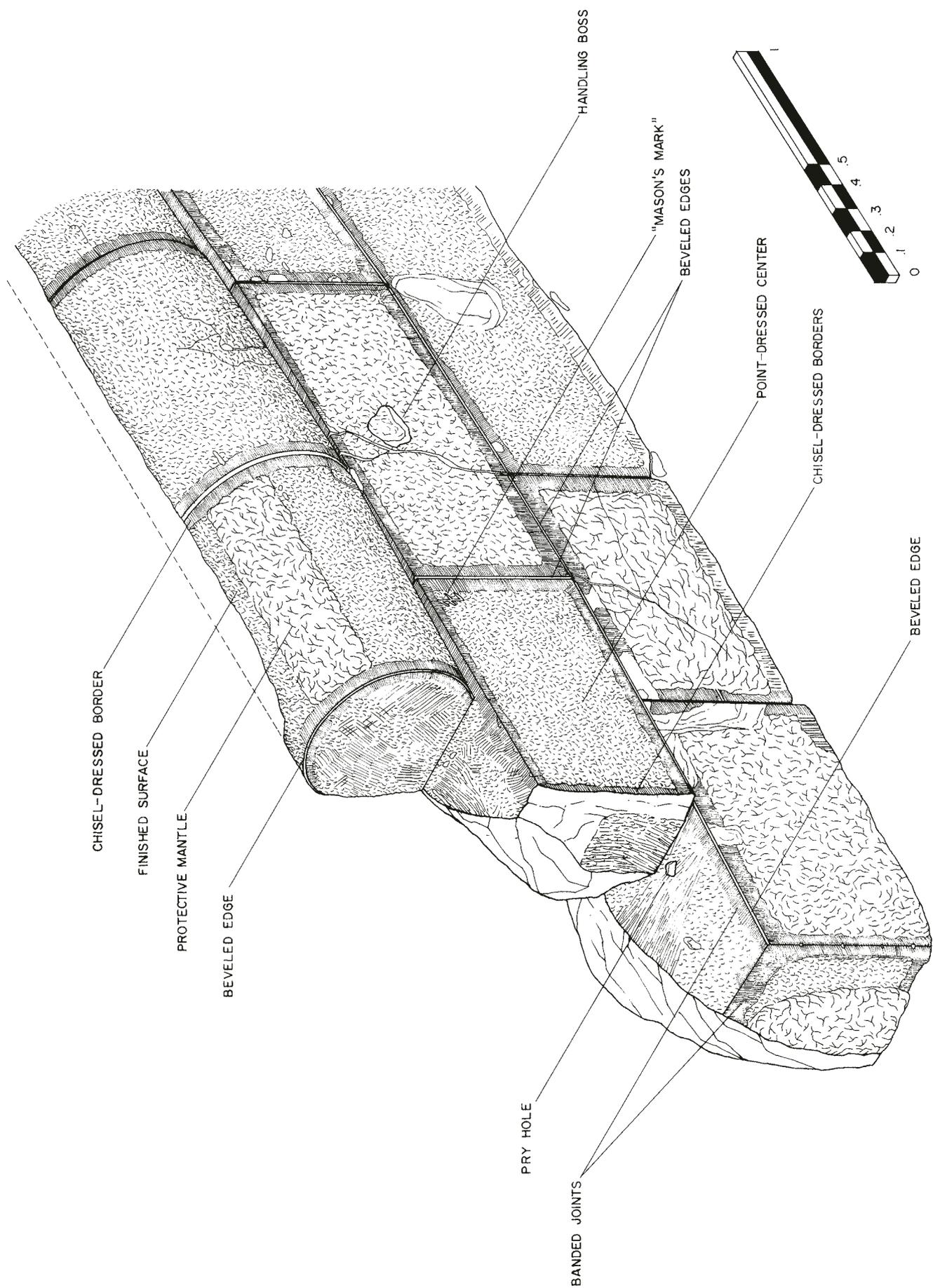


Fig. 45. Karnyarak Tepe (no. 2): Isometric view of crepis wall (scale 1:20)

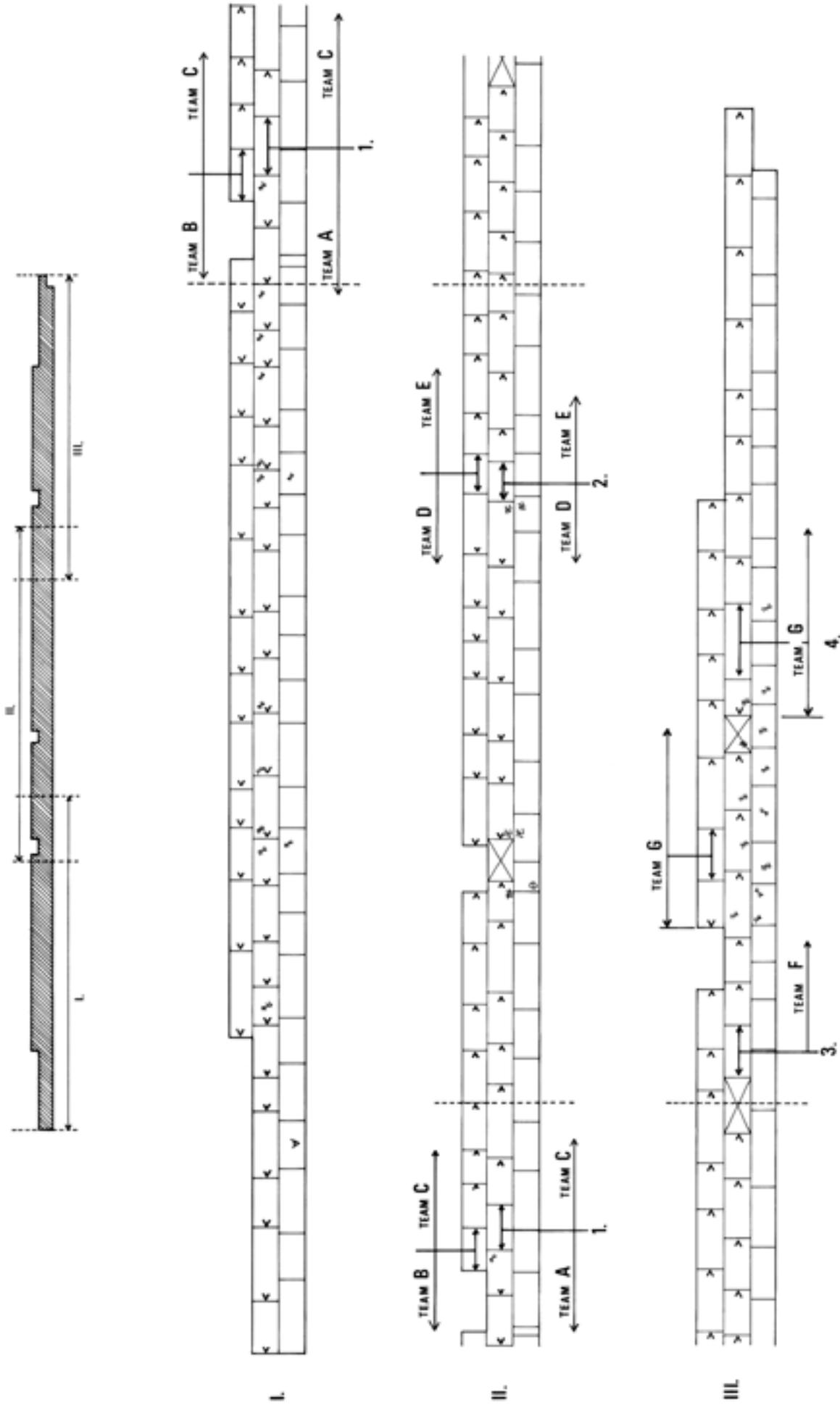


Fig. 46. Karniyank Tepe (no. 2): Diagram showing bevels, mason's marks, and working teams



Fig. 47. Karniyarik Tepe (no. 2): Northern section of crepis wall



Fig. 48. Karniyarik Tepe (no. 2): Quarry face



Fig. 49. Karnıyarık Tepe (no. 2): Detail of quarry face showing pick marks



Fig. 50. Karnıyarık Tepe (no. 2): East end of central section of crepis wall



Fig. 51. Karnıyarık Tepe (no. 2): Detail of central section of crepis wall



Fig. 52. Karnıyarık Tepe (no. 2): Detail of central section of crepis wall



Fig. 53. Karnıyarık Tepe (no. 2): Detail of central section of crepis wall

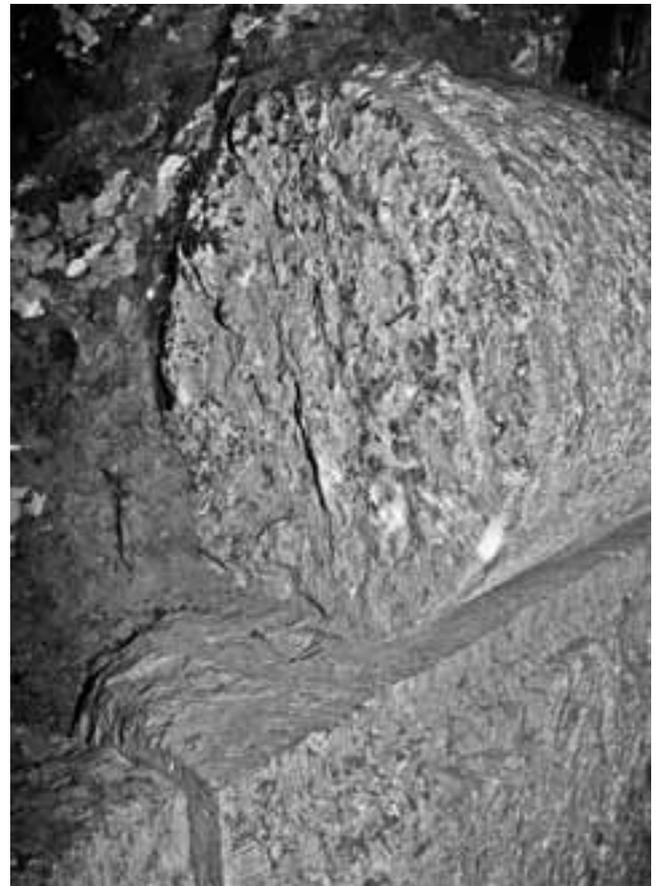


Fig. 54. Karnıyarık Tepe (no. 2): Detail of central section of crepis wall



Fig. 55. Karniyarık Tepe (no. 2): West end of central section of crepis wall



Fig. 56. Karniyarık Tepe (no. 2): Western section of crepis wall

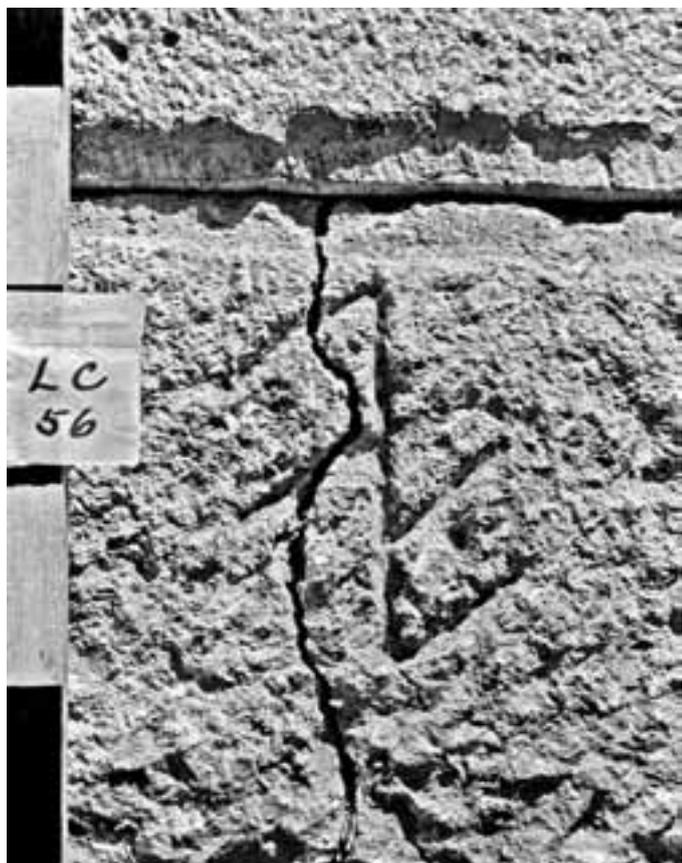


Fig. 57. Karniyarık Tepe (no. 2): Detail of mason's mark



Fig. 58. Karniyarık Tepe (no. 2): Detail of mason's mark



Fig. 59. Karnıyarık Tepe (no. 2): Pottery found in 1963



Fig. 60. Karnıyarık Tepe (no. 2): Pottery found in 1963 (scale 1:2)

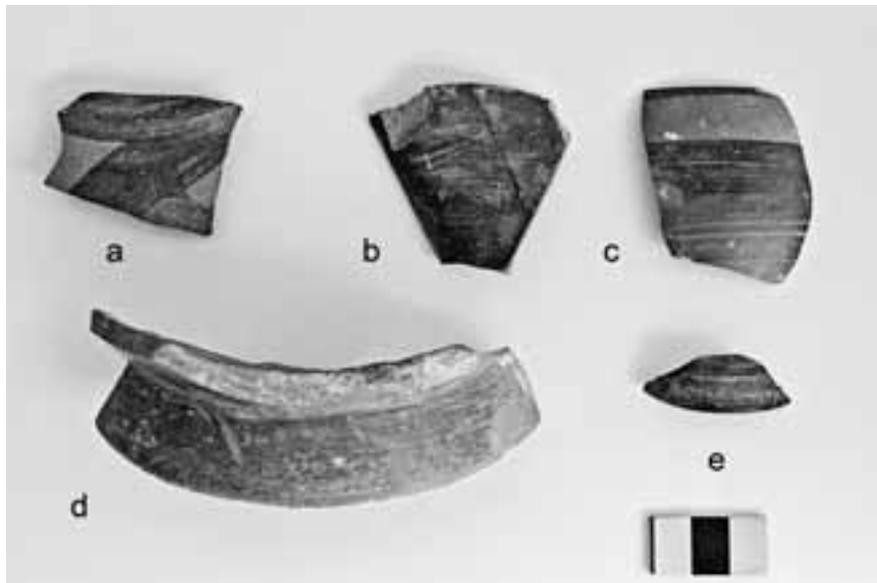


Fig. 61. Karnıyarık Tepe (no. 2): Pottery found in 1964

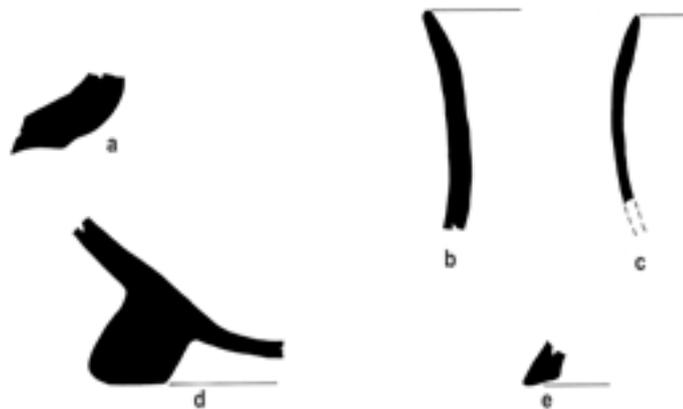


Fig. 62. Karnıyarık Tepe (no. 2): Pottery found in 1964 (scale 1:2)



Fig. 63. Karniyarık Tepe (no. 2): Pottery found in 1965: A



Fig. 64. Karniyarık Tepe (no. 2): Pottery found in 1965: A (scale 1:2)

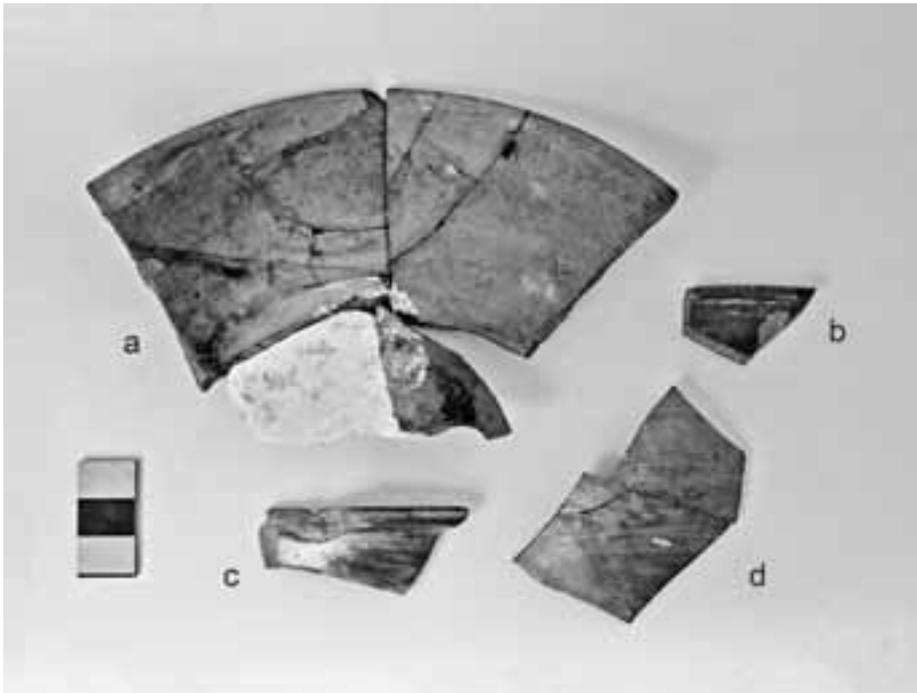


Fig. 65. Karniyark Tepe (no. 2): Pottery found in 1965: B

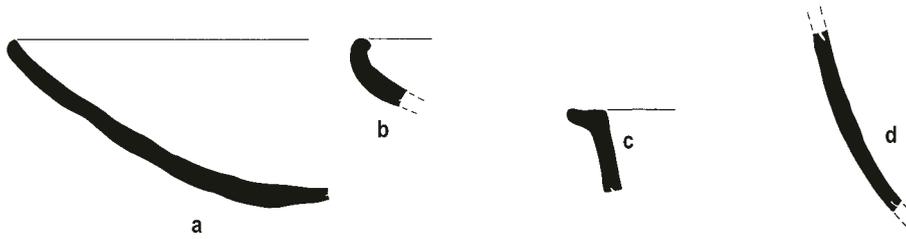


Fig. 66. Karniyark Tepe (no. 2): Pottery found in 1965: B (scale 1:2)

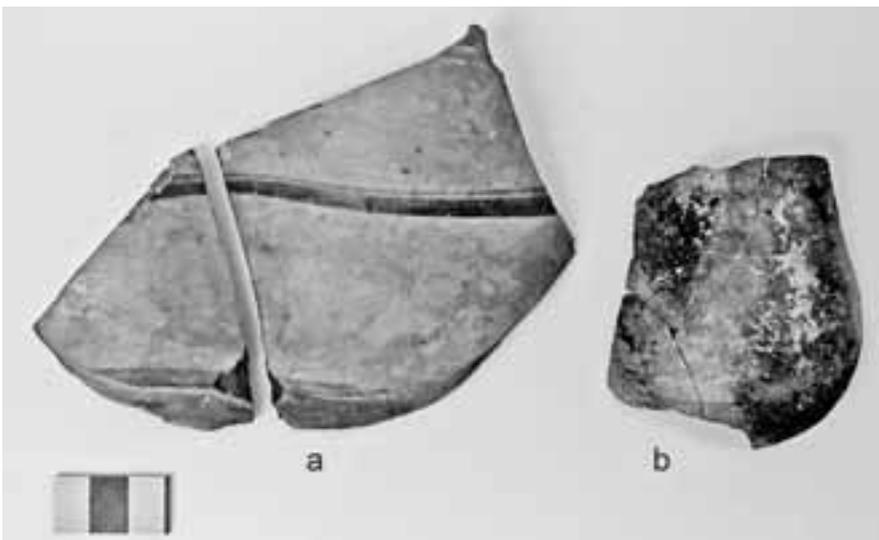


Fig. 67. Karniyark Tepe (no. 2): Pottery found in 1965: C

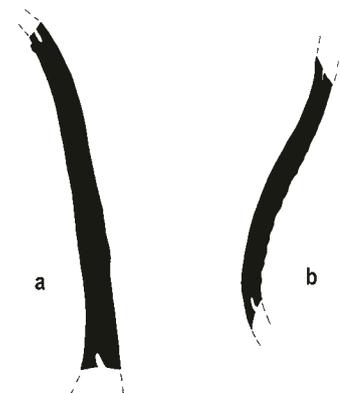


Fig. 68. Karniyark Tepe (no. 2): Pottery found in 1965: C (scale 1:2)

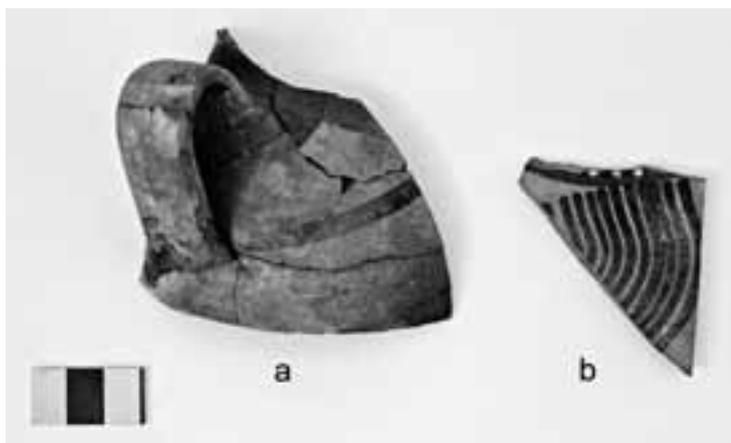


Fig. 69. Karniyarık Tepe (no. 2): Pottery found in 1965: D

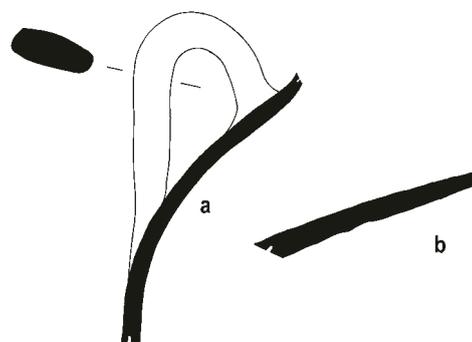


Fig. 70. Karniyarık Tepe (no. 2): Pottery found in 1965: D (scale 1:2)



Fig. 71. Karniyarık Tepe (no. 2): Pottery found in 1965: E

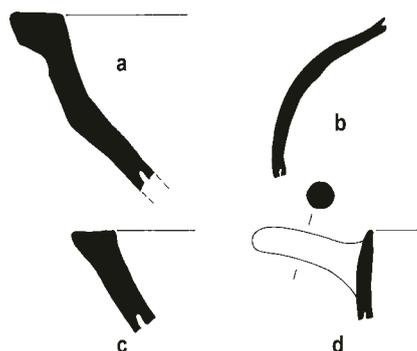


Fig. 72. Karniyarık Tepe (no. 2): Pottery found in 1965: E (scale 1:2)

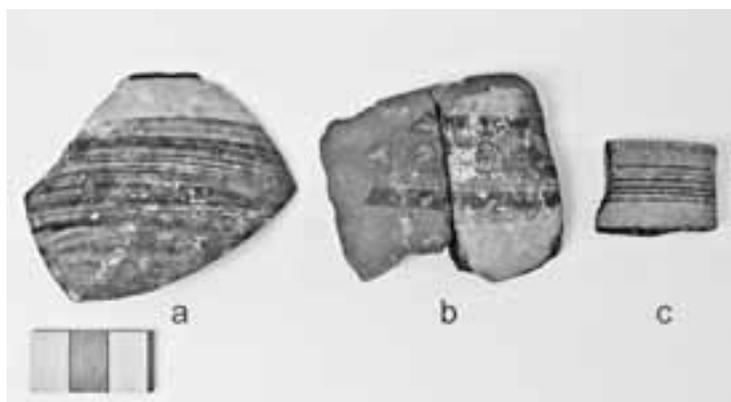


Fig. 73. Karniyarık Tepe (no. 2): Pottery found in 1966

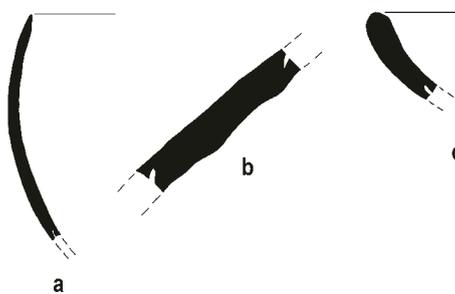


Fig. 74. Karniyarık Tepe (no. 2): Pottery found in 1966 (scale 1:2)



Fig. 75. Karnıyarık Tepe (no. 2): Stemmed dish found in 1991

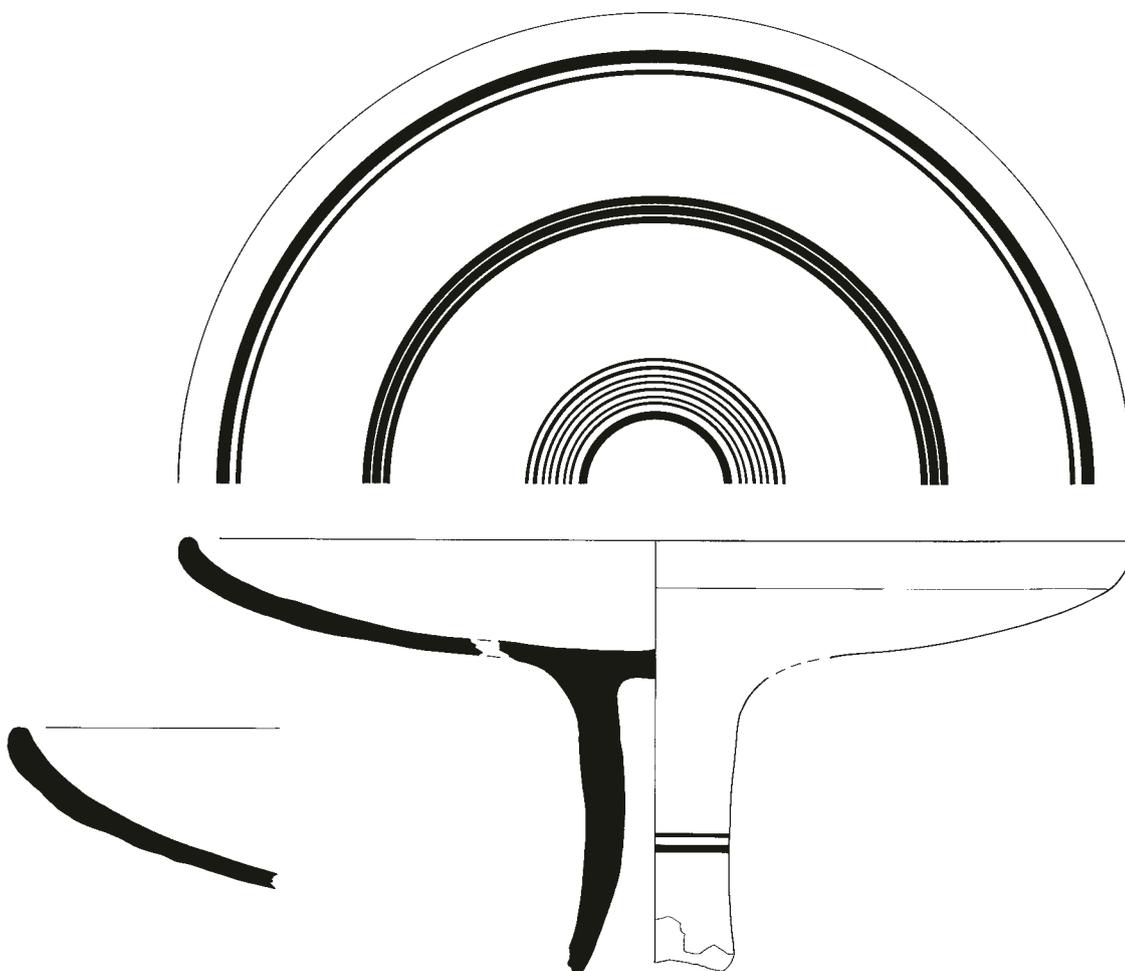


Fig. 76. Karnıyarık Tepe (no. 2): Stemmed dish found in 1991 (scale 1:2)

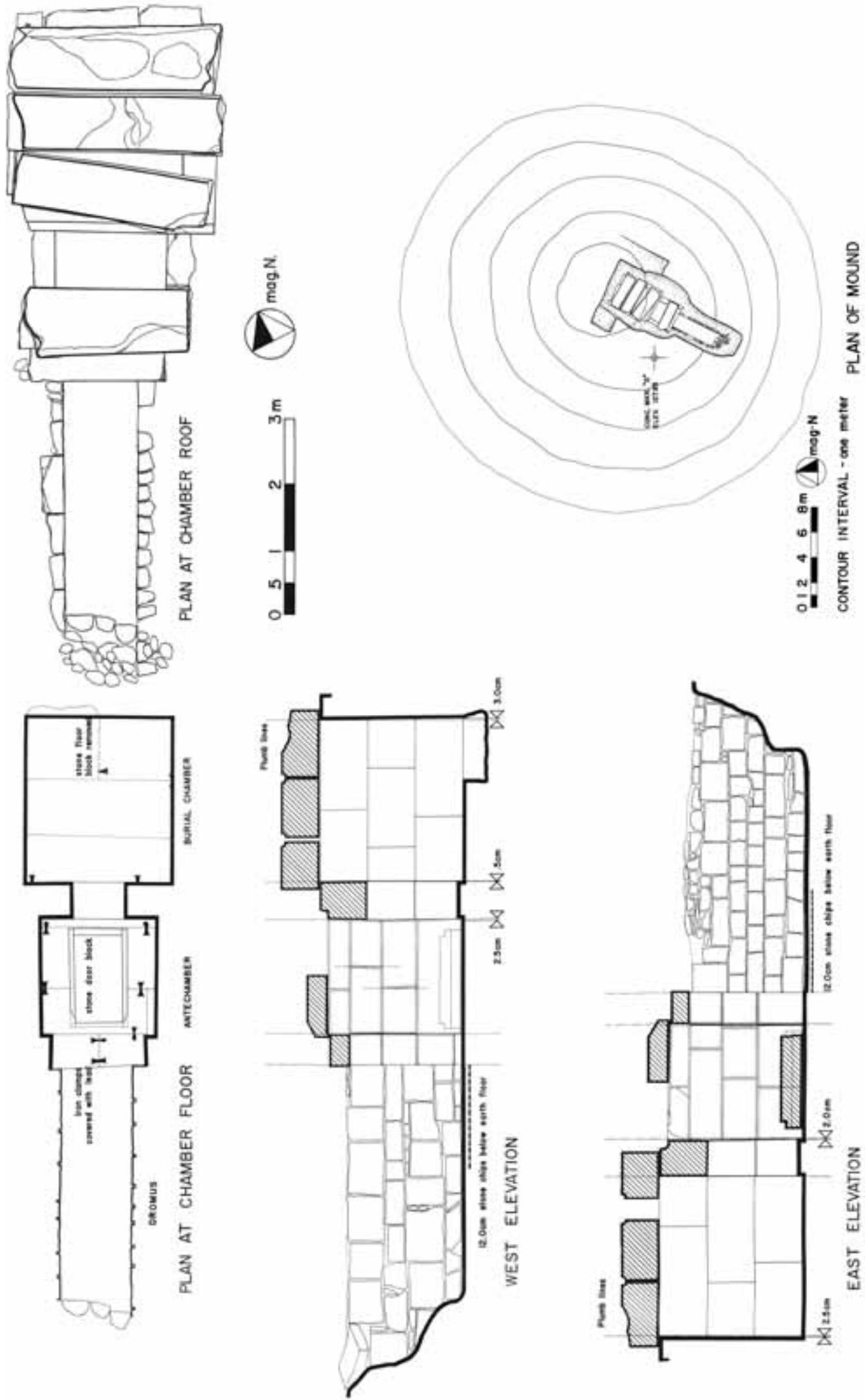


Fig. 77. BT62.4 (no. 3): Plans and sections (scale 1:75 and 1:400)



Fig. 78. BT62.4 (no. 3): View down dromos



Fig. 79. BT62.4 (no. 3): View down dromos

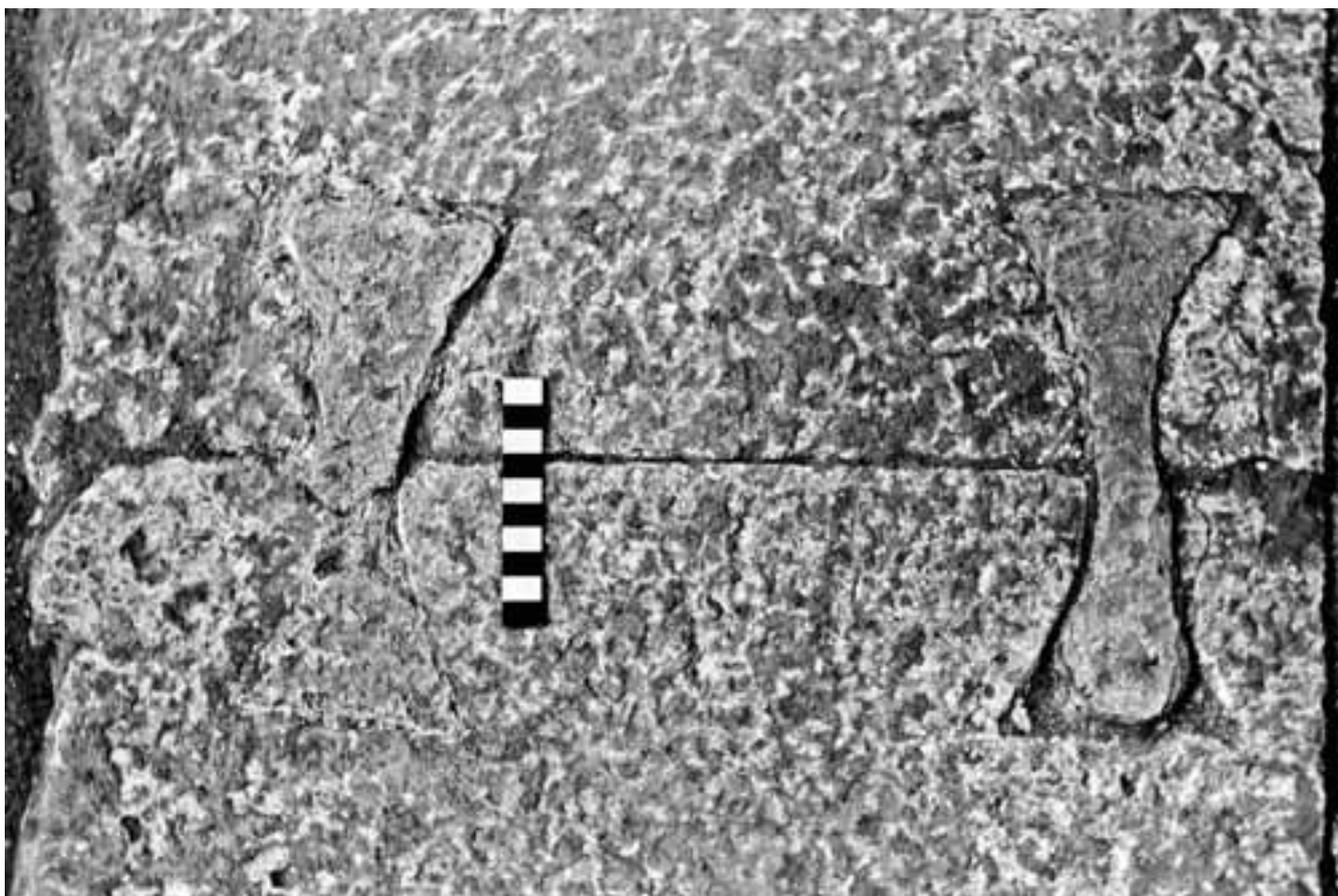


Fig. 80. BT62.4 (no. 3): Clamps in floor of antechamber



Fig. 81. BT62.4 (no. 3): Southeast corner of antechamber



Fig. 82. BT62.4 (no. 3): Back wall of chamber



Fig. 83. BT62.4 (no. 3): Claw-chisel marks



Fig. 84. BT62.4 (no. 3): Northeast corner of chamber



Fig. 85. BT62.4 (no. 3): Ceiling blocks, detail showing anathyrosis joint

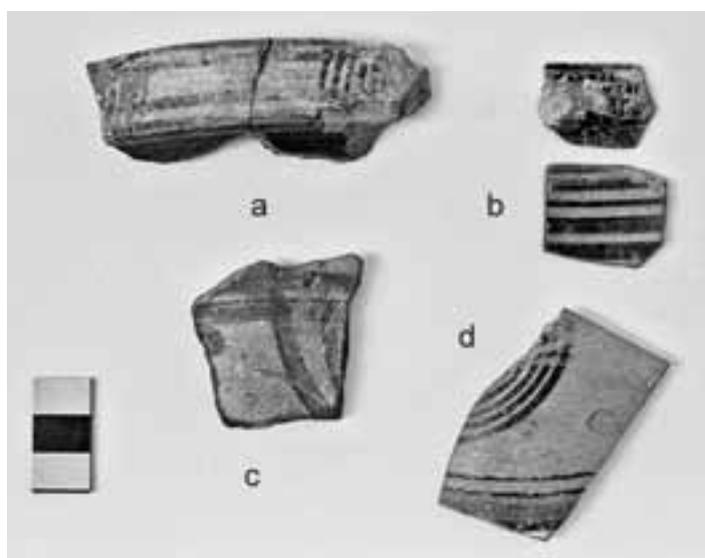


Fig. 86. BT62.4 (no. 3): Pottery

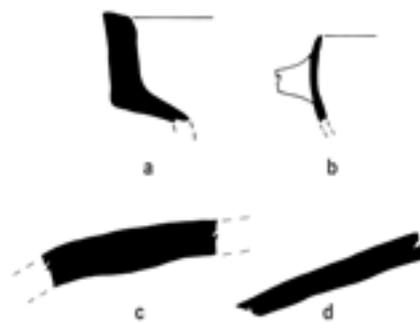
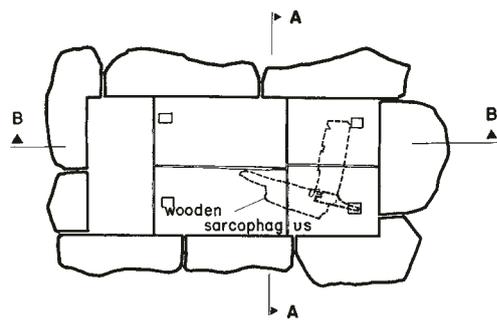
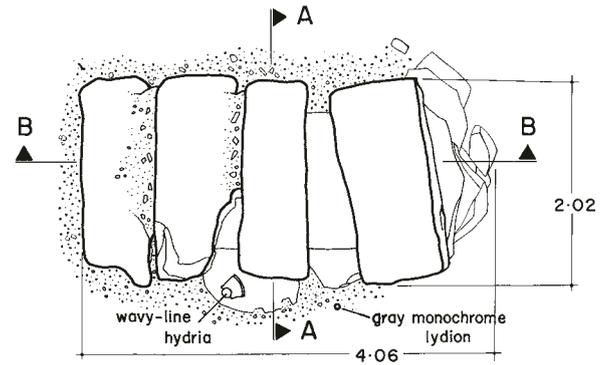


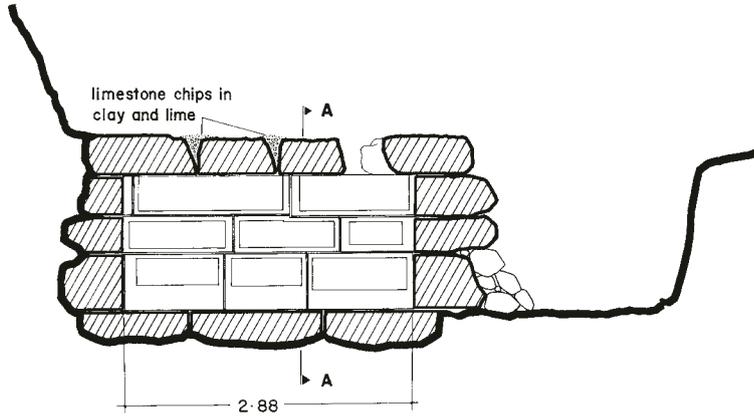
Fig. 87. BT62.4 (no. 3): Pottery (scale 1:2)



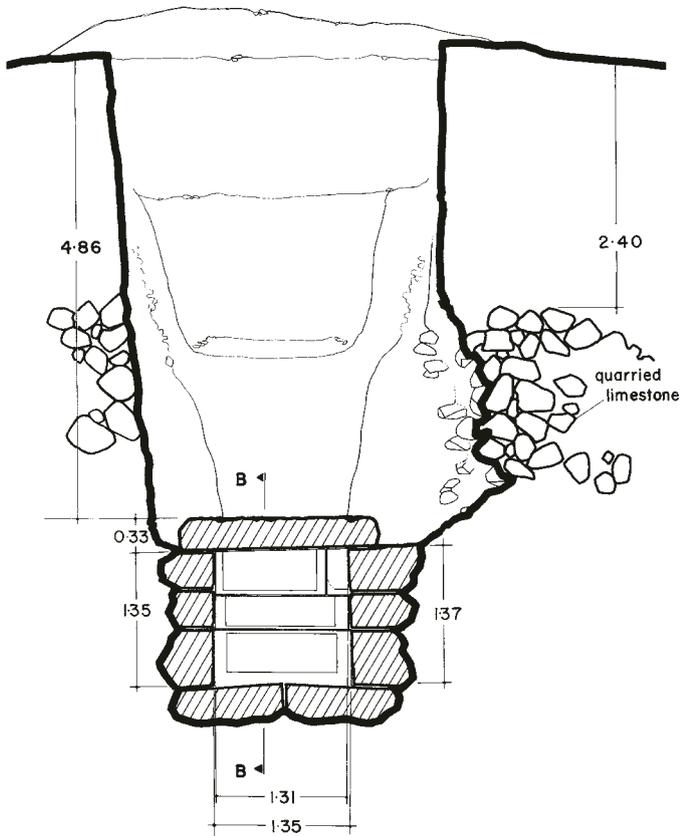
PLAN AT CHAMBER FLOOR



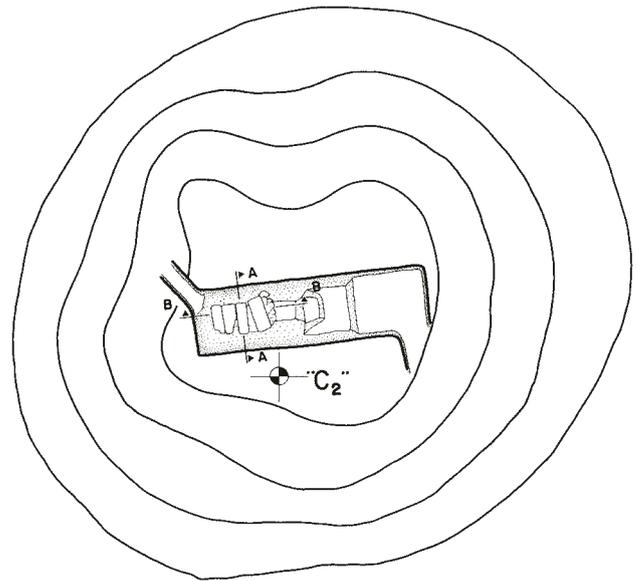
PLAN AT CHAMBER ROOF



W-E SECTION BB



N-S SECTION AA



PLAN OF MOUND



CONTOUR INTERVAL - one meter

Fig. 88. BT63.2 (no. 4): Plans and sections (scale 1:75 and 1:400)



Fig. 89. BT63.2 (no. 4): Northeast corner of chamber



Fig. 90. BT63.2 (no. 4): Southwest corner of chamber



Fig. 91. BT63.2 (no. 4): Lekythoi and jar



Fig. 92. BT63.2 (no. 4): Lydion



Fig. 93. BT63.2 (no. 4): Skyphos

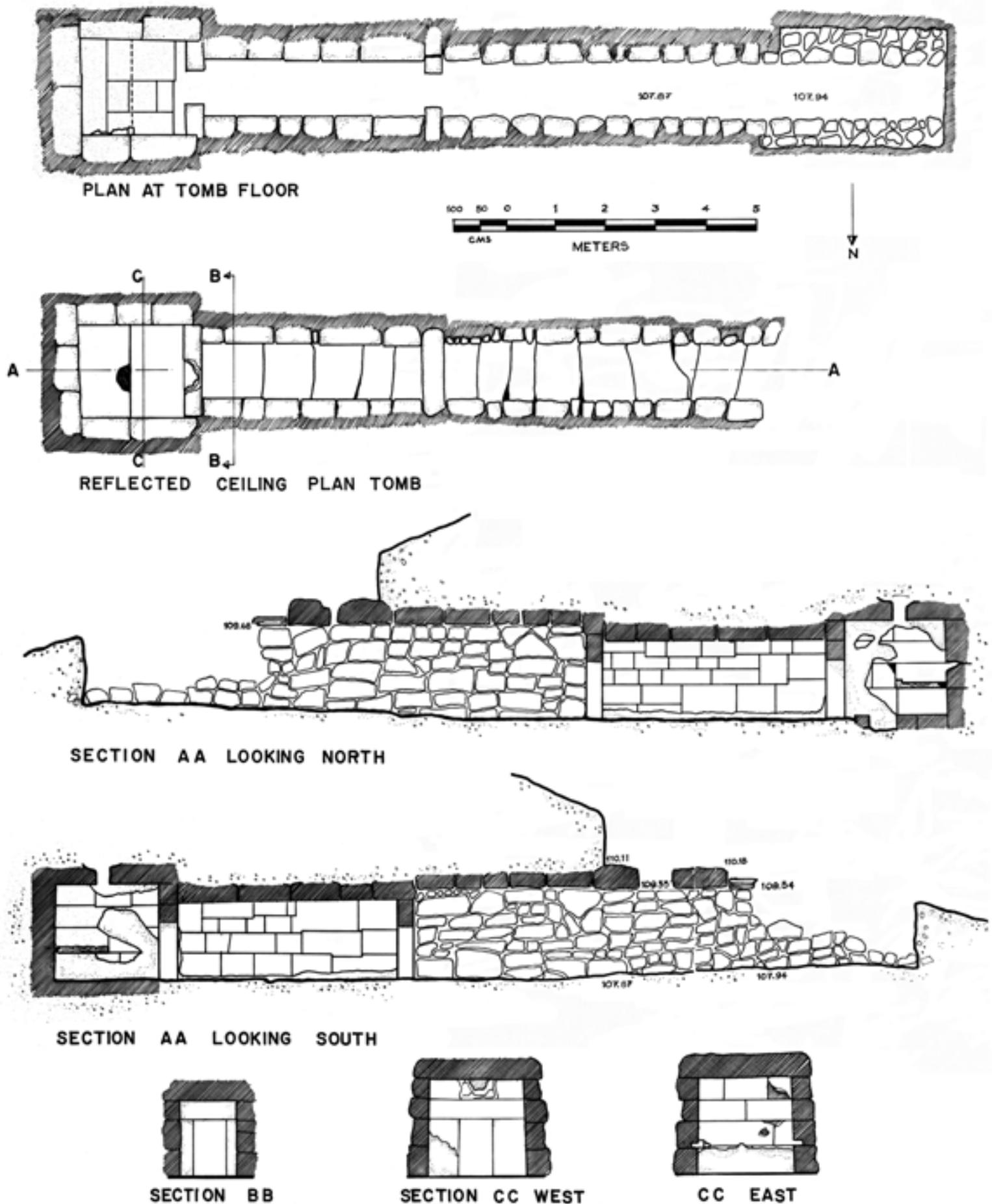


Fig. 94. BT66.1 (no. 5): Plans and sections (scale 1:100)



Fig. 95. BT66.1 (no. 5): View of tumulus



Fig. 96. BT66.1 (no. 5): Interior of chamber



Fig. 97. BT66.1 (no. 5): Dromos



Fig. 98. BT66.1 (no. 5): Antechamber

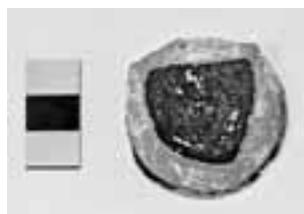


Fig. 99. BT66.1 (no. 5): Foot of cup



Fig. 100. BT66.1 (no. 5): Foot of cup (scale 1:2)

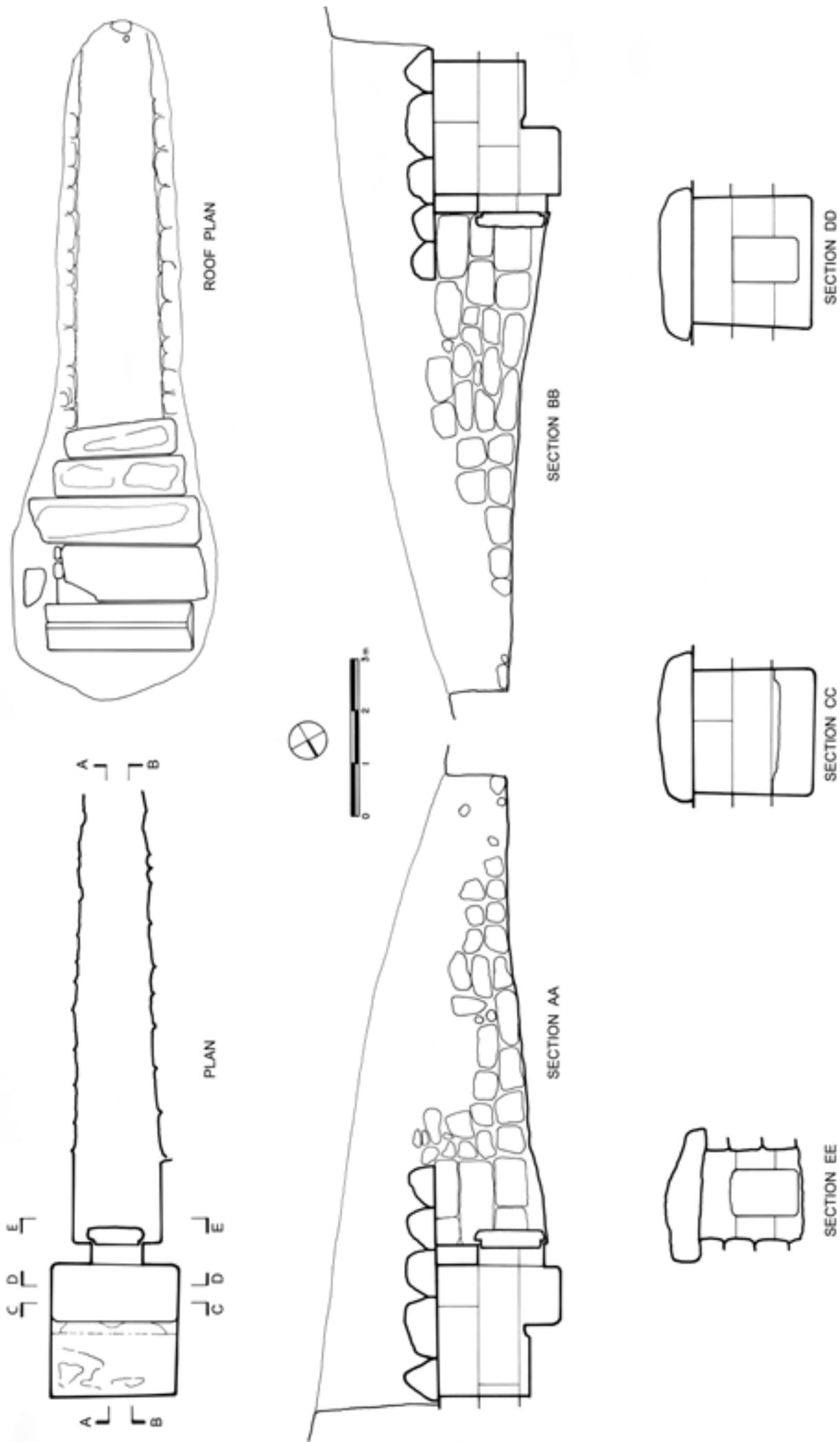


Fig. 101. BT66.2 (no. 6): Plans and sections (scale 1:100)



Fig. 102. BT66.2 (no. 6): View down dromos

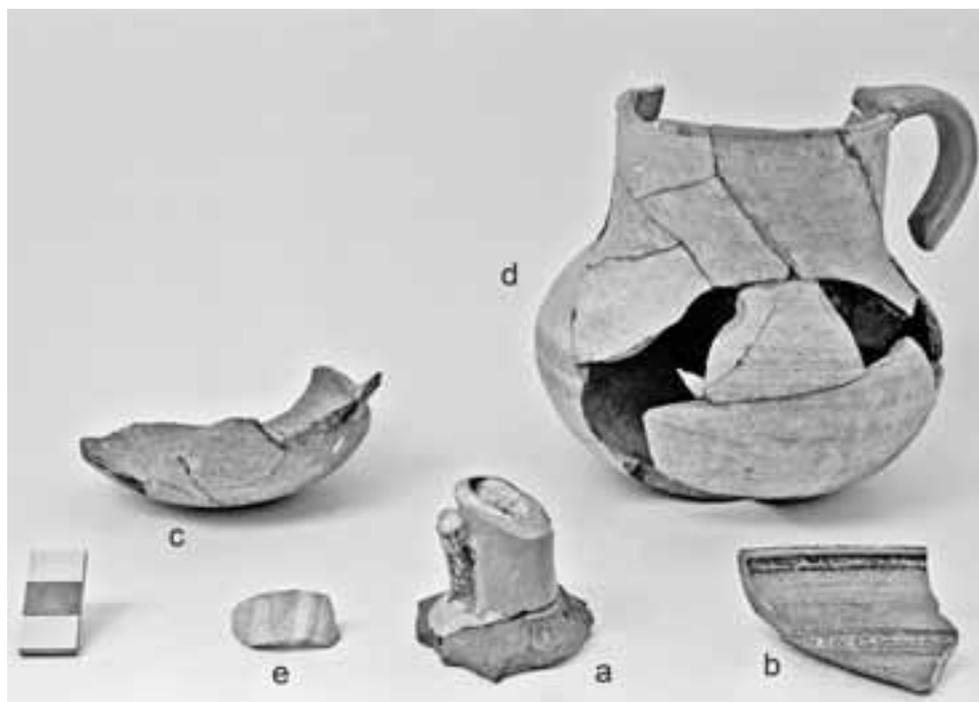


Fig. 103. BT66.2 (no. 6): Pottery



Fig. 104. BT66.2 (no. 6): Lekythos and dish (scale 1:2)

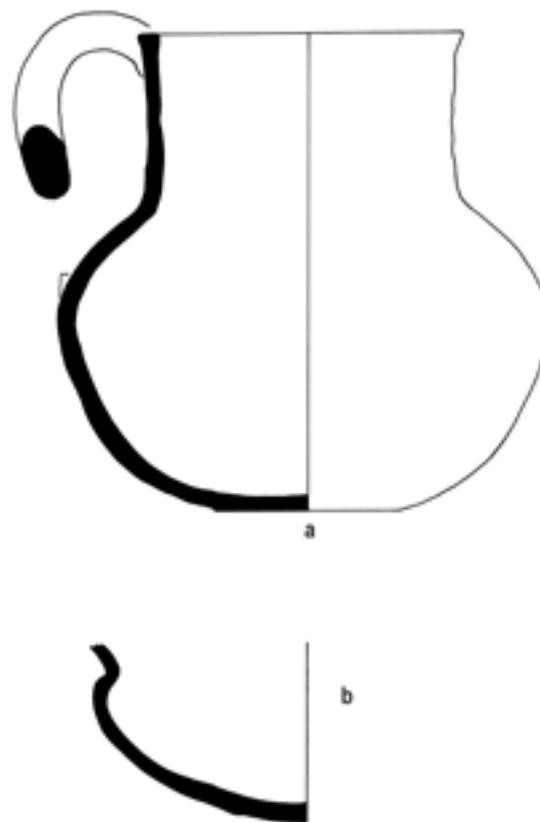


Fig. 105. BT66.2 (no. 6): Jug and bowl (scale 1:2)

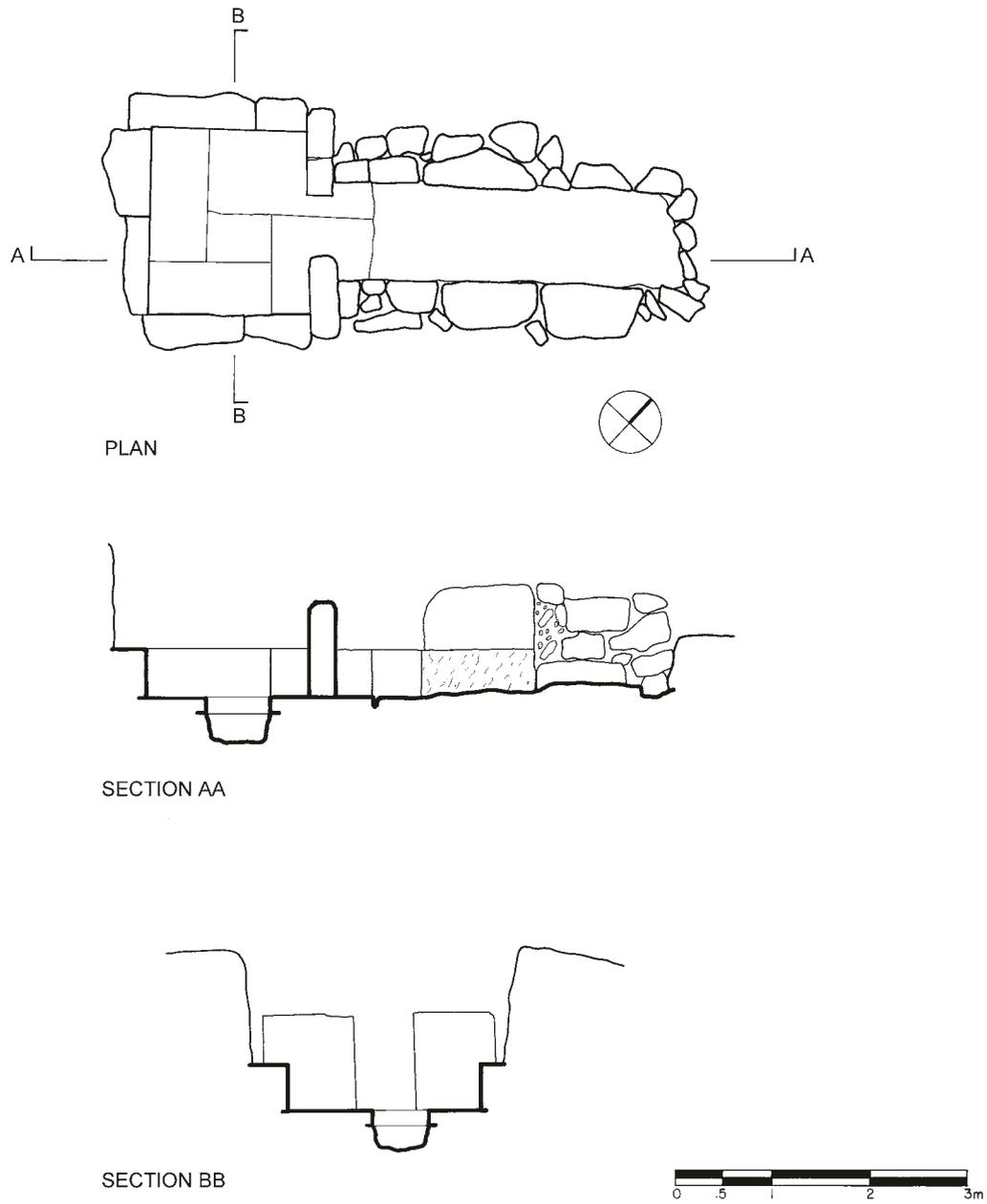


Fig. 106. BT66.3 (no. 7): Plans and sections (scale 1:75)



Fig. 107. BT66.3 (no. 7): View down dromos



Fig. 108. BT66.3 (no. 7): View of chamber

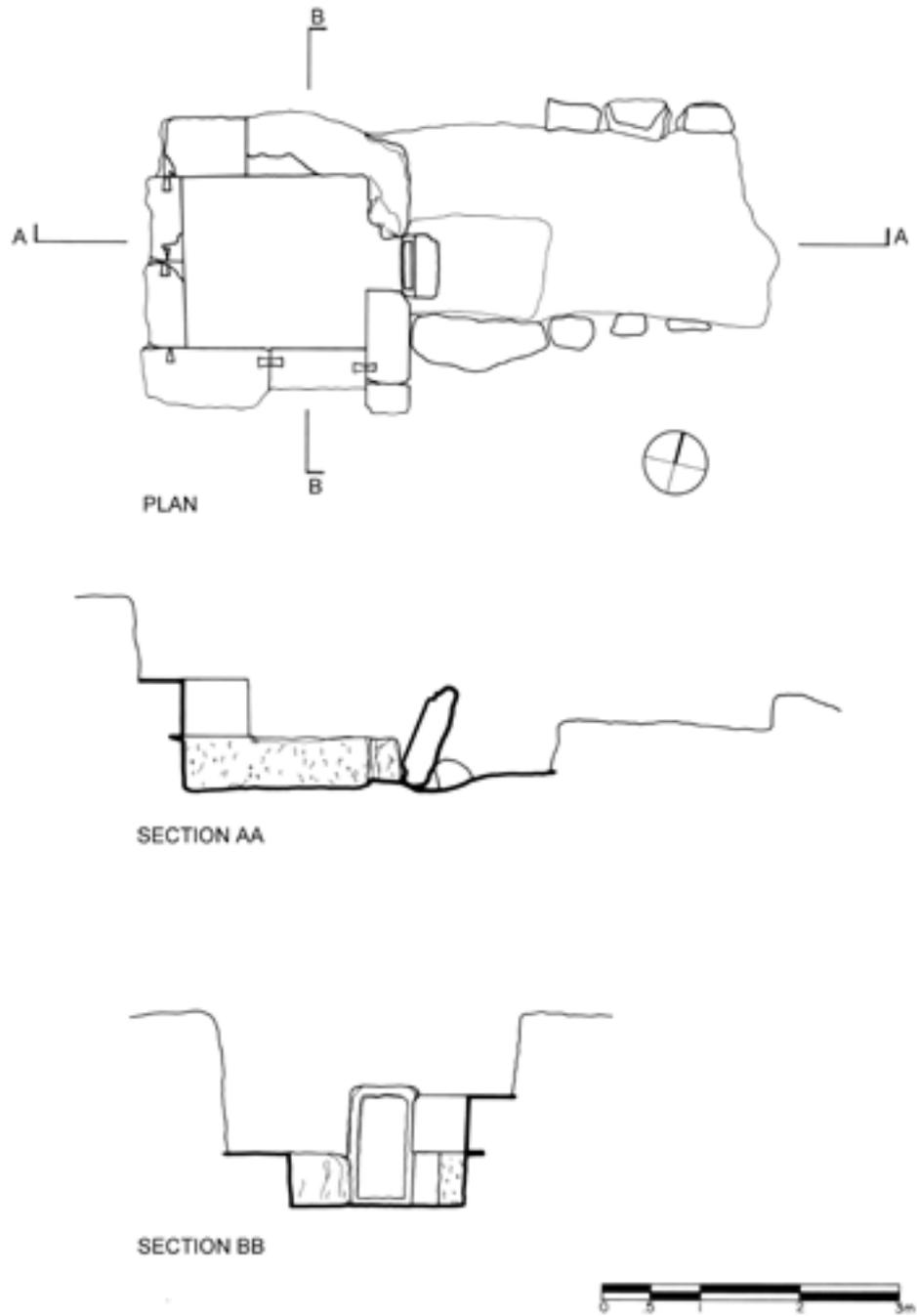


Fig. 109. BT66.4 (no. 8): Plans and sections (scale 1:75)



Fig. 110. BT66.4 (no. 8): View down dromos



Fig. 111. BT66.4 (no. 8): View of chamber



Fig. 112. BT66.4 (no. 8): Pottery

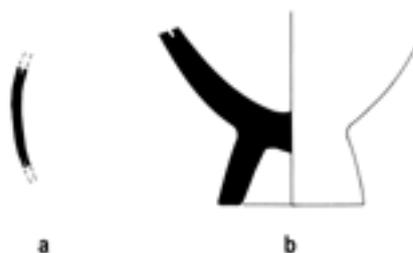


Fig. 113. BT66.4 (no. 8): Pottery (scale 1:2)

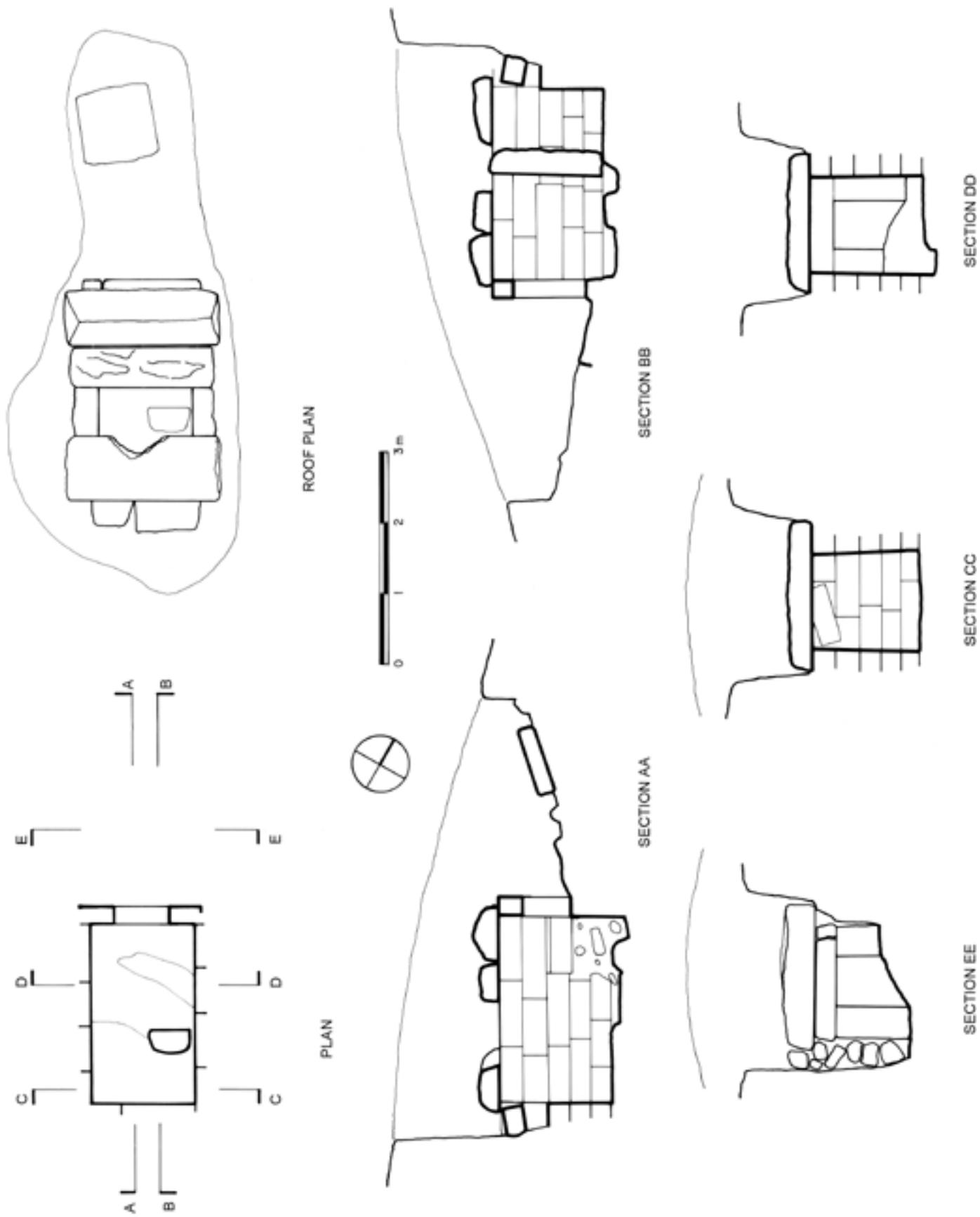


Fig. 114. BT66.6 (no. 9): Plans and sections (scale 1:75)



Fig. 115. BT66.6 (no. 9): Entrance

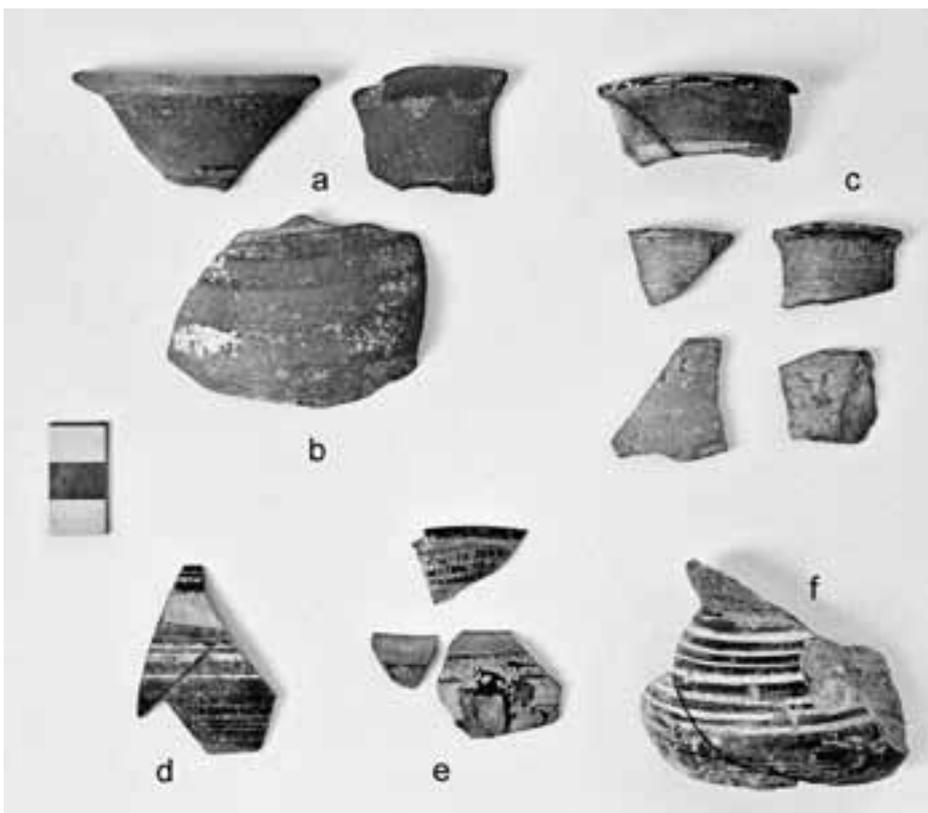


Fig. 116. BT66.6 (no. 9): Pottery

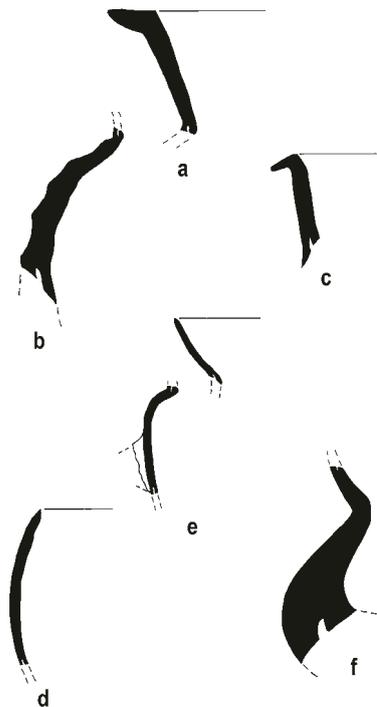


Fig. 117. BT66.6 (no. 9): Pottery (scale 1:2)

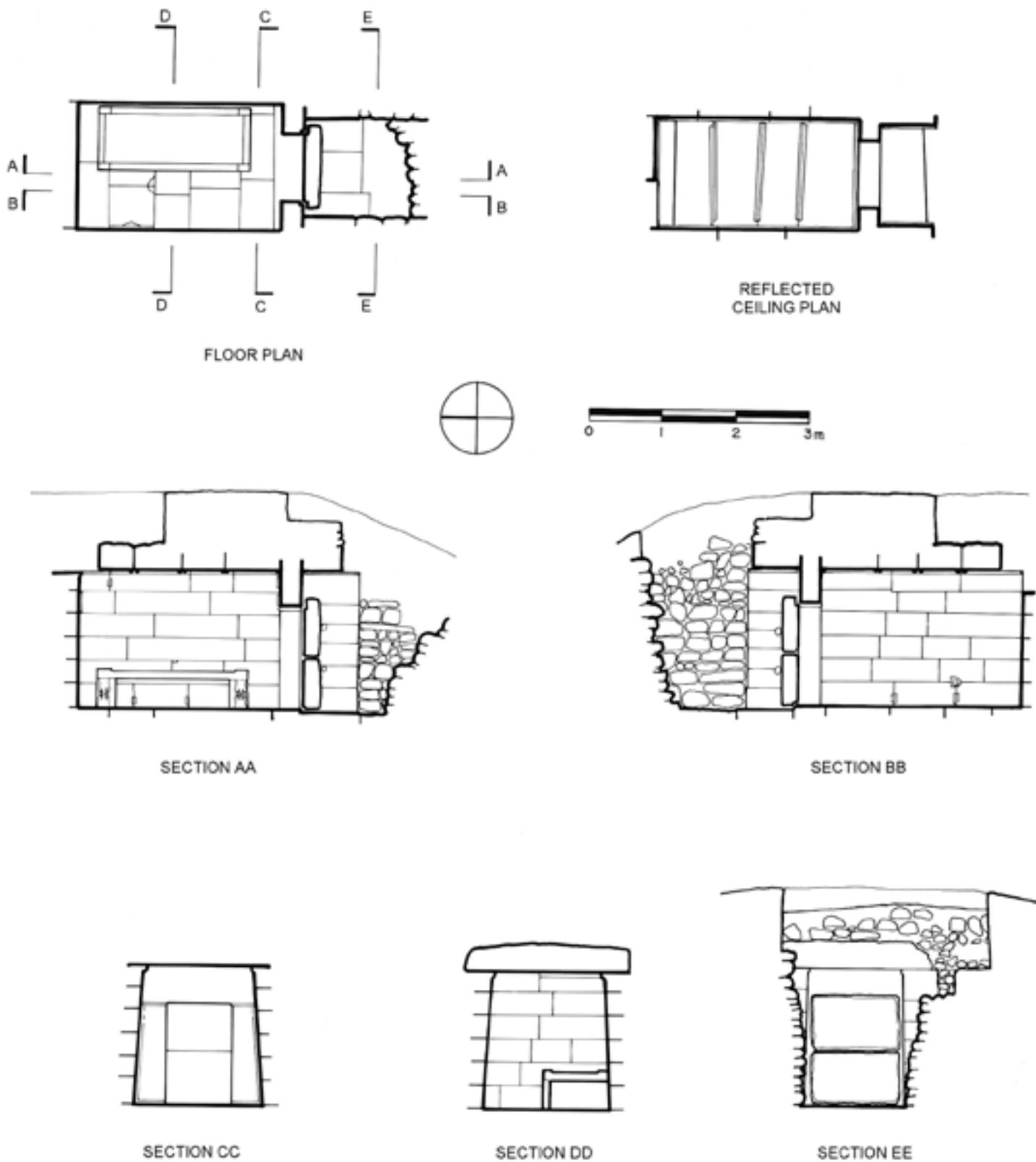


Fig. 118. BK71.1 (no. 10): Plans and sections (scale 1:75)



Fig. 119. BK71.1 (no. 10): Location of tomb (in middle ground of picture)



Fig. 120. BK71.1 (no. 10): Entrance



Fig. 121. BK71.1 (no. 10): Interior



Fig. 122. BK71.1 (no. 10): Detail of couch

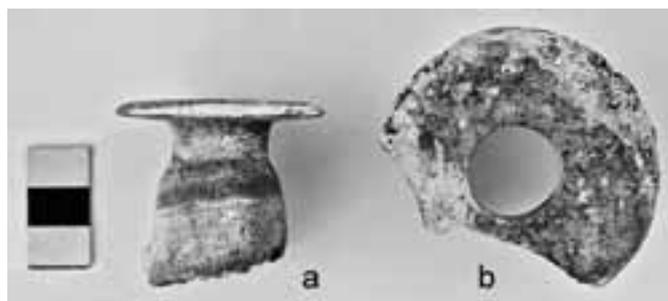


Fig. 123. BK71.1 (no. 10): Fragments of alabastra

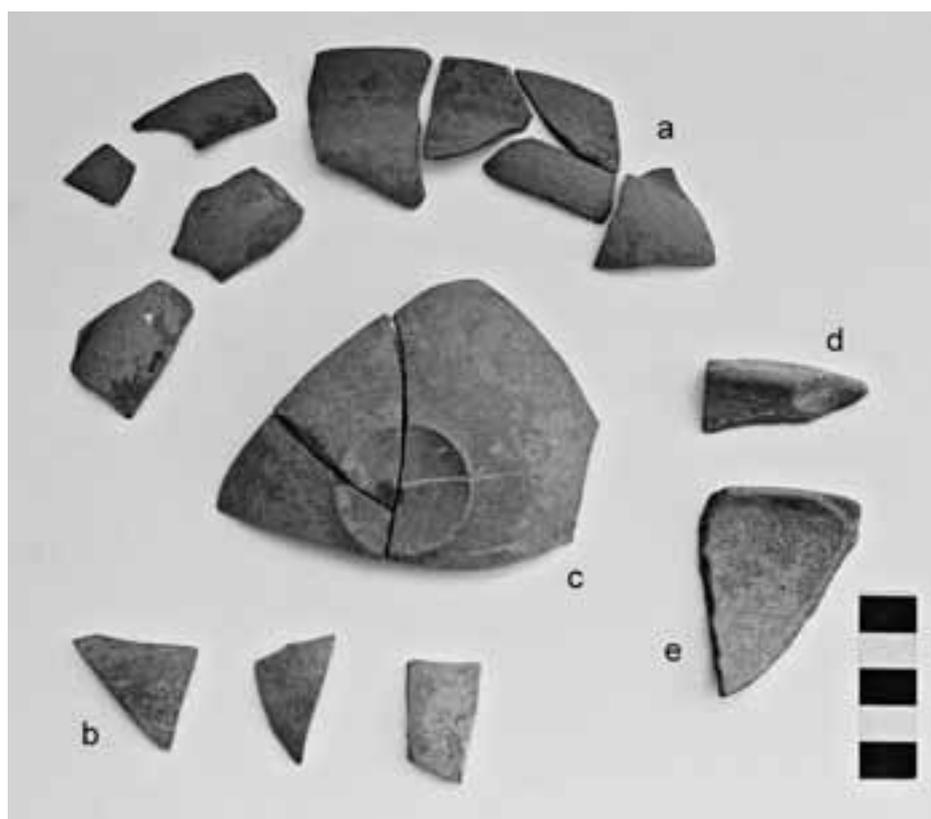


Fig. 124. BK71.1 (no. 10): Pottery

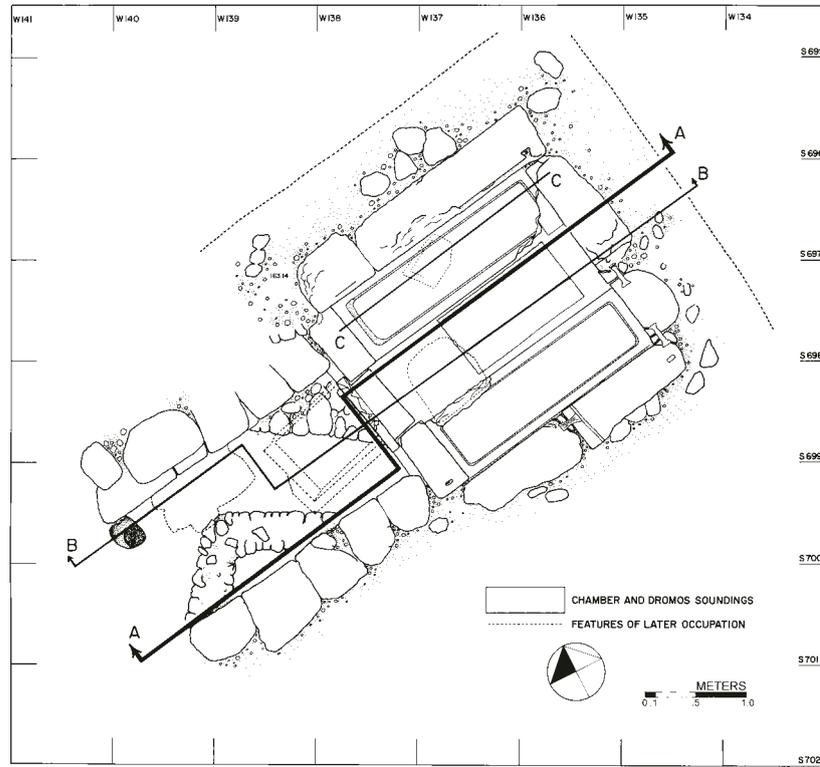


Fig. 125. T77.1 (no. 11): Plan (scale 1:75)

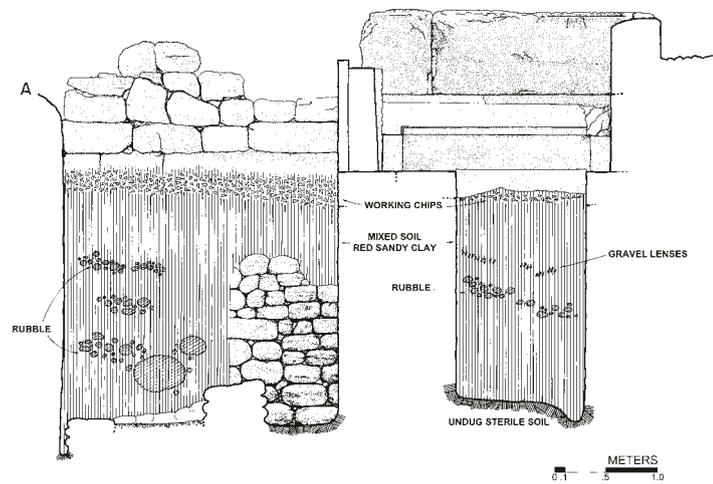


Fig. 126. T77.1 (no. 11): Section (scale 1:75)

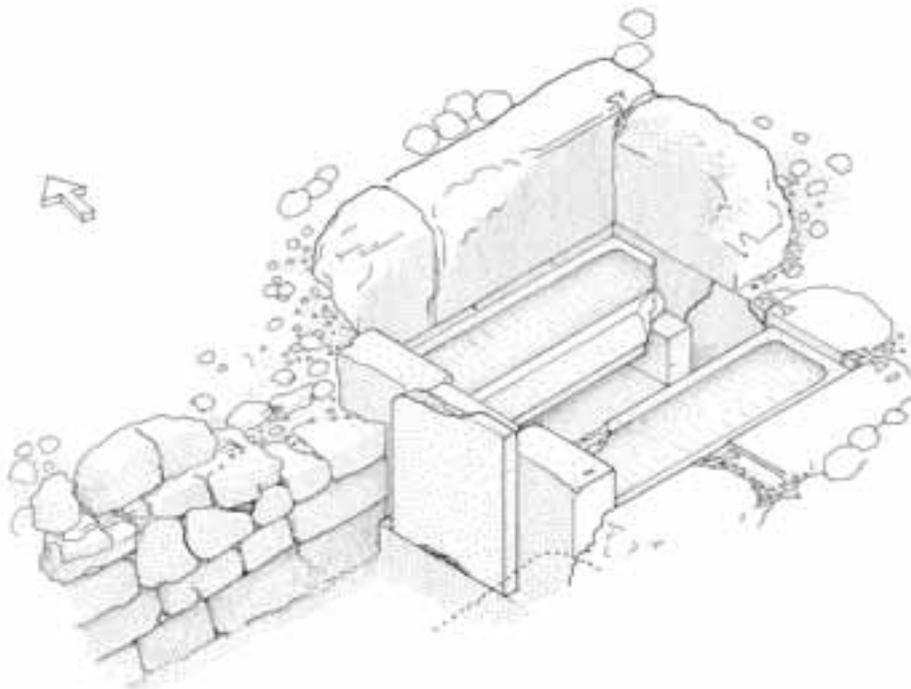


Fig. 127. T77.1 (no. 11): Isometric view



Fig. 128. T77.1 (no. 11): Location of tomb



Fig. 129. T77.1 (no. 11): General view



Fig. 130. T77.1 (no. 11): Clamp



Fig. 131. T77.1 (no. 11): Detail of north wall

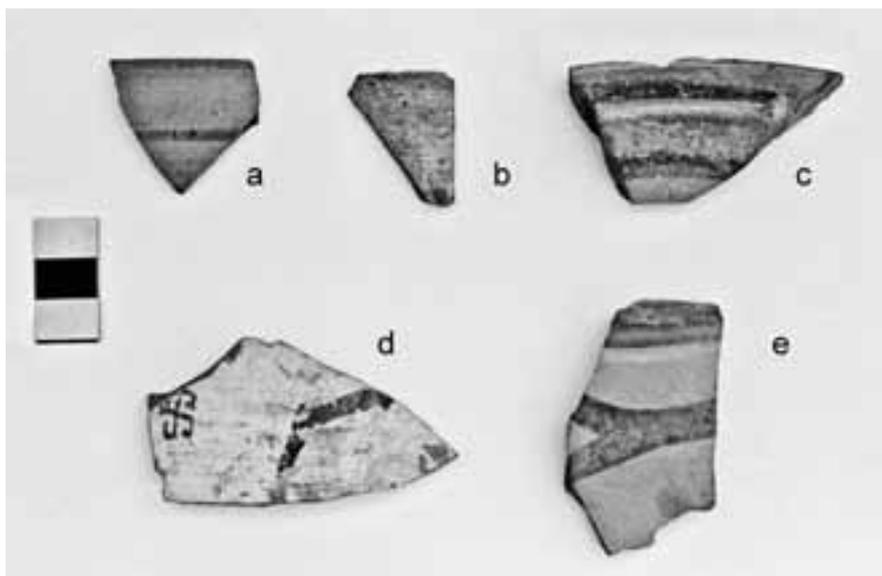


Fig. 132. T77.1 (no. 11): Pottery: A

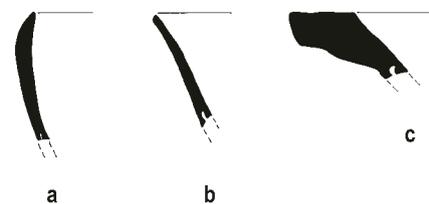


Fig. 133. T77.1 (no. 11): Pottery: A (scale 1:2)

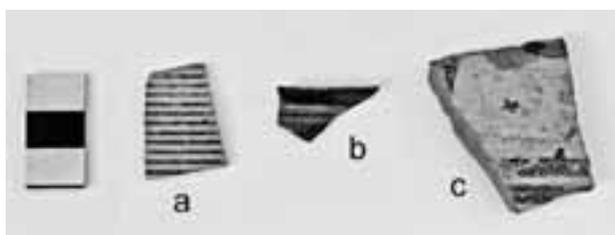


Fig. 134. T77.1 (no. 11): Pottery: B



Fig. 135. T77.1 (no. 11): Pottery: B (scale 1:2)

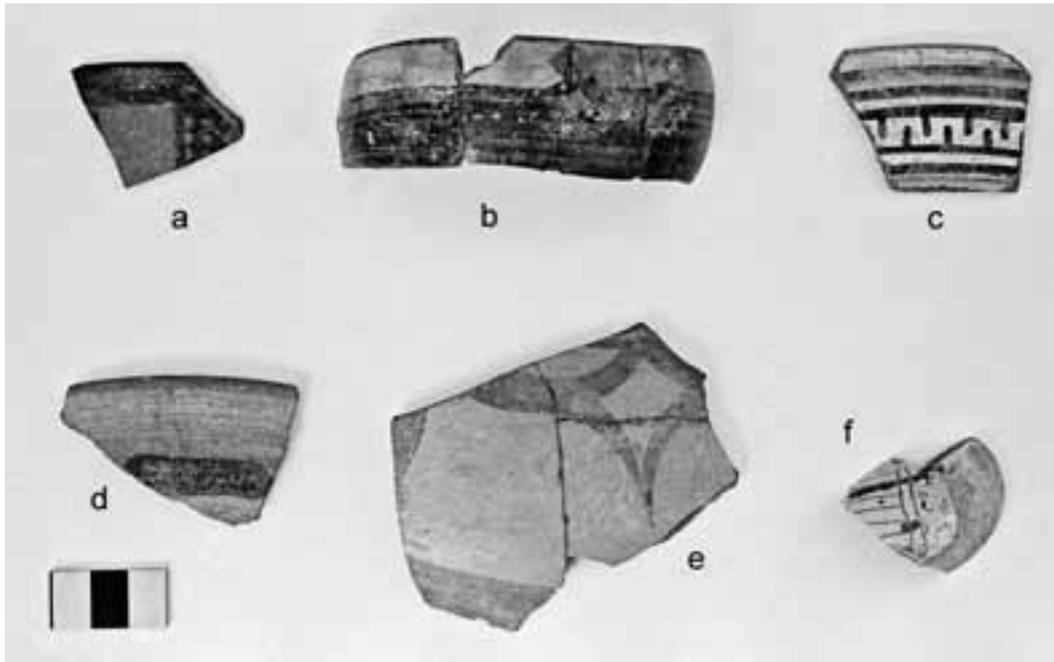


Fig. 136. T77.1 (no. 11): Pottery: C

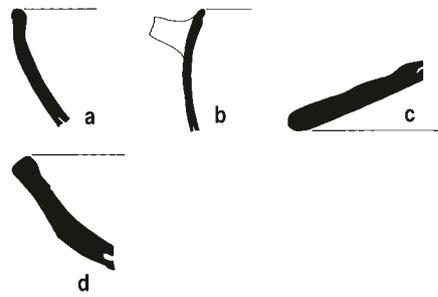


Fig. 137. T77.1 (no. 11): Pottery: C (scale 1:2)



Fig. 138. T77.1 (no. 11): Pottery: D

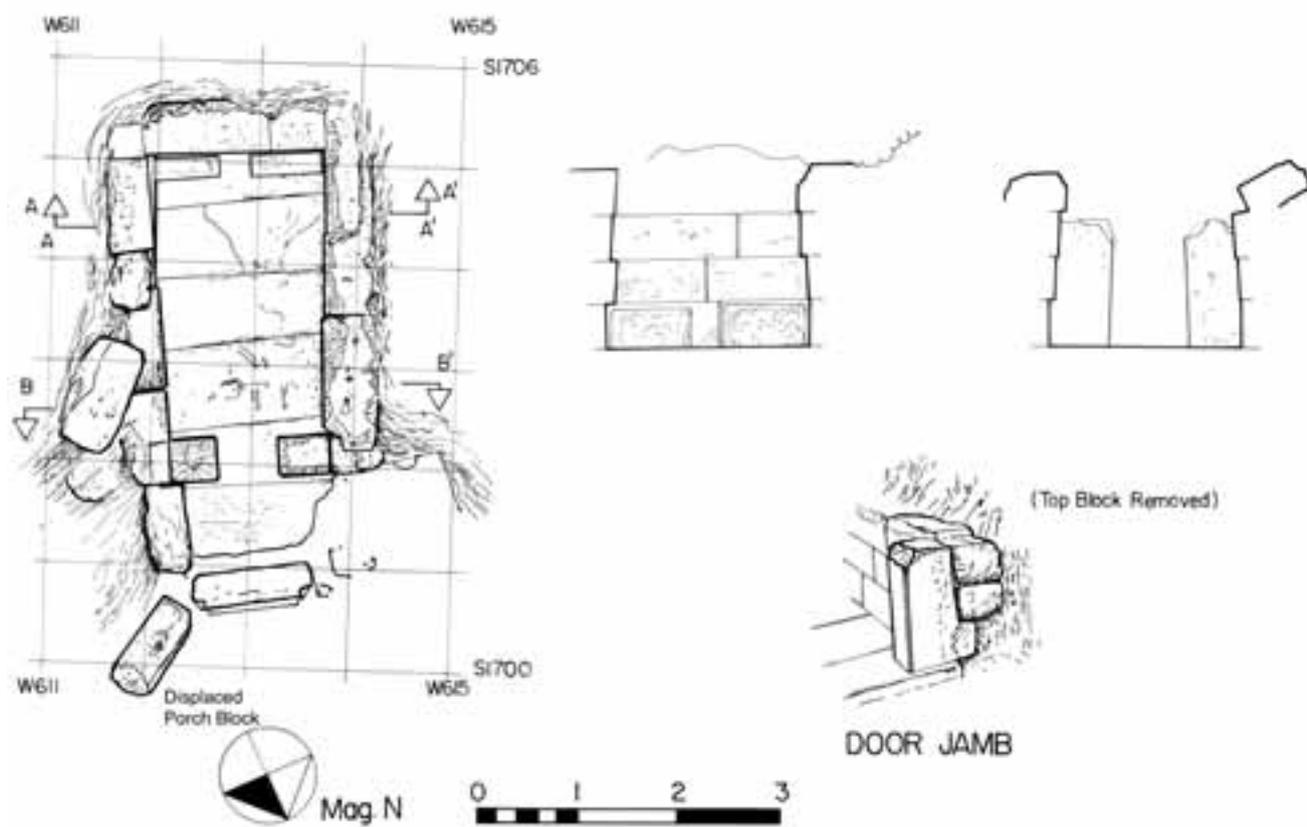


Fig. 139. T82.1 (no. 12): Plan and sections (scale 1:75)



Fig. 140. T82.1 (no. 12): Aerial view of chamber



Fig. 141. T82.1 (no. 12): View of chamber

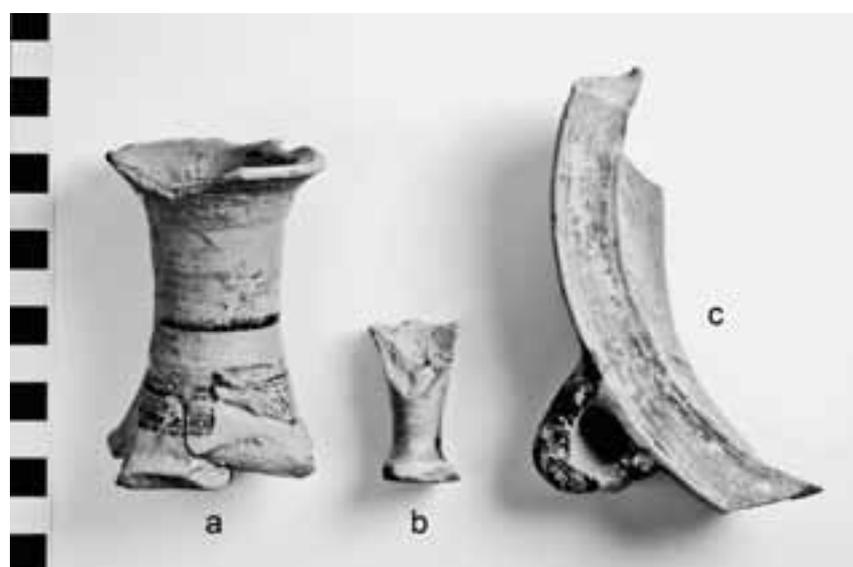


Fig. 142. T82.1 (no. 12): Pottery

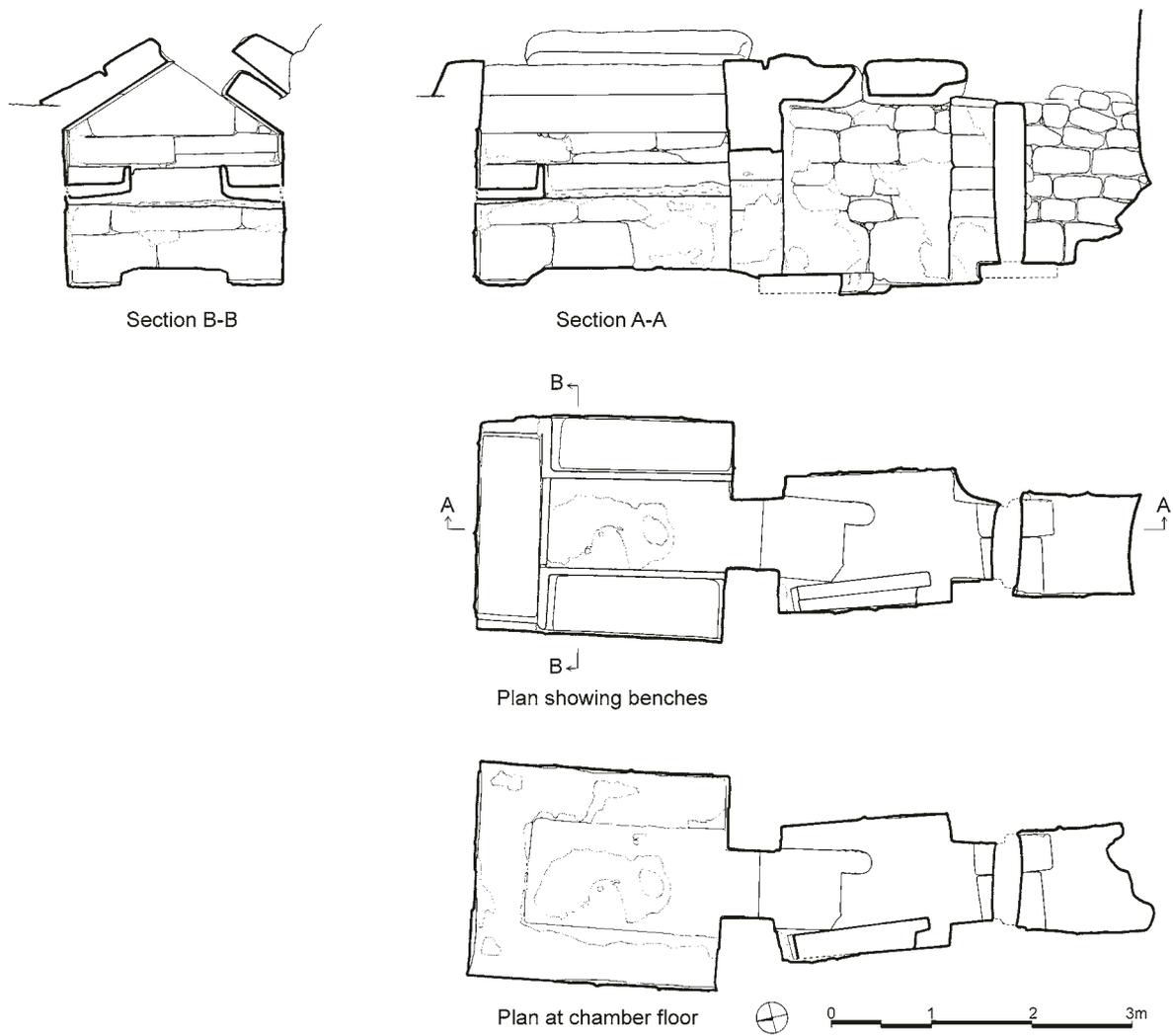


Fig. 143. T89.11 (no. 13): Plan and sections (scale 1:75)



Fig. 144. T89.11 (no. 13): General view



Fig. 145. T89.11 (no. 13): View of antechamber as seen from chamber



Fig. 146. T89.11 (no. 13): Detail of benches



Fig. 147. T89.11 (no. 13): Pottery

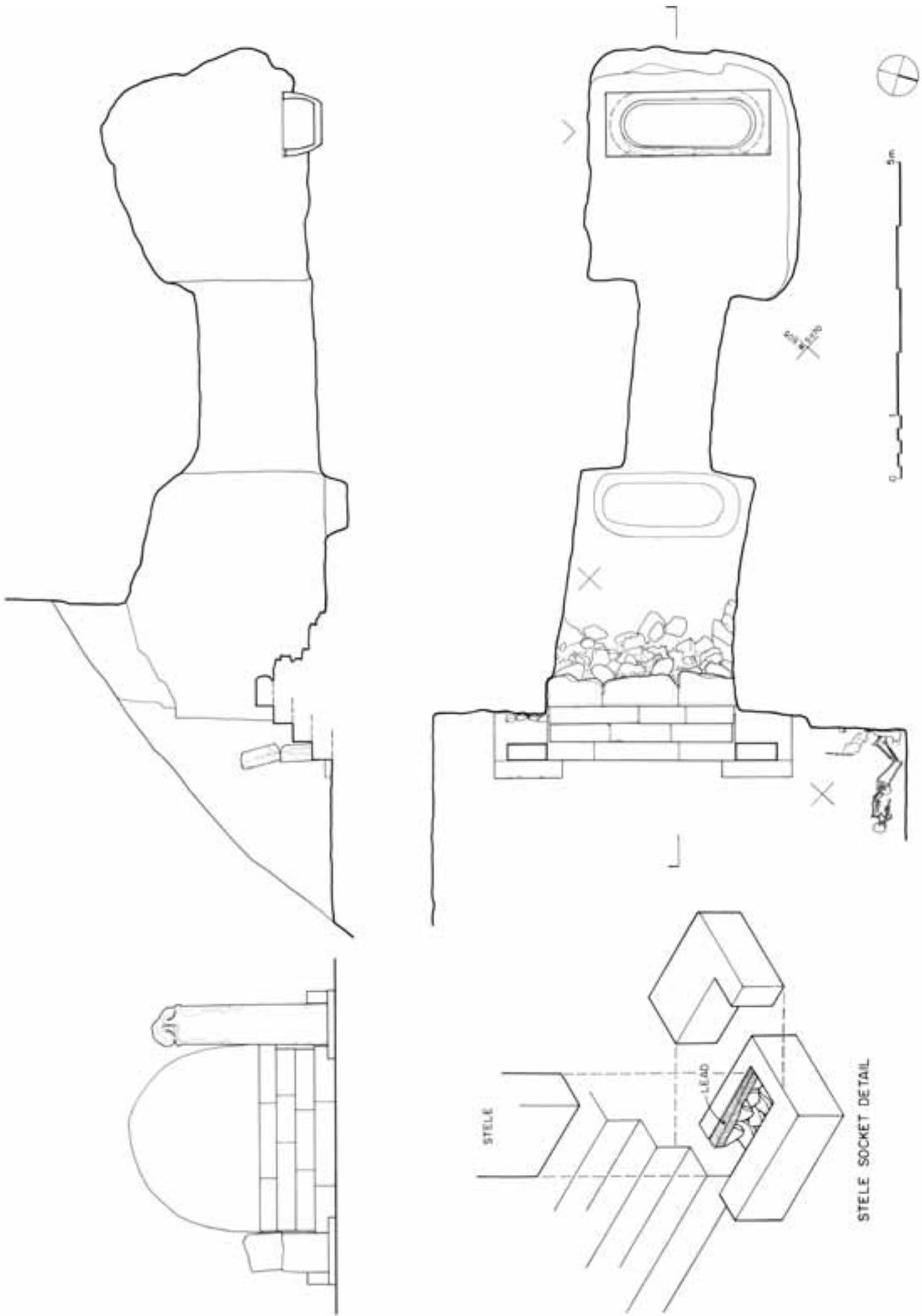


Fig. 148. Tomb 813 (no. 14): Plan, section, elevation (scale 1:75)



Fig. 149. Tomb 813 (no. 14): Entrance



Fig. 150. Tomb 813 (no. 14): Stele socket

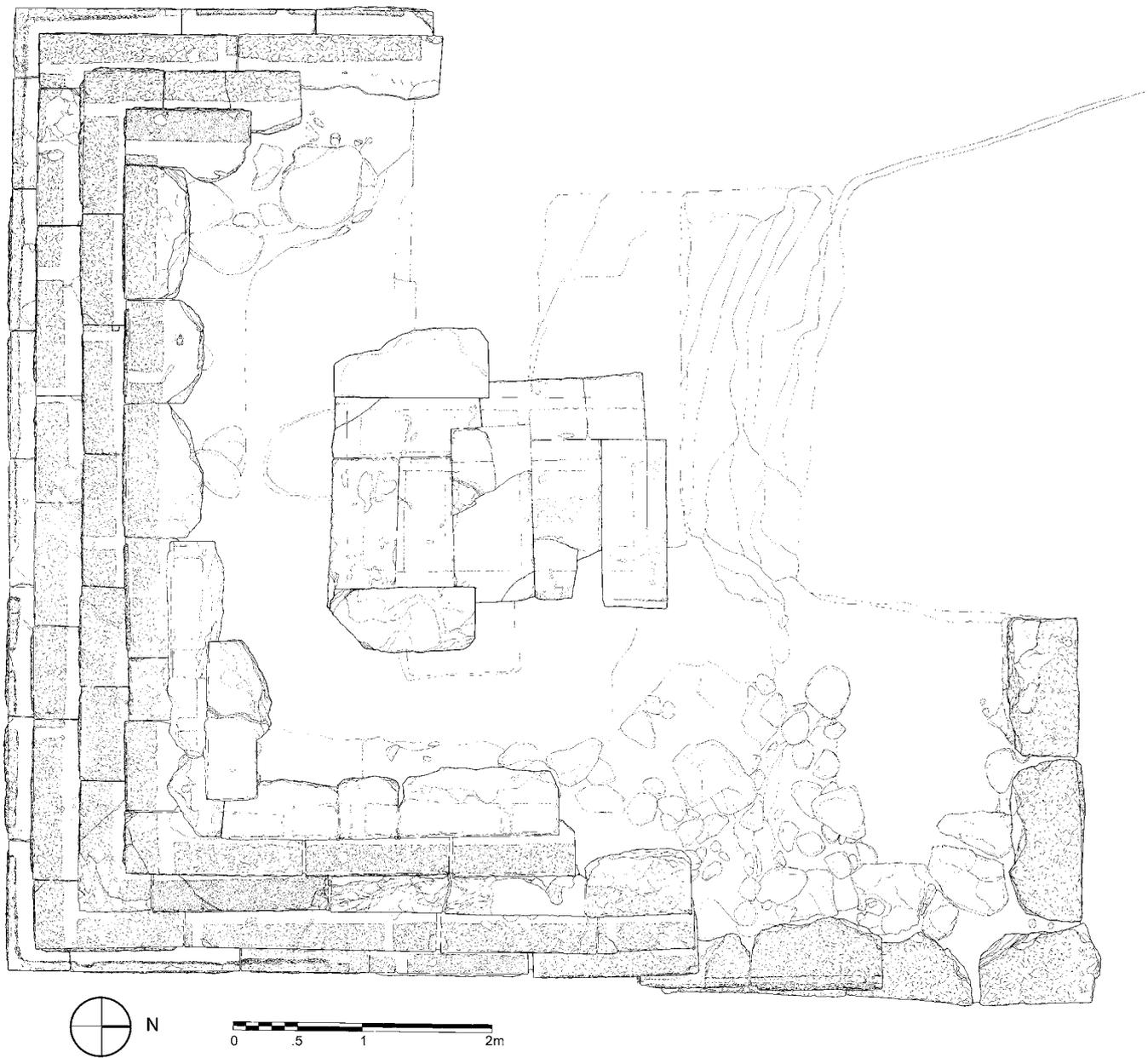


Fig. 151. Pyramid Tomb (no. 15): Plan (scale 1:50)

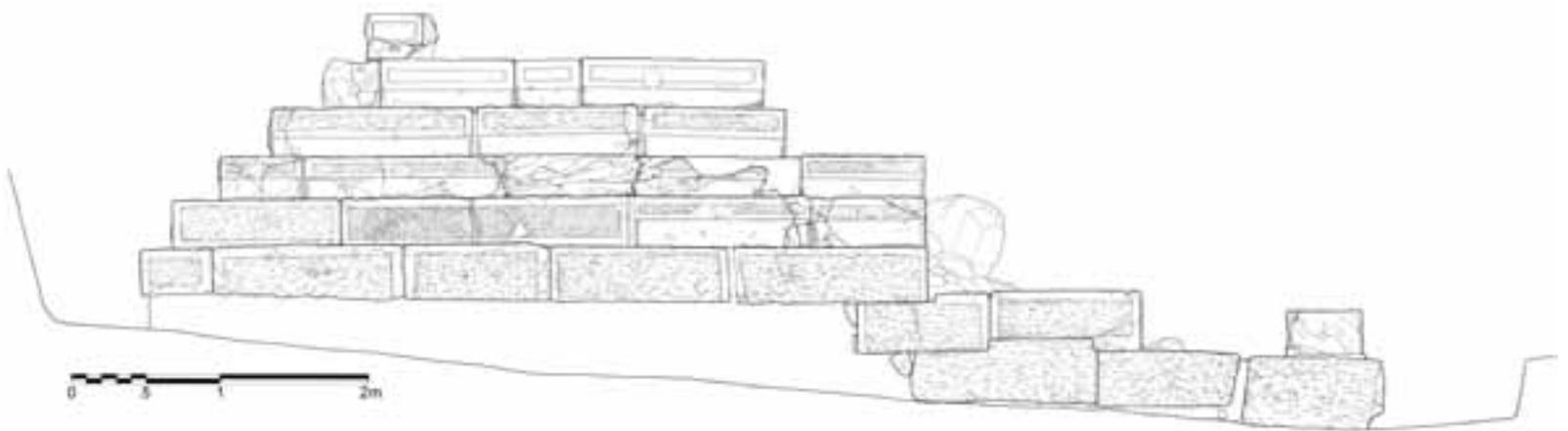


Fig. 152. Pyramid Tomb (no. 15): Elevation of east side (scale 1:50)



Fig. 153. Pyramid Tomb (no. 15): Location



Fig. 154. Pyramid Tomb (no. 15): General view



Fig. 155. Pyramid Tomb (no. 15): East side

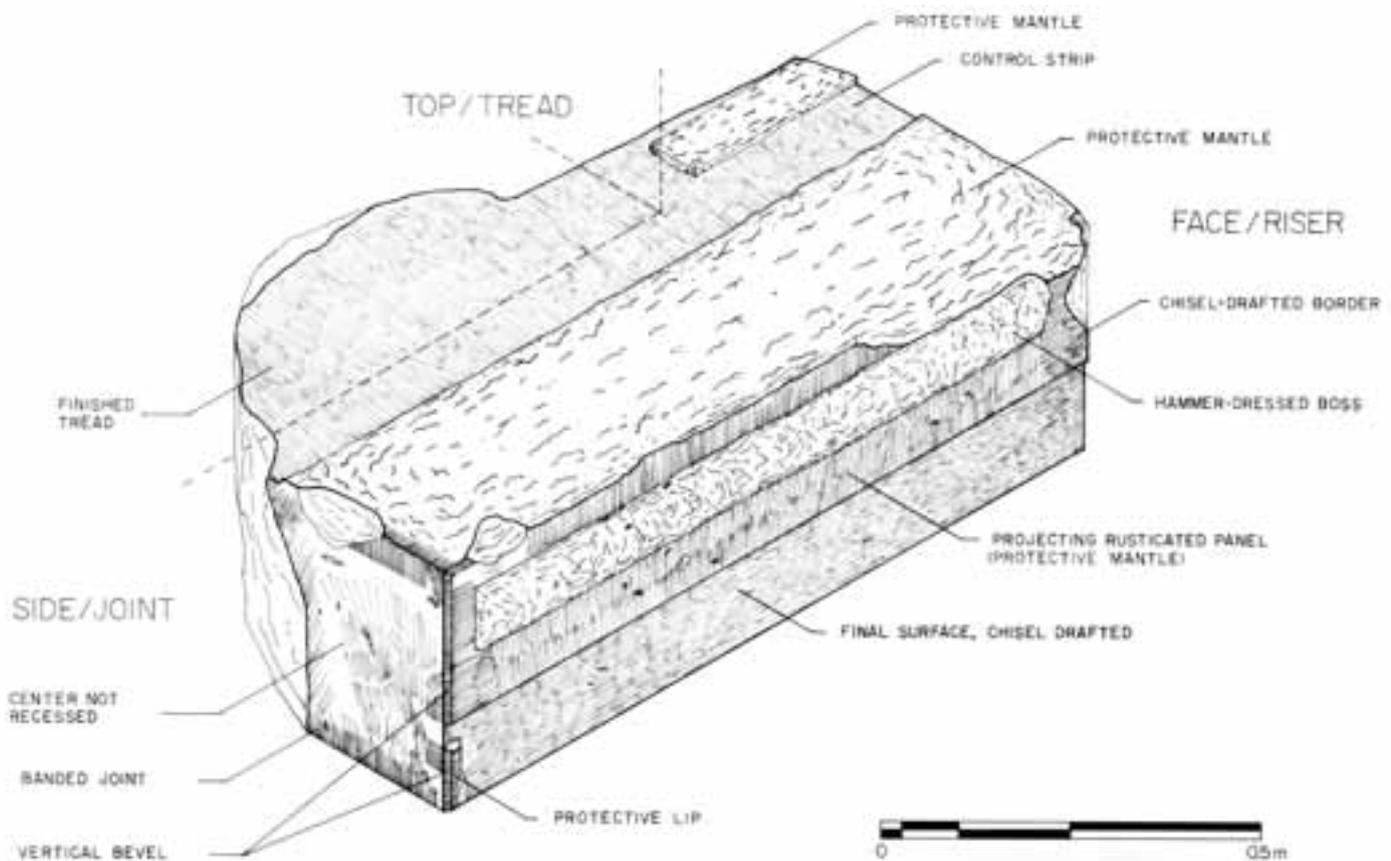


Fig. 156. Pyramid Tomb (no. 15): Isometric view of block (scale 1:10)

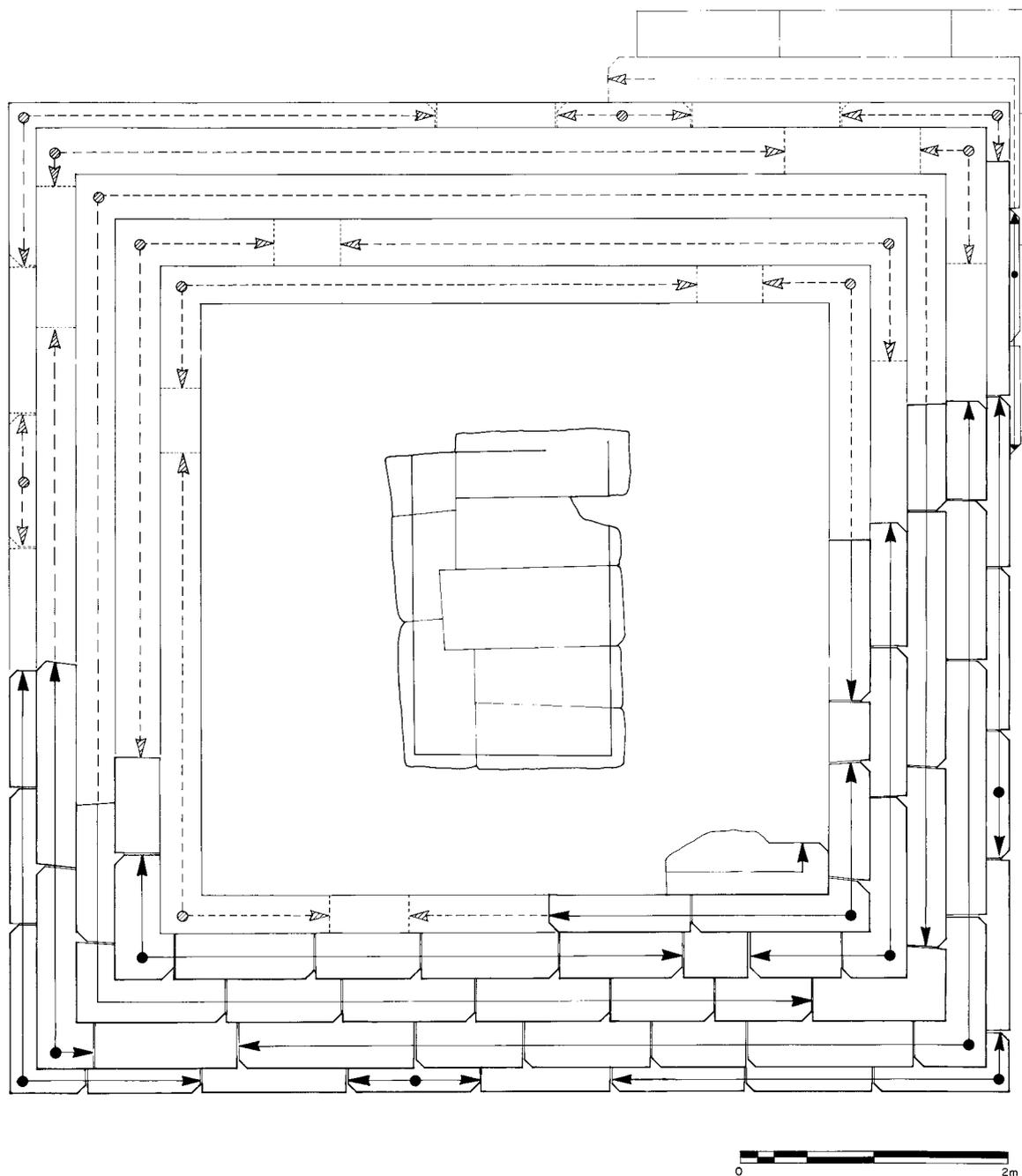


Fig. 157. Pyramid Tomb (no. 15): Schematic plan showing bevels (scale 1:50)

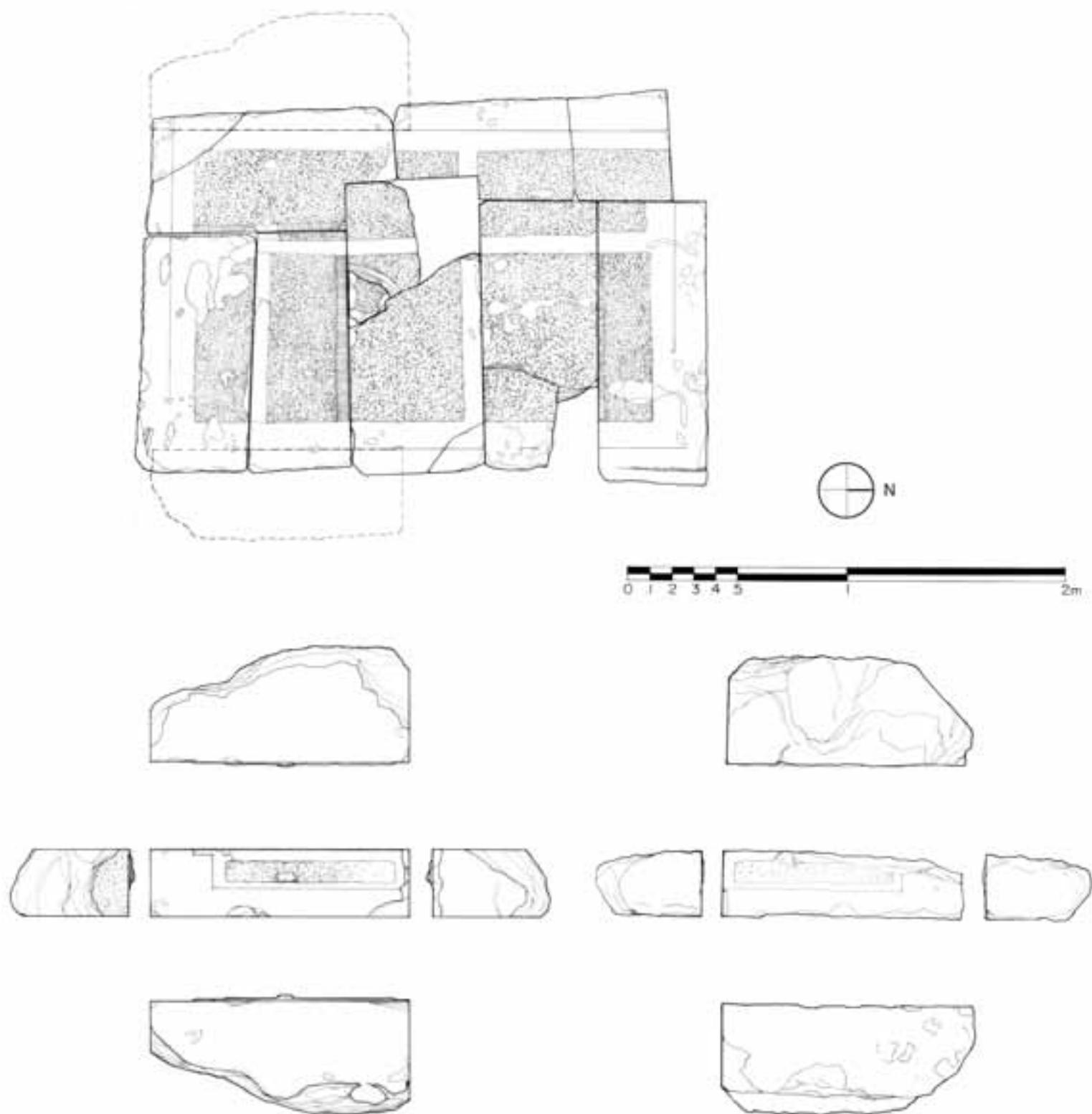


Fig. 158. Pyramid Tomb (no. 15): Plan of chamber floor, wall blocks (scale 1:25)

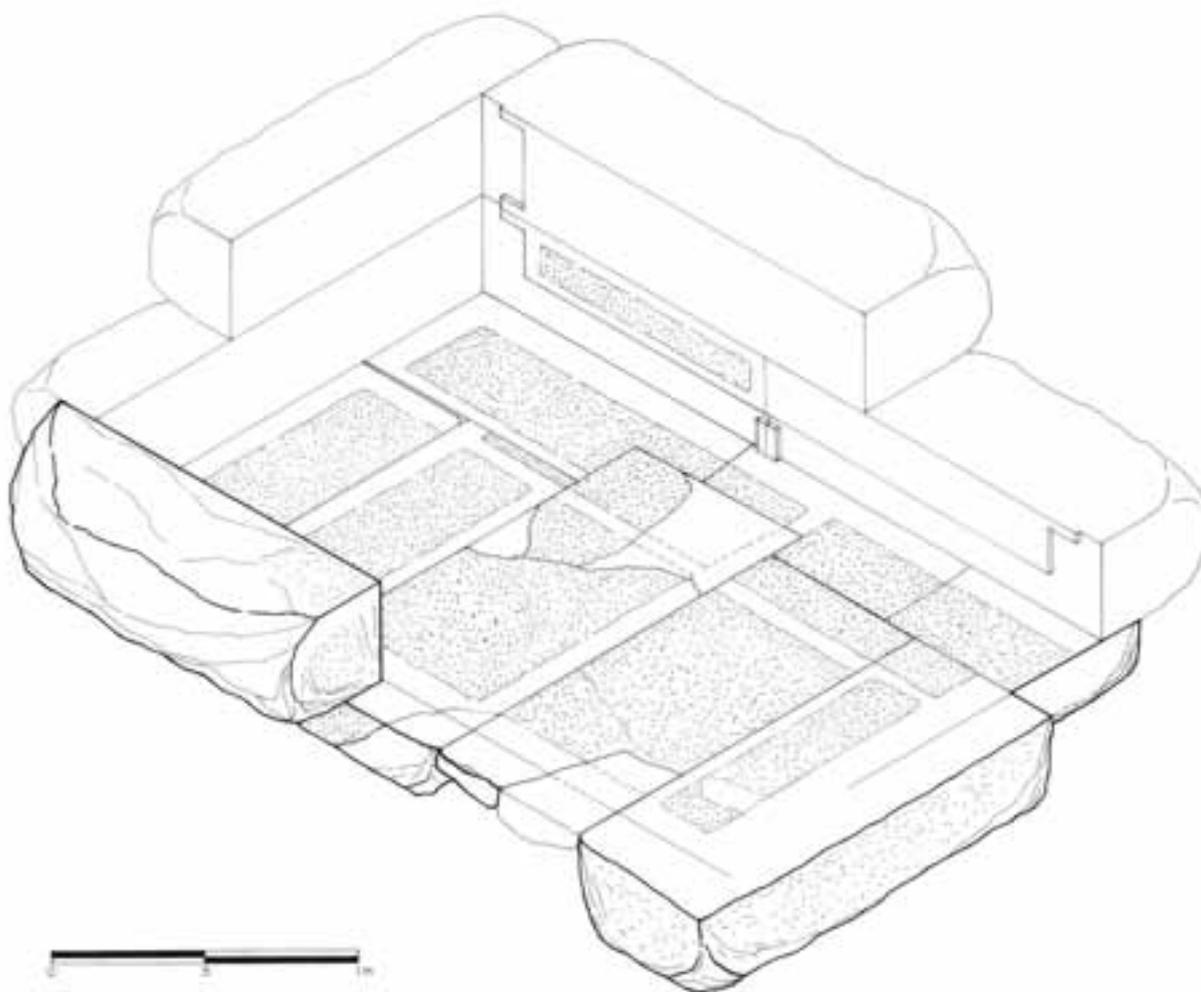
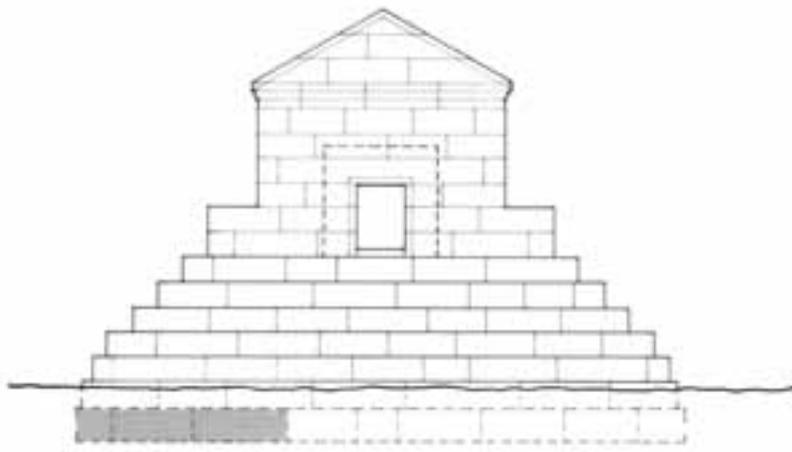
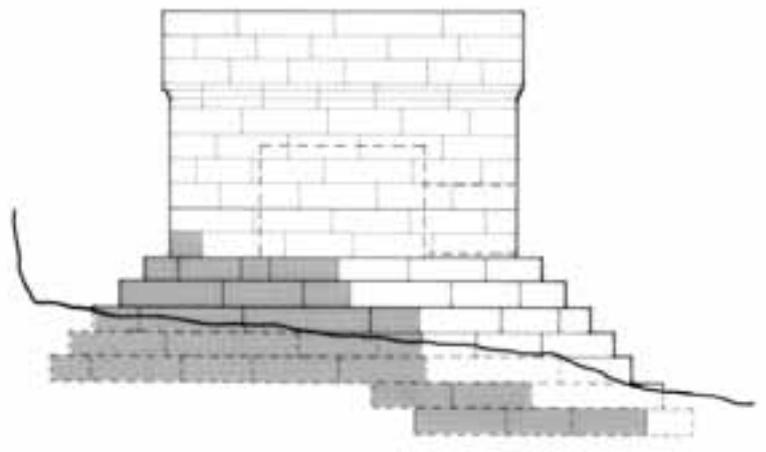


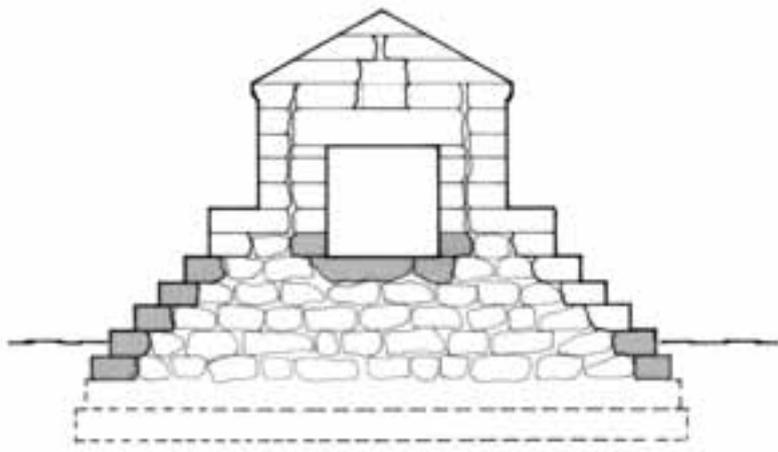
Fig. 159. Pyramid Tomb (no. 15): Isometric view of chamber (scale 1:25)



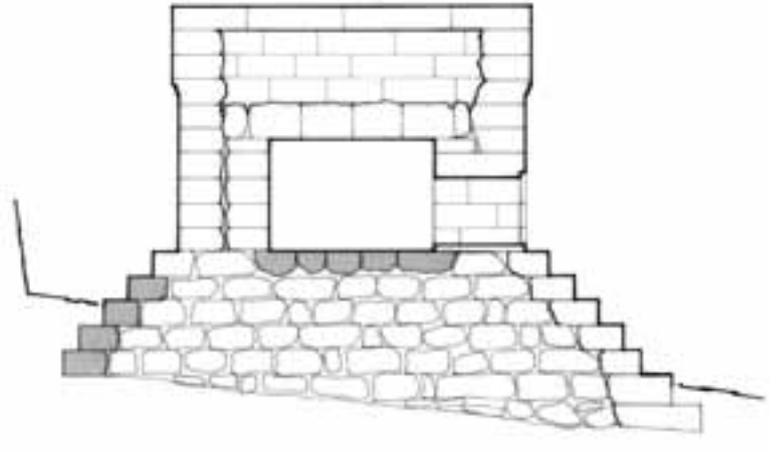
NORTH ELEVATION



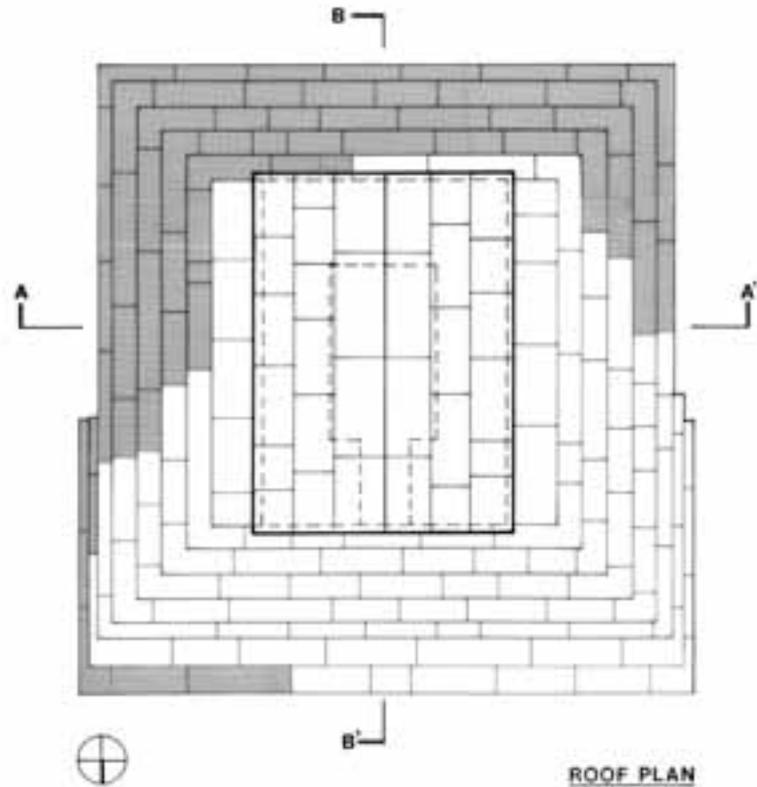
EAST ELEVATION



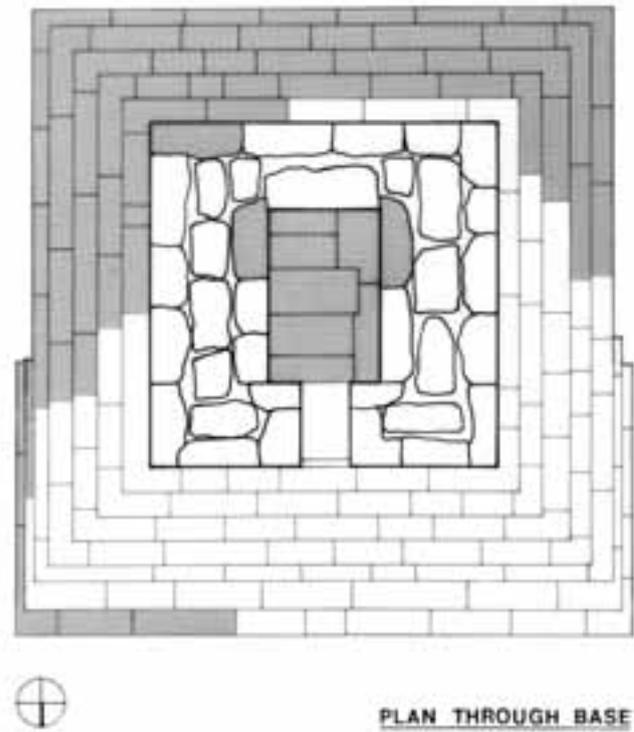
SECTION A-A'



SECTION B-B'



ROOF PLAN



PLAN THROUGH BASE



Fig. 160. Pyramid Tomb (no. 15): Conjectural reconstruction (scale 1:100)

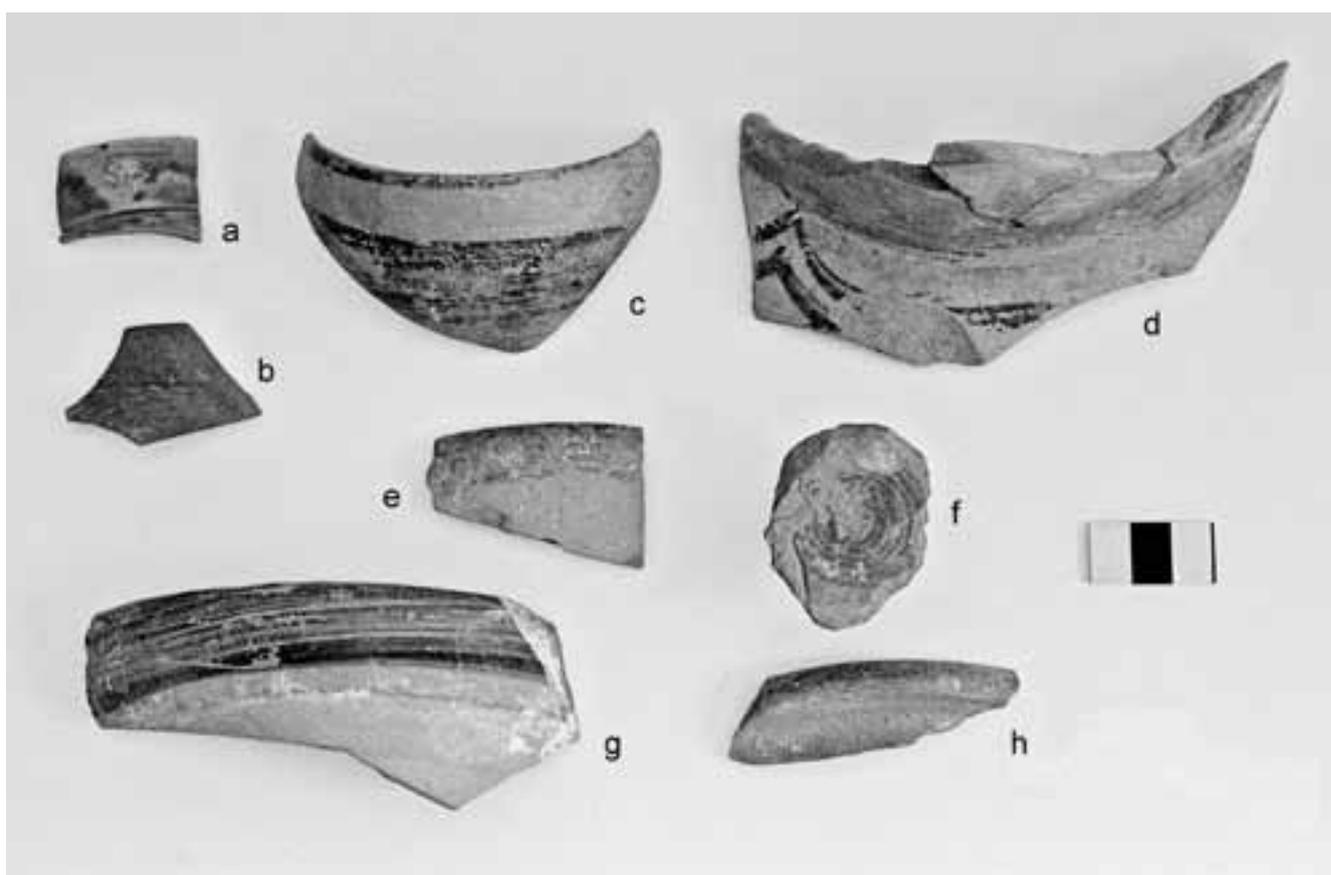


Fig. 161. Pyramid Tomb (no. 15): Pottery



Fig. 162. Acropolis North (no. 16): Plan of Lydian terraces (scale 1:200)

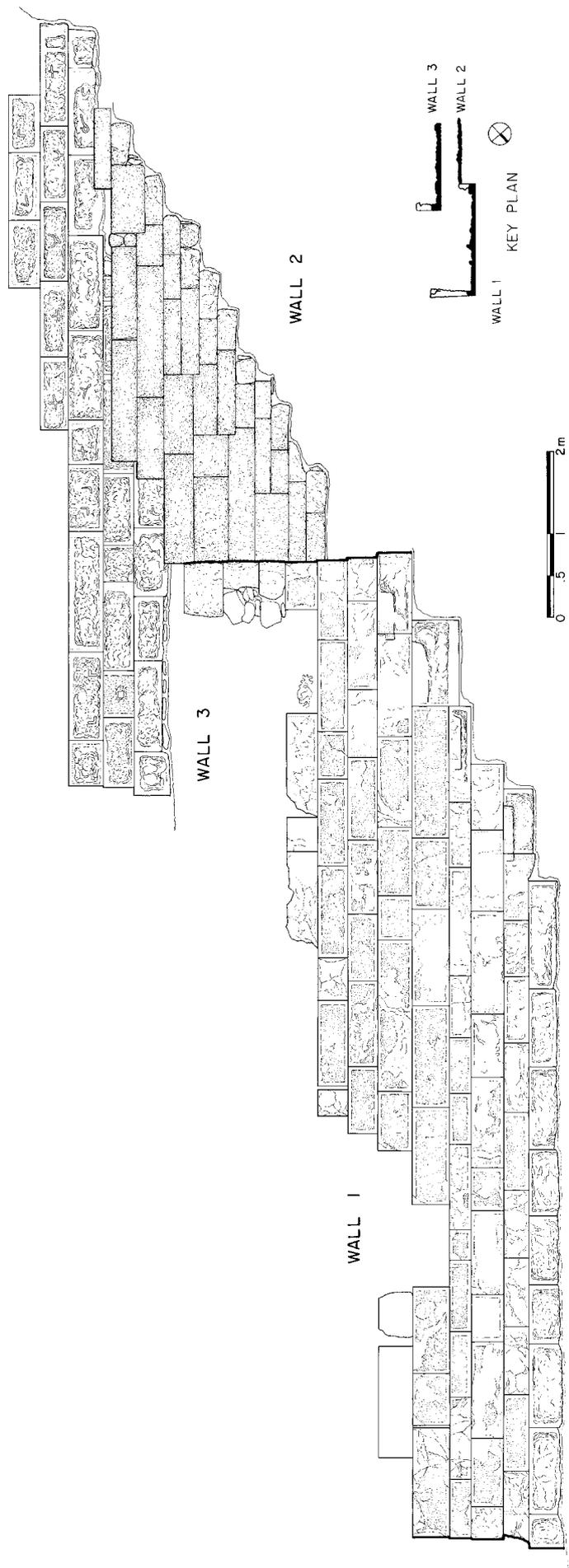


Fig. 163. Acropolis North (no. 16): Elevation of Lydian terraces, looking east (scale 1:75)

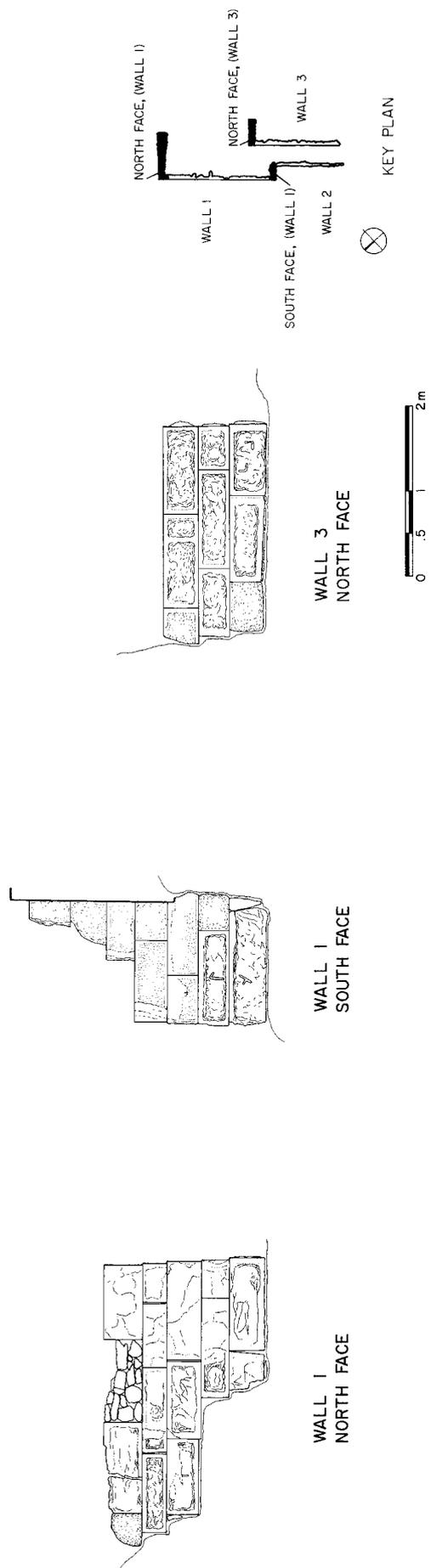


Fig. 164. Acropolis North (no. 16): Elevation of Lydian terraces, details of north and south faces (scale 1:75)

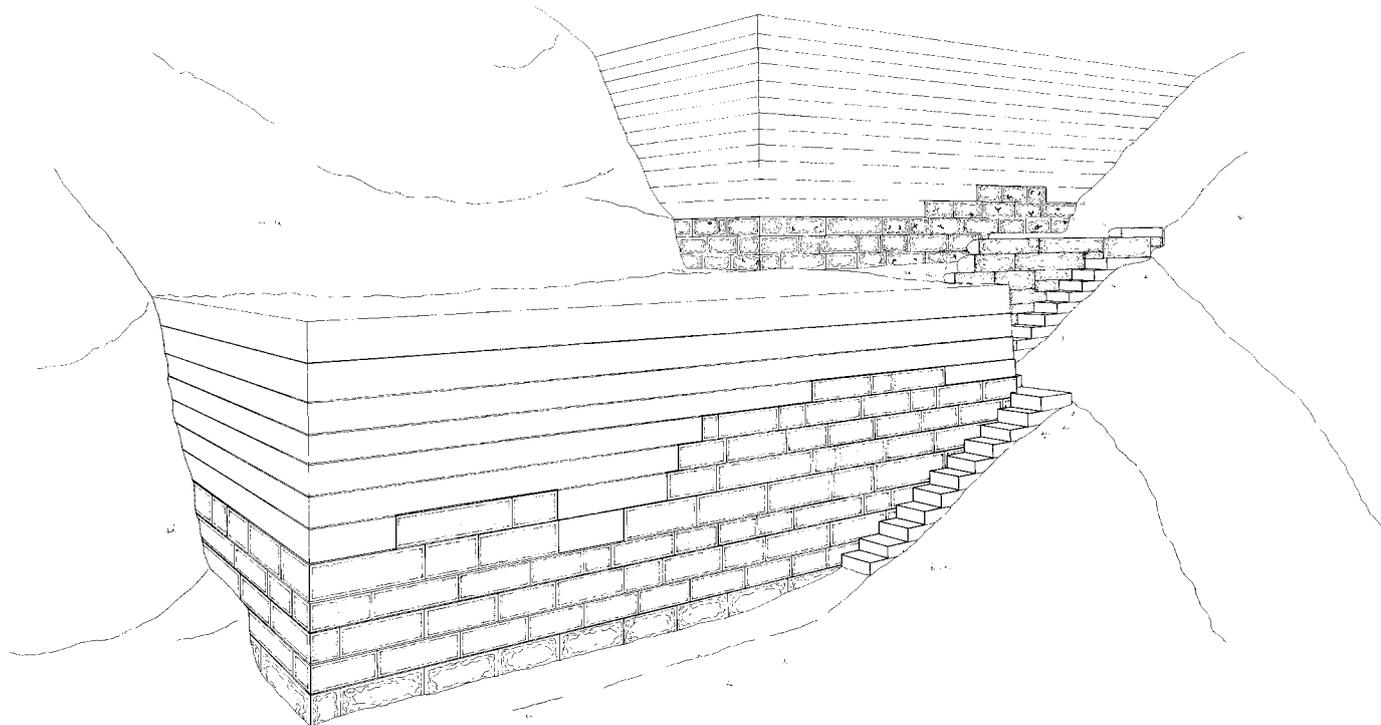


Fig. 165. Acropolis North (no. 16): Perspective view of Lydian terraces



Fig. 166. Acropolis North (no. 16): Lydian terraces from below



Fig. 167. Acropolis North (no. 16): Lydian terraces from above



Fig. 168. Acropolis North (no. 16): Lower limestone wall



Fig. 169. Acropolis North (no. 16): Sandstone wall



Fig. 170. Acropolis North (no. 16): Upper limestone wall



Fig. 171. Acropolis North (no. 16): Upper limestone wall, showing layers in front of wall

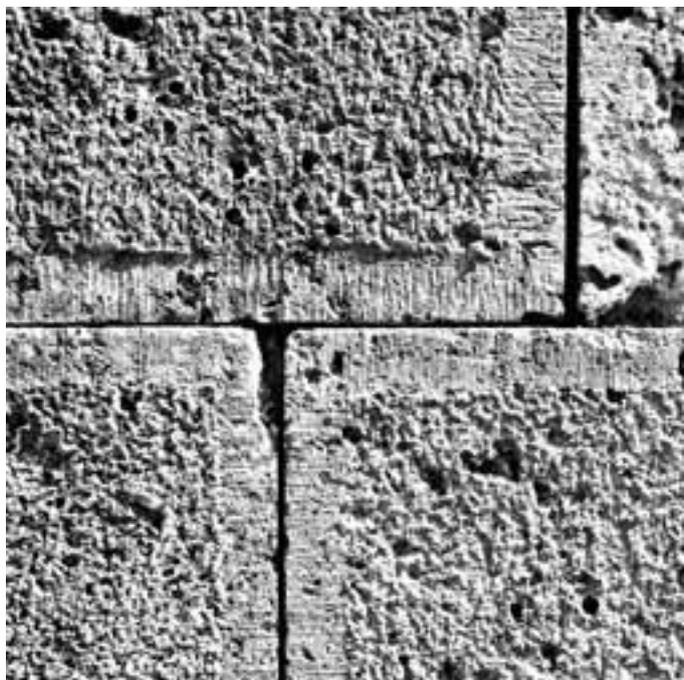


Fig. 172. Acropolis North (no. 16): Masonry of lower limestone wall



Fig. 173. Acropolis North (no. 16): Masonry of upper limestone wall



Fig. 174. Acropolis North (no. 16): Pottery

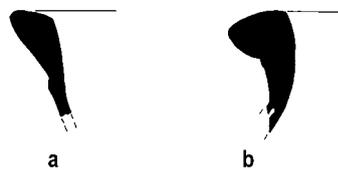


Fig. 175. Acropolis North (no. 16): Pottery (scale 1:2)

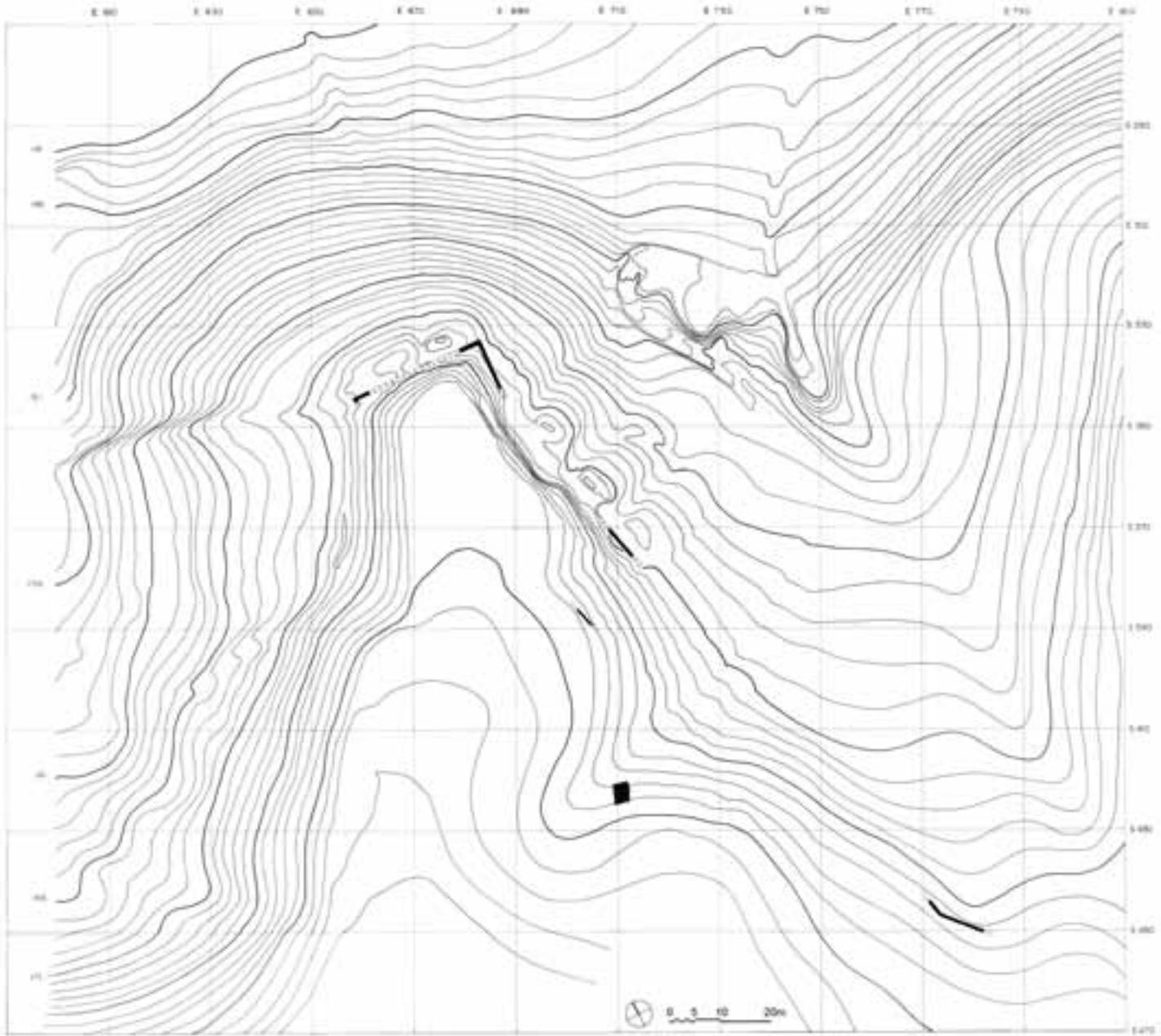


Fig. 176. ByzFort (no. 17): Topographical plan (scale 1:1250)

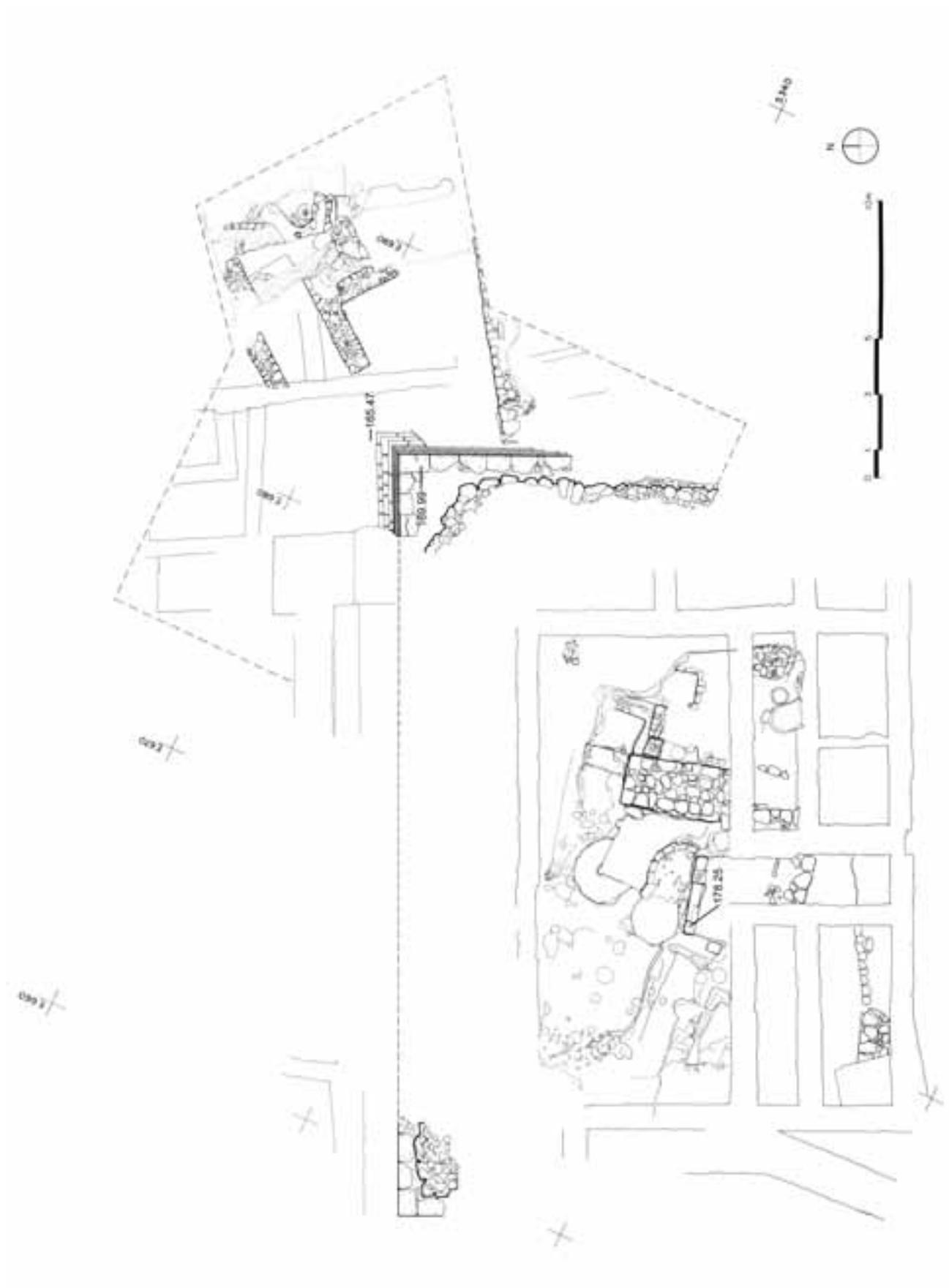


Fig. 177. ByzFort (no. 17): Trench plan, north end of hill (scale 1:200)

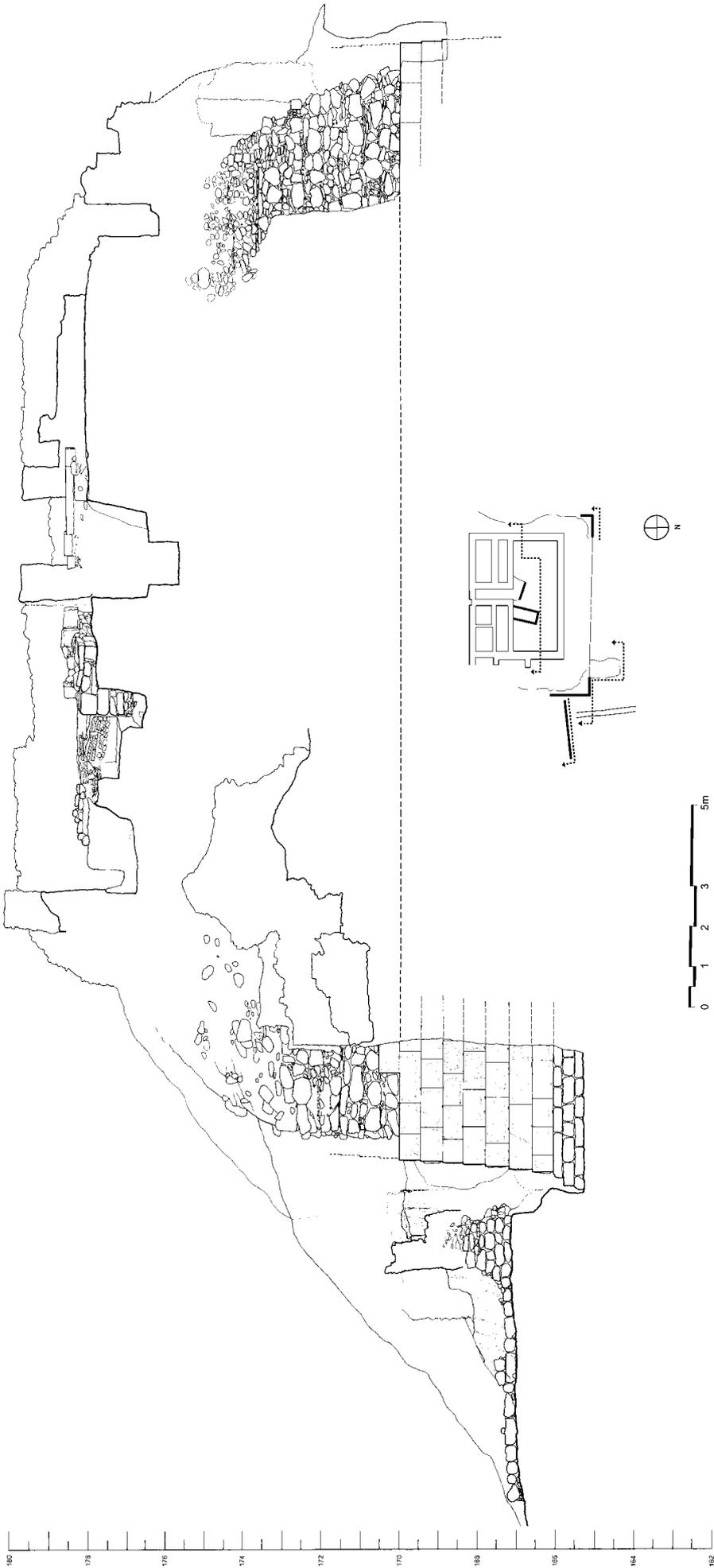


Fig. 178. ByzFort (no. 17): East-west section of Lydian terrace (scale 1:150)

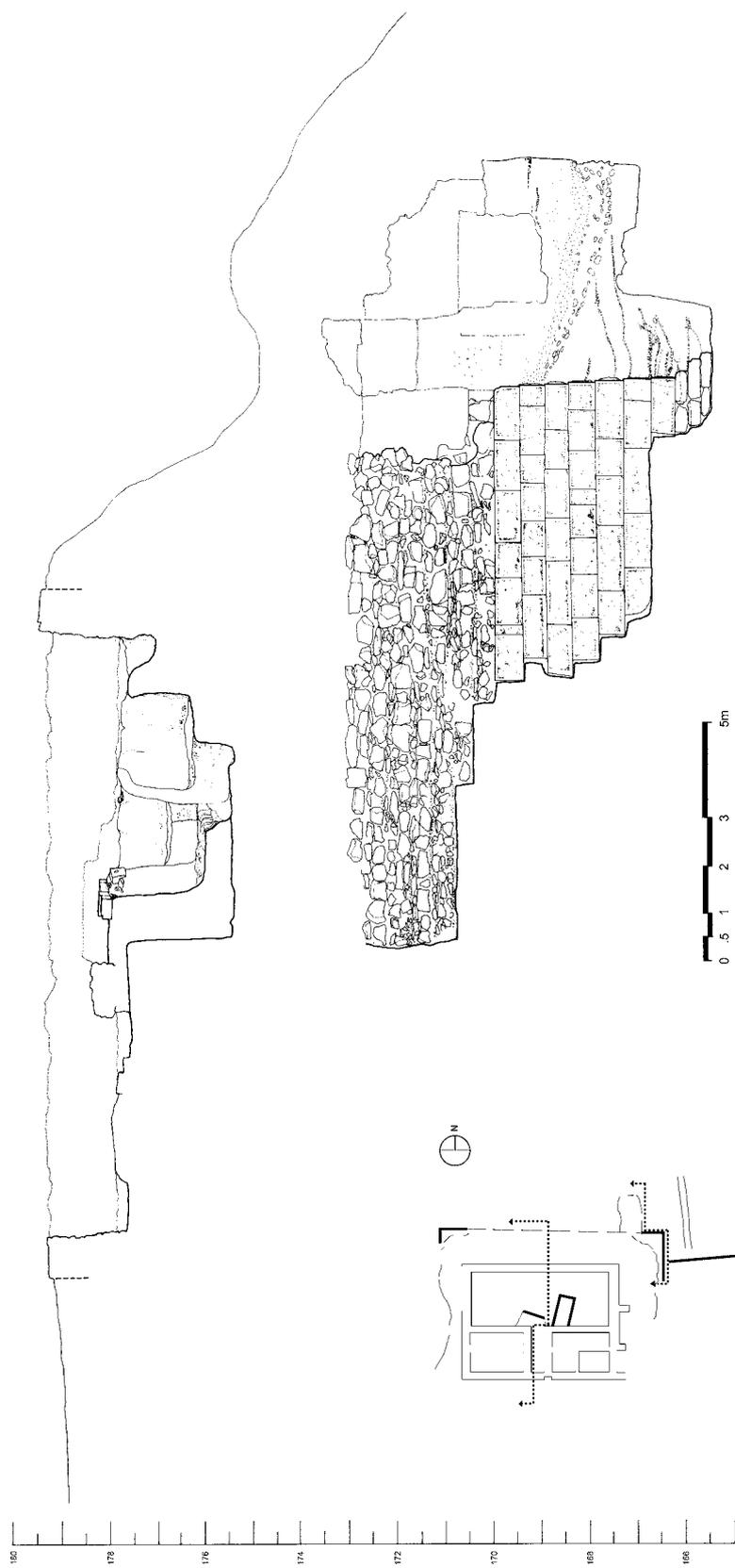


Fig. 179. ByzFort (no. 17): North-south section of Lydian terrace (scale 1:150)



Fig. 180. ByzFort (no. 17): Reconstruction sketch

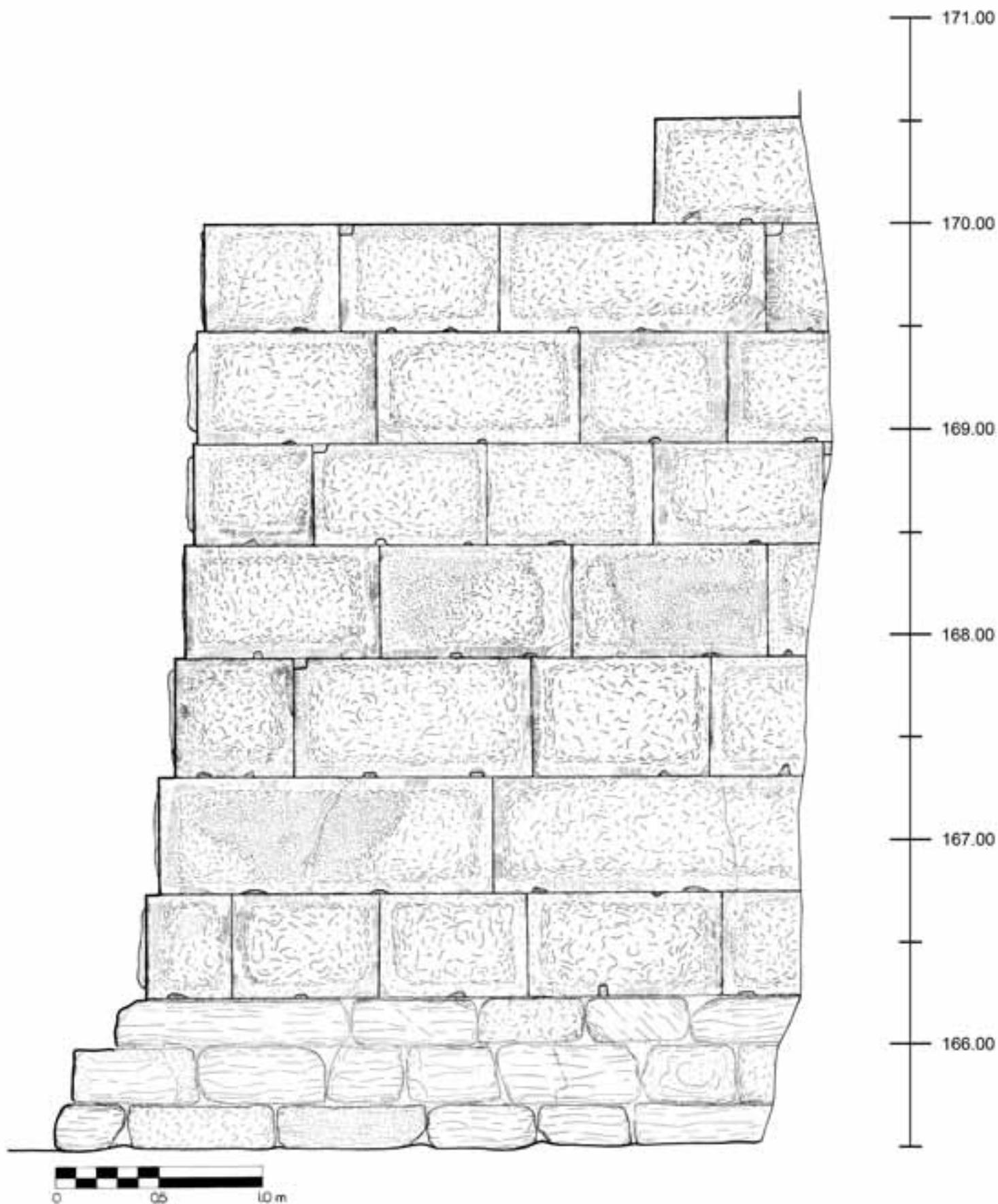


Fig. 181. ByzFort (no. 17): Elevation of Lydian terrace (north face) (scale 1:25)

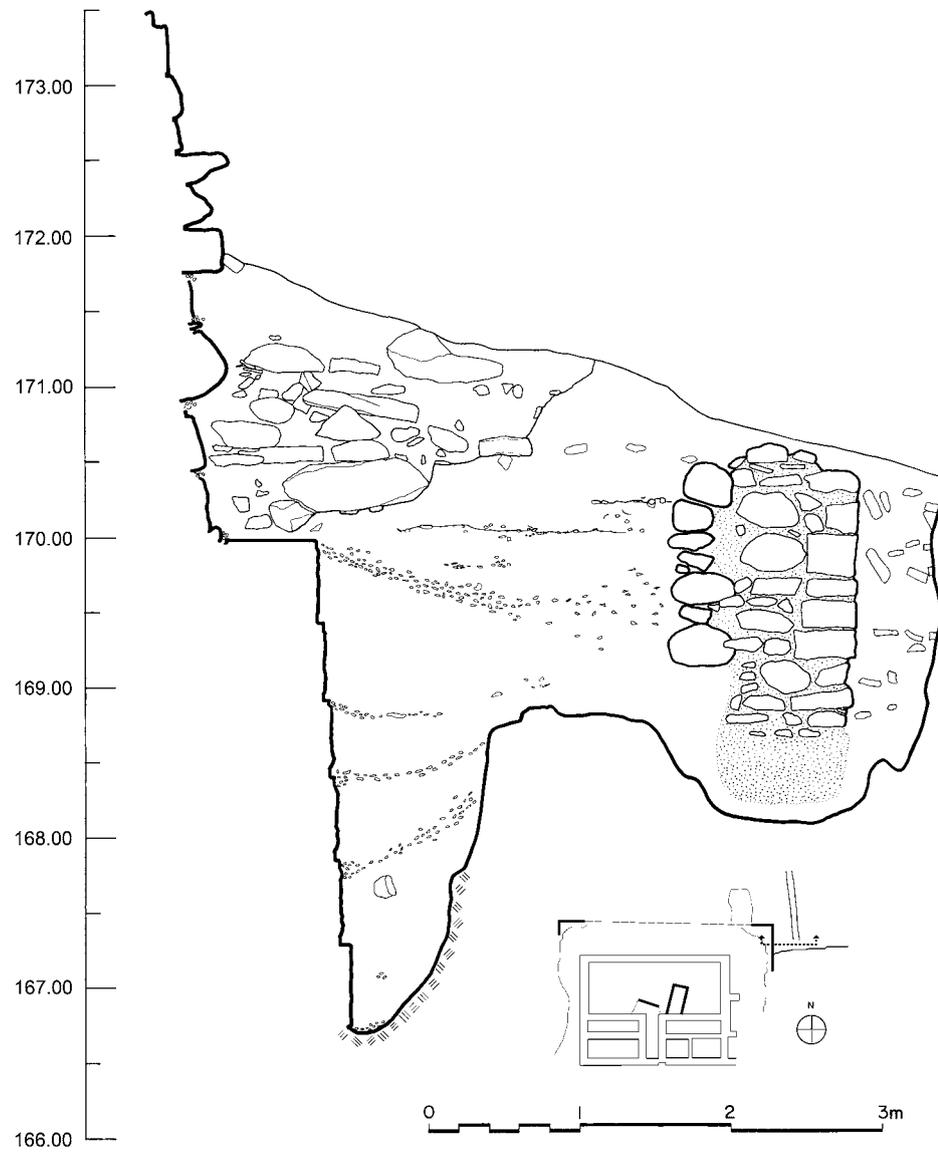


Fig. 182. ByzFort (no. 17): Section through earth in front of east face of Lydian terrace (scale 1:50)



Fig. 183. ByzFort (no. 17): Lydian terrace (north face)



Fig. 184. ByzFort (no. 17): Limestone chip layers in front of east face of Lydian terrace



Fig. 185. ByzFort (no. 17): Northwest corner of Lydian terrace



Fig. 186. ByzFort (no. 17): East side of Lydian terrace

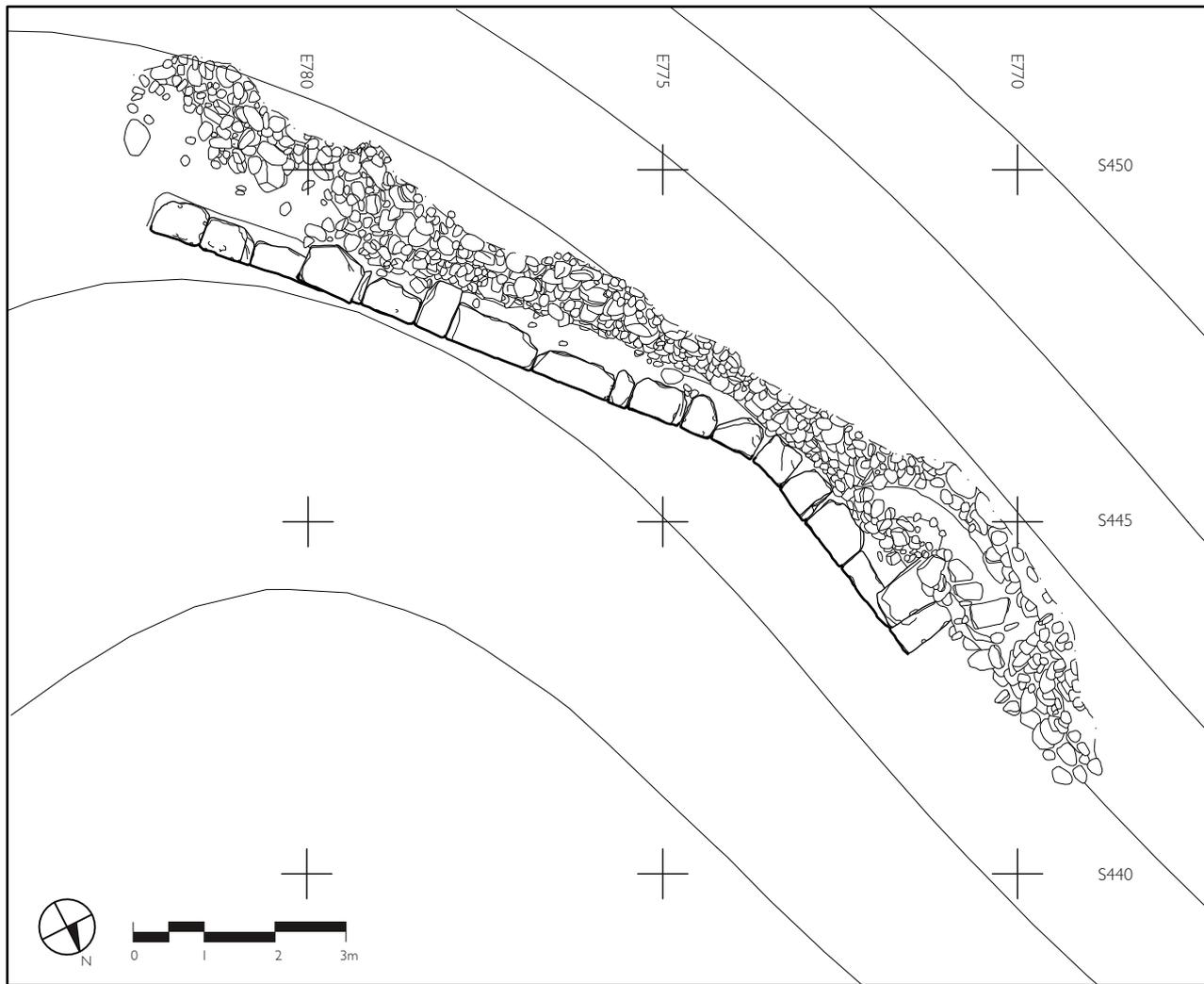


Fig. 187. ByzFort (no. 17): Plan of southern section of Lydian terrace (scale 1:100)

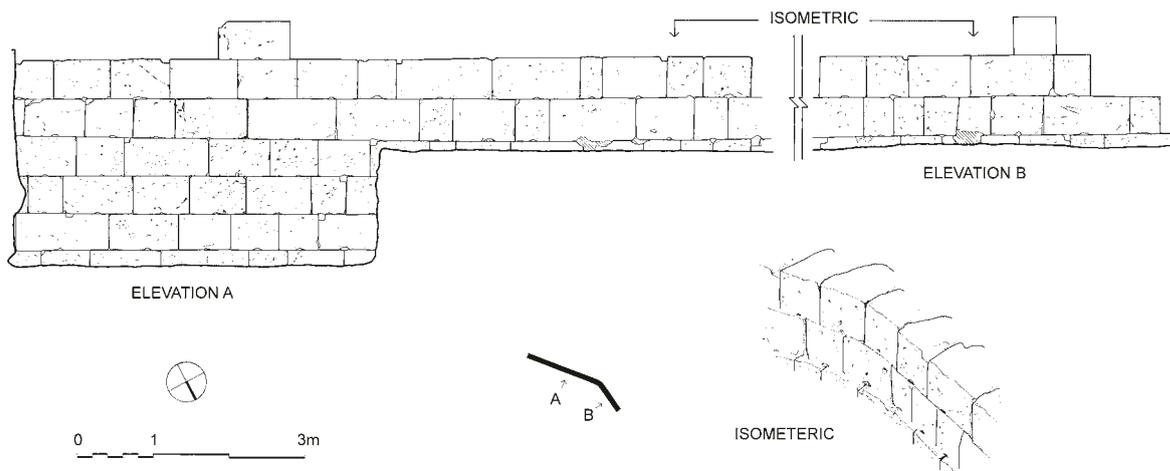


Fig. 188. ByzFort (no. 17): Elevation of southern section of Lydian terrace (scale 1:100)



Fig. 189. ByzFort (no. 17): Southern section of Lydian terrace



Fig. 190. ByzFort (no. 17): Southern section of Lydian terrace



Fig. 191. ByzFort (no. 17): View of top of section of terrace discovered in 2010

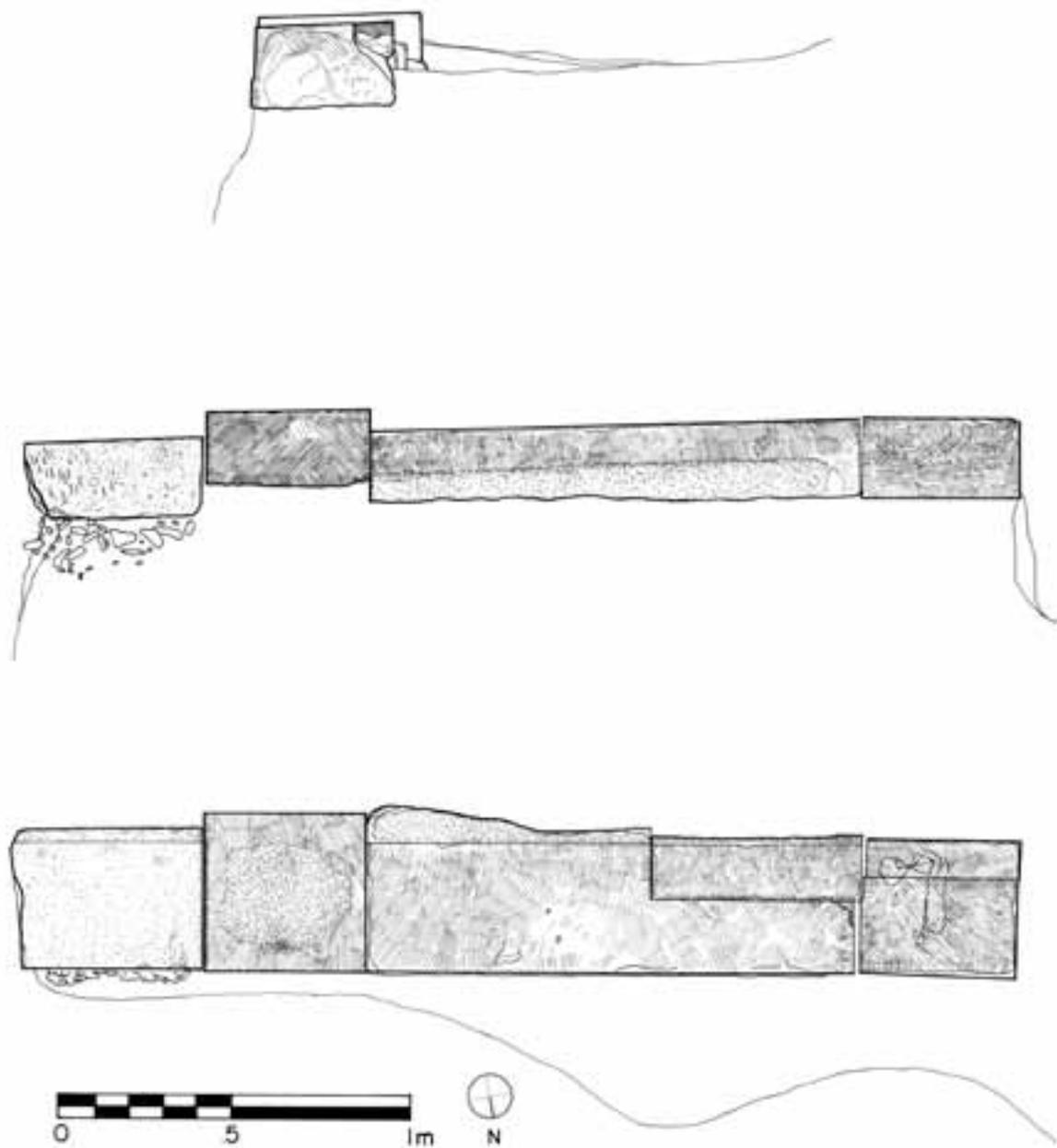


Fig. 192. ByzFort (no. 17): Stylobate on top of hill, plan and sections (scale 1:20)



Fig. 193. ByzFort (no. 17): Stylobate on top of hill, general view

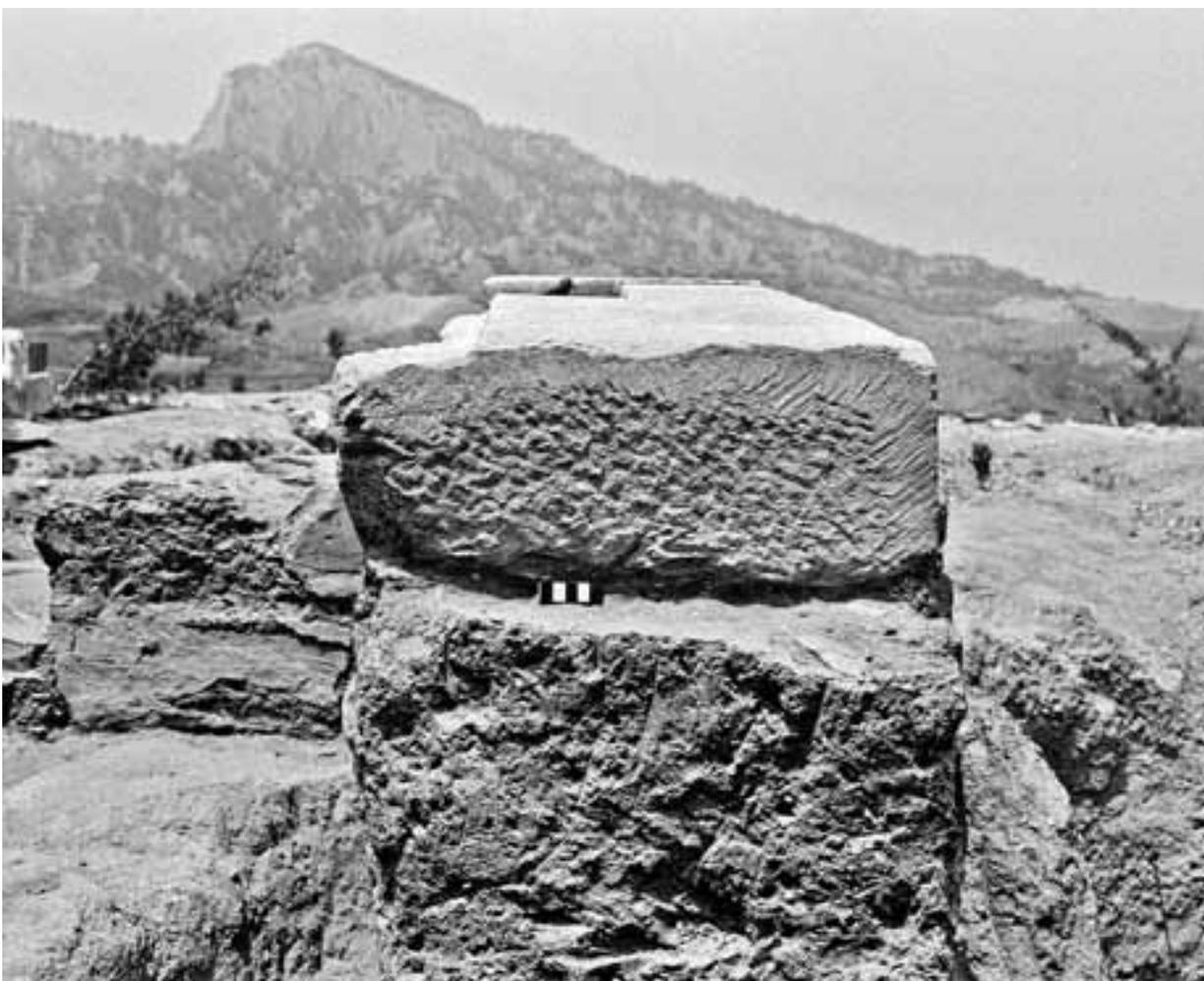


Fig. 194. ByzFort (no. 17): Stylobate on top of hill, detail showing anathyrosis joint

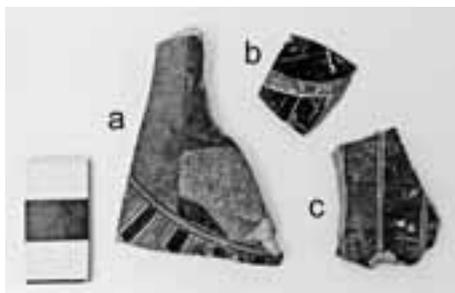


Fig. 195. ByzFort (no. 17): Imported pottery

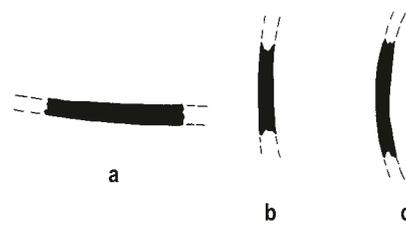


Fig. 196. ByzFort (no. 17): Imported pottery (scale 1:2)

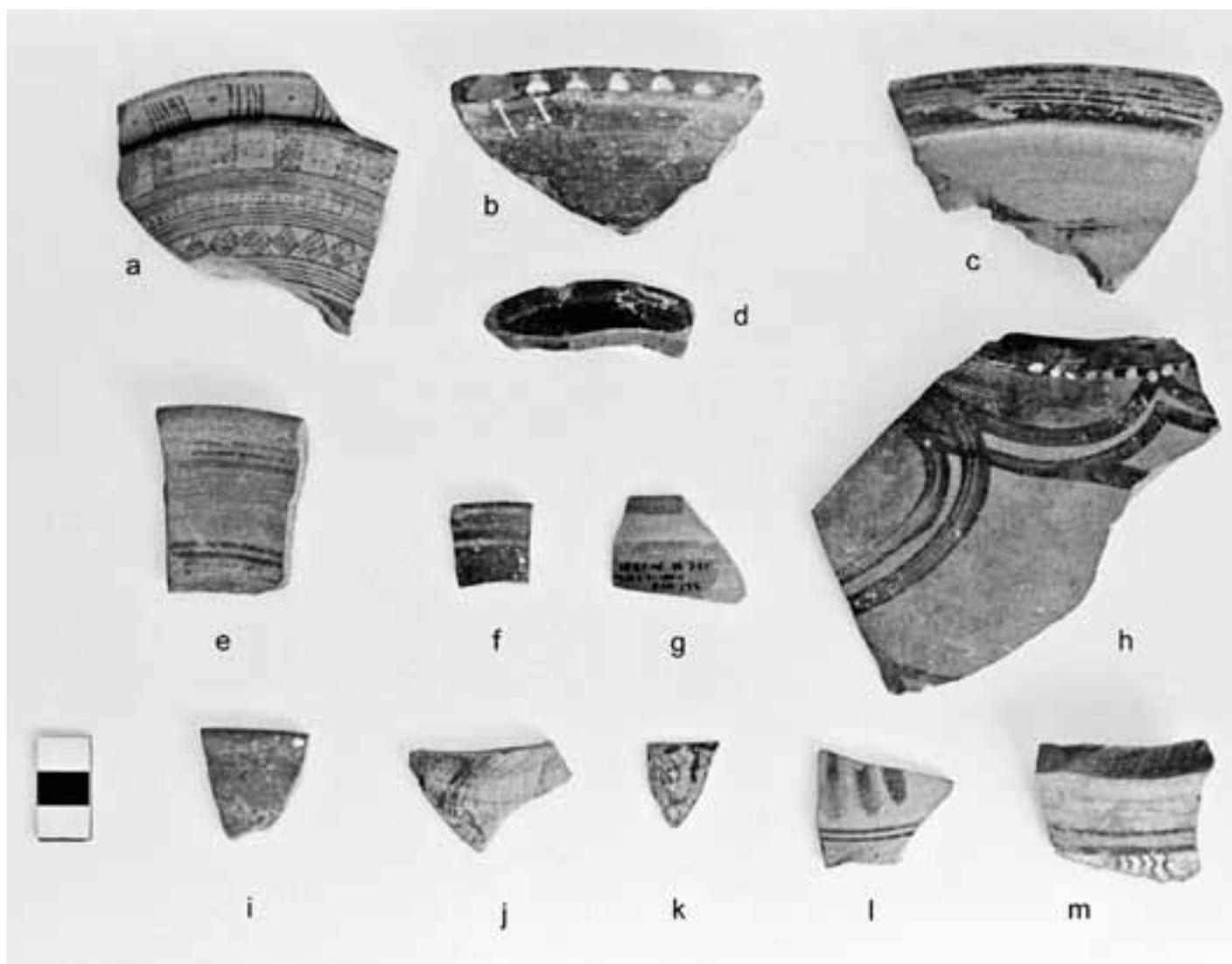


Fig. 197. ByzFort (no. 17): Local pottery



Fig. 198. ByzFort (no. 17): Selected architectural terracottas

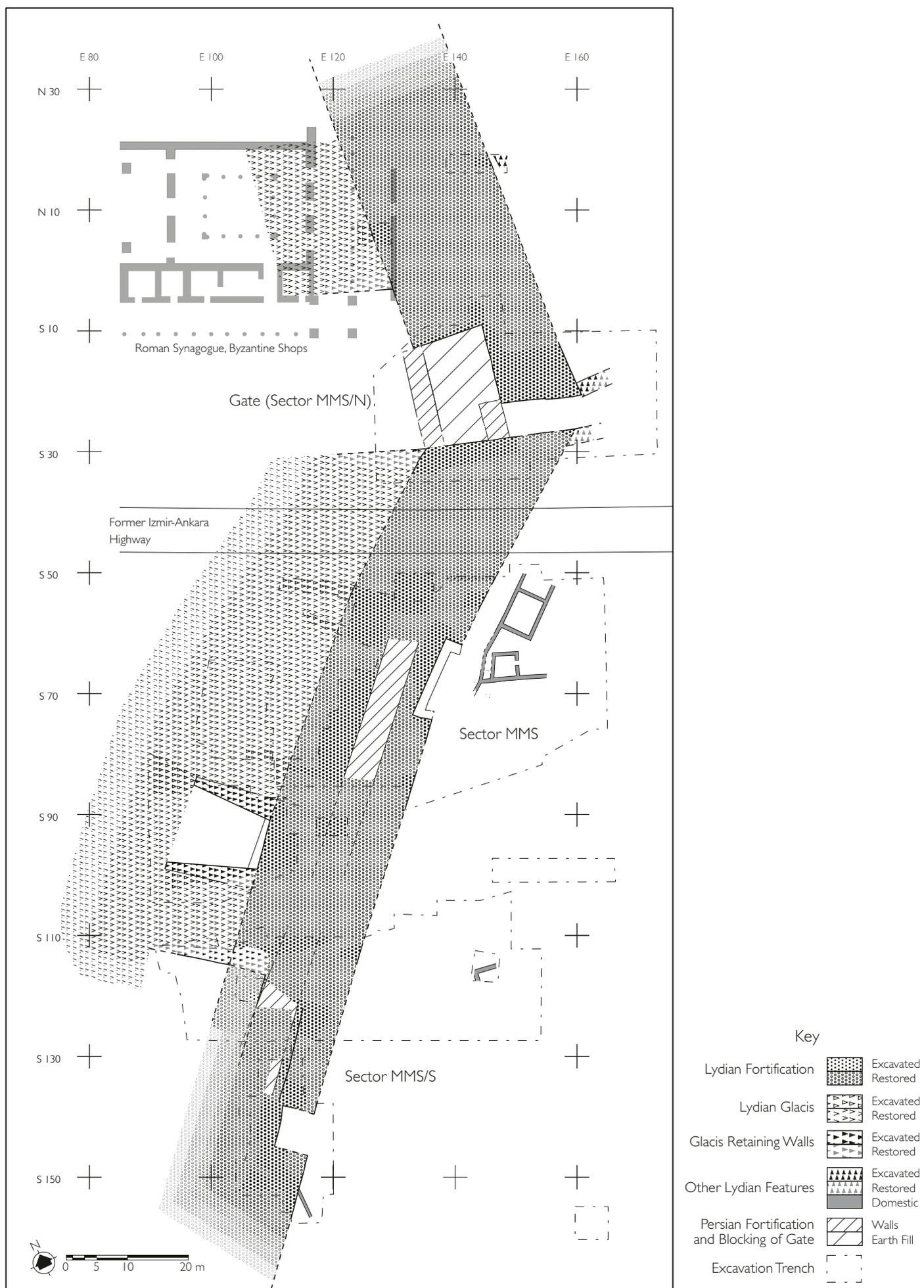


Fig. 199. Sector MMS (no. 18): Plan

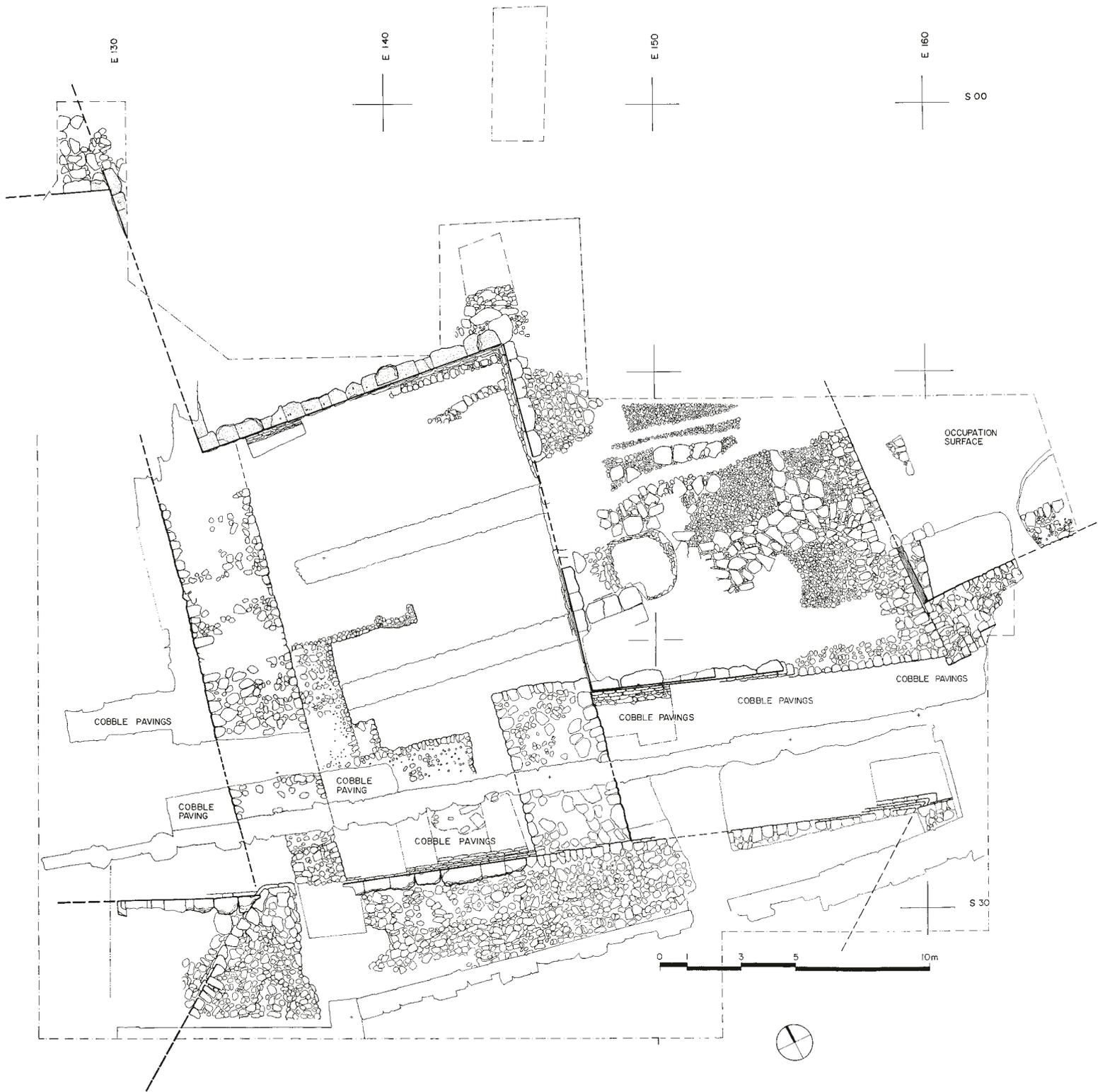


Fig. 200. MMS/N (no. 18): Plan (scale 1:200)

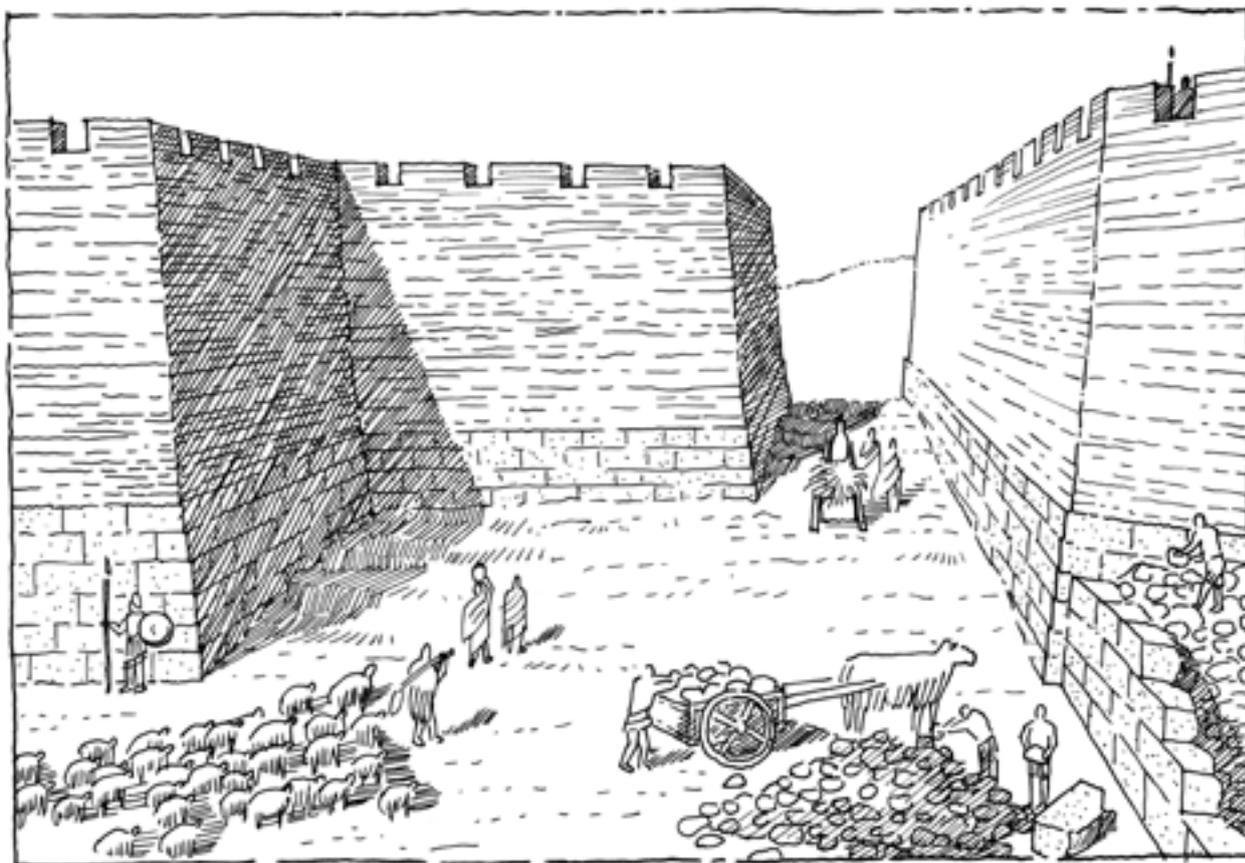
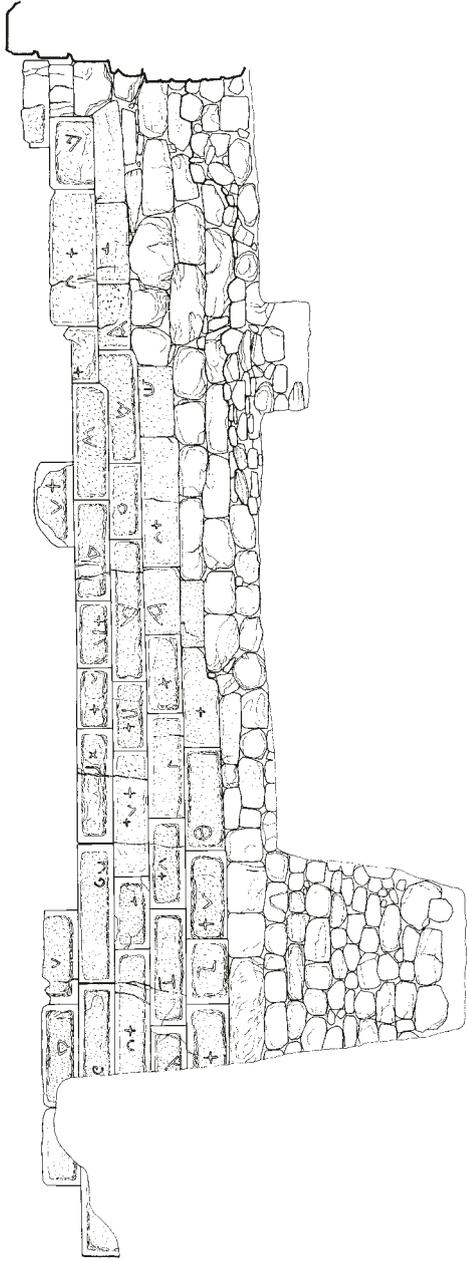


Fig. 201. MMS/N (no. 18): Reconstruction sketch



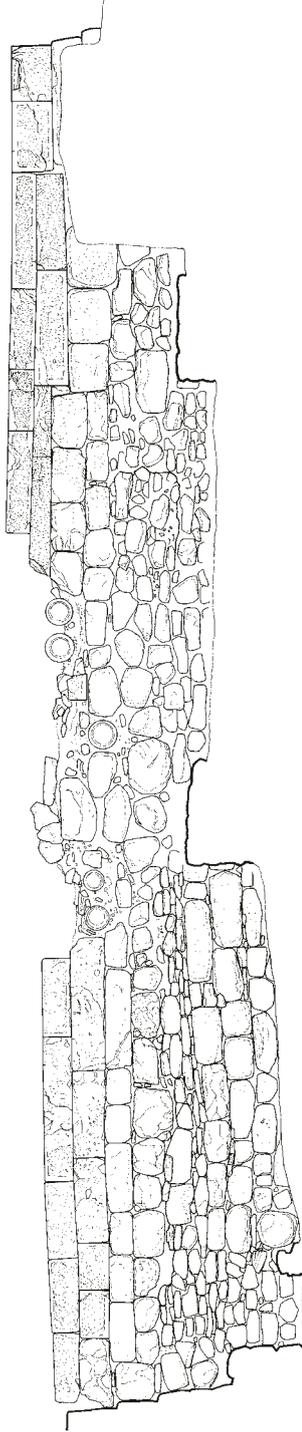
Fig. 202. MMS/N (no. 18): General view, looking east

98
97
96
95
94



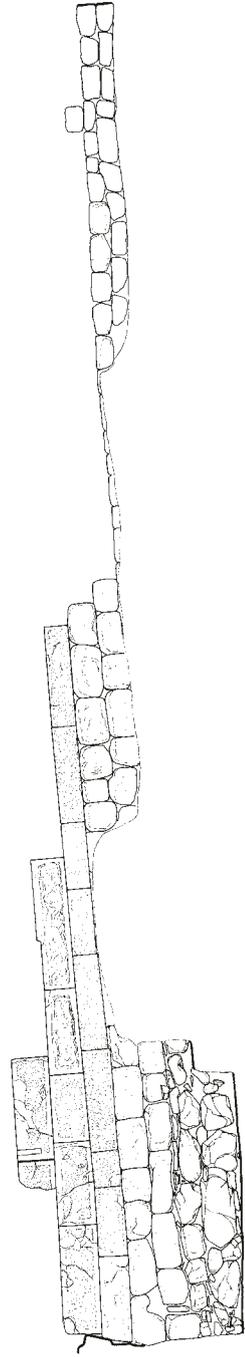
A - LOOKING NORTH

99
98
97
96
95



B - LOOKING EAST

99
98
97



C - LOOKING NORTH

Fig. 203. MMS/N (no. 18): Elevations of limestone and sandstone walls on north side of gate (scale 1:75)

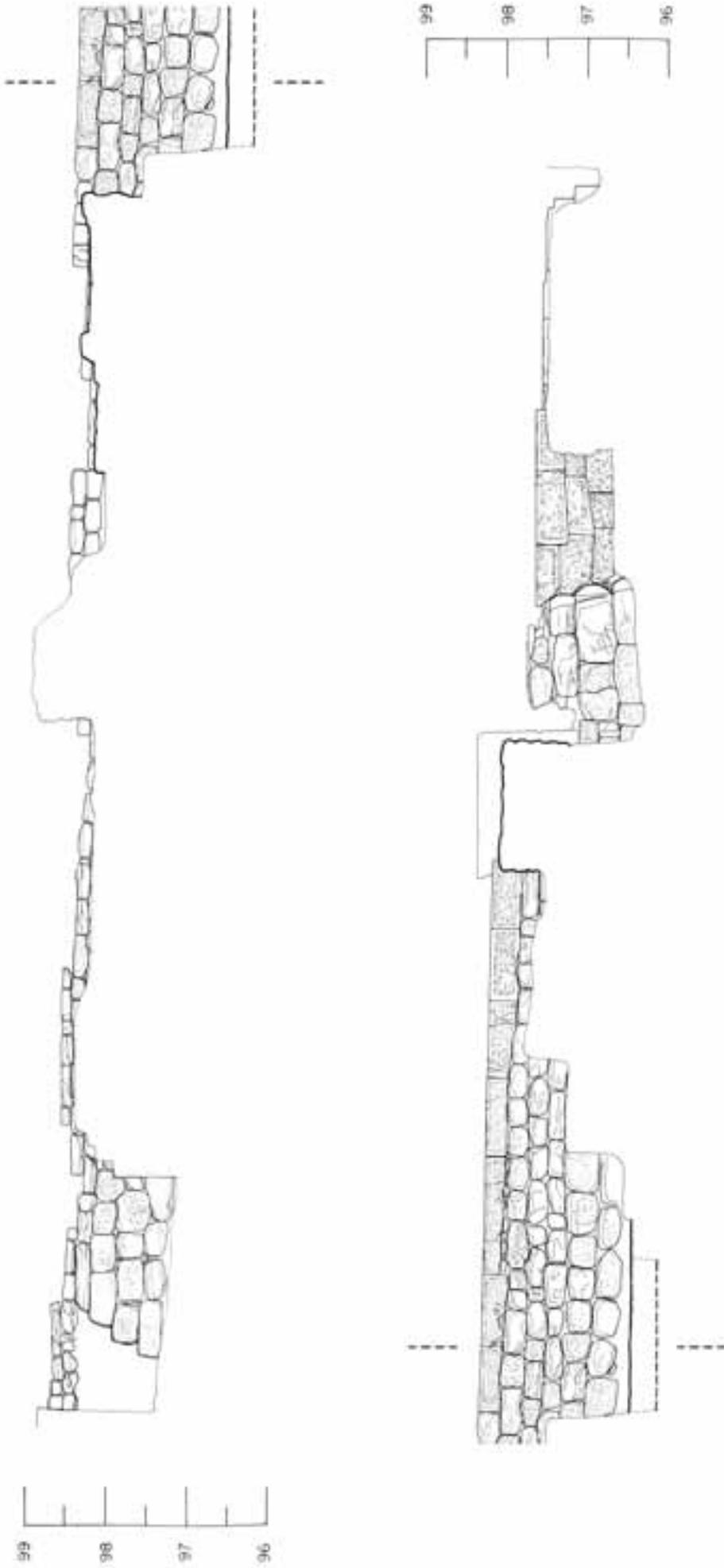


Fig. 204. MMS/N (no. 18): Elevation of limestone wall on south side of gate (scale 1:75)

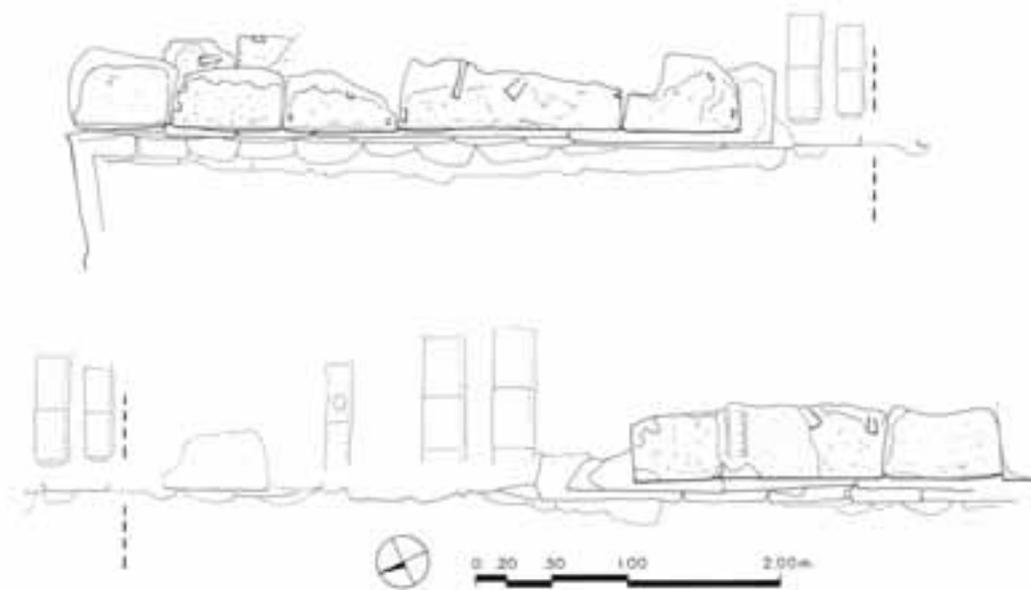


Fig. 205. MMS/N (no. 18): Plan of limestone wall on north side of gate showing clamp cuttings (scale 1:50)



Fig. 206. MMS/N (no. 18): Limestone wall on north side of gate



Fig. 207. MMS/N (no. 18): Sandstone wall on north side of gate



Fig. 208. MMS/N (no. 18): Limestone wall on south side of gate



Fig. 209. MMS/N (no. 18): Strata at base of limestone wall on south side of gate

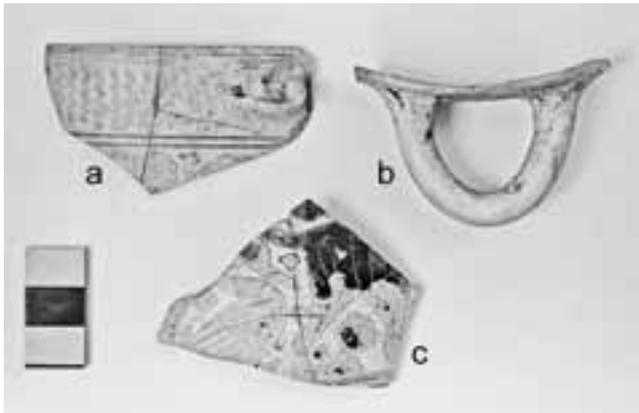


Fig. 210. MMS/N (no. 18): Corinthian pottery

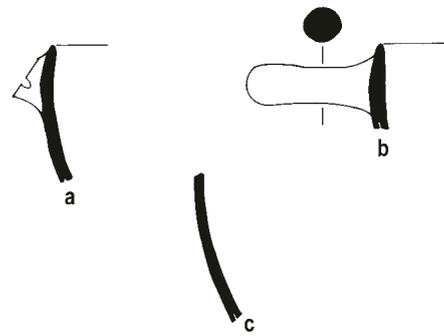


Fig. 211. MMS/N (no. 18): Corinthian pottery (scale 1:2)

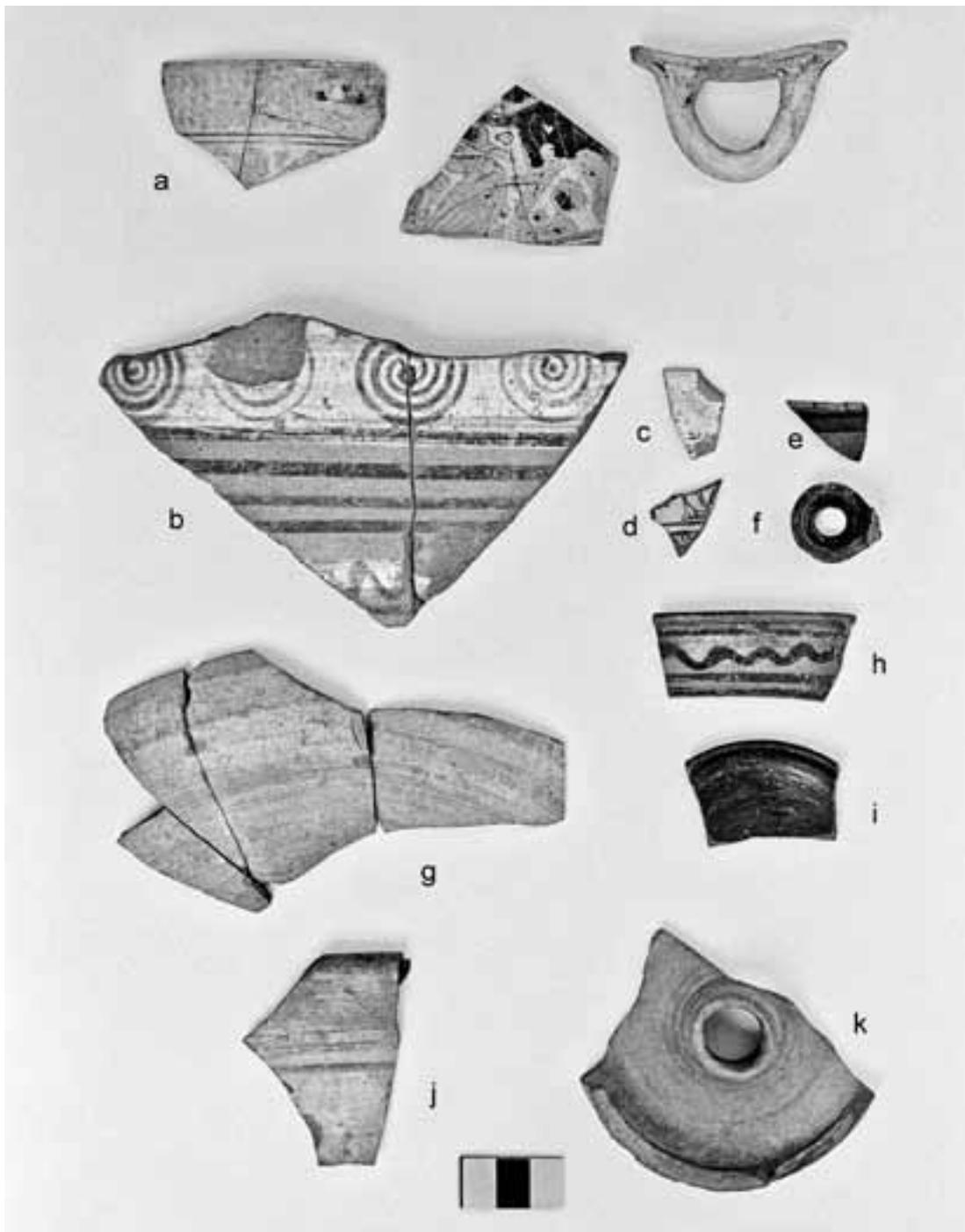


Fig. 212. MMS/N (no. 18): Local and imported pottery



Fig. 213. Mounds at edge of Hermus plain

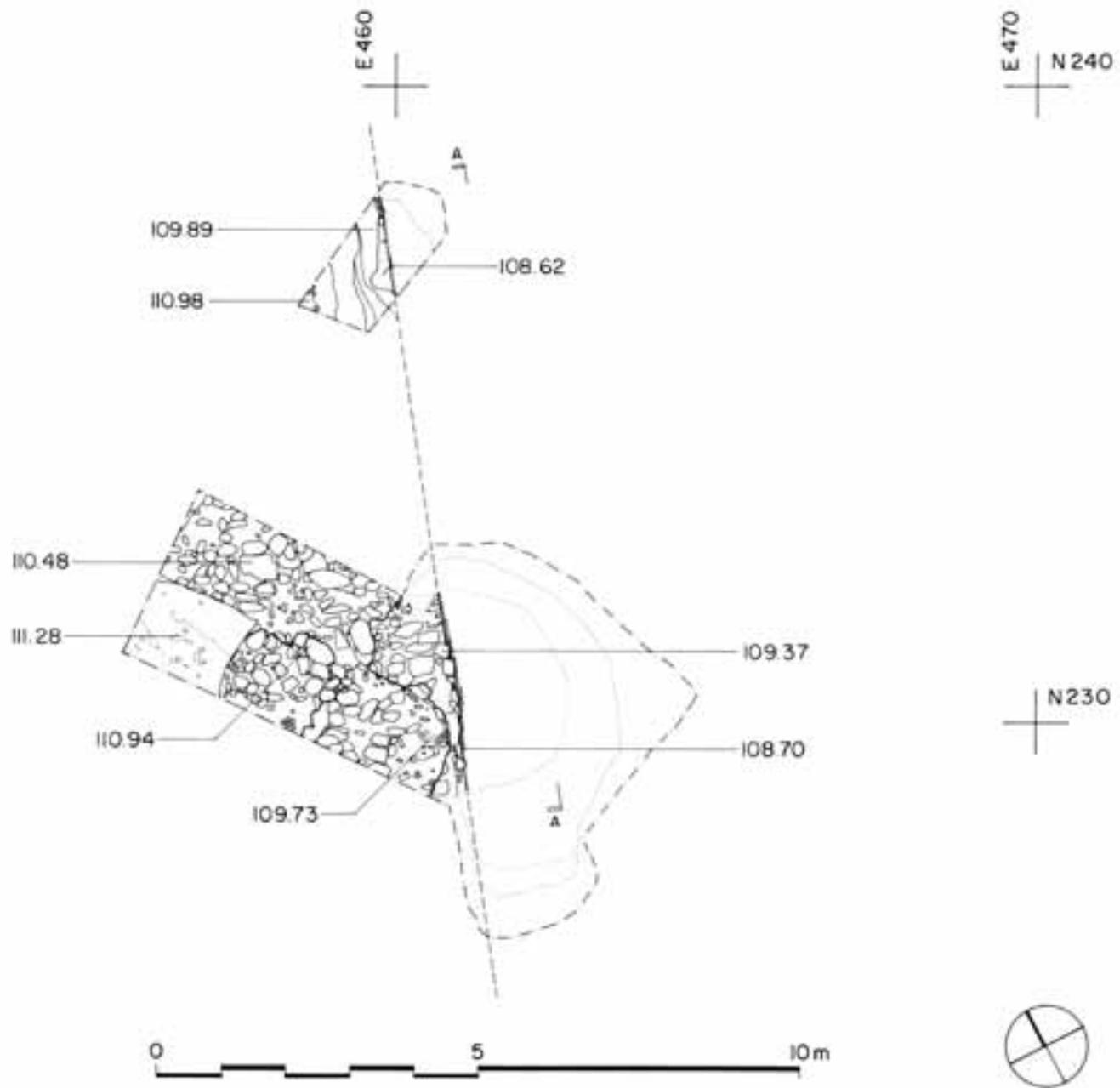


Fig. 214. Mound 2 (no. 19): Plan (scale 1:100)



Fig. 215. Mound 2 (no. 19): Elevation and sections (scale 1:75)



Fig. 216. Mound 2 (no. 19): Limestone masonry



Fig. 217. Wall base molding (App. 1, no. A1a)

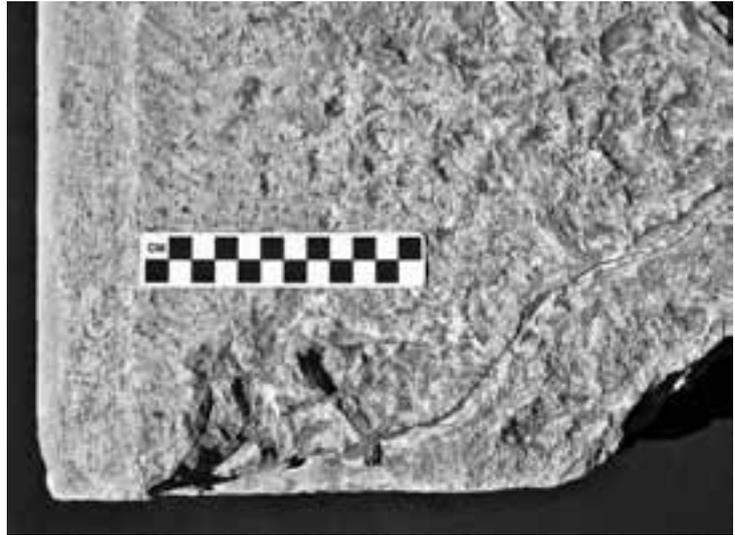


Fig. 218. Wall base molding (App. 1, no. A1a), detail of clamp cutting

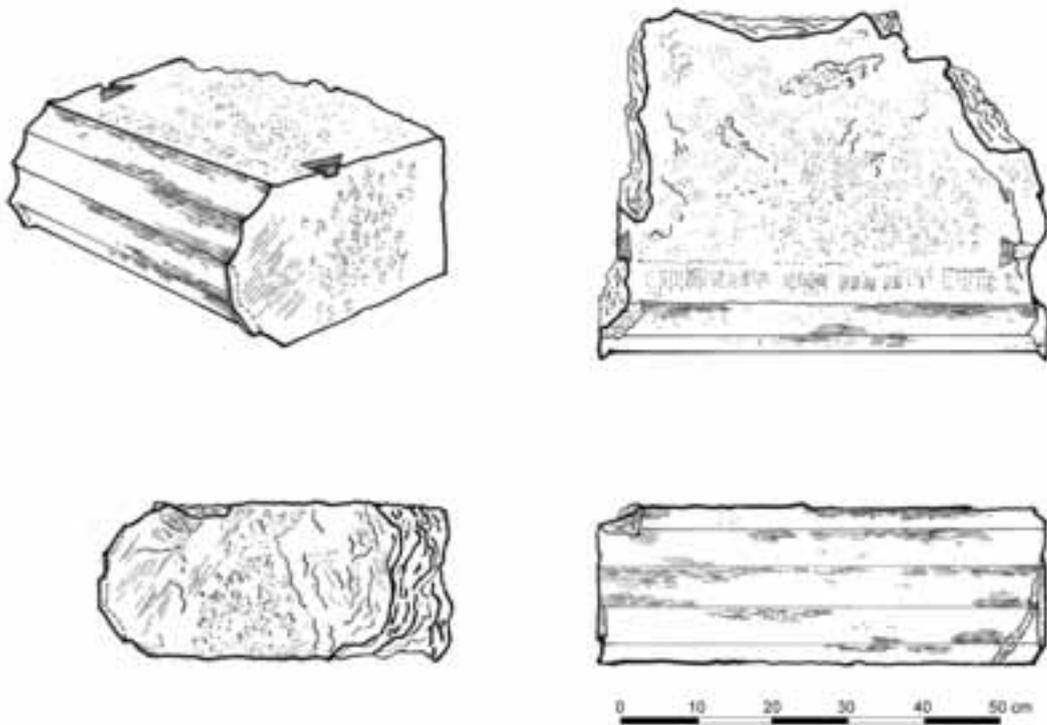


Fig. 219. Wall base molding (App. 1, no. A1a) (scale 1:10)



Fig. 220. Wall base molding (App. 1, no. A1b)

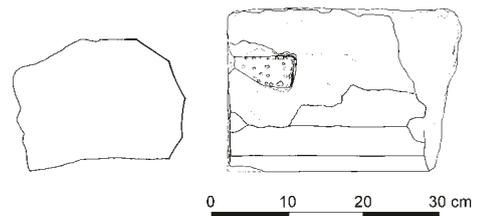


Fig. 221. Wall base molding (App. 1, no. A1b) (scale 1:10)



Fig. 222. Wall base molding (App. 1, no. A1c)

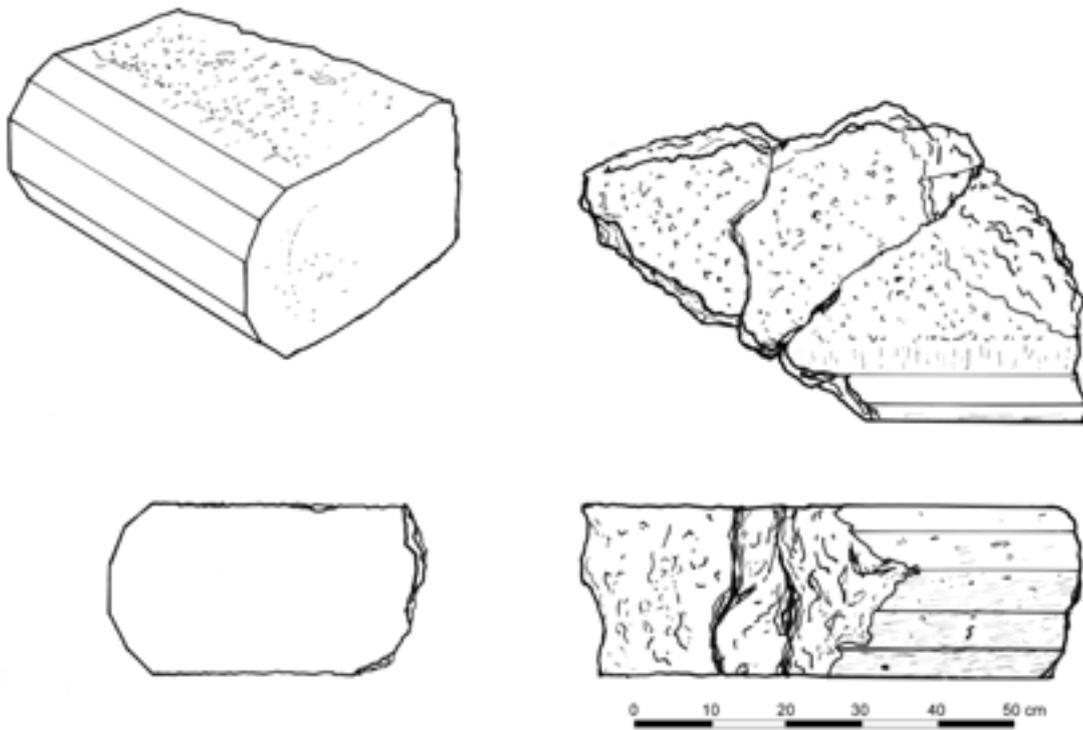


Fig. 223. Wall base molding (App. 1, no. A1c) (scale 1:10)



Fig. 224. Wall base molding (App. 1, no. A1d)

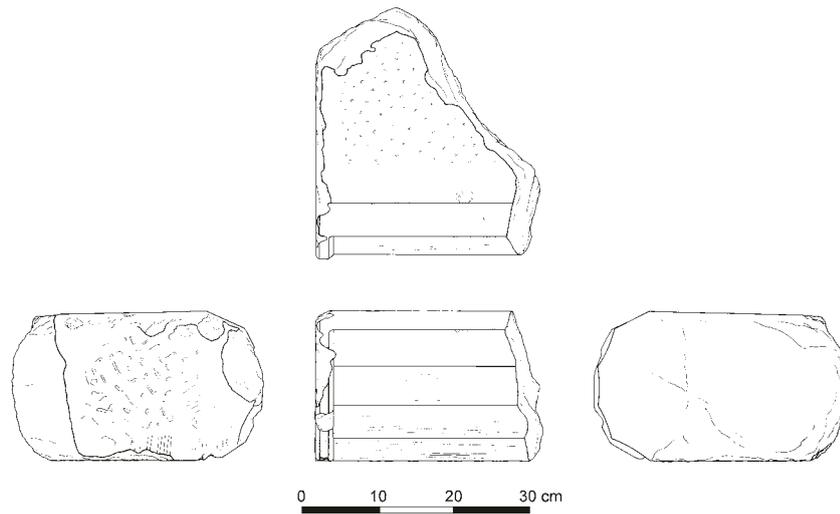


Fig. 225. Wall base molding (App. 1, no. A1d) (scale 1:10)



Fig. 226. Wall base molding (App. 1, no. A1e)

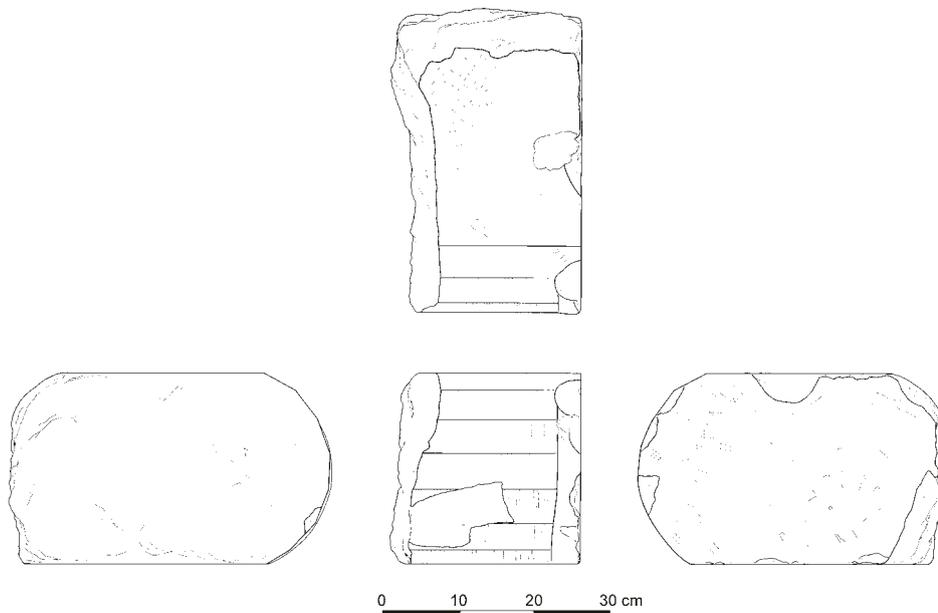


Fig. 227. Wall base molding (App. 1, no. A1e) (scale 1:10)



Fig. 228. Wall base molding (App. 1, no. A1f)

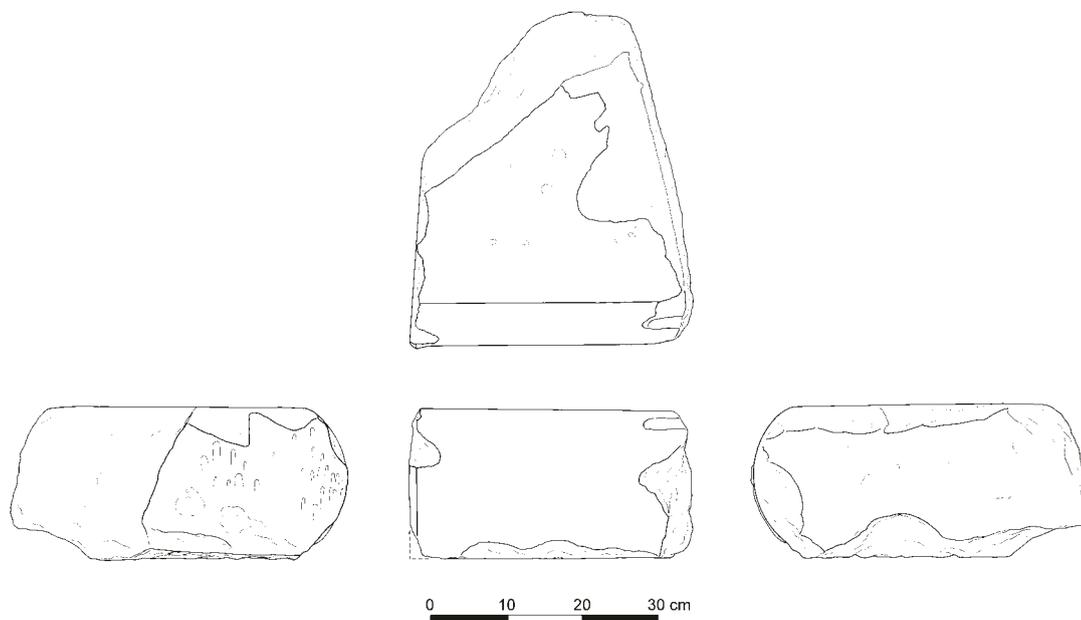


Fig. 229. Wall base molding (App. 1, no. A1f) (scale 1:10)

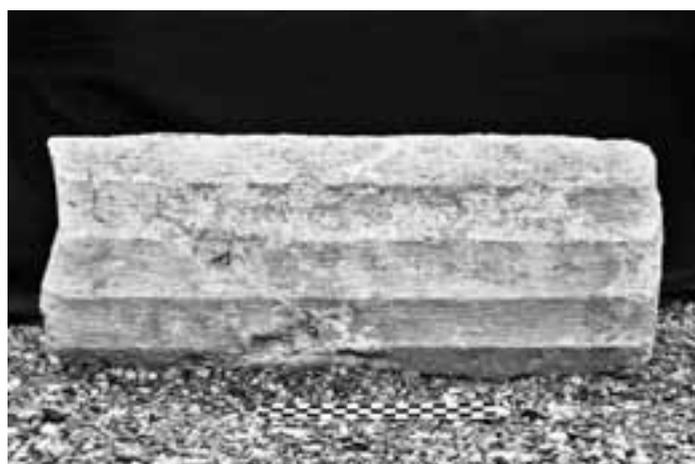


Fig. 230. Wall base molding (App. 1, no. A1g)

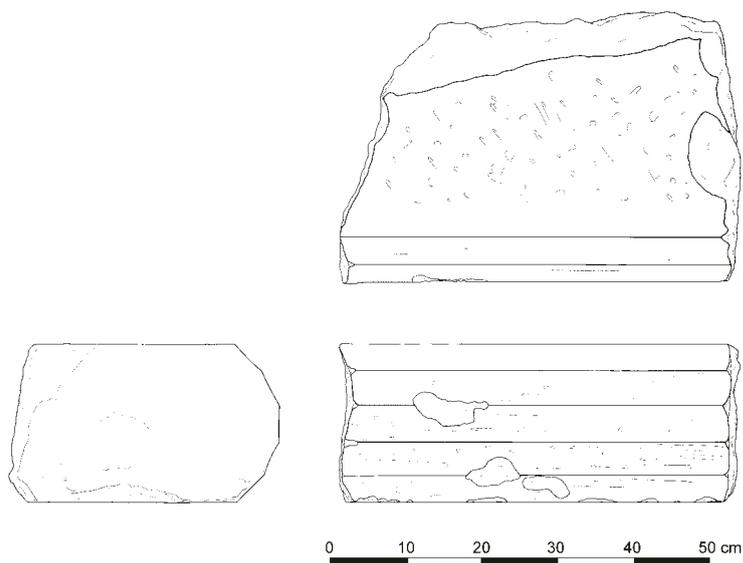


Fig. 231. Wall base molding (App. 1, no. A1g) (scale 1:10)



Fig. 232. Wall base molding (App. 1, no. A2)



Fig. 233. Wall base molding (App. 1, no. A3)

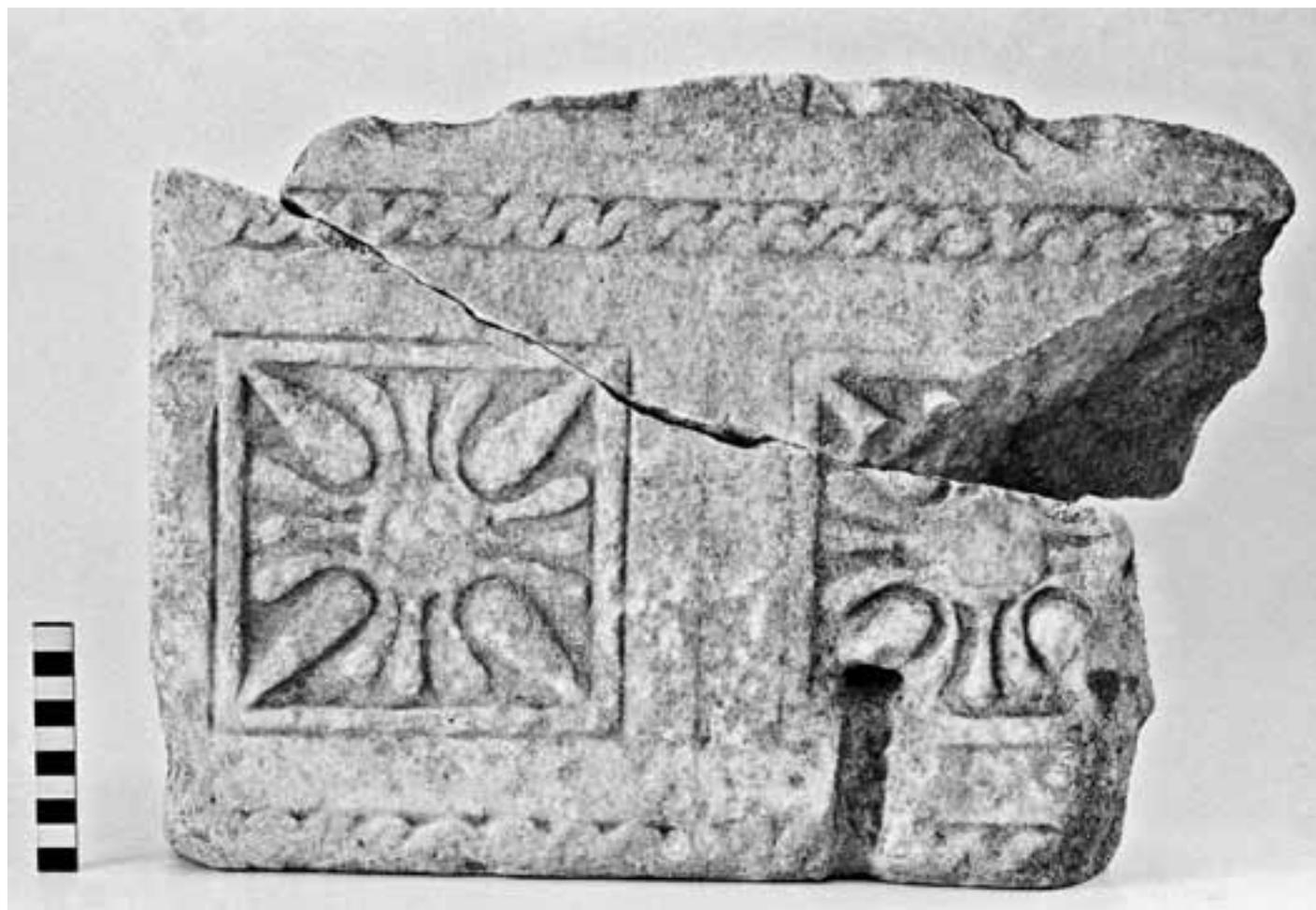


Fig. 234. Threshold block (App. 1, no. A4), fragments a and b



Fig. 235. Threshold block (App. 1, no. A4), fragments a and b (scale 1:10)

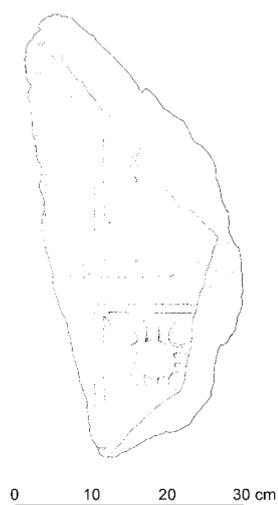


Fig. 236. Threshold block (App. 1, no. A4), fragment c (scale 1:10)

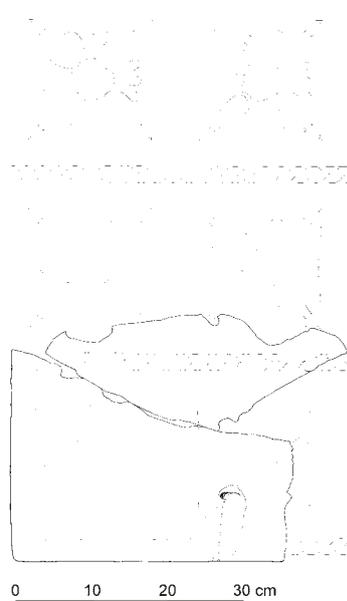


Fig. 237. Threshold block (App. 1, no. A4), fragments a and b, reconstruction (scale 1:10)

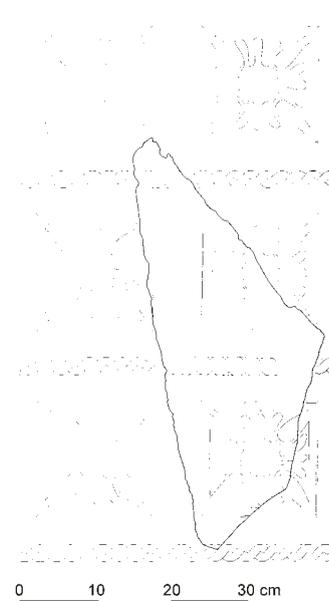


Fig. 238. Threshold block (App. 1, no. A4), fragment c, reconstruction (scale 1:10)



Fig. 239. Corner volute finial (?) (App. 1, no. A5)



Fig. 240. Volute finial (?) (App. 1, no. A6)



Fig. 241. Crowning molding (App. 1, no. A7)



Fig. 242. Crowning molding (App. 1, no. A8)



Fig. 243. Crowning molding: Detail (App. 1, no. A8)

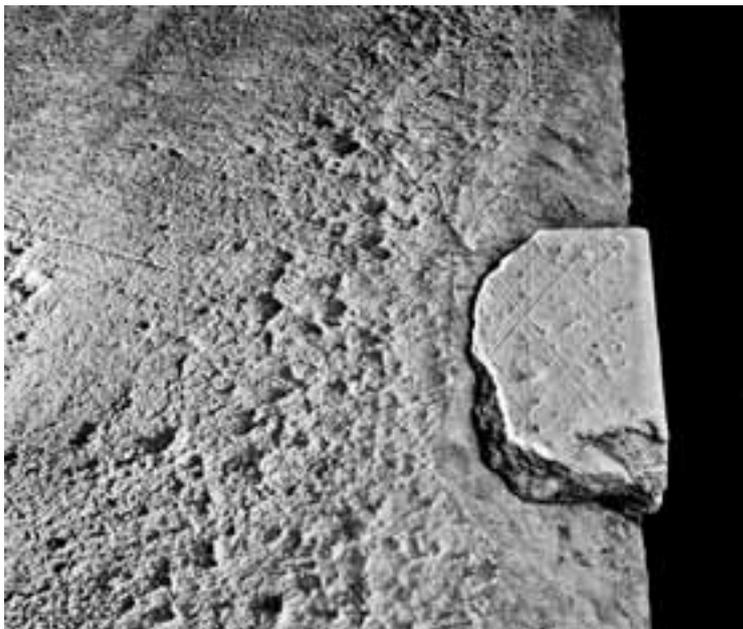


Fig. 244. Crowning molding: Incisions on top (App. 1, no. A8)



Fig. 245. Crowning molding: Plan of top (App. 1, no. A8) (scale 1:10)

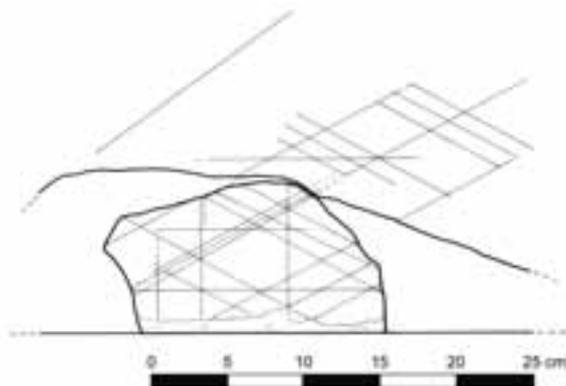


Fig. 246. Crowning molding: Detail showing incisions on top (App. 1, no. A8) (scale 1:5)



Fig. 247. Crowning molding (App. 1, no. A9)

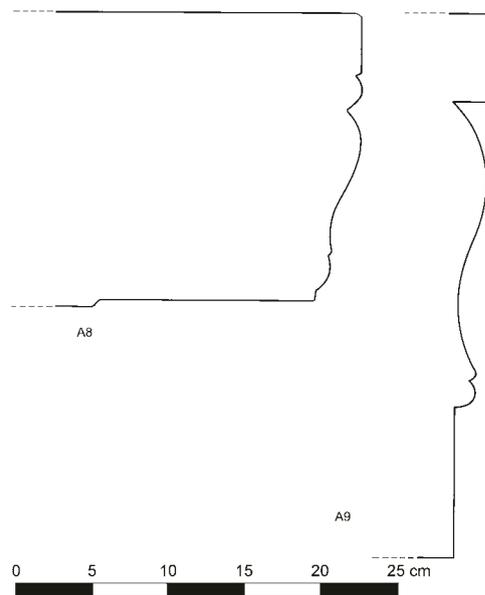


Fig. 248. Crowning moldings (App. 1, nos. A8, A9) (scale 1:5)



Fig. 249. "Aeolic" base or capital (?) (App. 1, no. A10)

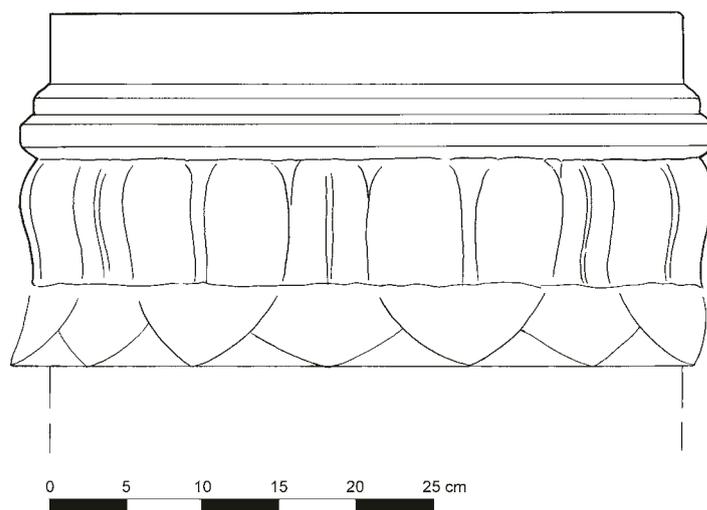


Fig. 250. "Aeolic" base or capital (?) (App. 1, no. A10) (scale 1:5)



Fig. 251. Stele anthemia



Fig. 252. Stele anthemia



Fig. 253. Crowning molding (?) (App. 1, no. A11)



Fig. 254. Table support (?) (App. 1, no. A12)



Fig. 255. Ionic corner capital (App. 1, no. A13)



Fig. 256. Ionic corner capital (App. 1, no. A13)



Fig. 257. Ionic corner capital (App. 1, no. A14)



Fig. 258. Ionic corner capital (App. 1, no. A14)



Fig. 259. Pediment (App. 1, no. A15)



Fig. 260. Pediment: Detail of molding (App. 1, no. A15)

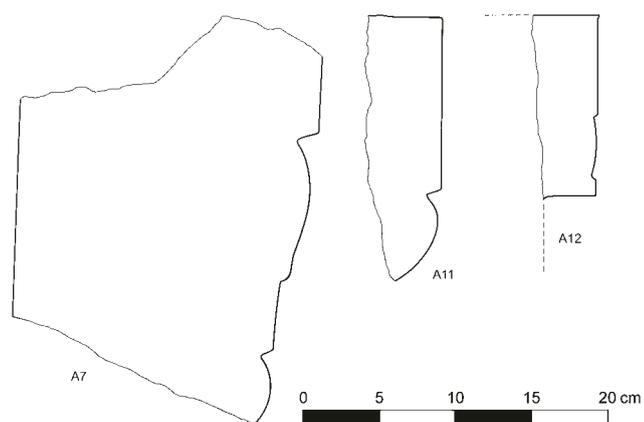


Fig. 261. Selected profiles (App. 1, no. A7, A11, A12) (scale 1:5)



Fig. 263. Naiskos showing goddess in columnar shrine



Fig. 262. Cybele naiskos



Fig. 264. Tomb of Alyattes (no. 1): Trench dug at base of mound in 1993

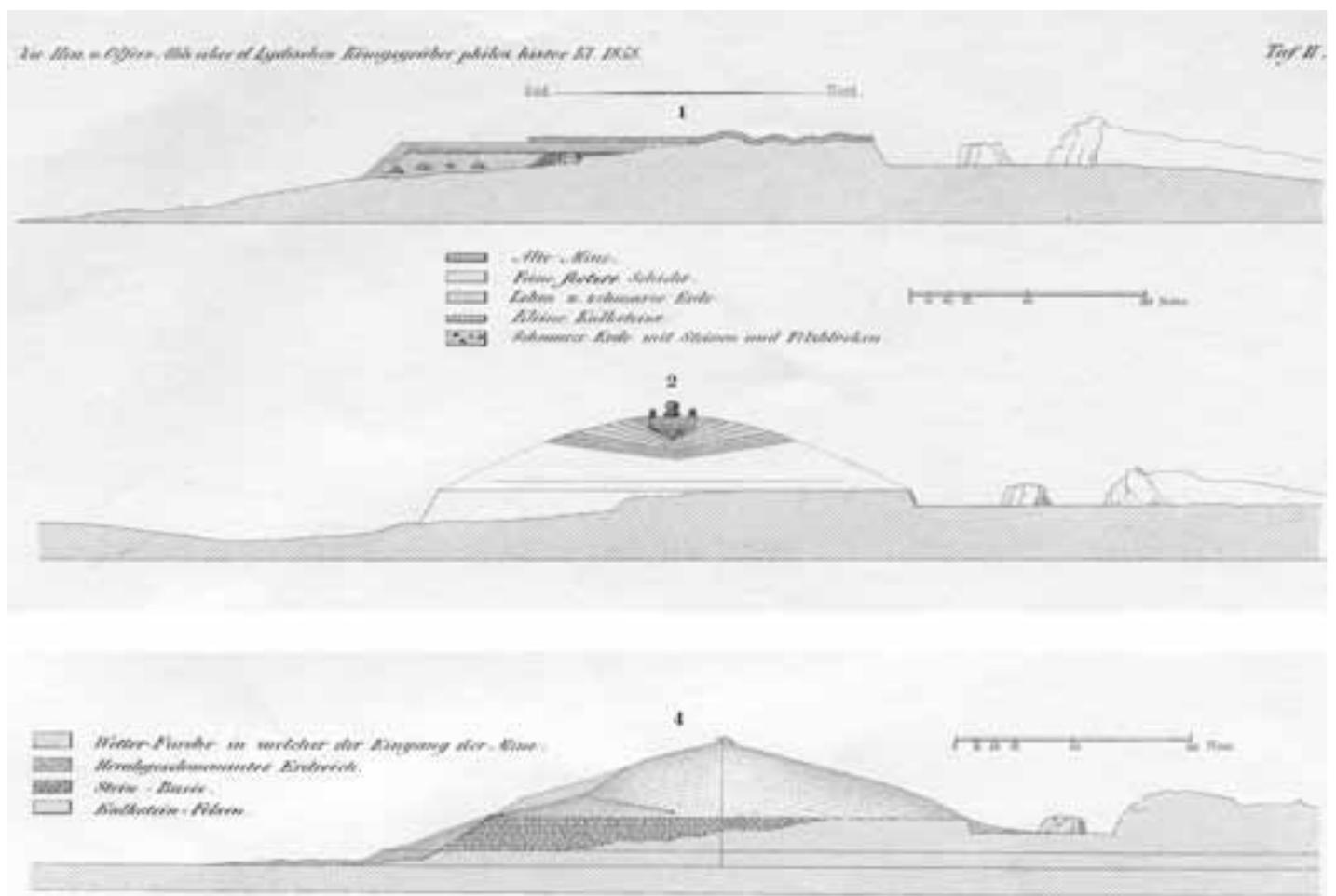


Fig. 265. Tomb of Alyattes (no. 1): Illustrations published by Olfers (Olfers, "Königsgräber," pl. 2)

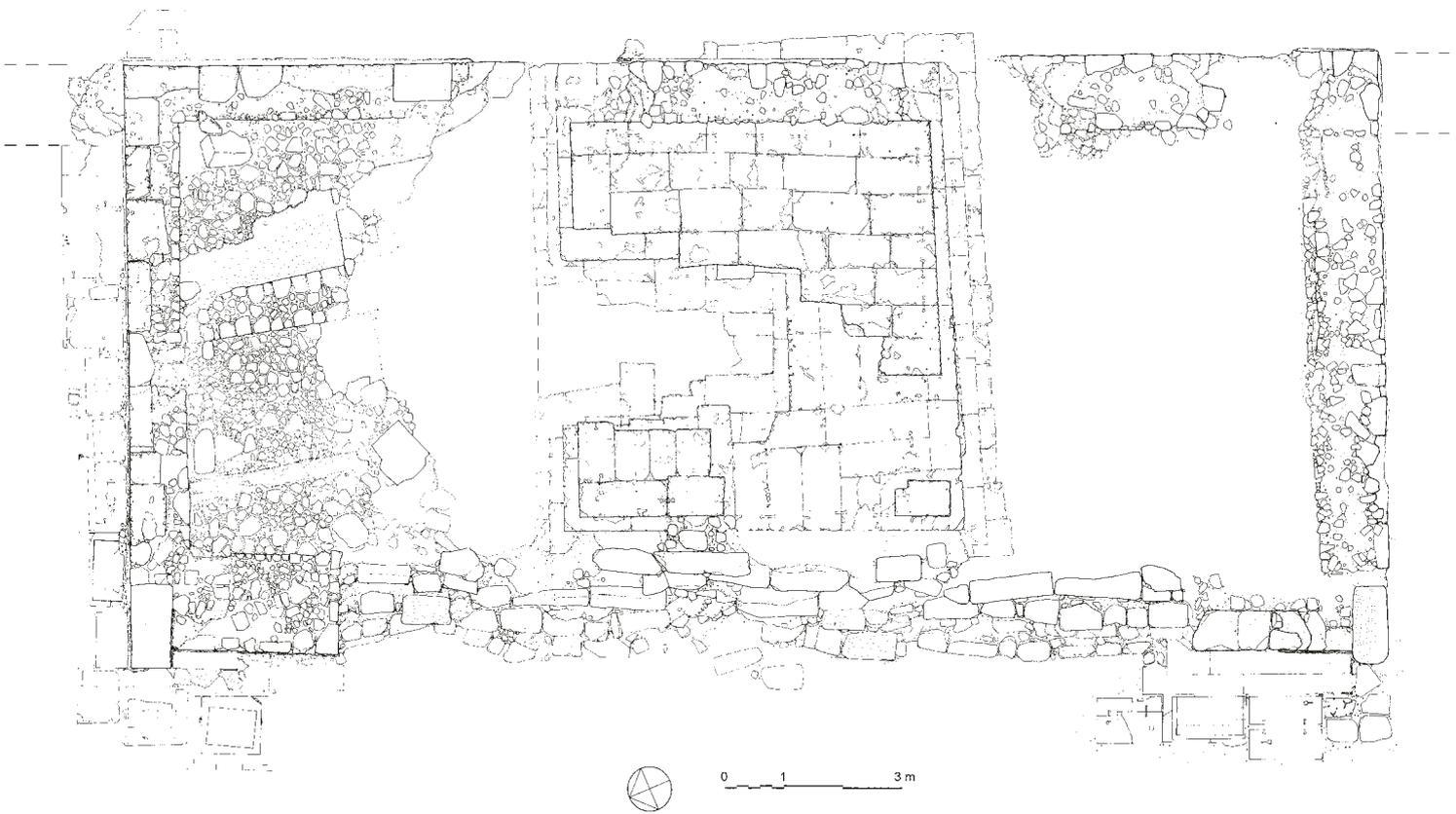


Fig. 266. Lydian Altar: Plan (scale 1:125)



Fig. 267. Lydian Altar: General view



Fig. 268. Lydian Altar: East side

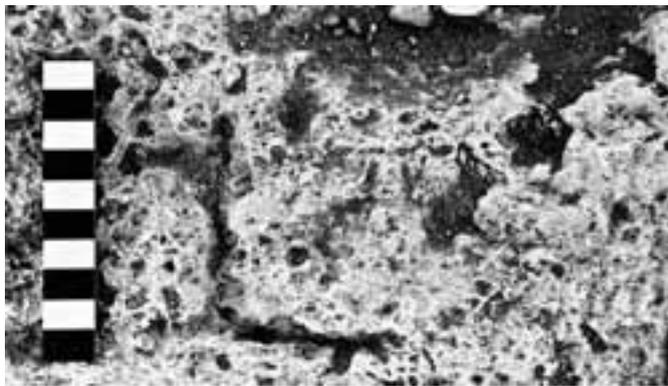


Fig. 269. Lydian Altar: Setting mark



Fig. 270. Lydian Altar: Clamp



Fig. 271. Lydian Altar: Pottery

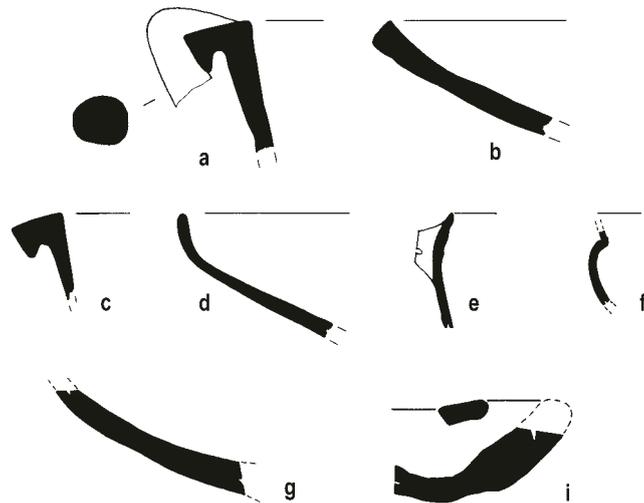


Fig. 272. Lydian Altar: Pottery (scale 1:2)



Fig. 273. Tomb 3 at Salamis in Cyprus: Detail of entranceway



Fig. 274. Tomb V at Tamassos in Cyprus: Detail of entranceway



Fig. 275. The Fortifications of Assur in Mesopotamia



Fig. 276. Sennacherib's aqueduct at Jerwan in Mesopotamia



Fig. 277. Iron Age masonry at Samaria in Israel (Reisner et al., *Excavations at Samaria*, pl. 27a)



Fig. 278. Ashlar wall of seventh-century temple platform at Old Smyrna



Fig. 279. The naiskos of the Croesid temple of Artemis at Ephesus: Detail of corner block



Fig. 280. The altar of Poseidon at Monodendri near Miletus: Detail of enclosure wall

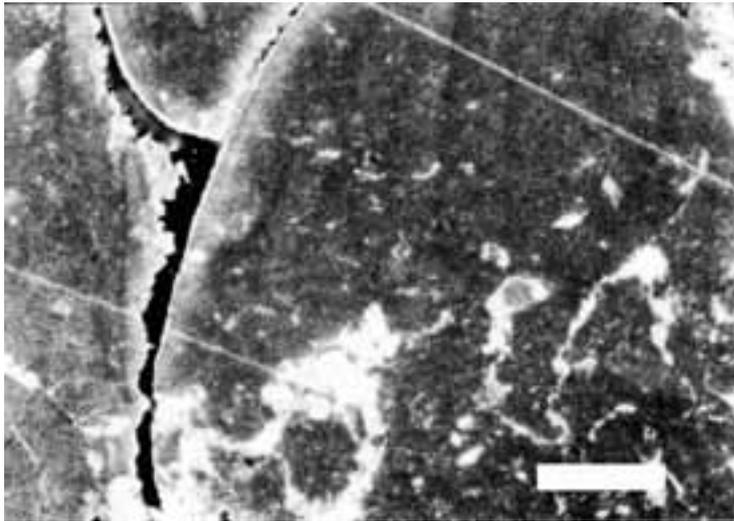


Fig. 281. Archaeological sample AcN 1: Correlation based on the micritic texture, little dissolution, and little quartz (scale bar = 0.5 mm)

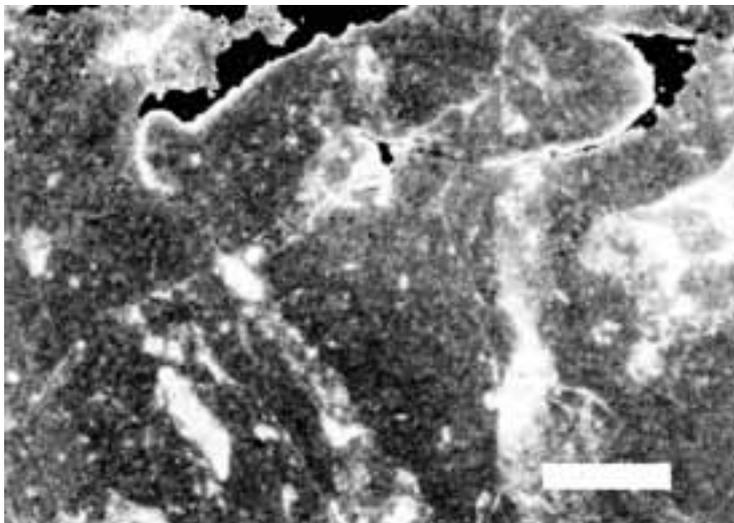


Fig. 282. Quarry sample Y, from east of Karniyarık Tepe (scale bar = 0.5 mm)

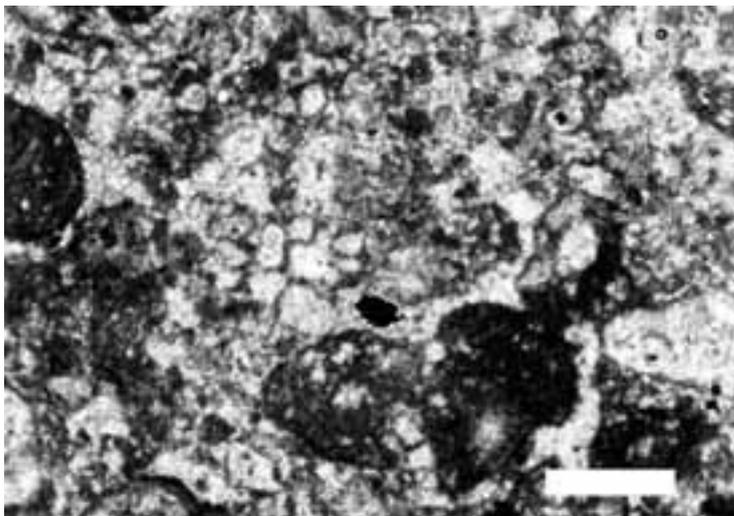


Fig. 283. Archaeological sample MMS/N A3: Correlation based on the pellets, which are themselves pelletal (scale bar = 0.5 mm)

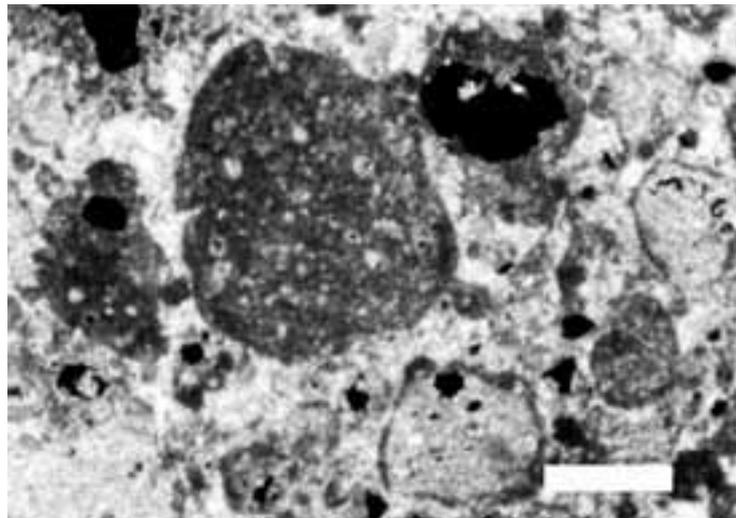


Fig. 284. Quarry sample KT-B, from Karniyarık Tepe (scale bar = 0.5 mm)

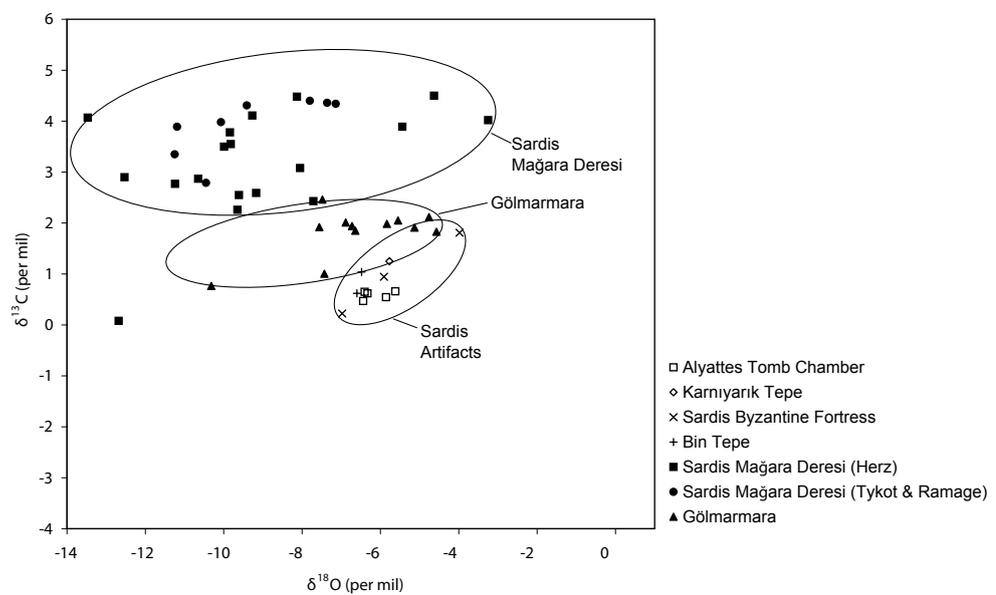


Fig. 285. Isotope ranges of Mağara Deresi and Gölmarmara quarries compared with the isotope values of Lydian marble

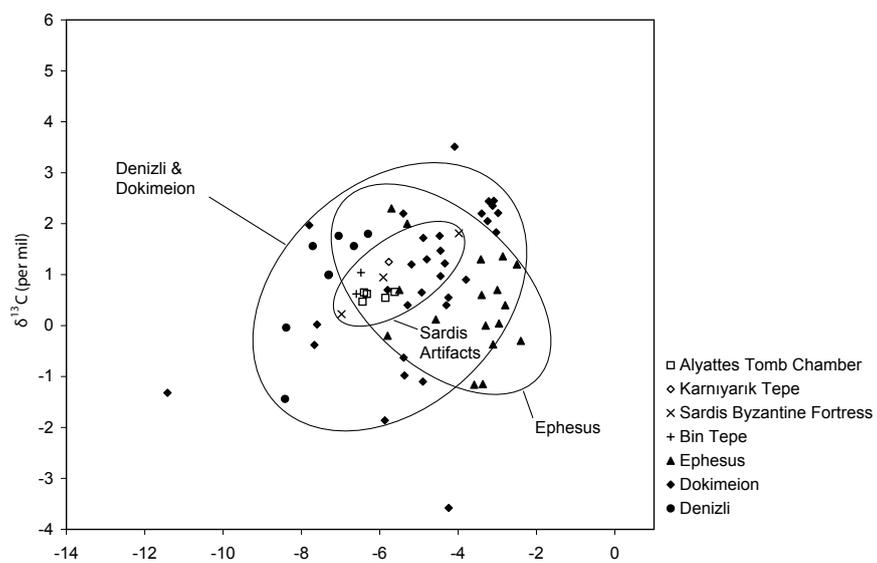


Fig. 286. Isotope ranges of Ephesus, Denizli, and Dokimeion quarries compared with the isotope values of Lydian marble

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