KAVOUSI IIC

The Late Minoan IIIC Settlement at Vronda
Specialist Reports and Analyses



KAVOUSI

The Results of the Excavations at Kavousi in Eastern Crete

directed by

Geraldine C. Gesell, Leslie Preston Day, and William D.E. Coulson

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Digital reconstruction of the LM IIIC settlement at Kavousi Vronda as seen from the west. Visualization created by Sayed Kashif Dafedar.

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by

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Preface

This book is the third volume in the final report of the cleaning and excavations at Kavousi Vronda, conducted between 1983 and 1992 by Geraldine C. Gesell, Leslie Preston Day, and the late William D.E. Coulson. The reports on the houses of the settlement in their context, with focused analyses of specific buildings, can be found in two previous volumes. *Kavousi* IIA describes the buildings on top of the Vronda ridge: Building A-B, Building Complexes C-D and J-K, and Buildings P, Q, and R (Day, Klein, and Turner 2009). *Kavousi* IIB presents the buildings on the slopes of the Vronda ridge: Building Complexes E, I-O-N, and L-M, Building F, and the pottery kiln, as well as areas excavated on the periphery that did not belong to any of these buildings (Day and Glowacki 2012). Detailed analyses of the architecture, pottery, other finds (including figurines and stone tools), and botanical and faunal remains are presented here, along with a complete history of the site and an attempt to reconstruct the social, political, and religious organization of the Late Minoan (LM) IIIC settlement. For building and room designations, the reader should consult the previous two volumes, which also present the analysis of the stratigraphy that serves as the basis for the assignment of the material into chronological phases and periods. Pottery and objects are discussed in this volume using the catalog numbers given in the first two volumes. In each case, the catalog number has a letter designation for the building in which the object was found (e.g., A, B, C, and so on) followed

by the room number (e.g., C1, C2, C3, and so on) and then a letter designation: P for pottery, TC for terracotta, F for figurine, S for stone, ST for stone tool, M for metal, and G for glass; any individual object or building thus can be easily located in *Kavousi* IIA and *Kavousi* IIB. All of the objects are discussed fully here, with illustrations (figures and/or photographs), some of which are repeated from *Kavousi* IIA and *Kavousi* IIB. Objects are arranged on figures according to types, and within those types they are grouped by similarity of features (e.g., size, preservation, diagnostic parts). Only some of the pottery is illustrated since drawings of all cataloged ceramics appear in the first two volumes; figures of major shapes in each period and some of their variations are provided here.

Reports on the LM IIIC Shrine (Building G) and the later cemeteries at Vronda are being prepared as separate books. The Kavousi series also includes volumes on the excavations on the Kastro, a site high on the mountain above and to the east of Vronda, and another volume presents the material from the tombs on the slopes surrounding the Kastro that were recovered by earlier archaeologists.

A history of excavations at Kavousi can be found in *Kavousi* I (Haggis 2005, xvii–xix) and *Kavousi* IIA (Day, Klein, and Turner 2009, xxv–xxviii, 3–5) and will not be repeated here. Information on the topography of the site, the methodology employed in excavation, the cataloging of finds, and the presentation of the material in this publication are to be found in the first volume on the Vronda settlement (Day, Klein, and Turner 2009, 1–14). The fabric types referred to in this report appear in the appendix to *Kavousi* IIA (Mook and Day 2009).

The list of acknowledgments for the three volumes on the LM IIIC settlement at Vronda is presented in *Kavousi* IIA (Day, Klein, and Turner 2009, xxix–xxxv), and additional acknowledgments follow. Peter Day and David Wilson helped with the identification of the Prepalatial pottery, Donald Haggis and Carl Knappett with the Protopalatial pottery, and Kellee Barnard and Emilia Oddo with the Neopalatial pottery. Their comments were insightful, but any faults in the final discussion are the responsibility of the author. Heidi Dierckx would like to thank Vasilis Tsikouras, Charalambos Fassoulas, and Yannis Bassiakos for helping with understanding the geology of the area and for providing identification of the raw materials used for the stone tools. Her thanks also extend to Maria Emanuela Alberti for help with the Type 11 possible balance weights. Finally, she is grateful for the help of Elizabeth Warkentin and Ashley Cesta in scanning the inkings of the tools. Kevin Glowacki and Nancy Klein wish to thank Melissa Eaby for panoramic photos from the Vronda summit, Sabine Beckmann for insights on topography and inter-site visibility, Sayed Kashif Dafedar for his work on the digital reconstruction of the Vronda settlement, and Ryan Collier, Matthew Hurley, Shireen Kanakri, Matthew Miller, Megan Oehrlein, and Mark Willingham for assistance with the architectural illustrations and estimates of vessel capacities. Geraldine Gesell would like to express her appreciation for the assistance of the director, Thomas Brogan, and the staff of the INSTAP Study Center for East Crete during her study and preparation of the manuscript on the figurines. In particular she would like to thank Eleanor Huffman for both preparing the figures and plates for this chapter and her assistance with the digital problems involved in this and in general throughout her years of study there. She would also like to thank Nota Dimopoulou-Rethemiotakis, the Director of the Heraklion Museum in 2005 at the time the study of the comparanda figurines was made, and her staff for their helpful assistance in the study of the material from Hagia Triada, Karphi, and Patsos.



List of Abbreviations

The following chronological abbreviations are used. Early Neolithic and Middle Neolithic dates are based on Tomkins 2007b; Final Neolithic and Bronze Age dates are based on Warren and Hankey 1989 and Nowicki 2002a.

EN	Early Neolithic (ca. 6500–5900 B.C.)
MN	Middle Neolithic (ca. 5900–5300 B.C.)
LN	Late Neolithic (ca. 5300–4500 B.C.)
FN	Final Neolithic (ca. 4500–3200 B.C.)
EM	Early Minoan (ca. 3200–2100 B.C.)
MM	Middle Minoan (ca. 2100–1600 B.C.)
LM	Late Minoan (ca. 1600–1100 B.C.)
SM	Subminoan (ca. 1100–1000 B.C.)
LH	Late Helladic (ca. 1600–1100 B.C.)
EIA	Early Iron Age (ca. 1100–700 B.C.)
PG	Protogeometric (ca. 1000–850 B.C.)
EPG	Early Protogeometric (ca. 1000–920 B.C.)
MPG	Middle Protogeometric (ca. 920–875 B.C.)
LPG	Late Protogeometric (ca. 875–850 B.C.)
PGB	Protogeometric B (ca. 850–810 B.C.)
G	Geometric (ca. 900–700 B.C.)
LG	Late Geometric (ca. 750–700 B.C.)
EO	Early Orientalizing (ca. 700–660 B.C.)

A	Archaic (ca. 600–480 B.C.)
C	Classical (ca. 480–331 B.C.)
V	Venetian (13th–17th century A.D.)
Mod.	Modern (1900 A.D.–present)

The following additional abbreviations are also used in this volume.

avg.	average
b.	breadth
ca.	approximately
cat.	catalog
cf.	comparable to (in faunal analyses)
cm	centimeter(s)
cont.	continued
d.	diameter
E	east
est.	estimated
ext.	exterior
F	figurine
fr	fragment
g	gram(s)
G	glass
GS	ground stone
h.	height
ha.	hectare
H	hardness (Mohs scale)
HM	Herakleion Archaeological Museum catalog number
IM	Ierapetra Museum number
Inv.	inventory
kg	kilogram(s)
km	kilometer(s)
L.	length
L	liter(s)
m	meter(s)
M	metal
m asl	meters above sea level
MASSPROP	mass properties
max.	maximum
min.	minimum
mm	millimeter(s)
MNI	minimum number of individuals
N	north
NE	northeast
NISP	number of identified specimens
no(s).	number(s)
NW	northwest
P	1/12 of N (N = 1/2 mina)
P	pottery
pers. comm.	personal communication
pers. obs.	personal observation
pres.	preserved
PT	possible tool
s	shekel of Ugarit (9.4 g)
S	south
S	stone
SE	southeast
ST	stone tool
SW	southwest
TC	terracotta
th.	thickness
UM MS	University of Pennsylvania Museum of Archaeology and Anthropology, Mediterranean Section catalog number
VGA	visibility graph analysis
W	west
w.	width
wh	whole
wt.	weight



Glossary

The text uses the following terms, which are specialized terminology or do not have exact English equivalents.

aloni	threshing floor with stone-built border, usually round (pl. *alonia*)
andreion	building for communal male dining (pl. *andreia*)
apotheke	a building housing archaeological workrooms and storerooms
conulus	conical stone or terracotta bead (pl. *conuli*)
dint	thumb impression on pottery, generally at the attachment of handle or leg
dromos	the entrance passage of a tholos tomb
jift	solid and semi-solid residue from olive pressing
kalderimi	paved mountain road of the Ottoman and Modern periods (pl. *kalderimia*)
kernos	a flat stone whose surface is decorated with a ring of small indentations, possibly used as an offering table or gaming table; also called a cupule stone (pl. kernoi)
marzeah	a Near Eastern ritual practice that involved drinking and ancestor worship

meltemi	strong, dry northern wind that blows primarily in the summer months; also called Etesian winds
nodulus	a small lump of clay with one or two seal impressions but without any means of attachment to another object (pl. noduli)
plaka	large flat stone or paver (pl. plakas)
plateia	a wide court or square
sgraffito	a technique of decorating glazed ceramics by scratching designs through a surface layer to reveal a different color beneath
stamnotaki	a jar stand
synoikismos	uniting of several towns or villages into one community
tholos	a type of tomb that is generally round in plan and covered with a corbeled vault (pl. tholoi)
tsakali	soft marl bedrock that can easily be cut; also called *kouskouras*
umbo	lateral prominence just above the hinge of a bivalve shell
unguentarium	a small bottle commonly used as a container for oil in the Hellenistic and Roman periods
Vierpasse	a design that includes four interlocking spirals
zembili	a large rubber basket with two handles used for carrying dirt and stones; approximate capacity of 25 liters (pl. *zembilia*)



1

The Architecture of Vronda

Nancy L. Klein and Kevin T. Glowacki

The preserved architecture of the Vronda settlement, with the exception of Building G (the Shrine) has been described in detail in *Kavousi* IIA (Day, Klein, and Turner 2009) and *Kavousi* IIB (Day and Glowacki 2012). The architecture of Building G is to be discussed separately. In these publications, emphasis was given to the contextual presentation of all finds within their architectural and stratigraphic settings. In this chapter we present a synthesis of the architectural data and an analysis of materials and construction techniques, beginning with a topographical overview of the site and its natural features, followed by a summary of the limited evidence for Proto- and Neopalatial architecture at Vronda, and concluding with a more in-depth discussion of the built environment of the Late Minoan (LM) IIIC settlement. Our aim is to identify the "set of consistent choices" that reflect culturally specific human behavior and societal rules (Rapoport 1990, 80–86), as well as the exceptions and anomalies, in order to understand more clearly how the vernacular architectural traditions at Vronda met the needs of the residents and expressed aspects of culture, social structure, and communal identity (McEnroe 2010, 5, 147–159, 161–162).

Site Analysis: Topography and Natural Features

Vronda is located in northeastern Crete, approximately 3–4 km east of the isthmus of Ierapetra and 1.25 km south of modern Kavousi village on the eastern edge of the Gulf of Mirabello (Figs. 1, 2). The site lies at an elevation of ca. 427 m asl on top of a ridge known locally as Xerambela ("Dry Vineyards"), a prominent northern spur of Mt. Papoura in the Thriphti Mountain Range (Pls. 1A–3B). With steep escarpments at its back to the south, Vronda enjoys a commanding view of the northern part of the isthmus of Ierapetra and the Gulf of Mirabello (Pls. 4A–4C). On clear days, visibility to the west extends as far as Anavlochos, overlooking the main route from the northern coastal plain of Central Crete, to Mt. Dicte above the Lasithi Plateau and as far south as the Libyan Sea west of Ierapetra.

The summit forms a roughly oval, flat-topped area (ca. 40 m north–south by 24 m east–west at the 426 m asl contour) oriented north to south (Fig. 3; Pl. 5A). The terrain slopes gradually (11°–12°) away from the crest toward the north and west but falls more steeply (ca. 30°–40°) on the east. On the southern edge of the summit, the ridge first drops abruptly, then it levels out to form a narrow saddle or trough, and it finally rises again toward the south.

The exposed bedrock at Vronda is gray, often heavily brecciated dolomite (limestone) of Permian-Triassic date above layers of yellow, gray, and green phyllite (schist), while the mountains immediately to the south are composed primarily of late Paleozoic carbonate rock and bluish-gray, crystalline limestone (Plattenkalk series; Morris 2002, 62; Haggis 2005, 11; cf. Betancourt and Farrand 2006, 22–28). Large colluvial deposits from the steep mountain slopes extend nearly to the Vronda site, in front of which are extensive agricultural terraces, some of which may date at least to the Venetian period if not earlier (Haggis 2005, 16–18; Day, Klein, and Turner 2009, 2).

The Vronda ridge is exposed to the prevailing winds from the northwest for most of the year and to the strong, dry northern wind (*meltemi*) that regularly blows with wind speeds of 5–7 Beaufort (29–61 km/h or 18–38 mph) for several days at a time during the summer, especially in July and August (for a general discussion of wind and weather patterns in Crete, see Rackham and Moody 1996, 33–38; for the Kavousi area specifically, see Betancourt and Farrand 2006, 19–21). The summit and the north and west slopes of the site are particularly open to these northern and northwestern winds, while the southeast slope is somewhat better protected. At times, the mountains on the east and south trap clouds and moisture from weather systems moving from the north, with the result that the entire Kavousi valley, especially the upland sites such as Vronda, can be cool and overcast while the isthmus is dry and sunny. Although largely sheltered by the mountains, the site can also be affected by a strong, warm wind from the south (*sirocco*) that blows mainly during the spring and autumn but is not unknown in the summer; such winds are desiccating and often bring with them dust from the Sahara along with intense heat.

The modern climate of the region is moderate and "Mediterranean," with a cool rainy season in winter and hot, dry, and sunny weather in summer. While detailed meteorological data are not available specifically for the Kavousi area, a general idea of temperature ranges and precipitation levels can be gained by comparing records from larger nearby towns (cf. Betancourt and Farrand 2006, 19–21). For example, according to the Hellenic National Meteorological Service, average monthly temperatures from 1956 to 1997 recorded at Ierapetra, ca. 15 km away on the south coast at 10 m asl, range from a low of 8.7°C (47.6°F) and a high of 16.2°C (61.2°F) in January and February to a low of 22.7°C (72.9°F) and a high of 31.8°C (89.2°F) in July and August. Absolute minimum and maximum temperatures for the same period were 0°C (32°F) and 41°C (105.8°F). Rainfall over the same years averaged 618.9 mm (24.37 in.) and fell mostly in October through March. Located at a higher elevation (427 m asl), facing the north coast and the prevailing winds, and framed by mountains on the south and east, Vronda is generally cooler and experiences more rainfall.

Recent studies on the ancient climate (Moody 2005, 2009), however, have emphasized important differences and changes throughout the Bronze Age that may have affected not only the island's ecology, agriculture, and animal husbandry practices, but also its built environment (Table 1). In the

Protopalatial and early Neopalatial periods, when the first evidence for building appears at Vronda, the climate appears to have been generally warmer and moister than at present. Conditions changed significantly in the Postpalatial period and Early Iron Age, as drought conditions developed and intensified. When Vronda was reoccupied early in the LM IIIC period (ca. 1170 B.C.; for chronology, see Ch. 8, pp. 205–209), the climate became cold and dry with much colder winters—changes that may be reflected in the vernacular building traditions and domestic architecture (small, single-story stone structures with flat roofs, central hearths, and interior ovens) of Early Iron Age Crete (Moody 2009). Within two generations, the climate shifted to hotter and drier conditions, accompanied by lower levels of precipitation than at present. Extreme hot and dry conditions may have peaked ca. 1050 B.C., around the time when the settlement at Vronda was finally abandoned.

There are no natural water sources on Vronda itself. The closest spring is ca. 280 m northeast of the summit in an alluvial fan descending to the north along the northeast edge of Mt. Papoura (Fig. 2), between the sites of Vronda to the southwest, Azoria to the northeast (ca. 900 m), and Kastro to the east (ca. 590 m). This spring, located within the Thriphti drainage, is also situated along one of the main overland routes from Kavousi village to the Thriphti region in medieval and modern times; a stone-paved road (*kalderimi*) was constructed along this path in the Venetian or Ottoman periods, and it is still partially preserved today (Haggis 2005, 10). The close proximity of the spring, which is probably one of the main reasons people originally chose to live on Vronda, also suggests that the primary ancient access to the site may have been from this direction following the natural topographic contours of the north slope of Mt. Papoura between the spring and the Vronda summit.

Pre–LM IIIC Architecture

Buildings and Features

The most extensively preserved phase of occupation on the Vronda ridge dates from the LM IIIC period, but archaeological evidence indicates human activity going back to the Final Neolithic (FN) period and continuing at intervals down to the Venetian (13th–17th centuries), Ottoman (17th–19th centuries) and even the Modern (early 20th century) periods (Haggis 2005, 134, site 77; Day, Klein, and Turner 2009, 2; this vol., Ch. 8). While earlier stone tools and pottery from the Final Neolithic, Early Minoan (EM) II, EM III, Middle Minoan (MM) II, and MM IIIB–LM I periods are found throughout the settlement, especially in the fill beneath the floors of the later buildings, the earliest extant architectural remains belong to MM II and are located on the east and southeast side of the summit (Fig. 4).

Building P, dating to MM II, is situated between the east wall of Building A and the East Terrace Wall, both of which were built in LM IIIC (Day, Klein, and Turner 2009, 65–66, fig. 45, pl. 12B). Building P consists of two bonding walls set at an acute (ca. 80°) angle: a long north–south wall on the east (6.00 m long, 0.80–1.15 m wide) and a short east–west wall on the south (1.80 m long, 1.10–1.30 m wide), together forming the southeast corner of a room. Abutting the southern face of the south wall is a semicircular enclosure (bin) outlined by small stone cobbles. Excavation revealed that these walls were established on bedrock. The wall faces are irregular and utilize large boulders of the breccia (brecciated dolomite) that forms the parent bedrock of the site as well as smaller, crystalline limestone boulders and cobbles most likely collected from the large colluvial deposits from the mountain slopes to the south. Many small cobbles and pebbles fill the interior between the two faces of the walls. In comparison, the walls of the LM IIIC buildings typically consist of roughly coursed breccia and limestone blocks also arranged in two

distinct faces but with larger stones used at intervals to span nearly the entire width of the wall and provide greater horizontal bonding. Only the lowest wall courses are preserved from Building P, and these may have supported more regularly built courses either in rubble masonry or mudbrick (Day, Klein, and Turner 2009, 65). Based on the preserved walls and the presence of the bin, it is possible that Building P was roughly rectangular in shape with two rooms, one to the north and another to the south of the east–west crosswall. It appears that this building was abandoned and most of its superstructure dismantled and reused, probably in the construction of the East Terrace Wall in LM IIIC. Also possibly to be associated with Protopalatial Building P is a partially paved area to the south that includes a cupule stone or kernos (Day, Klein, and Turner 2009, 49–50, pl. 9C; revised from Day, Coulson, and Gesell 1986, 365–366, where it was associated with LM IIIC Building B; see Ch. 8, p. 201).

To the east of Building P and on a lower terrace, a short section of wall (preserved length 1.20, width 0.55 m) founded on bedrock below the floor in Building Q, Room Q2, may also have been part of an earlier MM II structure (Day, Klein, and Turner 2009, 75, figs. 51, 52). This MM wall is about 10 m east of and roughly in line with Wall G, but it is ca. 2.70 m lower in elevation and so is unlikely to be related to the other structures farther up the slope.

At a short distance to the southwest of Building P, in the areas designated as Building B, Rooms B5 and B6, there are a series of walls, linear accumulations, and other features that also predate the LM IIIC settlement (Day, Klein, and Turner 2009, 39, 47–50, 60, figs. 6, 7, 44, pl. 9C; cf. Day, Coulson, and Gesell 1986, 356, fig. 1). While some of these walls may date to the same (MM II) period as Building P, their slightly different orientation and associated ceramic remains suggest a later date for their construction and use, possibly MM III–LM IA. Walls E and I form a corner with an obtuse angle to the south of Building P. A small slab enclosure ("pot stand") containing cup fragments was found near Wall E. Walls G and H form a right angle to the north. Three pot stands were also found next to Wall H, including one with the base of a MM II pot (Day, Klein, and Turner 2009, 49, pl. 9E). The two angles of these four walls (Walls E and I, Walls G and H) meet at the intersection of Walls H and I to form an open W-shape with arms of differing length. The walls are preserved only in their lowest levels, so that it is not clear if Walls H and I were bonded. If these walls are all contemporary with one another, the two pairs of walls define a level space slightly to the south and west of Building P (Day, Klein, and Turner 2009, fig. 6). The ground level drops to the east, which suggests that these walls could have functioned in part as retaining walls, but the presence of a slab enclosure near Wall E and three pot stands next to Wall H suggest that there may have been interior rooms defined by the walls as well. The intersection of these walls in a W-shape is somewhat unusual, but if Wall H had originally extended farther to the south and was paralleled by a companion wall to the west, the resulting structure would have included two parallel, rectangular rooms, not unlike those of Building B, Rooms B1/2, B3, B4, and B7.

On the summit of the Vronda hill, to the southwest of Building A, Room A1, the excavators discovered several features that also predate the LM IIIC settlement (Fig. 4), including a stone platform and a series of cuttings in the bedrock leading to a pit (Day, Klein, and Turner 2009, 21–22, figs. 6, 7, 9). The pottery from the pit dates to MM IIIB–LM IA and suggests that it had been filled during the Neopalatial period. Among the objects found within were a terracotta drain tile (**AW TC1**) and a fired mudbrick (Day, Klein, and Turner 2009, 23). The drain tile is one of several collected from the excavation of the settlement (see discussion below, pp. 5–6), and its discovery in the pit has led to the suggestion that there may have been a drainage system in this area consisting of the bedrock cuttings and drains leading into the pit, which might have functioned as a cistern. This pit had ceased to function and was filled with debris in the Neopalatial period.

It is clear from even these scanty remains that more than one building stood on the Vronda summit in the Proto- and Neopalatial periods, but most of the earlier walls appear to have been cleared away prior to or during the construction of the LM IIIC settlement. While it is likely that some still-standing sections of early walls were incorporated into the later LM IIIC buildings (e.g., Building B, Walls G, H, I, and E), the stratigraphic and ceramic evidence

suggests that most areas were cleared down to bedrock. For example, the very large boulders used in the construction of the southern half of the East Terrace Wall (see below, p. 11) resemble megalithic or Cyclopean masonry used widely throughout the island from MM I to LM I (Zielinski 1998; Shaw 2009, 57–58; Beckmann 2012, 92–114), but the ceramic material recovered from the deep rubble fill behind the terrace, combined with the wall's close alignment with Building A-B, suggest a date in LM IIIC for its construction (Day, Klein, and Turner 2009, 27–28). If any part of the East Terrace Wall dates to an earlier period, archaeological evidence indicates that entire wall was substantially modified and/or rebuilt in LM IIIC.

Materials

Although there is very little architecture remaining in situ before the LM IIIC period, the preserved walls and features are constructed of the same local stones as the later buildings. Evidence exists, however, for two types of materials or objects used in the built environment of the earlier periods of habitation that are not used in the later settlement: mudbrick and terracotta drain tiles.

Stone

The brecciated dolomite bedrock was used as the primary building material, usually in the form of carefully selected but minimally worked cobbles and boulders of irregular shape. Bluish-gray, crystalline limestone from the scree or talus slopes of the mountain immediately to the south was also employed. Since these more crystalline limestones frequently break in nearly cubic or rectangular blocks, they seem to have been used in wall construction with little or no dressing or modification.

Mudbrick

Mudbrick does not appear to have been in common use as a building material at Vronda in any period. Mudbrick may have been used in the construction of Building P, where a soft red soil between the MM wall and the eastern wall of LM IIIC Building A may represent either packing for the floor or decomposed mudbrick from the walls (Day, Klein, and Turner 2009, 66, fig. 46). The excavation of the pit outside the southwest corner of Building A, Room A1, recovered several fragments of what seem to be fired mudbrick, most of which were subsequently reassembled into a single block measuring 10 cm thick, with preserved dimensions of 24.33 x 20.45 cm (Day, Klein, and Turner 2009, 21–23, pls. 4D, 4E). The material found in this pit has been dated to MM IIIB–LM IA, and the excavator has most recently suggested that the mudbrick may have been used in the wall of a Neopalatial building on the summit (Day, Klein, and Turner 2009, 23, revised from the earlier discussion in Day 1997, 394, where it was proposed that the object came from the superstructure of LM IIIC Building A). Apart from the thickness (10 cm), however, the preserved dimensions of the single Vronda example do not correspond closely with other attested Minoan mudbricks, whose sizes normally ranged from 42–64 cm long x 26–42 cm wide x 9–12 cm thick (Shaw 2009, 132–135, 183–188). Mudbricks of smaller dimensions, however, are attested at EM II Myrtos, where sizes vary from 14–20 cm long x 14–16 cm wide x 8–10 cm thick (Warren 1972, 59 n. 1, 80; Shaw 2009, 182). The Vronda mudbrick is also unusual in that it contains almost no organic tempering material (e.g., straw), a common ingredient in most other Minoan examples (Nodarou, Frederick, and Hein 2008, 2999; Shaw 2009, 127).

Terracotta

Numerous terracotta drain tiles or channels were recovered from the area of the summit and the west slope. None of the fragments was found in situ, but their spatial distribution is at a distance from the early preserved architecture on the east side of the summit and so could be a reflection of their original use (i.e., nonarchitectural) or abandonment and

reuse processes. Based on their fragmentary and worn condition, it is likely that most of these tiles originally served structures or features that predate the LM IIIC settlement. The preserved fragments are made from a variety of coarse fabrics, some of which can be dated to MM–LM, while others are of uncertain date (Table 2). There are no complete examples, but the drain tiles appear to have been three sided, with a flat base (width ranges from 7–11 cm) and two vertical sides (preserved heights range from 4.6–11 cm) with a maximum preserved length of 21.7 cm. The bottoms and outsides are generally very rough. There are traces of burning on the bottom of one example (**WS TC1**) and the interior of another (**IC3 TC1**), but it is not possible to determine if these objects were exposed to fire in their primary role or after they had been discarded (Day and Glowacki 2012, 133, 166, figs. 83, 133). The only fragment for which a particular use can be suggested was found in association with the bedrock cuttings and pit to the southwest of Building A (**AW TC1**); it may have been used to channel water into the pit in MM IIIB–LM IA (Day, Klein, and Turner 2009, 22, 25, fig. 13, pl. 4B).

Comparison with similar tiles from other Minoan sites suggest two primary architectural functions for these three-sided, U-shaped objects, either as drains set at ground level to channel wastewater or runoff liquid or as spouts built into a wall or parapet at roof level to direct rainwater away from a building (Shaw 2004, 188; 2009, 137–139, 189–192). For example, long sections of terracotta channels have been found at many Neopalatial sites, including Kato Zakros, Palaikastro, and Gournia (Shaw 2009, 135, 137–139, 190–192). Two fragmentary examples of terracotta drains were found in Building AD 11 from the Neopalatial settlement at Pseira, where it has been proposed that they were used to direct wastewater (McEnroe 2001, 34). U-shaped tiles were also found in the Neopalatial Artisan's Quarter at Mochlos and the Chalinomouri farmhouse, some in association with vats and possibly functioning in an industrial process or in food preparation (Soles et al. 2004, 19–20). Numerous examples were noted in MM III–LM I contexts at Gournia by Hawes, who suggested that they were used both as drain channels and as gutters (Hawes et al. 1908, 28, pl. 1:5; Shaw 2009, 138). In Neopalatial houses at Akrotiri on Thera, terracotta drains with a similar shape projected from the facade at roof level (Palyvou 1999; 216–217; 2005, 39, 128–129) in order to direct rainwater away from the house. The Theran tiles are 65–70 cm in length (or shorter) and pass through the entire thickness of the wall or parapet. Similar U-shaped drain tiles have also been found at LM III sites such as Knossos (Hood and de Jong 1958–1959, 188, fig. 7:19), Katsambas (Alexiou 1955, 312–313, fig. 1), and even at LM IIIC Palaikastro Kastri (Sackett, Popham, and Warren 1965, 299, fig. 17:P30).

LM IIIC Architecture at Vronda: Materials and Techniques

In this section we present a detailed analysis of materials and construction techniques from foundations to roofs of the LM IIIC buildings of the Vronda settlement (Fig. 5). The discussion of construction materials includes a description of types, sources when known, and uses. We then address the construction techniques used in site preparation, and the building of walls, floors, and ceilings/roofs.

Materials

The excavation of a number of domestic complexes provides information about the materials and techniques used to build each structure and allows us to determine which practices were commonly used, as opposed to others that may indicate preferential treatment, higher investment of

resources, or special status. In the case of building materials, all of the architecture from the LM IIIC settlement at Vronda was built with locally available materials that would not have required specialized knowledge or preparation in order to use them effectively. These are stone, mud mortar, clay or claylike soils, terracotta, and wood.

Stone

Rubble masonry was used to build the walls (house walls, terrace walls) and fixed features (e.g., benches, bins, platforms) with stones selected from the slopes of the Vronda hillside and the nearby mountains. As noted above, there are two main types of stone used in construction: the brecciated dolomite (Tripolitza series) that represents the local bedrock and a more crystalline limestone (Plattenkalk series), often with chert or calcite veins, from the colluvial scree or talus deposits of the Thriphti range immediately to the south. The excavators described the stones using terms that are less geologically accurate, but more reflective of their visible properties. The bedrock surfaces and boulders are often described as "breccia," a poor quality stone that has a rough, fragmented appearance and does not lend itself easily to shaping with tools. Many of the better-preserved sections of walls also employed the hard, bluish-gray and crystalline limestone that fractures naturally into larger rectangular blocks with long straight edges. While larger (>1.0 m), irregularly shaped breccia boulders and bedrock outcrops are frequently employed in the wall foundations, smaller boulders, usually of a size that could be lifted easily by one or two people, were selected for the upper courses. Stone tools (basalt, conglomerate, sandstone, limestone, quartzite) were also sometimes reused in wall and bench construction (see Day and Glowacki 2012, 62 [**I2 ST1**], 67 [**I3 ST1**, **I3 ST2**], 95 [**O1 ST1**–**O1 ST4**]). Individual limestone blocks found on the floors of several rooms have been interpreted as bases for wooden posts to support ceiling beams. Phyllite schist plaques, cobbles, and small boulders are present, but they were rarely used in wall construction. Small schist plaques are occasionally found in the uppermost courses of benches and platforms, where they seem to have been used to create more level surfaces. Larger schist plaques, frequently trimmed by chipping to a nearly circular or oval shape, were probably employed as lids or bases for storage vessels (Day and Glowacki 2012, 65, 75).

Mud Mortar

All of the walls and built features at Vronda are made of local stone with a small amount of mud mortar or filler, which serves as a bedding and binding agent. No evidence was found, however, for mud or earthen coatings of the walls that would have provided an additional layer of insulation or base for a more refined layer (for a discussion of the mud coating found in the LM I Building 5 at Palaikastro, see Devolder 2005, 71).

Mudbrick

There is no evidence for the use of mudbrick in the LM IIIC architecture of Vronda (contra Wallace 2010, 106–107). Fragments of a poorly fired mudbrick recovered from a pit near the southwest corner of Building A were mentioned in preliminary reports as possibly coming from the superstructure of that building (Day, Coulson, and Gesell 1986, 364, pl. 80:b; Day 1997, 394). Subsequent analysis, however, has dated the context in which the single mudbrick was found to the Neopalatial period (Day, Klein, and Turner 2009, 21–23, pl. 4E; see also the discussion of pre–LM IIIC architecture above). Heat-reddened clay pieces noted during excavation as fragments of mudbrick were later determined to have come from the superstructure of hearths and ovens or from earthen artifacts that may have been curbs or stands used in association with hearths (Day, Klein, and Turner 2009, 18, 97; Day and Glowacki 2012, 111).

Clay/Claylike Soils

A distinctive claylike soil, frequently with pebbles of schist, flecks of carbon, and small and worn pieces of pottery, was used in the construction of the flat roofs of the buildings at Vronda (see description and discussion of roofing material in Day, Klein, and Turner 2009, 6). Soil with significant clay content was laid down on top of the rough bedrock in

some interior spaces to form a rudimentary floor surface. A similar clayey soil was used to build the hearths and ovens found inside many of the rooms, as well as the floor and possibly the superstructure of the LM IIIC kiln (Day and Glowacki 2012, 52).

Terracotta

Terracotta architectural elements are very rare in the LM IIIC architecture of Vronda. Terracotta drain tiles found in the excavation appear to belong to structures or features that predate the LM IIIC settlement (see discussion above, pp. 5–6). A singular example of a terracotta window frame (**B8 TC1**) was found in Building B (Day 1999; Day, Klein, and Turner 2009, 59; see also Ch. 5, pp. 160–162). In addition, pithoi were used as chimney pots above the hearths of at least three rooms. The fabrics of the window frame and the reused pithoi were typical of LM IIIC cooking or storage vessels.

Wood

There is very little direct or indirect evidence for the use of wood in the LM IIIC architecture at Vronda. Samples of carbonized wood from the settlement were all too small or too worn for identification; remains from the later cremation burials included olive and oak (for architectural uses of olive wood in Archaic buildings at nearby Azoria, see Haggis et al. 2011a, 445, 447; 2011b, 22, 35). Based on ethnographic parallels with traditional Cretan architecture, it is assumed that the Vronda buildings had flat roofs with a series of horizontal ceiling timbers (beams or joists) topped by smaller branches and brush and covered by layers of clay-like soil (Vasileiadis 1980; Rackham and Moody 1996, 165–173; Mook 2000; Day, Klein, and Turner 2009, 6; McEnroe 2010, 10–11). In the excavation of most interior spaces at Vronda, deposits of roofing clay were found beneath rock tumble or wall collapse, but the actual wooden timbers that had supported the roofs must have decomposed over time. A single example of charred wood was discovered in Building D, Room D1, in a deposit with carbon and ash in heat-reddened roofing clay. This evidence suggested to the excavator that a wooden ceiling beam had caught fire and collapsed onto the floor, along with a section of the clay ceiling/roof (Day, Klein, and Turner 2009, 96). Other indirect evidence of the roofing timbers may be found in a few fragments of heat-hardened clayey soil with curved surfaces that were found in the excavation above hearths and ovens. The most likely example comes from Building O, Room O3, and it preserves a smooth, concave surface (est. d. 0.05–0.06 m) on one side (Day and Glowacki 2012, 102, pl. 21C). Such fragments may have been part of the roofing clay packed on top of the wooden beams and branches: when the roofing material dried or was hardened by exposure to heat (above an oven, as in, e.g., Room O3), it retained the shape of the wooden supporting elements. Similar indirect evidence in the form of mud or plaster bearing impressions of wooden beams or reeds comes from many other sites on Crete from the Early Neolithic (EN) through the Late Minoan period (Shaw 2009, 152–153). For example, the LM IB Building 5 at Roussolakkos Palaikastro that was destroyed by fire has fragments with a smooth flat surface that is perpendicular to one or more concave, curving surfaces that Devolder suggests come from an earthen coating applied to the underside of rounded ceiling timbers (Devolder 2005, 72–76). The fragments from Vronda do not have the smooth surface seen at Palaikastro, so it is not clear that the coating was applied to the underside in order to make a smooth ceiling, but it may have been from the packing above. Indirect evidence for interior wooden posts to support the ceiling in some of the rooms is found in the stone post bases lying on the floor.

Construction Techniques

The excavation of the Vronda settlement revealed a consistent pattern of stratigraphy that reflects both construction and abandonment processes in all of the building complexes (Day, Klein, and Turner 2009, 5–7). Our study suggests that the builders were deliberate in their selection of building

locations and that they prepared the area in order to create a stable and usable space. The natural terrain played a key role in determining situation and orientation in particular. All of the structures were laid out to take advantage of the level areas on or around the summit, and orientation appears to have been determined more by the direction of the slope than any other variable, such as weather (prevailing winds) or cardinal direction (solar alignment and exposure to sunlight). The buildings were all constructed with rubble walls set in earth mortar, probably with flat ceilings and roofs made from layers of timbers and branches with water-resistant clay packing above. The techniques used to build the structures are straightforward and functional with very few decorative embellishments, although some buildings are clearly distinguished by their materials and the effort required to construct them. Many of the building complexes were expanded over the life of the settlement as the population grew, in particular Building Complexes C-D, E, J-K, and I-O-N. Based upon the architectural phasing and ceramic evidence, it appears that the community existed for at least three, perhaps four generations, probably slightly over a century, and was then abandoned, with most material goods taken away (see Ch. 8, p. 209). Over time, the lack of maintenance of the superstructure led to the weakening of the roof beams and the clay and soil covering of the ceiling began to collapse into the room. This layer of roofing material was usually found directly above the floor and built features within each room. The subsequent collapse of the rubble walls created areas with rock tumble above roofing material, although the process of collapse was not uniform and some walls may have stood longer than others, resulting in varying horizontal and vertical distribution of these layers. Although postabandonment processes have impacted some areas quite severely, the systematic excavation of all of the major building complexes provides ample evidence for understanding the techniques common to LM IIIC vernacular architecture at Vronda.

Site Preparation

Although the buildings at Vronda demonstrate a variety of shapes, sizes, and functions within the LM IIIC community, the sloping topography was a consistent challenge and the builders responded by developing several methods to prepare the site and build the walls of their structures. In areas where there was no preexisting architecture, it appears that the ground was roughly cleared down to bedrock prior to construction of the walls (e.g., see Day, Klein, and Turner 2009, 120, for Building Complex C-D; Day and Glowacki 2012, 134, for Building Complex I-O-N). In some cases there is evidence for the bedrock having been trimmed back vertically or leveled horizontally, and the walls were then built directly on top of the bedrock. Some walls, especially those running along the edge of a natural contour, incorporate large bedrock outcrops or boulders in their lowest levels. This technique appears to have been used for the houses on the summit (Buildings A, C-D, J-K) and the slopes to the southwest (Building G) and west (Building I-O-N). The east and southeast sides of the Vronda ridge presented two particular challenges: a much steeper slope than elsewhere and the presence of earlier walls from the Protopalatial or Neopalatial period. These differences prompted the builders to use slightly different techniques. In Building E, the builders used a cobble fill to provide a level area for construction (Day and Glowacki 2012, 2). The space between the east wall of Building A and the East Terrace Wall had a deep rubble fill on top of a layer of clay below which was bedrock (Day, Klein, and Turner 2009, 27–28, fig. 15). This technique of laying down a deep rubble fill supported by a terrace wall may reflect the builders' concern with providing a stable foundation for these structures that stood on a relatively steep slope by comparison with other parts of the settlement. In the case of Building B, which is also situated on a relatively steep slope in this area, it appears that some of its walls were built on top of the earlier walls (Day, Klein, and Turner 2009, 59).

Wall Construction

It is apparent that the materials and techniques used to build the walls had a primary, practical purpose to create a stable structure, but in some cases the size of the blocks and the care with which they were laid also provided a visual statement of each structure's importance and status in the community. There are two main types of walls

found in the Vronda settlement: house walls and terrace walls. All of the walls are built of rubble in earth mortar, but the shape and size of the stones, the regularity of courses, and the quality of workmanship can differ from one building to the next. Our experience of excavating collapsed walls indicates that the majority of the stones were fairly small and could be moved easily by one or two people. Although the excavators occasionally mention blocks that appear to have been dressed, there are no preserved examples of visible toolmarks as are frequently seen, for example, on the architectural remains of the Minoan palatial periods (see Shaw 2009, 38–54, 253–258, figs. 50–63:c). This may be due to the weathering of exposed surfaces or the manner in which blocks were dressed, with either harder stones or possibly metal tools. It could also be that the builders selected stones with an appropriate size and shape, and the need for further dressing or surface treatment was minimal. Most building stones of brecciated dolomite are rounded and range in size from cobbles (0.06–0.25 m) to boulders (>0.25 m). Flat-faced, rectangular limestone boulders and cobbles are most commonly used in the best-built walls. The stones are set in an earth mortar and roughly coursed, sometimes with smaller cobbles and large pebbles to fill in the gaps (sometimes called "boulder-and-chink" construction), and the walls usually have two vertical faces (Pls. 5B–6A; see McEnroe 2010, 10). In order to prevent splaying and provide horizontal bonding, larger through-stones were used at irregular intervals to span the width of the wall. Large boulders were frequently employed at the basal levels, especially at the corners, and straight-edged stones were selected to form wall terminations marking doorways. These techniques are used for the walls throughout the LM IIIC settlement but offer a contrast with the walls of MM Building P, which have irregular faces and rely upon larger breccia boulders with earth mortar and many smaller stones in the interior.

Differences in wall construction, whether in materials, techniques, or both, appear to be determined by topography and the importance of each building. Most of the building complexes occupy sloping ground, and the builders took advantage of natural contours to place rooms along a flat plateau or to expand a building with additional rooms downslope. In general, the walls on the downslope side are built directly on top of bedrock and are made of heavier, coarser materials such as breccia boulders and even bedrock outcrops. Some of the walls toward the top of the hill are built on soil and have a greater percentage of limestone in their superstructure. The strength and size of the downslope walls that are located along the natural contour lines suggest that they were intended to act as retaining walls (i.e., they served to retain or support the fill below the floor) as well as structural members of a building. These are sometimes called spine walls, and one example is found between Rooms D1 and D4–D5 (Pl. 6B; Day, Klein, and Turner 2009, 95, 105–106, 108–109, pl. 19E). This wall (V 5001) is situated along the edge of a natural plateau and is built directly on top of the bedrock, with bedrock outcrops incorporated in its construction along with very large limestone blocks. The size of these boulders is much greater than almost any other wall in this building and must correspond to its role as a retaining wall. The wall has two faces, although the western (downslope) face is much more uneven than the eastern, due to the predominance of large breccia boulders. A bench (V 5006) was built against the downslope face in Building D, Room D4. Another example is seen in Building I (Pls. 6C, 6D): the west wall between Rooms I3 and I5 (uphill to the east) and O1 (downhill to the west; Day and Glowacki 2012, 63, 75, 93). In Building C, the bedrock has a more significant drop between Rooms C1 and C2 (downslope to the west) and C3 and C4 (uphill to the east). Here the bedrock at the eastern side of Room C1 has been partially trimmed to create a vertical face, and additional breccia boulders were laid on top with earth packing to provide a foundation for a built wall (V 11901; Pl. 6E; Day, Klein, and Turner 2009, 81, pl. 12F).

Differences in type and size of stone are also apparent among the buildings at Vronda. Two examples of house walls with a greater uniformity and use of limestone blocks are the east wall of Building A, Room A1 (Pl. 6F) and the east wall of Building D, Room D1 (Pls. 5C, 6A). These rooms are distinctive for having the two largest interior spaces on Vronda (72.07 m^2 and 38.90 m^2, respectively). Building A may have been used for communal feasting by select members of the community

(Day and Snyder 2004; Day, Klein and Turner 2009, 61–63; see Ch. 8, pp. 222–224). Based upon its size (overall and individual rooms), Building D may have been home to one of the more important households, and Room D1 was used, among others things, for domestic cult activities (Day, Klein, and Turner 2009, 122; see also Ch. 3). The western wall of Building G, which faces an open area that was perhaps used for communal ritual activity, was built with some of the largest bedrock and limestone boulders found in the Vronda settlement (Klein 2004, 96, fig. 7.3). These examples suggest that the selection of stone type and size was not a random process. It takes time and skill to collect limestone blocks of an appropriate size and shape and then build them into a wall; larger stones offer greater strength but also require more people to move them. Based upon these examples, it appears that the builders may have used the material and block size to indicate a difference in status among buildings in the settlement.

There are three partially preserved, large terrace walls at Vronda, two on the summit of the hill and one on the western slope. Each of these was situated along a natural contour line and served to increase the horizontal space available for building. Two of them were later covered by modern field walls, which also tend to follow contour lines. On the eastern side of the Vronda summit, the East Terrace Wall is a megalithic construction (Figs. 3–5; Pls. 7A–7C), utilizing numerous unworked boulders that can range well over 1 m in width (Day, Klein and Turner 2009, 27–28, fig. 14, pl. 3A; see Boyd 1901, 131 [“an excellent stretch of wall”]). The wall was built with a single face on the east, with boulder and rubble fill behind (th. 1.20–1.50 m). It is preserved up to ca. 1.97 m in height (next to Building Q) and extends ca. 27.50 m from the southern end of Room B3 to just south of Building R, although it may once have continued farther to the north, in the direction of Building J-K. At the south the wall forms the east wall of Building B, Room B3 (Wall A), and it continues to the north in a line parallel to the east wall of Building A (V 2903). Two main sections of the wall are preserved. In the southern section, the exterior face of the wall consists of extremely large, uncoursed breccia boulders (Pl. 7B). As noted above (p. 5), while the large size of the blocks and the rough exterior face of this section of the wall are reminiscent of megalithic constructions found from MM I to LM I (Zielinski 1998; Shaw 2009, 57–58; Beckmann 2012, 92–114; cf. Haggis 2005, 129, pl. 20A), the deep rubble fill behind the East Terrace Wall contained LM IIIC pottery almost to the very bottom, indicating that the filling took place in that period (Day, Klein, and Turner 2009, 27–28). The northern section of the wall (Pl. 7C), to the northeast of Building A and just southeast of Building R, stands only to a height of two or three courses, but it is clearly built with different materials at its basal level. The exterior face of this part of the wall is made with smaller, more quadrangular and flat-faced limestone blocks that are roughly coursed—a technique more commonly found in the best-built house walls of the settlement. The stones selected for the face here generally have a maximum dimension under 1 m. Massive boulders of brecciated dolomite over 1 m in length are still used along with smaller boulders and rubble for the fill behind the wall (Day, Klein, and Turner 2009, fig. 14). Although this northern section of the East Terrace Wall follows the same contour line as the segment to the south, and its construction with only a single exterior face indicates that it was also meant to function as a terrace wall supporting the fill to the west, the differences in material and coursing suggest that it may have been part of a different phase of building or rebuilding.

To the west of Building C, Rooms C1 and C2, a section of an ancient terrace wall was discovered below a modern field wall built along the face of the bedrock where it drops significantly from east to west (Figs. 3, 5; Pl. 7D; Day, Klein, and Turner 2009, 111–112, figs. 5, 55, 56, pls. 20D, 21A). This West Terrace wall is modestly constructed with a single, western face of limestone and breccia boulders and cobbles built against bedrock, with a maximum preserved height of 1.22 m. Larger boulders were placed directly on top of and against outcroppings of bedrock, on top of which were laid smaller boulder and cobbles in rough courses. The outer face of the terrace wall is slightly battered. In the LM IIIC period, this wall defined the western edge of a terrace (pres. L. ca. 11.80 m) beside the rooms of Building C that was accessed by a stepped passage from the north. To the west of Building N, Room N4, is a short stretch of what may have been a

substantial terrace wall that was also uncovered beneath a modern field wall (Day and Glowacki 2012, 131–132, figs. 64, 65). The ancient wall was built along a natural drop-off in the level of the bedrock, and it is 2.80 m in length and 1.40–1.60 m wide. Although it is different from the other two terrace walls in apparently having two built faces, its significant width (more than twice that of the other house walls in the building complex) and topographical placement suggest that it also functioned as a terrace wall.

The location, construction, and size of these terrace walls set them apart from others in the settlement and raise the question of their function. It is clear when considering the topography and looking at the position of these walls in the aerial photograph of the Vronda settlement (Pl. 5A) that these walls were built along the edge of natural topographic contours. Both walls on the summit incorporate bedrock faces in their construction, which would have provided a suitable foundation to support the wall and retain a deep fill behind. The preserved height and limited length of the two walls on the west suggests that they offered no strategic defense. An able-bodied individual could quickly scale a wall of these heights or simply use the staircase leading to the terrace beside Building C. These characteristics suggest that the walls were intended to increase the usable area of the summit and western slope, with an additional role of indicating access around the buildings. Similarly, the preserved height of the East Terrace Wall would have restricted access to Building A-B and served to direct a pedestrian to the north or south in order to gain access to the summit of the Vronda settlement. The scale of the East Terrace Wall (length and height), however, along with the very large stones used to build the exterior face in its southern section and the roughly coursed limestone to the north, may also have been intended to distinguish the area by creating a visible demonstration of strength and power. Its most impressive face is apparent when the settlement is viewed at a distance from the east, which may indicate an ancient line of approach to the settlement (from the settlements at the Kastro or Azoria, e.g.). If the approach from the east was indeed the primary route (rather than the present-day approach from the west via the modern road), then the presence of the East Terrace Wall and the position of Building A-B were deliberately chosen to emphasize the great symbolic importance of the building that was so visually prominent.

Floors

The interior floors of the buildings at Vronda were usually established on bedrock that had been roughly leveled with the addition of an earth or clay packing to create a usable surface. In many cases, irregular bedrock outcrops still protruded above the discernible LM IIIC floor surface and in some instances were used to the builders' advantage; in Building C, Room C1, the central hearth was flanked by bedrock, perhaps to serve as a fixed curbstone (Day, Klein, and Turner 2009, 81). The same manner of incorporating bedrock into the LM IIIC floor can be observed in Building I, Room I3, where a smoothed outcropping of bedrock to the north of the hearth may have provided a level foundation for a wooden post (Day and Glowacki 2012, 65, pl. 11C). In other rooms, such as those in Building Complex E, the floor rested upon a layer of cobble leveling fill (Day and Glowacki 2012, 2), while some areas also contained layers of earthen fill. These deposits of fill immediately beneath floors are often the source of earlier pottery, especially from the Pre- and Protopalatial periods (e.g., Building E, Rooms E1, E3, and Courtyard; Building C, Room C2). Partially paved floors or areas covered by flat stone slabs were found in several rooms. For example, much of the interior of Building B, Room B3 was paved with stone slabs (Pl. 8A; Day, Klein, and Turner 2009, 35, pl. 6E). The pavement may have been related to its function as a storage room or to create a level surface for pithoi to stand upon. In other rooms (C4, C5, J1) a cobbled or paved area next to a wall may have been designed to create a level surface on which pithoi or other objects could stand (Day, Klein and Turner 2009, 87–88, 91, 128).

Ceilings/Roofs

Our understanding of ceiling and roof construction comes from the stratigraphic deposition of building material following the abandonment of the structures, comparison of wall and room

design with better preserved examples of Minoan architecture, and ethnographic parallels. Excavation of interior spaces throughout the Vronda settlement typically revealed rock tumble above a significant layer of clayey soil deposited on top of LM IIIC surfaces (Day, Klein, and Turner 2009, 6). These layers were deposited when the abandoned structures began to collapse, and the flat earthen roofs fell into the rooms below, followed by the rocks and earth mortar of the rubble walls. Other organic material from wooden timbers or branches in the ceiling is rare, although a single example of charred wood found in Building D, Room D1, discussed above, may be from a timber roofing beam.

Evidence for the construction of ceilings and roofs from better-preserved Minoan buildings presents a design that was probably also used in the buildings at Vronda. Shaw's discussion of Minoan architecture suggests that most buildings had flat roofs supported by horizontal timbers, often with layers of smaller branches or reeds, which were then covered by layers of clay or earth (Shaw 2009, 152–154; McEnroe 2010, 10–11). Studies of traditional architecture on Crete show that this technique continued in use down to the 20th century (Vasileiadis 1980; Bozineki-Didonis 1985; Rackham and Moody 1996, 165–173; Mook 2000).

Clay roofs must be maintained in order to remain impervious to water. Crete can receive a significant amount of rainfall in the winter, and a flat roof with a clay surface would need to maintain its thickness and its impermeability so that no water leaked into the house. Shaw has suggested that a new layer of earth and clay was probably added annually, and an example from the West House in the settlement at Akrotiri on Thera shows eight layers of earth combined with waterproof clay (Palyvou 1999, 220, fig. 117; 2005, 128, fig. 184; Shaw 2009, 154 n. 993, fig. 265). Ethnographic parallels suggest that the clay layer had to be rolled on an annual basis (Rackham and Moody 1996, 167). Without this care, rainfall would begin to pool in depressions on the roof and ultimately cause the ceiling to collapse. This process of collapse, with the clay roofing material falling into the building and later being covered by the rubble walls, appears to be reflected in the stratigraphy observed within the buildings at Vronda.

Architectural Features

The Vronda buildings were enhanced by a variety of fixed architectural features, some structural (doors, thresholds, stairs, post bases), and others related to activities (benches, platforms, enclosures, hearths, and ovens). Windows may have been present in the fabric of the wall, but the state of preservation does not provide evidence for their size, number, or placement. While some features are found frequently in a variety of houses (benches, hearths, and ovens), others appear to be less common (platforms) or unique (terracotta window frame). The discussion below is dedicated to the LM IIIC buildings, although reference may be made to earlier examples. Most of the features were made of stone or rubble, a few of terracotta (a window frame, chimney pots). Others modified existing natural features such as bedrock for use within the buildings.

DOORWAYS AND THRESHOLDS

In her discussion of the "affluent" architecture of Akrotiri on Thera, Palyvou observes that doorways present a challenge to the structural stability of a wall while also creating a focal point in the urban landscape (Palyvou 2005, 136). At Vronda, the construction of the doorways is another example of the very basic, functional nature of building, but one that may also reflect significant characteristics of a building's importance and placement in the settlement. Many of the building complexes preserve doorways that allow us to understand access and circulation patterns (Table 3). In general, doorways are indicated by a gap in the line of the wall where both wall ends are well finished. There are no preserved examples of worked stone doorjambs, orthostats, or pivots found in situ. Doors were probably made of wood and either attached to vertical poles that pivoted on one side or attached to a vertical frame by means of rope hinges. Internal doorways may also have had a similar design, but it is also possible that a less substantial barrier, such as a cloth hanging, was employed, which offered visual privacy but little else in terms of physical separation. In most examples at Vronda, the floor level is consistent from one side of the doorway to the other. In two or perhaps three examples,

a stone threshold marked the transition. In Building D, the northern entrance from the outside into Room D1 had a wide and smooth bedrock threshold at the level of the interior floor (Day, Klein, and Turner 2009, 95). In Building E West House, two courses of flat limestone boulders raised slightly above the floor level indicate a central doorway between Rooms E1 and E4 (Day and Glowacki 2012, 3, figs. 4, 5). Although these stone thresholds may have been deliberately smoothed, none of them shows any sign of having been worked to receive a wooden doorframe. In several other cases, the doorway marks a transition in levels between one room and another that required steps. There are three doorways associated with stairs leading down into another room. In Building N, steps were cut in the *tsakali* bedrock to facilitate access from Room N1 to Room N2, and stone-built steps lead down from Room N3 to Room N5 (Day and Glowacki 2012, 108, 115, 119, pls. 21D, 24A). In the northeast corner of Room D4, there are stone-built steps leading to a doorway located in the wall at a short height above the interior floor (similar to a stile; Day, Klein, and Turner 2009, 105, 109, pls. 19E, 20B). In some cases there is no doorway apparent in the state plan of the buildings. This may be due to the level of preservation of the wall.

The location of doors in Late Bronze Age architecture has sometimes been considered as a diagnostic tool to determine Minoan (off-center) or Mycenaean (central, axial) influence. Minoan Neopalatial architecture traditionally uses doors that are off-center or in the corner, but by the LM IIIC period, domestic architecture on the mainland and Crete show that both forms were commonly used, often in the same building (Hayden 1990, 211; Hiesel 1990, 251–259; E. Hallager 2000, 127 n. 2). Other factors may have influenced door position. For example, Shear noted that both types of doorways were used in the Late Helladic (LH) III Panagia Houses at Mycenae but suggested that central doorways were used for more important rooms (Shear 1987, 35). Darcque acknowledged that this phenomenon appears to be the case for houses at Mycenae, Sparta, and Pylos but added that other factors, including routes of access and use of interior space, may also have played a role (Darcque 2005, 164). Hayden, in assessing the relationship of Postpalatial domestic architecture on Crete to the mainland, notes that off-center doors were common to both places, and she suggests that their use may be a reflection of their advantages, namely "more protection from the elements and privacy, universal concerns which do not necessitate a relationship" linking Crete and the mainland (Hayden 1990, 211).

Not all of the buildings at Vronda have preserved doorways, but those present can be central (Rooms C4 to C5, D1 to exterior, D1 to D2/3, E1 to exterior, E1 to E4, G2 to exterior, I4 to exterior court, K1 to K2, K3 to K4, and possibly A1 to A2) or in a corner (all others; Table 3). The central or axially located doors are larger (1.00–1.65 m) while corner doors are slightly smaller (0.70–1.20 m). Both types are found leading into and within the houses. In cases where we can determine the development of a building complex over time, there may be a general trend toward a large central door leading into a building in its earliest phase, as seen in Buildings C (Room C4 from north), D (Room D1 from north), K (Room K1 from east), I (Room I4 from north), and G (Room G2 from north). It has been noted that the central doorway offers the least amount of privacy or protection from the elements, and thus the central door may have been used for other reasons, perhaps ease of access or visibility. In Building Complexes C-D and I-O-N, where we have the best evidence for agglutinative (additive) expansion over time—the construction of rooms on lower slopes with later walls abutting the earlier, higher ones—the corner doorway was easily created by leaving a gap between the existing wall and the new addition. In these cases, practicality and expediency may have been the determining factors, although the desire for greater privacy, protection from the elements, and room function may also have played a role.

PIVOT STONES

Very few pivot stones were recovered from the excavation of the settlement (Pls. 8B–8E), and none of them were found in situ directly beside a doorway (Table 4). Because pivot stones could have been used both for architectural and industrial purposes (e.g., for use by potters; see Soles et al. 2004, 83), the interpretation of their function depends as much upon context as form. The best candidate for an architectural element was found in Room K1, displaced a short distance (ca. 0.70 m) to the west

of the badly disturbed doorway between Rooms K1 and K2 (Day, Klein, and Turner 2009, 146, figs. 82, 83). The object is a small, oval, limestone boulder with a circular depression in the center worn by pecking and rotary abrasion; a few concentric striations are clearly visible (Fig. 6; Pl. 8B). In Room K4, another possible pivot stone (V92.49) was recovered from the cleaning of the south wall (V 5702/V 5801; Day, Klein, and Turner 2009, 154). The stone object is described as a limestone cobble with a circular depression (Pl. 8C). One possible pivot stone (V83.18) was discovered during the excavation of the area designated Room B5 (Fig. 6; Pl. 8D), in cobble fill of mixed date (EM–MM, LM IIIC) brought in to level up the area for the construction of Building A-B (Day, Klein, and Turner 2009, 36 and pl. 8A [where it is incorrectly assigned to Room B3], 47–48). The object is a worn and irregularly shaped sandstone cobble, broken on one side; the top surface preserves most of a circular depression created by pecking. As with the example from Room K1, the object from Room B5 also shows traces of striations from rotary abrasion. Its archaeological context, however, provides little reliable information about its date or original use. Finally, a possible pivot stone (V87.30) was recovered from a layer of light yellowish-brown soil with pebbles and larger stones, perhaps wall collapse on top of the floor of Room Q2 (Pl. 8E; for the context, see Day, Klein, and Turner 2009, 75). The object is intact except for a few chips on its edges. A shallow, oval depression in the center has clear traces of circular striations.

STEPS (INTERIOR)

Steps built from stone slabs laid in earth mortar are found inside several buildings. In Building D, there is evidence for steps leading over a threshold between Rooms D4 and D5 (Day, Klein, and Turner 2009, 105, 109, pls. 19E, 20B). Steps may also have been used in this way to allow access between Rooms C3 and C4 (stones in southeast corner of Room C4) and possibly between Rooms C2 and C1 (a structure called a platform [V 12404] against south wall of Room C2 may be the remains of a step or landing; Day, Klein, and Turner 2009, 83, 87, figs. 55, 56). In Building N, there are three bedrock-cut steps connecting Room N1 with Room N2 and three stone-built steps leading down from Room N3 into Room N5 (Day and Glowacki 2012, 108, 115, 119, pls. 21D, 24A). Building E, Room E1 may have had a stepped entrance at its northern edge (Day and Glowacki 2012, 4, pl. 2C).

POST BASES

The use of vertical wooden supports is suggested by the presence of square or rectangular stone blocks found resting on or embedded in the LM IIIC floor surface of several rooms at Vronda (Table 5). In a room with a small interior span (e.g., in Room I5), a post base can be situated closer to one wall than another (Day and Glowacki 2012, 75, pl. 14A). In most cases, however, the preserved bases are more or less equidistant between the two long walls of the room, probably to support a large main beam, although their placement does not have to be rigidly axial or symmetrical. Other factors (e.g., desired visibility and lines of sight, the position of a hearth, the presence of a doorway or passage, the sizes of available timber for the ceiling beams, necessary structural repairs and reinforcement of cracking timbers) may also have influenced the location of a vertical support.

In large spaces, such as Room D1, it must have been necessary to divide the span into shorter segments supported by vertical supports sitting either on bases or directly on the floor. Two base stones were located approximately midway between the east and west walls in rough alignment with each other, ca. 1.80 m apart, in the southern half of the room (Day, Klein, and Turner 2009, 95, pl. 16D). The northern base is on axis with the hearth, but the southern base is shifted to the east, possibly so as not to obstruct the room's southern, central doorway. A similar concern may have influenced the situation of the base in Room C5 (Day, Klein, and Turner 2009, 91); its placement closer to the west wall than to the east allows unimpeded access to the central doorway leading into Room C4. Stone post bases slightly off axis with a central doorway, as in Rooms D1 and C5, are also attested at Karphi, in Room K 9 of the "Great House" and Room K 113 of the Western Block (Pendlebury, Pendlebury, and Money-Coutts 1937–1938, 67, 77, 94, pl. XXI.5). In Room N1, a post base just north of the central hearth is equidistant from both the east and west walls, but another base, ca. 3.00 m to the south, rests significantly closer to the west wall

(Day and Glowacki 2012, 109, fig. 93, pl. 21D). Since the doorway from Room N1 into Room N2 is in the southeast corner, some other concern must have necessitated the westward placement of the southern post base.

WINDOW FRAME/WINDOWS

The buildings at Vronda may have had windows or openings in the walls to provide light and air, but none are preserved in the walls as excavated. The terracotta window frame discovered in Building B (**B8 TC1**) is unique for this site (Day 1999; Day, Klein, and Turner 2009, 58; see also Ch. 5, pp. 160–162).

CHIMNEY POTS

At Vronda, there are three examples of pithoi being used as chimney pots (Table 6). Based on the similarity of their fabric and profile to other pithoi found in the houses, these appear to be reused or repurposed, perhaps after having been partially broken. Two fragmentary pithoi from Building C, Rooms C1 (**C1 P8**) and C2 (**C2 P7**) were found in the roofing to floor deposit directly above or in very close proximity to a central hearth (Day, Klein, and Turner 2009, 81–83, 85, figs. 58, 60). Another was found in topsoil to the east of Building I (**IE P4**) (Day and Glowacki 2012, 90, 91, fig. 83). The preserved examples are unfortunately incomplete. Although they have the original rim and a section of the body, it is unclear if they would have had additional perforations in the sides and/or top. The interior surfaces of these three examples are still darkened with soot carried through the chimney pot as the smoke from the fire passed through the vessel. While the neck opening was relatively narrow (est. d. 0.32 m), these reused pithoi would have provided rudimentary ventilation for the rooms with cooking installations.

Modern parallels suggest that they were used in an upright, vertical position with the narrow neck at the top, in which case the original base must have been broken away. If used upside down, it might have been preferable to leave the base intact and to cut openings in the side so that the vessel could still draw air from the room below while protecting the interior from rainfall or downdrafts of air.

Although it is commonly assumed that rooms with heating and cooking facilities must have had some type of opening for the evacuation of smoke, specific examples of chimney pots have rarely been noted in the excavation reports of Minoan sites. Excavations at Akrotiri on Thera have uncovered two areas that have been tentatively identified as kitchens with chimneys dating to the last period of occupation prior to the LM IA eruption (Nikolakopoulou 2003, 564–565; Palyvou 2005, 108 n. 7). At Mochlos, a piriform vase whose bottom had been broken off evenly may have functioned as a chimney pot in Building A, Room 1 of the LM IB Artisans' Quarter (Soles 2003, 21). A fragmentary pithos with a burned interior may have served a similar purpose in Room 6 of the LM IIIB farmhouse at Chalinomouri (Soles 2003, 109). Recent excavations of LM IIIB Building CD at Sissi have discovered large fragments of two cylindrical objects designed with one open end and the other end domed and perforated, which the excavators suggest may have been used as chimney pots (Gaignerot-Driessen and Letesson 2011, 95–96, fig. 5:16). The use of pithoi as chimney pots was suggested by the excavators of LM IIIC Karphi, who called attention to the quantity of pithos fragments found above collapsed roofing debris (Pendlebury, Pendlebury, and Money-Coutts 1937–1938, 67).

Chimney pots have been identified on the Greek mainland at Mycenae, Pylos, Nichoria, and Midea (Darque 2005, 81). The four examples from Mycenae (two found in the Panagia Houses, one from Citadel House, and another from the House of the Columns) all appear to be cylindrical, and most have openings in the walls (Shear 1987, 8, 18, 114, fig. 21, pl. 33). At Pylos, Blegen discovered two fragmentary chimney pots above the hearth in the Throne Room (Room 6; Blegen and Rawson 1966, 81, figs. 271:2, 3, 272:6, 7), and two more in the Queen's Hall (Room 46; Blegen and Rawson 1966, 200, figs. 271:7, 8, 272:8, 9). At Nichoria, a cylindrical, tapering chimney pot without openings was found in a mixed context to the north of Unit III-3 (McDonald and Wilkie, eds., 1992, 547, pl. 9.76). A fragmentary example found in a LH IIIB destruction layer at Midea is said to have an opening in the wall, although this feature is not clear in the published photograph (Demakopoulou, Divari-Valakou, and Walberg 1994, 23, fig. 12).

Terracotta architectural models from Crete may also serve as a potential source of information concerning the use of chimney pots in Minoan architecture. Mersereau's study of prehistoric models lists several examples from the Proto- and Neopalatial periods, many of which clearly depict buildings, often with an extraordinary amount of structural detail, but none with features resembling chimney pots (Mersereau 1991, 48–103, cat. nos. 13–26). Postpalatial and Postminoan cylindrical models ("hut urns" or "hut models") are generally more schematic and include fewer details that can be related to actual domestic architecture, although a few have what appear to be openings or projections at the apex of their roofs (Mersereau 1991, 107–146, cat. nos. 28–48; see also Hägg 1990; Mersereau 1993; Petrakis 2006). In Quartier Nu A at Malia, a very large house model was found smashed on top of a LM IIIB pebble mosaic courtyard (Driessen and Farnoux 2011; Driessen and Fiasse 2011, 287–288, fig. 25.2). The model depicts a tall square house with windows in the middle of each side and two cylindrical chimneys protruding from the gently sloping, hipped roof.

Finally, a house model from a tholos tomb at Knossos Khaniale Tekke, apparently dating to Protogeometric B (PGB) or later, depicts a nearly square structure with entrance, windows in its side walls, and a cylindrical chimney projecting near the center of its flat roof (Hutchinson 1954, 220–221, 224, pl. 20; Boardman 1967, 64–66; Mersereau 1991, 147–151, no. 49). The abstract manner of representation used for the models makes difficult a direct translation to vernacular architecture, and the lack of chronological overlap with the Vronda settlement must be noted, but the models do suggest that the use of chimney pots was not unknown in LM architecture.

The study of the houses at Vronda shows that interior hearths and ovens were commonplace, so it seems likely to us that there would have been a need to provide ventilation. The three examples of chimney pots recovered from the excavation suggest that pithoi (reused or repurposed) could be set into the roof over a hearth in order to draw air up and out of the room. In contrast, the preserved examples from the Greek mainland are either solid (Pylos, Nichoria) or pierced (Mycenae, Midea), and they appear to have been purposefully made. The presence of cylindrical elements in the roofs of Minoan architectural models leaves open the possibility that cylindrical chimneys were common, they could be either solid or pierced, and they may have been open to the sky.

BENCHES

Stone-built benches are a common feature within the Vronda settlement (Table 7). They are found in 14 rooms of the domestic building complexes and both rooms of the Shrine (Building G). The benches are typically long, narrow, and built of rubble in earth mortar directly on top of the floor surface or a thin layer of soil. Unlike walls, which were constructed using a two-skin technique, most benches preserved only one (outer) face. All of the examples are built against a wall, typically against the downslope face of the longest wall in a room (Rooms B8, E1, north of E2, E6, C4, D4 east, G1, G2, I3, I4, K1, K3, O4, N2, N3), with some built against the shorter transverse walls (Rooms C4, E6, O1, K1, G2). One possible bench (Room D4 west) was built against the upslope face of a long wall. Three benches (Rooms K1, E6, north of E2) have continuous sections built in the corner of two walls, so that the completed features are L-shaped. The length of the benches varies from room to room, with some examples running almost the entire length of a wall (Rooms D4 east, I3, N2, N3, O4) and others for only a short section (Rooms B8, C4, D4 west, E1, E6, K1, K3). Some of the constructions categorized as benches are distinguished from what we have called platforms only by their shorter heights and/or shallower depths. Excluding the very large bench outside of Building G, which is of monumental proportions, the maximum preserved lengths of the benches at Vronda range from 1.00 to 6.25 m (avg. 2.48 m), the depths from 0.20 to 0.75 m (avg. 0.48 m), and the heights from 0.12 to 0.60 m (avg. 0.31 m).

Most of the benches are found inside the buildings, with some rare exceptions. Possible exterior benches were found in Room/Area B8, north of Room E2, and in Room E6. The first two cases appear to be exterior spaces, but erosion and later activity have obscured or destroyed much of the LM IIIC levels in these areas, so it is not certain that the benches were originally outside the LM

IIIC buildings. It was not possible to excavate the area to the south of Room E6, so the nature of this space also remains unclear. The only unequivocal example of an exterior bench belongs to Building G, the communal Shrine (Klein 2004, 96).

What function(s) did these benches serve in the domestic complexes at Vronda? We have used the term "bench" collectively to describe these long, narrow stone-built features, but their lengths and depths vary, and their original heights probably did so as well. Essentially, the bench is a narrow surface raised above the floor, which provides a permanent architectural feature that could be used for many different activities. Comparable rubble benches from the Neopalatial houses on the island of Pseira, for example, measure 1.1 m long and 0.45 m wide and 0.40 m high and are typically located near the entrance, either inside or outside (McEnroe 2001, 52–53). It has been suggested that the size and location of these benches were suitable for a variety of activities, including meeting with friends and neighbors in front of the house. Although "bench" suggests a primary role as permanent seating, the preserved height of most of the Vronda benches is below the modern U.S. industry standard of ca. 18 inches or 0.46 m (Ramsey and Sleeper 2000, 625). Extremely shallow benches may have functioned as shelves, while the length and depth of others barely may have made them suitable as places to sleep. Kopaka's study of Minoan "bedrooms" identified benches ranging in length from 1.50–2.00 m, depth 0.60–1.00 m, and height above floor 0.06–0.35 m as appropriate for sleeping or as platforms to support a bed (Kopaka 1990, 226). This size is generally confirmed by the portable wooden beds (shape recovered using plaster of paris) from the excavations of the settlement at Akrotiri on Thera (Marinatos 1971, 22–24, 41–42, pls. 34:b, 35:a, b, 104; Doumas 1993, esp. 178, pls. 105, 106). One example found in the Room Delta 2 measures 1.60 m long and 0.68 m wide (Marinatos 1971, 41). The horizontal surface of the Vronda benches would also have been useful for food preparation or other activities, or simply as a means to raise foodstuffs or objects off the ground. Some long benches are found in rooms with a central hearth (Rooms C4, D4, E1, I3), but not every hearth room preserves a stone bench. In some cases a bench is located next to an oven (Rooms C4, I3, O1), but there are also ovens without any preserved benches nearby.

PLATFORMS

Platforms, like benches, are built of rubble in earth mortar, with all but one example (in Room C2) distinguished by their relatively more compact proportions and greater height (Table 8). The maximum preserved lengths/widths of these platforms range from 0.65 to 1.48 m (avg. 0.98 m), the depths from 0.55 to 1.00 m (avg. 0.72 m), and the heights from 0.30 to 0.92 m (avg. 0.57 m). The anomaly is the low platform in Room C2 (V12404), which is roughly triangular in shape, measuring ca. 1.20 x 0.90 m, but only 0.15 m high (Day, Klein, and Turner 2009, 83, 87, figs. 55, 56). As noted above (p. 15), its identification as a platform is not secure, and it may have been a step or landing providing access to Room C1 to the south. Platforms are less common than benches at Vronda, and most of the securely identified examples are located in the corners of rooms. There are nine built features identified as platforms in the LM IIIC settlement, six found within houses (in Rooms C2, D1, I3, N1, N3, N5), two in the Shrine (Building G), and one to the east of Building A (it is not clear if this is an interior or exterior space).

Determining the function of platforms is a challenge; their similarity to benches suggests that they, too, could be used for multiple purposes, as workspaces, storage surfaces, or even for display. At Vronda, the form of the platform and the objects left in situ at the time the settlement was abandoned offer some clues. The height and location of the platforms, often next to a bench or in a room with a hearth, suggest that they could have been used as working surfaces or places to store vessels and objects. Two stone tools (**N1 ST 9**, **N1 ST10**) were discovered on top of the small platform in Room N1 (Day and Glowacki 2012, 108, 110, 114). The platform in Room I3 has a central depression that the excavator suggested would have been suitable to cradle a ceramic vessel or other utensil (Day and Glowacki 2012, 64, pls. 12A, 12B), perhaps similar to the "jar-stand" (*stamnotaki*) noted in Room K 9 at Karphi (Pendlebury, Pendlebury, and Money-Coutts 1937–1938, 77, pl. 18.2). The platform in Room D1 is unique at the site in having objects preserved on top and adjacent that may be related to its function. Two nearly complete terracotta figures, a bovine (**D1 F1**) and a horse (**D1 F2**), were found on

the top surface, and a second horse (**D1 F3**) was found in a pit nearby. A small LM IIIC krater (**D1 P10**) and coarse painted jug (**D1 P14**) were on the ground to the north (Day, Klein, and Turner 2009, 94–98, pls. 16A–16F, 17A, 17B). Gesell has suggested that the figurines and platform were used as a focus for domestic ritual (see Ch. 3).

McEnroe identified six platforms in the Neopalatial houses at Pseira (McEnroe 2001, 54). The Pseira examples are somewhat lower than those found at Vronda (average height 0.20–0.30 m), but it is suggested that they could still have served as workspaces for people sitting on the ground. This may also be the function of the low platform in Room C2 at Vronda. For comparison, Darcque notes that built features identified as benches in Mycenaean architecture average 0.50–0.60 m above the ground, while platforms are between 0.10–0.20 m taller (Darcque 2005, 178).

STONE-BUILT ENCLOSURES: BINS AND POT STANDS

The terminology used to identify stone-built enclosures is often vague or inconsistent due to the poorly preserved state of remains and lack of direct evidence for function. The typology proposed below, of features meant to enclose a small space for storage or to support a ceramic vessel, is based upon the design and dimensions of the features, particularly the shape and height of the superstructure and the presence of stone-paved interior surfaces. Precise functions remain elusive, but some examples have preserved objects or remains from the time the settlement was abandoned that may reflect daily practice.

Slab enclosures, sometimes known as bins, are formed by a series of thin stone slabs (sometimes combined with other cobbles and small boulders) set on edge and usually utilizing the face of a wall for one of its sides (Table 9). This construction forms a box-like enclosure, generally taller than features we have designated as pot stands. The function of these slab enclosures may have been to hold or store pots, but the relatively tall, enclosed space could also have been used for storage of foodstuffs or nonperishable objects. Some may even have been covered with additional flat stones or a wooden cover to create a closed storage bin with workspace on top.

Cobble enclosures, also referred to as bins and pot stands, consist of areas bordered by cobbles and small boulders instead of upright slabs (Table 10). While one or more sides of these features are often formed by the walls of a room, the height of the enclosing border is very low, typically that of a single stone. Plans vary, with circular, semicircular, oval, triangular, and rectangular forms attested.

Boulder enclosures, also called bins, differ from cobble enclosures in terms of larger overall size, the use of larger stones, and the opportunistic use of bedrock boulder outcrops in their construction (Table 11).

Other features that have been called bins are what we refer to here as paved enclosures, partially paved areas in the corners of a room (Table 12). Walls define two or three sides, but there was little evidence for a constructed boundary elsewhere. The northern end of Room/Area B8 was partially paved in the area between the west wall, north wall, and the East Terrace Wall (Day, Klein, and Turner 2009, 57, pl. 11E). In the northwest corner of Room D3, a paved area was bounded on the north and west by walls, while the southern edge was formed by an outcropping of bedrock that projected above the level of the floor (Day, Klein, and Turner 2009, 103–104, pl. 19B).

HEARTHS

Sixteen hearths were identified in buildings at Vronda (Table 13). We have defined a hearth as an area, sometimes bordered by curbs of stone, clay, or bedrock, where a fire was built repeatedly during the life of the structure (Day, Glowacki, and Klein 2000, 116). Hearths were recognized in the course of excavation by the presence of hard, heat-reddened clay, often associated with ashy soil and bits of carbon directly above the floor. In preliminary reports, the more poorly preserved examples were sometimes designated as decayed mudbricks (Rooms A1 and D1), nonspecific evidence for fire (Rooms D4, E2, and O1), or a pyre site (there is actually a pyre site above a hearth in Room C4). Most hearths appear to have been constructed primarily with thin layers of clayey soil, similar to the material used for the roof. At Vronda, they were built on top of floor surfaces but not dug into the ground or raised significantly above it on any type of built platform. In most cases, the preserved thickness of