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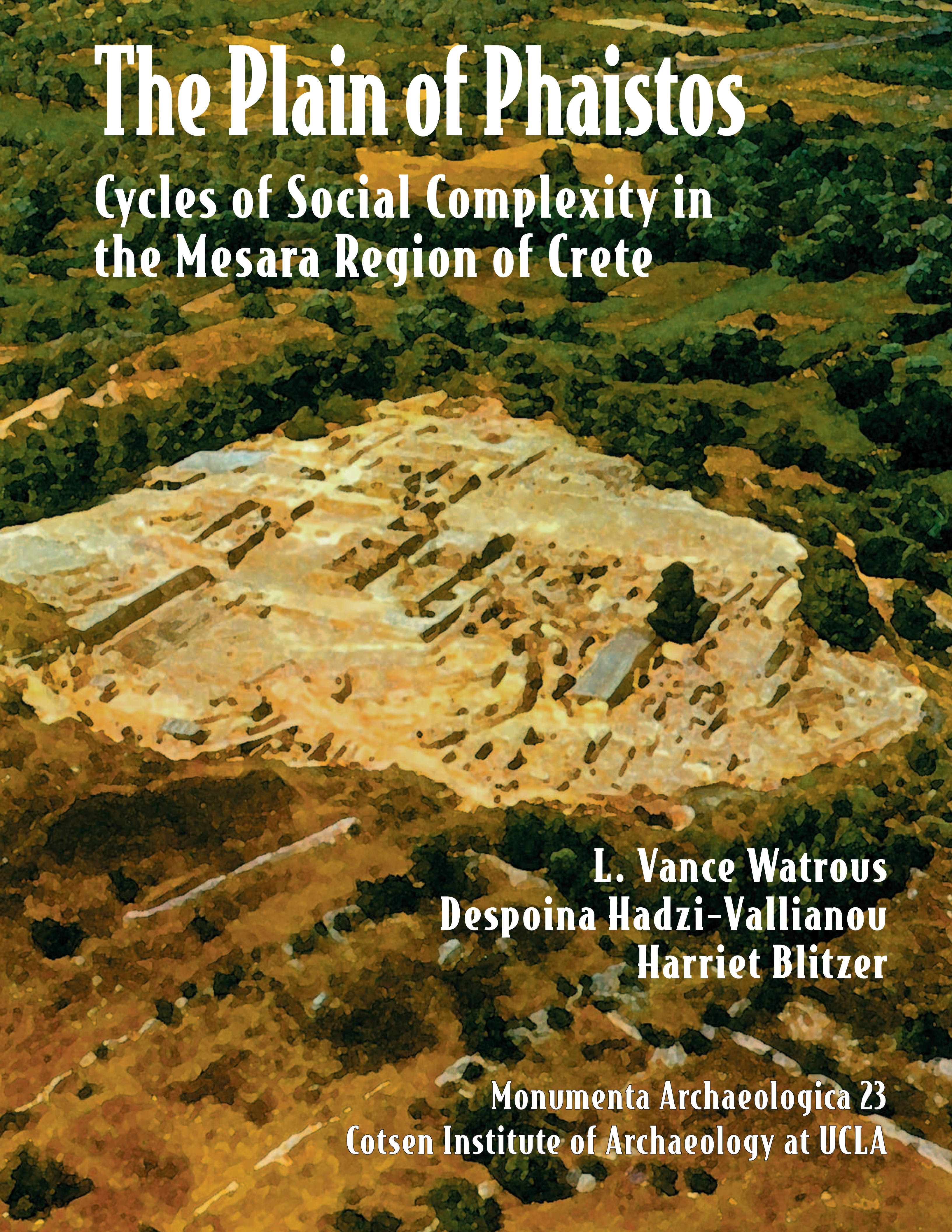

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Monumenta Archaeologica 23
Cotsen Institute of Archaeology at UCLA

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Εἰς τόν λαόν Δυτικῆς Μεσαρᾶς

and

for Joseph and Maria Shaw

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Acknowledgments

THE FIELDWORK FOR THIS PROJECT was carried out in 1984, 1986, and 1987 under a Greek-American permit (synergasia) from the Greek Ministry of Culture and under the aegis of the American School of Classical Studies at Athens. The codirectors, L. Vance Watrous and Despoina Hadzi-Vallianou, would like to acknowledge grants for their fieldwork from the National Endowment for the Humanities, the Institute for Aegean Prehistory, the National Geographic Society, and private donors. An additional grant from the Institute for Aegean Prehistory helped support the preparation of this publication. The codirectors and John Bennet supervised the daily archaeological survey work. Students from the Universities of Thessalonike, Athens, Crete, Ioannina, and the State University of New York at Buffalo manned the survey teams. In 1986 John Frankish and Tracey Cullen also helped with the field survey. Kevin Pope, Karolos Beze, and Nikos Mourtzas conducted geological studies associated with the project. Botanical studies were carried out by Jennifer M. Shay and C. Thomas Shay, with additional work by Michalis Damanakis (University of Crete) and Zacharias Kipriotakis (Municipal Botanist for Herakleion). In 1987 John Hayes identified and dated the Roman, Byzantine, Venetian, and Ottoman pottery from the survey. Maps were provided by the Greek Army Cartographic Service and IGME, the Greek Geological Service. Much good advice and helpful support came from Christophoros Vallianos, director of the Museum of Cretan Ethnology in Voroi. In Athens, Stephen Miller, director of the American School of Classical Studies at Athens, gave official support to our work during the field seasons. The fieldworkers would also like to salute and thank the local Cretan farmers, shepherds, and villagers who were, without exception, welcoming and helpful to us as we carried out our fieldwork on their land.

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Di Vita (director of the Gortyn excavations) likewise read a draft of chapter 7 and made many valuable corrections. Joseph Shaw (director of the Kommos excavations) has been supportive of our work and has answered numerous questions about Kommos. Members of the Archaeological Service, Alexandra Karetsou (Director of the Herakleion Museum), Antonis Vasilakis, and Georgios Rethemiotakis have graciously shared their extensive knowledge of Central Crete with us at various times. We would also like to remember the late Myron Zacharakis of Pobia and the guards at Phaistos who helped us in our work. Object photographs were taken by Tasos Chalikias, Winston Burke, and Harriet Blitzer. Artifact drawings in Appendix C are by Harriet Blitzer.

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The response to these lectures produced a number of stimulating questions and suggestions that have caused Watrous to rethink his data and conclusions. In 1995 Watrous and Ben Nelson team-taught a graduate seminar on the Archaeology of Complex Societies in the Department of Anthropology of the State University of New York, Buffalo, from which this manuscript has benefited. Sturt Manning generously sent Watrous a copy of his 1996 Ph.D. thesis on Cretan state formation prior to its publication. An individual SUNY Faculty Research Grant for 1983 is gratefully acknowledged in the early stages of this project. Watrous's comprehension of the state formation process, described in chapters 5, 6 and 12, has, over the years, deepened considerably, in large part due to help from responsive colleagues.

We especially thank Barbara Evans of the Graphics Section, University of Buffalo, for her artistry and support. She has patiently created, or redrawn, nearly every figure in this volume. In the editing of this volume, the bibliographic support of Marjorie Lord, Associate Librarian in the Butler Library, Buffalo State College, has been invaluable. We are grateful for her meticulous efforts on our behalf. Panagiota Pantou graciously helped in our editing of both text and bibliographic sources in Greek. And finally, we are grateful to our compositor, Carol Leyba, who has carefully designed and organized our enormous amount of data and text in a clear and readable form. To all, we extend our thanks.

Chronology

All prehistoric dates (calibrated C14) are based on Coleman 1992 and Warren and Hankey 1989.

4000 BC
Late Neolithic
3500 BC
Early Minoan I
2900 BC
Early Minoan II
2200 BC
Early Minoan III
2100 BC
Middle Minoan IA
1900 BC
Middle Minoan IB
1850 BC
Middle Minoan II
1800/1775 BC
Middle Minoan III
1725/1700 BC
Late Minoan I
1570/1540 BC
Late Minoan II
1490/1450 BC
Late Minoan IIIA
1360/1325 BC
Late Minoan IIIB
1220/1200 BC
Late Minoan IIIC
1100 BC
Subminoan

970 BC
Protogeometric
800 BC
Geometric
700 BC
Orientalizing
600 BC
Archaic
500 BC
Classical
323 BC
Early Hellenistic
150 BC
Late Hellenistic
66 BC
Early Roman
400 AD
Late Roman/
Early Byzantine
828 AD
Arab Occupation
961 AD
Second Byzantine
1210 AD
Venetian
1645 AD
Ottoman
1894 AD

Bronze Age = ca. 3500 BC to 1200 BC
Prepalatial = Neolithic through Middle Minoan IA
Late Prepalatial = Early Minoan III–Middle Minoan IA
Protopalatial = Middle Minoan IB–II
Neopalatial = Middle Minaon III–Late Minoan I
Iron Age = ca. 1200 BC to the end of the first millennium BC

Introduction

THIS VOLUME HAS TWO separate but overlapping goals. The first is the presentation of the results of our interdisciplinary survey carried out in the Western Mesara region on the Aegean island of Crete (figure 01) between 1984 and 1987. As such, the book publishes geological, environmental, botanical, agricultural, and historical studies of this area as well as the archaeological evidence for settlement within the region from the Late Neolithic period to the present. The second goal is regional and thematic, that is, to trace and interpret the social evolution of the polity of Phaistos, located within the Western Mesara. Invariably, this focus has produced an emphasis on the Early Minoan II to Hellenistic periods, when Phaistos was the center of an autonomous polity.

The introduction presents an overview of the project. Part I deals with the project itself. In chapter 1 the goals, format, and methods of the field project are presented. Chapter 2 traces the evolution of our study during the decade following our fieldwork. Part II consists of four chapters that consider aspects of the local environment and its use. Chapter 3 introduces the reader to the island of Crete and the Mesara region in particular. Chapter 4 treats geologically related themes, namely, changes in sea level, erosion, and deposition, and site preservation biases in the survey. Chapter 5 discusses the environment, land capability, and vegetation. The ethnographic study in chapter 6 records local methods of agriculture and other subsistence strategies from circa 1890 to 1950.

FIGURE 01. Map of the Aegean and the Eastern Mediterranean

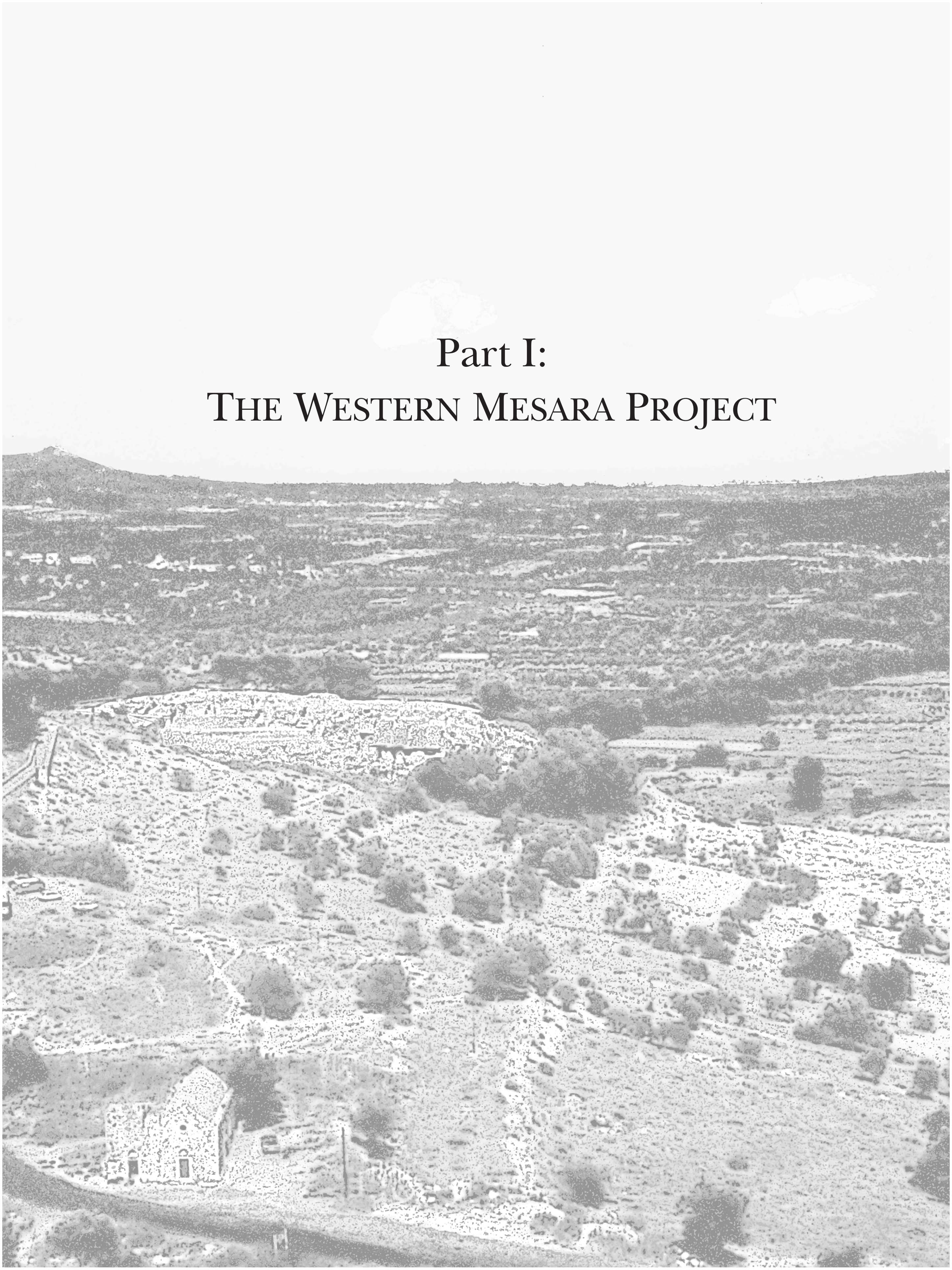
Part III deals with prehistoric archaeological evidence. Chapter 7 examines Late Neolithic to Early Minoan I society in the Western Mesara. In chapter 8 we focus on the emergent social complexity of Early Minoan II. Chapter 9 discusses the question of Minoan state formation in the Middle Minoan IA period. Chapter 10 outlines the subsequent development of the Minoan state in the Mesara during the Protopalatial to Late Minoan III periods.

The four chapters in Part IV treat the Mesara during the historical era. In chapter 11 we document regional settlement during the Late Minoan IIIC through the Late Hellenistic periods. This chapter also examines the political relationship between the two rival poleis of the region, Phaistos and Gortyn. Chapter 12 discusses various aspects of the emerging Cretan polis, at Phaistos and at Gortyn, including Early Iron Age social organization, cult practices, and the two famous local seers, Epimenides and Thaletas. In chapter 13, Late Hellenistic to Early Roman settlement and "romanization" in the Mesara are considered. Drawing on archival data, chapter 14 describes the economic and political history of the Byzantine to Ottoman Mesara.

Finally, in Part V, chapter 15 presents the diachronic cycles of social complexity in the Western Mesara and reexamines the interconnection between rural land settlement and the structure of the Phaistian polity.

Greek words in standard Greek are transliterated and italicized in the text. In sections that deal with the present-day local names of places and objects in the Mesara, for example, chapter 6 and appendix D, the original Greek is included to ensure proper identification. Variable local place-names from the Early Byzantine through Ottoman periods are presented here as they appear in the historical documents. Commonly Anglicized Greek names, such as Phaistos, Asterousia, and Petrokephali, are rendered in English.

Part I:
The Western Mesara Project



1

The Field Survey

L. Vance Watrous, Despoina Hadzi-Vallianou, and John Bennet

THE FIRST TWO CHAPTERS in this volume treat the evolution of our research project during its program of fieldwork (chapter 1) and subsequent study of the data (chapter 2). This chapter presents the goals and methods of the fieldwork carried out from 1984 to 1987. The original goals of the project, aimed at explaining the rise and subsequent development of social complexity within our region, have remained unchanged from the project's conception to its final publication in this volume. Our interpretive approach, however, has been modified as a result of our intensive ongoing study (1988–1999) of the collected data and in light of recent theoretical research on social complexity. In chapter 2 we describe our study of the data, current scholarship on social complexity, and our own approach. We begin this chapter with an introduction to earlier archaeological fieldwork in the Western Mesara region.

Earlier Research in the Mesara

One of the main advantages in undertaking a survey in the Western Mesara was the breadth of previous archaeological work in the region. The earliest descriptions of antiquities in the Mesara go back to the fifteenth century. Early travelers, such as Buondelmonti (1415), often drawn by antiquarian interest in the ruins of Gortyn, wrote accounts of the region. Two particularly valuable descriptions of local ancient and Venetian monuments were written during the nineteenth century by Pashley (1837) and Spratt (1865).

Archaeological, as opposed to antiquarian, investigation of the Mesara began in 1884, the year that the Italian Frederico Halbherr discovered the famous Law Code at Gortyn. That same year, Halbherr and the Cretan Hadzidakis began to excavate a cave on Mount Ida said to be the legendary sanctuary of Idaean Zeus (Plato *Laws* 625b). During the final years of the nineteenth century, Halbherr and Taramelli excavated sites in the region (figure 1.1), including the Idaean, Kamares, and Miamou Caves and an Early Iron Age settlement at Kourtes near Zaros (Taramelli 1897, 1901b). In 1900, Halbherr began systematic excavations at Phaistos, and with other colleagues in the years following, dug at a variety of sites in the Mesara region, including the Hellenistic–Roman sanctuary at Lebena, the Early Iron Age–Roman city at Gortyn, Early Minoan tombs at Sivas, and the Minoan settlement at Agia Triada (Di Vita, La Rosa, and Rizzo 1984). Following this, the Greek archaeologists, Xanthoudides (1924) and Marinatos (1924–1925), also began to excavate at sites throughout the Mesara, including an Early Minoan–Middle Minoan tomb at Kalathiana and a Minoan farmstead at Kouses.

After World War II, a new generation of Italian archaeologists, namely Levi, Di Vita, and La Rosa, continued to work at Phaistos, Gortyn, Kamilari, Agia Triada, and other sites in the region. In her magisterial *Inscriptiones Creticae, I–IV* (1935–1950), the epigrapher Margarita Guarducci published the Gortyn Law Code, a unique and detailed record of the social and political institutions of Classical Gortyn. The Greek archaeologists Alexiou, Davaras, and Sakellarakis carried out investigations at Lebena (Alexiou 1958), Apesokari (Davaras 1976), and Agios Kirillos (Sakellarakis 1968). The British scholars Branigan and Blackman conducted surveys in the Agio Pharango Valley, in the Asterousia and along the south coast of Crete (Blackman and Branigan 1975, 1977).

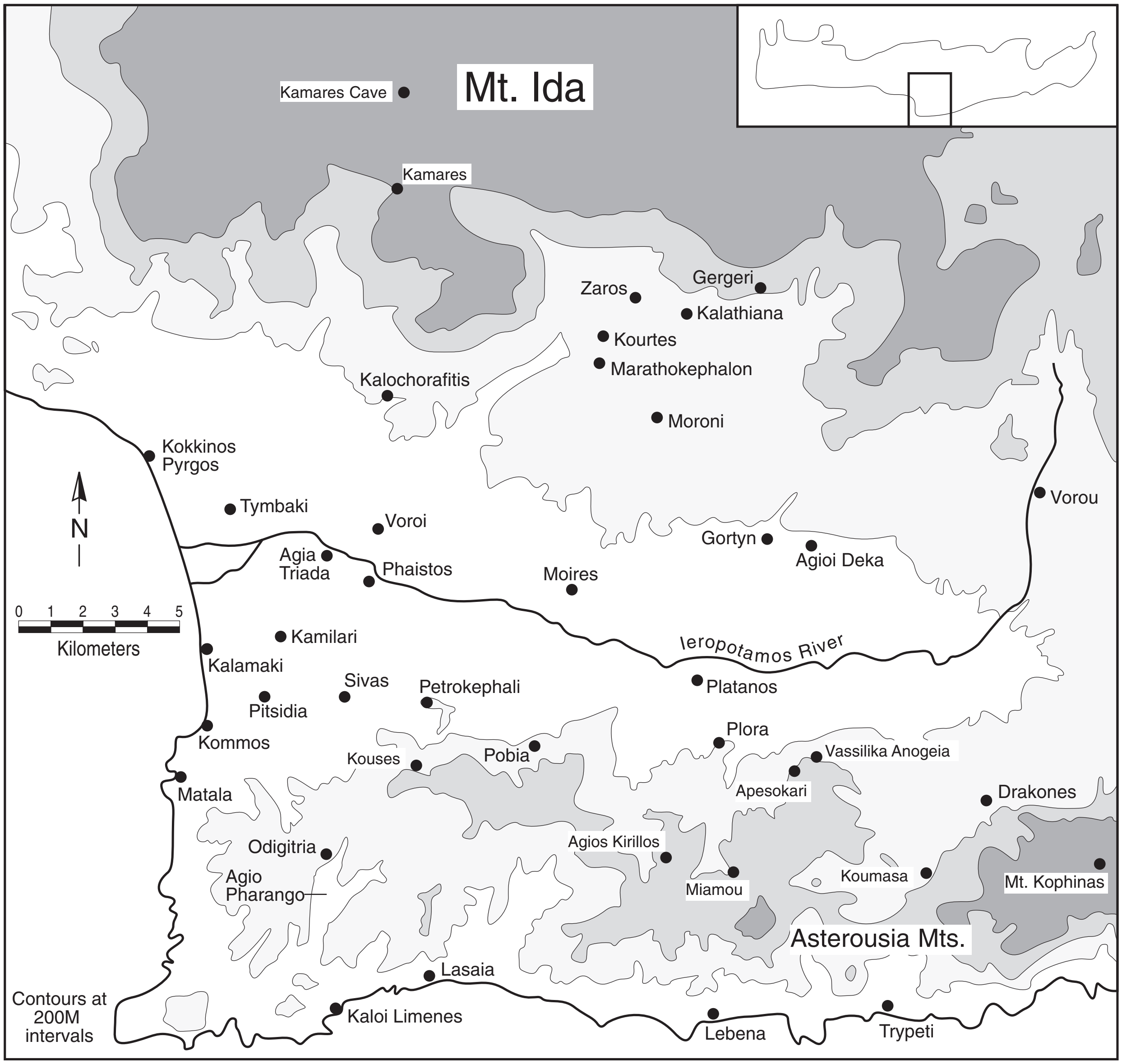


FIGURE 1.1. Map of the Western Mesara

In 1976, Joseph and Maria Shaw began large-scale investigations at Kommos (Shaw 1977), including excavations that have revealed a Minoan town, a monumental harbor complex, and an Iron Age sanctuary (Shaw 1977, 1980, 1981, 1984, 1986; Shaw and Shaw 1993, 1995, 1996, 2000). In 1979, in order to provide a (paleoecological) context for understanding the site of Kommos, J. Shaw invited Thomas and Jennifer Shay and D. Reese to publish the botanical and faunal remains from the site (Shay and Shay 1994; Reese 1995). Surveys of the geology (Gifford 1995) and soils and land use (Parsons and Gifford 1995) were also carried out in the area around Kommos. In 1978 and 1979, J. Shaw initiated an archaeological survey in the immediate area of Kommos, carried out under the direction of Hope Simpson (Hope Simpson et al. 1995). Using traditional methods (for example, only sites were recorded), Hope Simpson and a small team walked comprehensively over an area of 17 km^2. Bordered on the west by the sea, this area (figure 1.2) had its

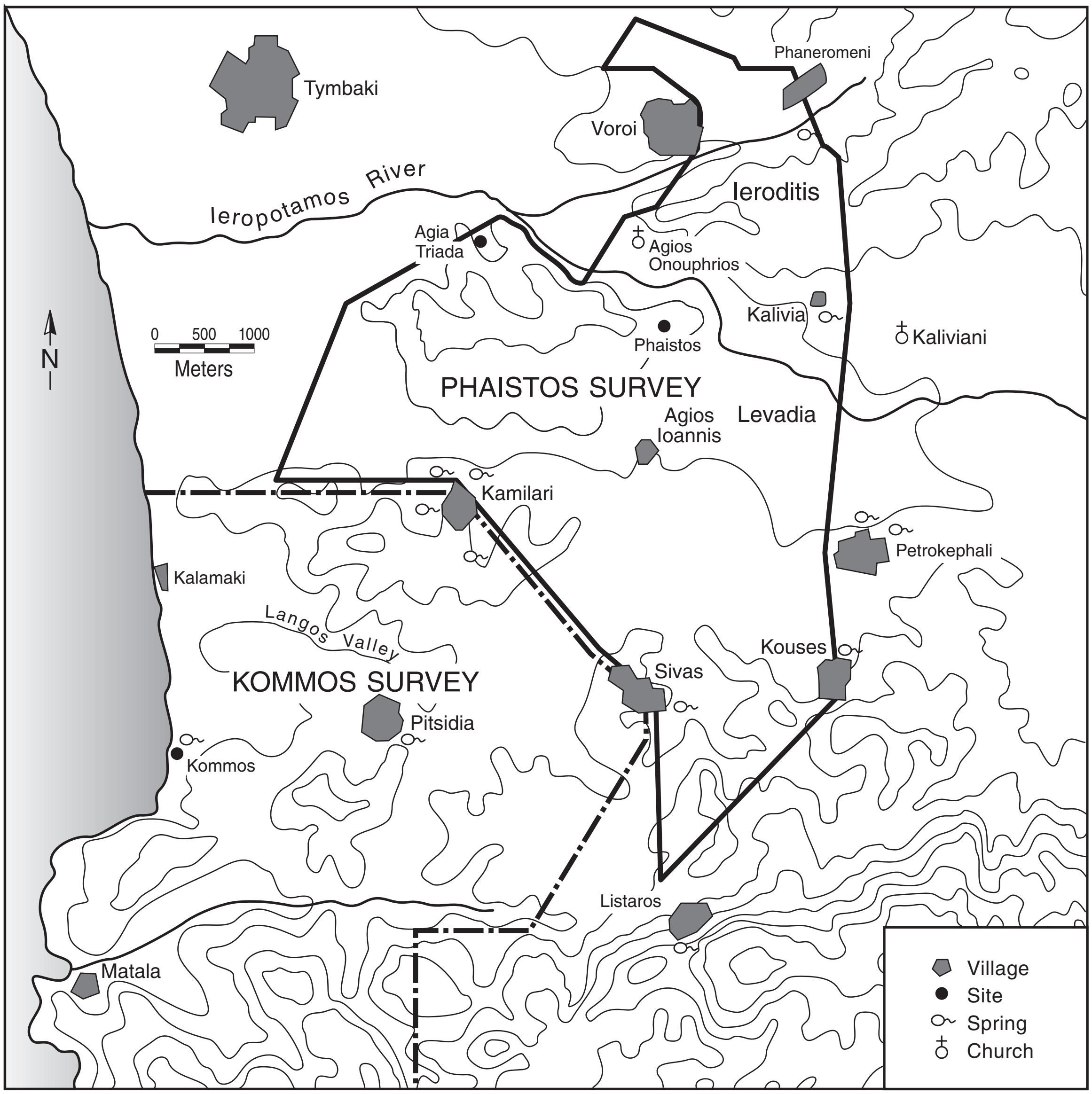


FIGURE 1.2. Map of the survey area in the Western Mesara

northern boundary along the Kamilari ridge, its southern limit along the foothills of the Asterousia Mountains, and its eastern boundary along the Kamilari–Sivas and Sivas–Listaros roads. This survey margin formed the southwestern border of our own archaeological survey.

During the last two decades, important fieldwork has continued in the Western Mesara. Despoina Hadzi-Vallianou has excavated houses and tombs at the Roman port towns of Matala, Lasaia, and Lebena, the Roman aqueduct near Zaros, Hellenistic chamber tombs at Phalangari near Phaistos, an entire Minoan villa at Plakes near Pitsidia, tombs at Alexandraki near Phaistos, a Minoan tholos tomb near Kouses, a fourth-century industrial establishment and a Minoan site near Kalamaki, a Hellenistic house and paved road at Agios Ioannis near Phaistos, a Hellenistic farm at Gria Saita southeast of Phaistos, Minoan, Iron Age, and medieval remains from Voroi, and Minoan sites at Aphratias near Kalamaki (Hadzi-Vallianou 1979, 1988, 1989, 1990, 1992, 1995a–c; 1996). In addition, she carried out topographic work in the Mesara, including at

Kokkinos Pyrgos, Lebena, Lasaia, and Martsalos (Hadzi-Vallianou 1979). Hadzi-Vallianou has also undertaken a program of preservation and restoration of a large number of monuments in the Mesara and elsewhere (Hadzi-Vallianou 1989). At the same time Vasilakis excavated at Matala and Trypeti, tombs and an EM settlement near Odigitria, tombs at Phaistos, and a Neolithic house at Kaloi Limenes, as well as commencing a new survey of the Agio Pharango area (Vasilakis 1983, 1987, 1989, 1993, 1994/1996, 1989/1990).

Karetsou and Rethemiotakis (1990) excavated the Minoan peak sanctuary at Mount Kophinas. In recent years Di Vita and his colleagues (Di Vita 1988) have uncovered the Roman and Byzantine monuments at Gortyn. Publications and study at the major ongoing excavations of Phaistos, Agia Triada, Kommos, and Gortyn have established a relatively secure regional ceramic framework for the Western Mesara survey. The groundwork laid by these earlier investigations has made it possible for our project to focus on broader, regional questions.

Earlier fieldwork in the Mesara was not only archaeological. Burgel (1965) carried out an anthropological study of the community of Pobia. C. Vallianos has conducted several pioneering studies of the medieval–Ottoman monuments of the Mesara (Vallianos et al. 1985; Vallianos and Kokkoris 1987). In 1980, Bottema published a unique pollen core from Agia Galini near Kokkinos Pyrgos (figure 1.1) on the western margin of the region. Yassoglou (1960) had previously prepared detailed soil maps of the Western Mesara.

Inevitably, our predecessors' fieldwork has also placed some limitations on our study. Since most of the excavation in our region was done before 1970, the quality of much of the published data is relatively poor by contemporary standards. For example, excavated material from the rich tombs of the Mesara cannot answer some of our current questions. At Phaistos, the excavations of certain periods, for example, Early Minoan II, Middle Minoan IA, Late Minoan IIIC, and Archaic–Hellenistic, remain largely unpublished. Faunal, floral, and physical anthropological data from many of these excavations is lacking.

The data available for the Western Mesara has also shaped the format of our study. Chapters 7 through 13, on the Minoan–Roman Mesara, are mainly archaeological, while chapter 14, on the Byzantine–Ottoman era, is largely based on written documents. Previous archaeological surface surveys, in the Asterousia Mountains and the Kommos area, supplement our survey finds and create a broader basis for our discussions of regional settlement.

BACKGROUND TO THE WESTERN MESARA FIELD PROJECT

This project was organized in 1983 by the codirectors, L. Vance Watrous and Despoina Hadzi-Vallianou. As a representative of the Greek Archaeological Service for the Mesara, Hadzi-Vallianou had excavated at many sites in the region (see above) as well as at the important Late Minoan–Early Iron Age site of Smari (Vallianou 1989). Her interests were particularly, though not exclusively, focused on the Geometric–Roman periods. While beginning a register of archaeological localities in the Mesara, she had discovered a large number of new sites, including those at Zaros, Moni Odigitria, Agia Kryiaki, Kaloi Limenes, Agios Spyridon near Phaistos, at Moni Kaliviani, and Phaneromeni (Hadzi-Vallianou 1995a, b). As a result of her experience, she knew the archaeology of the Mesara region well, which was particularly valuable for our project. Since the cessation of our fieldwork in 1987, she has continued to excavate at local sites, including Pitsidia (Plakoures), Matala, Kalamaki, and Voroi (Hadzi-Vallianou 1988, 1989a,1990, 1992, 1995a–c). She was joined in her interest in the Western Mesara by her husband, Dr. Christophoros Vallianos, who had established an award-winning museum of ethnography and folklore in the village of Voroi.

Having completed an archaeological survey (Watrous 1982) in East Crete, Watrous had come to the Mesara in 1976 to work on the Kommos excavations as a pottery specialist. One of the chief topics of conversation at the Kommos project from 1976 to 1982 concerned the nature of the economic and sociopolitical relationship between Kommos, Phaistos, and Agia Triada, the three major Bronze Age sites in the area. As a consequence, Watrous decided to undertake a survey that would address these questions by filling in some of the local archaeological gaps in the areas between these three sites.

In our preliminary report (Watrous et al. 1993:193) on our fieldwork, we wrote that we were interested

> in bringing survey techniques to bear on the specific problem of the rise and subsequent development of complex society in Crete. The Western Mesara was an ideal area for the project because it formed the heartland of the territory controlled by the city of Phaistos ca. 1900–150 BC. Through survey we hoped to trace the rise of the Phaistian state and its regional structure as well as to identify the local *ecological* and *cultural* factors that might have contributed to its development.

Our specific approach to this problem was influenced by three interrelated developments in archaeological thinking. The first was ecological. We were convinced that human subsistence was the most basic operating level of culture and, therefore, an understanding of local man-land relations was fundamental to a diachronic study of the region. Without this understanding, a study would be largely self-referential and self-serving. Almost twenty years have passed since then, and this conviction has not lessened. An ecological approach placed an emphasis not only on subsistence and the environment but also on learning about the ethnographic record, population size, and settlement patterns. In common with other ongoing projects (Jameson 1976; Forbes 1976b; Van Andel and Runnels 1987) interested in environmental issues, we organized our survey with an operational emphasis on local geology, soils, flora, and traditional agricultural methods.

The second development was settlement archaeology (described in Trigger 1989:282–297). This approach emphasized the importance of regional settlement patterns and their potential to supply information on the economic, social, and political structure of a society. Settlement archaeology influenced regional surveys worldwide, stimulating work in both the New and Old Worlds (for example, Blanton 1978; Adams 1965). The first Aegean archaeologist to apply these perspectives was William McDonald in his influential regional survey of Messenia (McDonald and Rapp 1972). The Minnesota Messenia Expedition attempted to understand Late Bronze Age society in the Messenia region of Greece largely in terms of the environment, land use, agriculture, technology, population and settlement patterns. Other major Aegean regional field projects soon followed: the first phase (1972) of the Southern Argolid survey (Jameson, Runnels, and Van Andel 1994), the Melos survey in 1976/1977 (Renfrew and Wagstaff 1982), and the Boeotia survey in 1979 (Bintliff and Snodgrass 1985).

The third major development was systems theory. In 1972, C. Renfrew's *The Emergence of Civilisation* based on Clarke (1968), supplied a systemic model for Aegean culture and its evolution. Both Clarke and Renfrew viewed culture as a complex organism, a "system" composed of smaller "subsystems." These subsystems consisted of basic, constituent parts of all human cultures: subsistence, population, technology, trade and communication, social organization, and ideology (C. Renfrew 1972:486–494). This systems theory held that culture evolved through the interaction of these subsystems. It was these "cultural factors" beyond subsistence that we were referring to in our original statement of project goals quoted above.

Systems theory made it possible to approach questions of how and why ancient societies changed, by means of regional archaeological survey work. Until the 1960s, the study of ancient Greece had been largely preoccupied with epigraphy, literature, high art, and urban monuments. During this decade, however, archaeologists (McDonald and Rapp 1972; Jameson 1976) began to use regional projects to address a wide range of socioeconomic questions about the Greek past. In the mid-1970s, Renfrew, Wagstaff, and Cherry conducted a regional survey on the island of Melos (Renfrew and Wagstaff 1982). Based on central-place and systems theory, the Melos survey concluded, as a general proposition, that a hierarchical pattern of settlement, demographic growth, and regional production was correlated with periods of outside influence. In 1983, Cherry, Davis, and Mantzourani (1991) turned to the island of Keos to confirm this cultural generalization (and eventually came to different conclusions). We were indebted to the Keos survey, for we were joined by John Bennet in 1984, who organized our archaeological field techniques (see Field Methods, below) based on his experience with the Keos project.

On more theoretical matters, however, we differed from the Melos and Keos surveys. We did not believe in universal cultural laws and their testability by archaeological data (the Keos survey team seems to have subsequently come to the same realization about their survey data [Cherry, Davis, and Mantzourani 1991:7, 458]) or in the appropriateness of the hypothetico-deductive method for a regional survey project (Cherry, Davis, and Mantzourani 1991:xv, 4–12, for the hypothesis that the Keos survey was supposed to test). Instead, like some of our predecessors (Jameson 1976), we were interested in the relation between rural subsistence, the interaction of man with the environment, and changing patterns of settlement with the economic and political organization of our region. We believed that the first step in our research process should be an inductive and more flexible gathering and evaluation of all of the available cultural data within a systemic framework before attempting to understand the data in the light of any single hypothesis or model.

In this respect we believed that archaeology was closely akin to anthropology, because the business of both disciplines was the analysis of culture through fieldwork. Hence we viewed archaeology in the same way that Clifford Geertz defined anthropology in his classic 1973 essay "Thick Description: Toward an Interpretative Theory of Culture." For Geertz, anthropology was "not an experimental science in search of law but an interpretative one in search of meaning" (Geertz 1973:5). The importance of anthropological findings based on long-term fieldwork (like data collected by an archaeological field project) was "their complex specificness, their circumstantiality" that gave major cultural concepts, such as social development, conflict, and societal organization, a "sensible actuality that makes it possible to think not only realistically and concretely about them, but, what is more important, creatively and imaginatively with them" (Geertz 1973:23). We agreed with Geertz, therefore, that theories derived from this field data "hover so low over the interpretations they govern that they don't make much sense or hold much interest apart from them . . . because stated independently of their applications, they seem either commonplace or vacant" (Geertz 1973:25).

GOALS AND FORMAT OF THE WESTERN MESARA FIELD SURVEY

In 1983 we began our project with three basic goals, cited as they appeared in our preliminary report (Watrous et al. 1993:191):

- to describe and reconstruct the present and past environments of the region,
- to document the history of settlement in the survey region, and
- to interpret how these and other cultural factors affected the formation and development of complex society in the Western Mesara.

We chose to investigate this area of the Western Mesara (figure 1.2) because it was the heartland of a Minoan polity and a Classical polis, both centered at Phaistos. As such, the region was ideal for a study of social complexity leading to state formation. Sources available to us were unusually rich. They included many excavated sites, among them the regional palace/polis center; accessible ancient land surfaces in the surrounding countryside; and a wealth of relevant written documents, such as Linear A and B tablets, the Gortyn Law Code, Plato's *Laws*, and Aristotle's *Politics*. Geographically well defined, the Western Mesara region consisted of an urban center closely surrounded by the three primary landscape elements of Greece: plain, mountains, and seacoast. So prototypical of Greece is the Western Mesara that in the *Laws*, Plato set his utopian state there (Morrow 1960). Over most of three millennia (2000 BC–AD 1000) the agricultural wealth of the Mesara had translated into powerful political status. Greek myths speak of two primary rulers of Minoan Crete: Minos at Knossos and his brother Rhadamanthys of Phaistos (Diodorus Siculus 4.60; Apollodoros 3.1, 2).

The interdisciplinary format of our project was dictated both by the nature of our central problem and by the extant evidence. Since the 1960s, anthropological archaeologists have been explicit in studying cultural change as a complete interactive system, consisting of economic, social, and political parts (Trigger 1989:303–312). Studies in Mesopotamia and Mesoamerica (Adams 1972, 1981; Sanders, Parsons, and Santley 1979), for example, have indicated that regional environment, subsistence systems, exchange, and population played important roles in the social evolution of local complex societies. For this reason, our project concentrated on the region of the Western Mesara (see chapter 3) and included geologists, botanists, ethnographers, and historians as well as archaeologists in order to understand the cultural system of the Phaistian polity. Archaeological survey data (chapters 7–13) is eloquent about the local history of settlement but speaks more softly on other cultural issues. Information on these issues comes from other disciplines. In addition, separate disciplines within a study such as ours act as correctives to the bias of any one single data base (Hodder 1992:172–173). Finally, much of the data collected in chapters 5 and 6 is fast disappearing, and hence is valuable as historical documentation.

Kevin Pope's geological study of the landscape concentrated on three objectives: (1) to determine the impact of erosional and depositional processes on the archaeological record as revealed by the surface survey, (2) to determine the chronology and extent of human impact upon the environment, and (3) to contribute information on past environments that would help explain the ecological basis of settlement patterns and processes. Pope's methods and conclusions appear in chapter 4.

Over three seasons, Jennifer and Thomas Shay studied the present environment, land capability for crops, and regional plant cover so as to speculate about prehistoric vegetation and crops in the Western Mesara. Combining the concepts of human adaptability and landscape ecology, their study focused on four components of the present-day Western Mesara: (1) local climate, water resources, and soils, (2) flora, plant communities, and resources, (3) regional diversity, and (4) human influences on the environment. In conjunction with this study, the Shays also supervised a program of coring for pollen in the alluvial bottomland (Levadia) immediately east of Phaistos.

In a multiyear series of interviews and fieldwork with older villagers, Harriet Blitzer documented methods of agriculture and subsistence during the late and post-Ottoman era in the Mesara. In her chapter we hear the actual voices of Mesariotes on foods, farming, trade, and industries. This ethnographic study (chapter 6) gives us an account of life in the Mesara circa 1890 to 1960. While ethnography cannot be used to extrapolate specific cultural details about the past (Halstead 1987), it does show us in concrete detail what activities were possible within a specific environment. It also demonstrates the fundamental importance of certain economic patterns and man-land relationships. Ethnography demonstrates why certain long-lasting methods of subsistence are practiced, knowledge that can be extremely helpful in interpreting past evidence. Above all, ethnography forces the researcher to approach and think about his data in terms of real life, of individuals working their fields, of specific problems facing these people, and how they dealt with one another in order to survive.

The archaeologists Vance Watrous and Despoina Hadzi-Vallianou directed an intensive archaeological survey over an area of 22 km^2 around the site of Phaistos (figure 1.3) with two teams of fieldworkers during the summers of 1984, 1986, and 1987. We chose to conduct a full-coverage survey (Fish and Kowalewski 1990), concentrating on a single contiguous area around Phaistos, rather than a probabilistic sample (for example, Renfrew and Wagstaff 1982), because we were interested first and foremost in understanding the changing social organization of the state of Phaistos. By surveying a single large area surrounding Phaistos, we would obtain survey data directly related to the polity center, in a way that random sampling within a political territory would not. Fieldworkers (Kowalewski 1990) have found that full-coverage survey of an area is by far the most informative way to understand the evolution of the local culture as a system. This full-coverage method also has the advantage of producing especially significant or rare types of sites. In our case, the survey was able to document knapping sites,

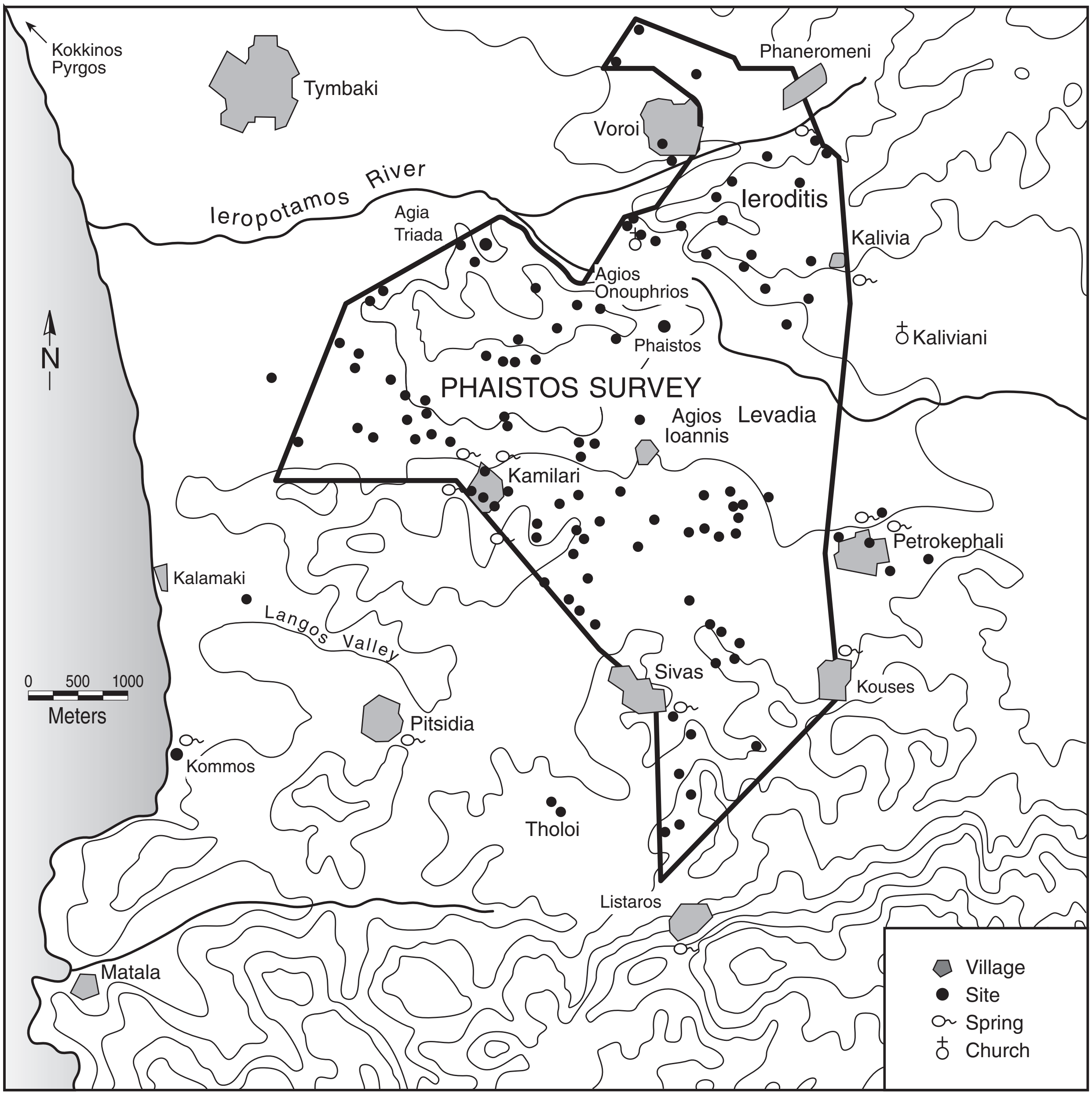


Figure 1.3. Map of sites within the survey area

quarries, ceramic production sources, Classical farmsteads, the main Phaistian cemetery, and the post-destruction diaspora communities of Phaistos.

We were also interested in providing a regional context for major excavated sites, such as Phaistos, Agia Triada, and Kommos, and as a result integrating the evidence from these sites into our own investigation. We focused on the Mesara Plain as a center in order to uncover as much evidence as possible for the regional settlement hierarchy. In addition, our data would complement that from previous surveys of the coastal zone around Kommos and the mountainous Agio Pharango Valley to the south. Our model in this respect was Adams's Mesopotamia survey (1981) around the urban center at Uruk. Care was also taken that our survey area include the physiographic subregions (see chapters 3–5) in our area, so that the ecological dimensions of regional settlement could be included in our data. In this way we hoped to address the larger ecological and political questions spelled out in our project goals.

Our fieldwork, then, took the form of an interdisciplinary and empirically based regional project. Addressing the issue of social complexity by means of the hypothetico-deductive approach, which formulates a theory and seeks to match the theory with selected evidence, was unacceptable for several reasons. It seemed like putting the cart before the horse to test one single aspect of such a complicated issue before defining the social structure within our region. By its nature, the hypothetico-deductive method is designed to test a limited sample and is therefore methodologically inconsistent with the broad scope of an interdisciplinary project. The fact that at least four theories based on deductive arguments, and all derived from the same body of published material, explain Aegean state formation in four different ways (see chapter 9) does not breed confidence in the explanatory power of the hypothetico-deductive method for this purpose. An inductive argument such as ours (chapters 7–9), based on a comprehensively assembled empirical base, is a priori much more likely to be correct than any deductive explanation.

Current deductive theories, in effect, supply fashionable prime movers in the same manner as earlier empirically based arguments, such as Wittfogel's idea (1957) that "despotic" Asian states were the result of irrigation. Some thirty years have passed since Binford's call (1962) to formulate universal cultural laws through deductive testing, and, as Trigger remarks (1989: 392–396), we are still waiting for substantive results. Moreover, as Hodder (1992:100) has pointed out, a theory, based on a good fit between a deductively derived hypothesis and archaeological data, does not actually explain the causal relationships involved. In the end, a deductive model lacks cogency because it is inevitably based on a narrow, preselected body of data, with the end result that its probability is impossible to evaluate. On the other hand, if empirical data collected from different categories of evidence (that is, archaeology, geology, botany, and ethnography) produces a single repeated pattern, that pattern possesses a higher degree of historical probability than the results of a hypothetico-deductive approach.

During five weeks in 1984, our archaeological survey teams covered an area of 9 km^2 in the valley between Phaistos and the village of Kamilari. Over a similar period in 1986, the teams intensively walked 12 km^2 in the areas to the south of Kamilari, around Sivas, and between Voroi and Phaneromeni. Finally, in 1987, a single team completed the areas between Agios Ioannis and Petrokephali and north of Voroi. The total area (figure 1.3) intensively surveyed amounted to approximately 22 km^2 and extended southward from the villages of Voroi and Phaneromeni to the area of Sivas, Listaros, and Petrokephali. On the west, the survey extended as far as a coastal strip of land and beach along the Libyan Sea. The southwestern boundary was determined by the limits of the Kommos survey. To the east, the survey edge was roughly defined by a line running north-south between the villages of Kalivia and Petrokephali. Isolated transects were carried out across the recently alluviated center of the Mesara Valley floor.

Our archaeological survey area is adjacent to a major urban center and therefore produced a high density of finds (see Field Methods and appendix D). We surveyed the western and southern edge of the site of Phaistos (the northern and eastern limits of the center are topographically determined), defined by masses of pottery and roof tiles, almost all of late Classical and Hellenistic date. We did not have the resources or time necessary to survey the 60 ha urban site of Phaistos itself (compare Snodgrass and Bintliff 1991; Cherry, Davis, and Mantzourani 1991:265–281 for such techniques). Earlier archaeological surveys by Branigan and Blackman, Hope Simpson, and Vasilakis have, together with our own work, provided surveyed zones totaling approximately 75 km^2 (including portions of the Mesara Plain, the Asterousia, and the south coast) in the region. Together, the data from this area forms the basis of our regional settlement analysis in chapters 7–13.

In 1987, we revisited all Bronze Age sites as well as locales of unusually high artifact count.

We conducted these revisitations to check the boundaries of each site and the date of its material remains. Revisitations were invaluable for providing us with a wider sense of settlement pattern. At the end of each field season we wrote reports, corrected our field maps, and made additional study of the finds, before they were finally transported to the Herakleion Museum for storage. We also visited and recorded a number of sites immediately outside our intensive survey area that had been brought to our attention. By the end of the 1987 field season, we had discovered well over one hundred new sites within our survey area. Since the archaeological survey was the central component of the project, its field methods are described in the next section (Field Methods).

The historians Dimitri Tsougarakis and Eleni Angelomati-Tsougaraki began their investigation by collecting and studying the existing Byzantine, Venetian, and Turkish historical and archival material relating to the Mesara. Their study (chapter 14) focuses on the administration, settlements, population, land use, economy, and monasteries of the Mesara from AD 400 to 1898. This information adds an historical dimension to our largely archaeology-based reconstructions. In 1986 and 1987, they visited the villages, monasteries, churches, and various other local monuments in our region and identified deserted settlements and churches known from written sources. During the years of fieldwork, C. Vallianos, Director of the Museum of Cretan Ethnology at Voroi, carried out his ongoing work on the settlements and monuments of the Mesara circa AD 961–1900 as part of the project and contributed a synthesis of his work to our preliminary report (Watrous et al. 1993: 237–240).

FIELD METHODS OF THE ARCHAEOLOGICAL SURVEY

John Bennet, who in 1983 had worked on the Keos survey (Cherry, Davis, and Mantzourani 1991), organized our survey methods along the lines of that project. Bennet's account of these methods follows.

Members of the survey were divided into two work teams (each of six to ten persons) with the prefixes A and B. Each team had a leader, who kept a daily logbook of its activities, and a vehicle to provide transportation to its daily starting point. Documentation available to each team included: 1:10,000 scale air photographs, 1:5,000 scale topographical maps, and the necessary forms for noting artifact counts and sites. In addition, all necessary materials for recording sites and other features (camera, etc.) and for collecting material (plastic bags and tags) were carried. Work took place in the field from 7 A.M. to 2:30 P.M. All collected material was washed, studied, described, and dated under Watrous's direction in Voroi from 5 to 7:30 P.M. daily.

Each team walked transects—minimal units of observation and recording—across landscape units, using a spacing of between 10 and 20 m, depending on terrain and visibility. These landscape tracts, visible in figure 1.4, were called "fields" to distinguish them from the individual transects within them, and were defined by topographic features such as terraces, plots, roads, and soil color. More recent surveys have abandoned this type of areal sampling because it produces transects of unequal and therefore noncomparable sizes. At the completion of each tract the area covered was marked on the 1:5,000 maps carried by each team, and a count and date of all artifacts (sherds, roof tiles, stone tools) observed on each transect were recorded on a special form.

In addition, a visual estimate of ground visibility (expressed as a percentage of bare earth visible) was noted in order to test for consistent relationships between artifact counts and visibility (see below), and the land use was noted. Visibility was recorded on an interval scale of 1 (least) to 10 (most). Chronologically diagnostic and functionally distinctive material (for example, *pithoi*, amphorae, stone tools, loom weights, spindle whorls, lamps, figurines, and beehives) was picked up during each transect and recorded as potential indicators of land use. This material was especially plentiful in an area as archaeologically rich as the Mesara. Finally, each "field" was given a number (A/B 1), and a composite map and overlay showing both teams' fields was maintained at the survey home base in Voroi. The value of the "field" records has been in permitting an average overall density of

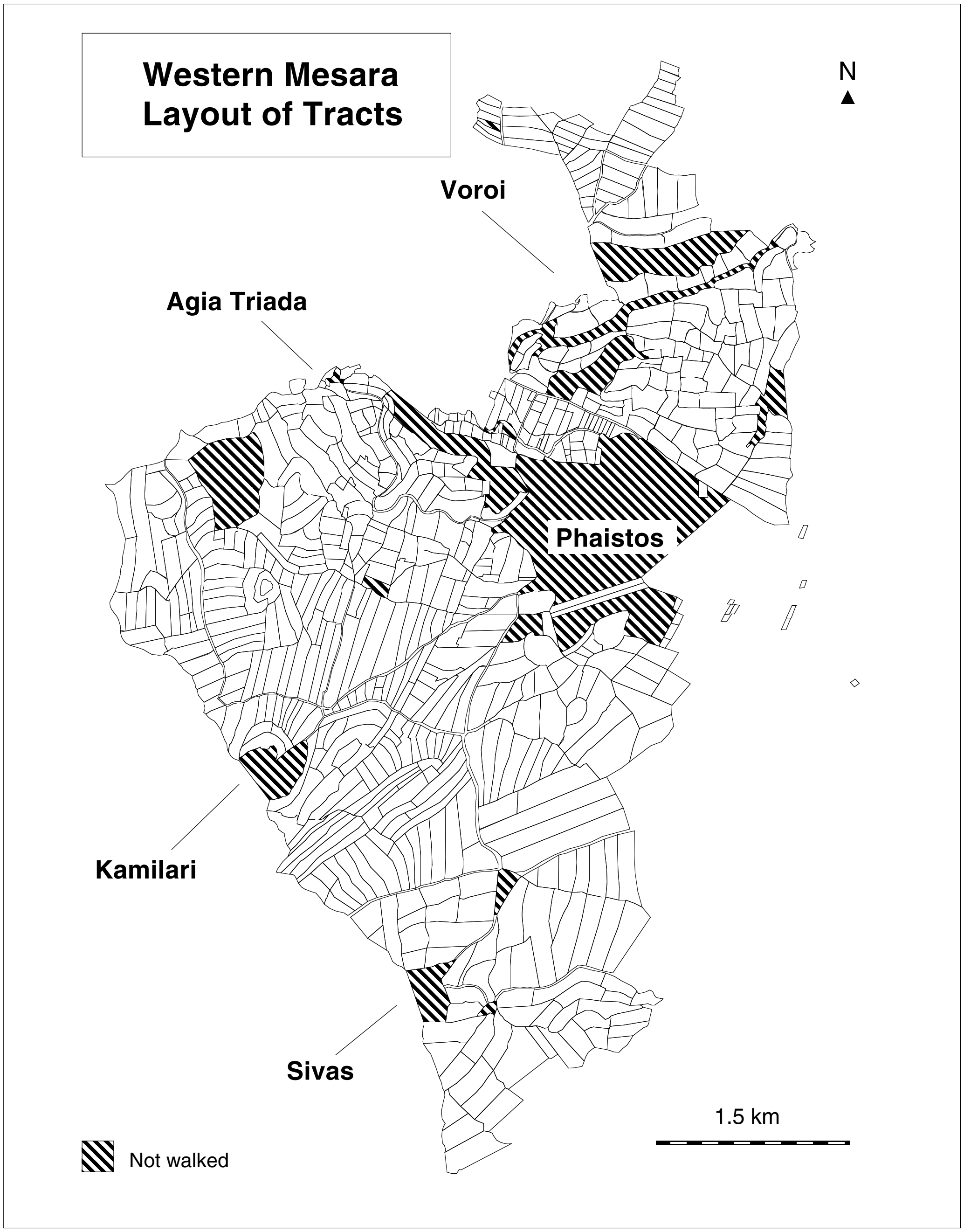


Figure 1.4. Map of off-site tracts walked by the survey

material to be computed for each unit and variations across the unit to be checked by reference to the individual transect counts. These calculations are discussed below.

The decision as to whether a surface presence of material warranted consideration as a site was taken by the team in the field, based on the monitoring of artifact frequencies on transects or any additional factors, such as the distinct clustering of specific artifact types, like chipped stone. The chief criteria were that the material should have fairly easily definable boundaries and present a distinct and/or dense spread of material relative to surrounding levels of artifacts. Given the abundance of sherds present in our survey area, a locus had minimally to produce more than five to ten securely dated contemporary sherds before being considered a potential site. Because Minoan pottery tends to be either burnished or hard fired, and thus preserves relatively well, we did not, with a few exceptions caused by colluviation, find isolated prehistoric sherds that seemed to belong to completely buried sites (in contrast to the situation reported in Boeotia; see Bintliff, Howard, and Snodgrass 1999 and Barker et al. 2000:100–123). Where a site was encountered, transects were walked to their end in order to preserve a count for the whole unit within which the site was thought to lie. The site was then walked over, leaving artifacts in situ, in order to determine its approximate boundaries. Once this had been done, a center was marked and the collection procedure began.

This procedure was designed to gather both objective, quantitative data about the site's size and artifact density as well as qualitative data about its period(s) of occupation and possible function(s). In order to measure the site's size and artifact density, four radii were run at right angles to each other from the center. The first two radii were laid along the long axis of the site. These radii were labeled T1–T4 ("Transect"), and T1 was always closest to a heading of due north and was given an exact compass bearing. Along each of these lines, at intervals of between 5 and 20 m, depending on site size (but always consistently within any one site), all material was collected from circles of radius 1.5 m (7.07 m^2 area). These collections (or "samples") were bagged separately and labeled T1,0, T1,1 and so on. Back at home base, these samples were counted and analyzed, giving a measure of the varying density of material across the site as well as providing a collection of diagnostic material. Samples were taken along these transects until each team member was sure he or she had reached the edge of the site (that is, the density of material was the same as the "background noise" in the surrounding area), thus providing information on the site's dimensions in the four cardinal directions. This method was reasonably successful in defining site size, but, in many cases, it did not allow us to distinguish the relative size of long-lived sites by period (especially chronologically sequential ones).

In addition to the qualitative information gathered on the transect samples, further collections were made solely of diagnostic material by team members walking systematically over the four quadrants defined by the four radii. They were encouraged to collect only material potentially diagnostic for periodization or for function: that is, feature sherds, decorated sherds, a range of distinctive fabrics, *pithos* fragments, and chipped stone. Quadrant pickups thus provided additional information as to period of occupation and possible site function. They were bagged separately and labeled Q1–Q4.

In addition to the collection of archaeological materials, the site's setting, nature, probable date, visibility, hydrology, and any threat of disturbance were summarized on a special form, photographs were taken, and its position was indicated on a map or air photograph. Collection usually took less than one hour, and when completed, produced a site form, a sketch of the site, four quadrant collection bags, and four large transect collection bags, each containing a number of smaller bags of material from each individual sample.

The collection procedure resulted in a definition of the site's boundaries in an objective manner and the division of the site into smaller observational units that could potentially yield information about spatial variation within the site (different types or densities of artifacts) or chronological variation (for example, expansion or contraction of the site through time, or areas of the site in use only within certain periods). [Watrous et al. 1993:215–219]

ANALYSIS OF OFF-SITE DATA

Bennet also analyzed (Watrous et al. 1993:219–222) our off-site data. In three seasons we walked 737 observed units (figure 1.4), or "fields." Of these 737 "fields," density data is available for only 653, since all those "fields" for which problems of data completeness still exist, or which were not walked as part of our overall systematic coverage, have been excluded from the present analysis. Table 1.1 presents the mean density of artifacts in the three major categories in which they were observed by us for these 653 "fields."

On the basis of this table, we can clearly see that densities of artifacts observed are on average higher for those "fields" in which a site was defined than for those in which no site was defined. However, the ranges in both cases are extreme, and the highest nonsite field count would in fact rank second among the density of "fields" containing sites. These seem to be relatively localized effects. For example, the highest "nonsite" field count for pottery lies right by the boundary fence of the site of Agia Triada (and should therefore be considered as an extension of that site), while the second highest (41.96 sherds/100 m^2) lies close to the village of Kamilari, immediately adjacent to the field with the highest "site" field count. It is also interesting to observe how many "fields" produced zero densities of pottery even in an utilized area like the Western Mesara, which has a long and intense history of human exploitation. These figures are presented in table 1.2.

In terms of comparability of the off-site portion of artifact densities, figures are available for comparison from Aegean surveys in Boeotia, Lefkas-Pronnoi, Keos, and Nemea in the Peloponnese. The figures given for Boeotia are rather complex, ranging from what Bintliff and Snodgrass (1988:510) refer to as "total background" (density range: 0.4–1.0 artifacts/100 m^2) through "intensive manure" (1–6 artifacts/100 m^2) to "halo" (6–45 artifacts/100 m^2). Gallant's figures (Gallant 1986:417) for Lefkas give a mean "background" density of 8 sherds/100 m^2 for Pronnoi and 15 sherds/100 m^2 for Lefkas. Mean background pottery densities for Keos (Cherry, Davis, and Mantzourani 1991:42, Figure 3.3) were 0.5 sherds/100 m^2, while for Nemea they were 2.0, although there was a large variation around this mean. Our overall figures for "fields" without sites broadly correspond to the mean background density in the Nemea region and probably to at least the first two categories of the Boeotia density figures. However, our large range of values, with a maximum value of 62.97/100 m^2 for a "nonsite" "field" suggests that we do have some areas of relatively dense background material, which is not surprising, given the number of relatively large and long-

TABLE 1.1. Observed mean density of pottery, tile, and stone per 100 m^2

	Pottery	Max Min	Tile	Max Min	Stone	Max Min	N
All fields	3.84	129.8 0	0.32	25.77 0	0.02	1.92 0	653
Fields without sites	3.17	62.97 0	0.27	25.77 0	0.01	0.35 0	502
Fields with sites	6.05	129.8 0	0.50	12.73 0	0.05	1.92 0	151

TABLE 1.2. Percentage and absolute numbers of fields with zero counts of pottery, tile, and stone. Percentage and number of zero counts.

	Pottery		Tile		Stone	
	%	N	%	N	%	N
All fields	13%	82	52%	340	84%	548
Fields without sites	16%	80	57%	284	86%	430
Fields with sites	1%	2	37%	56	78%	118

lived sites in the region: Phaistos, Agia Triada, Agios Ioannis, and Kamilari. In this connection, it is perhaps not surprising that the mean background density of off-site pottery on Keos, an area perhaps less densely settled throughout antiquity, is considerably lower. With further work on the spatial distribution of our background densities, and the distribution into categories similar to those employed by Bintliff and Snodgrass, patterns of association with site concentrations should emerge.

One final point can be made about this data. The effect of visibility on the densities of artifacts observed can be checked to some extent by using the Spearman Rank Correlation Coefficient (r_s). The values of r_s (corrected for ties) produced are presented in table 1.3, together with their Z-values and significance.

On the basis of this table it would appear that there is a positive, statistically significant relationship between visibility and the density of pottery and tile observed, but the relationship between visibility and the density of stone is much weaker and is not statistically significant. Similar analysis of the Keos survey data produced comparable results (Cherry, Davis, and Mantzourani 1991), a significant correlation between pottery density and visibility, but an insignificant correlation between visibility and obsidian. Similarly we can demonstrate that pottery and tile tend to occur together, since the correlation between the densities of these classes of material is also positive and statistically significant ($r_s = 0.648$); as we might expect, many fields and sites will turn up both sherds and tile. On the other hand, the correlation of both pottery and tile with stone is weak ($r_s = 0.12$ and 0.026, respectively).

What is perhaps more interesting is the relationship between visibility and the definition of sites. Overall mean visibility for fields with and without sites was 3.9 on our scale of 0–10. For fields with sites, the mean was 3.7, whereas for fields in which sites were not defined it was 4.0. This observation is interesting, since it implies that visibility was not a significant factor in our ability to define artifact concentrations as sites. For the Keos survey, analyses showed that the median value of visibility was significantly higher for those units in which sites were defined, suggesting that sites tended to be defined more often in areas of significantly better visibility (Cherry, Davis, and Mantzourani 1991:45, Figure 3.6). It would seem that this was not the case in the Mesara, and indeed 71 of our fields that contained sites or parts of sites fell in areas of visibility of 30% or lower, while 80 had 40% or better visibility. It is possible that the difference between the two regions can be accounted for in terms of qualitative differences between the sites discovered. Nevertheless, it seems that visibility, although having some effect on the detectability of artifacts, has not seriously vitiated our measurement of densities or our ability to define the anomalously dense distributions called sites.

In 1998 Bennet collated our survey finds from all walked fields and prepared the maps showing the distribution of this off-site data in chapters 7 to 11.

LIMITATIONS OF OUR FIELDWORK

No extended field project unfolds completely as planned, and ours was no exception. During the 1980s, the new Papandreou government created a nationalistic atmosphere in Greece that produced various constrictions on foreign field archaeologists. Our geological fieldwork, for

TABLE 1.3. Spearman Rank Correlation Coefficient (r_s) (all observed fields: $n = 653$) Correlations (V = visibility)

V:Pottery	V:Tile	V:Stone	Pottery:Tile	Pottery:Stone	Tile:Stone
0.212	0.288	–0.042	0.648	0.12	0.026
Z = 5.423	Z = 7.362	Z =–1.062	Z = 16.556	Z = 3.059	Z = 0.66
($p = 0.01$)	($p = 0.0001$)	($p = 0.2881$)	($p = 0.0001$)	($p = 0.0022$)	($p = 0.5091$)

instance, was cut short, the official reason being concern for national security. In addition, we list some specific problems that set certain limits on our research and conclusions:

- Five pollen cores taken in the alluvial plain (Levadia) adjacent to Phaistos (figure 1.3) produced pollen that was too poorly preserved to be analyzed, as a result of the fluctuating water levels and heavy abrasion by the sandy soil. Thus, our discussions of ancient agriculture are dependent on other pollen cores from Agia Galini near Kokkinos Pyrgos (figure 1.1) and West Crete and from indirect evidence in the historical and ethnographic records.
- Alluviation and colluviation in our region has affected our ability to identify the full range of settlements in certain areas (discussed in chapter 4).
- The total area surveyed by our archaeological teams lies well inside the territory of Minoan and Iron Age Phaistos. Consequently, our data could not define the eastern boundary of the Phaistian polity. Our survey area of 22 km^2 is also miniature in scale relative to surveys conducted in the New World and the Near East, and thus our data is rarely responsive to the types of statistical analyses (for example, nearest neighbor, random distribution, and population growth rates) carried out in these areas.
- The large size and sampling strategy of our recorded field transects have placed limits on our ability to interpret off-site data. Because only chronologically diagnostic material was collected, the data appearing on the off-site maps greatly underrepresents the actual distribution of off-site pottery. In addition, since transects were initially walked over all fields, including those subsequently identified as possessing sites, some of the pottery represented in the fields on the off-site maps (figure 1.4) comes from sites. Our discussions of off-site pottery in the text do, however, distinguish between on-site and off-site finds.
- Our study permit was limited primarily to a single season, in 1988, which precluded a full restudy and publication of our survey finds, hence the format of their presentation in appendices C, D and E.
- Digging of house foundations in the present-day villages of Voroi, Kamilari, Petrokephali, and Sivas indicate that these villages probably cover ancient sites for which we only have random (sherds from a single trench) and/or indirect evidence (for example, adjacent cemeteries).

Having completed the fieldwork portion of our project in 1987, we turned next to the study and interpretation of the data, which we describe in the next chapter.

2

Study and Interpretation

L. Vance Watrous

THIS CHAPTER DESCRIBES the study of our finds and other data in the years (1988–2001) following our fieldwork, the changing theoretical perspectives on social evolution that modified our approach to the data, and our subsequent interpretation and publication format. At the end of the chapter we present our method of estimating population based on archaeological site size.

INITIAL STUDY

After the completion of fieldwork in 1987, we began by studying the physical data we had collected. With Hadzi-Vallianou's help, we obtained a short but valuable period of study time in the Herakleion Museum, where the artifactual material is stored. Watrous restudied the Minoan pottery; John Hayes dated and identified the provenance of the Roman and later pottery from the survey. Blitzer studied, drew, and photographed the stone finds. Hadzi-Vallianou (1990) published an initial description of our fieldwork. In 1991, individual authors turned in summaries of their fieldwork that were subsequently published in the project's preliminary reports (Hadzi-Vallianou and Watrous 1991; Watrous et al. 1993).

Drawing upon their paleobotanical studies at Kommos (Shay and Shay 1995), Tom and Jennifer Shay began to focus their research primarily on the environment and land capability. Because of poor results from our pollen cores, the botanical study concentrated on documenting local flora and surveying existing plant communities in relation to the environment. In Winnipeg, plant specimens were identified, verified, and labeled. Four separate analyses were carried out on the distribution of existing plant communities and their important species in relation to location, climate, soils, and history of disturbance. First, data on plant species from 202 locations was analyzed using a variety of multivariate statistical techniques to show the degree of similarity in plant composition. Second, the relationship of species to one another was described through a chi-square analysis of association. Third, the geographical distribution of major shrub species was plotted. Fourth, major shrub species were examined in respect to indices of soil moisture and disturbance. This preliminary work took six years. All botanical classifications and species names were revised up to the year 2000.

After the 1987 season, Harriet Blitzer carried out additional recording, drawing, and photography of the agricultural system of the nineteenth- and twentieth-century Mesara during the fall and winter of 1984, 1986, 1989, 1990, 1993, 1994, and 1995, during the summers of 1983 through 1995, and in the spring of 1985 and 1992. From 1990 through 1996 she researched comparative Ottoman and Turkish systems of agriculture via archival collections and libraries.

Dimitri Tsougarakis and Eleni Angelomati-Tsougaraki returned to the Mesara in 1992, 1994, and 1996 through 1999 to visit and photograph churches, monasteries, and deserted settlements, where they also recorded unpublished inscriptions and graffiti. In 1996 and 2000 they traveled to Venice to research notarial documents of Crete housed in the Archivo di Stato. As the records of the local notaries in the Western Mesara (Kainourgio and Pyrgiotissa districts) have not survived, they concentrated on the documents written by the notaries of Candia.

Watrous began to collate settlement data from the Kommos, Agio Pharango, and Asterousia (Vasilakis 1989/1990) surveys as well as from local excavations in order to define regional patterns of settlement over time. In line with the approach described in chapter 1, our initial analysis of the survey data concentrated on defining settlement number, size, hierarchy, and location and their relation to the environment, with the aim of elucidating subsistence, population levels, and the economic, social, and political organization of the region. In order to approach the question of social complexity within our region fully and systemically, it was necessary to integrate our archaeological and environmental survey data with the large body of available local evidence derived from earlier archaeological fieldwork described in chapter 1. For this reason, Watrous assembled, sorted out, and analyzed all of the published data for systemic elements—subsistence, population, technology, exchange, social relations, and ideology—from our region.

NEW PERSPECTIVES ON SOCIAL COMPLEXITY

Meanwhile, during the 1980s, new ways of thinking about cultural evolution and social complexity had begun to accelerate. Early studies (for example, C. Renfrew 1972) viewed social change as a process involving the interaction of systemic elements of society. Often, these so-called processualist studies (Sanders, Parsons, and Santley 1979) explained the cultural system and its evolution as adaptations to the environment. In reaction to these claims, Hodder (1982) emphasized that abstract systems do not cause social change; it is human individuals who effect change—hence the term social action theory (Hodder 1985). Groups, based on class, gender, factions, and institutions, also cause social change through competition or conflict (Brumfiel 1992). Recent investigations of social complexity, therefore, have looked at ways in which individuals or groups achieve power through competition (Brumfiel and Fox 1994; Earle 1991b), ideology (Renfrew and Zubrow 1994), and trade (Algaze 1993; Helms 1993; Stein and Rothman 1994). Brumfiel (1992:555) points out that, since production in agrarian societies is household based, political change usually involves the restructuring of household labor, which means that the initial stages of social inequality will be marked by high birthrates and the establishment of dependent labor. Population increase, therefore, can be the result of emerging social complexity, and not necessarily the other way around.

In a series of ethnographically based studies, Ian Hodder (1982) reaffirmed pre-1960s conclusions about culture and its relation to archaeological data. Culture is not just an adaptive mechanism, but is meaningfully constituted. Hodder (1982) demonstrated that individuals or groups often use material culture in symbolic ways as part of social interaction to foster their identity, legitimize their claims, or express their ideology. Culture is not a normative system, and artifacts can be multivalent. Archaeological evidence, therefore, must be interpreted within its own specific cultural and historical context. Because of his criticism of processualism, Hodder's approach became known as post-processual, or contextual, archaeology.

Other studies began to question the neoevolutionary model of social change developed during the 1960s and 1970s. This school of thought explained increasing social complexity as an inevitable evolutionary process. Based on anthropological field data, Fried (1967) postulated that societies passed through four stages of social complexity: (1) egalitarian, (2) ranked, (3) stratified, and (4) state. For Fried, a society became ranked (2) at the onset of inherited wealth. A stratified society (3) was one in which members had privileged access to limited natural resources through an organizational, geographical, or physical means, or by virtue of their specialized status/occupation. Once stratified, the elite class in a society developed an institution to oversee the unequal distribution of wealth. That institution was the state (4), which had control mechanisms, such as an army, laws, and an ideological system. For the purposes of our present study, we define a state as a stratified society, with at least three levels of administrative hierarchy and a permanent, centralized, and institutionalized political authority that has coercive power over its subjects (see Tainter 1988:26–31 for earlier definitions). This definition has the advantage of including both the Minoan polities that were probably headed by dynastic rulers, and the Classical city-states whose governing officials were elected.

Elman Service (1975) delineated a similar evolution of societies, from egalitarian bands, to tribes, to chiefdoms, and finally to states. Chiefdoms were seen as stratified societies with a hereditary leader whose centralized authority was based on a system of redistribution. The final stage in Service's evolutionary model was the state, which had a centralized bureaucratic hierarchy with the power of coercion over its subjects. Service had argued that ancient complex societies did not possess internal conflict or classes determined by landownership. Consequently, he held that, as societies grew in size, leaders with managerial responsibilities became hereditary chiefs. Thus, the centralized structure of ancient states evolved as an adaptive response to the integrative needs of the growing society. State rulers, therefore, ensured obedience primarily through religious ideology rather than by means of force.

In reaction to the neoevolutionary perspective, Yoffee (1990) pointed out that developing chiefdoms need not evolve into states, because societies often develop through the interplay between social institutions within a society that are unrelated to any general evolutionary and hierarchical cultural "stages" such as tribes or chiefdoms. In other words, ancient societies may have changed in unique ways that are not precisely predictable by universalist, ethnographically based models.

Blanton and others (1998) have criticized systemic and evolutionary studies of cultures because of their emphasis on centralized and hierarchical social structures. In a basic article, McGuire (1983) documented that social complexity within a society consists of two principal variables, hierarchy and heterogeneity. Social hierarchy is the vertical inequality (differential access to material and social resources) present in a society. Social heterogeneity is a form of horizontal diversity, that is, the degree to which social groups, based on kin, gender, occupation, institution, or alliances of these groups, are distributed within a society. Cycles of social complexity, therefore, involve the fluctuation of both these aspects of society. Thus, Blanton and others (Blanton et al. 1996) distinguish between power-sharing "corporate" societies and centralized, authoritarian ("network") social structures. Chiefdoms, then, can be understood as a (politically centralized) subset of stratified societies, rather than a distinct phase of social evolution. Political power in stratified societies can also be shared among the members of social groups or institutions (see chapters 8 and 12).

These distinctions have important implications for understanding past societies. Keswani (1996), for instance, has suggested that Late Bronze Age polities in Cyprus evolved without any antecedent chiefdoms. Power in complex societies need not always have been organized along centralized or hierarchical lines (Ehrenreich, Crumley, and Levy 1995; Keswani 1996). Control of subsistence production, craft specialization, and external trade, therefore, may actually lie outside the official social hierarchy (see chapter 6). For Mesopotamia, Adams (1981:76–81) had pointed out that political centralization was not a necessary precondition for urban growth.

Processual and neoevolutionary studies have treated culture as a closed system, in effect, isolated from external influences. Social complexity was often understood in these studies as an internal response to population pressure brought on by agricultural intensification (Boserup 1965; Sanders 1972). C. Renfrew's *Emergence of Civilisation* was typical in this respect. For Renfrew (1972:482), Aegean social complexity arose out of the need for a central organization to manage a diverse ecological region under growing population pressure. Halstead's explanation (1981) of Aegean state formation as a cultural response to ecological uncertainty is a reworking of this same thesis (see chapter 9). In contrast to this view, more recent studies of society have widened their focus to include neighboring polities and their interrelations. "World-systems" studies (Wallerstein 1974; Kohl 1978; Blanton and Feinman 1984; Algaze 1993; Rothman

2001), for example, have discussed how geographically separate but interactive societies effect extensive cultural changes upon one another.

SUBSEQUENT INTERPRETATION AND FORMAT

Arriving at a point where we could address the original goals of our project turned out to be a longer and more circuitous route than we had initially imagined. After the completion of our fieldwork, we began to analyze our data along systemic lines defined by Renfrew's study (1972) of the evolution of Aegean society. As we proceeded, we became convinced that Renfrew's model (figure 2.1a) suffered from several specific defects. First, it privileged population and the environment as prime movers of social change. In several cases (see chapters 10 and 12) of population growth, we found that Brumfiel's theory (1992), that demographic growth is a byproduct of emerging social inequality, best explained our Mesara data. Second, Renfrew's term *social organization* is a static concept, not a causal one. In the Mesara (see chapters 9 and 12), periods of sudden growth in social complexity were marked by competition among elite groups. Hence, we have used the term *social relations* instead of *social organization* to represent these dynamic interactions (see below). Third, Renfrew treated Aegean culture as a closed system. His antidiffusionistic position prevented him from seriously considering foreign contacts and ideas as having a role in Aegean social evolution. In line with more recent multipolity studies (Stein 1999; Rothman 2001), we have examined social changes in our region within a wider Eastern Mediterranean context.

For purposes of comparison, we present Renfrew's systemic diagram (figure 2.1a) alongside our own, more basic, framework (figure 2.1b). Our diagram is not meant to imply that cultural change is always the same or that the social elements or aspects (Renfrew's "subsystems") always interact equally. The social evolution of a society, for example, can influence its later social development. For this reason, the actual process of cultural change—the role of cultural elements relative to one another—will alter as a society grows more complex. In the Western Mesara, the early settlers went through a period of basic ecological adjustments during the Late Neolithic–Early Minoan II period (chapters 7 and 8). During this time, their methods of subsistence directly determined their social structure. After the Middle Minoan I period, however, despite the agricultural intensification that accompanied state formation, there is little sign of any fundamental change in subsistence methods and in the local environment until the Thera eruption in Late Minoan IA. Therefore, it

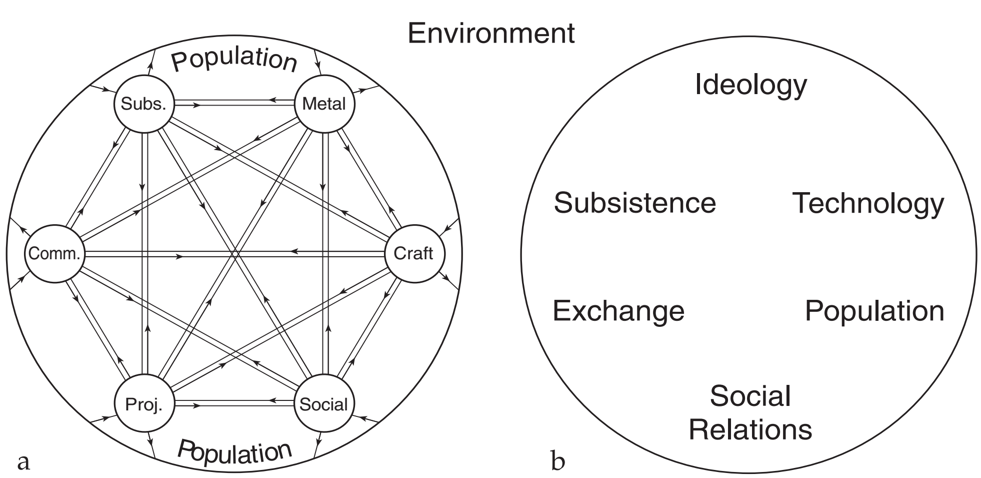


FIGURE 2.1. Systemic diagrams of culture: *(a)* Renfrew 1972: 486, and *(b)* our format.

seems that from Middle Minoan I onward, major cultural change would have been mediated primarily through social relations (Rosenberg 1994: 333) and ideology.

As we continued to work with the prehistoric data, the more we tried to understand it in neoevolutionary terms, the less sense it seemed to make. The concept of a "chiefdom" was particularly problematic, because it did not fit our data closely, and it forced us to assume the existence of crucial but unproven features of Early Minoan society. While prepalatial society in the Mesara exhibits signs of social complexity (see chapter 8), these features cannot be measured solely in hierarchical or centralizing terms associated with chiefdoms. So, for example, signs of ascribed ranking, centralized decision making and storage, and regional integration are missing in the Early Minoan I–II Mesara. Hence, we cannot follow studies (for example, Renfrew and Cherry 1986; Soles 1986) that explain the evolution of the Minoan states as an outgrowth of prepalatial chiefdoms. Instead, we have interpreted our evidence in light of the heterarchical and group-oriented models of Blanton and others (Blanton et al. 1996; Ehrenreich, Crumley, and Levy 1995).

Our format in this volume, therefore, involves two parts. In the first part, we analyze systemic data (chapters 7–9) in three steps (compare a similar format in Parsons 1982). First, the archaeological chapters (7–11 and 13) present the settlement data from our survey. Then, with the help of previously published archaeological data, we define the regional pattern of settlement in the Western Mesara as completely as possible. Second, we describe cultural aspects—subsistence, population, technology, exchange, social relations, and ideology—of Mesara society for each period. Collection and analysis of the archaeological data needed for this second analytical step alone has taken a decade. Third, we analyze how these cultural variables change and interrelate (Flannery 1972; Hill 1977). Since social evolution can be a chronologically uneven process, some chapters are more interpretive than others. Chapters 9 and 12, for instance, are given over to the question of Minoan and Classical state formation.

Our second analytical step was to interpret the body of cultural data in light of relevant models of social change. For example, C. Renfrew's model (1972:274–278; 480–481) of incipient social complexity arising from diversified subsistence fits our Early Minoan I data closely (chapter 7) and helps to explain Early Minoan I social evolution in the Mesara. On the other hand, local data in chapter 9 casts doubt on current theories about Minoan state formation. Instead, we have found social action theory (Hodder 1985) and the conflict model of society (Brumfiel 1992; Brumfiel and Fox 1994) more congruent with our evidence.

Such a diverse and empirically based format has also enabled us to interpret artifacts in their own specific cultural context (Hodder 1982, 1992). This will be apparent in our discussions of the social meaning of objects and monuments, such as Early Minoan II bronze daggers (chapter 8), the stone-lined pits (*kouloures*) found in the west courts of the palaces (chapter 9), and seventh-century BC inscribed Cretan laws (chapter 12). In most cases, the systemic approach does not in itself explain cultural change, but is capable of documenting clear diachronic patterns of cultural change (chapter 15). These patterns are valuable, because they often indicate what aspects of society are in flux, and, hence, where the causes of social change may be sought. Additionally, some specific systemic changes, when compared synchronically and diachronically, provide valuable insights into the process of social evolution. In chapter 11, for instance, we argue that the rise in Hellenistic population, foreign exchange, and social strife are causally linked. In the end this study is a mixture of processual and postprocessual methods. Its basic structure is empirical and processual, but it uses certain postprocessual perspectives, principally an emphasis on human agency and specific "historical" contexts.

Our emphasis on causal interrelationships has engendered a certain chronological obsessiveness. It has been necessary to study and redate certain local tomb assemblages (Agia Triada, Platanos, and Koumasa) as well as artifact categories (seals, bronze daggers, and stone vases) from earlier excavations (reported in

Watrous 1995). Earlier studies of cultural change in Early Bronze Age Crete (Warren 1975; Branigan 1988) and of Minoan artifacts (Branigan 1968; Warren 1969) have been based on general chronological terms, such as "Early Minoan," "Early Minoan–Middle Minoan I," or "Prepalatial," that have distorted or blurred the very processes or typologies they were attempting to define. One can no more discuss the development of Early Minoan II economy or social organization with "Early Minoan–Middle Minoan I" data than one could trace the evolution of major issues in modern European history by using fragmentary data drawn randomly from the last two hundred years. Only when the constituent parts of the process of evolving social complexity in Crete are carefully distinguished and placed in correct chronological relation (figure 15.1) to one another can the question of causality be addressed. This observation is especially true for the Prepalatial period, which actually consists of three chronological phases, each with its own distinct cultural development. Recent work on Aegean chronology (Manning 1999) has been integrated with other data to produce an up-to-date chronological outline of the late Early Bronze Age (figure 8.7).

The interdisciplinary format of our project has resulted in distinct but interrelated perspectives on the Western Mesara. Chapter 5, for example, describes the present and past environments of the Western Mesara, which provide a framework for understanding ancient land use and agriculture. Chapters 6 and 14 detail the economy, local subsistence, and sociopolitical organization of the Mesara in the Byzantine through post-Ottoman eras. In a sense, these historical and cultural details from archival and living sources highlight a specific Mesara identity that is invariably absent in the coarse-grained archaeological record. A broad understanding of the Mesara as a region through time is only possible with the security of such specialized data from studies that reinforce the concept of regional identity as perceived by local inhabitants.

Our project goals have therefore translated into a publication with two principal purposes. The first is establishing the broader identity and patterns of existence in the Western Mesara region as presented by our interdisciplinary sources. This objective provides data that serves as an empirical framework for the interpretive analysis. The second purpose is to examine the diachronic cycles of social complexity in the Western Mesara during the Neolithic–Late Minoan IA and Late Minoan IIIA–Hellenistic periods, when the regional polity was politically autonomous. We focus on these periods because it was during these times that local factors that our project could discern, such as the environment, subsistence, population, technology, and social organization, played a direct role in the region's sociopolitical development.

SITE SIZE AND POPULATION

In order to discuss the social implications of our regional data, we needed to have some idea of the size of the populations living at the settlement sites in our region. Gauging population on the basis of archaeological site size has been, and still is, a contentious issue (Hassan 1981; Whitelaw 2001). Traditionally, Near Eastern and Mesoamerican archaeologists have allowed 100–300 persons per ha of site size. More recent estimates for the Near East have been in the area of 100–150 persons per ha (Adams 1981:69; Schwartz and Falconer 1994). These estimates are based on two assumptions: (1) that there is one person per every 10 m^2 of space within an architectural residence (Naroll 1962), and (2) site size approximately equals living space. Additionally, it should be remembered that Near Eastern and Mesoamerican settlements (both ancient and modern) often sit on densely settled sites next to a major river system. Late Uruk sites in Mesopotamia, for example (excluding major centers 40+ ha in size), routinely reach 5–10 ha in size (Adams 1981:73, Figure 16).

Aegean environments are different. Landscape in the Aegean is smaller in scale, rugged, dry, and lacks perennial rivers for extensive irrigation. As a consequence, Aegean settlements tend to be smaller, less densely occupied, and more dispersed than in the Near East and Mesoamerica. In contrast to Mesopotamian sites cited above, Middle Minoan IB–II sites in the Mesara (excluding the center at Phaistos) average only 1.6 ha in size. Based on the settlement density of present-day villages in Cyprus, Manning (1992:42) has come to similar conclusions about the population of Cypriote archaeological sites. He has suggested that the population size of archaeological sites on Cyprus—whose environment is close to that of Crete—be calculated at 35–50 persons per ha. We can check the relevance of Manning's figures for our region by examining several traditional villages in the Western Mesara. Four villages in our region, Pitsidia (appendix F), Kamilari, Sivas, and Petrokephali, are 31, 10, 13, and 12 ha in size, respectively, and have current populations of 812, 575, 439, and 668, which yield population densities of 26, 57, 33, and 55 persons per ha, figures that are consistent with Manning's calculations for Cyprus.

Our field methods for defining the size of a site (see chapter 1) resulted in two overall measurements, site length and width, which produced a site area in some form of an oval. Accordingly, we have estimated the size of our sites by multiplying their length and width and subtracting 30% of the total. Ethnographic data suggests that density of housing tends to increase with site size. As of 1991, for example, the towns of Moires (pop. 4,571) and Tymbaki (pop. 5,230) were about 80 and 112 ha in size. Thus, their density of occupation comes to 46 and 57 persons per ha, which is higher than the village average cited above. Hence, for purposes of accuracy, we have adopted two sets of estimates for population density: 30–50 persons per ha for smaller sites (up to 10 ha), and 50–100 persons per ha for larger sites (over 10 ha). These computations should certainly be regarded with caution, for the simple reason that we do not know how accurately sherd distribution on unexcavated sites reflects architectural (living) space. Based on our observation that the living quarters of traditional rural settlements (farms, hamlets, and villages) in Crete today are surrounded by occupation debris from adjacent work areas, corrals, manure pits (chapter 6), and gardens, we suspect that on ancient sites the housing spaces were considerably smaller than their overall area of sherd distribution. Moreover, on many sites, it is clear that erosion and agricultural cultivation have spread occupation debris beyond their original bounds.

We have distinguished sites by their size (and hence, estimated population) as follows: "fieldhouses" (seasonal dwellings), up to 0.10 ha; "farms," up to 0.20 ha; "hamlets," up to 1.0 ha; "villages," up to 10 ha; and "centers," over 10 ha (see Table 2.1). In part, these identifications are derived from the spread of sherds observed around excavated archaeological sites whose function is known, such as Kouses (single farm structure), Selli (two excavated houses), Myrtos/Fournou Koriphi (hamlet of five to six houses), Agia Triada (ten or more houses), and Phaistos (many tens of houses). Comparable estimates have been made by the Argolid Exploration Project (Jameson, Runnels, and Van Andel 1994:417–418; Morgan and Coulton 1997:122–126) and in Methana (Mee and Forbes 1997:37). Our distinctions are arbitrary to some degree, and are therefore best used as a comparative framework rather than as a basis for calculations of absolute population or site function. Additionally, excavations at several small sites, at Selli, Kouses, and Myrtos/Fournou Koriphi, have revealed that they were self-supporting agricultural habitations, and it is only to this limited aspect of the sites that we are referring

TABLE 2.1. Site size and population

Site Size	Identification	Estimated Population
0–0.10 ha	Fieldhouse or farm	1–5 persons
0.10 ha–0.20 ha	Farm(s)	3/5–6/10 persons
0.20 ha–1.0 ha	Hamlet	10–30/50 persons
1.0 ha–10 ha	Village	30/50–300/500 persons
10 + ha	Center	500–1000s of persons

when we use terms such as *farm* or *hamlet.* Our ancient sites may well have played different ritual, political, or economic roles that do not exist in present-day rural settlements. Likewise, our designation of town-sized settlements as "urban" refers to their specialized economic and political role rather than to the size of their population. Our designation *fieldhouse* is used to cover temporary work areas, such as agricultural field structures, seasonal camps, knapping sites, and quarries.

Part II:
The Natural Environment and Its Use

3

A Cultural Geography of the Island

L. Vance Watrous

THE FIRST SECTION of this chapter describes the geography and physical environment of Crete, especially those features that have affected the history and culture of the island. The second section presents the physiography of the Western Mesara region.

THE ISLAND OF CRETE

By Mediterranean standards, Crete is a large island, 156 miles (260 km) long and about 8,261 km^2 in area. In width the island is narrow, ranging from 12 to 57 km north to south with a long coastline (1,046 km) (figure 3.1). Mountains dominate the Cretan landscape. Mount Dicte (2,148 m), Mount Ida (2,456 m), and the White Mountains (2,453 m) form the central spine of the island. Mountains also divide the island into a patchwork (figure 3.1) of smaller natural regions, each with its own central town: East Crete (Siteia), Mirabello (Agios Nikolaos), north central Crete (Herakleion), the Mesara (Tymbaki), western Crete (Rethymnon), and far western Crete (Chania). Each region differs from its neighbors in its environment, dialect, natural resources, and produce. This Cretan landscape has encouraged the formation of multiple small polities.

We begin our description at the eastern end of the island, a region formed by many small valleys separated by low mountains. During most of the Bronze Age, Petras, Palaikastro, and Zakros were independent Minoan centers, each situated within its own coastal valley. Further west, the Isthmus of Ierapetra, a north-south corridor seven miles in width, was also an autonomous region in ancient times. The Minoan palace town of Gournia on the north coast was the administrative center during the Late Minoan I period, while the settlement of Ierapytna (modern Ierapetra) on the southern coast was the local polis during the Classical period. West of the isthmus rises the Dictaean mountain range, leaving thin strips of coastal plain to the north and south. The palace of Malia sits on the north coast. Proceeding westward, the hilly plains at the center of the island are called the Pediada, where a new Minoan palace was uncovered in 1987 at Galatas (Rethemiotakis 1999). The large coastal plain north of the Pediada had its center at Knossos, near modern Herakleion.

South of the Pediada, the land drops off sharply, down to the largest (362 km^2) arable area in Crete, the Mesara Plain. At its center, the broad Mesara Plain runs westward between Mount Ida on the north and the Asterousia Mountains (elev. 1231 m) on the south, opening out onto the Libyan Sea in the west. Phaistos, the Minoan center of the Western Mesara, sits on a ridgetop near the coast. To the north, the Idaean massif dominates all of central Crete. Traveling west and north from the Mesara, one arrives at the rich coastal valley of Classical and modern Rethymnon. West of Rethymnon rise the White Mountains, whose slopes are covered with forests of cypress and pine. Situated at the base of the White Mountains, Chania (Classical Kydonia) faces northward to the island of Kythera and across to the Peloponnese on the Greek mainland (figure 3.2).

The island's geology has determined the location and size of many Cretan settlements. Mountains running along the center of the island rest on a lower stratum of impermeable

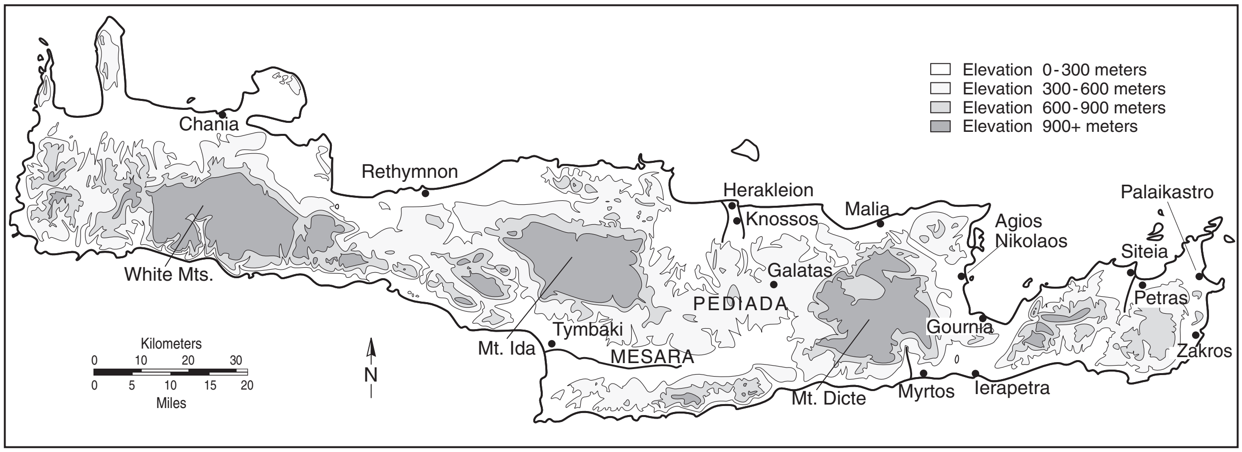


FIGURE 3.1. Map of Crete

FIGURE 3.2. Map of the Aegean

schist. Rainfall, absorbed into this limestone mass, seeps down to the schist base, where it gushes to the surface in the form of springs. Hence, many villages (figure 3.3), such as Kamares, Grigorias, Zaros, and Gergeri, are located at the base of the mountain near these springs. Surface soils (Zohary and Orshan 1965) are of two main types, terra rossa and marly rendzina. The latter is preferable for agriculture (chapters 5 and 6) and has attracted both ancient and modern settlement.

Crete has a Mediterranean climate, with moderately cool, wet winters and hot, dry summers. Rainfall is concentrated between the months of November and February. During the summer the prevailing northwest winds (*meltemia*), called the Etesian winds by the ancient Greeks, bring dry, sunny days. Climate differs with elevation and latitude (chapter 5). Higher elevations receive more rainfall and have significantly cooler temperatures. In the summer one can swelter in the hundred-degree heat in the Mesara Plain and look up to the snow-covered peaks of Mount Ida. The western portions of Crete receive significantly more rainfall than the rest of the island. Chania has an average of 70

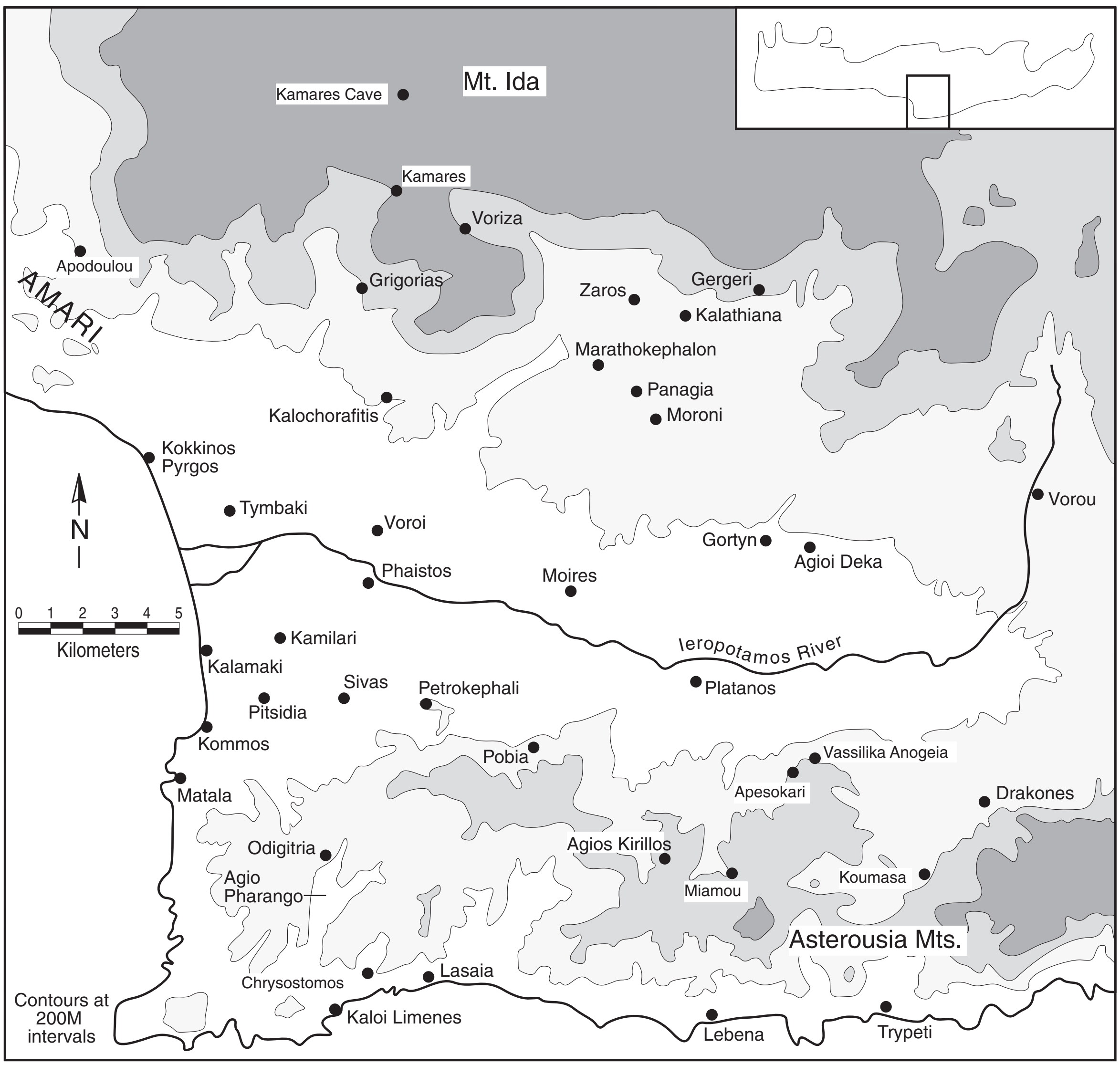


FIGURE 3.3. Map of the Western Mesara

cm of rainfall annually, while the annual rainfall at Ierapetra is only 20 cm.

Mountains have created a vertical set of distinct physical environments on the island (figure 3.1). Every vertical environmental zone possesses distinctive vegetation (Sfikas 1987; Turland, Chilton, and Press 1993) and fauna of its own. Lowest of these zones is the sea itself. Encircling the island, the sea provides Cretans with many edible species during the summer months. Next are the low coastal plains. They are relatively narrow—only about 10% of the island is less than 300 meters in elevation—and are mostly found along the north coast or in the Western Mesara. This zone is the best agricultural land on the island. Above the plains are the foothills and elevated plains (elev. approx. 300–800 m). This area—less than 30% of the island—has always been thickly settled where springs and arable land are available. Finally, the great mountains (elev. approx. 800–2400 m) supply forests and grazing land that are mainly exploited during the summer months.

Such a landscape has forced a vertical economy on its inhabitants (see Braudel 1966:25–102 on this subject in the Mediterranean). Cretans have survived by exploiting different environments, primarily through a combination of farming and shepherding. In its most extreme form, villagers practice a transhumant way of life, maintaining separate summer and winter residences, growing crops at both locations, and driving their herds between residences. The Mediterranean quartet (Sarpaki 1992a) of crops—cereals, grapes, pulses, and olives—flourishes in the lower elevations of the island. Dry, rugged landscapes are particularly rich in pungent herbs, used as spices and scents. At higher elevations, cereals, grapes, cherries, pears, and kitchen gardens are cultivated. Some of the crops and animals, especially barley, wheat, sheep, and goats, have been crucial to Cretan subsistence because they can prosper in the full range of the island's environmental zones.

As of 2001, Crete had a population of 601,131 inhabitants. The island possesses one of the highest densities of agricultural population per square mile in Europe (Allbaugh 1953:55). Traditionally, most of Crete's population has lived in the interior of the island, in close proximity to well-watered farmland. Mountainous areas are thickly settled, and villages there can be large. Zaros, on the slope of Mount Ida, has 2,266 inhabitants. During the Bronze Age the island's population was one of the largest in the Aegean (Wiener 1989).

The natural resources of the island have provided the Cretans with materials for export overseas. Mountain slopes yielded large supplies of timber. In Classical antiquity, Crete was famous for its cypresses (Theophrastus *Natural History* II ii, 2; IV i, 3 and v, 2). Cretan cypress was used in fifth-century Athens to roof the city's temples, probably including the Parthenon (Meiggs 1982:200). In times of peace and efficient government, the island has produced an agricultural surplus that could be exported—most recently (Allbaugh 1953:295–298) consisting of olive oil, raisins, wine, and cheese. Minoan storage jars found on the Aegean mainland and islands indicate that Crete exported oil and wine during the Bronze Age. On the other hand, Crete has always been poor in metals, lacking copper, tin, silver, and gold. This absence of metals was one of the main motivations for Minoan overseas contacts.

The Cretan landscape—rugged topography, diverse environments, and small and separate landholdings—has molded a traditional Cretan character that is hardy, proud, and agonistic (Herzfeld 1985). The Cretan author Nikos Kazantzakis writes in his memoir, *Report to Greco*: "I look down into myself and shudder. On my father's side my ancestors were bloodthirsty pirates on water, warrior chieftains on land, fearing neither God nor man."

Most Cretans have made their living by working the surrounding land as agriculturalists and pastoralists. Due to the unchanging physical realities of the land, this has been the prevailing pattern of settlement in rural Greece. Campbell's classic treatment of social interactions in a rural Greek community, *Honour, Family and Patronage* (1964:185–220) describes the predominant strength of kinship groups in such a society. The family owns the land as a tight, corporate group, and all support and protection comes from the self-sustaining family. In a landscape of limited resources, the corollary of this social structure is hostility and distrust between unrelated families. This agonistic aspect of Greek life (chapter 6) has been recognized as a central feature of Greek culture in antiquity and today (Cartledge 1993; Friedl 1962).

In the twentieth century the inhabitants of mountain villages in Crete are legendary for their extreme behavior in this regard. Herzfeld's book *The Poetics of Manhood* (1985), a study of a village in the Idaean Mountains, describes how this mutual mistrust is institutionalized in theft and other forms of potentially violent competition. Customs such as these are particularly common among shepherds and others who live in marginal environments like the Asterousia or Idaean Mountains. During the recent past, the Agio Pharango Valley, for example, was used by seasonal pastoralists from the Idaean foothills and even Sphakia (Bintliff 1977b:80) in the White Mountains of West Crete. Villagers in the Mesara recall that shepherds from the villages in the Idaean foothills, Voriza and Kamares, brought their flocks down into the Mesara and Agio Pharango in the winter to graze (chapter 6). Conflicts were common, because the herds damaged village crops, particularly olive and almond trees. Herds are an ever-present source of conflict between villagers and shepherds, because the flocks can destroy cultivated crops or can themselves be stolen (Black-Michaud 1986: 157, 191–192).

Internecine conflict has been a central feature of Cretan culture, a legacy manifest in the fluctuating settlement patterns of the Bronze Age and Classical and Ottoman periods (chapters 7–12 and 14). Uneven distribution of natural resources has led to repeated conflicts (chapters 6 and 14). Land control, especially of good land, engendered power and social tension. One solution to these problems was to leave the island. Throughout history, Crete has been an exporter of soldiers, seafarers, and traders. Odysseus, for example, posed as a wandering Cretan during his travels (*Odyssey* 13.256–286; 14.199–359; 19.172–202).

Over the ages, Crete has been a steppingstone between Europe, Asia, and Africa. The Peloponnese is clearly visible from the White Mountains. From Mount Dicte, the Cyclades, including Santorini (ancient Thera), appear on the horizon (figure 3.2). North Africa is 320 km from the south coast, only two days by sail (Strabo 10.4.5). Several of the most traveled sea routes in the Mediterranean pass along the island. This has been both a curse and a blessing. Repeated invasions and subsequent uprisings against foreign occupiers (chapters 10, 13, and 14) mark Cretan history. A visitor to the Monastery of Arkadi, the national shrine of Cretan independence, enters the church and stands before walls silently inscribed with eleven dates of recent Cretan insurrections against occupying powers, beginning in 1821 and ending in 1941. Historical documents of this era (chapter 14) have recorded the widespread destruction and loss of life caused by these struggles. Archaeology provides abundant evidence that this pattern also existed in prehistory.

From earliest times, the material culture of Crete hints that the island's population consisted of diverse groups (chapter 7). Speaking of the Early Iron Age, Homer (*Odyssey* 19.175–179) says that in Crete "There are ninety cities. They have a mixture of languages, for there are Achaeans, stout-hearted Eteocretans, Kydonians, Dorians with their three tribes and god-like Pelasgians." And in the recent past (Karpat 1985:155), the island's people were a mixture of different origins and religions—Greeks, Byzantines, Arabs, Venetians, Christian Anatolians, Muslims, Jews, and Armenians—a palimpsest of the island's history.

The island of Crete sits on a threshold between the Aegean and the Near East. Proximity to more-developed eastern civilizations made Cretans aware of different cultural practices that could be adapted to their own society. As a result, Crete was politically precocious within the Aegean world, both in the Bronze Age and in the Early Iron Age. Eastern imports, found in large numbers on the island, are archaeological trace elements of intellectual currents running between the Near East and Crete. This is especially true in the Mesara (chapters 9 and 12). Often religious in nature, these eastern artifacts arrived at coastal towns and sanctuaries, such as Kommos, Matala, Lebena, and Tsoutsouros (figure 3.4), where locals came into contact with foreigners and ideas could be exchanged. During the Roman period, for example, Egyptian cults were established at Gortyn, Tymbaki, and at least five other sites along the south coast of the island

(Bowsky 1999; Magnelli 1999). In our own era, St. Paul, who himself had landed at Kaloi Limenes, dispatched Titus (later Bishop of Gortyn) to Crete to establish Christianity on the island (Titus 1.5) (see chapter 14).

PHYSIOGRAPHY OF THE WESTERN MESARA REGION

The Western Mesara region is bounded on the west and south by the Libyan Sea, on the north by Mount Ida, and on the east by the narrowing of the plain between the villages of Agioi Deka and Vassilika Anogeia (figure 3.3). This area totals about 616 km^2. Most present-day visitors to the Mesara leave Herakleion and proceed southward through a series of villages, reaching the midpoint of the island at the village of Agia Varvara (figure 3.4), where in the nineteenth century, travelers making the two-day journey by pack animal between the Mesara and Candia (Herakleion) spent the night at inns (chapter 6). Leaving the town, southbound travelers come to the summit of the Pediada (figure 3.1) and catch their first glimpse of the Mesara Plain. Gazing downward, an immense valley appears in the distance (plate 3.1), stretching out to the east and west as far as the eye can see. Reaching the floor of the plain, travelers take the main road that threads through a string of villages and towns, including Agioi Deka, Mitropoulis (ancient Gortyn), and Moires, along the northern edge of the plain. West of Moires, visitors finally come upon the ridge of Phaistos (plate 3.2), towering above the Western Mesara.

Local inhabitants (chapter 6) speak of the Mesara as being divided into two areas, the Western, or Exo (Outer), Mesara, and the Eastern, or Mesa (Inner), Mesara. The Eastern Mesara is a poorer, strictly agricultural, and thinly populated hinterland. This region has its own drainage system, the Anapodaris River, which runs eastward to the port of Tsoutsouros on the south coast. So separate are these two regions of the Mesara that today there is still no single main road connecting the two areas. In Classical antiquity, the Western Mesara was shared uneasily by Gortyn and Phaistos, while the Eastern Mesara was dominated by the city-state of Lyttos, with its harbors at Chersonesos on the north coast and Tsoutsouros on the south (figure 3.4). In the Minoan period, the center of the Eastern Mesara was at the site of Kastellos, later the Classical city-state of Priansos.

The Western Mesara consists of several environmental zones (chapter 5): the Mesara Plain in

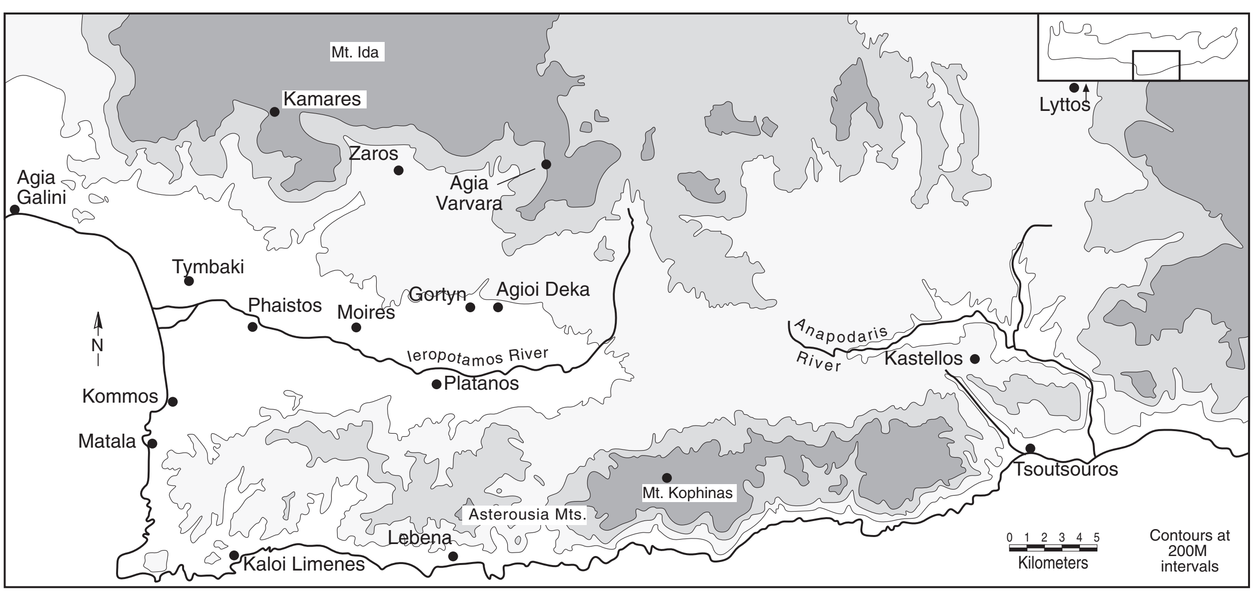


FIGURE 3.4. Map of the Mesara

the center, the Idaean foothills to the north, and the Asterousia Mountains to the south. Chapter 5 discusses the botanical and environmental differences among these areas in detail. The economic and social relations between settlers living in these different environmental zones played an important role in the earliest development of the Mesara (chapter 8). For this reason, we begin with a summary description of the zones within our region. Many of the subsequent economic and political themes that run through chapters 7 through 12 have their roots in the physical realities of the region described below.

First among these zones is the great Mesara Plain. The largest plain on the island, the Mesara extends 54 km east to west and 6 to 9 km north to south. This area possesses more than two-thirds of the best arable land (40,485+ ha) on Crete. Bounded on the north by the massif of Mount Ida (elev. 2,456 m) and the elevated spine (Pediada) of the island, the Mesara is physically separate from north central Crete. As a consequence, the region faces southward; historically, the Mesara has often had close ties with Egypt and the Near East. In the Roman period, for example, the capital of Cyrenaica (and Crete) was at Gortyn. The broad alluvial floor (elev. less than 100 m) of the Western Mesara is drained by the Ieropotamos River, which runs westward by Tymbaki and into the Libyan Sea. Well irrigated and possessing broad tracts of good farmland and lush orchards, this area produces a magnificent array of fruits, olives, and grain, available today in markets in Herakleion and Athens. Massive olive trees dating back to the Venetian era (chapters 6 and 14) yield oil of the highest quality.

With its rich alluvial bottomland, ample groundwater, and open western coastline, the Western Mesara is the most densely settled part of southern Crete. Today two large market towns, Tymbaki (pop. 3,864) and Moires (pop. 3,501), function as commercial and administrative centers, providing public services at hospitals, banks, and government offices. Every Saturday, traffic is snarled around these two towns as villagers travel to sell produce and buy all manner of finished goods not available in the villages. Outside of town, villagers earn their livelihood from a traditional mixture of farming, livestock, agriculturally related crafts, fishing, shepherding, and more recently, tourism (chapter 6 and appendix F).

Our archaeological survey was carried out within this first zone, in the area immediately around Phaistos (plate 3.3). To the west our survey area is bounded by the sea. The north and south margins of our area are marked by the foothills of Mount Ida and the Asterousia. To the east is the alluvial floor of the Mesara Plain. Landscape in our survey area consists of low rolling hills and valleys. The northernmost valley follows the course of the Ieropotamos River out to its coastal delta. South of Phaistos, a second valley runs westward between Phaistos and the village of Kamilari to the coast at Kalamaki. Still further south, a third valley proceeds between the villages of Kamilari and Sivas to the coast at Kommos and Matala. At the western edge of our survey area, a coastal plain (plate 3.4), formed of sand dunes and river-borne alluvium, stretches between Kommos and Kokkinos Pyrgos.

The Idaean foothills, the second zone within our region, rise from the Ieropotamos River northward some 10 km to the base (plate 3.5) of the Idaean massif. Red soils on the lower slopes of these hills are dry and show few signs of use in the past. Since the introduction of deep-drilled wells and plastic-sheeted hothouses in the 1960s, however, the area of red soils around Tymbaki has become startlingly productive. Further north, the landscape of eroded marl hills is only planted sporadically in olives, cereals, and grapes. Today, the villages in these hills, for example, Moroni, Kalochorafitis, and Panagia, are relatively small and poor because of their lack of local water. On the other hand, several of the villages at the base of Mount Ida, such as Kamares, Zaros, and Gergeri, are quite large and prosperous due to local springs. In the Roman period, the water from these springs was piped via aqueducts to the urban center at Gortyn. Today one of the main routes connecting the Mesara and the north coast runs along Zaros and

Gergeri to Agia Varvara. In prehistory this must also have been true, as tholos tombs in the Idaean zone frequently contain materials imported from north central Crete.

South of the Mesara Plain, the Asterousia Mountains (elev. 1,231 m) make up the third environmental zone in our area. Composed of extremely hilly topography, only a few valleys, such as the Agio Pharango, and small scattered plateaus offer any land suitable for farming. Nevertheless, the area has other natural resources—local copper (?), cherts, steatite, clay beds, grazing land, and, in antiquity, timber. Ancient mines are known at Matala (whose variant name in antiquity, Metallon, means "mine") and Chrysostomos. Soils in the Asterousia, on the other hand, are thin, eroded, and dry and mainly support shrubs (chapter 5). Rainfall in this area is the lowest recorded in Greece. Archaeological surveys (Blackman and Branigan 1977; Vasilakis 1993) in the Asterousia have shown that in antiquity, small settlements existed next to patches of marginal agricultural land. In recent history, the area mainly supported transhumant shepherds from Idaean villages and from the Sphakia region in the White Mountains. Settlements in the valleys running through the Asterousia, such as Phaistos-Odigitrias-Kaloi Limenes and Platanos-Miamou-Lebena, were networks of trade connecting the Mesara Plain with the south coast. Today, however, only a few hamlets, for example, Agios Kirillos and Koumasa, survive in this barren landscape.

The Asterousia Mountains end at the south coast (plate 3.6) of the island. Steep slopes and cliffs along the southern face of the Asterousia are broken by occasional pockets of coastal plain located at the mouths of valleys. Local settlement is concentrated at a few seaside hamlets or villages, due to lack of water and arable land. In the recent past, only small numbers of fishermen and seasonal shepherds lived along the coast. Harbors exist at Kaloi Limenes and Lebena, and, through much of history, an international trade route has run along this coast. It was at Kaloi Limenes that St. Paul, sailing on his way to Rome, sought refuge from a storm (Acts 27.8). Written sources also mention that in the Hellenistic and Roman periods, visitors from North Africa frequently came to the shrine of Aesclepius at Lebena. In the Minoan and Early Iron Ages, imports and imitations of eastern objects in local tombs and shrines testify to overseas contacts with Egypt and the Levant. Today, a major refueling station for oil tankers from the Middle East exists at Kaloi Limenes.

The Mesara is a landscape of sharp natural distinctions. Each area possesses certain resources (chapter 5) and lacks others. Chapter 6 documents many examples of local specialization within the regional economy. Certain villages or areas were known for their production of specific goods. For example, before World War II, villagers went to Gergeri to buy wooden plows, to Voroi for chairs, to Phaneromeni for baskets, and to Kamilari for stone hand mills. Until recently, cafes in the coastal village of Pitsidia served land snails as *meze* (hors d'oeuvres), while similar cafes at Voroi offered freshwater crab. Overall, the regional distribution of natural wealth is uneven; only villages, such as Voroi, Petrokephali, and Platanos, that had access to lands along the Ieropotamos River can be said to be relatively well-off agriculturally. Throughout history, this mixture of natural resources has propelled economic and social interactions in the region.

As documented in chapter 6, life for a traditional farmer in the Mesara was a struggle. When one speaks with local villagers in the different areas of the Western Mesara, the regional distinctions described above can surface, heatedly, as topics of conversation. Farmers resident in the Mesara Plain speak of their mountain neighbors to the south and north with a mixture of disdain and resentment. In the eyes of the plains folk, mountain villagers are viewed as uncivil and lawless (for example, for their acts of theft and violence and the destruction of property caused by their herds). A visitor to the Asterousia and the south coast quickly notices an undisguised antipathy and jealousy among the local shepherds, farmers, and fishermen toward the wider world. Local custom condones stealing from these wealthier villages. Competition over scarce resources is a natural concomitant of the Mesara landscape.

Seen on a topographical map (figure 3.1), the Mesara region appears removed from other parts of the island. Chapter 6, however, indicates that this impression is misleading. Prior to the introduction of mechanized transport (circa 1925), locals in the Mesara made regular visits north to Herakleion. Similarly, shepherds and farmers from Idaean villages brought their produce and flocks down to the Mesara. Archaeological evidence points to similar interregional trade in the past (chapters 7 to 10). Four principal routes link the Western Mesara to the outside world. First is the overland route to north central Crete, already in use by the Early Minoan I period (chapter 7). Arthur Evans envisioned a "Great South Road" connecting Knossos and the port of Kommos in the Mesara during the Neopalatial period (Evans 1921–1935, II:91 and map opposite page 70). A second route linking the Western Mesara with the north coast runs northeast of Tymbaki, through the Amari Valley (figure 3.3), to Rethymnon. Both of these routes had the potential to provide the Mesara with crucial access to the north coast and to the Aegean world beyond.

The third route is maritime. During the Bronze and Early Iron Ages, Kommos was the main harbor town of the region. In the Hellenistic period, Matala (plate 3.7) and Lebena became the chief ports. These points of entry connected the Mesara with Ierapetra to the east, North Africa to the south, as well as to parts west and north. Twenty years ago, the oldest villagers in Pitsidia remembered that, in the years after World War I, Egyptian and Libyan caïques from North Africa used to sail regularly to Matala to buy and sell goods. Finally, the fourth sea route was westward, connecting the Mesara with Chania (ancient Kydonia), the Peloponnese, and Italy.

4

Geoarchaeology of the Western Mesara

Kevin O. Pope

Introduction

The Western Mesara was first settled in the Late Neolithic period (chapter 7) and thus provides us an opportunity to examine the relatively abrupt impact of human settlement on a pristine Mediterranean environment. Given this opportunity, and the project goal of investigating Cretan social and political evolution, the focus of the geoarchaeological research in this chapter is the Late Neolithic and Bronze Age periods. The geoarchaeology of later periods is addressed, but in less detail and primarily as a means of placing the prehistoric data in context and as a means of evaluating bias in the archaeological survey data.

Over the last two decades, the impact of Bronze Age land use on the environment in Greece has been a major issue in field research. Prior to the 1980s the prevailing view was that Holocene erosional and depositional events in Greece were primarily climatically induced and occurred quite late in the historic period (Vita-Finzi 1969; Bintliff 1975, 1977a). In contrast, geoarchaeological research in the Argolid in the late 1970s and early 1980s produced evidence suggesting that the first major episode of Holocene soil erosion was linked to Early Bronze Age settlement expansion (Pope 1984; Pope and Van Andel 1984; Van Andel, Runnels, and Pope 1986). The geological evidence from the Argolid included:

- the identification of a deeply eroded, but once extensive, relict paleosol (pre–Bronze Age soil) on moderate slopes,
- the presence of chaotic alluvial deposit debris flows in the adjacent valleys, resulting from soil erosion in the Early Bronze Age, and
- palynological data (Sheehan 1979) indicating deforestation contemporaneous with the soil erosion.

The interpretation of human-induced soil erosion was based upon the spatial and temporal correlation of these settlement, erosion, deposition, and pollen records. Subsequent research in the Argolid has helped confirm this Early Bronze Age erosional event and its association with settlement expansion and deforestation (Finke 1988; Bottema 1990; Jahns 1990; Zangger 1991, 1992a, 1992b; Wells et al. 1993).

Geoarchaeological research in the Western Mesara produced data comparable to that collected in the Argolid and thus provided a further test of the impact of Bronze Age agricultural expansion in Greece. Preliminary appraisals of the data indicated that a similar sequence of events occurred in the Mesara and Argolid, events that led to significant erosion of the Mesara landscape by the Late Minoan period (Pope 1989, 1991; Watrous et al. 1993). This chapter examines erosional and depositional events in the Western Mesara in greater detail, and their relationship to both the archaeological record and the landscape.

Objectives of the Research

Greece has been the focus of several regional geoarchaeological studies in the last decade (see

Van Andel, Zangger, and Demitrack 1990 for a summary). Three objectives, common in these earlier studies and adopted in this present study, are: (1) to determine the impact of erosional and depositional processes on the archaeological record as revealed by surface survey, (2) to determine the chronology and extent of human impact upon the environment, and (3) to contribute information on past environments in order to understand the ecological basis of settlement patterns. The first two objectives are discussed in this chapter, while the third is treated in the discussion of settlement and land use in chapter 5 and later chapters. The geoarchaeological approach in the Mesara, adapted from techniques developed in the Argolid (Pope 1984; Pope and Van Andel 1984), focused upon geomorphic and soil-stratigraphic studies conducted in conjunction with an intensive archaeological survey. The goal was to develop a history of erosional and depositional events that mark episodes of landscape destabilization and to use archaeological data to date these episodes and correlate them with changes in land use.

Fieldwork

Geological fieldwork, conducted in the summers of 1984 and 1987, focused on describing stratigraphic profiles in exposed sections of Holocene alluvium, colluvium, and aeolian sands, and on mapping the surface extent of these same deposits. Work concentrated on natural exposures, such as stream banks, or artificial ones, such as canals or road cuts. A soil auger (7 cm diameter) was used at several points to examine the stratigraphy in areas where no exposures were found. Stratigraphic descriptions included soil definitions, especially those of buried and relict paleosols. Buried paleosols were traced out to the surface when possible, a technique that was instrumental in identifying surface deposits of different ages. In addition to the study of Holocene deposits, eroded patches of Pleistocene soils, the Mesara equivalents of the relict paleosol noted in the Argolid studies above, were also mapped. The entire Western Mesara region was reconnoitered, including our intensive survey region and the area previously surveyed by the Kommos Project (Hope Simpson et al. 1995). Detailed mapping was, however, limited to the intensive survey area and the vicinity of recorded sites. All observations were plotted on 1:5,000 scale topographic maps with the aid of 1:26,000 and 1:27,000 scale aerial photographs shot by the British Royal Air Force in the 1940s and obtained from the University of Keele.

Dating Geological Deposits

Archaeological data were incorporated into the geological field studies in two ways. First, archaeological sites were correlated with the geomorphic surface and the soil-stratigraphic unit upon which they rested. The earliest component of each site provided a minimum age for the underlying deposit (for example, a deposit can be no younger than the oldest archaeological site that rests upon it). These data were collected by detailed mapping of surface deposits in the vicinity of sites located on the lower slopes and valley bottoms where useful associations were likely to be found.

Second, exposures of alluvial, colluvial, and aeolian deposits were examined for their artifact content (usually ceramics). The stratigraphic positions of the artifacts were recorded, and they were then collected and analyzed as part of the archaeological survey. The latest of these artifacts provide a maximum age for the deposit (for example, a deposit can be no older than the latest artifact it contains). It is important to note that artifacts alone do not provide an accurate age for the deposit, in large part because later sherds can work their way into it.

While these two techniques provide a series of dates that help bracket the age of the deposits, two factors limit their usefulness. First, artifacts in exposures are rare and are often too eroded to be accurately dated. Ceramics were collected from 37 stratigraphic exposures, but only 25 of these produced datable sherds. Second, it is not often that sites were found resting on Holocene deposits, probably because areas of active deposition were not favored settlement locations or because sites in these locations were usually too deeply buried to be detected by the survey. Fewer than 10 surface sites, resting on alluvium, produced useful dating information. Despite these limitations, sufficient datable material was collected from 12 locations to develop a regional stratigraphic sequence (figure 4.1). Although no single location contained a complete sequence, it was possible to correlate sequences based on their artifact content, age of overlying sites, and degree of soil development (see appendix A). These correlations produced a composite regional stratigraphy that is internally consistent and contains four Holocene alluvial units (figure 4.2). The units are labeled, from oldest to youngest, as follows: EM (Early Minoan) alluvium, LM (Late Minoan) alluvium, H/ER (Hellenistic/ Early Roman) alluvium, and B/V (Byzantine/ Venetian) alluvium. The latest three units correlate with the aeolian stratigraphy using the same archaeological and soil stratigraphy techniques.

SITE PRESERVATION BIAS IN THE ARCHAEOLOGICAL SURVEY

The question of site preservation is basic to archaeological survey because it directly affects the way the archaeological data are interpreted. Preservation bias has been addressed by several surveys in Greece (for example, Bintliff and Snodgrass 1985; Cherry et al. 1988; Jameson, Runnels, and Van Andel 1994), and it is clear that preservation factors vary from region to region, depending on landscape type and settlement history. Conditions in the Mesara resemble those in the southern Argolid (Jameson, Runnels, and Van Andel 1994). The southern Argolid study examined the effects of site loss as a result of the postglacial rise in sea level and burial by Holocene alluvium. Sea level changes are an important factor in the southern Argolid, with its complex, extensive coastline and early settlement. In the Mesara they are less important, because of the relatively small size of the coastline and the minimal sea level rise since habitation began in the Late Neolithic. Site burial in the lowlands, and its corollary, site erosion in the

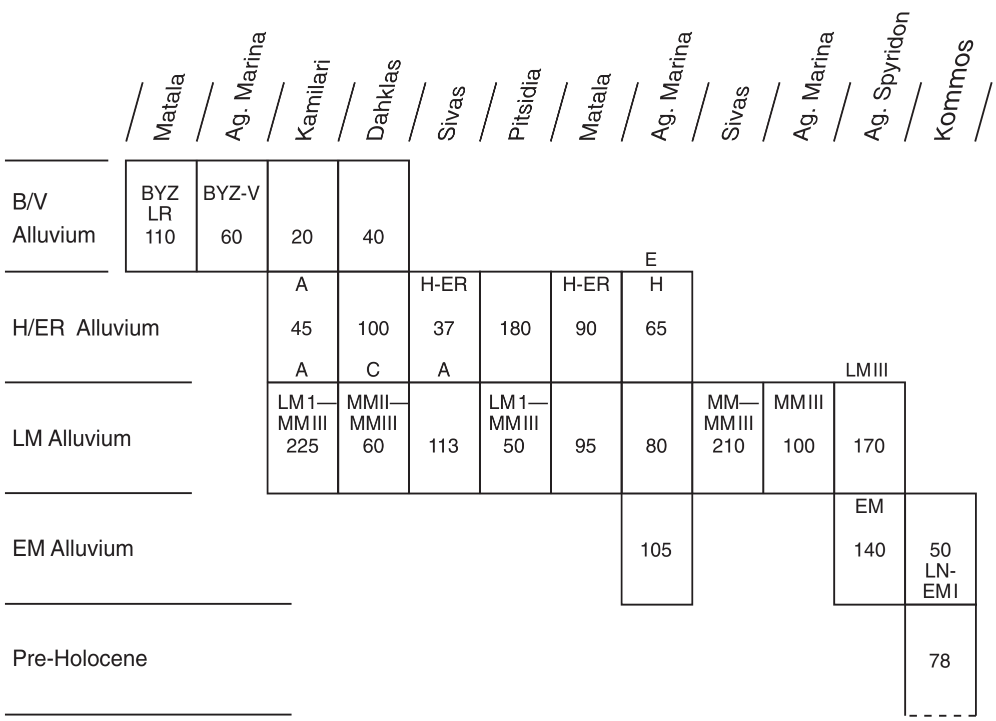


FIGURE 4.1. Chronostratigraphic data for alluvial deposits. Summary of chronostratigraphic data for alluvial deposits from twelve drainages in the Western Mesara. Each of the twelve columns represents a measured stratigraphic section containing one or more of the four Holocene alluvial units (H1–H4) identified in this study. Numbers within boxes give thicknesses of alluvial unit in cm. Letters and Roman numerals designate archaeological periods represented by either sites found on top of alluvial deposits (period names on top of stratigraphic boundary) or by artifacts found deposited with the alluvium (period names within box). Abbreviations: BZ = Byzantine; V = Venetian; LR = Late Roman; ER = Early Roman; H = Hellenistic; A = Archaic; C = Classical; LM = Late Minoan; MM = Middle Minoan; EM = Early Minoan; LN = Late Neolithic; PL = Pleistocene

uplands, are, however, important factors in the Mesara.

This study of site preservation in the Mesara, described below, reaches the same conclusion as Jameson, Runnels, and Van Andel (1994), contrary to Bintliff and Snodgrass's conclusions (1985), that while preservation can have significant effects on the distribution of sites on certain land forms (for example, coasts and valley bottoms), it probably does not greatly distort the total number of sites from one period relative to another. A method similar to that used by Jameson, Runnels, and Van Andel (1994) examines potential preservation bias in the distribution of sites with respect to landforms. The results here are comparable to those of the southern Argolid, although the interpretations differ in several important respects (see discussion below).

Changes in Sea Level in the Mesara

Studies by Nikos Mourtzas indicate that the sea level along the Mesara coastline has risen about 4 m in the last three to six thousand years, with perhaps about a 1 m rise since Roman times (Watrous et al. 1993: 204–205). Since the intensive survey was not permitted to include the immediate coastal zone between Kalamaki and Tymbaki, details of the coastal evolution of the Mesara in the Holocene remain mostly unknown. These limitations preclude a discussion of coastal settlement patterns in the Neolithic or Bronze Age. Nevertheless, even if a rise in sea level inundated a few Neolithic and Bronze Age sites, the lost area represents a small percentage (< 1%) of the Western Mesara region.

Evidence that the Bronze Age coastline was seaward of today's shore is found at Kommos (Gifford 1989) and in an auger test made in a marsh 300 m from the coast at Kalamaki. The auger recovered 4.8 m of alluvium overlying a red soil with abundant large (1 cm diameter) pedogenic carbonate nodules. This red soil is interpreted as the Pleistocene surface, overlain by stream deposits with no indication of marine or beach influence. Nevertheless, it is possible that the Early Bronze Age coastline occupied a position inland from that of today in the vicinity of the mouth of the Ieropotamos River. Until about

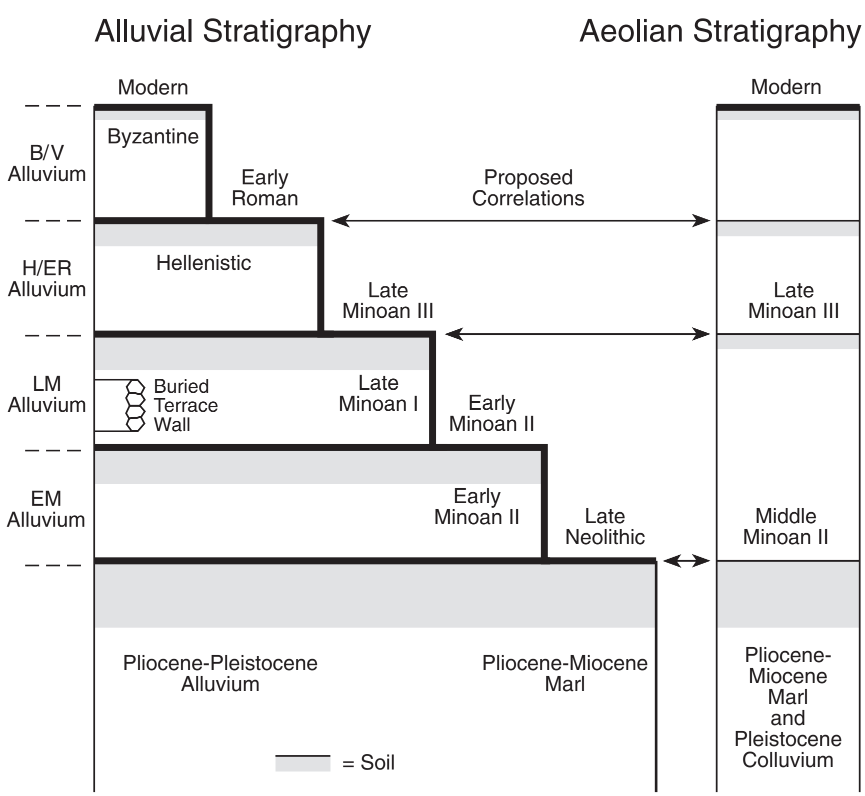


FIGURE 4.2. Composite alluvial and aeolian stratigraphy from the Western Mesara (after Watrous et al. 1993)

five thousand years ago, the sea level rose rapidly, causing a marine transgression where the rise of the sea level outpaced sedimentation by coastal rivers. As a result, in some parts of Greece, narrow bays formed in the valleys cut by Pleistocene rivers that are now alluvial plains (for example, Kraft et al. 1975; Zangger 1991). After 5000 BP the sea retreated as the rise in sea level slowed and, as is the case in the Mesara, sedimentation increased. The Greek geologist Karolos Beze, who worked with the project in 1984, discovered (Beze, pers. comm.) that the shallow Ieropotamos channel is cut into bedrock 2.3 km from the coast (1.5 km northwest of Agia Triada), which indicates that such a marine transgression, if it occurred, was probably minor. It also makes it highly unlikely that Agia Triada was ever a port (contra Chadwick 1976a: 53–54; Watrous 1984:131).

Soils and Site Preservation in the Mesara

This soil-stratigraphic study in the Western Mesara is not adequate for fully assessing preservation bias in the archaeological survey data, largely because the time permitted for fieldwork did not allow for detailed mapping of surface deposits throughout the entire survey area. Quantitative analyses of the effect of erosion and deposition on site distributions cannot be made without a uniform database of surface deposits for the entire region. In order to assess the impact of erosion and deposition on the archaeological record, field data was extrapolated from the soil map of the Mesara compiled by Yassoglou (1960). The Yassoglou map distinguishes between two major soil orders in the Western Mesara: Alfisols, which have well-developed horizons and represent stable surfaces of some antiquity (mostly Pleistocene), and Entisols, which have little to no horizon development and represent either recent deposits or deeply eroded soil where the diagnostic horizons have been stripped. The Yassoglou map also records the depth of the soil and the degree of erosion in the Entisols of the A horizon (the surface horizon characterized by an accumulation of organic material and by the removal of mineral constituents such as carbonate or clay). This information can be used to separate the Entisols into three types: (1) a deep Entisol with thick (> 75 cm) alluvial or colluvial deposits of recent age, (2) a minimally eroded Entisol < 75 cm thick but with an intact or partially intact A horizon, and (3) an eroded Entisol < 75 cm thick where the A horizon has been completely stripped.

The Yassoglou soil map was redrafted, consolidating the various soil types into Alfisol and the three categories of Entisol noted above (figure 4.3). Based on its erosional history, each of these four soil types can be ranked according to its site preservation potential and thereby used to assess preservation bias in the survey sample. The Alfisol is ranked the best (rank 1) for preservation, and nearly all sites on this soil should be detectable. The minimally eroded shallow Entisol is ranked second best (rank 2). Minor burial or moderate erosion may obscure some of the sites on this soil, but most are probably detectable by survey methods. The Entisol with major erosion (rank 3) and the deep uneroded Entisol (rank 4) have poor site preservation potential. The eroded Entisol is ranked better in preservation potential than the deep Entisol because deep erosion of a site can leave a lag deposit of sherds detectable by survey. A site buried by more than 75 cm would rarely be detected unless it was exposed in a road cut or other similar feature (since plowing in the Mesara rarely extended deeper than 75 cm).

This ranking of the preservation potential of surfaces provides a basis from which to draw general conclusions about the representative nature of our archaeological survey data. Nevertheless, this information does not permit direct estimates of the percent of sites preserved from various time periods. For example, the rank 1 Alfisols and rank 2 minimally eroded Entisols may have nearly 100% site preservation; however, there is no objective means of estimating the percentage of sites preserved on the rank 3 eroded Entisols other than acknowledging that it must be significantly less than 100%. Furthermore, there is no objective means of quantifying changes in preservation over time.

Site preservation is quite variable across the landscape, and it is thus difficult to draw any conclusions about spatial patterns of settlement within the survey area without first assessing site preservation. This is especially true for the Bronze Age, because of problems in comparing settlement densities on soil types with drastically different preservation potential. Thus, for example, the existence of many more Minoan sites on the valley flanks as opposed to the valley bottoms may well be the result of site burial, not a Minoan preference for high ground.

Evaluation of Spatial Patterns of Survey Bias

To evaluate the possible preservation bias in our survey sample, it was assumed that settlements from all periods were randomly or evenly distributed within the survey region with respect to soil type. Such a distribution is perhaps unlikely, but the detail of the soil data and the heterogeneity of the landscape does make such an assumption somewhat plausible, since most settlements were within easy walking distance of all soil types (except the Alfisols). Thus, there was no great benefit in settlements being situated directly on the soils they exploited. This assumption does not require an even or random distribution across the entire landscape. Densely populated or unpopulated zones may have existed, but to satisfy this assumption, these zones cannot have been preferentially located on certain soil types. One of the major goals of our project was to determine the relationship between settlements and environmental variables, hence any a priori assumption about such relationships would result in circular reasoning. In this regard the even or random distribution assumption serves as a hypothetical baseline against which settlement pattern data can be compared.

If sites were evenly or randomly distributed with respect to soil type, and there is no preservation bias, then each soil type should have the same density of sites. Thus, the percentage of sites within each soil type should equal the percentage of soil type within the survey. Table 4.1 demonstrates that when site distributions in the Western Mesara as a whole are considered, they are not evenly or randomly distributed with respect to soil type, the cause of which could be either clustering of settlements on certain soil types, site preservation bias, or, most likely, a combination of these.

The deep Entisol with the poorest preservation potential has fewer sites than expected, and the minimally eroded Entisol with good preservation has more sites than expected. The Alfisol and the eroded Entisol have total site percentages roughly equal to their area percentages. If periods with fewer than 10 sites are ignored (due to small sample size that may give unreliable percentages), the overall pattern noted above is also applicable to individual periods, with the exception of the Late Minoan III A2–B period. Percentages for the eroded Entisol fall below or above the expected value in several periods. Patterns for the Alfisol category deviate somewhat from expected values, but so few sites are found on this soil type that any conclusions about settlement here are suspect, and therefore little emphasis can be placed on settlements on this soil type.

The pervasive pattern of fewer than expected sites on the soils with the poorest preservation potential and more sites than expected on the soils with the second-best preservation potential are both consistent with the effects of site loss due to burial. To examine this possibility further, a heuristic model is presented (table 4.2). This model is based on two assumptions: (1) sites are evenly or randomly distributed with respect to soil type, and (2) the 61 sites found on the minimally eroded Entisol represent all settlements that existed on that soil type (100% preservation and survey recovery). Model predictions are made only for time periods with more than 10 sites, because extrapolations from small sample sizes are considered unreliable. The purpose of this model is to examine the structure of the settlement data in more detail to determine if site distributions follow patterns that can be predicted by preservation bias. It is important to remember, however, that this model cannot be used to confirm or refute such bias, since the two assumptions upon which it is founded cannot be independently tested.

Based on these two assumptions, the total number of sites in the survey region is predicted to be 139. Given the 104 sites found, the predicted preservation/recovery for the total survey is 75%.

TABLE 4.1. Sites and soil types*

Period	Deep Entisol	Eroded Entisol	Minimally Eroded Entisol	Alfisol	Total Sites
LN	0	25	75	0	4
LN/EM I	17	17	61	6	18
EM II	8	31	62	0	13
EM III/MM IA	0	43	57	0	7
MM IB–II	12	24	63	2	51
MM III/LM I	9	26	60	6	35
LM II–IIA1	11	11	56	22	9
LM IIIA2–B	13	30	39	17	23
LM IIIC	25	25	25	25	4
PG/Geo	0	25	50	25	4
O–A	14	21	64	0	14
C	12	27	58	4	26
H	7	23	70	0	44
ER	19	14	62	5	37
LR	18	0	73	9	11
Totals	13	22	59	6	
Survey Coverage	28	22	44	6	

* Only sites found by the survey within the intensively surveyed region and falling unambiguously on a given soil type were used in the calculations (104 total sites). The excavated sites of Phaistos, Agia Triada, and Kommos are excluded.

Total site preservation/recovery is calculated to be 36% on the deep Entisol and 74% on the eroded Entisol. The preservation/recovery of sites on the Alfisol is set at 100% in the model due to its high preservation potential rank, even though there is a slight discrepancy between the predicted and actual number of sites. Such a discrepancy in the totals is preferable to basing model predictions on the very small sample size of 6 sites. This model is best viewed as representing minimum site losses, since less than 100% preservation/recovery on the minimally eroded Entisol would result in even lower preservation percentages for the other Entisol types. Percentages predicted by the model are consistent with the projected relative preservation potentials (for example, rank), and emphasize that site preservation on the rank 4 deep Entisol may be much less than 50%.

Model predictions by period are also given in table 4.2 for the periods that have more than 10 sites. The survey results predicted by the model fall within 1 site of the actual survey result in 73% of the cases and within 2 sites in 88% of the cases (table 4.2). The Late Minoan III A2–B period and the Hellenistic and Early Roman periods stand out in this analysis as periods when site distributions deviate more than two sites from predicted values in one or more soil category. Such a good fit between the predicted and actual site distributions reflects a rather remarkable consistency in site formation processes over a 4,400-year period. Apparently the major factor controlling site distributions and/or preservation was the same in most periods. There is no obvious geological reason why the Late Minoan III A2–B, Hellenistic, and Early Roman periods should deviate more from the model, and hence these periods may

TABLE 4.2. Model of site preservation*

Period	Deep Entisol		Eroded Entisol		Minimally Eroded Entisol		Alfisol		Total Sites	
	A	P	A	P	A	P	A	P	A	PT
LN/EM I	3	2	3	4	11	11	1	1	18	24
EM II	1	2	4	3	8	7	0	1	13	17
MM IB–II	6	7	12	11	32	30	1	3	51	68
MM III/LM I	3	5	9	8	21	21	2	2	35	47
LM IIIA2–B	3	3	7	5	9	14	4	2	23	31
O–A	2	2	3	3	9	8	0	1	14	19
C	3	4	7	6	15	15	1	2	26	35
H	3	6	10	9	31	26	0	3	44	59
ER	7	5	5	8	23	22	2	2	37	49
LR	2	2	0	2	8	7	1	1	11	15
Total Actual Sites	14	23	61	6	104					
Total Predicted Site Population	39	31	61	8	139					
Model Preservation Percentage	36	74	100	100	75					

* Model predictions (P) of the number of sites detectable by survey, the actual (A) number of sites found, and the predicted total (PT) site populations for the four soil types and 10 archaeological periods with sufficient data. Predictions are based on the assumptions described in the text. Site distributions as in table 4.1.

mark times when actual settlement patterns deviated from the norm (see chapters 10 and 13).

Evaluation of Temporal Patterns of Survey Bias

The heuristic site preservation model presented in the previous section placed some hypothetical limits upon the impact of erosional and depositional processes but did not consider changes in site loss over time. Local alluvial and aeolian depositional history (figure 4.2) suggests that site loss is episodic, with losses occurring during erosional/depositional events, followed by stable periods of soil formation and little impact on site distribution. One would expect that site loss, either by burial or erosion, is cumulative and therefore has increased over time (for example, Bintliff and Snodgrass 1985; Bintliff, Howard, and Snodgrass 1999), albeit not in a linear fashion.

Nevertheless, the percentage of sites found on the deep and eroded Entisols (table 4.1) shows only a slight tendency to increase over time. The highest percentages of sites on the deep Entisols (within time periods with reliable data) occur in the two most recent periods but differ only slightly from percentages found in the Late Neolithic to Early Minoan I period. It is worthwhile to note, however, that the time periods immediately preceding major erosional/depositional events (for example, Early Minoan II, Middle Minoan III/Late Minoan I, and Hellenistic) have the lowest percentage of sites on the deep Entisol (excluding periods with less than 10 sites), an indication that the effects of site burial may have distorted settlement patterns in these three periods more than others. In contrast, there is no discernible trend on the eroded Entisols. While changes in settlement preference for soil types over time may have obscured any trend, it is more likely that the effects of erosion and deposition are not, for the most part, cumulative.

The Bronze Age depositional events, one in the Early Minoan period (EM alluvium, mean thickness 98 cm, standard deviation +32 cm) and another in the Middle to Late Minoan period (LM alluvium 123 + 23 cm) produced the thickest deposits and no doubt eroded a few sites from the slopes and buried many sites on the lower slopes and valley floors. The Hellenistic-Early Roman alluviation phase (H/ER alluvium 86 + 23 cm) and Byzantine-Venetian alluviation phase (B/V alluvium 58 + 39 cm) produced thinner deposits, but were still sufficient to render some sites undetectable. Nevertheless, site loss is not cumulative over the long term in the valley bottoms, because successive alluviation phases tend to cover the same area, given the restricted extent of these valleys.

For example, the percentage of Bronze Age sites buried in the valley bottom is probably about the same as the percentage of pre-Roman Iron Age sites, if the settlement distributions in these two periods were the same. The fact that the highest percentage of sites on the deep Entisol are Early and Late Roman reflects that only one minor (B/V alluvium, 58 + 39 cm thick) alluviation phase has occurred since these sites were settled. In contrast, sites from all earlier periods have experienced two or more alluviation phases. Neolithic and Bronze Age sites may be more deeply buried than Classical or Hellenistic sites, but once sites are covered by about a meter of sediment (below the depth of deep plowing), they become undetectable by survey. Additional sedimentation buries sites more deeply but does not result in the loss of additional sites, hence the lack of any long-term cumulative trend in site loss on the deep Entisol.

A similar argument can be made that erosion may have little cumulative effect on site preservation on the eroded Entisol. Most highly vulnerable sites, such as small sites on steep slopes, have now been lost regardless of age. Once slope erosion has advanced to the point where all these vulnerable sites are gone, subsequent erosion does not necessarily remove more sites from these slopes. Site loss is limited to instances when very deep erosion occurs, and because such events are both spatially and temporally rare, they do not produce significant cumulative effects. It is interesting to note that in contrast to the pattern of preservation on the deep Entisol, sites on the eroded Entisol are least abundant in the Early and Late Roman periods. The Early Roman pattern cannot be easily explained by physical site loss (see chapter 13).

While counterintuitive, the argument that there is no significant cumulative site loss in our area is consistent with the data in table 4.1 and the site preservation model in table 4.2. A word of caution is in order, since changes in cultural preference for settlement location may mask cumulative effects. Nevertheless, it is preferable to follow the straightforward physical arguments for minimal cumulative effect rather than to assume a hypothetical cultural trend whereby settlers in the Western Mesara ceased to settle on the deep or eroded Entisols, especially since they represent prime agricultural land.

In conclusion, the spatial distributions of the settlements are probably greatly distorted by site losses in certain areas. There appears to be no significant cumulative effect in the loss of sites over time. Settlement patterns on the lower slopes and valley bottoms from the Early Minoan II, Middle Minoan III/Late Minoan I, and Hellenistic periods may have been most affected by site burial. Spatial site distributions, with a few exceptions, are not significantly different from those expected, given an initial even or random distribution of sites and the vagaries of site burial and erosion. Therefore, cultural aspects of spatial patterns must be interpreted with proper care. For example, if Late Neolithic and Early Minoan settlers preferred to settle along the banks of the Ieropotamos River, there is no objective way to determine how many of these sites lie buried there. Conversely, temporal changes in the total number of sites (not their spatial distribution) mostly reflect actual settlement dynamics. This is an important result, since it indicates that the survey data may be used in diachronic studies of demography without major limitations arising from preservation bias.

These conclusions have important implications for other archaeological surveys in similar environments. Data presented in Jameson, Runnels, and Van Andel (1994) indicate that the burial of sites by alluvium in the southern Argolid may have caused the loss of about 17% of the Final Neolithic to Late Roman period sites (site preservation of 83%). Site preservation by period deviates little from this average; for example, 77% of the Early Helladic II sites were preserved compared to 81% of the Late Roman sites. These results compare well with those from the Mesara, where an average preservation of 75% is estimated over this same time period (table 4.2). The results are even closer when one considers that Jameson, Runnels, and Van Andel (1994) did not consider site loss by erosion. The Mesara estimates of site loss on the deep Entisols give a preservation figure of 79%. It should be noted that Jameson, Runnels, and Van Andel (1994) did not consider burial by colluvial mantle at the base of hill slopes, which is included in the deep Entisol analysis here. Such losses would slightly decrease the Argolid preservation values. Both the Argolid and Mesara data do not indicate much cumulative site loss. This is especially interesting since Jameson, Runnels, and Van Andel (1994) explicitly dealt with temporal changes in burial based on the detailed mapping of alluvial deposits (Pope 1984; Pope and Van Andel 1984). This result seriously calls into question the claim by Bintliff and Snodgrass (1985; Bintliff, Howard, and Snodgrass 1999) that cumulative site loss is in part responsible for the dearth of prehistoric sites in Boeotia.

Despite the remarkable similarities between the overall site preservation figures in the southern Argolid and the Western Mesara, this study differs from Jameson, Runnels, and Van Andel (1994) in the interpretation of the details. They conclude that given these relatively high preservation percentages, settlement spatial patterns revealed by survey are basically reliable. In contrast, work in the Mesara emphasizes that while overall site preservation may be good, relatively poor preservation in the valley bottoms cannot be overlooked. Site preservation on the deep Entisols may be as poor as 36% (table 4.2). Finally, it should be added that all of these estimates of site preservation, both in this study and in the southern Argolid, remain speculative inasmuch as they are based on untested assumptions about site distributions.

EROSIONAL AND DEPOSITIONAL EVENTS

Four alluvial and three aeolian depositional events occurred in the Western Mesara within the time span of human settlement. The good correlation in age and thickness between alluvial deposits from different locations within the Mesara (figure 4.1), and between the last three alluviation events and the sequence of aeolian deposition (figure 4.2), indicates that depositional events throughout the Mesara were caused by similar regional processes (Watrous et al. 1993:197–204). These erosional/depositional events and the chronostratigraphic evidence (figure 4.3) are described below. Calendar dates for these events are approximate.

The Early Minoan alluvial event (circa 2800–2500 BC) appears to have been relatively minor, since it produced no detectable aeolian deposit, but this may be in part because the coastline in the Early Minoan period was farther out. Where found, the EM alluvium is as thick as later deposits, hence it appears to be a severe but localized event. This is supported by the fact that EM alluvial deposits have been positively identified in only three locations (figure 4.3), at Agios Spyridon, Agia Marina, and Kommos, with a fourth possible location near Pitsidia. For purposes of comparison, figure 4.4 presents the location of other identified EM II sites relative to the location of soil types. A buried Early Minoan II site (**52**) rests on top of and is interstratified with the EM alluvium, exposed in a canal cut near Agios Spyridon. The main site rests on the EM alluvium surface at a depth of 1.9 m. Early Minoan I–II sherds were found in auger tests to a depth of 2.9 m. The few Early Minoan I sherds found by the survey in the canal back dirt at site **52** probably came from the EM alluvium. Augering within the Gria Saita canal between Agios Spyridon and Phaistos identified the buried EM alluvium surface at a depth of 8.2 m. Early Minoan I–II sherds are found within the deposit in other locations. The EM alluvium also buried a Late Neolithic site near Kamilari (plate 4.1). The onset of this event is most likely confined to the Early Minoan II period, but may have been as early as Early Minoan I.

The Late Minoan alluvial event (circa 1700–1500 BC) is identified in nine locations (figure 4.1). It is the thickest unit on average, with deposits often exceeding 1 meter, and it produced a substantial aeolian deposit. This event is the largest recognized for the Holocene in the Western Mesara (see discussion of H/ER alluvium

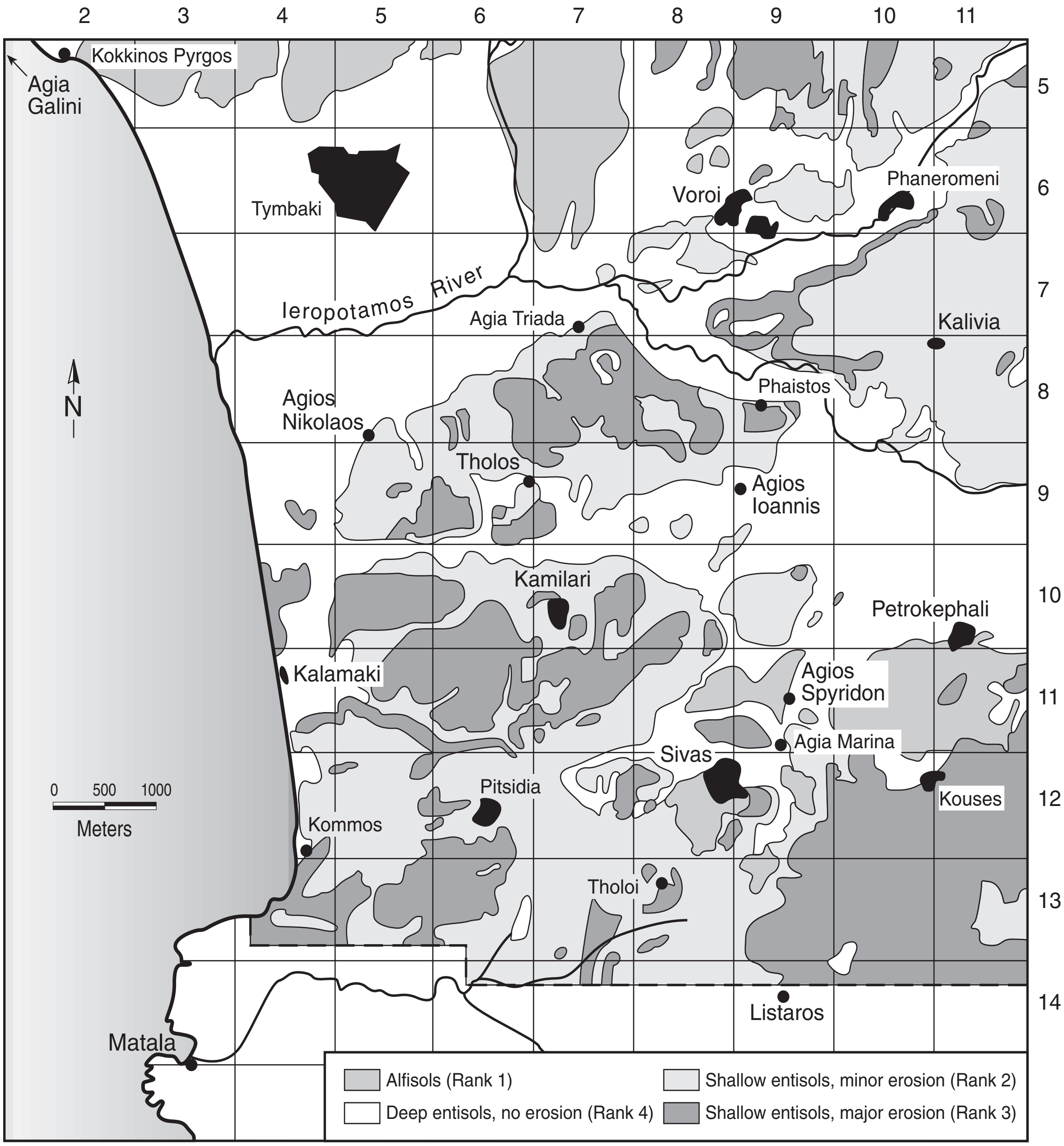


Figure 4.3. Soil types in the Western Mesara (modified from Yassoglou 1960) ranked according to site preservation potential. Location of present-day settlements indicated by black areas. Black dots are archaeological sites.

below). The auger test in the drainage ditch (Gria Saita) east of Phaistos recovered 1.9 m of sand and fine gravel interstratified with layers of organic rich bluish clay overlying the EM alluvium surface. The upper 0.5 m of this 1.9 m section is a moderately developed buried soil with land snails and fine (1–2 mm) pedogenic carbonate concretions (the top of this soil lies 6.3 m below the surface). This sequence of clay, sand, and gravel presumably represents the LM alluvium. The rare layers of bluish organic rich clay indicate that a marsh occasionally formed near the base of Phaistos in Late Minoan times, but earlier in Middle Minoan times this area was permanently dry land. The bluish silty clay with freshwater snails, clams, and plant remains

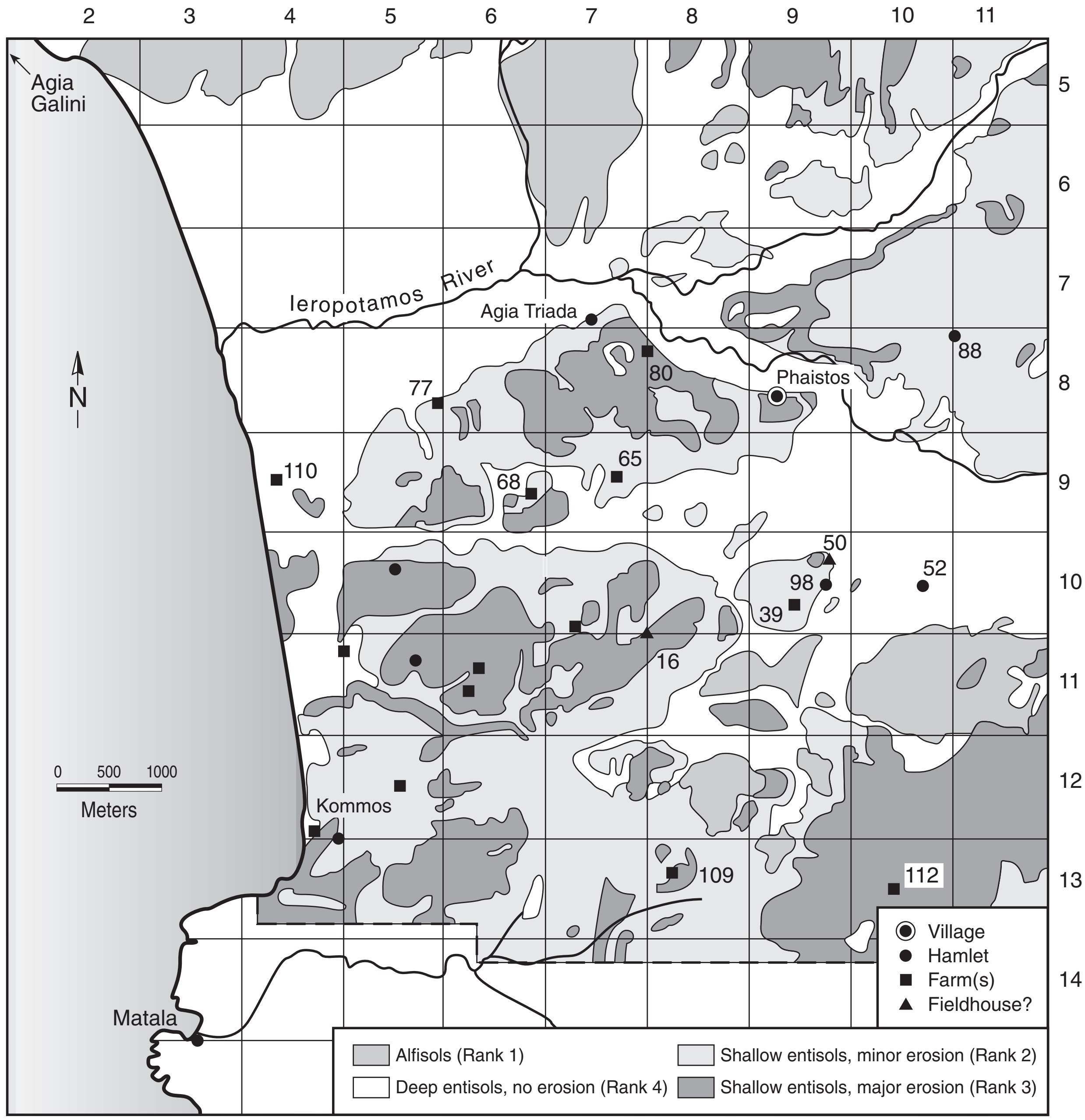


FIGURE 4.4. Soil types ranked according to site preservation potential relative to the location of Early Minoan II sites in the survey area

overlying the LM alluvium in the Gria Saita auger test indicates the presence of an extensive marsh and perhaps a seasonal lagoon in the early Iron Age (circa 1000–300 BC).

Deposition of LM alluvium is confirmed between the Late Minoan I and IIIA1 periods: however, it may have begun slightly earlier, in the Middle Minoan III period. Late Minoan sherds are only found in the upper deposits, and three out of the five exposures with datable material contain only Middle Minoan sherds (Middle Minoan IB–III). This finding must be interpreted with caution, however, since younger alluvial deposits (for example, H/ER alluvium) also contain mostly Middle Minoan sherds due to the high settlement density in

Middle Minoan times. In the Pitsidia-Kalamaki drainage this unit is composed of three stratigraphically distinct depositional events, the middle one of which is associated with a buried terrace or check dam (figure 4.2 and plate 10.1). The lower two depositional layers at this site contain Middle Minoan IB–III sherds, while the uppermost layer contains mixed Middle Minoan and Late Minoan I sherds. Nearby is another set of more sophisticated stone walls in the cyclopean style of possible Middle Minoan age (Hope Simpson et al. 1995: Plates 7.27 and 7.28) resting on bedrock and buried by LM alluvium. Late Minoan IIIA–B site 95 rests on top of the alluvium near Agia Marina. Aeolian sand deposition near Kalamaki, interpreted as resulting from this alluvial event, is bracketed by buried sites dated to between Middle Minoan II and Late Minoan III times (figure 4.2), consistent with the alluvial chronology. In overview, while this event may have begun in the Middle Minoan III period, the only time for which deposition can be confirmed is in the first centuries of the Late Minoan period (circa 1700–1500 BC).

The Hellenistic/Early Roman alluvial event (circa 300–50 BC) is perhaps the most common alluvial deposit in the Western Mesara. Today, H/ER alluvium appears to cover most of the valley bottoms, although it has been confirmed in only six locations (compared to nine for the LM alluvium). In the Gria Saita canal cut near Phaistos the upper 3.6 m consists of a mottled brown and yellow silt with many Hellenistic sherds, which is much thicker than the 1.9 m of LM alluvium sampled in the adjacent auger test. This silt deposit is not directly comparable to the locally derived LM alluvium as it is a combination of H/ER alluvium and flood deposits from the Ieropotamos River. Its unusual thickness does suggest a major period of soil erosion in the Mesara region. This deposition correlates well with the fact that the thickest aeolian sand deposits on the coast are probably a result of the H/ER event.

The latest positively identified sherds in the H/ER alluvium are Early Hellenistic (circa 300–150 BC), but many lots were identified as either Hellenistic or Early Roman. Thus, deposition may have begun in the Hellenistic period, or possibly in the first part of the Early Roman period. Deposition was brief, however, and ceased in Early Roman times, because Early Roman sites 102 and 107 near Petrokephali are found on top of this deposit.

Of all discrete events in the Western Mesara, the Byzantine/Venetian alluvial event (circa AD 1000–?) was the smallest. Deposition is mostly confined to minor terraces along seasonal streams or small alluvial fans where these same streams enter the plain. Its age is not well constrained, but ceramics within the unit confirm that deposition began in or after the Byzantine-Venetian period (circa AD 1000). While deposition may continue in a few locations, it has, for the most part, ceased, and streams are incised in most valleys.

Correlation between the Mesara and Argolid Alluviation

The erosional/deposition history of the Western Mesara detailed in the previous section provides a valuable opportunity to compare events in the Mesara with similar ones documented for the southern Argolid. This comparison forms a foundation for the discussions of human interactions with the environment in the following section.

The EM alluvial event is most likely confined to the Early Minoan II period and thus correlates well with a major period of alluviation in the Argive Plain (Pope and Van Andel 1984; Finke 1988). Both the Mesara and the Argive Plain have Early Bronze Age II sites on top of, and Early Bronze Age II sherds within, their first major alluvial deposit. Since this cultural period spans over five hundred years, the exact timing of these events is unknown, and thus the two events may not be precisely contemporary. In the Argive Plain the Early Bronze Age alluviation marks the largest erosional event of the Holocene (Finke 1988; Zangger 1992a) which contrasts sharply with what appears to be the modest extent of the EM alluvial event in the Mesara.

The first major Holocene depositional event in the southern Argolid, the Pikrodaphni alluvium, may also date to the Early Bronze Age. The youngest artifacts within the Pikrodaphni are Early Helladic II; however, overlying sites permit bracketing of the unit to only 2700–1400 BC (Pope and Van Andel 1984). The Pikrodaphni event could, in part, be contemporaneous with the LM alluvial event in the Mesara, but the degree of soil development in the Pikrodaphni deposits is most similar to that found in the Early Minoan rather than the Late Minoan deposits. The thickness and extent of the Pikrodaphni alluvium are intermediate between the Early Minoan and Late Minoan units in the Mesara.

The major LM alluvial event of the Mesara finds few correlations in the Argolid. As noted above, the imprecise dating of the Pikrodaphni alluvium permits a partial overlap with the LM alluvium, but is considered unlikely. For the Argive Plain, Late Bronze Age alluvial deposition was later in time (circa Late Helladic IIIB) and was of limited extent (Zangger 1992a).

The thickness, extent, and age of the H/ER alluvium correlate well with the lower member of the Flambouro alluvium in the southern Argolid (Pope and Van Andel 1984). The minimal soil development on these Mesara and southern Argolid deposits is also comparable. These two deposits have identical time ranges for deposition, given that they contain Hellenistic sherds and have Early Roman sites on top of them. Post–Bronze Age deposits in the Argive Plain are of minor extent and have not been differentiated (Finke 1988).

HUMAN INTERACTIONS WITH THE MESARA LANDSCAPE

Climate change, tectonic movements, eustatic sea level rise, and even perhaps the eruption of the Santorini volcano have had an impact on the people and landscape of the Mesara in the late Holocene. Nevertheless, unambiguous evidence for these natural phenomena in the Western Mesara is sparse. It is especially difficult to glean climatic information from the geological record because of the intensive human modification of the landscape over the last five thousand years. An overview of the late Holocene vegetation history of Crete and its climatic implications is presented below to provide a context for a detailed discussion of the causes of soil erosion and depositional events in the Western Mesara.

Palynological Evidence for Vegetation History on Crete

Most of the evidence for late Holocene climate change in Crete comes from the fossil pollen studies of sediment cores taken near Agia Galini 10 km northwest of Kokkinos Pyrgos (Bottema 1980) and from the Akrotiri peninsula northeast of Chania (Gennet 1982; Moody 1987; Moody, Rackham, and Rapp 1996). Cores from both regions appear to contain a record of vegetation change from the Neolithic through much of the Bronze Age. Unfortunately, the Agia Galini record has a major gap, and neither pollen sequence is well dated. Both cores have single radiocarbon dates in the lower part of the sequence that fix the beginning of the pollen records in the Early to Middle Neolithic (Agia Galini 8265 + 50 BP and Tersana, Akrotiri 5800 + 130 BP). The Tersana core from the Akrotiri peninsula northeast of Chania has a radiocarbon date (2110 + 130 BP) on shell from a beach deposit near the top of the core. This latter date is calibrated to circa 415 BC to AD 210 (Moody, Rackham, and Rapp 1996) but apparently was not corrected for any marine carbon reservoir effect that could make the true age several hundred years younger. Given the paucity of radiocarbon dates in these cores, dating of vegetation changes in the Late Neolithic and Bronze Age can only be done with rather tenuous extrapolation or interpolation. As a result, only broad temporal trends can be addressed with any confidence.

A major vegetation change occurs between the Neolithic and Bronze Age in the cores from Crete. The Neolithic sediments contain pollen from a deciduous forest type not found in Crete today. This forest included deciduous oaks, linden, hazel, and hornbeam, of which the latter three no longer occur naturally on the island. The reduction and disappearance of this deciduous woodland at Akrotiri correlates with:

- a dramatic increase in (cultivated?) olive,
- indications of land clearing,
- an increase in pine, and

- an expansion of the typical Mediterranean maquis and garigue flora (Moody 1987; Moody, Rackham, and Rapp 1996).

This change from deciduous woodland to a more Mediterranean-type vegetation occurs within a gap in the Agia Galini core, which separates pollen spectra of the these two markedly different flora. Olive is represented by only a few grains in the uppermost part of the Agia Galini core, suggesting that this core may predate cores from Akrotiri or that the spread of olive culture was later in southern Crete.

Moody, Rackham, and Rapp (1996) attribute the decline of the deciduous woodland vegetation in Crete to a shift toward a drier climate beginning in the Early Bronze Age. Moody's (1987) earlier interpretation of this vegetation change, however, emphasized the role of expanding human settlement. In this earlier work she noted the co-occurrence of intensified land use and the deciduous woodland decline, and that some of these woodland tree species decline, expand, disappear, and reappear in the Bronze Age pollen record. This latter phenomenon seems best explained by the effects of fluctuating land use intensity, a supposition strongly supported by the archaeological data.

Bottema (1990) also noted similar Neolithic to Early Bronze Age vegetation patterns in the southern Argolid pollen record and concluded that there was clear evidence of human impact on the vegetation and that a climatic interpretation of these trends was problematic. Indeed, pollen records from Greece and much of the Eastern Mediterranean contain irrefutable evidence of human-induced changes in vegetation beginning about four thousand radiocarbon years ago (circa 2500 BC) (Bottema and Woldring 1990). These same pollen data contain indications of climatic change, but the data are ambiguous because of the heavy imprint of human disturbance. The early to middle Holocene (circa 7000–4000 BC) in Crete was probably marked by a drying trend (Bottema 1980, 1990; Rackham and Moody 1996; Dalfes, Kukla, and Weiss 1997; Moody and Watrous in press), perhaps followed by cooler and wetter conditions leading up to today. However, significant or abrupt climate changes in the Late Neolithic and later cannot be discerned with any confidence.

Human Impacts in the Mesara and Comparisons with the Argolid

The Western Mesara survey records an abrupt settlement expansion in the Early Bronze Age following initial colonization of the region in the Late Neolithic (chapter 7). The disappearance of the deciduous woodland and first appearance of olive in the Agia Galini core may date to this early period of settlement expansion. Late Neolithic to Early Minoan clearing and cultivation of virgin lands, as well as the introduction of grazing animals, must have disrupted hill slopes in the Mesara. This disruption may be recorded in the EM alluvial event, the first of its kind in the Holocene of the Mesara.

The Late Neolithic to Early Bronze Age pattern of settlement expansion (archeological record), reduced tree cover (pollen record), and erosion/deposition (geological record) in the Mesara is similar to that found in the southern Argolid (Pope and Van Andel 1984) and Argive Plain (Finke 1988; Van Andel, Zangger, and Demitrack 1990; Jahns 1990; Zangger 1992a; Wells, Runnels, and Zangger 1993). The fact that these settlement, vegetation, and erosion patterns in Greece are temporally correlated suggests that the three patterns are causally related (Pope 1989, 1991). The most straightforward interpretation is that the cutting of trees and tilling of soils by Neolithic and Early Bronze Age farmers destabilized slopes and caused the Early Bronze Age erosion/deposition event. Nevertheless, these correlations can only be made for broad time periods, given the uncertainties in dating. Time lags probably occurred between initial clearing and subsequent erosion.

Despite the broad similarities in the cultural and geologic records of the Mesara and Argolid in the Early Bronze Age, differences do exist. Data comparable with those from the Mesara are available from survey projects in the southern Argolid (Jameson, Runnels, and Van Andel 1994) and the Berbati (Wells, Runnels, and Zangger 1993) and Nemea (Cherry et al. 1988) Valleys.

Berbati is a small valley adjacent to the lower Argive Plain, while Nemea is a larger valley in one of the main upper drainages of the Argive Plain. The Mesara EM alluvial event was similar in magnitude to the southern Argolid Pikrodaphni event, albeit slightly less extensive (in both regions the subsequent erosion phase was larger). In contrast, the Early Bronze Age event in the Argive Plain was by far the largest of the Holocene (Finke 1988). Late Neolithic and Early Bronze Age settlement patterns are similar in the Mesara, southern Argolid (Jameson, Runnels, and Van Andel 1994), and Berbati Valley (Wells, Runnels, and Zangger 1993), but the Nemea Valley is different (Cherry et al. 1988).

Early Neolithic settlements were quite prominent in the Nemea landscape, followed by a drop in settlement numbers in the Final Neolithic and earliest Bronze Age (Early Helladic I), with a rapid rebound toward the end of the Early Bronze Age (Early Helladic II). It should also be noted that while Neolithic settlement prior to the Final Neolithic was very sparse in Berbati and the southern Argolid (Jameson, Runnels, and Van Andel 1994; Wells, Runnels, and Zangger 1993), there is little doubt that these regions were inhabited throughout the Neolithic (and earlier). A sizeable settlement prospered at Franchthi Cave in the southern Argolid throughout the Neolithic (for example, Jacobsen 1981). This contrasts with the Mesara, where it appears that the first settlers arrived no earlier than the Late Neolithic.

It seems, therefore, that the more protracted and intensive Neolithic land use in the Argolid, as compared to that in the Mesara, may be related to the more extensive Early Bronze Age erosion in the catchment of the Argive Plain. Perhaps gradual land use intensification over a period of millennia ultimately led to catastrophic slope failure in the Early Bronze Age (Van Andel, Runnels, and Pope 1986), but such mechanisms remain speculative and do not fully explain why a much shorter period of land use also caused slope failure in the Mesara, perhaps on a smaller scale. The apparent co-occurrence of the first Holocene erosional/depositional event and the first major expansion of farming communities is striking.

In the Middle Bronze Age the settlement patterns of the Mesara and Argolid diverge dramatically. The Mesara undergoes a transition phase in the Early Minoan III to Middle Minoan IA periods, which includes growth of the major site of Phaistos but a depopulation of the countryside (chapters 9 and 10). Within the next few hundred years a palatial center appears at Phaistos (Middle Minoan IB–II) and is surrounded by the highest settlement density recovered by the survey (see chapter 10). The southern Argolid also undergoes a major rural depopulation and nucleated settlement at the end of the Early Bronze Age, but recovery is slow and populations remain depressed throughout the Middle Bronze Age (Jameson, Runnels, and Van Andel 1994). Similarly, the Middle Bronze Age was a period of relative decline in the Argive Plain: the Berbati region became a backwater (Wells, Runnels, and Zangger 1993), and several sites, most notably Lerna, were destroyed (Caskey 1960). There is little evidence for erosion or deposition in Crete or the Greek mainland in the Middle Bronze Age. As outlined above, it is possible that the LM alluvial event began in later Middle Minoan times, but this possibility cannot be confirmed.

This situation changed dramatically in Crete in the first few centuries of the Late Minoan period. By Late Minoan IB the palace at Phaistos was destroyed, and the number of settlements in Late Minoan II–IIIA1 declined sharply (chapter 10). There is a slight resurgence in settlement numbers in Late Minoan IIIA2–B period, but by the Late Minoan III C period most of the countryside in the Western Mesara was abandoned. The most extensive erosional/depositional phase in the Mesara occurred during the initial stages of this demographic decline, circa 1700–1500 BC.

There is no record of significant erosion or deposition in either the southern Argolid or the Argive Plain during the first several hundred years of the Late Bronze Age, when Mycenaean civilization prospered and spread. The only Late Bronze Age event on record for this region is a minor one near Tiryns that occurs in Late Helladic IIIB or even later (Zangger 1992a). Crete and the Argolid have very different cultural trajectories in the Late Bronze Age. As a consequence they also have very different erosional/depositional histories. In the Mesara the LM alluvial event correlates with a period of sociopolitical upheaval and a drop in settlement density, while landscape stability in the Argolid correlates with a time of economic prosperity.

The H/ER alluvial event (circa 300–50 BC) in the Mesara, like the preceding Late Minoan event, correlates with a period when the region was in turmoil, ending with the destruction of Phaistos circa 150 BC, annexation by Rome in 66 BC, and a fundamental political and economic restructuring of the entire region (chapter 13). In the southern Argolid, cultural events were even more severe, and the political turmoil that plagued the late Hellenistic period culminated in a major depopulation of the countryside by 250 BC (Jameson, Runnels, and Van Andel 1994). A major erosional/depositional event (Lower Flambouro alluvium), dated to 300–50 BC, correlates with this period of cultural instability and collapse. As with the Early Bronze Age, once again the Mesara and southern Argolid appear to have parallel cultural and geological histories. The later B/V alluvium (circa AD 1000–?) in the Mesara and the Upper Flambouro alluvium (circa AD 400–1700) in the southern Argolid correlate, but are too poorly dated to warrant speculation on their causes.

Landscape and Social Change in the Mesara and Beyond

The comparison of cultural and erosional patterns from the Mesara and the Argolid favor the interpretation that most, if not all, Holocene erosional/depositional events were induced primarily by changing patterns of land use. Climate changes no doubt have occurred in the last five thousand years, but these changes may not have been any more severe than those of the first five thousand years of the Holocene, a period for which little soil erosion has been recorded in the Mesara or Argolid. If climate changes are in part the cause of Holocene erosion phases, then there must be something unique about the middle to late Holocene environment that made it more vulnerable to erosion during an episode of climatic change. The most obvious cause of such an increased instability in the landscape is the dramatic expansion of agrarian societies throughout much of the Mediterranean at this time. It is possible that some of the dramatic erosional/depositional events in the Mesara were triggered by relatively sudden, brief climate changes that have left no independent evidence. Nevertheless, in this concluding section, human interactions with the landscape are emphasized, because our project did produce a wealth of independent evidence for such activity.

The human activities that destabilized the Mesara landscape in the Early Minoan II period appear to be related to the expansion of dryland agriculture onto the valley slopes (see chapter 8). This destabilization corresponds approximately with the Early Bronze Age introduction and spread of plow-based agriculture throughout the Aegean (Pullen 1992). The fact that erosion in the Mesara and Argolid occurs late in the Early Bronze Age suggests that the intensification of land use accompanying increased social complexity at this time was more critical than the initial expansion of population. This seems to be evident in the Argolid, which has a longer history of Neolithic land use, but also experienced erosion late in the Early Bronze Age (Finke 1988; Wells, Runnels, and Zangger 1993; Jameson, Runnels, and Van Andel 1994). The brief, but perhaps regional, severe change to a more arid climate proposed for the Eastern Mediterranean beginning circa 2200 BC (Weiss et al. 1993; Courty 1994) appears too late to be linked to the Greek erosional events under discussion. This climatic event may, however, be linked to the Early Minoan/Early Helladic III depopulation of the region (see chapter 9). In overview, the first Bronze Age erosional/depositional event in the Mesara was probably the result of intensified land use in the vicinity of the numerous hillside Early Minoan II farms and settlements (figure 8.1).

A period of landscape stability lasting over five hundred years followed the EM alluvial event. This period witnessed the emergence of the Minoan state centered at Phaistos and the spread of farming communities throughout much of the Western Mesara (chapters 9 and 10). Whatever the land use systems during this major period of expansion, they must have been varied and complex, and they were apparently well managed from the point of view of soil conservation. Possible Middle Minoan stone walls built in the cyclopean style (plate 10.1) in the Pitsidia-Kalimaki drainage (Hope Simpson et al.1995) suggest that efforts to combat erosion may have been initiated by 1900 BC. Middle Minoan terrace walls have also been reported from Pseira, off the coast of Crete (Betancourt and Hope Simpson 1992).

At the end of the Middle Minoan period, the Western Mesara landscape underwent another major destabilization, which is marked by the LM alluvium. The LM alluvial event was not part of an Aegean-wide disruption of the landscape, since hill slopes in the Argolid remained stable in this time period. It has often been assumed that the Santorini eruption, circa 1600 BC (Hammer et al. 1987) had devastating effects on the Minoan environment (for example Chadwick 1976a) but geological studies indicate that the effect on Crete was probably minor (Blong 1980). The Santorini eruption may have caused global climate changes, as frosts in California (LaMarche and Hirschboeck 1984) and disastrous summer frosts, floods, and droughts in China (Pang 1991) have been linked to this eruption. Nevertheless, there is no reason why such a climatic disturbance would affect the Mesara and not the Argolid or other Mediterranean societies that flourished at this time.

The most obvious difference between the Mesara and the Argolid in the Late Bronze Age, probably linked to the different erosional histories, is sociopolitical. The Mesara underwent a major social and economic upheaval caused by the Knossian and subsequent Mycenaean conquest of Crete. The Mycenaean expansion brought prosperity to the Argolid, but hardship to the Minoan farmers of the Mesara (chapter 10). Terrace walls buried by LM alluvium in the Pitsidia-Kalamaki drainage may be an example of abandoned soil conservation efforts that reflects this economic uncertainty and hardship in the Mesara.

The Mesara and the Argolid witnessed a long period of landscape stability, extending from the latter stages of collapse of Late Bronze Age society, through the abandonment of large areas in the Early Iron Age, and including a long period of sustained population growth in the Archaic, Classical, and Hellenistic periods. As noted above, both the Mesara and the Argolid were in turmoil at the end of the Hellenistic period (chapter 11), when erosion resumed and the H/ER (Mesara) and lower member Flambouro (Argolid) alluvium were deposited. While the details of the late Hellenistic disruptions in these two regions differ, one aspect seems clear—both regions maintained sizable populations during the Hellenistic period and it seems that the erosion was linked to disruptions at the end of the period in both cases.

General conclusions can be drawn with regard to cultural and landscape dynamics in the Mesara and Argolid that may apply to the Mediterranean and beyond. Both areas experienced population increases in the Late Neolithic through much of the Early Bronze Age, and during the Archaic to Hellenistic periods. Both areas also experienced major population declines at the end of the Early Bronze Age, at the beginning of the Iron Age, and at the end of the Roman period. The Middle and Late Bronze Age periods have very different population trajectories in the Mesara as compared with the Argolid. In the Mesara, the Middle Bronze Age is a time of major population growth followed by a decline in the Late Bronze Age. The Argolid has the opposite trend, with comparatively stagnant populations in the Middle Bronze Age and major growth in the Late Bronze Age. When these population trends are compared with the record of landscape stability, three important patterns emerge: (1) the periods of widespread land abandonment are not associated with erosional/depositional events; (2) the periods of major population growth are not associated with erosional/depositional events; and (3) erosional/depositional events occurred after a population peak and during the initial stages of population decline. This pattern was first recognized in the southern Argolid (Pope and Van Andel 1984), and the Mesara data provide additional support.

While there is a clear link between socioeconomic decline and soil erosion in ancient Greece, it is often difficult to identify cause-and-effect relationships. Does soil erosion help cause cultural decline, or does this decline lead to erosion? These two explanations are probably not mutually exclusive. Feedback can occur between the cultural and environmental systems, where both contribute to an escalating pattern of increasing erosion and decreasing conservation. Such a feedback loop appears to be most likely during an economic decline, when land use intensity is still high but investment in conservation diminishes. If this holds as a general axiom, then the Late Minoan I and Hellenistic periods, and perhaps even the Early Minoan II period, represent times when socioeconomic systems became stressed. In contrast, the cultural collapse that ended the Mycenaean era and ushered in the Greek Dark Age stands out as being unusually abrupt and unrelated to a protracted period of socioeconomic decline. Following the various demographic collapses, the hill slopes stabilized as land use declined and natural vegetation colonized the abandoned fields (chapter 5). When the economy boomed again, little erosion occurred, because farmers had the resources and motivation to invest in soil conservation. This scenario carries an important warning to modern society, when economic difficulties tempt people to relax environmental protection efforts.

5

Environment, Land Capability, and Botanical Studies in the Western Mesara

Jennifer M. Shay and C. Thomas Shay

THIS CHAPTER PRESENTS the results of two separate studies: (1) a review of environment and land capability for crops, and (2) a comprehensive botanical survey. In part I, the Mesara Plain and the area around the palace of Phaistos, the uplands to the north, and the Asterousia Mountains and coast to the south are described in terms of geology, landforms, climate, rivers and springs, and soils and their agricultural capability. We also note ways in which agricultural capability may be improved. The botanical survey (part II) includes a 25-km transect across these environmental zones; the flora, plant communities, and useful plants; and human influences on the vegetation. The chapter closes with a speculative discussion (part III) about the plant cover and agricultural crops during the Neolithic and Bronze Ages in the Mesara.

INTRODUCTION

From sun-drenched coastal shores to lofty mountain meadows, the Western Mesara offers rich diversity in geology, landforms, climate, soils, flora, and fauna. Much of this diversity does not favor agriculture, due to the widespread occurrence of shallow and/or coarse-textured soils, inadequate or excessive drainage, or steep slopes subject to erosion. Farmers in the Mesara, as elsewhere in Crete, must also cope with year-to-year variations in temperature and rainfall. Occasional killing frosts or scorching heat, drought, or flood can spell poor yields or even crop failure. Traditionally, the economy of Crete has been based on agriculture, so the past and present capability of the land to support crops and livestock is key to interpreting not only the rise of Minoan civilization but also much of Crete's subsequent history.

Through land clearance, cultivation, plant introductions, and in other ways, human influences on the landscape have been profound, from the early days of agriculture to today's intensively cultivated fields and orchards. Thus most of the present plant cover is the result of many centuries of human influence. In spite of these human influences, and in part because of them, the flora is rich, with about six hundred plant species distributed among a mosaic of cultivated and seminatural communities, including shrublands, grasslands, meadows, cultivated fields and waysides, marshes, stream banks, woodland groves, and coastal areas. The diverse flora provides hundreds of uses for wild plants as food, fodder, fuel, medicine, crafts, and other purposes.

PART I: ENVIRONMENT AND LAND CAPABILITY FOR AGRICULTURE

The Environment

The Western Mesara covers 619 km^2 of the valley floor and its surrounding uplands. It can be divided into three zones: (1) the relatively flat Mesara Plain, crossed by several northeast–

southwest marl ridges, (2) hilly uplands to the north leading to the foothills of the Idaean Mountains at an elevation of 600 m, (3) rugged southern uplands of the Asterousia Mountains, and the south coast. This three-fold division parallels differences in geology, climate, water resources, and soils.

THE MESARA PLAIN

Geology and Landforms. Situated on a high, steep-sided ridge, the palace of Phaistos commands a view of much of the valley, with its groves, pastures, and fields. The palace was built upon the most northerly of three heavily eroded marl and limestone ridges. The village of Kamilari is on the second ridge, and south of this, another ridge runs from Listaros 10 km inland to Matala on the coast. These ridges and associated valleys form a band up to 4 km wide, aligned from northeast to southwest across the central Mesara and extending into the northern uplands (plate 3.1 and figure 5.1; Gifford 1995; Watrous et al. 1993). South and east of these ridges, between Matala and Petrokephali, rugged topography is underlain by a complex of limestones, marls, and metamorphic rocks of gneiss, schist, marble, and metamorphosed sandstone and chert (Watrous et al. 1993). The valley floor consists of thick deposits of alluvium.

Climate. The overall climate is typically Mediterranean—semiarid, with mild, wet winters and hot, dry summers (Nahal 1981). At Gortyn, in the center of the Mesara Valley, January temperatures average 11.8° C and those in August, 27.4° C (Zohary and Orshan 1965; Mariolopoulis 1982). The mean minimum in January is 6.7° C with occasional frosts recorded. Annual rainfall at Tymbaki near the coast is 480–500 mm, most of which falls between November and March, sometimes in intense downpours. Heavy rains result in both considerable erosion and the loss of potential soil moisture through runoff. There is little or no rain during the dry season from June to September, as illustrated by a graph, based on Didaktoria (1979), of rainfall by month (for the years 1952–1971) at Tymbaki (figure 5.1). Monthly and annual rainfall at stations across the Mesara shows ranges from 480 to 812 mm per year (appendix B, table B.1). A comparison of rainfall at stations at different elevations shows a close correlation between rainfall and elevation.

Potential evaporation is about three times the annual rainfall (Vallianos et al. 1985), with the greatest deficit occurring during summer, when evaporation exceeds 300 mm with little or no precipitation. Insufficient precipitation is a limiting factor for most agricultural crops. It is difficult to document year-to-year variations, because temperature and rainfall records for the Western Mesara span only a few decades. Rainfall on the plain is more variable from year to year than in the northern uplands, as measured by the coefficient of variation (CV). The CV is a relative measure of variability around a mean value, expressed as a percentage. In this way,

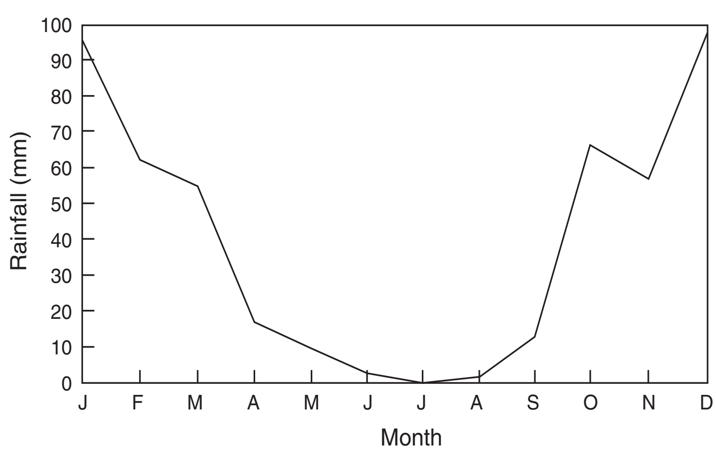


FIGURE 5.1. Rainfall by month at Tymbaki

sets of data with different means can be readily compared. Coefficients for stations on the plain such as Tymbaki, Gortyn, and Pobia show that variation in annual rainfall ranges from 26 to 28% (appendix B; table B.1) (Didaktoria 1979). Monthly variation is highest during spring, summer, and fall when rainfall is lowest. In summer, high temperatures, sometimes coupled with strong winds, further deplete soil moisture. Fall rains, crucial for fall-planted crops, vary from year to year as much as 55 to 58% at these three stations, sometimes causing devastating floods, as occurred in November 1937 (chapter 6). One or two rainfall events a year may cause up to 80% of soil loss for that year (Imeson and Emmer 1992).

Rivers and Springs. The main source of fresh water for the plain is the Ieropotamos River, which rises in the east and flows along the axis of the valley, depositing alluvium along its banks during winter's high water. The Ieropotamos drains much of the Eastern and Western Mesara Valley, an area of nearly 400 km^2 (Vallianos et al.1985). At Phaistos, where monthly flows have been measured, they are highest in February and lowest in August. River flow is quite variable, with the five-year mean from 1975 to 1980 being three times higher than the previous five-year mean.

Most other streams in the central Mesara flow only during the winter rainy season. Their drainage basins are small, ranging from that of Pitsidia (2.6 km^2) to Kalamaki (8.5 km^2) and Matala (15 km^2). Small drainage basins respond rapidly to flooding and erosion (Gifford 1995).

There are no large springs on the plain, but many minor seeps issue from both sides of the valley. On the south side there are springs at Pitsidia, with a flow of 340 l per hour (5.7 l per minute), and at Agios Stephanos, with 76 l per hour (1.3 l per minute) (Gifford 1995). Others include several near Kamilari (Hope Simpson 1995: Plate 7.48), near Sivas, and at Petrokephali and Pobia (Crosby 1949; personal observation).

Soils. Soil formation is characterized by the interaction of climate, organisms, topography, parent material, and time (Jenny 1941; Barbour, Buck, and Pitts 1987). In the semiarid Mesara, soils have developed on several different parent materials, such as deep deposits of Holocene alluvium on the valley floor or various types of bedrock, predominantly calcareous limestones and marls, on the surrounding uplands. Calcareous materials are typical of the Mediterranean (di Castri 1981).

Soils of the entire Mesara Plain, stretching from the coast 50 km eastward to Kasteliana, an area of 335 km^2, have recently been mapped at a scale of 1:10,000 and a number of chemical and physical properties measured (Yassoglou 1960). They were classified based upon soil texture, drainage, processes responsible for soil development, slope, degree of erosion, and the presence of carbonates and gravels in the profile (details in appendix A). Yassoglou's comprehensive report serves as the basis of the following description of soils in the archaeological survey area.

The area is dominated by soils of two major soil orders, according to the US Department of Agriculture classification (Yassoglou 1960): Entisols (also called Regosols or Lithosols in the Food and Agriculture Organization classification; Dregne 1976) and Alfisols (terra rossa; Dregne 1976; di Castri 1981). Entisols are soils that show little or no differentiation into horizons (Dregne 1976). Some are made up of layers of various textures, clay loam being dominant, while others are on bare bedrock and have had their upper soil horizons removed through erosion. Alfisols are soils with clay-rich (argillic) B horizons developed on Quaternary alluvial terraces. These distinctions, in part, parallel those made by local farmers between white soils (Entisols) and red soils (Alfisols) (chapter 6).

The distribution of these major soil types in the archaeological survey area (chapter 4, figure 4.3) shows that the deep Entisols on recent alluvium are the most widespread, followed by shallow Entisols with minor erosion, shallow Entisols with major erosion, and finally, the Alfisols. Alfisols are found in scattered patches on the northern and southern fringes of the survey area. Table 5.1 lists these various soils with their extent and land class according to texture, depth, drainage, slope, and erosion.

Deep (deeper than 1.5 m) Entisols with no erosion occur in about 40% of the map area (figure 5.2), including the coastal plain, the Ieropotamos floodplain and its major tributaries, as well as flat-to-gently rolling upland areas elsewhere. Low-lying, clay-rich soils on the floodplain between Petrokephali and Phaistos are poorly drained, with the water table at or near the surface during the wet months of the year. These are poor soils for crops because of their poor drainage, in part due to their fine textures. Much of the area is pasture or marsh. Another marshy area, of about 1 km^2, is found near the mouth of the Ieropotamos River.

Along the margins of the floodplain, surface layers (up to 25 cm) are composed mostly of sandy loams to clay loams. These soils are moderately drained, with the water table during the wet months of the year being 100 to 150 cm below the surface. Toward the mouth of the river, north of Tymbaki, soils are well drained. Surface textures include sand and loamy sand, although gravel layers occur throughout the profile. Such layers limit agriculture. Deep soils of flat-to-gently rolling upland areas between Kamilari and Agios Ioannis and elsewhere are medium textured and well drained. These are judged to be the best soils for agriculture (Yassoglou 1960).

The coastal plain between the mouth of the Ieropotamos and southward to the archaeological site of Kommos is covered with sand between 0.1 and 14 m thick (Watrous et al. 1993: Figure 3; Gifford 1995: Plate 3.2).

Shallow Entisols with minor erosion occupy 30% of the area on the lower slopes of the marl bedrock hills and ridges. These soils are generally on moderate slopes, but subject to erosion. They lie between deep Entisols with no erosion and those with major erosion.

Shallow Entisols with major erosion form the marl bedrock hills and ridges and make up 21% of the area. They include the ridge between Phaistos and Agia Triada, between Kamilari and Kalamaki, between Pitsidia and Matala, and a large area south of Kouses (figure 4.3).

Alfisols, covering about 9% of the area, are found mainly between Sivas and Petrokephali in the south and between Voroi and Tymbaki in the north. They were formed on alluvial terraces during the Quaternary. Due to their greater age, they have developed a brown sandy loam upper (A) horizon and a reddish brown clay-rich (B_t) horizon somewhere between 20 and 40 cm deep. Because of cultivation and erosion, coarser-textured surface horizons have been removed or become mixed with finer-textured lower horizons. Surface textures are sandy clay loam, clay loam, and sandy clay, and in some areas, the parent material below contains layers of gravel.

TABLE 5.1. Major soil types in the central portion of the Western Mesara valley (after Yassoglou 1960).

	Recent alluvial soils	Older alluvial terraces	Eroded soils of hills
USDA soil order	ENTISOL	ALFISOL	ENTISOL
Parent material	Holocene alluvium	Quaternary alluvium	Eroded limestones, marls, and conglomerates
Geomorphology	Constant accumulation	Little or no erosion	Constant erosion
Topography	Flat	Flat to low slopes	Low to steep slopes
Drainage	Medium-well to well-drained	Well-drained	Well-drained
Fertility	Moderately low	Low	Low
Carbonate (%)	15–30	0.2–0.3	
Organic matter (%)	0.8–1.5	< 1.5	
Total nitrogen (ppm)	0.05–0.09	< 0.1	
Phosphorus (ppm)	~ 2.5	< 2.5	
Potassium (ppm)	80–360	80–200	

NOTE: Phosphorus and potassium concentrations are extractable amounts.

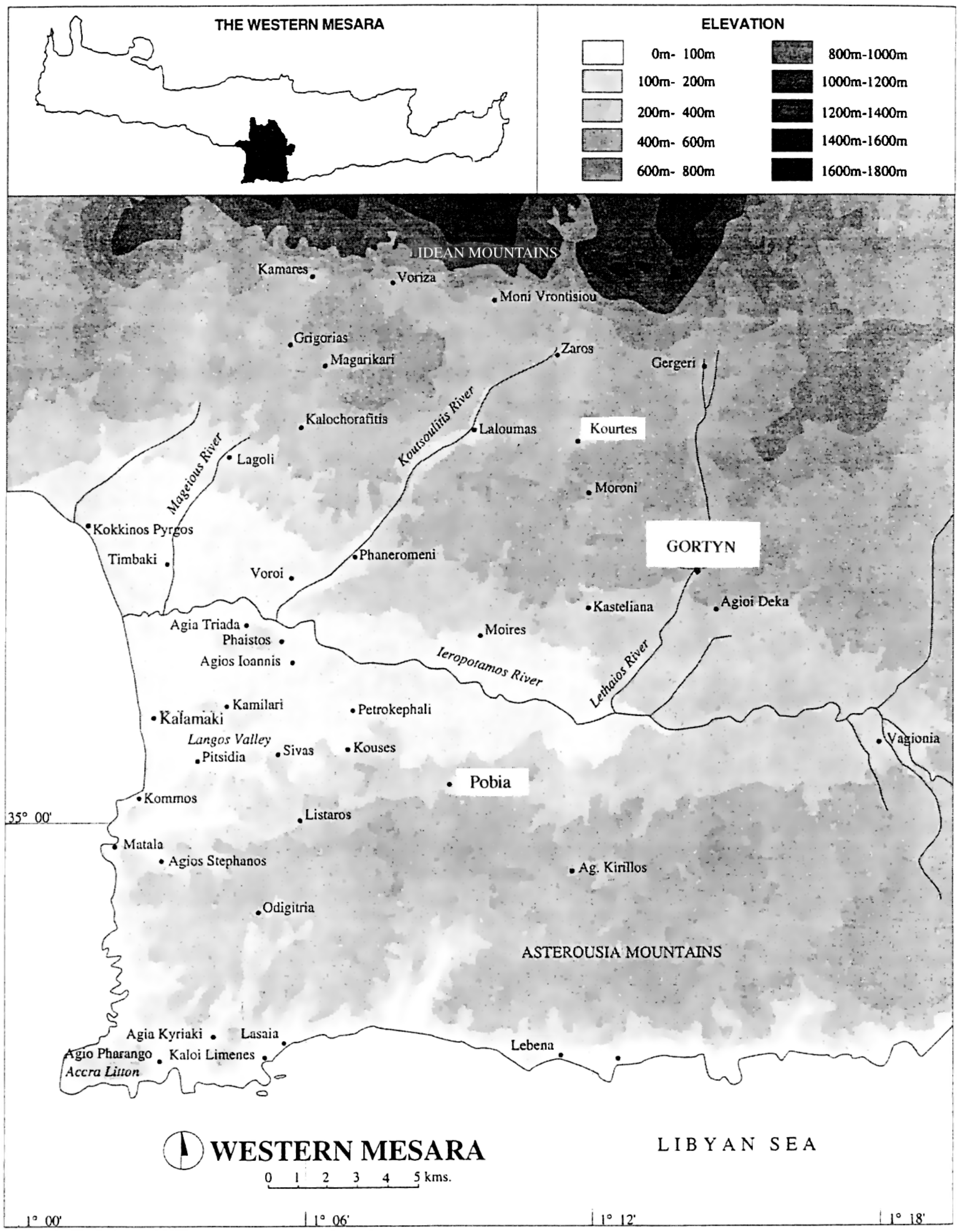


Figure 5.2. Topographic map of the Western Mesara

An important characteristic of a soil is its infiltration rate. Infiltration allows water to percolate through the soil. It depends on many factors, such as soil texture, plant cover, tillage practices, surface organic material, and the moisture content of the profile (Yassoglou 1960). It is important for plant growth, because high rates mean that soil moisture can be recharged rapidly, and there is less erosion and water loss through runoff. The rate of water infiltration through Mesara soils varies widely, slowing from an initial rate of 10–20 cm/hour to less than 2 cm/hour.

Water-holding capacity is also important for plant growth. Available water in a soil is the difference (in percent) between the total amount of water a soil can hold (its field capacity) and the permanent wilting point, a point beyond which plants cannot withdraw water. In the Mesara, the percentage of available water ranges from less than 5 to over 20% of field capacity. The higher the percentage of silt and clay, the more the available water. Entisols generally have more available water than Alfisols, another observation made by local people (chapter 6).

Soil fertility reflects the type of parent material. Entisols of the valley floor have relatively low, but greater, fertility than those of the upland slopes. Like upland Entisols, Alfisols are also low in fertility. Entisols contain little organic matter (0.8 to 1.5%), and, as this is an approximate measure of nitrogen (Brady 1984), soil fertility is marginal. They are also high in carbonates, between 15 and 30%, which increases the pH and, in turn, reduces the availability of nutrients (Barber 1984). Of the three major soil nutrients, nitrogen, phosphorus, and potassium, total nitrogen ranges from 500 to 900 ppm (parts per million) in surface layers, available phosphorus is 2.5 ppm, and available potassium varies from 80 to 360 ppm. It should be noted that these soil chemical properties may have been influenced by recent fertilization of fields where samples were collected. A "good" agricultural soil would have 1,000–2,000 ppm nitrogen, 25–30 ppm available phosphorus, and more than 250 ppm available potassium (T. Goh, Department of Soils, University of Manitoba, Winnipeg, Manitoba; D. Keyes, Norwest Soils Lab, Edmonton, Alberta, pers. comm.).

Cation exchange capacity (CEC), "the sum total of the exchangeable cations that a soil can absorb" (Brady 1984:175), is an overall measure of soil fertility. The more cations that can be exchanged, the higher the fertility. In the Mesara, values range from about 4 cmol (a cation exchange capacity value) per kg of soil found in an Entisol with a loamy texture to 25 cmol in two samples of clay-textured Entisols. Finer-textured soils usually have a higher exchange capacity than sandy soils. Soils in semiarid parts of the U.S. possess CEC values of 20–25 cmol per kg of soil (Brady 1984).

Within each soil order, dominant clay minerals may influence soil fertility, in that some clay minerals, including smectite and montmorillonite, have a much higher capacity to absorb cations than others, such as illite and kaolinite (Brady 1984). Few studies of clay minerals have been made of soils in the Mesara, but several measurements reported in Gifford (1995), Parsons and Gifford (1995), and Pye (1992) show that the smectite group of clay minerals is more common and abundant than kaolinite.

Alfisols are less fertile than Entisols. Organic matter content is usually lower than 1.5% at the surface. Total nitrogen is usually below 1,000 ppm, available phosphorus less than 2.5 ppm, and available potassium from 80 to 200 ppm. These soils are also often high in calcium carbonates. They tend to be deep soils and present no serious limitations to crop production, but they are subject to erosion where slopes are steep, and their relatively coarse texture leads to low soil moisture during the dry season.

Among the eighty-nine soil samples collected in our botanical survey, correlations of soil texture and the other soil variables were analyzed and showed that texture is positively correlated with carbonates and negatively with pH (appendix B, tables B.2, B.3). Carbonates are negatively, and organic matter positively, correlated with nitrogen, phosphorus, and potassium. This means that soils rich in carbonates are generally low in nutrients.

NORTHERN UPLANDS

Geology and Landforms. The Mesara Plain is bordered on the north by low hills and valleys underlain by sedimentary and metamorphic rocks and alluvium (Galeos 1984). A northeast-southwest band of late Tertiary marls and limestones continues across much of the northern uplands. On its southern flanks are thick deposits of deeply dissected sloping alluvial fans laid down during the Pliocene and Pleistocene. These fans are composed of brick-red sand and gravel and cover an extensive area north of Voroi and Phaneromeni. They resemble fingers of an outstretched hand, the spaces between the fingers being deep, steep-sided ravines. To the north, at higher elevations, the hills are made up of assorted metamorphic flysch and gneiss with patches of detrital limestone.

Climate. Temperatures are cooler in the northern uplands than on the plain. On the north side of the Idaean Mountains, at an elevation of 700 m and a rainfall of 925 mm (Zohary and Orshan 1965), mean temperatures are 7.1° C in January and 22.5° C in August.

Annual rainfall in the northern uplands averages from 500 to 1,000 mm per year; the higher the elevation, the more the rainfall. At an elevation of 520 m, Voriza receives 1,000 mm. Higher elevations are snow-covered during winter (Zohary and Orshan 1965). Annual evaporation at Gergeri (elevation 450 m) is about twice that of the annual precipitation (Vallianos et al. 1985). Rainfall is greater in the north but slightly less variable from year to year than on the plain. At Zaros, the coefficient of variation for annual rainfall is 23% (appendix B, table B.1). Monthly variation is highest during spring, summer, and fall.

Streams and Springs. The northern uplands are drained by rivers and streams that flow in narrow, steep-sided valleys from the northeast to southwest. Rainfall and snowmelt from the Idaean Mountains combine with springs to provide ample supplies of water over much of the north. The two most important tributaries of the Ieropotamos originate in the north: the Koutsoulitis, which comes from springs at Zaros and flows past Phaneromeni, and the Lithaios River, which arises from springs at Gergeri (Vallianos et al. 1985). Both tributaries share a similar annual rhythm of flow, with peaks in February and lows in August. The Koutsoulitis drains 100 km^2, the Lithaios 42 km^2 (mostly outside our study area). Their annual discharges are about one-third to one-half that of the Ieropotamos. The Mageious River is a minor tributary that rises in the foothills and joins the Ieropotamos near Tymbaki.

Springs in the northern uplands can be found at the interface of impermeable rocks and overlying permeable alluvium or limestone. They are concentrated at or near the upper foothills near the base of the Idaean Mountains. Those at Zaros and Gergeri are the largest. From 1970 and 1980, the average flow of the Zaros spring was 313,000 to 342,000 l per hour (5,220 to 5,700 l per minute), while that at Gergeri was between 133,000 and 146,000 l per hour (2,220 to 2940 l per minute) (Vallianos et al. 1985). There is a smaller spring at the Moni Vrontisiou with 10,800 l per hour (180 l per minute), and groups of minor springs around Grigorias, near Laloumas, and Phaneromeni, with 110 to 1,800 l per hour (1.8 to 30 l per minute).

Soils. Although not included on the maps of Yassoglou 1960), soils on the uplands have been depicted on a general map of Crete (Zvorykin n.d., reproduced in Allbaugh 1953). They resemble Entisols and Alfisols found on the plain; Alfisols are again characteristic of deeply eroded alluvial fans, while Entisols characterize fill-in alluvial valleys and the slopes of limestone and marl ridges. Samples of yellow soils near Zaros and red soils near Kamares were both silty loams with 53–67% silt, 4–35% sand, and small amounts of clay (Pye 1992).

SOUTHERN UPLANDS AND SOUTH COAST

Geology and Landforms. The Asterousia Mountains form the southern uplands, an area of rugged topography and high relief with narrow, steep-sided, V-shaped valleys incised deeply into rocky uplands (figure 5.2). Major rock formations include a 4–6-km-wide strip of marl and patches of limestone extending from the south coast 6 km north to Matala (Galeos 1985). East of this strip is a series of east-west zones beginning at the south coast, the first being a zone of metamorphic gneiss, 1–3 km wide followed to the north by belts of flysch and limestone.

Climate. The southern uplands receive much less precipitation than the northern uplands. At two stations, Vagionia (elev. 190 m), and Agios Kirillos (elev. 420 m), annual rainfall (1970–1980) averaged 550 mm. Annual and seasonal variability in rainfall at Agios Kirillos are comparable to those at stations on the plain (appendix B, table B.1).

Streams and Springs. Drainage is through steep-sided valleys a few kilometers long that follow a predominantly northwest to southeast orientation. The longest (12 km) is the Agio Pharango, which originates beyond the monastery of Odigitria. These streams are active only during the winter rainy season. In the far north near Matala and Listaros, the land drains northward to the Mesara Plain.

There are few springs and wells in the southern uplands. One spring at Agios Kyriaki had a measured flow at the end of summer, when groundwater supplies would be at their lowest, of 480 l per hour (8 l per minute) (Doe and Holmes 1977).

Soils. Soils are depicted on a general map of Crete (Zvorykin n.d., reproduced in Allbaugh 1953). Most soils in the south appear to be Entisols and Alfisols. Those on plateaus and on the tops of ridges are thin to nonexistent, although on lower slopes and stream terraces there is some soil cover. Based on moisture and fertility, the best soils are those on river terraces (Bintliff 1977b).

SUMMARY

Limestones and marls predominate throughout the Western Mesara, although the flat plain contrasts with the hills of the northern and southern uplands. Rainfall increases with altitude and, in the foothills, it is twice that at sea level (1,000 vs. 500 mm/year). The northern foothills and uplands also receive runoff from snowmelt in the Idaean Mountains and have the advantage of the occurrence of numerous springs, notably those at Zaros.

The major stream is the Ieropotamos River, which rises in the eastern portion of the valley. It maintains its flow year-round, although its minor tributaries to the north usually dry up with the end of winter rains. Water is scarce in the rugged limestone hills of the Asterousia, where springs are few and there are no permanent streams.

Soils of large areas on the plain and parts of the northern uplands lie atop thick deposits of alluvium, while such soils in the southern uplands are confined to a few narrow valleys. Everywhere, the soil mantle on steep slopes has been partially or completely washed away, leaving exposed bedrock. This is especially true of the south, where there is little soil cover on the dry slopes and plateaus. Climate and soils on the plain and northern uplands are thus more favorable for agriculture than those in the southern uplands.

LAND CAPABILITY FOR AGRICULTURE

Agricultural decisions are a product of both natural and cultural factors. On the one hand, climate, geology, landforms, and soils all contribute to the capability of land to produce crops, grazing for domestic animals, and other purposes. On the other hand, population, settlement pattern, economy, technology, ideology, and social and political organization may play a role in land use decisions. Rainfall in an area may be sufficient to produce wheat (*Triticum*[1] spp.) or olives (*Olea europaea*), but the choice of which crop is to be produced may be based upon economic or other factors.

Traditional agriculture in the Western Mesara included annual crops such as cereals (wheat, barley [*Hordeum vulgare*], and oats [*Avena sativa*]), pulses (broad beans [*Vicia faba*]), peas (*Pisum* spp.), chickpeas (*Cicer arietinum*), vetches (*Vicia* spp.), and lentils (*Lens culinaris*), as well as perennials such as olives, figs (*Ficus carica*), and grapes (*Vitis vinifera*) (appendix B, tables B.4–7). Only some of the soils of the Mesara have the capability to produce high yields of such crops.

Yassoglou (1960) applied land capability classes to the soils of the central Mesara. He based them on the U.S. Bureau of Reclamation classification (for example, Standing Rock Sioux Tribe 1997) of a 5-part scale from 1 to 6 (Class V is omitted in this application of the classification, because no lands in the region meet Class V conditions). Soil texture, drainage, slope, and erosion were assigned numbers, with I being the most favorable for agriculture and VI being the least favorable (table 5.1; see appendix A for details). Land capability Class I includes deep, well-drained soils of loamy texture on flat land with little or no erosion. Based on these criteria, the best lands for agriculture lie on the margins of the Ieropotamos River and along its major tributary, the Koutsoulitis floodplain, as well as in the flat-to-gently rolling uplands, particularly around Kamilari, Agios Ioannis, Sivas, Petrokephali, and Voroi. At the other extreme, poor soils are the shallow Entisols with major erosion occurring along the upper flanks of marl ridges, and Alfisols (table 5.1).

Another way to classify Mediterranean soils is to assess their suitability for a particular group of crops (Verheye 1973). Verheye's classification includes some of the above characteristics (soil texture, depth, drainage, and slope) but adds calcium carbonate status, salinity, profile development, and weathering stage of parent material (details in appendix A). We calculated Verheye's suitability index for annual crops (wheat, barley, pulses) and perennial crops (olives, grapes, figs), multiplying the scores of ten factors. Each factor is given a range of values. For example, soil texture ranges from a low of 25 for sandy soils with gravel to a high of 105 for silty clay loam. Low concentrations of calcium carbonate are preferred; soils with less than 10% $CaCO_3$ score 1, and those with over 50% $CaCO_3$ score 0.4. These two factors multiplied together result in a capability score of 10 for the sandy (carbonate-rich) soil and 105 for the loamy soil (with little calcium carbonate). The eight other factors are similarly multiplied to produce a total for a particular soil type. A score of 100 or more indicates a suitable soil for annual or perennial crops. Deep soils between Kamilari and Agios Ioannis score highly for all crops, but highly eroded soils on the Pitsidia to Matala ridge have low scores for both groups of crops (table 5.1). Vines and tree crops do not grow well on poorly drained and/or shallow soils.

Verheye (1973) and others add important details about soil suitability for certain crops, such as those able to tolerate moderate amounts of salinity (for example, barley), and those that are sensitive to salinity (for example, pulses). Barley is also more productive than wheat, except on moderately deep soils where both have about the same yield (appendix B, table B.5).

Some soils with low land capability scores can be improved through agricultural practices that improve soil fertility and soil moisture and conserve soils on slopes.

Improving Soil Fertility and Soil Moisture. The soils of the Western Mesara are low in fertility but, more importantly, lack soil moisture (Yassoglou 1960). In addition, annual variability in rainfall, particularly on the plain and in the southern uplands, and the risk of winter frosts in the northern uplands may reduce crop yields. Given the low nutrient status of these soils, and lack of rainfall, Yassoglou (1960) recommends both fertilization and irrigation for crop improvement.

Traditionally, farmers on Crete have applied various fertilizers, such as animal manure, to enhance soil fertility; however, the use of chemical fertilizers has increased since World War I (Allbaugh 1953). Large and sometimes dramatic increases in crop production have been reported for Crete and elsewhere in the Mediterranean as a result of fertilizer application, particularly of nitrogen and phosphorus. For example, wheat fields treated with 58 kg nitrogen and 29 kg phosphate (P_2O_5) per ha produced 1.5 times the yield of unfertilized fields in Crete (United Nations Food and Agriculture Organization 1947). Unfortunately, excessive use of fertilizers results in water pollution, because residues wash into streams (Newman 1993).

Pulses, grapes, and olives also respond favorably to fertilizers (appendix B, tables B.6, B.7). Interviews with farmers across Crete in a study of agriculture (Allbaugh 1953: unpublished Tables 249, 253, 259 in Rockefeller Archives) showed that pulse yields increased 1.4 times, grapes 1.2 to 1.8 times, and olives 1.2 times with the application of fertilizer.

Two other means of increasing fertility include fallowing and crop rotation involving pulses. Wheat production may more than double after fallow, or after a crop of lentils or peas (Saxena 1988). If wheat follows broad beans, yields can more than triple. These increases seem unusually high compared with North American and western European trials, where increases are between 10 to 50% (T. Warkentin, pers. comm.). Pulses vary widely in their capacity for nitrogen fixation, with chickpeas able to fix about half that of peas. Nitrogen fixation of broad beans and lentils lies between the two.

Soil moisture is perhaps the most severe environmental constraint for crop production. It operates in concert with soil nutrients (Bolton 1981). Adequate or improved soil moisture enhances crop response to nitrogen fertilizers. Apart from irrigation, soil moisture can be improved by weeding and tillage practices. Water stored in the soil during wet years can be a boon to crops during a dry year. Soil water storage is crucial because of year-to-year variations in rainfall typical of much of the Western

Mesara. This is where deep, fine-textured soils have a distinct advantage over shallow, coarse-textured soils. In Mediterranean environments, most soil water is lost through growing plants in a process known as transpiration (Turner and Begg 1981). This type of loss can be substantially reduced by weeding. Weed control is especially important early in the growing season, when water is most needed by the crop. Weeding also reduces competition for nutrients, light, and space.

Weeds can be reduced by tilling several times during the growing season. Tilling also improves soil moisture, although it may have negative effects (Turner and Begg 1981; T. Warkentin, pers. comm.). On the positive side, tilling can increase rainfall infiltration, which results in less runoff and erosion. On the negative side, tillage dries out the soil by removing plant cover and disturbing the surface and increases soil evaporation and the risk of erosion during heavy rains. Tillage may also compact the subsoil and hence reduce infiltration of water and root penetration. The depth of tillage may vary depending upon the crop. For example, soil in vineyards may be much more deeply disturbed (up to 70 cm) than in a cereal field (S. Aschenbrenner, pers. comm.)

Soil Management through Terracing. Because much of the land is hilly and subject to erosion, the construction of terraces is important for soil management throughout Greece (Rackham and Moody 1992; Parsons and Gifford 1995; chapter 6). Terraces create strips of arable land on slopes that would otherwise be too steep to cultivate. The pockets of soil behind a terrace wall are deeper than the surrounding soil and thus can absorb and hold more water than shallow soils. This results in less water loss through runoff and less erosion. However, terraces must be periodically maintained so that soil behind them does not erode.

On the plain, terraces are today found on the steeper slopes of all the major marl ridges: between Phaistos and Agia Triada, between Kamilari and Kalamaki, between Pitsidia and Matala, in the Matala Valley, and elsewhere.

Crop Sensitivity to Climatic Variations, Pests, and Diseases. Despite attempts to improve soil conditions, crops may be damaged or destroyed due to extreme weather, such as frosts, a succession of dry years, or violent storms. Pests and diseases may also result in crop failures.

The risk of crop loss through frost may be significant, particularly in higher parts of the northern uplands where minimum winter temperatures are near freezing. An example from northern Syria regarding the effects of severe frost on legume yields is given by Saxena (1988). The growing seasons of 1980–1981 and 1981–1982 varied little in terms of seasonal precipitation, but a severe frost in 1981–1982 reduced yields of legumes by 15 to more than 60%. Peas were least affected, chickpeas the most.

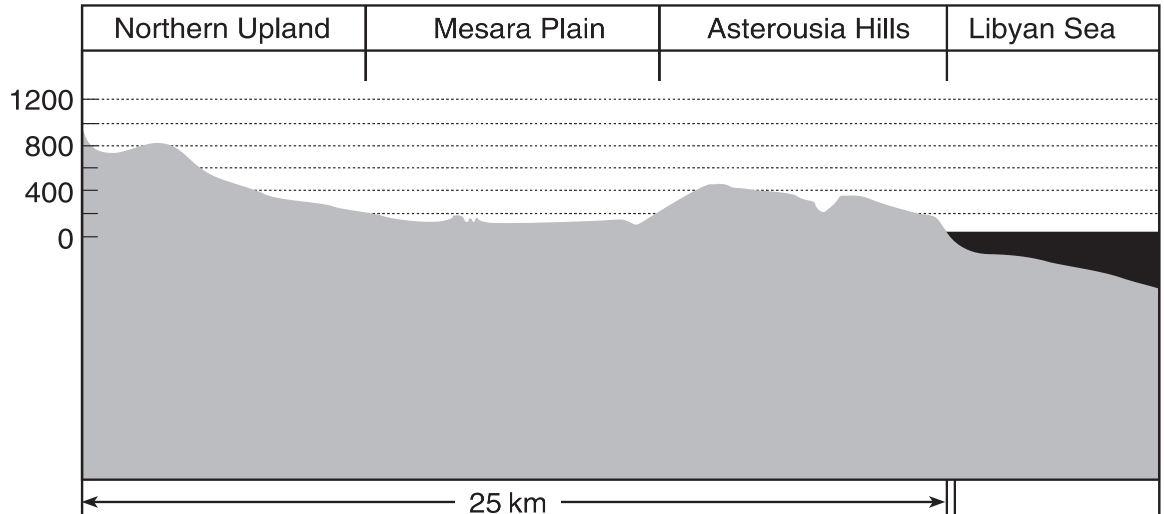
Yields may also be reduced by diseases, such as rusts on wheat and mildew on grapes, and pests, like the olive fly (*Dacus*), which ravages olive crops (Allbaugh 1953: unpublished Table 268, Rockefeller Archives; Forbes 1992).

Although agriculture dominates land use throughout the Mesara (appendix B, table B.8), wild plants are a valuable resource. Remnants of natural vegetation occur in lowland marshes, along streams, and on steep slopes. Shrublands are found throughout the rugged southern uplands. In order to assess the role of the native vegetation, we undertook a botanical survey.

PART II: FLORA, PLANT COMMUNITIES, AND HUMAN IMPACTS ON VEGETATION

A Botanical Journey

The diversity of the Cretan landscape can be appreciated by journeying across the Mesara from the shores of the Libyan Sea, on the south coast, to the foothills of the Idaean Mountains, one of the four massifs that comprise the rugged backbone of the island (figure 5.2). This 25-km journey reveals striking changes in landforms, soils, vegetation, and land use (figure 5.3). The landscape also changes over the seasons. Our descriptions apply to spring and early summer, from late April till early June, after the winter



Northern Upland	Mesara Plain	Asterousia Hills	
Limestones and marls	Holocene alluvium Limestone and marl ridges	Limestones, igneous and metamorphic rocks	GEOLOGY
Slopes, deeply eroded valleys	Flat to slightly undulating floodplain with steep ridges	Plateaus, deeply eroded narrow valleys	LANDFORMS
Springs, plentiful soil moisture	Ieropotamos River and adjacent marshes, plentiful soil moisture on floodplain	Few springs, dry uplands with little soil moisture	HYDROLOGY
Tree groves and shrublands. Pine, evergreen, deciduous oaks, maple, myrtle, in tree groves	Floodplain forest, marsh, meadow; shrublands on slopes Plane and willow trees along the river, marshes with grasses, sedges and rushes Shrublands with thyme, spiny broom, sage, spiny burnet and other shrubs with scattered grasses and other herbs	Open shrublands on uplands and slopes, scattered trees in valleys	VEGETATION
Olive groves, cereals, vines	Olive, citrus groves, cereals, vines; grazing on meadows	Grazing on shrublands, cereals, olive groves	LAND USE

FIGURE 5.3. Schematic profile along south–north transect in the Western Mesara

rains have ceased, but before the summer sun has completely dried the vegetation.

Our botanical survey (table 5.2) is based on extensive plant collections made throughout the area during April to July over several years. The abundance of each tree, shrub, and herb species in plant communities found at various sampling locations was assessed. Soil samples were collected at some of the locations and assayed for their texture and chemical characteristics. Data on plant species composition, slope, elevation, soils, and other features were analyzed using several statistical techniques in order to reveal similarities among sampling locations and relationships among species. A literature review supplemented by a few observations and interviews helped us understand the contemporary uses of plants. Observations were also made on the effects of fire and animal grazing on the vegetation. Our study of the ancient vegetation and agriculture involved a review of paleobotanical evidence. Detailed methods of our investigation are contained in appendixes A and B.

TABLE 5.2. Vascular plant families, genera, species, subspecies, and varieties of the Western Mesara botanical survey

Family	Genera	Species	Subspecies	Varieties
Fern allies:				
Selaginellaceae	1	1		
Conifers:				
Pinaceae	1	2		
Angiosperms:				
Acanthaceae	1	1		
Aceraceae	1	1		
Adiantaceae	1	1		
Aizoaceae	1	1		
Amaranthaceae	1	2		
Anacardiaceae	1	2		
Apocynaceae	1	1		
Araceae	3	3		
Asclepiadaceae	1	1		
Berberidaceae	1	1		
Boraginaceae	7	10		
Campanulaceae	5	7		
Capparaceae	1	1	1	
Caprifoliaceae	1	1		
Caryophyllaceae	8	17		
Chenopodiaceae	3	4		
Cistaceae	4	7	1	
Compositae	43	67	12	
Convolvulaceae	2	3	1	
Crassulaceae	3	5		
Cruciferae	13	14	1	
Cucurbitaceae	1	1		
Cupressaceae	2	3	1	
Cyperaceae	4	11	2	
Dioscoreaceae	1	1		
Dipsacaceae	3	4	1	
Equisetaceae	1	2		
Ericaceae	2	3		
Euphorbiaceae	4	10		
Fagaceae	1	4		
Frankeniaceae	1	1		
Gentianaceae	2	4	1	
Geraniaceae	2	10	1	
Globulariaceae	1	1		

TABLE 5.2. Vascular plant families, genera, species, subspecies, and varieties of the Western Mesara botanical survey *(continued)*

Family	Genera	Species	Subspecies	Varieties
Gramineae	47	74	4	1
Guttiferae	1	3		
Iridaceae	4	6		
Juglandaceae	1	1		
Juncaceae	1	3		
Labiatae	18	32	1	1
Leguminosae	29	75	4	2
Liliaceae	10	16		
Linaceae	1	2	2	
Lythraceae	1	1		
Malvaceae	2	5		1
Moraceae	1	1		
Myrtaceae	1	1		
Oleaceae	2	2		
Orchidaceae	6	21	8	
Orobanchaceae	1	3		
Oxalidaceae	1	1		
Palmae	1	1		
Papaveraceae	5	7		
Plantaginaceae	1	6	1	
Platanaceae	1	1		
Plumbaginaceae	1	4	1	
Polygalaceae	1	1		
Polygonaceae	3	8	2	
Primulaceae	3	3		
Punicaceae	1	1		
Ranunculaceae	6	10	3	
Resedaceae	1	1		
Rhamnaceae	1	2	2	
Rosaceae	8	10		
Rubiaceae	6	13		
Rutaceae	1	1		
Salicaceae	1	1		
Santalaceae	2	2		
Scrophulariaceae	10	14	1	
Solanaceae	4	6	1	
Styracaceae	1	1		
Tamariaceae	1	1		
Typhaceae	1	1		

Continued on next page

TABLE 5.2. Vascular plant families, genera, species, subspecies, and varieties of the Western Mesara botanical survey *(continued)*

Family	Genera	Species	Subspecies	Varieties
Tamariaceae	1	1		
Thymelaeaceae	2	2		
Typhaceae	1	1		
Umbelliferae	20	25	1	
Urticaceae	1	1		
Valerianaceae	3	5	1	
Verbenaceae	1	1		
Vitaceae	1	1		
Zygophyllaceae	1	1		

The journey begins (figure 5.2) on the rugged south coast along a narrow road that runs from the small fishing village of Kaloi Limenes eastward to Lebena (plate 5.1). The road is bordered on the south by steep slopes and sandy beaches, where tamarisk trees (*Tamarix parviflora*) have been planted to provide shade along the beach. Traveling east for a few kilometers, the road crosses the mouths of a number of narrow valleys that have eroded into the hills, made up of Jurassic gneisses and Upper Cretaceous basalts. Above the sea, the rocky slopes are mostly bare but dotted with shrubs and patches of herbs and grasses. One such slope is less than 2 km from Kaloi Limenes, near ancient Lasaia, where shrubs such as spiny broom (*Calicotome villosa*), with densely prickly stems and golden flowers, and Jerusalem sage (*Phlomis* spp.), with white woolly leaves and yellow flowers, are intermingled with low rounded hummocks of thorny burnet (*Sarcopoterium spinosum*). Together these provide a scattered ground cover of less than 25%. There are also some tufted grasses, such as *Hyparrhenia hirta* and *Stipa* spp., and other small herbs. Flocks of sheep graze on the slopes and on the coastal plain, where farmers cultivate olive trees, small plots of cereals, and irrigated fields of vegetables and melons. The narrow valleys are marked by dense thickets of a gray-leaved shrubby atriplex (*Atriplex halimus*), spiny broom, and lentisc (*Pistacia lentiscus*), a dark green multibranched evergreen aromatic shrub.

Our progress northward begins near Kaloi Limenes, where the coast road crosses an intermittent stream whose boulder-strewn bed provides access by foot to the Asterousia Mountains that rise 500 m above sea level. At the mouth of the stream, the valley floor is covered with fields of barley and oats as well as olive orchards. The streambed is bordered by evergreen shrubs, primarily lentisc and wild olive (*Olea europaea* subsp. *oleaster*), the latter with small oval leaves and thorny branches, and an occasional carob tree (*Ceratonia siliqua*), with pinnate leaves and large beanlike pods. Further upstream, plant cover on the dry rocky slopes is predominantly scattered low shrubs, some in bloom. Clumps of the densely branched and spiny genista (*Genista acanthoclada*) with small yellow flowers, Jerusalem sage, and the short, spreading undershrub phagnalon (*Phagnalon graecum*), with solitary brownish flower heads and softly hairy stems and leaves, contrast with pink rock roses (*Cistus* spp.) and low-growing compact shrubs of thyme (*Coridothymus capitatus*), bedecked with purple blossoms. Signs of animal grazing are everywhere, with innumerable trails threading among the vegetation. Herb cover is sparse, but the broad, strap-shaped leaves of the sea squill (*Urginea maritima*) are prominent. Some scree slopes support a few shrubs of lentisc and wild olive, while others are sparsely covered with small spiny bushes of blue-flowered lithodora (*Lithodora hispidula*).

At the head of this small valley we join the dirt road from Kaloi Limenes before it descends northward into the steep-sided Agio Pharango Valley. Unlike the valleys to the east, the Agio Pharango is cut into Tertiary limestones and schists. The vegetation along the Agio Pharango (plate 5.2) is similar to that just described, with low, scattered bushes intersected by numerous animal trails. A particularly showy shrub is the endemic Cretan ebenus (*Ebenus cretica*), which has drooping branches, gray downy leaves, and erect spikes of rose-pink flowers.

The narrow road borders the streambed for several kilometers as it winds northward to the monastery of Odigitria. Built on a promontory, the monastery has a splendid view of the rugged valley to the south. Its buildings are surrounded by small grainfields, well-kept olive groves, cypress (*Cupressus sempervirens*), and some large carob trees. The fields give way to rocky shrublands as the road continues northward 3 km to Listaros. Along the way is a plantation of pine (*Pinus halepensis* subsp. *brutia*).

The small village of Listaros is perched on the southern edge of the Mesara Valley. The gently rolling topography is in marked contrast with the rugged Asterousia Mountains. Here, reddish soils overlie schists, gneisses, and other metamorphic rocks of Tertiary age.

In the 2 km between Listaros and Sivas, olive groves and grainfields reflect a predominantly agricultural landscape. Compared with the southern uplands, the remnants of wild vegetation appear more luxuriant. Slopes too steep to cultivate are covered by thyme, Jerusalem sage, sage (*Salvia fruticosa*), and other aromatic low shrubs and herbs. Among the herbs are the tall spikes of pale pink flowers and the rush-like leaves of asphodel (*Asphodelus aestivus*), caraway (*Carum carvi*) with umbels of white flowers and feathery leaves, and densely tufted bulbous barley (*Hordeum bulbosum*), readily identified by the swollen "bulbs" at the base of the stem. Wild pear trees (*Pyrus spinosa*) with gnarled trunks also occur.

Just before Sivas the road crosses an intermittent stream. It is clearly marked by the tall spreading shrubs of oleander (*Nerium oleander*), with showy, large, pink flowers; the aromatic chaste tree (*Vitex agnus-castus*), with dark green palmate leaves and long spikes of pale lilac flowers, together with thickets of brambles (*Rubus sanctus*). These shrubs and a variety of herbs favor such damp places. Beyond Sivas, cultivation characterizes the valley floor and spreads into the surrounding hills. Field margins are colonized by shrubby vegetation interspersed with a sparse cover of herbs and grasses. Common are thyme and thymelaea (*Thymelaea hirsuta*), a multibranched shrub with white woolly branches, rather fleshy scale-like leaves, and clusters of very small yellowish flowers.

A kilometer north of Sivas, we descend into the broad floodplain of the Ieropotamos River, where there are lush orchards of citrus fruits, pomegranates (*Punica granatum*), loquats (*Eriobotrya japonica*), and irrigated fields with market garden vegetables. The river course is marked by poplar (*Populus nigra*) and plane trees (*Platanus orientalis*), oleanders, brambles, and dense stands of the tall, bamboo-like giant reed (*Arundo donax*) (plate 5.3).

The floodplain has extensive marshes and wet meadows between Petrokephali and Phaistos. A number of the water channels and ditches are bordered by giant reeds, others by the more slender reed grass (*Phragmites australis*), with attractive feathery plumes. The majority of the wet meadow vegetation consists of robust tussocks of imperata (*Imperata cylindrica*), with conspicuous long shining white inflorescences, clumps of canary grass (*Phalaris minor*), rushes, and sedges (*Carex* spp.), and a number of herbs. Among the latter are pale green glandular spikes of yellow bartsia (*Parentuciella viscosa*), white rounded heads of water dropwort (*Oenanthe pimpinelloides*), and purple spikes of loosestrife (*Lythrum hyssopifolia*).

On its way westward to the coast, the Ieropotamos River flows past the Phaistos ridge, which rises 100 m above the floodplain. Native vegetation on this and other steep-sided ridges is diverse and composed of many of the familiar shrubs found throughout the Mesara. These include wild olive, spiny broom, thymelaea, thyme, Jerusalem sage, phagnalon, and elichrysum (*Helichrysum conglobatum*) a short, woolly perennial with bright everlasting yellow flowers.

The Ieropotamos floodplain is flanked on the north by uplands leading to the Idaean

Mountains. About 5 km beyond Moires, a side road climbs past olive groves, fields, and shrublands to the northern uplands. The bedrock of the uplands consists of Quaternary alluvium as well as Miocene and Pliocene marls. At an elevation of about 400 m, near the village of Moroni, scattered trees of deciduous oak (*Quercus pubescens*) are intermingled with a few evergreen Kermes oaks (*Q. coccifera*) (plate 5.4). Several of the trunks show scars where branches have been removed. In the same community are rock roses, Jerusalem sage, thyme, spiny burnet (plate 5.5), wild olive, phagnalon, elichrysum, wild pear, and St. John's wort (*Hypericum empetrifolium*), a low shrub with narrow leaves and numerous small yellow flowers.

Our 25 km journey ends at a 600 m elevation near the steep scree slopes of the foothills of the Idaean massif, which rises to some 2,000 m. The vegetation is patchy, due more to the steepness of the slopes and the lack of soil accumulation than to low rainfall. On one southeast-facing 35–40° slope, the rocky scree supports scattered pine trees joined in places by cypress, Kermes oak, and domesticated olive. The shrub cover includes Jerusalem sage, spiny broom, and butcher's broom (*Ruscus aculeatus*), a dark green, evergreen shrub that may grow to almost a meter in height. It has flattened, rigid, spiny, pointed branches that function like leaves.

The Flora

> "Mediterranean ecosystems are very heterogeneous and show a relatively high species diversity." (di Castri 1981:35)

The flora of Crete, as elsewhere in the Mediterranean basin, originated from both temperate and tropical regions some eighty million years ago in the late Cretaceous (Axelrod 1973; di Castri 1981). Since then, environmental conditions, particularly summer drought, fire, and grazing, resulted in a flora composed of a large number of spring-flowering annuals, herbaceous perennials with underground storage organs, and shrubs resistant to drought and grazing.

The flora of Crete is rich for its area of only 8,700 km^2. Chilton and Turland (2002) report that its flora has over 1,700 species. The reasons for this floral diversity include the variety of habitats, long-term isolation, little or no glaciation, many subsequent introductions, and the large number of annuals. In addition, some widespread habitats are relatively poor in soil moisture and nutrients, and such places tend to have the greatest plant diversity within a region.

First, there is substantial habitat diversity in Crete. Rugged mountains up to 2,456 m high (Mount Ida) form an arc along its east-west axis, and steep gorges, numerous valleys, upland plains, and lowlands contribute to the diversified topography. The geology, consisting of Jurassic, Cretaceous, and Eocene limestone and dolomite, metamorphic rocks, and Quaternary alluvial deposits, has produced a variety of soils.

Second, five million years ago Crete was separated from the mainland for the last time—initially as a group of islands corresponding with its high mountain ranges. This separation occurred when sea levels rose and flooded the Mediterranean basin. In the Pleistocene (beginning 1.6 million years ago) the seas retreated and a single island emerged (Turland, Chilton, and Press 1993). This isolation has contributed to its diversified flora. Some species have gradually evolved; others have hybridized or developed along different lines. As a result, 9% (Barclay 1986; Turland, Chilton, and Press 1993) of the flora is endemic and restricted to the island.

Third, unlike northern Europe, where glaciation eliminated many species, lowland Crete escaped glaciation. This allowed a number of species to survive (di Castri 1981). Fourth, since the Neolithic, Crete's flora has been subject to human influence and enriched by numerous crops, ornamentals, and weeds introduced from elsewhere. Fifth, as in other Mediterranean regions, Crete has a large number of annuals. Annuals and perennials can effectively coexist, because the season of growth for perennials begins earlier and ends later than that of annuals (Mooney and Dunn 1970).

It is hypothesized that habitats poor in soil moisture and nutrients, such as those on eroded slopes, allow a greater number of species to survive than those with more moisture and soil nutrients (Grime 1979; Tilman 1982, 1986). The relationships, however, between species richness and environmental factors such as rainfall and temperature may not be simple (Austin 1980).

Almost 70% of Crete's flora has a general Mediterranean distribution. The island lies at the southern and western limits of many species. Indeed, 34% of its flora has eastern affinities (Zohary and Orshan 1965). The flora also has an unusually high number of endemics (139), which occur mainly on calcareous cliffs and treeless mountain tops (Barclay 1986). Some of the endemics are genera that have Anatolian affinities or affinities with mainland Greece. Many of the genera are represented by only one species. Half the endemics grow on rocks, on rocky outcrops, or along the seashore.

The flora of the Western Mesara is also rich and diverse. We recorded nearly six hundred species, over a third of the island's flora in the study area (appendix B, table B.9). This is an underestimate of the total, because our collections were made only between April and July. They did not include many species that flower during the late fall and winter, such as those belonging to the amaryllis (Amaryllidaceae), iris (Iridaceae), and lily (Liliaceae) families. Furthermore, there are important collections that were made in the Mesara by Rechinger (1943), Greuter (1974), and others (for example, Turland, Chilton, and Press 1993). These would doubtless add eighty species or more to the list.

We found representatives from eighty-four plant families (table 5.2). Six families—legume (Leguminosae/Fabaceae), grass (Gramineae/Poaceae), daisy (Compositae/Asteraceae), mint (Labiatae/Lamiaceae), parsley (Umbelliferae/Apiaceae), and orchid (Orchidaceae)—made up over half the total number of species. Thirty-three families had only one species.

The flora changes dramatically with the seasons. Rains between late autumn and spring stimulate the growth of annuals and perennials, which flower from March to May. By June, when most of the cultivated fields have been harvested, this lush growth has disappeared. Deciduous plants have shed their leaves, annuals have gone to seed, and many perennials are resting under the ground as bulbs, corms, or rhizomes. Evergreen shrubs, grasses, and a few summer-flowering species are all that persist in the sun-baked landscape.

Plant Communities

> "Community—a general term applied to any grouping of populations of plants and animals found living together in a particular environment." (Allaby 1994:90)
>
> "Habitat—the living place of a community, characterized by its physical or biotic properties." (Allaby 1994:187)

Most plant communities have a number of layers or strata, ranging from the overstory to the ground layer. Each stratum has its own characteristics and modifies the conditions below it. The taller species that make up the overstory are the so-called dominants. They receive the most light, produce the most biomass, and use the bulk of the soil moisture and nutrients. They are also subject to the most wind action. When trees form the overstory, they characterize the community as forest or woodland.

Tree saplings and shrubs of various heights, herbs, mosses, and lichens form successive layers beneath the tree canopy. Species in these lower layers are adapted to the conditions, such as shade, in their stratum. They are usually smaller in size and have larger, thinner "shade" leaves.

It is usual to describe plant communities in terms of the main layers: trees, shrubs, herbs (which include grasses, sedges, rushes, and broad-leaved herbs), and the ground layer (mosses and lichens). When vegetation is sampled, the various layers are usually sampled separately, although the herbs and ground layer may be combined.

The habitats of the Western Mesara range from wind-blown sandy beaches to subalpine slopes and from wet floodplains to arid rocky hills. This natural diversity joins with human influences to form a mosaic of plant and animal communities.

The plant communities of these habitats can be classified in many different ways. They are classified here by:

- the growth habit of the dominant plant species, that is, whether the dominants are trees, shrubs or herbs;

TABLE 5.3. Plant communities of the Western Mesara in relation to the degree of human disturbance, soil moisture during the early summer, and geographical distribution

Major community type	Number of locations surveyed	Degree of human disturbance	Soil moisture conditions during early summer	Geographical distribution
Cultivated fields and orchards	10	Very high	Dry	Widespread, but most in central Mesara
Field margins and waysides/roadsides		High	Dry	Widespread, but most in central Mesara
Grasslands and meadows	12	Moderate to low	Dry to moist	Widespread
Shrublands	152	Moderate to low	Mostly dry	Widespread, but most in southern uplands
Intermittent streams and riverine forest	12	Moderate to low	Damp to wet	Widespread, but highly localized
Marsh and wet meadow	9	Moderate	Wet	Confined to Mesara flood-plain
Springs and seeps		Low	Damp to wet	Widely scattered, but confined to seeps and areas around springs
Woodlands and tree groves	4	Slight	Moist	Most woodlands in northern upland s andfoothills; planted tree groves along roads and waysides

- the amount of moisture in the soil, that is, whether the soils are wet or dry; or
- the degree of human disturbance.

This classification thus distinguishes between communities that are dominated by trees, shrubs, or herbs, and it takes soil moisture and human disturbance into account. The locations we surveyed in our botanical studies fall into major community types (table 5.3). Some of these community types are plotted on figure 5.4 in relation to the amount of soil moisture available, their degree of human disturbance, and an estimate of the plant species they have in common. They include cultivated land, field margins and roadsides, grasslands and meadows, shrublands, marshes and intermittent streams, woodlands, and communities of coastal habitats. Although we are concerned mainly with plant communities, we cannot ignore the effects of animals on plants, such as insect attacks and the overgrazing of domesticated animals.

THE BOTANICAL SURVEY

During the course of our fieldwork, we surveyed the plant communities at 199 locations. Forty of these locations were sampled quantitatively using ten 2 x 2 m quadrats (plate 5.6) to determine the cover and frequency of each plant species in the tree, shrub, and herb categories, while the remainder were assessed using a scale involving estimates of the dominant, abundant, frequent, occasional, and rare species (DAFOR scale in Shimwell 1971).

Of the 199 locations, 152 (77%) were communities dominated by shrubs; 16 (8%) were woodland groves; 12 (6%) were grassland and dry meadow communities (sometimes called steppes); 9 (4%) contained communities of intermittent streams, marshes, and wet meadows; and 10 (5%) consisted of cultivated fields and orchards. Most locations (appendix B, figures B.1, B.2) were in the general area of the Mesara archaeological survey; 152 were within 5 km of the palace of Phaistos (table 5.4). The remaining 50

TABLE 5.4. Trees and shrubs identified at 152 survey locations in the Western Mesara

Family	Growth Form*	Genus and Species	Common Name	Presence (%)	Average Abundance
Aceraceae	1	*Acer sempervirens*	Maple	0.7	1.0
Anacardiaceae	3	*Pistacia lentiscus*	Lentisc	30.9	2.6
Apocynaceae	2	*Nerium oleander*	Oleander	2.0	1.3
Boraginaceae	3	*Lithodora hispidula*		5.3	2.1
Capparaceae	5	*Capparis spinosa*	Caper	4.6	1.2
Cistaceae	5	*Cistus* sp.	Cistus	15.1	2.6
	5	*Fumana* sp.	Fumitory	12.5	2.1
	5	*Helianthemum* sp.	Rock rose	8.6	2.2
Compositae	3	*Achillea cretica*		5.3	2.3
	3	*Dittrichia viscosa*		3.3	1.3
	5	*Helichrysum* sp.	Everlasting	50.7	2.1
	5	*Phagnalon graceum*		57.2	2.0
Cupressaceae	1	*Cupressus* sp.	Cypress	2.0	1.3
Dioscoreaceae	6	*Tamus* sp.	Black bryony	0.7	2.0
Ericaceae	4	*Erica* sp.	Heather	4.0	2.0
Euphorbiaceae	1	*Euphorbia* sp.	Spurge	4.0	1.5
Fagaceae	1	*Quercus coccifera*	Kermes oak	3.3	2.0
	1	*Quercus trojana*	Macedonian oak	1.3	3.5
Globulariaceae	3	*Globularia alypum*	Globularia	4.0	1.8
Gramineae	7	*Arundo donax*	Giant reed	2.6	2.0
Guttiferae	7	*Hypericum* sp.	St. John's wort	15.1	1.7
Labiatae	5	*Micromeria nervosa*		7.2	1.8
	3	*Phlomis cretica*		52.6	2.1
	6	*Prasium majus*		19.1	1.9
	4	*Salvia* sp.	Sage	40.8	2.1
	4	*Satureja thymbra*	Savory	19.1	2.0
	4	*Stachys* sp.	Woundwort	5.9	1.6
	4	*Teucrium* sp.	Germander	33.6	2.2
	4	*Coridothymus capitatus*	Thyme	79.6	3.0
Leguminosae	3	*Anagyris foetida*	Bean trefoil	5.9	1.4
	4	*Anthyllis hermanniae*		18.4	2.4
	3	*Calicotome* sp.	Spiny broom	67.8	2.6
	1	*Ceratonia siliqua*	Carob	9.2	1.3
	3	*Ebenus cretica*	Cretan ebony	28.3	2.6

Continued on next page

TABLE 5.4. Trees and shrubs identified at 152 survey locations in the Western Mesara *(continued)*

Family	Growth Form*	Genus and Species	Common Name	Presence (%)	Average Abundance
Leguminosae (continued)	4	*Ononis natrix*	Large yellow restharrow	3.3	2.6
	4	*Ononis spinosa*	Spiny restharrow	7.9	1.8
Liliaceae	6	*Asparagus* sp.	Asparagus	25.0	1.5
	3	*Ruscus aculeatus*	Butcher's broom	4.0	1.7
Malvaceae	4	*Lavatera* sp.	Tree mallow	7.2	1.6
Moraceae	1	*Ficus carica*	Fig	0.7	1.0
Oleaceae	1	*Olea europaea* var. *europaea*	Olive (cultivated)	8.6	1.6
	3	*Olea europaea* subsp. *oleaster*	Olive (wild)	26.3	1.7
Pinaceae	1	*Pinus* sp.	Pine	2.0	2.3
Rhamnaceae	3	*Rhamnus lycioides*	Buckthorn	15.1	1.4
Rosaceae	2	*Crataegus azarolus*	Hawthorn	0.7	1.0
	1	*Prunus* sp.	Almond	4.6	1.5
	1	*Pyrus amygdaliformis*	Pear	6.6	1.4
	2	*Rubus sanctus*	Bramble	5.3	2.3
	4	*Sarcopoterium spinosum*	Thorny burnet	58.6	2.2
Santalaceae	3	*Osyris alba*		14.5	1.8
Styracaceae	2	*Styrax* sp.	Storax	0.7	2.0
Thymelaeaceae	3	*Thymelaea hirsuta*	Thymelaea	49.3	1.9
Verbenaceae	1	*Vitex agnus-castus*	Chaste tree	2.6	2.8

* 1 = Tree; 2 = Tall shrub > 2 m tall; 3 = Medium shrub 0.5–1 m tall; 4 = Low shrub < 0.5 m tall, grows in clumps; 5 = grows as single or a few stems; 6 = vine; 7 = grass sometimes woody at the base.

NOTE: Nomenclature follows *Flora Europaea* (Tutin et al. 1966–1975), common names taken from *Flowers of Europe* (Polunin 1969).

locations were spread along a 25-km transect from the south coast to the foothills of the Idaean Mountains.

The sites range from 2 to 540 m in elevation. Because elevation is closely related to precipitation, rainfall varies from less than 500 mm to nearly 800 mm per year. The sites vary widely from flat terrain to steep slopes, from dunes of blowing sand to limestone ridges and rugged uplands of metamorphic rock, from bare rock to many meters of alluvial fill, from coarse sands to fine clays and silts, and from waterlogged wetlands to arid hills.

Roughly half of the Western Mesara is under the plow (National Statistical Service of Greece 1961). Bottomlands, lower slopes, and hillside terraces are clothed with olive orchards and fields of cereals, vines, forage, and other crops. Where cultivation has been abandoned, herbs and shrubs invade, and fields soon become grassland or meadow and, after a few decades, shrubland. A few naturally regenerating woodlands occur in northern uplands, but small groves or isolated trees can be found scattered throughout the valley along streams and around springs. Wetlands, such as marshes with perma-

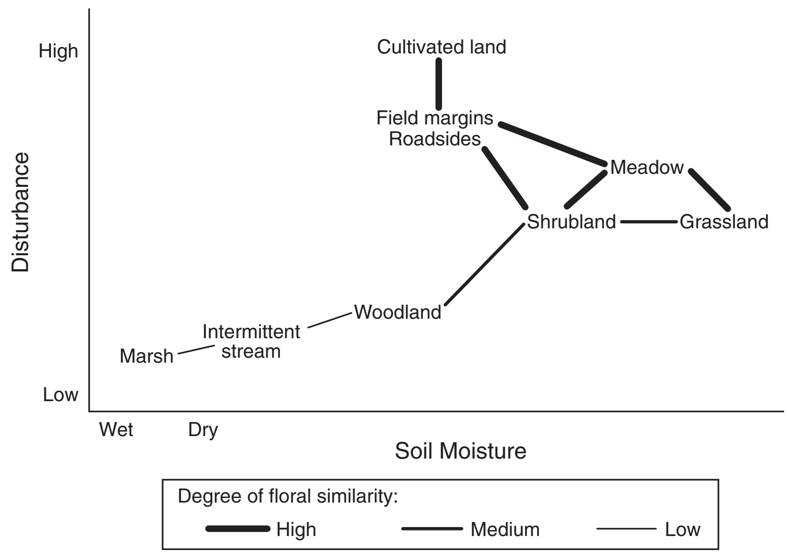


FIGURE 5.4. Western Mesara plant communities in relation to soil moisture and human disturbance

nently standing water and wet meadows, occur only on the Mesara Plain. Other, more unusual, communities are coastal sand dunes.

Some plant communities share species in common, as suggested by the width of the black lines connecting them in figure 5.4. For example, many species are found in shrublands, woodlands, and field margins. The latter may serve as reservoirs of species that can colonize abandoned land.

The composition and distribution of the major plant communities in the Mesara are described below, beginning with shrublands, the community type that typifies the Mediterranean and covers the largest area of uncultivated land.

Shrublands. Several types of shrublands are found in Mediterranean climates throughout the world. In addition to the Mediterranean basin, parts of California, Chile, Australia, and South Africa enjoy a similar climate and thus have vegetation types that resemble one another (appendix B, table B.10). A distinction is made between high (maquis), medium (garigue), and low (phrygana) vegetation types, and this generally corresponds with a moisture gradient from moderate to low rainfall.

Maquis, or high mattoral, is a type of Mediterranean shrubland that covered most of the dry habitats and steep ravines prior to the increasingly intensive cultivation of the last few centuries (di Castri 1981). Maquis is often impenetrable and usually dominated by a few species of woody shrubs with small, broad leaves that are stiff and thick (sclerophylls). An overstory of occasional small trees is sometimes present with or without an understory of annuals and herbaceous perennials. This is a fire-prone type of vegetation, the controlling factors being summer drought and low nutrient status.

Margaris (1981) recognizes a continuum between maquis and phrygana. In his view, maquis at the moist end is characterized by evergreen sclerophylls, while phrygana at the dry end has more deciduous shrubs that lose their large winter leaves at the onset of the summer dry season, when they produce smaller summer leaves. In some plants, such as Jerusalem sage, summer leaf fall is triggered by day length. Turland, Chilton, and Press (1993) consider phrygana to be composed of low, hemispherical, dwarf shrubs that are often spiny and aromatic, and all are resistant to fire and grazing. Garigue is an intermediate, degraded type of maquis created and maintained by wood cutting, browsing, and burning (Le Houérou 1981; Turland, Chilton, and Press 1993). Spiny shrubs and undershrubs are characteristic, and if protected from such impacts, some species can grow into trees.

Shrublands, predominantly garigue and phrygana, clothe the rugged hills of the Asterousia and parts of the northern uplands. Small patches can also be found on the plain on hillsides and rocky plateaus. The tallest shrubs are between 0.5 and 2 m in height, although most are less than 1 m tall.

Of the eight tree and fifty-four shrub species found in our survey, only twenty-one occurred in at least 10% of the shrub locations (table 5.5; appendix B, table B.11). Six of the most widespread shrubs were thyme, spiny broom, phagnalon, thorny burnet, Jerusalem sage, and elichrysum (figure 5.5). Each of these shrubs occurred in at least half the locations we surveyed (table 5.5). Thyme grows as a low and compact rounded bush up to 0.5 m tall. It was found in 79% of the locations. Its leaves are small and stiff, and in early summer its numerous clusters of small purplish pink flowers with protruding orange stamens are a major attraction for honeybees. Spiny broom, another common shrub, was found at 66% of the locations. Its flowers are produced between March and June. Phagnalon, an undershrub whose brownish flowering heads appear between April and June, was recorded in 59% of the locations. Thorny burnet is a spiny, low shrub with slender interwoven branches and tiny leaves with four to seven pairs of leaflets. It has small red flowers and produces small red fleshy fruits. This shrub was found in 58% of the locations we examined.

Jerusalem sage, found in 52% of the locations, flowers from March until late May and is a rich source of nectar for honeybees. Elichrysum, found in 50% of the locations, flowers in the late spring and is found in dry, stony places. Another widespread shrub, thymelaea, had a presence of 49%. It flowers from October to May (Huxley and Taylor 1977). Three other shrubs—sage, lentisc, and Cretan ebenus—were found, respectively, in 41%, 30%, and 28% of the locations. Lentisc flowers from March to May; Cretan ebenus, in May and June. An evergreen, the olive (*Olea*), found in 26% of the locations, produces erect clusters of small white strongly perfumed flowers.

Four straggling undershrubs worthy of mention are germander (*Teucrium* spp.), with a frequency of 33%; asparagus (*Asparagus aphyllus*), with a frequency of 25%; and savory (*Satureja thymbra*) and prasium (*Prasium majus*), both occurring in 18% of the locations.

To further understand the nature of these shrublands, we asked the following questions: how similar are the 152 shrub locations in their species composition, how similar are the species distributions, and what factors can account for these distributions?

To answer the first question in an objective manner, we used an ordination technique (Begon, Harper, and Townsend 1986; Jongman et al. 1987). Ordination is a multivariate statistical technique that can summarize the relationships among a number of locations and species. Our ordination analysis included only shrubs, as these were the dominant plant type in the shrublands. The ordination data were analyzed in two different ways. First, locations were plotted to show the degree of similarity in plant composition. The data points representing locations similar in species composition are close together, while locations that differ markedly in their composition are far apart. Second, shrub species were plotted to show the degree of similarity in their distribution.

The results of the first ordination analysis (figure 5.6a) did not reveal a clear pattern. The data points are distributed relatively uniformly across axis 1 and 2. This suggests that there is considerable overlap in terms of plant composition among the various locations and that there is no clear separation between the south, central, and northern parts of the Mesara.

The second ordination (figure 5.6b) shows a central data cluster surrounded by outlying points. The central cluster consists of fourteen of the twenty-one tree and shrub types. One of the outlying groups contains four of the seven most widespread shrubs (*Coridothymus*, *Phagnalon*, *Helichrysum*, and *Calicotome*). The points in this group are close together on the right-hand side of the diagram. This means that whenever one is found, the other three are likely to occur. The other outlying group contains *Satureja*, *Ebenus*,

Table 5.5. Presence and frequency of common herbs at 40 quantitatively sampled vegetation survey locations

Family	Common Name	Genus and Species	Presence (%)	Average Frequency (%)
Gramineae	Brome	*Bromus* sp.	95.0	60.6
Linaceae	Flax	*Linum* sp.	85.0	61.3
Primulaceae	Scarlet pimpernell	*Anagallis arvensis*	82.5	50.0
Leguminosae	Medick	*Medicago* sp.	80.0	47.3
Leguminosae	Birdsfoot-trefoil	*Lotus* sp.	80.0	40.3
Liliaceae	Sea squill	*Urginia maritima*	80.0	37.1
Leguminosae	Clover, Trefoil	*Trifolium* sp.	77.5	37.0
Liliaceae	Asphodel	*Asphodelus* sp.	72.5	49.8
Plantaginaceae	Plantain	*Plantago* sp.	67.5	34.0
Gramineae	Oat	*Avena* sp.	67.5	26.8
Rubiaceae	Crosswort	*Valantia hispida*	65.0	30.0
Rubiaceae	Field madder	*Sherardia arvensis*	62.5	24.8
Compositae	Hawkbit	*Leontodon* sp.	55.0	33.9
Gramineae	Cock's-foot	*Dactylis* sp.	52.5	28.8
Leguminosae	Cockscomb sanfoin	*Onobrychis caput-galli*	52.5	18.8
Liliaceae	Grape-hyacinth	*Muscari* sp.	50.0	25.0
Umbelliferae	Carrot	*Daucus* sp.	45.0	19.2
Compositae		*Reichardia intermedia*	45.0	15.4
Gramineae	Hair's-tail	*Lagurus* sp.	42.5	20.2
Leguminosae	Sanfoin	*Onobrychis aequidentata*	30.0	15.0
Gramineae	Rye-grass	*Lolium* sp.	30.0	13.8
Gentianaceae	Yellow-wort	*Blackstonia* sp.	27.5	11.8
Gramineae	Barley	*Hordeum* sp.	27.5	11.3
Compositae	Hawk's-beard	*Crepis* sp.	25.0	14.0
Gramineae		*Stipa bromoides*	25.0	9.5
Umbelliferae		*Lagoecia cuminoides*	25.0	9.5
Leguminosae	Bladder vetch	*Anthyllis tetraphylla*	25.0	9.3
Rubiaceae		*Crucianella latifolia*	25.0	9.3
Rubiaceae	Bedstraw	*Galium* sp.	25.0	8.0
Gramineae	Quaking grass	*Briza* sp.	25.0	7.3
Leguminosae	Horse-shoe vetch	*Hippocrepis* sp.	25.0	7.3
Iridaceae	Iris, Flag	*Iris* sp.	22.5	13.8
Gramineae	Albardine	*Lygeum spartum*	22.5	12.8
Gramineae		*Piptatherum coerulescens*	22.5	4.5
Compositae	Knapweed	*Centaurea* sp.	20.0	8.8
Gramineae		*Hyparrhenia* sp.	20.0	8.3

Continued on next page

TABLE 5.5. Presence and frequency of common herbs at 40 quantitatively sampled vegetation survey locations *(continued)*

Family	Common Name	Genus and Species	Presence (%)	Average Frequency (%)
Gramineae	Poa	*Poa* sp.	20.0	6.9
Compositae	Knapweed	*Centaurea* sp.	20.0	8.8
Gramineae		*Hyparrhenia* sp.	20.0	8.3
Gramineae	Poa	*Poa* sp.	20.0	6.9
Leguminosae	Crown vetch	*Coronilla* sp.	20.0	6.5
Liliaceae	Onion	*Allium ampeloprasum*	20.0	6.3
Gramineae		*Aegilops* sp.	20.0	5.3
Scrophulariaceae	Bartsia	*Bellardia trixago*	20.0	5.1
Compositae	Saw-wort	*Serratula* sp.	20.0	4.0
Caryophyllaceae	Campion	*Silene* sp.	17.5	15.7
Gramineae	Fescue	*Vulpia* sp.	17.5	11.8
Leguminosae		*Scorpiurus muricatus*	17.5	4.0
Leguminosae	Vetch, Tare	*Vicia* sp.	15.0	3.0
Compositae		*Pallensis spinosa*	12.5	3.5
Leguminosae		*Hymenocarpus circinnatus*	12.5	3.3
Scrophulariaceae	Southern red bartsia	*Parentucellia latifolia*	12.5	2.6
Selaginellaceae	Lesser clubmoss	*Selaginella denticulata*	10.0	5.0
Compositae	Chamomile	*Anthemis* sp.	10.0	4.5
Leguminosae	Asparagus pea	*Tetragonolobus purpureus*	10.0	2.3
Gramineae		*Catapodium* sp.	10.0	2.0
Umbelliferae	Shepherd's needle	*Scandix* sp.	10.0	2.0
Gramineae		*Trachynia distachya*	7.5	3.8
Compositae		*Hedypnois achyrophorus*	5.0	0.5
Leguminosae	Melilot	*Melilotus* sp.	2.5	0.8
Compositae		*Urospermum picroides*	2.5	0.3

and *Thymelaea*. These species are not as closely linked to each other.

Another way to describe the relationship of one species to another is through a chi-square analysis of association (figure 5.7; appendix B, table B.12). Chi-square analyses do not provide an absolute index of association, although a high chi-square statistic may imply a significant association between two species. The statistic for the joint occurrence of spiny broom and phagnalon is 11.7. This highly significant result corresponds to a probability of less than 0.001 (appendix B, table B.12). This means that there is less than one chance in a thousand that the association is strictly by chance. Other highly significant associations include those between spiny broom and Cretan ebenus, lentisc, elichrysum, Jerusalem sage, and prasium. It thus seems that although spiny broom does not appear close to all these other shrubs on the plot of ordination scores, it

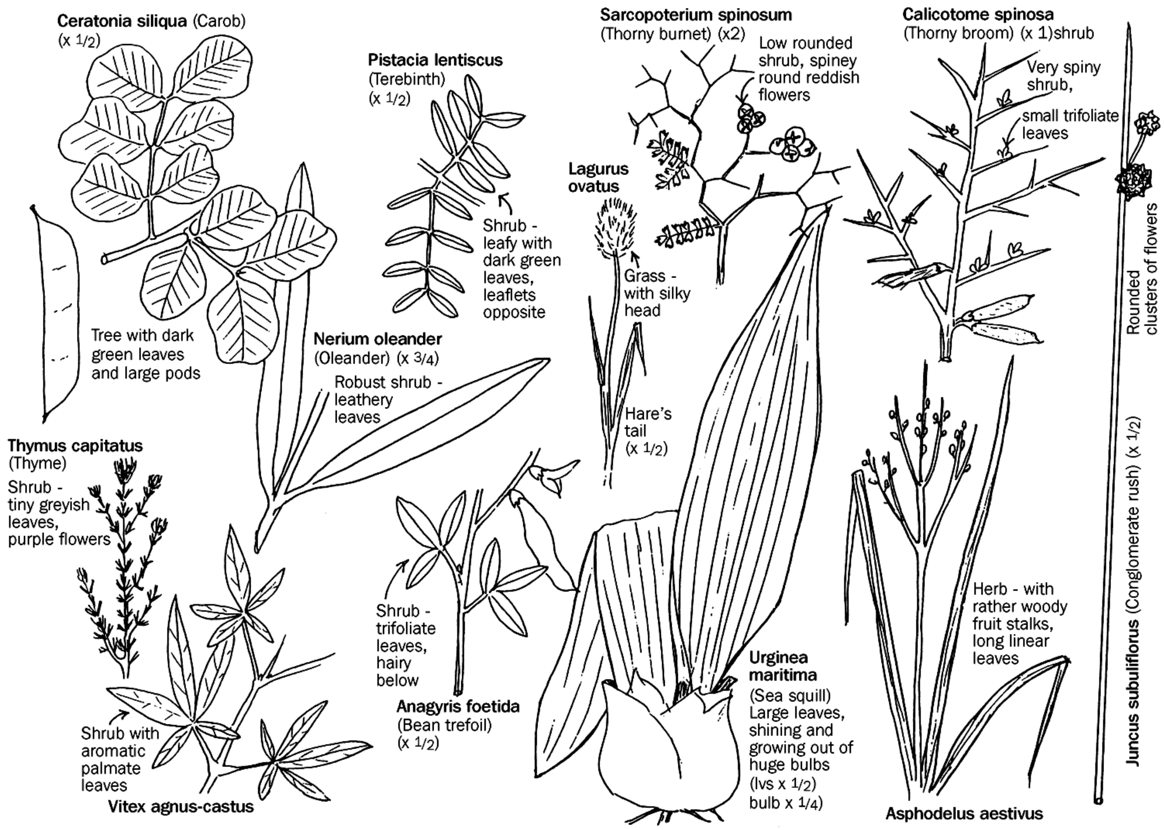
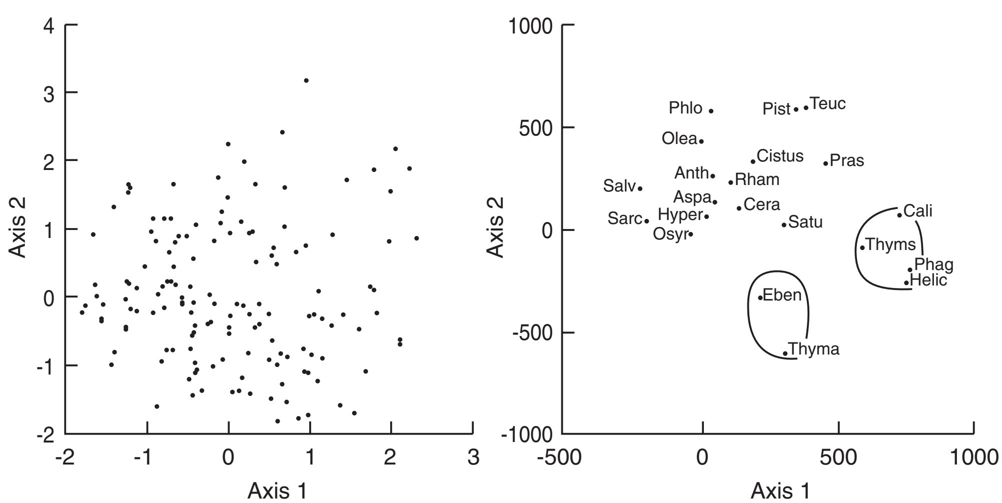


FIGURE 5.5. Selected plants represented in the Western Mesara



Species Names and Common Name Equivalents

Anthyllis (Anthylllis)	*Hypericum* (St. John's wort)	*Rhamnus* (Tutin)
Asparagus (Asparagus)	*Olea* - wild (Olive - wild)	*Salvia* (Sage)
Calicotome (Spiny broom)	*Osyris* (Osyris)	*Sarcopoterium* (Thorny burnet)
Ceratonia (Carob)	*Phagnalon* (Phagnalon)	*Satureja* (Savory)
Cistus (Cistus)	*Phlomis* (Jerusalem sage)	*Teucrium* (Germander)
Ebenus (Cretan ebony)	*Pistacia* (Lentisc)	*Thymelaea* (Thymelaea)

FIGURE 5.6. Ordination scores for *(a)* 152 shrub survey locations, and *(b)* 21 shrub taxa in the Western Mesara

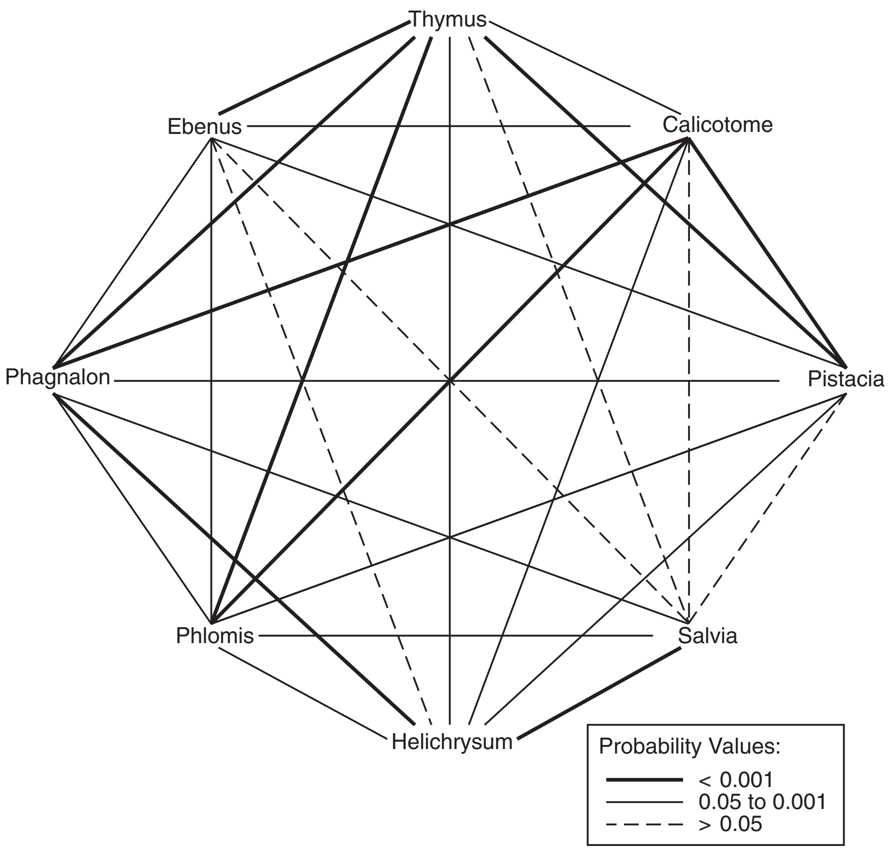


FIGURE 5.7. Degree of association (%) between eight major shr ub taxa in the Mesara

still occurs together with them by much more than simple chance.

The geographical distribution of major shrub species is also of interest since shrubs that share similar distributions may also share similar environmental adaptations. On a series of topographic maps we have plotted the distribution of eighteen common shrubs in the Western Mesara (appendix B, figures B.3–8). Four elevation ranges are indicated on the maps. The lowest elevation range (very light gray) is below 200 m and represents the Mesara Plain and the southern coast. The elevation range between 200 and 600 m (light gray) represents the southern upland, the Asterousia hills, and northern uplands, while the elevation range between 600 and 800 m (medium gray) represents the northern foothills zone. The highest elevation range (dark gray) is above 800 m and represents the Idaean Mountains. To help describe shrub distribution patterns, we divided our survey area into a southern, central, and northern zone (appendix B, table B.11). The distribution of all the locations surveyed was plotted so that the pattern of each species could be compared with the total. Two general distribution patterns have emerged: (l) widespread and found in all three zones, or (2) mostly confined to one or two zones.

Of the eighteen shrub species, twelve were found in all three zones but not in equal abundance. These were: spiny broom, spiny burnet, thyme, asparagus, elichrysum, phagnalon, teucrium, wild olive, Jerusalem sage, prasium, sage, and rock rose. Carob, Cretan ebenus, and satureja were found mainly in the central and northern zones, while lentisc occurred mainly in the south and central Mesara. Thymelaea was fairly abundant but found mainly in the central Mesara. The far less common buckthorn (*Rhamnus*) had a similar distribution.

What can account for the geographical patterns of these eighteen common shrubs? What role do environmental factors such as soil moisture and nutrients play? Soil moisture and the

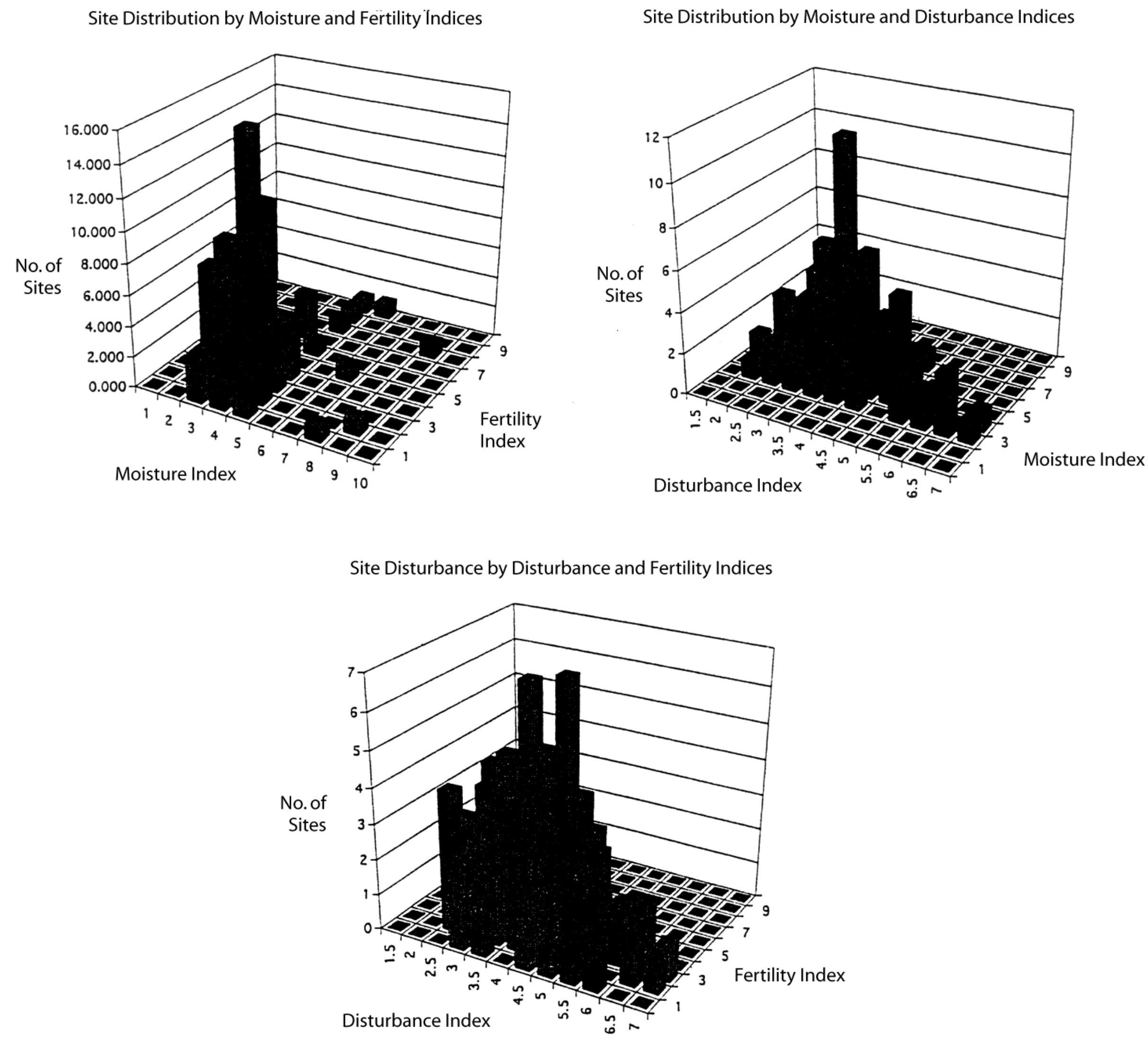


FIGURE 5.8. Site distribution by indices of moisture, disturbance, and fertility

lack of certain soil nutrients, particularly nitrogen and phosphorus (Specht 1981), have been recognized as a key to plant distribution in the semiarid Mediterranean. The degree of human disturbance may also play a role, as some species may be better able than others to withstand plowing, trampling, or grazing (appendix B, table B.13).

We investigated the abundance of these eighteen common trees and shrubs in relation to rainfall, soil texture, moisture, and nutrients. The same species were also examined with respect to human disturbance. We correlated the ordination axis 1 scores for each species with scores for soil chemistry and the estimated values of rainfall at each site. The abundance of shrub species was then plotted against soil texture. We also constructed an index of soil moisture, soil nutrients, and disturbance and plotted the relative abundance of each species on histograms (figure 5.8) (details of the methods are found in appendix A).

Our analyses revealed several generalizations. First, there was no strong correlation between the ordination axis 1 scores for shrub species and rainfall or soil chemistry. This is to be expected considering that there is no separation between the southern, central, and northern zones on the ordination. However, plots of soil texture and the shrub abundance show, for example, that sage apparently prefers coarse-textured sands whereas wild olive, thorny burnet, and germander are more common on finer textured silts and clays. These differences may reflect the soil moisture holding capacity of these soils.

The soil moisture index range is relatively narrow, as we did not include damp or wetland locations. Locations on dry, exposed ridges at low altitudes have a soil moisture index of 1, while north-facing slopes at high altitudes have an index of 10. Most locations are in the 3 to 5 range. The soil chemistry index spans rather infertile soils at 1, to soils of intermediate fertility at 10. Most locations lie in the 2 to 4 range. The human disturbance index ranges from 1 for locations surrounded by large tracts of undisturbed shrubland, to 10 for recently abandoned fields that have become invaded by shrubs.

Three-dimensional histograms are used to plot the relative abundance of trees and shrubs against soil moisture, soil chemistry, and disturbance (appendix B, figures B.9–13). They show five different patterns. Twelve species grow within a narrow range of soil moisture (dry to intermediate) but within a fairly wide range of chemical composition and human disturbance. This pattern applies to such common shrubs as thyme, spiny broom, phagnalon, elichrysum, thorny burnet, and wild olive.

Another group, containing Cretan ebenus (appendix B, figure B.10) and buckthorn, has a similar moisture range but tolerates only intermediate levels of soil chemistry and disturbance. Both species in this group tend to be concentrated in the central region. Cretan ebenus is also found in parts of the northern zone. The third pattern, that for the carob tree (appendix B, figure B.11), has a similar moisture range but with intermediate levels for soil chemistry and a low disturbance level.

Rock rose (appendix B, figure B.12) displays a fourth pattern. This shrub grows under relatively moist soil conditions and a broad range of soil chemistry. Apparently it does not tolerate high levels of disturbance, as it occurs only under low to intermediate levels. Finally, pattern number five represents savory. Savory (appendix B, figure B.13) grows under relatively dry conditions and a broad range of soil chemistry. It differs from other shrubs in that it grows only under low levels of disturbance.

Several of the shrub communities sampled are similar to those described in Zohary and Orshan's (1965) general summary of Cretan vegetation. The medium shrub or garigue sites might fit within their *Ceratonieto-Pistacietum lentisci* maquis association, which includes carob, lentisc, thyme, and wild olive. In our sites, lentisc and thyme are common, but carob and wild olive are rare. Our low shrub or garigue communities share similarities with Zohary and Orshan's (1965) *Poterietalia spinosa intermedia* association, which includes thorny burnet, thyme, and spiny broom. Both of these Zohary and Orshan associations were also similar to the types found by Rackham (1972) around the Bronze Age site of Myrtos (Fournou Korifi), 90 km to the east along the south coast. As in the lowland Mesara, the shrub communities around Fournou Korifi are typical of a semiarid environment with a rainfall of about 500 mm per year.

Shrubs may be understoried by or interspersed with herbs. In the forty locations quantitatively sampled, four herbs had frequencies greater than 50% (table 5.5). These included the small yellow-flowered flax (*Linum strictum*), brome grasses (*Bromus* spp.), blue pimpernel (*Anagallis arvensis*), and asphodel. Eleven other herbs were found in more than 20% of the quadrats. Showy orchids (*Orchis* spp., *Ophrys* spp., *Serapias* spp.) and irises (*Iris unguicularis*) were less common.

Grasslands. Shrublands, grasslands, and meadows intergrade with one another, from shrublands with scattered clumps of grasses and other herbs, to grasslands and meadows with a few shrubs. Grasslands tend to be found in more arid situations and contain more drought-resistant grasses than meadows. They occur on dry, exposed hilltops and slopes, whereas meadows (also called pastures) occur in more moist situations on gentle slopes and in lowlands. Both vary widely in size, from a few square meters to several hectares.

Most grasslands we encountered were in the central and southern portion of the Mesara. Extensive grasslands of several hectares or more were seen on south-facing slopes between Moires and Agioi Deka, on top of Vigles hill immediately south of the Bronze Age site of Kommos, along the south coast near Lebena, and in two areas between Sivas and Listaros. All these contained one or more species of shrubs.

There are many different grasses found in the grasslands and meadows of the Western Mesara. Our botanical survey revealed eighty species of grasses that grow mainly in such upland habitats (appendix B, table B.9). Despite this diversity, only a handful of species were abundant or made up most of the herbaceous cover. Identification to species was complicated by the fact that many grasses are difficult if not impossible to identify when they are not in flower or fruit.

Hyparrhenia hirta, *Lygeum spartum*, and *Stipa capensis* are three of the most common grasses adapted to such dry habitats. They are all perennial, tall (50 to 100 cm), have narrow leaves, and grow in tufts. The narrow leaves, which reduce the transpiring surface, make them well suited to dry habitats. The inflorescence of *Hyparrhenia*, a coarse tufted grass, is branched with paired, slender, spike-like clusters of flowers on hairy branches. The production of inflorescences is stimulated by fire (Trabaud 1981). Lygeum, another drought-resistant grass with rush-like leaves, has a distinctive broad sheath around the single terminal spikelet. Stipa is easily distinguished by the feathery inflorescence with long twisted awns. A grassland community type recognized in Crete contains *Lygeum spartum* and other grasses (Turland, Chilton, and Press 1993).

The south coast grasslands were dominated by *Hyparrhenia* with occasional scattered shrubs. Two grassy areas between Sivas and Listaros had somewhat different plant species compositions. One area, called the "saddle" because of its shape (Vegetation Site 86), is a shrub and grassland community. The shrub component covered about 60% of the ground surface and contained mainly thorny burnet and thyme. The grasses were an assortment of about fifteen species, which collectively covered about 20% of the ground. The other area (Vegetation Sites 55–57) is in gently rolling terrain with dry, eroded slopes, a sort of badlands landscape where plants covered only about 25–50% of the ground. The main grass noted here was lygeum, which was occasional to dominant. There were also other herbs, such as *Pallenis spinosa*, wild carrot, asphodel, and sea squill. The shrub component was mainly thorny burnet and the leguminous shrub *Anthyllis/Genista*.

Smaller grassy areas were also noted. One was near Agia Triada, where grasses were mixed with clumps of the straggling shrub elichrysum between mature olive trees. Another, dominated by *Hyparrhenia*, was on the top of a hill adjacent to Sivas. Much smaller patches, only a few square meters in extent, were seen in a number of other dry situations.

Meadows. We use the term *meadow* (or pasture) to describe a moister type of herbaceous community that shows no signs of being an abandoned cultivated field. Meadows are found scattered throughout much of the central and northern Mesara. They share most of the same species as shrublands and grasslands although they are home to a number of more moisture-loving plants. Winter rains stimulate the luxuriant growth of many perennials, which arise from sprouts, bulbs, tubers, rhizomes, and axillary buds. In addition, both perennials and annuals germinate from numerous seeds in the soil.

Early spring is colorful with anemones (*Anemone* spp.), grape hyacinths (*Muscaria* spp.), gladiolus (*Gladiolus italicus*), a variety of legumes, such as medicks (*Medicago* spp.) and trefoils (*Lotus* spp.), and many grasses. They are followed by poppies (*Papaver rhoeas*), shepherd's needle (*Scandix pecten-veneris*), and a bewildering array of yellow Compositae (*Leontodon* spp., *Reichardia* spp., *Crepis* spp.). Orchids, some that mimic bees, wasps, and other insects, provide additional color. Orchids need the assistance of a fungus for successful growth, but once established, their underground tubers provide a means for survival from one year to the next. The majority of spring-flowering species flower, set, seed, and wither before the heat of summer.

Cultivated land. The use of agricultural land in the Mesara reflects variations in soil moisture and fertility. The main field crops grown in recent decades include wheat, barley, legumes, and vegetables, especially those like tomatoes (*Lycopersicon esculentum*), zucchini (*Cucurbita* *pepo var. medullosa*), and cucumbers (*Cucumis sativus*), often grown in polyethylene greenhouses (*thermokipia*) that enable them to be harvested early for northern European markets. In addition to olives, grapes, and figs, a few almonds (*Prunus dulcis*) and pears (*Pyrus communis*) are cultivated. Cypress is planted in small groves, along field margins and roadsides. Wild almond (*Prunus webbii*) and wild pear (*Pyrus spinosa*) also occur.

On the Mesara Plain, irrigated groves of fruits such as orange (*Citrus sinensis*), lemon (*Citrus limon*), pomegranate (*Punica granatum*), and loquat (*Eriobotrya japonica*) are grown. Crops are usually sown in rows, leaving space for weedy invaders that were present in the seed bank or have arrived from surrounding areas. The invaders are mainly annual plants that can germinate, grow, and set seed within a few months, such as daisies or medicks (*Medicago* spp.) (table 5.6).

Weeds are plants in the wrong place (Allaby 1994) and are often the first plants to grow in disturbed sites (Bunting 1960). They are able to thrive in the open, where temperatures are high, rain infiltration is reduced, and runoff is high. They compete successfully with other species for water, nutrients, sunlight, and other resources. Improved nutrient status after the application of fertilizers may favor some weeds, as may grazing pressure. Weeds may produce more than one generation in a growing season, have efficient seed dispersal mechanisms, and variable seed dormancy, in which some seeds germinate immediately and others are dormant between seed maturation and the onset of fall rains (Groves 1986). Germination may occur in response to plowing, which exposes seeds in the soil to light. Rapid root elongation and growth after germination and the ability to reproduce from a small section of root or rhizome are other characteristics of weeds. Introduced species, such as the yellow oxalis (*Oxalis pes-caprea*) from South Africa, often do not have natural enemies in their new environments and become successful weeds.

Abandoned Fields and Waysides. Many shrubs, such as thyme, spiny broom, and Jerusalem sage, and herbs, such as corn marigold, thrive along the margins of cultivated fields. They are also seen along paths and trails and around settlements. These areas are somewhat less disturbed and, although not cultivated, are nevertheless subject to trampling and soil compaction by villagers, their livestock, and vehicles. These margins and trails are also sometimes grazed by livestock, mainly sheep and goats as they wander through the countryside.

In springtime, fallow fields are colorful with a great variety of plants such as wild carrot (*Daucus* spp.), field bindweed (*Convolvulus arvensis*), buckler mustard (*Biscutella didyma*), various medicks and other legumes, hawksbeards (*Crepis* spp.), corn marigold (*Chrysanthemum segetum),* crown daisy, poppies, shepherd's needle, as well as many grasses (*Aegilops* spp., *Bromus* spp., *Hordeum leporinum* subsp. *leporinum*) (table 5.6). The majority of these species are annuals, but if fields are not cultivated, many annuals are replaced by biennial or perennial herbs, like alkanet (*Anchusa* spp.), knapweed (*Centaurea* spp.), pitch trefoil (*Psoralea bituminosa*), onion (*Allium* spp.), mignonette (*Reseda lutea*), goat's-beard (*Tragopogon* spp.), asphodel (*Asphodelus aestivus*), and a host of grasses. On many hillsides there are recently abandoned fields whose margins are marked by terrace walls or rock piles. These margins harbor a number of herbs and shrubs poised to invade abandoned land. Within a few years, shrubs such as thyme, spiny broom, spiny burnet, Jerusalem sage, and thymelaea invade together with undershrubs: elichrysum, sage (*Salvia* spp.), prasium, germander (*Teucrium* spp.), and asparagus.

Near Matala we surveyed three former grainfields that were abandoned in 1942. The fields lay on a gentle slope overlooking the sea and were still marked by low terrace walls (plate 5.8). A network of grazing trails covered the shallow soil and bare rock between the low wind-pruned bushes. The fields had reverted to shrubland, scarcely distinguishable from that on the surrounding slopes. Common to both areas were dense bushes of spiny broom, lentisc, and thyme, about 0.5 to 1.5 m tall, together with rock roses and elichrysum. The main difference between the abandoned fields and their surroundings was the presence of thorny burnet in the former and carob and heather (*Erica manipuliflora*) in the latter.

TABLE 5.6. Typical plants of cultivated fields, field margins, and waysides in the Western Mesara

Family	Common Name	Genus and Species
Acanthaceae	Acanthus	*Acanthus spinosus*
Araceae	Friar's cowl	*Arisarum vulgare*
	Lords-and-Ladies	*Arum* sp.
Boraginaceae	Hound's-tongue	*Cynoglossum columnae*
	Alkanet	*Anchusa* spp.
Campanulaceae	Venus's looking glass	*Legousia pentagonia*
	Campanula, Bellflower	*Campanula* spp.
Capparaceae	Caper	*Capparis spinosa*
Caryophyllaceae	Proliferous pink	*Petrorhagia velutina*
	Campion	*Silene* spp.
Compositae		*Carthamus lanatus*
	Scotch thistle	*Onopordum* spp.
	Ox-tongue	*Picris* spp.
	Chamomile	*Anthemis* sp.
		Asteriscus aquaticus
	Distaff thistle	*Atractylis cancellata*
	Pot-marigold	*Calendula arvensis*
	Knapweed	*Centaurea* spp.
	Chicory	*Cichorium* spp.
	Crown daisy	*Chrysanthemum coronarium*
	Corn marigold	*Chrysanthemum segetum*
	Hawksbeard	*Crepis spp.*
	Cats ear	*Hypochoeris achyrophorus*
	Hawkbit	*Leontodon tuberosus*
	Syrian thistle	*Notobasis syriaca*
		Pallensis spinosa
		Reichardia spp.
	Star hawkbit	*Rhagadiolus stellatus*
	Spanish oyster plant	*Scolymus hispanicus*
	Sow-thistle	*Sonchus* spp.
	Goat's-beard	*Tragopogon* spp.
		Urospermum picroides
Convolvulaceae	Bindweed	*Convolvulus* spp.
Cruciferae		*Erucaria hispanica*
	Buckler mustard	*Biscutella didyma*
	Hoary mustard	*Hirschfeldia incana*
	Hedge mustard	*Sisymbrium* spp.
Euphorbiaceae	Spurge	*Euphorbia* spp.
Geraniaceae	Storksbill	*Erodium* spp.
	Cranesbill	*Geranium* spp.

Continued on next page

TABLE 5.6. Typical plants of cultivated fields, field margins, and waysides in the Western Mesara *(continued)*

Family	Common Name	Genus and Species
Gramineae	Rye-grass	*Lolium rigidum*
		Lophochloa cristata
	Melick	*Melica* spp.
		Aegilops spp.
	Oat	*Avena* spp.
	Brome	*Bromus* spp.
	Hard poa	*Catapodium* spp.
	Bermuda-grass	*Cynodon dactylon*
	Cock's-foot	*Dactylis glomerata*
	Sea squill	*Urginia maritima*
Papaveraceae	Horned-poppy	*Glaucium* spp.
	Poppy	*Papaver rhoeas*
Primulaceae	Scarlet pimpernell	*Anagallis arvensis*
Ranunculaceae	Buttercup	*Ranunculus* spp.
Resedaceae	Mignonette	*Reseda lutea*
Rubiaceae	Crosswort	*Crucianella latifolia*
	Wild madder	*Rubia* spp.
	Field madder	*Sherardia arvensis*
Scrophulariaceae		*Bellardia trixago*
	Mullein	*Verbascum spp.*
Solanaceae	Henbane	*Hyoscyamus albus*
	Mandrake	*Mandragora autumnalis*
	Black nightshade	*Solanum nigrum*
Umbelliferae	False bishop's weed	*Ammi majus*
		Bunium ferulaceum
		Pseudorlaya pumila
		Scaligeria spp.
	Shepherd's needle	*Scandix pecten-veneris*
		Tordylium apulum
	Carrot	*Daucus* spp.
	Hedge-parsley	*Torilis* spp.
Valerianaceae	Lamb's lettuce	*Valerianella* spp.

Many herbs typical of fields and shrublands also occur along roadsides, trails, and in other disturbed places. Along roadsides, the introduced castor oil plant (*Ricinus communis*) is a favorite planting. Other ornamental trees, such as eucalyptus (*Eucalyptus* sp.), mulberry (*Morus alba*), and tree of heaven (*Ailanthus altissima*) have been planted along village streets. Exotics such as agave (*Agave americana*), cactus (*Opuntia ficus-barbarica*), and globe artichoke (*Cynaria scolymus*) mark many field boundaries. Such disturbed habitats also provide a refuge for weeds, many of them spiny thistles like the Spanish oyster plant (*Scolymus hispanicus*) and

TABLE 5.7. Typical plants of wet and damp habitats in the Western Mesara

Family	Common Name	Genus and Species	Standing Water	Wet Meadow	Gallery Forest	Intermittent Stream	Springs, Seeps, Damp/ Shady Areas
Alismataceae	Water-plantain	*Alisma* spp.	X				
Cruciferae	Watercress	*Nasturtium officinale*	X				
Cyperaceae	Club-rush	*Scirpus* spp.	X				X
Scrophulariaceae	Speedwell	*Veronica anagallis-aquatica*	X				
Typhaceae	Bulrush, Reedmace	*Typha domingensis*	X				
Compositae	Thistle	*Cirsium creticum*		X			
Cyperaceae	Sedge	*Carex* spp.		X			
Cyperaceae	Galingale	*Cyperus longus*		X			
Cyperaceae	Spike-rush	*Eleocharis palustris*		X			
Gramineae	Fescue	*Festuca arundinacea*		X			X
Gramineae		*Imperata cylindrica*		X			
Gramineae	Reed-grass, Canary grass	*Phalaris aquatica*		X			X
Gramineae	Reed	*Phragmites australis*		X			
Gramineae	Beardgrass	*Polypogon* spp.		X			X
Juncaceae	Rush	*Juncus* spp.		X			
Leguminosae	Vetch, Tare	*Vicia hybrida*		X			X
Lythraceae	Purple loosestrife	*Lythrum junceum*		X			
Rosaceae	Creeping cinquefoil	*Potentilla reptans*		X			
Rubiaceae	Bedstraw	*Galium debile*		X			
Scrophulariaceae	Yellow bartsia	*Parentucellia viscosa*		X			
Umbelliferae	Fool's watercress	*Apium nodiflorum*		X			
Umbelliferae	Water dropwort	*Oenanthe pimpinelloides*		X			
Juglandaceae	Walnut	*Juglans regia*			X		
Platanaceae	Plane	*Platanus orientalis*			X		

Continued on next page

TABLE 5.7. Typical plants of wet and damp habitats in the Western Mesara *(continued)*

Family	Common Name	Genus and Species	Standing Water	Wet Meadow	Gallery Forest	Intermittent Stream	Springs, Seeps, Damp/ Shady Areas
Rosaceae	Bramble	*Rubus sanctus*			X	X	
Salicaceae	Willow	*Salix alba*			X		
Salicaceae	Poplar	*Populus nigra*			X		X
Santalaceae		*Osyris alba*			X		X
Styracaceae	Storax	*Styrax officinalis*			X	X	
Verbenaceae	Chaste tree	*Vitex agnus-castus*				X	
Anacardiaceae	Oleander	*Nerium oleander*				X	
Compositae		*Dittrichia viscosa*				X	
Araceae	Lords-and-Ladies	*Arum* spp.					X
Araceae	Dragon arum	*Dracunculus vulgaris*					X
Boraginaceae	Honeywort	*Cerinthe major*					X
Campanulaceae		*Petromarula pinnata*					X
Equisetaceae	Horse tail	*Equisetum* spp.					X
Gramineae	Quaking grass	*Briza minor*					X
Labiatae	Mint	*Mentha* spp.		X			
Myrtaceae	Myrtle	*Myrtus communis*				X	X
Polygonaceae	Knotgrass	*Polygonum* spp.					X
Polygonaceae	Dock	*Rumex* spp.					X
Primulaceae	Brookweed	*Samolus valerandi*					X

thistle-like related members of the daisy family.

Wet and Damp Habitats. Despite its predominantly semiarid landscape, there are numerous wet and damp places scattered across the Mesara where moisture-loving plants thrive (table 5.7). During the winter rainy season, the low-lying area subject to flooding between Phaistos and the village of Petrokephali covers more than 4 km^2. Permanently damp or wet habitats can be seen adjacent to the channel of the Ieropotamos, along the major drainage ditch on the plain, the Gria Saita, and in smaller ditches that criss-cross the plain. Many ditches are conspicuous because taller shrubs and trees mark their courses between fields and wet meadows. Small freshwater marshes also occur on the plain near the coast.

Other moist habitats are widely distributed, such as the margins of seasonally flowing streams and around springs and seeps. An important spring on the floor of the Mesara Valley lies north of Sivas, and there are several springs along the northern edge of the river valley near Phaneromeni. The largest springs are in the uplands north of the valley, including the celebrated spring and associated fish tanks north of Zaros. Springs and seeps are much less common in the southern Mesara, although we noted a seep 2 km southwest of Sivas and another near Listaros. Springs and seeps are apparently rare in the Asterousia range to the south, although damp habitats can be found along the streambeds in the bottom lands of the Agio Pharango and neighboring gorges.

The wet meadows and marshes on the plain below Phaistos support many species usually restricted to places that remain wet for most of the year. Plants encountered in shallow standing water include water-plantain (*Alisma plantago-aquatica*), with its large, long-stalked leaves; watercress (*Nasturtium officinale*), a straggling, rather fleshy plant with shining leaves and small white flowers; water speedwell (*Veronica anagallis-aquatica*), with spikes of pale blue flowers in the axils of leaves that clasp the stem; and the stiffly erect club-rushes (*Scirpus* spp.).

Along the margins of ditches, one of the most conspicuous plants is the giant reed. True to its name, the giant grows to heights of 5 m, and its thick bamboo-like stalks form dense clumps. It is also found in other damp habitats, such as along roadsides and field margins where it is planted. Much less widely distributed is its shorter cousin, the common reed, whose inflorescences wave above stems that may be 3 m tall. An associate of the common reed is the reedmace (*Typha domingensis*), with dense, elongate, dark brown flower heads. Other conspicuous plants of shallow ditches or their margins include the spike-rush (*Eleocharis palustris*), with tufts of leafless stems topped by small cylindrical spikes, and mint (*Mentha* spp.), an aromatic herb with whorled clusters of purple flowers. Mint is also found in other wet places.

The extensive wet meadows on the plain are characterized by grasses, such as tall fescue (*Festuca arundinacea*), a tufted grass with a lax, nodding inflorescence, clumps of canary grass (*Phalaris aquatica*), creeping cinquefoil (*Potentilla reptans*) and the more conspicuous white-flowered water dropwort, fool's watercress (*Apium nodiflorum*), purple loosestrife (*Lythrum junceum*), and various triangular-stemmed sedges (*Carex* spp.), galingales (*Cyperus* spp.), and rushes (*Juncus* spp.) (table 5.7). Sedges, galingales, and rushes are also found around springs and seeps.

The Ieropotamos River is the largest permanent stream in the region. Its major tributary, the Koutsoulitis, may be dry during the summer. The Ieropotamos flows from the eastern Mesara, while the Koutsoulitis has its headwaters in the northern uplands near Zaros and joins the Ieropotamos immediately southwest of the village of Voroi. The Ieropotamos reaches the Libyan Sea about 4 km beyond this junction. Along its banks further inland is a gallery forest of towering trees and cool, shady places that during the summer offer refuge from the shimmering heat. Here are tall trees, such as plane (*Platanus orientalis*), the cultivated olive, cypress, and willow (*Salix alba*), together with trees such as eucalyptus from Australia, walnut (*Juglans regia*) and mulberry (*Morus alba*) from Persia, and pomegranate (*Punica granatum*) from eastern Asia. Some of these trees grow to a substantial size. We measured a mulberry tree trunk that was 90 cm in diameter, several ancient olives that ranged from 60 to 80 cm, and a number of plane and willow trees whose trunks were between 30 and 50 cm across. Plane trees were also seen around several springs and in damp soil at the bottom of the Agio Pharango gorge in the south, along stream courses in the northern uplands, and in damp places around villages.

The undergrowth of the gallery forest is a tangle of dense thickets of bramble and other shrubs. Occasionally the taller shrub storax (*Styrax officinalis*), with its white woolly twigs and leathery leaves, is seen along the Ieropotamos but is more common in the northern uplands.

Intermittent streams that flow only during the winter rainy season occur throughout the region. The streambeds are often enveloped by dense thickets of tall shrubs, such as the oleander, chaste tree, and brambles, and impenetrable stands of the giant reed. Where openings in the shrubs occur, there are often sedges, galingales, clubrush, rushes, and sometimes the grass imperata. Watercress, mint, the inconspicuous brookweed (*Samolus valerandi*), the fern *Adiantum capillus-veneris*, and rushes and sedges grow in shallow pools or around the margins of flowing springs and seeps.

Under the shade of the trees and tall shrubs are found other damp ground plants, such as the honeywort (*Cerinthe major*), with clusters of drooping yellow flowers; arum (*Arum concinnatum*); and sometimes, the large fanlike leaves of the tall and strange-looking dracunculus (*Dracunculus vulgaris*). The latter has a fetid smell and a large elongate burgundy-colored spathe around a thick fleshy column (the spadix).

Woodlands in the Northern Uplands. The Mesara Plain is flanked by rugged uplands that are encountered a few kilometers north of the plain at about 200 m elevation and rise to 600 m in the foothills of the Idaean Mountains. The dome-shaped hills and steep-sided valleys of the uplands contrast with the flat-to-gently rolling terrain of the plain. These wetter uplands are drained by rivers and streams that have eroded, deep, steep-sided valleys with a northeast to southwest orientation.

Although scattered examples can be found at lower elevations, especially in damp habitats, a number of trees and shrubs seem to prefer the moister northern uplands and foothills. These include Kermes (evergreen; *Quercus coccifera*) and white (deciduous; *Q. pubescens*) oak, Aleppo pine, maple (*Acer sempervirens*), Spanish broom (*Spartium junceum*), hawthorn (*Crataegus azarolus*), myrtle (*Myrtus communis*), and walnut.

Both Kermes and white oak grow in the uplands as scattered groves or individual trees along roadsides and on slopes. Most oaks are found at elevations greater than 300 m and become more abundant northward, although a single Kermes oak tree was seen a few kilometers northwest of Voroi. We noted oaks near the villages of Kalochorafitis, Magarikari, Grigorias, Kamares, Zaros, Kourtes, and Moroni. Near Moroni, the white oaks ranged in diameter from 8 to 62 cm and were 2 to 8 m tall, and two Kermes oaks were 12 and 15 cm in diameter, although there were larger trees elsewhere in the northern uplands with diameters of up to 70 cm and a height of more than 10 m. The majority had diameters between 10 and 25 cm; many showed evidence of heavy pruning. Kermes oaks were by far the most widespread and abundant. Of eleven locations where oaks were seen, Kermes oaks were rare to abundant, while a few white oak trees occurred at only one place.

Tree and tall shrub associates found elsewhere in the Mesara included pine and, less commonly, cypress, carob, wild almond, wild pear, and hawthorn. Hawthorn seems to be characteristic of the northern uplands, although it also occurred on the Phaistos ridge. The most common medium and low shrubs associated with the oaks (found in five or more of the eleven locations surveyed) were Jerusalem sage, wild olive, *Anthyllis/Genista*, thyme, sage, and thorny burnet.

The Kermes oak may assume a variety of forms ranging from a low shrub to a tall tree depending on grazing intensity, age, and environmental conditions. Oaks of tree size are rare in many parts of Greece, where grazing by sheep and goats is unrestricted (Rackham 1983). These large trees had obviously escaped the sheep and goats, but we did find low, scrubby Kermes oaks that had been heavily browsed. These much-browsed oaks, scarcely 0.5 m high, were growing in a low shrub community near Voriza together with Jerusalem sage, spiny broom, and other species typical of the low shrub areas throughout the Mesara.

At the upper edge of the foothills, at an elevation of about 600 m, is the first evidence that pines were becoming a predominant element, sometimes together with cypress. Some pines grow in stands in sheltered ravines or gullies, while others are scattered among the craggy rocks of the foothills of Mount Ida. Streamside vegetation in the uplands includes plane, walnut, myrtle, and, less often, poplar.

Coastal Areas. Along the Libyan Sea coast from Agia Galini to the north, southward around the cape of Accra Litton, and east to Lebena, there is about 45 km of shoreline. For 10 to 12 km, the shoreline is bordered by a broad, flat coastal plain, while the remainder has steep, rocky sea cliffs. The shoreline ranges from broad sandy

TABLE 5.8. Typical plants of coastal habitats in the Mesara region

Family	Common Name	Genus and Species	Maritime Sands	Coastal Shrublands	Other Inland Habitats
Aizoaceae		*Mesembryanthemum nodiflorum*	X		
Amaryllidaceae		*Pancratium maritimum*	X		
Caryophyllaceae		*Silene colorata*	X	?	
Chenopodiaceae	Seabite	*Suaeda vera*	X		
Compositae		*Achillea cretica*		X	
Cruciferae	Sea Rocket	*Cakile maritima*	X	X	X
Frankeniaceae	Sea Heather	*Frankenia hirsuta*	X	X	X
Gramineae	Marram Grass	*Ammophilia* sp.	X		
	Brome	*Bromus diandrus*	X		X
		Corynephorus divaricatus	X	X	
		Cutandia maritima	X		
		Desmazeria marina	X		
	Lyme-grass	*Elymus farctus*	X		
		Triplachne nitens	X		X
	Fescue	*Vulpia fasciculata*	X		?
Leguminosae		*Lotus halophilus*		X	X
	Medick	*Medicago littoralis*	X	X	X
	Medick	*Medicago marina*	X	X	
	Restharrow	*Ononis natrix*	X		
Plumbaginaceae	Sea Lavender	*Limonium* spp.	X		
Solanaceae		*Lycium schweinfurthii*		X	
Umbelliferae	Rock Samphire	*Crithmum maritimum*	X		
	Carrot	*Daucus guttatus*		X	

beaches in front of wide coastal lowlands to narrow beaches below steep sea cliffs.

Sea cliffs are exposed to strong winds and salt spray. Plants unique to the sea cliffs include such salt-tolerant species as lyme grass (*Elymus farctus*), sea heather (*Frankenia hirsuta*), purple sea lavender (*Limonium* spp.), the fleshy-leaved rock samphire (*Crithmum maritimum*), sea rocket (*Cakile maritima*), mesembryanthemum (*Mesembryanthemum nodiflorum*), shrubby sea-blite (*Suaeda vera*), spinach (*Emex spinosa*), and sea beet (*Beta vulgaris* subsp. *maritima*) (table 5.8). Several more widely distributed species are also present on the cliffs, including a number of common weeds of fields and waysides such as wild barley, brome grass (*Bromus madritensis*), bird's-foot trefoil (*Lotus cytisoides*), and several medicks. Cretan ebenus thrives on cliffs near the sea, sometimes with the less-common white-flowered Cretan milfoil (*Achillea cretica*).

There are broad sandy areas along the western coast of the Mesara for about 5 km. The sand extends from the sea, into the lower reaches of the Pitsidia and Langos Valleys, from near Kalamaki to Kommos. Where observed along the western coast near Kalamaki and the delta of the Ieropotamos River several kilometers north, these arid beach sands are virtually barren, but above the major storm line there are patches of marram grass (*Ammophila arenaria*) with scattered plants of the sea daffodil (*Pancratium maritimum*) and shrubby sea-blite.

From Kalamaki south to Kommos, the beach zone is backed up by a broad expanse of coastal sands from less than 100 m to about 500 m wide. These sands are virtually barren in summer but support a colorful assortment of species in spring. The diminutive pink catchfly (*Silene colorata*), blue pimpernel, and grape hyacinth (*Muscaria spreitzenhoferi*) grow between low, rounded bushes of yellow-flowered ononis (*Ononis natrix*). Later in the year, when most spring plants have withered, dry patches of grasses such as fescue (*Vulpia fasciculata*) and needlegrass persist. As summer progresses, two survivors on the shifting sand are ononis and silver-leaved bugloss (*Echium plantagineum*). The latter is more abundant a little farther inland, where it joins the sea squill, whose large, strap-shaped leaves emerge from huge bulbs partially buried in the sand. Plants confined to these sandy areas include sea spurge (*Euphorbia paralias*) and spurrey (*Spergularia bocconei*). Tamarisk has been planted in places along the beach at the head of the Pitsidia Valley and, as mentioned before, on the south coast near Kaloi Limenes.

Useful Plants

Sarothamnus scoparium (broom) (i.e. *S. scoparius* [L.] Wimmer ex Koch = *Cytisusscoparius* [L.] Link)

> Grows to a height of from four to ten feet; is a forest weed, valuable, however in the following respects. The *flowers* yield honey, and a yellow dye. The *foliage* is eaten by goats and sheep. The *branches* will make hedges or brooms. The *inner bark* makes coarse sacking, even paper. The *wood* is firm, white veined with brown; useful in turners. The *ashes* are said to contain much potass[ium]. (Thibaud de Berneaud, 1810, in Van der Vin 1980:361)

Although lack of soil moisture and fertility limit plant growth, the diversity of landforms, geology, soils, and plant life offer wild plant resources that embrace a wide range of uses). More than several hundred species have one or more possible uses for food, forage, spices, medicines, fuel, construction, crafts, and ceremonies—over a third of the local flora. Because many species have more than one use, the number of possible uses totals nearly five hundred (table 5.9). Plants with medicinal capabilities are the most numerous (26%), followed by those that could be gathered for food (23%), construction and crafts (15%), and animal fodder (13%).

Useful plants are unevenly distributed among the plant communities, with shrublands having the greatest number. Shrublands contain such versatile plants as lentisc—which may be used for food, forage, medicine, beverages, crafts, fuel, and ritual (see chapter 6, table 6.11)—and thyme, used for flavoring, medicine, and fuel. The plants of pastures, fallow fields, and waysides include a variety of leafy vegetables belonging to the daisy and mustard families. Many forage grasses and wild pulses are common in these habitats. But the sparse vegetation of the sandy areas yields few plant resources, except for some bulbs and tubers.

Different plants become prominent and available in different seasons; few can be collected throughout the year. Many food plants renew active growth with the onset of rains in October and November and remain abundant until mid-May. During this period, emerging young leaves and shoots are much sought after, because they are tender and rich in nutrients. Similarly, underground storage organs such as rhizomes, bulbs, and tubers are best gathered as their leaves begin to appear. They can also be collected in early summer after their above-ground shoots have withered and their food reserves have been replenished below the ground. Seeds and pods of wild pulses are available in spring; fleshy fruits such as bramble, in late summer. Plants used for flavoring, beverages, and medicines, such as thyme and wild onion, are also seasonal. Leaves and stems are best when young, while underground parts are most potent if they are gathered either before or after their season of active growth.

A plant gatherer is naturally interested in the abundance of a particular useful plant. Those plants used for food, fodder, or fuel are required in bulk, but only small amounts are needed for medicines or decorations. Although the flora of the Western Mesara is rich, some

TABLE 5.9. Potential uses of plants found in the Western Mesara (see also Appendix B, Table B.9)

Use	Number of Potential Uses	%
Food	114	23.0
Flavoring	19	3.8
Beverage	17	3.4
Ritual or Ceremonial	15	3.0
Decoration	16	3.2
Fuel	17	3.4
Crafts or Utility	73	14.7
Medicinal	128	25.8
Poison	32	6.5
Animal fodder	65	13.1
Total	496	100.0

Sources: Akroyd and Doughty (1964), Ayensus (1979), Bianchini and Corbetta (1977), Boulos (1985), Chakravarty (1976), De Legnano (1973), Fogg (1941), Forbes (n.d.), Galt and Galt (1978), Grieve (1974), Huxley and Taylor (1977), Jones (1953), Krochmal and Lavrentiades (1955), Le Houerou (1981), Maybey (1977), Niebuhr (1970), Personal observation, Polunin (1969), Polunin and Huxley (1965), Prinea (n.d.), Sfikas (1979), Tanaka (1976), UNESCO (1960), Usher (1974), Vedel (1977), Wickens et al. (1985), Zohary (1973).

plant species are widespread and abundant while others are localized in their distribution. We measured the distribution and abundance of the various plant species by their presence, frequency, and cover. Presence refers to the number of locations sampled in which a species occurs. It is a measure of how widespread the plant is within the area. Some species such as the blue pimpernel, used for medicine, are found everywhere. In contrast, one food plant, rock samphire, grows only on the sea cliffs.

Frequency expresses the degree of distribution within a location. Some species, such as pimpernel, are widely distributed and are found in almost every plot sampled. These species have a high frequency. Others, such as stinking mayweed, used in herbal remedies and as an insecticide, are localized and confined to a few sample plots within each location and have a low frequency. Thus a plant gatherer must search carefully over a wide area to find stinking mayweed but can easily find pimpernel.

The percentage of ground covered by a plant species is an index of the quantity of that plant in an area. Cover depends upon the growth form and height of the plant. For example, the medium shrub lentisc, which grows about 1 to 2 m tall, makes up at least 2.5% and often as much as 15 to 75% of the ground cover in the shrub layer at 43 (21.3%) of the 202 sites. It could thus be harvested from these sites in quantity. On the other hand, it would take a long time to gather a quantity of the tiny pimpernel, which has a cover of less than 2%.

Some wild plants are still being used. For instance, we observed a variety of pot herbs being collected for food, such as the young leafy shoots of members of the mustard family like bastard cabbage (*Rapistrum rugosum*) and *Erucaria hispanica,* or the fresh green leaves and stems of the daisy family prickly lettuce (*Lactuca serriola*), chicory, and goat's beard (*Tragopogon* spp.). Chrysanthemum, wild oats, and other tall grasses are often gathered for forage.

Common culinary spices include the leaves of thyme and sage, which are gathered on the young shoots and then dried in bunches. These plants are also ingredients in herbal medicines, along with a host of others, including olive, cypress, lentisc, oleander, and chamomile (*Anthemis chia*). Lentisc, spiny broom, olive, and oak were some of the woods traditionally burned for fuel. Olive, oak, cypress, and the giant reed are common construction materials. Baskets are woven out of strips of plants that have strong flexible branches, such as rushes, chaste tree, Spanish broom (*Spartium junceum*), and storax. Plants such as lentisc and chrysanthemum also play a part in religious rituals.

It is difficult to assess the role of wild plants in the local diet today (but see chapter 6). They are undoubtedly far less important than they were a generation ago. Reports from the Argolid on mainland Greece indicate that wild greens are eaten once a week during the six months of the year that they are available (Clark Forbes 1976b), though perhaps not in great quantities (an estimated 9 kg per person per year). Such wild greens are rich in vitamins A and C and in minerals such as calcium, potassium, and iron, while the staple foods (cereals and olives), are low in these nutrients (Clark Forbes 1976a; Watt and Merrill 1963). Although wild pulses are time-consuming to collect, they are richer in proteins than most cultivated legumes and, as with the cultivated legumes, can serve to complement the amino acid deficiencies in starchy cereals (Aykroyd and Doughty 1964).

It is even more difficult to estimate the role of wild plants in the prehistoric past (Clark Forbes 1976a). Leafy greens and underground roots and tubers have little chance of becoming preserved in the archaeological record. In addition, the tools used for collecting and preparing wild plant foods (picks, knives, collecting containers, grinding stones) are similar to those used in farming. There is thus scant evidence of the use of wild plants for the archaeologist to retrieve. There is often more archaeological evidence for the use of wood, especially fuel, because charred wood preserves well.

Although other sources of fuel are now available, the gathering of firewood is still a feature of daily life for some households throughout rural Crete (chapter 6). Few recent figures are available, but a survey carried out in 1948 (Allbaugh 1953) found that 80% of rural Cretan families heated their houses with wood. Some charcoal is still produced and used for fuel in Crete. Although much wood is consumed in producing charcoal, charcoal is lighter, more economical to transport, and burns more efficiently than wood. In the vicinity of Kommos, charcoal has been produced annually by itinerant charcoal makers (J. Wright, pers. comm.; chapter 6).

Through crop cultivation, wood harvests, and other means, humans have profoundly altered the landscape of the Mesara. Some view such alteration as detrimental, others as beneficial.

Human Influences on the Landscape

> "It is now generally agreed that the Mediterranean region has suffered more than other regions in the world from landscape decay and desiccation, not because of adverse climatological changes . . . but as a result of man's misuse of this landscape." (Naveh and Dan 1973:373)

> "Man's intervention has not always meant the impoverishment of species diversity . . . on the contrary . . . man has created a mosaic of landscapes and has also provided new evolutionary chances to a number of species—above all to the grasses and annual herbs." (di Castri 1981:31–32)

As these quotes illustrate, two contrasting viewpoints permeate the writings about the nature of human impact on Mediterranean ecosystems. By considering both views, we may be able to achieve a more balanced understanding of the cultural and natural forces that have shaped the Mesara.

The Western Mesara has been occupied since Late Neolithic times (chapter 4). Thus for six thousand years the natural diversity has joined with human influences to create the present admixture of cultivated and seminatural plant communities (figure 5.9). Human influences can be grouped into five general types: the clearing of land, the introduction of foreign species, fire, overgrazing, and plant gathering.

LAND CLEARANCE

The clearing of land for cultivation, settlements, and other purposes has had dramatic effects on the landscape. Removal of the natural vegetation, especially on slopes, leads to widespread soil erosion unless protective terraces are built and maintained or unless the ground is recolonized by stabilizing plant cover. As in the Middle East, the plant families most commonly represented

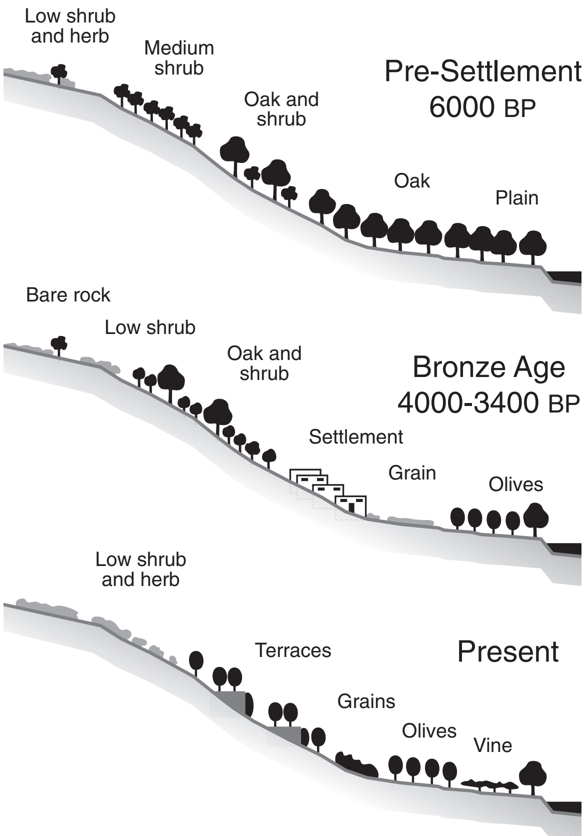


FIGURE 5.9. Schematic landscape section showing vegetation changes from 6000 BP to the present

among the weedy invaders are the mustard (Cruciferae/Brassicaceae), legume, parsley, daisy, and grass families (Zohary 1973).

INTRODUCTION OF FOREIGN SPECIES

The introduction and spread of foreign species has led to changes both in the landscape and in the composition of plant communities. Exotic plants have been introduced into Crete since the Neolithic period, when the first crops were brought to the island to be cultivated, and were probably accompanied by a number of weedy species. Since then hundreds of new plants have been added, many unintentionally. Barclay (1986) indicates that the flora of Crete includes ninety-two introduced wild plants. Turland, Chilton, and Press (1993) put this figure at seventy-six, not including those now completely naturalized. Fifty of the introduced species are considered to be weeds or behave as weeds in irrigated fields (Yannitsaros 1991) with eight to ten causing serious problems.

FIRE

Fire is another pervasive influence on Mediterranean vegetation (Naveh 1974; le Houérou 1981). Hot, dry summers and strong winds make the region highly susceptible to fires (Chandler et al. 1983). Some fires are naturally caused, but many are set by farmers or shepherds to clear land or improve pastures. It is said that Cretan shepherds traditionally burned certain grazing lands every few years in efforts to improve forage for their animals (Papanastasis 1977; Rackham, pers. comm.). There are a number of morphological and physiological characteristics that make many Mediterranean woody species prone to fire and adapted to recover from it. These characteristics include low moisture content; abundant resins, oils, and volatile products; persistence of dead wood; and a high rate of growth during the first years of resprouting (Papio and Trabaud 1991).

Genista is particularly susceptible to fire, as it contains a relatively large quantity of flammable twigs less than 2.5 mm wide. Although rock rose is less prone to fire, it contributes appreciably to an increased fire hazard when it grows with other shrubs, because it has a high proportion of thin twigs. Lentisc presents an intermediate situation, while rosemary has a fuel accumulation similar to that of lentisc, but the proportion of dead material is lower (Papio and Trabaud 1991).

The structure and function of shrublands is maintained by fire, and it is believed that fire may have been an important selective force in the evolution of these communities. Christensen (1985) suggests that the absence of fire may be more of a stress to shrub communities than fire itself but acknowledges that in most Mediterranean shrublands the complete absence of fire is a moot issue. Natural fire regimes in many shrublands have been altered, however, as a result of fire-suppression policies (Pyne 1982; Radtke, Arndt, and Wakimoto 1982; Minnich 1982).

Mediterranean shrub communities are generally resilient to fires at a frequency range of every 20–50 years (Keeley 1986), although the effects of fire may vary widely depending upon the season, weather conditions, topography, and amount of combustible material available. After a typical dry season burn, the ground is littered with blackened stems and patches of scorched earth, ash, and charcoal. Nutrients in the ash are a boon to renewed plant growth. This flush of nutrients stimulates a short-lived growth of annuals in the grass, vetch, and daisy families, and perennials in the lily family (wild onion and asphodel), which sprout from underground bulbs. Perennial grasses such as hyparrhenia also show a marked increase in flowering after fire.

A study of fifty-seven species common after fire in chaparral (Keeley and Keeley 1987) showed that more than half of the species germinated without the presence of charred wood and without being exposed to heat shock. These included herbaceous perennial monocotyledons, most herbaceous perennial dicotyledons, and a number of annuals. The presence of charred wood resulted in a significant enhancement of germination for 42% of the species studied. Some perennials exhibited an almost obligatory requirement for charred wood. Significant enhancement of germination in the presence of charred wood has been reported for species in nine plant families: daisy, borage (Boraginaceae), mustard, pink (Caryophyllaceae), willow-herb (Onagraceae), poppy (Papaveraceae), phlox (Polemoniaceae), madder (Rubiaceae), and figwort (Scrophulariaceae).

The dominance of herbaceous species is soon replaced by woody plants, some of which have adapted their reproductive cycles to fire (Keeley 1986). Some woody species, such as lentisc, carob, and Kermes oak, rely mainly on vegetative resprouting, while others, such as spiny broom, thorny burnet, thyme, and several species of rock rose, resprout but also regenerate from seeds. Resprouting shrubs continually rejuvenate their canopy by sprouting from the base and so are able to survive frequent fires as well as fires that occur between long intervals. Species that regenerate primarily by seed germination are not resilient to wide deviations from a fire frequency of 20–50 years. More frequent fires tend to eliminate these species, and longer intervals may do so as well (Keeley 1986). If repeated frequently over an extended period, fires may reduce or eliminate the taller shrubs in favor of annuals and other herbaceous plants, including many species of foreign grasses and legumes (Godron et al. 1981).

Species diversity is also maintained by fire. Species richness tends to be highest directly after a fire and then declines (Christensen 1985). If the seed bank in the soil is included, however, species richness changes very little during the fire cycle for many shrublands. Most species that germinate after a fire do so from a preexisting seed bank, although these banks can be replenished from adjacent communities (Westman 1979). Adventitious species are relatively uncommon. During the fire cycle, one community is not replaced by another; rather, there is a progressive return of species that were present previously with the temporary superposition of some species (Trabaud and Lepart 1980). Christensen (1985) suggests that fire may actually be more important to the evolution of richness in shrublands than to their maintenance and that this may account for the high richness and endemism of many shrubland floras.

These general patterns of regeneration were borne out by our survey of a several-hectare area near Listaros that had burned two years previously. According to local villagers the fire lasted for two days, suggesting that it had been relatively severe. Blackened stalks of dead spiny broom, thorny burnet, and wild pear trees were everywhere. But there was ample evidence of resprouting, particularly in thorny burnet, tree mallow (*Lavatera* sp.), Cock's foot grass (*Dactylis glomerata*), and asphodel. Jerusalem sage, asparagus, field eryngo (*Eryngium campestre*), gladiolus, grape hyacinth (*Muscaria* sp.), and a host of annuals such as bird's-foot trefoil (*Lotus* spp.), brome grasses, and restharrow (*Ononis spinosa*), a perennial, were among the forty-five species recorded.

Studies in California shrublands show other possible influences, including those on soil, surface runoff, and erosion. Fire may reduce the infiltration rate of water into the soil by forming a water-repellent layer below the soil surface, a layer that will increase surface water runoff (De Bano 1974). Thus, by both removing plant cover and allowing more surface runoff, fire may accelerate soil erosion (Radtke 1978; Jackson 1984).

GRAZING

Among the local domestic livestock, sheep and goats are by far the most numerous (chapter 6).

Sheep graze on herbaceous vegetation, while goats often browse on shrubby plant growth. Both feed in fields and pastures and are also free ranging in the surrounding shrublands. Sheep and goats alter the species composition of shrublands by selectively eating palatable species and avoiding others. Eating young shoots of palatable grasses may actually stimulate their growth, but eating the shoots of such shrubs as Kermes oak may keep them low or eliminate them altogether (le Houérou 1981; Rackham 1983). Less-palatable shrubs, such as spiny broom, thyme, Jerusalem sage, and germander, and herbs, such as wild carrot, bugloss (*Echium* spp.), and spiny thistles (for example, *Carlina macrocephala, Onopordum* spp.) expand with grazing (le Houérou 1981).

Those species left ungrazed are thought by some authors (Zohary 1973; le Houérou 1981) to have evolved unpalatable characteristics. Some unpalatable species have recognizable features, such as the spines on spiny broom, thorny burnet, and a number of members of the daisy family (for example, *Pallenis, Centaurea, Onopordum*). Other species are relatively unpalatable because of their woody growth form, while a third group possesses chemical compounds in their leaves that discourage grazing. Such chemical defenses are used by members of the mint and parsley families. A study that examined the response of Mediterranean grasslands to cattle grazing and protection (Noy-Meir, Gutman, and Kaplan 1989) found, however, that the attribute most strongly associated with grazing response was plant growth form. Tall erect plants usually decreased with grazing, while small, prostrate, or rosette plants usually increased. Erect plants of medium height generally had an intermediate response. Noy-Meir, Gutman, and Kaplan (1989) suggest that the response of plants to grazing does not depend on palatability and that, in addition to growth form, the factors that determine the response of a plant to grazing are the rate and timing of leaf and shoot elongation and the length of the growing period.

A study of semiarid rangelands in Israel (Noy-Meir 1990) also found that perennial thistles and a spiny shrub increased when protected from grazing. This seems to contradict the idea that spininess is an antigrazing adaptation, but Noy-Meir suggests that perennials are subject to heavy grazing pressure because their leaves are produced earlier than most annuals and their leaves remain available for some time during the dry season. When spines, prostrate habit, and chemical repellents do not outweigh this grazing pressure, plants generally considered unpalatable will decrease with grazing.

The Noy-Meir (1990) study also suggests that the removal of seeds by grazing during the dry season may be important in determining the response of vegetation to grazing. It was found that, among annuals, small-seeded species dominated the grazed area while species with larger seeds dominated the protected area. This could be directly related to grazers, particularly sheep, removing plant litter, including seeds, from the surface in the grazed area.

Apart from eating the plants, sheep and goats trample the vegetation and create a complex network of paths through the shrublands, thus exposing the soil to erosion. They may also spread plants from one area to another. As animals pass through the vegetation, seeds of annual grasses (for example, *Avena* spp.) and legumes (for example, *Medicago* spp., *Scorpiurus* spp.) with barbs or hooks may become attached to their woolly coats and dislodged elsewhere (Schmida and Ellner 1983).

We had the opportunity to assess the effects of grazing in an area of the Asterousia Mountains between Odigitria and Listaros. A 3-m-high enclosure contained strikingly different vegetation from that outside (plate 5.7). Many species occurred on both sides of the fence, such as spiny broom, thorny burnet, thyme, rock rose, Jerusalem sage, asphodel, and sea squill, but they were twice as tall and in larger clumps inside the enclosure. Other plants had been virtually eliminated by grazing**.** These included wild oats, hawksbeards (*Crepis* spp.), plantains (*Plantago* spp.), and rushes.

PLANT GATHERING

The gathering of plants for food, fuel, and other purposes may have major or minor effects on shrublands, depending upon the type and quantity harvested. As cited in the literature, those used for food and medicine are not usually collected in large enough quantities to permanently change the vegetation. In contrast, the intensive harvesting of firewood can have lasting effects.

Human influences have not operated uniformly over time and space. Not only have influences differed between lowlands and highlands, they have waxed and waned depending upon cycles of population and economy.

Human Influences on the Vegetation: Lowland vs. Highland Zones

> "This symbiosis with the sea does not involve only ecosystems, but also man during his long history in the Mediterranean . . . The littoral fringe is at present the critical edge of the Mediterranean environment." (di Castri 1981:42)

> "So the Mediterranean means more than landscapes of vines and olive trees and urbanized villages (of the lowlands); these are merely the fringe. Close by, looming above them, are the dense highlands, the mountain world." (Braudel 1966 1:26–27)

Crete, as well as other parts of the Mediterranean, has lowland and highland zones in which the plant life, population density, and land use differ (appendix B, table B.11). Human population, and thus the most intensive land use and environmental impact, are concentrated in the lowlands from sea level to about 300 to 400 m. For example, in 1961, 53% of the population of the southern half of Crete lived below 400 m (appendix B; table B.14). Most of the annual crops, including cereals, tree crops, and vines, were cultivated in the lower elevations. Such tree crops as olives have definite altitudinal limits (about 800 m), because temperatures at higher elevations are too cool for their successful growth. It should be noted, however, that 31% of the land mass of the Western Mesara lies above this elevation. A number of the common trees, such as pine and cypress, range above the elevation of the human population. Such higher altitude forests have probably experienced much less human impact than those at lower elevations because they are remote. An account of the seventeenth-century traveler William Lithgow notes the extensive cypress forests of Mount Ida. In 1610 he wrote:

> "Mount Ida is the highest Mountain in Crete, and by the computation of Shepheards feete, amounteth to sixe miles of height. It is over-clad even to the toppe with Cypre trees and good store of medicinable hearbes." (in Warren 1972:71)

Lithgow's description of the extensive tree cover of Cypre (cypress) on the slopes of Ida is corroborated by later writers such as Spratt (1865). One hundred years later, Zohary and Orshan (1965) note that some of these forests have survived until recent times. Lithgow's mention of a "good store of medicinable hearbes" suggests that there were open plant communities as well.

CYCLES OF LAND CLEARANCE AND ABANDONMENT

As elsewhere in Greece (Van Andel and Runnels 1987) and the Mediterranean (le Houérou 1981), the Western Mesara has undergone fluctuations in population, economy, and land use. The archaeological survey (chapter 10) found a marked difference among the number of sites dating to various ancient periods. Settlement during Middle and Late Minoan times (circa 2000 to 1200 BC) seems to have been more intensive than in the subsequent Geometric and Archaic periods (circa 1000 to 500 BC). Some areas that were once extensively occupied have since been abandoned. This is true of the uplands southeast of Matala, an area that was heavily settled during Classical, Hellenistic, and Roman times (circa 500 BC to AD 320) but since then has been used only for grazing sheep and goats. The links between such population fluctuations and the landscape can be illustrated by the following hypothetical example. Note that the cycle applies mainly to the lowlands.

We surmise that during periods of growth and prosperity, new lands would be cleared, terraces and other works built, flocks of grazing animals expanded, perhaps new settlements established, and roads and trails improved (table 5.10)). The removal of plant cover and the cultivation of upper slopes would render them prone to erosion unless stabilizing terraces were built. Areas with better soils would become more intensively managed, perhaps through new crops, irrigation, fertilization, and/or more frequent cropping. Expansion of the economy and local industries, such as metalworking and

TABLE 5.10. Land use and environmental impact at different elevations in relation to economic conditions

	Lowlands (0–350 m)			Highlands (350–700 m)		
General Economic Conditions	Population and Settlement	Land Use	Impact and Erosion	Population and Settlement	Land Use	Impact and Erosion
Growth	Substantial increase; urbanization	More intensive, with emphasis on export crops and anima products; new crops introduced; grazing pressure increases	More intensive with new land cleared, especially marginal land	Some population growth but less than in the lowlands	Somewhat more intensive although less emphasis on export crops, more production of animal products	Somewhat more intensive, especially through grazing
Decline	Substantial decline; abandonment of some ports and lowland towns	Less intensive; emphasis on subsistence crops	Less intensive, some land abandoned	Some population loss, although population may increase because of influx of people from the lowlands	May be more or less intensive depending upon population levels	Less intensive, depends on population levels and intensity of land use

pottery making, would increase the demands for fuel, building materials, and other local products. Increased wood harvesting could lead to increased erosion. Larger flocks of animals would also place more grazing pressure on pastures and shrublands. In contrast, when populations declined, some cultivated land would be abandoned and revert to shrubland in a few decades. Soil erosion would decline unless grazing and wood harvesting continued (Van Andel, Runnels, and Pope 1986).

Based on our knowledge of present environments, agriculture, vegetation, and human influences in the Mesara, we can speculate about past vegetation and agriculture.

PART III: VEGETATION HISTORY AND AGRICULTURE IN THE NEOLITHIC AND BRONZE AGES

The Reconstruction of Vegetation History

Questions regarding the nature of past vegetation based on paleobotanical evidence are not easy to answer for a number reasons, including the following:

- Some plants are overrepresented in the pollen rain while many others, notably those of shrubs, are underrepresented.
- Pollen grains can be carried great distances by the wind, and those from afar may give a false impression of local abundance.
- Pollen cores generally come from coastal lakes and marshes and represent lowland vegetation. Unfortunately, lakes and marshes are rare in uplands and hence there are few records of upland vegetation history.
- Few plant macrofossils (seeds or charcoal) have been retrieved from datable horizons in the Western Mesara.
- Only one pollen core has been analyzed in the Western Mesara, and it is incomplete.
- It is not easy to discern the causes of past vegetation change because it is difficult to separate the effects of climate and human

influence using the botanical records of plant remains (pollen and macrofossils) in the Mediterranean (Bottema 1982, 1994; Vernet and Thiebault 1987; Bottema et al. 1990; Badal, Bernaben, and Vernet 1994).

Thus, attempts to reconstruct past vegetation must, at present, rely on the meager pollen and macrofossil evidence. A brief chronology of vegetation and human history follows.

INFERRED VEGETATION HISTORY: LATE PLEISTOCENE AND HOLOCENE (RECENT)

The Late Pleistocene and Holocene vegetation history of Crete was linked with the rest of the Mediterranean and southern Europe (van Zeist and Bottema 1982; Huntley and Birks 1983; Delcourt and Delcourt 1987). During the last glacial period, from about twenty-five to eleven thousand years ago, lowland areas were dominated by a dry treeless steppe (grassland). By ten thousand years ago forest had replaced steppe over most of the region, and typical Mediterranean evergreen shrubland first appeared in southern Greece. By about six thousand years ago the present major vegetation types had become established across Europe and the Mediterranean. Since that time, the course of vegetation change has been heavily influenced by human activities, including land clearance, cultivation, fire, and overgrazing (Delcourt and Delcourt 1987; Bottema 1994). This has been accompanied by a rise in the pollen of domesticated plants, notably olive.

What was the climate like and what did the landscape look like during the Bronze Age? The climate of the western Mediterranean (Terral and Arnold-Simard 1996; Yll et al. 1997) and much of the eastern Mediterranean and Near East (for example, Bottema 1991) during the early Holocene seems to have been cooler and wetter than today. Recent pollen diagrams with multiple radiocarbon dates from the Peloponnese (for example, Jahns 1993; Atherden, Hall, and Wright 1993; Zangger et al. 1997) do not clearly confirm this, however. How much and how rapidly the climate changed during the middle and late Holocene is the subject of speculation. Presumably, the trend toward drier and warmer conditions began sometime before 3000 BC. If the climate of Crete became warmer and drier, rainfall variability would probably have increased and been accompanied by more frequent storms, with their potential for soil erosion. Greater variability may have also meant more extremes of temperature, such as more frequent winter frosts and summer heat waves, and perhaps more frequent fires.

NEOLITHIC AND EARLY MINOAN LANDSCAPE CIRCA 4000–2000 BC

What was the vegetation in the Western Mesara before, during, and after the Bronze Age? How did vegetation change in relation to changes in climate and human settlement?

Prior to circa 4000 BC, there would probably have been no human settlement in the Western Mesara, and the landscape would have looked different from today (chapter 2). The sea level would probably have been lower by several meters, there would be no extensive sand dunes along the coast, the Ieropotamos floodplain would have been narrower, and a dark red Pleistocene soil would have mantled much of the area. Sediment cores taken on the floodplain below Phaistos suggest that thick deposits of alluvium were laid down as sea levels rose.

Unfortunately, there is little evidence that can help us to reconstruct the composition of early vegetation in the Western Mesara. The most pertinent pollen study is one from the mouth of the Platys River near Agia Galini, about 5 km along the coast from Kokkinos Pyrgos and about 12 km from Phaistos (Bottema 1980: Map Figure 1). Another is from the Tersana salt marsh on the north coast, but this is 75 km northwest of Agia Galini (Moody 1987; Moody, Rackham, and Rapp 1996). A third is even more remote. It is a sea core that was retrieved 120 km off the south coast of Crete and reported by Rossignol and Pastouret (1971).

Clearly, Bottema's (1980) study should be able to provide the most relevant information. Unfortunately, the core has only one radiocarbon date, that of about 6300 (8265 ± 50 BP uncalibrated), below the surface, which is too early to be of help. Bottema (1980) makes it clear that evidence from the pollen is far from complete, but it does give some clues regarding past vegetation.

According to the Agia Galini pollen diagram (Bottema 1980), forest, dominated by deciduous oaks, was the prevailing vegetation of the region before circa 6300 BP (4300 BC). This is based upon the high percentages of deciduous oak (*Quercus cerris*-type) pollen together with the pollen of pine (*Pinus*) and evergreen oak (*Q. coccifera*-type). Other pollen types include vines such as ivy (*Hedera*), wild grape (*Vitis*), and an assortment of herbs.

Bottema estimates that sometime between 6300 and 5000 BP (4300 and 3000 BC), the forested area was reduced and was replaced by vegetation of a more open character. How rapidly this took place is uncertain, because there is a gap in the pollen profile between these two estimated dates. The vegetation after about 5000 BP (3000 BC) was composed mostly of herbs, including asphodel (*Asphodelus*) and members of the daisy (Compositae), grass (Gramineae), and goosefoot (Chenopodiaceae) families. Shrubs would have probably been present, but most of them produce little pollen and are likely to be underrepresented, but there were a few pollen grains of lentisc (*Pistacia* sp.) and rock rose (*Cistus*). Direct human influence on the landscape is indicated by the presence of a few grains of cereal and olive pollen. Above this level in the core, no pollen was found.

NEOLITHIC AGRICULTURAL CROPS AND LIVESTOCK

Our knowledge of agricultural crops from the Neolithic through the Minoan period in the Western Mesara and elsewhere in Crete and the Aegean is severely limited by the paucity of direct evidence (Hansen 1994; Hamilakis 1996). There are few sites where plant remains have been analyzed, because excavators have paid scant attention to their systematic recovery. Particularly noticeable is the lack of material from Neolithic, Early Minoan, and Middle Minoan sites (table 5.11). A further difficulty is that seed types (some cereals) that are parched over a fire during processing are more likely to be preserved and therefore better represented than those that are not parched (pulses, fruits) (Wilson 1984). In addition, even if charred, some pulses may sink and not be recovered through froth flotation (Sarpaki 1992). Thus, the following discussion is based on extremely limited evidence and must be considered speculative.

Neolithic immigrants probably brought agriculture to Crete, perhaps from the Anatolian mainland (Dickinson 1994). Finds at Knossos show that they kept domestic sheep, goats, cattle, and pigs and grew several species of wheat (bread wheat [*Triticum aestivum*], einkorn [*T. monococcum*], emmer [*T. turgidum = T. dicoccum*]), barley (hulled, *Hordeum vulgare* subsp. *disticum*) and naked barley (*Hordeum vulgare* subsp. *vulgare*), and lentils (*Lens culinaris*) (table 5.11). It is not surprising that lentils were the first introduced, because they are probably the most adaptable of all common pulses (appendix B, table B.6).

MIDDLE AND LATE MINOAN LANDSCAPE 2000 TO CIRCA 1000 BC

The landscape may have resembled that of today, but with less evidence of soil erosion, a lower sea level, and less sand accumulation (chapter 4). Because of poor soil conservation and/or climatic change, widespread erosion apparently began in Early Minoan times (between 3300 and 2250 BC) with more extensive erosion during the Late Minoan period, roughly between 1550 and 1200 BC. Thick deposits of sand at the mouths of several small valleys near the coast were not present until the Middle Minoan period.

The charcoal and seeds from Middle and Late Minoan levels at Kommos on the coast near Matala suggest that the landscape during Minoan times circa 2000 to 1000 BC included cultivated and seminatural communities (Shay and Shay 1995). Of the twenty-one trees and shrubs identified, olive, cypress, pine, almond, fig, and carob could have grown in cultivated orchards, tree groves, or shrub communities. Wild shrubs and trees included ononis, lentisc, spiny broom, buckthorn, bean trefoil, heather, thymelaea, juniper, and tamarisk. Some wood, such as plane and willow, probably came from streamside habitats such as the floodplain of the Ieropotamos River. Further north, the uplands at elevations above 400 m could have provided deciduous and evergreen oak, and maple. Oak and maple might also have grown close to Kommos during Minoan times.

Table 5.11. The presence of crop remains by period in the Mesara and elsewhere in Crete

				No. of Sites at which Specified Crops are Present							
				Neolithic		Early Minoan		Middle Minoan		Late Minoan	
		Crops		Mesara	Elsewehere in Crete	Mesara	Elsewehere in Crete	Mesara	Elsewehere in Crete	Mesara	Elsewehere in Crete
Cereals		Wheat	*Triticum* spp.	—	1	—	2	1	2	1	5
		Barley	*Hordeum* spp.	—	1	—	1	—	—	2	5
		Oats	*Avena* sp.	—	—	—	1	—	—	—	—
Pulses	Large seeded	Broad bean	*Vicia faba*	—	—	—	—	—	—	1	5
		Lentil	*Lens culinaris*	—	1	—	—	—	—	1	6
		Pea	*Pisum sativum*	—	—	—	—	—	1	1	3
			Pisum elatius	—	—	—	—	—	—	—	2
			Pisum sp.	—	—	—	—	—	—	—	
		Chick pea	*Cicer arietinum*	—	—	—	—	—	—	1	1
	Small seeded	Grass pea	*Lathyrus sativus*	—	—	—	—	—	—	1	1
		Bitter vetch	*Vicia ervilia*	—	—	—	—	—	—	1	4
			Vicia clymenum	—	—	—	—	—	—	—	1
		Other	*Vicia / Lathyrus*	—	—	—	—	—	—	—	2
Tree and vine crops		Olive	*Olea europaea*	—	—	—	2	2	—	3	1
		Grape	*Vitis vinifera*	—	—	—	1	2	—	2	4
		Fig	*Ficus carica*	—	—	—	—	—	—	1	1
		Almond	*Prunus amygdalus*	—	—	—	—	1	—	1	—
Total number of sites				—	1	—	3	2	2	3	15

Sources: Sarpaki and Jones 1990; Kroll 1991; Sarpaki 1992; Shay and Shay 1995

Lowland and coastal communities may have lacked adequate supplies of timber and firewood. Kommos, as a center of metallurgy during Late Minoan times (Blitzer 1995), would have required considerable quantities of wood or charcoal fuel. Some of the woods such as oak used at Kommos during Minoan times may have come from the northern uplands.

Areas that lacked timber may have had other resources for construction, such as the common reed. Common reeds are abundant in marshes, and today, a close relative, the giant reed, is widely used for roofing, fences, and other purposes. It was not available in the Bronze Age, having been introduced into Crete later (Turland, Chilton, and Press 1993). Marshes and streamsides would also be the place for gathering materials for baskets, such as willow, storax, reedmace, and rushes.

MINOAN AGRICULTURAL CROPS AND LIVESTOCK

It is not known when olives and grapes were introduced into the Mesara, but material from other parts of Crete (for example, J. Renfrew 1972; Blitzer 1993; Moody, Rackham, and Rapp 1996) suggests that it was by Early Minoan II (circa 2500 to 2200 BC), if not earlier. Olive trees have a long life span, and much knowledge, time, and effort is involved in their propagation and cultivation (chapter 6; Gavrielides 1976b). It would take many generations to establish reliable olive oil production (Blitzer 1993). Unfortunately, the importance of olives or grapes during these periods is uncertain (Hansen 1994, n.d.; Renfrew 1996; Hamilakis 1996).

Late Minoan Crete apparently witnessed a dramatic increase in the number of crops (table 5.11). Cereals, olives and, vines were augmented with peas, chickpeas, broad beans, grass pea, bitter vetch, and figs (Sarpaki 1992). This dramatic change may have been due in part by the fact that few earlier sites in Crete have been analyzed in detail for plant remains (Glynis Jones, pers. comm.). Assuming that the addition of these crops is not an accident of sampling, what difference might they have made to agriculture and diet? Most pulses demand more soil moisture than cereals and are quite susceptible to pests and diseases (appendix B, table B.6). Because their seeds ripen over a period of weeks, they cannot be harvested all at once (López-Bellido 1992). Most contain nitrogen-fixing bacteria in their root nodules and can considerably enrich the soil with this crucial nutrient. Used in rotation, they improve the soil, and this enhances yields of other crops. Pulses are known for their high protein content (Aykroyd and Doughty 1964; Dunne 1990), but some may cause favism, a type of anemia, and lathyrism, a neurological disorder (Summerfield and Roberts 1985; Hansen n.d.).

Presses for processing olive oil and/or grapes have been found in Late Minoan contexts at Kommos (Blitzer 1995) and at major sites across Crete (Hamilakis 1996). Olive oil, grapes, figs, and almonds were used as food and in ceremonies (Hamilakis 1996; Palmer 1996; Wright 1996). Wine, olive, and almond oil were also used in making perfume (Shelmerdine 1985).

The same domesticated animals that were brought to the island during the Neolithic period are reported for the Minoan era (Reese 1995). The presence of cattle at Kommos suggests that the ox-drawn plow was used (Reese 1995) although there is no direct evidence of this. The introduction of animal traction and the plow to Crete and mainland Greece may have expanded the range of agricultural production (Pullen 1992) but the management of draft animals is time-consuming (Pryor 1985); as much as five times more time is needed than that for sheep and goats (Pepelasis and Yotopoulos 1962). Plowing is a mixed blessing, though, for while it removes unwanted weeds, it also exposes the soil to evaporation and erosion.

New crops, particularly pulses and fruits, probably encouraged innovations in conserving and managing soil moisture. We assume that cereals and pulses were planted in the fall, when water would be available for their early growth. Spring-planted crops would be vulnerable to early summer drought unless planted on deep soils (Forbes 1982). Irrigation of small plots from the Ieropotamos River or around springs is possible, but there is no evidence for this. There is evidence, however, that several terraces or check dams were built in Minoan times, presumably to conserve water and control soil erosion (chapter 4; Hope Simpson et al.1995; Gifford 1995). In addition, hand weeding, crop rotation, and fallowing could have been used to conserve precious soil moisture.

The Minoans undoubtedly had an impact on the local wood resources, considering the traditional consumption of fuel wood (perhaps more than 1,000 kg/household/year, H. Blitzer, pers. comm., 1987). Most wood at Kommos was probably used for household cooking, metalworking, or lime production, although pieces of an evergreen oak beam were also recovered. Two hardwoods (olive and evergreen oak) and two conifers (cypress and pine) made up nearly 70% of the charcoal found. However, there was a striking change between 1500 and 1300 BC, when evergreen oak fell from 54 to 5% (Shay and Shay 1995) (figure 5.10). Cypress, olive, and pine all increased during this period.

What caused the dramatic decline of evergreen oak? Climatic change is possible, although

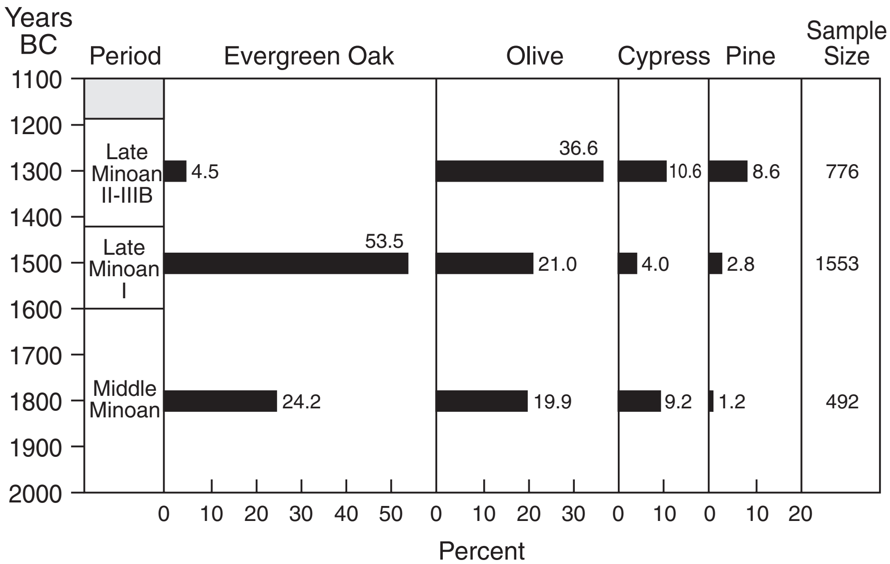


FIGURE 5.10. Tree charcoal from Kommos (Middle–Late Minoan levels)

it is difficult to evaluate. As noted above, the nature of late-Holocene climatic change in the Mediterranean is unclear. Any shift to drier conditions would be aggravated by land clearance, because erosion from cleared slopes would leave little soil cover to hold moisture, and there is evidence of extensive soil erosion in the Western Mesara during Minoan times (chapter 4).

The decline in Mediterranean forests by harvesting is an explanation popular among scholars (for example, Bottema et al. 1990). This may have been true on a smaller scale in the Bronze Age, as implied by changes in charcoal composition at sites in Anatolia (Willcox 1974), Iran (Miller 1985), and southern Spain and France (Badal, Bernaben, and Vernet 1994). Badal, Bernaben, and Vernet (1994) suggest gradual deforestation. Indeed this may have occurred around Kommos, but if so, the oak decline would have been gradual. Its almost complete removal by cutting, burning, or overgrazing would have been difficult (Rackham 1983; Tsiouvaras 1987). The shift to cypress and pine is consistent with the ecology of these two taxa, because they invade areas where other forest and shrublands have been cleared. In sum, it appears that both climate and human activities could have contributed to the decline of evergreen oak manifest in the charcoal samples.

SUMMARY

- The Western Mesara is diverse in geology, landforms, climate, and soils. It has a semiarid climate with summer drought, although rainfall varies from less than 500 mm per year near sea level to about 1,000 mm at 600 m elevation. Bedrock is predominantly limestone, landforms range from flat plains to rugged uplands, and soils have low to moderate fertility.
- A lack of soil moisture and nutrients limits agricultural production, which may be further reduced by periodic floods and droughts. The traditional crops of wheat and barley, various pulses, olives, and grapes each have different demands for soil moisture and nutrients.

- We studied the flora and plant communities along a 25-km transect from dry, coastal sands to moist slopes on the foothills of the Idaean Mountains.
- The present flora has more than six hundred plant species distributed among shrublands, grasslands, meadows, cultivated fields and waysides, marshes, stream banks, woodland groves, and coastal areas.
- The most important shrubs are thyme, spiny broom, thorny burnet, phagnalon, Jerusalem sage, elichrysum, and thymelaea, found in at least half of the 155 shrub locations we examined.
- The plant species in the vegetation survey have hundreds of possible uses for food, flavoring, medicine, fuel, crafts, and animal fodder.
- Over the millennia of human occupation, the surrounding hills and valleys have been influenced by the introduction of crops, the clearing of land and building of terraces to control erosion, burning of the vegetation, and the effects of livestock overgrazing and trampling.
- A lack of paleobotanical evidence hampers our ability to reconstruct past vegetation and agriculture.

NOTE

1. Plant nomenclature follows Turland, Chilton, and Press (1993) and Chilton and Turland (1997, 2002).

6

Agriculture and Subsistence in the Late Ottoman and Post-Ottoman Mesara

Harriet Blitzer

Mechri na fas (until you eat).

—Mesara farmer

Introduction

ANY STUDY OF TRADITIONAL LIFE in the vast Mesara Plain of southern Crete (plate 3.1; figures 6.1 and 6.2) naturally begins with agriculture (*agrotika*). Subsistence in the plain prior to World War II was contingent on agriculture, even in the households of shepherds, fishermen, craftsmen, merchants, and traders who were engaged, to a greater or lesser degree, in other workday activities within the Mesara communities.

The subject of this inquiry, therefore, is the subsistence sector of the Late Ottoman and Post-Ottoman periods (the late nineteenth and early twentieth centuries, circa 1880 through 1960) in the Mesara Plain as represented by the individual experience and perception of many hundreds of local inhabitants recorded by the author over a period of thirteen years. The ethnographic fieldwork for this study was begun in the summer of 1983 and continued every year through 1995. Research during the fall and winter seasons was carried out in 1984, 1986, 1989, 1990, 1993, 1994, and 1995. Fieldwork during the early spring was possible in 1985 and 1992, resulting in a combined total of four years and seven months of ethnographic research in the plain. In addition, my previous ethnoarchaeological and ethnographic fieldwork within the Mesara region (see "The Recent Cultural and Historical Context," below) provided a comparison for the data collected from 1983 onward. The author worked with elderly inhabitants (both male and female) in all of their agricultural and subsistence activities, repeatedly recorded in writing their perceptions (specific local concepts relating to subsistence were identified during these dialogues), and drew and photographed the material correlates of subsistence living in the region during this thirteen-year period. For practical agricultural and subsistence issues, such as how to domesticate a wild olive, how many times a year to plow a certain type of field, or when to gather specific varieties of wild food resources, most farmers and their families were in general agreement. Occasional differences of opinion about local agricultural and subsistence practices are noted where they occurred. In all other cases, such as perceptions of yields, amounts, sizes and other measurable or numerical data, that for a variety of intrinsic cultural reasons are less uniform elements of practical knowledge within the Mesara population, the most commonly cited figures are presented, with their qualifying cultural and environmental remarks. All fieldwork was carried out in Greek by the author, with gracious and patient instruction by elderly inhabitants in the Mesara dialect. Turkish words and phrases commonly used by elderly Mesara villagers were verified by the author against the agricultural and subsistence vocabulary of contemporary Anatolian subsistence farmers.

The microhistorical approach taken in this research thus differs significantly from one achieved primarily through broad archival and statistical studies in that it documents the myriad details of traditional agrarian and pastoral life that do not appear consistently, or in many cases, at all, in contemporary written records relating to

FIGURE 6.1. Map of the Kato Mesara and Epano Mesara regions showing stands of wild olive growth in the western Mesara at Kartellos, Kardiotissa, Charakas, and the Asterousia in the Herakleion nome, and at Efta Porous and Melambes in the Rethymnon nome

nineteenth- and early twentieth-century Crete. For example, twentieth-century government-generated statistics on agriculture consistently fall short of identifying the lowest levels of subsistence within traditional Aegean agricultural regions. The same is true for Venetian and Ottoman archival sources that do not address issues of individual subsistence, but rather deal with production for trade, most frequently external trade, with the buying and selling of property, and with taxation (see chapter 14). Finally, this study distinguishes between the early travelers' opinions and observations on environmental and economic issues in nineteenth- and early twentieth-century Crete and an ethnographically documented consensus of the contemporary inhabitants of the island.

This long-term study of subsistence in its social and economic context is founded upon localized data assembled solely from the Mesara region. In this respect, it exists in significant contrast with studies of Aegean subsistence that are based on cross-cultural parallels or on bibliographic references to subsistence practices employed throughout the Aegean or elsewhere in the Mediterranean. The analysis here examines only the range of man/land interactions that took place in the Western Mesara during the late nineteenth and early twentieth centuries, how they were carried out, and where it is possible to ascertain, why. These details of subsistence living are not easily recovered from historical documents.

As a result, throughout this text there is intentionally no mention of any subsistence activity that could be postulated or hypothesized for the traditional Mesara simply because it occurs elsewhere. This is a self-imposed restriction that is meant to emphasize and define human interaction with the Mesara landscape in all of its aspects and to eliminate the necessity for generalizations about past subsistence that currently tend to plague studies based on cross-cultural and cross-environmental data.

As a longitudinal study, this research in the Mesara may in some ways provide both a broader perspective on specific regional developments in Crete over the past century than could be assembled from published statistics, and a more localized database that could be helpful in assessing ancient subsistence within the Mesara landscape. More importantly, this research is focused on an economic level well beneath that of the external market economy, rendering it, in effect, a history from below (for discussions of this level of historical analysis see Ladurie 1979; Braudel 1980; and Krantz 1988).

Other ways of approaching this subject exist. One might attempt to discern regional patterns of regulated agricultural development in the decades of early twentieth-century production statistics drawn up by government agencies in Greece, or, one could independently compute the number of relic olive presses, grain mills, and fields of seed crops visible in the Mesara and from this essentially archaeological data, define a regional structure of annual food production. However, significant changes in local agricultural practice throughout the late nineteenth and early twentieth centuries, as well as the extensive market economy premise of governmental production statistics, argue against the use of only such formalized numerical data in the reconstruction of past local subsistence systems. What follows here, therefore, is not just a numerical appraisal of traditional life in the Mesara Plain, but a detailed report, in the voices of those who lived it, of the hidden complexities of subsistence prior to our mechanized era.

Representative of this complexity is the common and seemingly simple response of elderly Mesara farmers (*agrotes*) to inquiries about the annual reliability of their self-produced food supplies before the middle of the twentieth century. Consistently, their answer to this question of sufficient food was *mechri na fas* (that is, *until you eat*), meaning that, on a daily basis, the traditional Mesara farming families did not count on a meal until it appeared on the serving table (the wooden *sofra*) of their homes. This fundamental perception, with the involved environmental and cultural structures that supported it, was repeatedly enlarged upon in remarks such as, *sta agrotika ta panta diepountai apo tin fusis* (in agriculture, everything depends upon nature), and, *to vasiko tou anthropou etan na exeis sto spiti to ladi kai to psomi* (the fundamental in life was to have at home enough oil and bread). All agreed that the long-term problems of cultivation, harvest, and storage in traditional Mesara households combined with unexpected environmental events to make the achievement of an annual supply of food an extremely stressful effort. Trade (*emborio*) on any scale was uniformly perceived as the only sound option by which a subsistence farmer could substantially improve his family's living conditions on a long-term basis. And, despite the recent application of economic cost-benefit analyses in comparable publications of anthropological research, there were few means by which the head of a Mesara household could markedly change or improve the family situation without a strong external economic stimulus. As will be seen below, the constraint of subsistence living itself proved an intense and relentless incentive for innovative economic activity of all types in the Mesara. Innovation must be considered here, however, both as the result of a persistent human desire to ameliorate the inflexibility of subsistence living in the Mesara and as a response to external conditions, both political and economic.

Despite the graphic chronological, economic, and environmental contrasts that would result, this present study does not attempt to provide numerical data on recent changes in farming practices following the introduction of extensive irrigation through the drilling of deep wells (*geotrisis*) and the use of rubber pipelines (*soulines*), now a familiar and unsettling sight in the Mesara Plain. Nor does it concentrate on chemically fertilized, irrigated plastic greenhouses (*thermokipia*), their production statistics and their long-term, and very likely destructive effect on both the environment and the agricultural economy. Rather, it examines the interaction of humans with the Mesara landscape at a time when options for subsistence from generation to generation could be both socially and economically limited. In this context, occasional day labor as a fieldworker for those with extensive landholdings or as a helper for traveling craftsmen, long-term work opportunities outside of the plain, vigorous day-to-day efforts at local and regional trade, the utilization of local natural resources in the production of marketable goods, and the measurable stimulus of political and commercial developments outside of the Mesara were understood as the only economic counterbalances in a difficult life. The text below is the history of a struggle to live.

THE SOURCES

It is important, at the outset, to identify the sources of the data and the cultural, historical, anthropological and environmental understandings that underlie this study. First, the detailed oral history and material record reported in the body of this text is based entirely upon my long-term ethnographic study of the Western Mesara region. Second, in order to understand this ethnographic data within the wider social and historical context of Western Europe, the Balkans, the Mediterranean, and the Near East in the late nineteenth and twentieth centuries, I have consulted extensive primary and secondary written sources that provided me, in my collection and analysis of the Mesara data, with both comparative and contrary perspectives (see table 6.1). This ethnographic fieldwork in the Mesara could not have succeeded without the dedication and published research of hundreds of Greek scholars and local historians on regional cultural diversity and man-land interaction throughout the early modern Aegean. In effect, the sources cited below, all of which served as a fundamental background during my years of fieldwork and analysis, made possible this inquiry and definition of the regional distinctiveness of the Western Mesara.

TABLE 6.1. Bibliographic sources

(1) Archival and historical documents written in Greek and in Turkish, including court records for the Ottoman city of Kandiye, now held in the Vikelaia Library of Herakleion, Crete; studies of Aegean-related documents from the Ottoman archives in Istanbul; and legal codes and interpretations of Cretan law published for the island prior to 1914 (e.g. Kousourelaki 1911; Stavrinidou 1975–1985).

(2) Previous historical, sociopolitical and economic studies of Crete, its regional variations and its industrial and commercial relationship with other areas of the Aegean and Eastern Mediterranean from antiquity through the early twentieth century, and general cultural, historical and economic studies of Greece, Europe, the Balkans, the Mediterranean and the Near East (Anderson 1971, 1973; Andromedas 1957; Angelomati Tsougarakis 1990; Antoun and Harik 1972; Ashtor 1983a, 1983b; Baer 1970; Baram and Carroll 2000; Bartlett 1993; Basque Gramont and Dumont 1983; Beaujour 1800; Berktay and Faroqhi 1992; Boissevain 1979; Braudel 1966, 1973, 1981; Campbell and Sherrard 1968; Chatzidakis 1881; Christides 1984; Coles 1968; Crosby 1986; Curtin 1984; Curuni and Donati 1988; Day 1988; Demos Herakleiou 1984; Detorakis 1986; Diderot 1959; Eisner 1991; Esposito 1917; Evelpidis 1953; Faroqhi 1984, 1986; Fine 1983, 1987; Fotiades 1995; Gellner 1981; Gibb and Bowen 1951, 1957; Gimpel 1976; Glass and Eversley 1965; Goffman 1990; Goitein 1967–1988; Green 1986; Greene 1993; Greenwood 1988; Gutas 1998; Hattox 1988; Heurtley 1965; Hodgson 1974; Hogarth 1925; Hopkins 1977; Howard 1931; Inalcik 1973; Inalcik and Quataert 1994; Issawi 1980; Itkowitz 1972; Karpat 1973, 1977, 1985; Kasaba 1988; Katsiardi-Hering 1986; Kentro Byzantinon Erevnon 1989; Kitsiki 1988; Konstantinidou 1868; Koukoules 1948–1957; Koukoule 1950; Kremmydas 1968, 1972, 1974, 1980, 1985–1986; Lefort 1981; LeGoff 1980; Leighton 1972; Leontaritis 1987; Lewis and Runyon 1990; Lindner 1983; Lopez and Raymond 1990; Malagari and Stratidakis 1990; Mango and Dagron 1995; Mansur 1972; Mantran 1989; McCarthy 1983; McGowan 1981; Mee and Forbes 1997; Mintzuri 1993; Nenedaki n.d.; O'Ballance 1966; Panagiotakis 1993; Papadopoulou et al. 1972; Papageorgiou 1996; Paradissis 1976; Penn 1900; Pentzopoulous 1962; Peristiany 1966; Pitcher 1972; Polanyi 1957; Pollard 1974; Psychoundakis 1955; Quataert 1973, 1980, 1983; Rashed 1978; Rendel 1953; Reyhanli 1983; Roesener 1995; Santschi 1976; Schumacher 1973; Shaw 1976; Shaw and Kural Shaw 1977; Siphounaki 1986; Smith 1976; Sougioultsoglou 1992; Spanakis 1940–1976; Spanaki 1964, 1957, 1976, 1981a, 1981b, 1990, 1991; Stavrakes 1890; Sugar 1977; Sunarelli 1989; Svoronos 1996; Sweet-Escott 1954; Taylor 1954; Topping 1975; Tracy 1990; Trakakis 1994; Triantafyllidou-Baladie 1988; Tsougarakis 1987, 1988a, 1988b, 1990a,b, 1996; Tsouloupis 1989; Usher 1954; Vacalopoulos 1963, 1970, 1976; Vlassopoulos 1996; Vuidaskis 1977; White 1937; White 1962; Wolf 1982).

(3) Studies of the concept of oral history and its relationship to social memory, and analyses of historical principles relevant to cultural reconstruction and human subsistence (Barnett 1953; Bedarida 1994; Bennett 1946; Bloch 1953; Blum 1970; Braudel 1980; Burckhardt 1943; Carr 1961; Childe 1965; Collingwood 1946; Crosby 1986; Diamond 1995a, 1995b; Elton 1982; Fentress and Wickham 1992; Finley 1975; Gardiner 1961; Ginsberg 1992; Gombrich 1969; Handler and Linnekin 1984; Hobshawm and Ranger 1983; Jain 1977; Krantz 1988; Kubler 1962; Kuhn 1962; Ladurie 1979; Lee 1959; Loewith 1949; Meyerhoff 1959; Nevins 1962; Orme 1974; Redfield 1940; Redfield 1991; Renier 1950; Richardson 1974; Steward 1973; Tilley 1990; Vansina 1985; Vaughn 1985; Wolf 1982).

TABLE 6.1. Bibliographic sources *(continued)*

(4) Culture-historical and anthropological studies of traditional man/environment relationships generally, and in the Mediterranean, the Balkans, and the Near East specifically, including published accounts of traditional agriculture, animal husbandry, food processing, plant use, and utilization of sea resources throughout Europe, Crete, the Aegean, highland Anatolia, Roumania, Albania, Macedonia, Bulgaria, Egypt and Cyprus; and local ethnographic accounts of village life, social systems, material culture in Crete and the Mediterranean that have been published during the nineteenth and twentieth centuries (Agrotiki Trapeza tes Ellados 1956; Akademia Athenon 1968; Allbaugh 1953; Amouretti and Brun 1993; Amouretti and Comet 1985; Andromedas 1957; Angelomati-Tsougarakis 1990; Arseniou 1972; Aschenbrenner 1971, 1972, 1975, 1976, 1986; Asdrachas 1978, 1979, 1982, 1984; Avlianos 1989; Barber 1991; Bardis 1955, 1957; Bastea 2000; Bennett and Elton 1898–1904; Bent 1885; Black-Michaud 1986; Blitzer 1984, 1990a, 1990b, 1993; Blum and Blum 1965; Borgeaud 1996; Boserup 1965; Bryer 1987; Burgel 1965; Campbell 1964; Carabott 1997; Chang 1981; Chatzidaki-Panagiotopoulou 1993; Chatzimichali 1957; Christodoulou 1959; Christopoulou 1991, n.d.; Christou n.d.; Chrysoulaki-Paterou 1958, 1986; Cocking 1987; Comet 1993; Cotterell and Kamminga 1992; Cowan 1990; Crane 1983; Cranstone 1972; Creutzberg 1960; Dalby 1996; ; Dalman 1928 – 1942; Dalton 1960, 1968; Damaskinos 1864; Damianidis and Leontidis 1992; Danforth 1982; Davidson 1972, 1980; Davis 1977; Davis 1991; Delaney 1991; Demakopoulou 1977; Demetriou 1986; Dimen and Friedl 1976; Dittemore 1983; Doukelis and Mendoni 1994; Dubisch 1986; Du Boulay 1974; Emellos 1985; Ephtaliotis 1897; Eudes 1970; Falaras 1990, 1992; Filologikos Syllogos Chanion 1968; Forbes 1976a, 1976b, 1976c, 1982, 1992; Forbes and Foxhall 1978; Forbes and Koster 1976; M. Forbes 1976a, 1976b, 1976c; Forde 1963; Frangaki 1969; Frezzoti, Manni, and Sten 1956; Friedl 1959, 1962, 1964; Fronimaki 1973; Gallant 1985; Garnett 1909; Gavrielides 1976a, 1976b; Georgiou 1986; Geroulanou 1978; Gilmore 1982; Githens and Wood 1943; Gkiolias 1989; Glotz 1967; Gos 1884; Greger 1985; Gregg 1988; Grieco 1993; Gubbins 1946–7; Gulick 1976; Hadjisavvas 1992; Halstead 1987, 1990; Halstead and Jones 1989; Halstead and O'Shea 1989; Hammond 1967; Harlan 1967, 1995; Harris 1959; Harris and Hillman 1989; Hartmann and Bougas 1970; Heiser 1973; Herzfeld 1982, 1983, 1984, 1985, 1987, 1991, 1992; Holden 1972; Humphreys 1978; Just 2000; Kalliataki-Mertikopoulou 1988; Kallivretakis 1990; Kanakaris 1969; Karalis 1994; Karavides 1931; Karudi 1983; Kassioti n.d.; Kassotaki 1977; Kavouras 1991; Kavvadia 1991; Kayser 1964; Kenny and Kertzer 1983; Kerestetzi 1981; Kladou-Bletsa 1983; Kokkinou and Kofinas 1993; Kollas 1988; Kontomichi 1977, 1985, 1986; Koromila 1991; Kosay and Ulkucan 1961; Kostakis 1977; Koster 1977, 1986; J. Koster 1976; Koster and Koster 1976; Koukoules 1948–1957, 1950; Kousoulas 1974; Kovani 1988; Kriari 1990; Kyriakidou-Nestoros 1979, 1993; Lambithianaki-Papadaki 1982; Lassithiotaki 1959; Lehmann 1939; Leimona-Trembela 1980; Leontidi 1986; Leontis 1995; Leotsakou 1953; Linardaki n.d.; Loizos and Papataxiarchis 1991; Loukopoulou 1983, 1984; Loukou 1985; Louloudakis 1985; Magnarella 1974; Manolakaki 1988; Mansur 1972; Maroudi 1878; Mattingly 1988a, b, c, 1989; Mavraki 1939; Mavraki 1983; McGrew 1985; Meiggs 1982; Mela 1921; Mellars 1976; Mergianou 1989; Middle East Technical University 1965; Molinos 1981; Moutaftsieva 1990; Musee de l'Homme 1982; Netting 1974; Nikolidaki 1985; Nomarcheia Lesvou 1986; Nouarou 1969; Oguz 1980; Okyar and Inalcik 1980; Pansiot and Rebour 1961; Papadaki 1977, 1981; Papademetriou 1971; Papageorgiou 1995; Papageorgiou 1912; Papanastasiou 1966; Papaskevaidi 1991; Papathanasi-Mousiopoulou 1980; Pepelasis and Thompson 1960; Peristiany 1966, 1968; Pernot 1981; Pitt-Rivers 1963; Polemis 1981; Politistiko Technologiko Idruma ETBA 1992; Polymerou-Kamilake 1989; Pomerance 1966; Pontikes 1992; Psaraki-Belesioti 1978; Psychogios 1987; Pyke 1970; Rackham and Moody 1992; Rasim 1886 [1302]; Rodd 1892; Sanders 1962; Sarpaki and Jones 1990; Sauer 1969; Seymour 1984; Shanin 1971; Sivignon 1992; Skiada 1991; Smothers, McNeill, and McNeill 1948; Sordinas 1971, 1972, 1975; Sordinas 1911, 1919; Spanakis 1976; Spathari-Beglite 1991; Spyridakis 1934, 1962; Stamelou 1988; Stewart 1991; Stivaktaki 1988; Stroup 1955; Surmakezi 1988; Tombasis 1878; Toska-Kampa 1981; Traiou 1994; Trigger 1971; Troullou 1989, 1991; Tsagkarake-Merampelliote 1993; Vallianos et al. 1985; Van Wersch 1972; Vayda 1969; Vogiatzoglou 1986; Wace and Dawkins 1914–5; Wace and Thompson 1972; Wagner 1974; Wagstaff 1961, 1965, 1967, 1982; Whipple 1944; Winnifrith 1987; Wolf 1966; Zotos 1967.

Continued on next page

TABLE 6.1. Bibliographic sources *(continued)*

5) Ethnobiological studies of natural resource classification (e.g. Berlin 1992), and research into the environment and local natural resources (flora, flauna, nonorganic raw materials) of Crete, the Aegean, and the Eastern Mediterranean, including botanical and geobotanical classification studies (Alibertis 1985; Allaby 1994; Allbaugh 1953; Anasi 1976; Apalodemou 1988, 1993; Attenborough 1987; Barbero and Quezel 1980; Bates 1960; Baumann 1993; Baytop 1984, 1994; Blamey and Grey-Wilson 1993; Bottema 1980; Bottema, Entjes-Nieborg, and Van Zeist 1990; Buczacki 1989; Centre National de la Recherche Scientifique 1985; Chavakis n.d; Christodoulou 1963; D'Angelo and Gargiullo 1978; Davies and Kathirthamby 1986; Davis 1970; Dawkins 1936; Demetraki n.d.; Dermitzakis 1984; Di Castri and Mooney 1973; Dimbleby 1967; Faure 1966; Frangaki 1969; Fuerst, Klitzsch, and Brink 1965; Githens 1948; Grieco 1993; Grieve 1982; Hammond and Everett 1980; Handrinos and Demetropoulos 1982; Huxley 1972; Huxley and Taylor 1977; Iatridis 1985; Jonsson 1993; Joret 1976; Kalopisi 1984, 1988; Kanelli 1980; Kanelli and Bauer 1973; Karol 1963; Kotoulas 1989; Kraus, Hunt, and Ramsdell 1936; Kubler 1980; Langkavel 1964; Lloyd 1921; Lucas 1948; McNeill 1992; Moldenke and Moldenke 1952; Niebuhr 1970; Pantidou 1991; Papanastasiou 1988; Peterson, Mountfort, and Hollom 1981; Petrou 1987; Philippou 1980; Phillips 1977, 1980; Phillips and Foy 1990; Platakis 1975b; Pliny 1968; Polunin 1969, 1980, 1987; Polunin and Huxley 1970; Postel 1943; Prescott-Allen and Prescott-Allen 1977; Radcliffe 1974; Riedl 1983; Ries 1916; Sallares 1991; Sfikas 1976a, 1976b, 1982, 1984, 1987; Sphika 1979; Shay and Shay 1978; Shay, Shay, Frego, and Zwiazek 1994; Sieber 1823; Simpson and Conner-Ozorgaly 1986; Sordinas 1911; Strid 1986; Strid and Tan 1991; Taylor 1984; Thompson 1947, 1966; Trevor-Battye 1913; Tsikritsis 1971; Tsimenis and Bouzas 1983; Turland, Chilton, and Press 1993; Turner 1930; Tutin et al. 1964–1975; Urquhart 1833; Usher 1974; Van der Leeuw 1998; Vavilov 1992; Vedel 1977; Vickery 1936; Winroth 1990; Yakar 1963; Yassoglou 1960; Zacharis 1977; Zeven and Zhukovsky 1975; Zohary 1973; Zohary and Hopf 1993; Zohary and Orshan 1965).

(6) Official regional production statistics on agriculture, animal husbandry, fishing, and beekeeping that have been published for the island of Crete since 1914 (Ethniki Statistike Ypereseia tis Ellados, all years), and lexicons of ancient and modern Greek, of the Cretan dialect in general and of the East Cretan dialect in particular, including linguistic studies of the roots of the Cretan dialect, lexicons of Ottoman and modern Turkish and studies of Turkish vocabulary contained in the modern Greek language (e.g. Bilgi Yayinevi 1985; Crighton 1960; Demetriadou 1962; Moran 1971; Pagkalou 1983; Pitukakis 1971).

(7) Published archaeological and epigraphic research in the Mesara region (see chapters 7–14 and related bibliography).

(8) Studies of plant communities, plant structures, the origins of domestication, the vegetative manipulation of plants, and the archaeological and cultural history of agriculture and animal husbandry in the Mediterranean and the Near East (Amouretti 1985; Anderson 1970; Angel 1972; Blitzer 1993; Bowen and Wood 1967; Briggle and Reitz 1963; Briggs and Walters 1969; Burford 1972; Butzer 1972, 1982; Carneiro 1960; Cartledge 1991; Chang and Tourtellotte 1993; Civil 1994; Clark 1945; Coulter and Dittmer 1964; Curwen 1953; Dennell 1974a, 1974b, 1976; De Planhol 1954; Dioskorides 1958; Ehrenberg 1951; Flannery 1973; Foxhall 1990, 1992, 1993; Francis 1945; Frayn 1979, 1993; Gallant 1991; Garland 1992; Garnsey 1988; Garnsey and Whittaker 1983; Garnsey, Hopkins, and Whittaker 1983; Gill and Vear 1980; Greenfield 1988; Greuter 1974; Halstead 1992a, 1994; Hansen 1988; Harlan 1965, 1971; Harlan and de Wet 1963, 1973; Harlan and Zohary 1966; Harris 1972; Hastorf and Popper 1988; Hawkes 1970; Helbaek 1959; Heltzer and Eitam 1987; Hitchner and Mattingly 1991; Hoffner 1974; Hopper 1979; Hubbard 1976; Isaac 1970; Isager and Skydsgaard 1992; Iversen 1956; Jameson 1981, 1992; Jashemski 1973; Jones 1987; Killen 1964; Klein 1987; Mattingly 1988c, 1989; Michell 1940; Moebius 1933; Moody, Rackham and Rapp 1996; Mosse 1969; Osborne 1987; Papadakis 1986; Pullen 1992; Renfrew 1991; Roebuck 1969; Runnels 1995a; Runnels and Hansen 1986; Ryder 1987; Sanders 1984; Sarpaki 1992a, 1992b; Schery 1972; Smith 1972; Stager 1976, 1985; Strong and Brown 1976; Sumerian Agriculture Group 1984–1995; Ucko, Tringham and Dimbleby 1972; United States Department of Agriculture 1938; Waterbolk 1961; Watrous et al. 1993; Watson 1983; Wells 1992; White 1967, 1970a, 1970b, 1975, 1977; Whittaker 1988; Wikander 1985a, 1985b; Wikander 1991; Zohary 1972, 1990; Zohary, Harlan, and Vardi 1969; Zohary and Hopf 1973; Zohary and Spiegel Roy 1975).

TABLE 6.1. Bibliographic sources *(continued)*

9) Sources on the art, architecture, crafts, literature, music and religions of Crete and the eastern Mediterranean from the Byzantine period to the present day (Alexiou 1969a, 1969b; Ammoun 1991; Bodur 1987; Borboudakis, Gallas, and Wessel 1983; Borboudakis 1993; Bozineki-Didonis n.d.; Cavarnos 1977; Charisis n.d.; Chatzimichali 1984; Chatzinikolaou 1990; Demakopoulou 1977; Dermitzaki 1968; Detorakis 1976; Frangaki 1960, 1974; Frye 1973; Glassie 1993; Gratsia and Roussi 1986; Hayes 1992; Hetherington 1991; Holst-Warhaft 1992; Jereb 1995; Karvalias and Antonopoulou 1986; Keusseoglou 1990; Kladou-Bletsa 1978; Kornarou 1713; Korre-Zographou 1978, 1995; Lawson 1964; Lear 1984; Loukopoulou 1985; Matsa 1974–1978; 1978; Mavraki 1985; Megas 1956, 1963, 1970, 1976; Melissourgaki-Arfara 1986; Morgan 1960; Papadaki 1982; Papadopoulos 1982; Pateraki 1981; Pavlides and Sutton 1994/1995; Platakis and Kontakis 1985; Poulos 1976; Prevelakis 1976; Provatakis 1990; Psilakis 1988, n.d.; Ragovin 1974; Soustiel and Sante-Fare Garriot 2000; Soy n.d.; Stathake-Koumari 1974, 1983; Stratege and Papadaki 1986; Surmakezi 1988; Tsigakou 1981, 1991; Tsougarakis 1987, 1988a, 1988b, 1990b, 1996; Vallianos and Padouva 1986; Vallianos, Pervolaraki, and Neroladaki 1986; Vallianos 1989; Vallianos and Kokkoris 1987; Vasileiadis 1976; Vlazakis 1961; Wulff 1966).

(10) Architectural remains of human activity in the Late Ottoman Mesara (e.g. houses, churches, towers, mills, terraces, threshing floors, workshops, and other structures); museum collections of nineteenth- and twentieth-century ethnographic artifacts from throughout Crete (primary collections in Chania, Rethymnon, Voroi, Herakleion, Agios Nikolaos, and Siteia, and smaller local collections in villages throughout the island).

(11) Descriptive accounts and personal observations of early modern and more recent travelers to Crete and the Mediterranean (e.g. Boschini 1651; Buondelmonti 1981; Evliya Celebi 1896–1938; Gerola 1993; Lithgow 1632; Pashley 1837; Shaw and Heywood 1972; Sieber 1823; Simopoulos 1976–1979; Spratt 1865; Tsigakou 1981, 1991).

THE RECENT CULTURAL AND HISTORICAL CONTEXT

Extensive discussion of the concept of *tradition* has appeared in recent anthropological literature (for example, Handler and Linnekin 1984; Hobsbawm and Ranger 1983; Jain 1977), requiring definition of the term as used in this text. Tradition refers here not only to customs and beliefs (practical or otherwise) but also to the physical correlates of those beliefs as manifested by the material culture of the nineteenth- and early twentieth-century Mesara. Thus, tradition is construed in this study as in an early definition of culture offered by Robert Redfield (1940): "an organization of conventional understandings manifest in act and artifact, which, persisting through tradition, characterizes a human group."

Traditional life in the Mesara Plain during the late nineteenth and early twentieth centuries is considered here both from within (a study examining internal processes of cultural development and their material correlates) and from without. To this end, the Early Byzantine (roughly nine generations, 600 to 824 AD), Arabic (five generations, circa 828 to 961 AD), Second Byzantine (roughly ten generations, circa 961 to 1210/1211 AD), Venetian (roughly eighteen generations, circa 1210/1211 to 1669 AD), and Ottoman (roughly nine generations, 1669 to 1898 AD) legacies on the island (see chapter 14) provide a chronological and historical backdrop for the economic struggles of Mesara inhabitants of the past century, and help, to a more limited degree, in distinguishing the workings of the recent premechanized economy at the subsistence level. In a similar fashion, the systematic geological and botanical studies carried out for this survey project in the Mesara Plain (see chapters 4 and 5, respectively) provide an expertly detailed environmental framework for assessing man-land interactions over the past century.

Recent oral tradition in the Mesara Plain, as throughout the rest of the Crete, is marked by three events that symbolize both continuity and change for the inhabitants who lived through them. The first is the compulsory exchange of population (*antallagi*), between Greece and Turkey in 1923/4, a separately agreed-upon provision of the Treaty of Lausanne during which the remaining Muslim inhabitants of Crete—although many had departed prior to this date—were resettled in Anatolia and the Near East and were replaced in Crete by Anatolian Greeks (see also McCarthy 1983; Tsoulouphi 1989). These Anatolian immigrants brought with them a knowledge of agricultural methods that were frequently perceived by the locals as superior to those then in use throughout the island. (See Quataert 1973 for the deliberate importation of Western European farming technology to Anatolia in the last quarter of the nineteenth century.) As an example, the initial use of chemical fertilizers (*lipasmata*) in Crete is ascribed locally to dates ranging from the late 1920s through the early 1930s, with pure phosphorus (*sketo phosphoro*) the first to be employed.

The second event is the onset of World War II, during which critical developments such as the German and then Italian occupations of the island (the *katochi*), beginning in 1941 and continuing until 1945, laid the foundations for civil conflict later in the decade. These occupations reduced both urban and rural life in Crete to the barest subsistence level (and in some cases to starvation level), meanwhile introducing new forms of technology, martial and otherwise. The third is the establishment of systematic drilling programs to tap, for purposes of irrigation, previously unavailable water sources deep underground (*geotrisis*). This practice flourished in the decades following 1970 and in conjunction with the common use of mechanized farming equipment such as bulldozers, tractors, mechanical harrows, and deep plows of up to two m in height has resulted in substantial changes in the Cretan environment, economy, and lifestyle.

These three developments, when considered in historical and cultural context, highlight a serious problem for the present-day field researcher. Our current understanding of traditional agricultural subsistence systems, based as it must be on the documentable language, knowledge, and experience of contemporary inhabitants throughout the Aegean, is, as a result of these and similar events, severely limited at the turn of the millennium, and in strictest cultural terms, is difficult to reconstruct. Within the next decade, fewer and fewer Aegean inhabitants who have consistently experienced agricultural subsistence at its most fundamental level will be alive to report their understandings within an existing traditional context. Intimate knowledge of the natural resources of rural contexts will thus become second- and third-hand memories. Likewise, fewer and fewer researchers are now devoting themselves to the intensive linguistic and culture-historical study necessary to carry out this type of time-consuming fieldwork.

In the Mesara Plain, the reasons for this loss of subsistence information are clear. Continuing fieldwork over the last twenty years indicates that, in terms of environmental perception and understanding of subsistence farming techniques once considered standard and necessary in the Mesara, those farmers born before the Anatolian-Cretan population exchange, that is, individuals who in 1995 were in their eighties and nineties, are roughly 50% (my own estimates) more knowledgeable of the floral and faunal components of the local environment than the group of individuals now seventy years of age or less, those born during or just after the population exchange. Likewise, those individuals born just before and during World War II, and now, in 1996, roughly sixty years of age or younger, have experienced a further loss of knowledge, resulting in a general awareness of less than 25% of the agricultural and environmental knowhow common to today's eighty- and ninety-year-olds. This age-related degree of actual experience within an agricultural subsistence system must be factored into any account of agrarian society in the Aegean.

It is especially significant in the case of ethnographic study, where thousands of comparative details provided by living individuals can form a viable agricultural database if founded upon a common chronological and environmental life experience. It is, however, equally important in agricultural subsistence studies that are reconstructed first from data in archaeological, historical, or official statistical records, and are then supplemented or reinforced by oral testimony from a broad range of living informants. Ethnographic recognition of different age groups and life experiences within a wide variety of social contexts in one landscape serves to highlight the cultural disturbance of advanced agricultural technology and mechanization that has defined rural life in the Aegean since the early decades of the twentieth century. The social context of all information collected in ethnographic research thus requires an unusual restraint and critical appraisal on the part of the researcher.

It is important, therefore, to acknowledge here the consistency, but not uniformity, of subsistence data derived from elderly Mesara inhabitants who have spent their lifetimes in an intimate relationship with the land and its natural resources. Extensive knowledge and experience of all aspects of the Mesara environment (for example, soils, water, flora, fauna, weather) is clearly the unique domain of these elderly individuals. The planting, harvesting, and storage of food crops through environmentally positive or negative years, and the intensive collection and manipulation of wild plant and animal resources for essential dietary supplements, for use in the production of necessary household and field equipment, or, as the raw materials for production of possible trade goods, were, in the late nineteenth- and early twentieth-century Mesara, *habitual* efforts. After years of repetitive labor, there developed in these inhabitants a resulting sense of what was necessary or possible to survive in the Mesara region. In effect, these farmers were economic botanists within familiar environmental surroundings. Such knowledge of local environmental capital is increasingly absent among younger farmers, who, for example, are less and less able to distinguish the forms, names, and functional characteristics of wild plants common to the shrubland and farmlands in their immediate locale.

Thus, for a long-term perspective on the three historical events cited above and their relation to late-nineteenth and twentieth-century cultural developments within the Mesara environment, it was necessary to begin this study with the perceptions of those who had lived through them. During the time of this intensive fieldwork (1983–1995) this meant that those elderly inhabitants of the Mesara then greater than seventy-five years of age were the first individuals sought out for their practical knowledge born of years of repetitive experience with traditional agriculture and subsistence in the local environment. Fortunately, much fieldwork of a more preliminary, although less systematic, nature had been carried out with Mesara elders from 1977 through 1981 and from January through August 1982, when nine continuous months were spent in the Mesara village of Pitsidia. The data from these earlier inquiries provided me with a preliminary understanding of traditional Mesara subsistence patterns that was clarified, both positively and negatively, by the intensive fieldwork with hundreds of villagers from 1983 onward.

The Role of Language

Within the framework of this study of the Mesara Plain, as in any cultural study of the Aegean, language is an essential defining factor. Throughout the thirteen-year period of this research, everyday conversation and instructive discussion with farmers in the Mesara served as an internally consistent means of reinforcing my own understanding of local perceptions. In this sense, language and dialect in the Mesara provided the context within which fieldwork conclusions could, or could not, be verified. Thus, recording and analysis of traditional Mesara culture in its material and tangible forms (essentially an archaeological study), as well as documentation of the local concepts of Mesara culture, that is, the native view (an ethnographic study), were both necessary as a foundation for later, more difficult levels of analysis.

Given the importance of language in both the archaeological and ethnographic components of this study as identified above, it was essential to distinguish the elements of local Mesara dialect which are drawn from the Turkish language, a vital linguistic remnant of the seventeenth- through nineteenth-century Ottoman occupation of Crete, and an influence that is most evident in the speech of Mesara elders. Frequent use of altered Turkish words for the traditional equipment of daily life and commerce, for example, *sentouki* (Turkish *sanduk*) for the boxes used by peddlers and traders on their pack animals and *ahiri* (Turkish *ahir*) for the stable, provided a unique opportunity for study not only of the linguistic interaction of Greek and Turkish, but of the acceptance of nonlocal words for a wide array of everyday goods and practices that, in a number of cases, may themselves have been introduced from elsewhere. This distinction of word forms within Cretan dialects applies as well to Italian, the residue of 450 years of Venetian occupation of the island, which continues to appear in the identification of objects in daily life. For example, the *tsoukali,* from *zucca* (gourd or pumpkin) in Italian, was, until recently, the common household clay cooking vessel, lending its name as well to the potters' villages (and workshops), which since at least the seventeenth century in Crete have been identified by some form of the word *tsikalario* (Blitzer 1984).

Equally, remnants of earlier Greek that persist in the dialects of Crete—for example, the common use of the word *ege* (from ancient Greek *aix,* goat) which occurs in addition to the word form *katsika* (from the Turkish *keci*)—are strongly evident in the Mesara dialect. This combination of older language elements with those introduced in recent centuries has resulted in a vocabulary that is not only markedly variable from region to region in Crete, but that differs in essential ways from traditional environmental, agricultural, and economic vocabularies operative elsewhere in the Aegean. A substantial percentage of the nouns and verbs used in these Western Mesara villages (and recorded as spoken in this text), do not appear either in similar form, as variants, or in many cases, at all, in any existing dictionaries of Cretan dialects or of the modern Greek language (for example, Pagkalou 1983).

As a blatant example of the local and regional character of Cretan language forms, various examples of the commonly found plant species *Hypericum* are referred to in Crete, and specifically in the Mesara, as *agoudouras,* but in the Peloponnese are widely known as *kapetouri*. Likewise, the commonly occurring bulb species *Urginea maritima* (sea squill), in Crete, including the Western Mesara, is identified by a number of variants on the word *ascheletoura*, but in the Peloponnese is frequently called *botsiki*. Such distinctions and variations may be dependent, in some cases, upon the rarity or commonality of the plant in each local landscape. It is thus impossible to categorize cultural distinctions in the traditional Mesara via language alone, without a fundamental understanding of the sources and vocabularies of chronologically variable forms of Greek, Turkish, and any other language relevant to human activity in the region. This complex linguistic mixture in the traditional culture of the Western Mesara, deriving as it does from both external historical events and internal social and economic development, requires, for a legible reading of concepts and tangible remains by the researcher, more than a face-value recording of labels and their obvious indigenous meanings. Linguistic coloration helps, in a graphic way, to define the region of the Western Mesara in both cultural and environmental terms.

The Mesara region, as a historically prominent center for agricultural production, has maintained to the present day a distinctive dialect, including an agricultural and environmental vocabulary that is rendered throughout this text as recorded. Substantial changes in the language of agriculture and subsistence have clearly occurred from the late nineteenth century to the present, another element of traditional Mesara culture that is age- and experience-related. As an example, the brief central Cretan agricultural vocabulary recorded by Spratt in the middle of the nineteenth century (Spratt 1865) bears limited resemblance to the glossary of terms known to elderly subsistence farmers in the Mesara today. For this reason, and because alterations in language have proceeded accordingly with the technological developments of the last fifty years, explicit renderings of the traditional Mesara dialect and vocabulary, such as the use of the *oka* (1 *oka* = 1.28 kg) throughout this manuscript, are considered an integral part of this study of subsistence.

ABSOLUTES OF NATURE IN THE MESARA PLAIN

While cultural change and varying cultural responses to the Mesara environment have occurred since antiquity, it is also necessary to acknowledge here the chemical, physical, and biological constants of the Mesara landscape that have not altered since the beginning of man's occupation of the region. In reducing the scale of this discussion to the most basic elements of a living ecosystem (its biogeochemical cycles) and to the overriding chemical and physical principles that govern, on a molecular level, all interactions of elementary raw materials within it, it is acknowledged here that these absolutes of the physical world have served as an unchanging foundation for agricultural know-how since agriculture began in the region. This is not to say that traditional farmers within the Mesara knew the chemical formulae for the reaction between alkali or acid soils and water, or that they could reduce the erosional and depositional capabilities of a river or stream to a physical paradigm. They knew, however, as did their predecessors, from habitual labor within familiar Mesara surroundings, what happened to specific types of soils with consistent or no irrigation, what parts of plants to use for particular subsistence activities, what kinds of clays served well in the production of pottery or in the roofing of houses, what types of cultural debris added beneficial elements to soils, and why waterflows substantially increased the nutrient content of resulting alluviums. Their familiarity with these visually coarse reactions of one raw material to another, and their understanding of the adaptation of both wild and domesticated Mesara plants within the chemical and physical boundaries of their natural world, were based on recognized rules of ordering determined first by evolutionary and biological principles and then by their own interference with these visible ongoing processes.

That it should be necessary to emphasize these absolutes of nature is a result of recent appraisals of traditional agricultural knowledge as inappropriate to the reconstruction of ancient subsistence systems. Recently, authors such as Fotiades (1995) have questioned the study and recording of traditional agricultural practices as an analogy for ancient subsistence within the same landscape (see Harlan 1995 for another discussion of this postmodern phenomenon). Leaving aside the issue of who should rightfully interpret culture in any one environmental or national context, this essentially ideological viewpoint highlights how far the general academic community has distanced itself from the environmental understandings of past scholarly generations, who were much more knowledgeable of the workings of nature than we are at present.

In none of these recent anthropological discussions have the participants tempered their own ideological (postmodern) perspectives with the adaptive biological, chemical, and physical absolutes of the natural world that apply, and have always applied, to agriculture. The elemental biology, chemistry, and physics of an ecosystem, even as it displays and absorbs both natural evolutionary and human-induced changes through time, cannot by any scholarly means be viewed as a cultural construct. Through time, the biogeochemical cycles of the Mesara ecosystem will have reacted repeatedly to the coarse habitual interference of mankind, *and*, in similar fashion, the fundamental scientific principles determining the finite ordering and natural developmental cycles of this ecosystem will not have changed.

The Plain and the Soil *(O Kampos kai To Edaphi)*

In the perception of local inhabitants over the past century, the Mesara Plain well into its northern and southern foothills was divided into two parts (figure 6.1): the *Kato Mesara* or *Exo Mesara*, that is, the Lower or Outer Mesara, roughly the western half of the plain bordered by the Libyan Gulf, and the landlocked eastern half known as the *Epano Mesara* or *Mesa Mesara*, the Upper or Inner Mesara. The easternmost border of the *Kato Mesara* began on the northern fringes of the plain roughly between the towns of Moires and Agioi Deka and ran south to the locale of Platanos village, which sat on the culturally elastic line between the Eastern and Western Mesara regions. This cultural division of the Mesara landscape into two parts roughly equivalent to the modern-day administrative units of Kainourgio and Pyrgiotissa in the western part, and Monofatsion in the east, was accompanied over the past century by a commonly held belief in differences in environment and lifestyle between the two areas. As an example, elderly villagers in the Western Mesara consistently described their counterparts in the villages east of Platanos as less prosperous, and as heavily dependent upon one another. In the early twentieth century they referred to them as *voutsades* (dung-burners), a label resulting from a lack of sufficient firewood in the foothills of the

Eastern Mesara and the necessity of burning dung-cakes rather than wood on the household hearth.

In addition to these broad spatial divisions of the landscape, local perceptions of the Mesara topography included the use of the word *kampos* (the plain) specifically for the level flatlands or alluvial bottomlands in the center of the region (plate 6.1) and more generally for slopes and hills also situated at these low elevations. Small hills, rises and ridges within the plain were referred to as *lophakia* or *lophous*, and mountain foothills on the northern and southern margins of the central bottomlands (plates 6.4 and 6.7) were described as *rizes* or *rizovounes*. The mountains of the Asterousia to the south and of Ida to the north were described as *oroi* and *vouna*. The shoreline of the Mesara Plain opening onto the Libyan Gulf in the west was referred to, in all of its aspects, as the *paraleia*.

The western half of the Mesara Plain (the Kato Mesara) (figures 6.1, 6.2) is remarkable for its vast expanse of soils (*edaphi*, *chomata*) varying in color, composition, and texture (see chapters 4 and 5) from one landholding to the next. Of the four types of soil most commonly recognized by plain inhabitants, two varieties, the white (*asprochoma*) and the red (*rousses*) were specifically singled out by all traditional farmers for their divergent forms of agricultural productivity.

Asprochoma, *asproulias,* and *asprouli* are all names for the common whitish-brown soil that occurs throughout the bottomland (plate 6.43) and along the slopes of the plain, and is primarily the result of severe erosion of the *kouskouras*, the blinding white marl bedrock or *vrachos* that highlights much of the Mesara topography in a midday sun (see chapter 4). This *asprochoma* was perceived as rich (it is described as *pachis*, thick or fat) and when winter rains were sufficient, it needed no irrigation at all during the dry months of the year. The eroded white soil was consistently described as staying cold or damp (*pianei kruo*) and capable of holding moisture (*sunkratei tin ugrasia*), even in the summer months. All agreed that olives grew best on this unirrigated white soil (plate 6.27) and grain, especially wheat, was said to have a higher yield per *stremma* (one-quarter acre) of unirrigated white soil as compared with a *stremma* of unirrigated red (see *rousses*, below). Since *asprochoma* was the preferred soil for dry agriculture throughout the Western Mesara, villages such as Listaros (figure 6.2), the landholdings of which consisted primarily of red and/or clay-based earths (plate 6.4) were considered to be, and were, at a serious disadvantage in terms of subsistence. (See "Social and Economic Structures in the Mesara Villages—The Values of Life," below, for another perspective on economic conditions in the village of Listaros.) Mesara villages with substantial areas of *asprochoma* among their landholdings (figure 6.2) included Petrokephali, Voriza, Pitsidia (north of the village), Sivas, Voroi (a major proportion of their fields), Magarikari, Phaneromeni (one-third of their fields), Agios Ioannis (small holdings in the Levadia) (figure 11.4), and Tymbaki. *Liakonochoma* (literally, lizard soil), a subvariety of the *asprochoma,* was also identified as a light, fluffy, and heavily aerated white soil (*fuskonei elaphra,* it is aerated) characterized by many hollow pockets and air passages throughout the deposits. The distinctiveness of this white soil variant was derived from the local designation (*liakoni*) for the ocellated skink, a small to medium-size lizard (*Chalcides ocellatus*) that inhabited these deposits and was the object of superstition in the Western Mesara.

Given a sufficient winter rainfall, red soils (called variously *rousses*, *kokkinas*, *kokkinochoma*, or *kokkinias*) were considered by all to be by far the most productive Mesara soils in terms of annual yield, *but only when consistently irrigated throughout the dry season* (May through September). According to all elderly farmers, with an average winter rainfall and continuous watering during the dry months, fields of *rousses* yielded substantially greater amounts of grain per *stremma* than fields of *asprochoma* (*'an potizeis apodidoun,* if you irrigate, they yield). Olives, grain, and more recently potatoes were observed to do especially well in summer-irrigated *rousses*, and if the previous winter rainfall had been heavy in any particular year, the grain yield (both barley and wheat) was stated as being greater than it could ever be from similarly irrigated *asprochoma*. However, infrequent or no irrigation of red soils during the dry season resulted in flat, hardened surfaces that were described as boiled (*evraze to choma*), with wide open cracks (*ska kai anoigoi*, it breaks [cracks] and opens up) and thus a poor yield.

All farmers, noting the limited amount of time and labor available for the dry-season irrigation of fields prior to World War II, stated that in the past the red soils were not productive (*den apodidane palaia*) and that fields with red soil were difficult to sell. As a result, using traditional agricultural practices, red soils were perceived as requiring much more work than white. Consistent tillage (*kalliergeia*) and irrigation (*potisma*) of red soils throughout the year were viewed as essential for a reasonable yield. Weeds, however, were much less abundant in unirrigated red soils than in unirrigated white. Likewise, seasonal wild herbs and other greens (*horta*) suitable for human and animal consumption flourished in the unirrigated white soils and were rare in the unirrigated red. Given the hardships involved in dry season irrigation before the introduction of mechanization (see "Water and Irrigation," below), these red soils were generally characterized by Mesara farmers as risky and unlikely to result in a high yield. Red soils

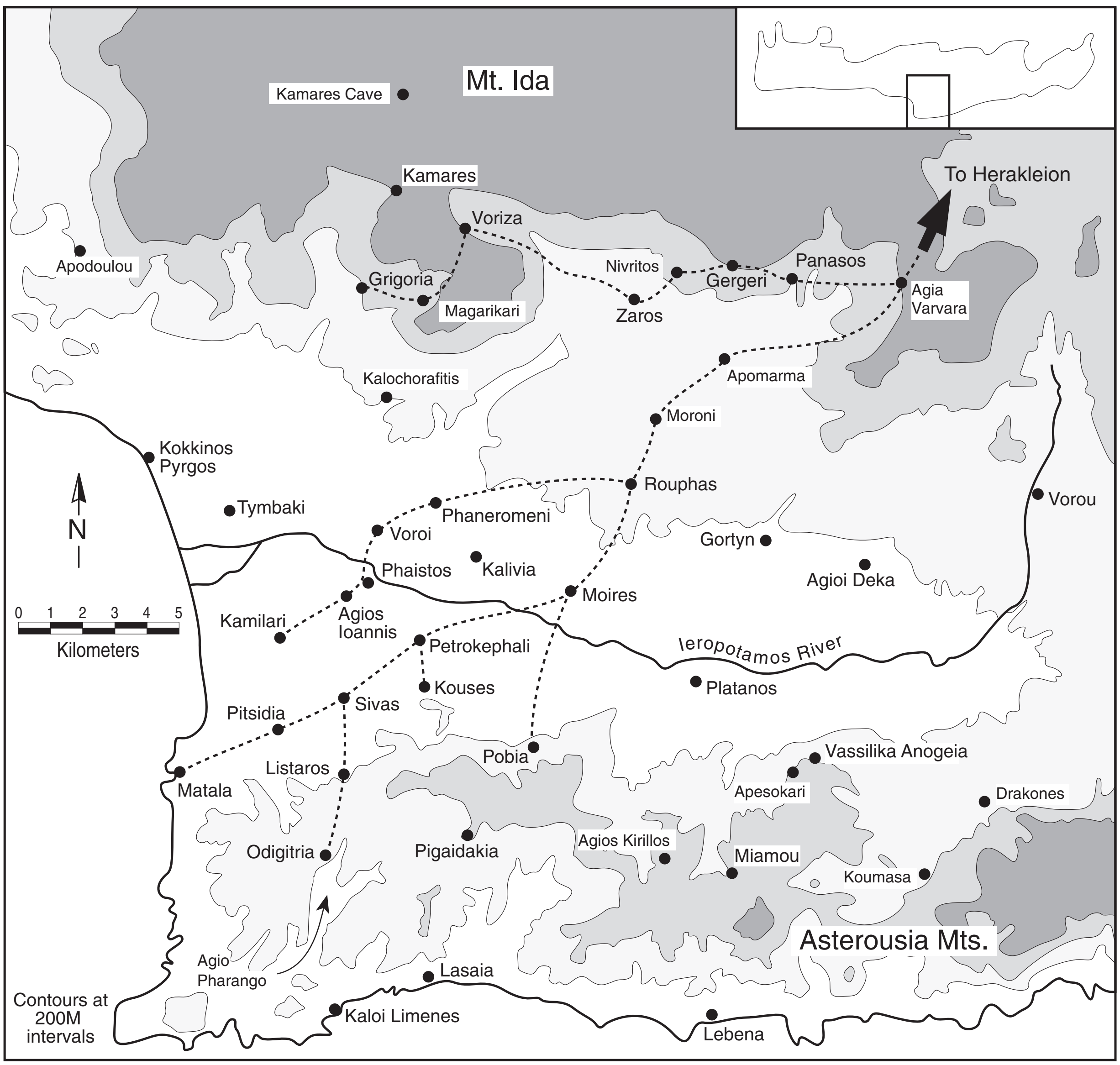


Figure 6.2. Map of the Western Mesara (Kato Mesara) region showing villages and major routes to Herakleion in the nineteenth and early twentieth centuries

were found both in the foothills north and south of the plain and in patches on the floor of the plain itself (see chapter 4).

The villages of Listaros (plate 6.4) and Phaneromeni, whose landholdings were primarily *rousses*, were able to produce a smaller range of agricultural goods and generally had smaller yields when, as was usual, a consistent source of water for irrigation was unavailable throughout the year. In the village of Agios Ioannis, the *rousses* appeared bit by bit (*apo metro se metro*) within its fields of *asprochoma* in the Levadia (the damp basin with year-round standing water in places at the foot of the Phaistos ridge) (plate 3.2). *Rousses* occurred as well in the hillside landholdings of Petrokephali, Voriza, Pitsidia, Sivas, Voroi (fields north of the village), and Magarikari.

Lepida, *lepidochoma*, or *lepidias,* a clay-based earth also called less frequently *argilodi* or *agrilodi*, occurred in the Mesara as a gray-to-black bedrock layer that sealed off groundwater (*sunkratei tin anavrosis*, it keeps the water from welling up) in many locations around the margins of the plain and that, as a result, limited the number of springs available at villages such as Pitsidia. Prominent eroded exposures of this earth type occurred in the underpinnings of hills between the villages of Pitsidia and Sivas (figure 6.2), south of Sivas on the road to Listaros and Moni Odigitria, and around the village of Pobia. One *agalia* (apronful, lapful) of *lepida* was said to weigh 30 *okades* (one Mesara *oka* equals roughly 1.28 kg). *Lepida* was thus perceived as a very heavy earth and was employed, because of its density and ability to stop water, as the preferred sealant layer in the flat roofing of Mesara houses (ideally the roof was relined and resealed each year with a new layer of *lepida*). Villagers whose landholdings did not contain *lepida* (for example, Voroi) purchased this earth annually from those who did own deposits of it, primarily from the Sivas community. If there was heavy rainfall during the winter, grain crops could be very successful in fields of *lepida,* but only with what were considered excessive efforts at tillage. Petrokephali, Voriza, Pitsidia, Listaros, and Magarikari all included *lepida* deposits among their holdings.

Koumoulias, a blue-grey clay earth related in composition to *lepida,* but occurring in an eroded form in secondary or tertiary deposits, was used only in the production of clay vessels by local manufacturers. These included a potter in Sivas and as well as visiting potters from Thrapsano in Central Crete (*Thrapsaniotes*) and from Margarites in the Rethymnon nome (*Margaritiani*), who in their annual visits to the plain made storage jars, both large (*pitharia*) (plate 6.36) and small (*kouroupes*). If applied to a household roof, this eroded clay variant was said to dry and crack open. Its use in house construction was thus avoided when possible. *Koumoulias* was found throughout the landholdings of Sivas, with a massive supply exposed in hillocks directly south of the village. The use of this earth in ceramic production was described by Mesara villagers as quite ancient, and indeed, the surface of the Sivas *koumoulias* deposit is covered with hundreds of coarseware fragments dating to the Bronze Age and later periods.

Within the bottomlands of the Mesara Plain, fertile soils fed by the flow of the Ieropotamos River were described as or *ammoudara* or *ammoudochoma* (that is, sandy soils). Most of the fields on the margins of the Ieropotamos streambed were composed of *ammoudara* (a combination of sand and silt), the sand of which was said to have blown in from Libya. Likewise, the pink coloration of winter snows on the peaks of Ida was described as the red dust of Africa (*kokkino skoni tis Afrikis*). These sandy river-dependent fields were perceived as productive (*ammoudochoma apodidei kai einai pio ousiastiko*, sandy soil yields and is full of nutrients). Fields of white and red soils also existed in the vicinity of the Ieropotamos River and contributed, via excavated water channels (*saites*) related to the siting of water mills, to the nutrients of the main Ieropotamos waterflow which then coursed through the fields of *ammoudara—ola ta nera echoun ousies* (*mana*) (all of the waterflows have nutrients). Olives were planted on the margins of the Ieropotamos (plate 6.43), but when flooding took place, frequently after heavy winter rains, the trees suffered from the deposition of very heavy earths (primarily clays) and the overabundant moisture that resulted.

Mesara fields with a high sand content, in this case deposited by wind, were also present along the Libyan Gulf on the shoreline from Kokkinos Pyrgos to Matala, a result of the dune formations established there (see chapter 4). Grapes were planted directly in these dunes and in marginal sandy fields based on red soils, primarily the landholdings of Pitsidia, and were considered to prosper.

Many Mesara farmers stated that before the introduction of mechanized irrigation "we grew plants that did not need water." This emphasis on the dry farming of grains (primarily barley) and pulses (see for example, Agia Deka, plate 6.5) highlights the importance of the chemical composition, physical structure, and water retentive properties of soil as the principal determinant of agricultural productivity within the Mesara region. All elderly farmers, in evaluating the physical factors, excluding extreme climatic events, that determined annual agricultural success or failure in the Mesara, consistently listed as most important the soil type, followed second by irrigation and availability of water, and third, by systems of tillage and fertilization. Thus, in terms of traditional premechanized Mesara agriculture, disturbed, heavily eroded white soils were perceived by farmers as more responsive to the amount of human labor possible in a subsistence system based on unmechanized irrigation and tillage. In addition, the vegetative productivity of these disturbed soils was enhanced, in a year of good winter rains, by a substantial growth of wild herbs that helped to retain moisture, including weeds (*prasinaria*, *hortaria*) employed as fodder for animals, and edible greens (*horta*), that were annually collected by farmers' families as a supplement to the sown products of tillage. Human disturbance and resulting erosion of the bedrock earths of the Mesara landscape was thus perceived locally as a positive factor in the maintenance of the traditional agricultural system.

The Mesara Villages *(Ta Horia tis Mesaras)*—Focus and Emphasis

Πιτσίδια μέ τ'αμβέλια
Καί τοη κοπελλιές
Πετροκεφάλι μέ τούς ανθούς
Σίβας μέ τση ελαιές του
Καί εσύ καΐμένε Λίσταρε
Μέ τση φασκομηλιές σου

(Pitsidia with its vines and its maidens
Petrokephali with its vegetables
Sivas with its olives
And you, poor Listaros,
With your wild sagebushes)

—Mesara *mantinada* (serenade)

Of the villages within the lowlands of the Western Mesara Plain and those situated at higher elevations on its margins (figure 6.2), a cross-section was chosen for ethnographic research that would parallel the degree of intensive analysis undertaken for the archaeological, environmental, and historical studies of this survey project. These included the villages (*horia*) of Listaros, Pigaidakia-Odigitria, Pitsidia-Matala, Kouses, Petrokephali, Kamilari-Agios Ioannis, Moires, Voroi, Phaneromeni-Kalivia, Magarikari-Kalochorafitis, and Voriza, among which are communities (*koinotides*), usually two or more villages united for administrative reasons, denoted here with a hyphenated name. Additional work over shorter periods of time was carried out in Platanos, Pobia, Zaros, Moroni, Kamares, and Rouphas. In this way, the villages within the study area included agricultural and subsistence histories that exploited the complete range of geological and botanical zones identified in the environmental studies of the survey project (see chapters 4 and 5) and were located both in the center and the periphery of the Western Mesara region.

Commonly, in recollections throughout the Western Mesara, the size of a village was perceived in terms of the total number of *zevgaria* (plates 6.8, 6.9), or teams of oxen (*vouia*, *vodia*), owned by the villagers. This measurement served in general conversation, in agricultural discussions, and in economic figuring as a fundamental cipher in establishing, in very rough terms:

1. the number of families in the village, commonly cited as roughly equal to the number of *zevgaria*, while allowing also for poorer families that might own only one ox each, and for wealthier families owning more than one pair;

2. the estimated village population, figured locally by multiplying the number of *zevgaria* by five to six individuals per family, a

figure that was considered average, allowing also for families without children and extended families with more than two or three offspring; and,

3. total village landholdings, the most variable estimate, achieved by multiplying the number of families in the village by a basic standard landholding of roughly twenty to twenty-five *stremmata* per family. Each *stremma* equals one-quarter acre or 0.1 hectare or 1,000 m^2.

This generalized landownership figure of 20 to 25 *stremmata* (roughly 6.25 acres or 2.5 hectares or 25,000 m^2 per family) was considered the bottom line in terms of traditional Mesara subsistence (plate 6.6) (although a few villagers insisted on the figure of thirty *stremmata)* and does not take into account the following variables, all of which were repeatedly cited by Mesara elders:

1. the bearing abilities of the different soils in the landholdings,
2. the number and geographic distribution of the parcels of land owned by each family—a figure of ten to fifteen separate plots per family was cited as average,
3. available water supplies and the possibility of irrigation during the dry months, and,
4. all possible variations in the size of families.

Thus, an average family (around five to six individuals) with extremely fertile and annually enriched landholdings located by the Ieropotamos River, or in the extensive eroded soils of the plain bottomland (plates 6.27, 6.43), could own as few as twenty to twenty-five *stremmata* and do very well, while a family that owned fields with less fertile soils (red or clay) and limited access to water, for example, in the southern foothills of the plain (plate 6.4) would need many more than twenty-five *stremmata* to subsist, and as a result, might also require more family members or hired hands to maintain that much land. Indeed, in villages whose overall landholdings consisted of a combination of fields in the plain bottomland and in foothills and mountain slopes, or whose fields were entirely in the foothills and mountain slopes, the figure cited was a minimum of roughly forty to fifty *stremmata* for basic subsistence, that is, twice the amount—roughly 13.5 ha or 50,000 m^2 needed on the alluvial flatland. Traditional landholding yields in relation to family subsistence were always described with the caveat *analoga me to edafi* or *analoga me to choma* (according to the soil type), indicating that generalized yields for Mesara landholdings can only be used as rough estimates in establishing regional subsistence parameters and are much more applicable to determining the subsistence capabilities of specific settlement sites (see also the individual yields of grains, pulses, and fruit crops in this text). The influence and extent of each village in its local landscape was thus variable and defined, in part, by an array of environmental and cultural factors that influenced not only agricultural productivity but also, in many cases, the economic structure of the village.

As an example, a substantial proportion of the landholdings belonging to the village of Agios Ioannis, located directly at the foot of the Phaistos ridge (figure 6.2), were characterized as consisting of heavy soils (*vari chomata*) that might require as many as fifteen days of plowing per *stremma* to make them productive for a crop such as cotton. These essentially waterlogged soils were situated on the margins of the Levadia or winter lake environment, a marsh-like accumulation of standing water resulting from the physical barrier of the Phaistos ridge that obstructed the flow of water around it, and extending as far to the southeast as the landholdings of Petrokephali and Sivas. Frequently, from January to May, the Levadia between Pobia, Petrokephali, and Agios Ioannis was completely flooded, and the weed-ridden fields in and around this area were then used from May to September for the grazing of sheep, goats, and oxen. The central Levadia fields were described as useless in the winter (*achristos to cheimona*), were frequently overgrown with a mesh of tightly interwoven varieties of reeds, sedges, and rushes—all of them aggressive types interchangeably identified as *angroustos*, *chyperi*, and *kalamouri*—characteristic of waterlogged environments (chapter 5), and were considered extremely difficult for dry crops such as grains and pulses. If these plants took over a field it was perceived as impossible to reclaim. Prior to World War II there were about eighty families in Agios Ioannis who produced small amounts of grain (*karpos*, *sitira,* or *demetriaka*), oil (*ladi*), and pulses (*osprea* or *psimika*) in the few white soils and spotty red soil landholdings on the floor of the plain. These were located well away from waterlogged areas, at the toponyms of Sta Akonia, Agios Demetrios, and Porta Ioannis, that is, toward Voroi, Kamilari, and Sivas, and in the terraced landholdings at Ephendi Christou to the northeast. In addition, they produced sesame (*sisami*) at Sta Akonia, the most productive land owned by the villagers, substantial amounts of water-dependent crops such as flax (*linari*) and cotton (*vamvaki*) in the heavier soils (both Agios Ioannis and Voroi were considered the major flax producers in the plain), and, in later periods, potatoes, at locations where the water was controllable. Thus, villagers of Agios Ioannis were obliged to supplement their limited production of essential subsistence goods (that is, grain, oil, pulses, grapes) with income, frequently in the form of foodstuffs, from day labor (*emeromisthio* or *emerokamato*) in wealthier villages such as Voroi and Sivas. Roughly 10% of the lands suitable for dry farming and olive culture in the environs of Agios Ioannis, including those with highly productive *ammoudara* or sandy soils near the Ieropotamos flow, were actual Agios Ioannis landholdings. The remainder were owned by the Odigitria monastery (plate 6.2) (an extensive field of one hundred olive trees was cited), and by villagers from Voroi, Sivas, Kamilari, and Pitsidia. An uncontrolled supply of water in relation to the amount of tillable land was thus an important factor in the subsistence of Agios Ioannis inhabitants over the last century. Most of the craftsmen (*mastoroi, technites*) needed by the Agios Ioannis villagers were to be found in the nearby village of Kamilari, with only a *tsagkaris* (shoemaker) operative in Agios Ioannis itself. Kamilari, the larger of the two villages in the *koinotis,* was known for its grain production, its wide range of village craftsmen, its extensive fieldholdings in the more productive alluvial soils of the plain, and its herds of sheep (*kopadia*).

Petrokephali (figure 6.2), located at the southeast margin of the Levadia, was identified, as in the poetic verse (*mantinada*) at the beginning of this section, for its special facility in growing fresh vegetables (*nopa proiounta*), a direct result of its access to and control of a consistent supply of water. A water mill (*neromylo*) with its associated manmade channels (*saites*) was located in the older part of the village near the *ipsoma*, or knoll, from which the village derives its name. Among the fresh vegetable products (*anthous*) for which Petrokephali was known were tomatoes (*domates*), cucumbers (*angouria*), squash (*kolokithia*), potatoes (*patates*), aubergines (*melitzania*), okra (*bamies*), green beans (*fasoulia*), cauliflower (*karnampidi* or *karempidi*), and cabbage (*lachana*), in the addition to water-thirsty tree crops such as oranges (*portokallia*), lemons (*lemonia*), and loquat (*despoura, despoulla,* or *mousmoulla*). Its landholdings, which extended into the Asterousia foothills (*pros tin riza*) included terraced fields (*to anomalos edaphi me traphous sta pezoulia*, sloping land with terraces) with *asprochoma*, *rousses,* and *lepida* on which were grown olives (*elaies*), grapes (*ambelia*), barley (*krithari*), wheat (*stari* or *sitari*), oats (*tagi* or *vromi*), chickpeas (*rovithia*), peas (*bezelia*), (*bizi*, a pea variety for animal fodder), and broadbeans (*koukia*). No carobs (*haroupia*) were cultivated in Petrokephali but there were a number of fig trees (*sukies*) and cotton was grown as well. Only two families in Petrokephali kept bees (*melisses*). More than one hundred families were said to inhabit the village, which many referred to as a *kentro* (center) before World War II, and of these, twenty or so were prosperous enough to produce surplus quantities of oil each year. Craftsmen in the village of Petrokephali included farriers (*albanides*), a bootmaker (*upodematopoios*), ironworkers (*charchiades*), a saddlemaker (*somaras*), masons and builders (*ktistes, oikodomoi)*, a carpenter (*marangkos*), a tailor (*tereze*, *terezis,* or *raphtis*), and dressmaker (*modistra*).

The village of Kouses (figure 6.2), situated just south of Petrokephali in the foothills of the Asterousia Mountains, had a population of roughly four hundred individuals prior to World War II with nearly one hundred *zevgaria* used in working the village landholdings. The soils of Kouses fields ranged from *asprochoma,* their best plots toward the bottomland of the plain, to *rousses* and *lepida*. Nearby Sivas (figure

6.2), which many inhabitants referred to as a *kephalohorio* (a primary village) of nearly 500 inhabitants before World War II, equivalent in local perception to the prosperous village of Voroi on the opposite (northern) side of the plain, had landholdings that permitted the production of substantial supplies of oil, grain, and pulses, and, as described in the *mantinada* above, Sivas was known in the plain for its groves of productive olive trees. Much of the Sivas land toward the Asterousia foothills that contained not only *asprochoma*, but *rousses* soils, was *anomalos* (uneven, irregular) and required *pezoulia* (earth terraces) with stone *traphous* (walls) (plate 6.7). In addition, Sivas fields on the floor of the plain included *ammoudochoma* by the well-watered margins of the Ieropotamos. The village was singled out by many for its workable *lepida* (villages such as Voroi bought their roofing *lepida* from Sivas) and for its *koumoulias*, clay suitable for ceramic manufacture, a massive deposit of which was visible to the south, outside of the village, at the toponym of *stou Chasoura to spitaki*. The village maintained many craftsmen (*ola ta epangelmata*, all the trades) and was known for its skillful midwife (*mami*).

In contrast, Listaros (plate 6.4; figure 6.2), located further into the Asterousia foothills on the southern perimeter of the Mesara, was described by all villagers as poor (*phtocho*) because of its situation on bedrock deposits of *lepida* and its inability to sustain more than a scattered cover of wild plant growth, much of it spiny and hirsute woody shrubs, as cited in the *mantinada* above. Its soils, also characterized as poor, consisted primarily of *rousses*, which were perceived as the best soils in the village, and *lepida,* which required consistent irrigation year-round for minimal productivity. There were very few Listaros fields with *asprochoma*. Before World War II there was insufficient water in the village for irrigation (*potisma*) and no common use of chemical fertilizer. Limited supplies of animal manure (*kopria*, primarily from small herds of sheep and goats and from the *zevgaria*) were saved almost entirely for kitchen gardens. Thus, in Listaros, there was a greater than average dependence on repeated tillage (*kalliergeia*), primarily plowing (*orgoma*) (plate 6.8), for the maintenance of local soil productivity (*kalliergousame me ta vodia kai to ksilino aletri*, we cultivated with oxen and the wooden plow). In comparative statements, Listaros villagers cited the inhabitants of Kouses, Kamilari, and Sivas as owning most of the good land in the Listaros area, although a few village landholdings did extend as far north as the Levadia margins (*pros ta kato*, down below) by Sivas, and were considered the best fields.

There were about twenty-five to thirty families in Listaros before World War II, and an equal number of *zevgaria* (plate 6.9) but a larger number of people in each family, frequently cited as seven or eight, than is suggested for other villages in the region. This small number of families subsisted on limited supplies of oil, grain, and pulses. The crops produced included barley, wheat, oats, broad beans, green beans, and lentils (*facches*). The villagers also kept small-scale herds (*kopadia*) of goats (*eges, katsikes*) and sheep (*provata*) in combined flocks called *egoprovata*. The range of subsistence products available in Listaros was thus perceived as more restricted than elsewhere in the Western Mesara and the average yield per landholding, less.

In the absence of local natural resources, this heavy dependence on *kalliergeia,* the cultivation of the soil (plate 6.8) made life in Listaros especially labor intensive. The common perception in the village was, the more plowing (three to four times a year), the greater the yield, with an equally common belief that red soils needed more intensive work, and that *lepida*, the bedrock (*vrachos*) in the village locale, kept the underground water sealed up. Adding to the agricultural difficulties of life in Listaros was the essentially steep slope of most village landholdings, on hills and mountain flanks that required extensive terracing (*pezoulia*) (plate 6.7). These terraces, constructed in irregular rows, retained what tillable soils were available.

Although many cited the environmental context of the village as a reason for its economic condition, there were other more potent perceptions of Listaros and the reasons for its poverty. According to many in the Mesara, the village was called Listaros because brigands from the port at Kaloi Limenes on the south coast settled there, thus resulting in a name derived from the verb *listevo* (to plunder, rob, commit acts of brigandage) and a general nickname (*paratsoukli*) for the villagers, who were called *listes*. More pointedly, the village of Listaros was perceived, in a parallel line of thought, as unsuccessful because of a curse (*echei eda afti tin katara, gi'afto den prochoraei,* it has a curse on it, that's why it doesn't progress) resulting from a violent murder and betrayal relating to local saints that has made its way into local Mesara myth-history (see "Social and Economic Structures in the Mesara Villages—The Values of Life," below).

To the south of Listaros, the Odigitria Monastery (Moni Odigitria) (plate 6.2) tended now by few individuals, is a larger-than-life material record of the period. The monastery (figure 6.2), as a major landowner of both cultivated and wild properties (called *monastiriaka*) throughout the Western Mesara—for example, the massive olive grove (*elaiona*) in the area of Agios Ioannis, the fields below Pobia at the toponym Levadiotis, plots on the eastern margins of Pitsidia in the area called Charakas (figure 6.1)—processed substantial amounts of agricultural produce (especially grain, grapes, and olives) (plate 6.6) on a scale unmatched in local domestic contexts. In the storerooms (*apothekes*) of the monastery are numerous large-scale clay jars (*pitharia*), including the 300-*oka* size (called *trakosioka*) for the storage of oil and grain (plate 6.36), many of them marked with with an incised cross and known as *stavropithara;* massive carved wooden basins (*skaphides*) for breadmaking; wide-mouthed clay tubs (*vraschia*) for household and farmyard use; and large copper alembics (plate 6.38) and cauldrons (*kazania*) for the production of *raki*, the spirits distilled in August and September from the must of wine-making.

In other rooms on the lower levels of the monastery, around the central court, are more 300-*oka pitharia* (both the Thrapsano and Margarites types); a variety of *kouroupes,* smaller clay storage jars holding up to one hundred *okades*; a *fabrika* or olive oil mill with a crushing bed (*aloni*) (plate 6.33) supporting three locally fashioned millstones for the production of olive pomace via the rotation of draft animals; remains of a wooden screw press (*piesterio*) and a more recent iron oil press (plate 6.34) with goat hair sacks (*boxades*) (plate 6.35) that served as press frails; a man-driven wooden winch for increasing the pressure in the *piesterio*; and a monstrous *linos* (*patitiri*) or crushing vat for the production of wine. Near the oven are wooden bread boards (*pinakotes*) for the rising of multiple loaves, with two rows of nine indentations each, for a time when the monastery maintained a significant population (see chapter 14). A large wooden threshing sledge (*voloseiro*) (plate 6.14) with iron blades (*sarakakia*) (plate 6.15), wooden threshing forks (*thrinakia*) (plate 6.21), and wooden shovels (*palamia*), are remnants of the processing of grain on nearby threshing floors (*alonia*) (plate 6.11). A large double-lipped clay vessel for the storage of honey is a testimony to the extensive apiaries (*flaschia, dypselia*) (plates 6.44, 6.45) once kept by the monastery. All of the implements and containers in the monastery are large—in many cases larger than any equipment or installations one might find in a family dwelling—and serve as a magnified record of agricultural production in the context of the nineteenth- and twentieth-century Mesara.

To the north of this once-prosperous monastery, around five to six hundred individuals lived in the village of Pitsidia (figure 6.2) and its harbor at Matala prior to World War II. As the major harbor for the Western Mesara (Kokkinos Pyrgos to the north was significant only after the war) Matala, with its storerooms (*apothekes*) and custom-house (*teloneion*) designation, was a transshipment point and a receiving point for bulk goods traded in the Mesara (see "Trade," below). Ten- to twenty-ton sailing ships (*kaikia*) with three to four sails (*pania*) would call in at the port, bringing goods from Egypt, from other parts of Crete, especially the Sphakia region, and from the Greek mainland. Prior to World War II, villagers from as far away as Charakas, a large community deep in the Eastern Mesara (figure 6.1) brought their bulk agricultural goods to Matala for sale and shipment to the north coast and off-island.

The village of Pitsidia (figure 6.2) had one spring and landholdings consisting of *asprochoma*, much of it located north of the village, and a stratum of *lepida* at bedrock level, cited by all as the reason for so little water in the village environs. Shoreline plots of *ammoudochoma* existed among the Pitsidia landholdings but all villagers agreed that the most fertile fields were in the *kampos*. Olives were planted primarily in the white soils, but vines (*ambelia*) prospered in the *ammoudochoma* and in the sand dunes on the margins of the Libyan Gulf coast that were, in turn, situated above undisturbed red soils. Tradesmen in Pitsidia in the era before World War II included builders (*ktistes*), a saddlemaker, a shoemaker, an ironworker, dyers (*bougiatzides*), a *tereze* (tailor for Cretan-style clothing), a butcher (*hasapis*), a carpenter (*marangkos*), and cafe owners (*kafetzides*). The village landholdings, which extended as far as the Levadia (figure 11.14) and the margins of Agios Ioannis and Petrokephali, were planted primarily in olives, grain (mostly barley), pulses (including broad beans, fava, chickpea, bitter vetch, several varieties of peas, lathyrus, and lentils), and vines. Pitsidia maintained a reputation among the Mesara villages for high-quality wine that was sold outside of the plain as well. Oats were also grown for animal fodder, and quantities of *pirines* (crushed olive stones from the oil mills), were an important product for bulk sale and trade and were stored in the apothekes at Matala.

Voroi, referred to by many as the *kephalohorio* (primary village) (plate 6.3; figure 6.2) on the north side of the plain prior to World War II, had numerous fertile landholdings, especially to the south of the village on the margins of the Ieropotamos flow (plate 6.43), and extensive, well-established olive groves (plate 6.27) that produced large quantities of oil. The assets of Voroi, as catalogued by villagers throughout the Western Mesara, were its unlimited access to controllable water, its fields of rich alluvial land (*pachia chomata*) in the level areas of the *kampos*, and its productive olive groves. Most of the cultivated landholdings to the south of Voroi were located close to the village, with wild and uncultivated parcels of red soil, referred to as poor and unsaleable, situated to the north.

In the period between 1910 and 1920 the village population was located in the area now referred to as the lower village (*kato horio*). The upper village (*to epanohori*) began to be settled after 1920 and before World War II there were around 120 families in both parts of the community, with a population of roughly 600. Many individuals married into the village of Voroi, including a substantial number from the Sphakia region. The overall prosperity of Voroi was remarked upon by all, who recalled that during the *katochi* (World War II occupation) of 1941 to 1945, the Voriani did not suffer the degree of starvation and want that affected villagers elsewhere in the Mesara.

Craftsmen in Voroi included builders, plasterers (*sofades*), carpenters, saddlemakers, shoemakers, bootmakers, ironworkers, dyers (*bougiatzides*), and basketmakers (*kophinades*) including those who manufactured *kirtaria* (eel traps) and *paragadia* (fishing baskets) (plate 6.55). A quiltmaker (*paplomatas*) also operated in the village and shoemakers were employed in the production of goatskin sacks (*aschia*) for the transport of olive oil (*eravane aschia,* they sewed goatskin sacks). The main products of Voroi were oil, barley (*krithari*), wheat (*sitari*), oats (*vromi* or *tagi*), a variety of pulses (chickpeas, broad beans, various types of peas), and because of its substantial water supplies, potatoes. Carob trees (*haroupia*) were also part of the Voroi environment. Cotton (*vamvaki*) and linen (*linari*), both thirsty crops, were grown extensively. Silk was produced in the village using the leaves of mulberry trees (*mournies*). After 1950, even rice was grown in the Voroi fields. Needless to say, kitchen gardens did extremely well throughout the village landholdings and included corn (*kalamboka, aravosito*) for household animals. Vines were cultivated early on for *staphilia* (wine grapes) and after 1925, for *staphides* (raisins/currants).

Trade flourished in the Voroi coffee houses (*kafeneia*) and as noted below (see “Trade”), many individuals in Voroi engaged in trade to and from Herakleion using pack animals and wooden carts (*cara*) (plate 6.73). In Voroi there were also two privately owned water mills (*neromyli*) at which grain was ground for a miller’s fee of 10% per sack. One mill was located by a smaller watercourse to the north called the *Koutsoulitis potamos* originating north of the village at higher elevations, and the other was situated below and to the north of the Phaistos ridge, at the toponym of *Falandra* or *Sto Milo* on the flanks of the Ieropotamos River.

In contrast with Voroi, the tiny village of Phaneromeni (figure 6.2) to the east had landholdings of primarily red soils, with a small percentage of white and sandy soils closer to the plain bottomland. The Phaneromeni landholdings were characterized by extensive deposits of loose stones that had to be removed to facilitate cultivation and that were employed in the construction of terraces throughout these sloping fields. In addition, stones brought in from the fields were used in house construction in the village (there were builders, *ktistes*). Roughly twenty families lived in the village before World War II. As in other villages with the restrictions of red soils, the main crops were grain (primarily barley, with some wheat) and very few olives (*elachistes elaies*). The village was known in the Western Mesara for its basketmakers (*kophinades*).

Kamares (figure 6.2) and other villages high on the flanks of the Idaean range overlooking the Mesara Plain were essentially shepherding villages, with so little grain produced that the elderly inhabitants rarely remember a surplus. Prior to World War II, if surplus barley was sold or traded at all, it was only within the confines of the village. In Kamares they also produced oil from their landholdings (*metochia*), located primarily at lower elevations, and large amounts of mold-made cheese (*tyri*) (plate 6.46), meat (*kreas*), and *mizithra,* a liquid form of cheese stored in goatskin sacks (*asches*). The larger herds (*kopadia*) spent the spring and summers in the Idaean mountains where each shepherd had a *mitato* (a cheese-making establishment and fold), and for the winter traveled south to the Asterousia where they lived on their own or rented lands. The smaller herds stayed closer to the village during the winter.

Magarikari (figure 6.2) at a lower elevation than Kamares, was still a village with steep slopes for cultivation and a heavy dependence on terracing. The stones for the terraces were found in the fields and were used to maintain shelves of the white, red, and clay-bearing soils of the area. In Magarikari the villagers subsisted on a successful combination of shepherding (*ktinotrophia*) and farming (*agrotika*). The main crops of the village were grain (mainly barley), with some oil, lots of carob, pulses, and a few specialty items such as sesame (*sisami*), and before World War II, cotton and linen. While agriculture was important, there were large herds in the village that were considered of equal significance.

The village of Voriza (figure 6.2) before World War II had a population of fewer than one hundred families. Most individuals in the village were shepherds with large herds of sheep and goats. The soils in the terraced Voriza landholdings at high elevations consisted mainly of *lepida*, with some red and white soils, the last of which was cited as best for agriculture. There was one family of builders in the village who, as noted above, worked with itinerant Karpathians, but most families lived on the products and the limited profits from their herds. The major crops in Voriza were small amounts of grain (barley), oil, pulses, some grapes, and the products of kitchen gardens. As cited by elders in the village, the Voriza inhabitants, collectively, had field borders (*sinora*) with Anogeia, Zoniana, Levadia, Kamares, and Zaros, a clear indication that the village overall owned very few fields of olives at lower elevations that were described as *horafia pros to kampos* (fields toward the plain bottomland).

In the village of Platanos (figures 6.1, 6.2) on the culturally perceived and very elastic border where the Western and Eastern Mesara regions merge, there is remembrance of "plenty of water" flowing from the Vagionia area, through the streambed of the Ieropotamos that passes to the north of the village. According to all, there was much more winter rain in the years before World War II and "everything was replenished quickly." According to many elders, the river remained full, even in the driest summer months, and each of the Platanos households could maintain a well (*pigadi*) because of the high water table. Branching water channels (*avlakia* or *katapotes*) (plate 6.43) were dug from the main *saites* of the Ieropotamos streambed, were used to irrigate the Platanos fields, and still left plenty of running water for use in village landholdings such as those of Voroi down the line in the Western Mesara. There were no springs in the Platanos area and equally, no catch dams (*fragmas*) or irrigation tools such as *gerania* (pole and bucket levers). The main crops in the village were oil, grain (barley, wheat, and oats), and grapes. The soils of Platanos village consisted mainly of *rousses*, with some *ammoudochoma* and patches of very little *asprochoma*. As described by all, the red soils in the Platanos area required irrigation throughout the year and were, as noted elsewhere in the Mesara Plain, the highest yielding soils if irrigated; otherwise they produced very little. There was, significantly, a wood shortage in the Platanos environs, and dung cakes (*voutses*) were burned for various household activities, such as the washing of clothes and more rarely for cooking. In Platanos there was also constant conflict with shepherds (from both the Idaean and the Asterousia ranges) over damages from sheep grazing. Village interaction with the south coast included the digging up of wild olive trunks (*argoulides*) for grafting, from the southern face of the Asterousia mountains, primarily from the area of Moni Odigitria, and because this wild plant growth was generally from monastery lands, it was not necessary to pay for it.

HOUSE AND HOME (*To Spiti)*

Den koitazame spitia, koitazame ktimata
(we paid attention to landholdings, not houses).
—Mesara farmer

Elderly Mesara villagers recall that in the late nineteenth and early twentieth centuries, both prosperous and poor families lived in the same types of houses. The most common house form at the end of the nineteenth and beginning of the twentieth century was a single rectangular room, roughly 15 m in length, with a living area for the family at one end, and at the other, called *tou voudia,* a space for the donkey and the pair of oxen (*zevgari*). Crowded living conditions and this lack of emphasis on substantial housing as an outward sign of prosperity before World War II was noted over and over again by farmers who stressed, as in the quote at the beginning of this section, the importance of the maintenance and, if possible, the increase over time, of family landholdings (*ktimata*).

Many of the newly erected houses in the Western Mesara villages during the first decades of the twentieth century were constructed by traveling builders and stonemasons from the island of Karpathos, who worked for daily wages (*emerokamato, emeromisthio*) of oil and grain, and who, after a period of as much as six months of labor on Crete, returned to Karpathos with the supplemental income needed by their family groups. Evidence of their fine masonry skill (Mesara inhabitants referred to them, in admiration, as *mana ton oikodomon*) is visible in buildings (plate 6.30) from the first half of the twentieth century, not only in the Mesara, but throughout the island of Crete. These modest dwellings of one or two rooms, or more rarely, larger complexes (some with second stories), were built with fine percussion-struck and shaped (*pelekites*) limestone chunks and slabs (of stone types called variously *aspropetra* and *malakopetra)* used for exterior corners, window frames, arched doorways, and interior *kamares* or arches. Specialization in house construction and fine masonry techniques was one result of the overextended natural resources of Karpathos, which could not provide even subsistence-level living for many families, thus forcing the emigration of Karpathiotes early in the twentieth century. This overextension was in some cases directly connected to the intermarriage of Cretan women and Karpathiote males who settled in the Mesara as *sogambroi,* for example, in Listaros. In addition to building houses in the Mesara, the Karpathiote masters, in many of the villages where they worked, trained helpers who might then build houses on their own. Voriza inhabitants cited the economic importance of this training. As an example, a number of villagers in Voroi who had been assistants also engaged in house construction throughout the Western Mesara. In villages such as Phaneromeni, with fields containing an overabundance of eroded stone chunks and fragments, quantities of stones were brought in from the fields to use in building.

For a young man to marry in the early twentieth century Mesara, it was considered essential to build him a house, preferably adjoining the parents' home, or close by on family-owned land. Single-room homes were frequently built up against the patriarchal structure, and larger houses of one or two stories might be constructed separately. Houses with more than one room might contain a living area in which cooking, eating, sleeping, and all other domestic activities were carried out; a storeroom (*apotheke*) for food goods, clay storage jars, agricultural equipment, household tools and other necessities; and a stable (*ahiri*) for the oxen, donkey or mule, and goats, that in some instances adjoined an *acheironas* or storage area for dry fodder (hay, branches of wild shrubs, tree prunings, oats). Exterior house walls in the Mesara were constructed of limestone (plate 6.30), with special sources for the more resilient types of building stone, frequently siliceous limestones with conchoidal fracture, preferred in different villages. For example, Sivas houses used limestone chunks from Plakoures, a local toponym, which were brought to the village in quantity with a *karo*, a two-wheeled wooden cart (plate 6.73) that could carry up to 500 *okades* in weight. In other cases, donkeys made repeated trips to the stone source (*petrokopi*) with either *sanidia*, wooden trays on either side of the animal, each one of which could hold a 50-*oka* chunk of stone, or *petrokophina*, heavy-duty baskets made of *astirakas* or storax (*Styrax officinalis*) or other sturdy plant materials. Easily worked building stone from the preferred sources near Voroi (*To Hani, To Plai*) was labeled *malakopetra* and was used as well for the construction of ovens (*fournes*), which, throughout the Western Mesara villages, could be shared by several families. Mudbrick (*plithrous*) was used for the interior walls of houses as a *horisis* or divider, and mud (*laspi, choma*) was the most common mortar employed in building construction, although more prosperous families might add slaked lime (*asvesti*) to the earth mortar to strengthen it. Many houses were built with a large fireplace or *tzaki* that was the focus of all family activity; structures with only a low clay-lined multiple hearth (*parathuia*) along one wall also existed. With the rare exception of more prosperous families owning pitched-roof houses with clay roof-tiles, the flat roofs of Mesara houses were consistently built with the following raw materials (plate 6.31), listed here from bottom to top:

- beams (*traves*), made in the plain proper of the trunks of cypress trees imported from Sphakia and delivered to the Mesara Plain via the Matala port; these were laid on the stone house walls bridging the width of the structure and served as the base for the flat roof;
- in mountainous margins of the Mesara, especially in shepherds' huts, smaller branches called *dokaria* might be laid over the larger beams or *traves;* these were made of locally available wood rather than imported cypress. These local woods, including oak (*prinos*), were then surmounted by stone slabs (*plakoures*) as below; or,
- local reeds (*kalamia*) were bound together and laid in parallel rows, frequently perpendicular to the cypress beams, or split and woven (*plekta kalamia*) into a plaid ceiling mat (*psatha*); in rural buildings and shepherds' huts this layer of reeds or matting would be replaced by large-scale laminar stone slabs (*plakoures*) laid directly over the cypress beams or the *dokaria*);
- a layer (a solid mass) of packed plant materials that might consist of oleander (*sphaka* or *pikrodaphni*) branches, *vroulo* or *vourlo* (a selection of locally available sedges, rushes, and clubrushes, including *Juncus* sp. and *Scirpus* sp. with their roots attached to prevent them from settling), *afrata* (reedmace varieties, including *Typha* sp.), *thumari* (whole thyme shrubs), *astivida* (thorny burnet, *Sarcopoterium spinosum*) or combinations of these reedy, hirsute, and spiny plants packed and crushed together under the rubric *vromerides*; some individuals used two plant layers, the lower one tightly packed with thyme and/or thorny burnet and the upper one composed of green oleander branches;
- an optional layer of locally procurred earth that was tamped or rolled onto the upper surface of the layer of plant materials; and,
- a thick final layer of gray-black *lepida* (clay earth) available from deposits such as those at Lalouma near Sivas or from Pobia; this impermeable clay was relaid and tamped down or rolled each year as needed and essentially sealed the roof, making it useful as a drying floor, a work space, and a place for storage of materials such as firewood.

Material goods in early twentieth-century Mesara homes reflected the importance of agricultural labors, animal husbandry, and especially food production, processing, and storage.

It was considered essential to keep the storage area (*apotheke*) clean, and in some cases it was located either right next to the living area or slightly away from it. In addition to storage jars of clay (labeled collectively *kioupia*), wooden *caselles* (long rectangular chests) for grain could also be kept in the *apotheke*. Striped cotton or wool sacks (*tsouvalia*) (plate 6.16) for grain, and hemp or other coarse fiber sacks (*sakkia*) for olives and other foods were stacked for seasonal use. Grain (*sitira, karpos*) could also be kept in clay *pitharia* (plate 6.36) ranging in size from 150 to 300 *okades*. Pulses (*osprea*) were stored in smaller clay jars (*kouroupes, kouroupia*) of twenty or thirty to one hundred *okades* size. Wine was stored in a wooden barrel (*vareli*) that, on average, could hold as much as 250 to 300 *okades*. Wooden boards suspended by means of hooks, rope, or wire from the storeroom ceiling (plate 6.46) served as shelves for food products such as homemade cheese that needed airing and aging, and metal hooks attached to walls and ceilings held bunches (*gremastres*) of onions, pomegranates, and spices strung with *vroulo* and ready for use as needed. Animal bells (*koudounia, leres*) purchased in Herakleion were also hung on wall hooks, as were *voudodepsia* (leather straps and animal harnesses), and against the walls were ranged threshing forks, threshing shovels, and a selection of leather, wire (*teli*), or metal sieves (*koskina*, *volistria*) (plate 6.21) for the processing of grain and pulses. Large (50-*oka*) baskets (*kofes*) (plate 6.37) made of *Vitex*, lentisc, or storax for the transport of agricultural goods, as well as smaller baskets made of reed (*kophinia*), eel traps (*kirtaria*) (plate 6.55) of *vroulo,* and fishing baskets of myrtle were also kept in storerooms. The *apotheke* might contain a supply of glue (*kola*), made from the sap of the plum tree (*bournellia*) or the almond tree (Plate 6.53) that flowed during the summer. Wooden beating equipment for flax (*to spathi*) and for the processing of pulses (*kopana*) was also found against the storeroom walls and could be kept as well in the living area. In addition, one might find metal pails (*kouvades*) and brooms of various types, including the *paraseira* (plate 6.12) fashioned of *Spartium junceum* (*sparto*) or of *Juncus* or *Scirpus* (rush or sedge). Binding and stringing media (*lugodetes*), consisting of strips or thin branches (*vitses*), leaves, and stems of various plants, including *vroulo* (plate 6.54), lentisc (*schinos*), *Vitex* (*lugia*), and bean trefoil (*azoguro*), were hung in handfuls for use in suspending bunches of fruit and vegetables, and in tying firewood, brush, sheaves of grain, and bales of pulses or hay. Iron horseshoes (*petalides*) were also hung or stacked against the walls. In those households where silk (*metaxi*) was cultivated, a stack of trays made of reed (*kalami*) with wooden frames held the silkworms (*skoulikia*) and might be stored either in the apotheke or in the living area of the home.

Larger pieces of equipment, such as the *aletri*, the wooden plow, and the wooden yoke (*zugos*) (plate 6.9) for the oxen could be kept in the entryway (*avli*), the storeroom or in the stable, along with the *voloseiro*, the threshing sledge (plate 6.14), and the *svarna*, or harrow, made of iron or wood, that was used to break up clumps of earth after plowing. In the stable (*ahiri, stavlo*) each animal had its corner eating area called a *pachni* (a basin like space built up on a stone platform) (plate 6.32) for the period between October to March when the animals spent a great deal of time indoors. From March to October, the animals were tethered in the fields for grazing and were fed with wild greens and tree prunings or with cultivated fodder (for example, *araka*) in a clay (*vraschi*) or limestone basin (*gourna*). The saddle (*somari*, *samari, selli*) made of plane tree wood (*platano*) was also stored in the stable.

Deeper limestone basins (also called *gournes*) made of *adruia*, an indurated sandy limestone found locally, were used for the washing of clothes (they were soaped and beaten) and were frequently located just outside the living area, in the entryway. The interior living space most often contained the following belongings:

- large spoons (*koutales*, used in the production of cheese and other foods), and smaller wooden spoons for eating, both of which were made locally from the roots of wild and domesticated olives and from wild pear wood;
- cheese-making equipment included *madaria*, tapering cylindrical baskets of lentisc and reed and, primarily in the homes of shep-

herds, a larger type of cheese-mold basket (*toupi*) made of wild olive or grape cuttings and *vroulo,* which was fashioned by specialized craftsmen in the Rethymnon and Lasithi nomes;

- the *tsakmakopetra* (strike-a-light), a chert fragment that was struck against a curled iron rod and was used to start fires;
- open copper and iron lamps (*lichnaria*) using olive oil and a cotton wick (*fitili*) that provided light throughout the house (one *lichnari* per room)—multiple *lichnaria* were suspended from a wooden stand called a *candilieris*;
- wooden bowls (*lekanides*), wooden mugs (*mastrapades*) and cups (*flutzania*), and a tall wooden mortar (*havani*) and pestle (*matsa*) made by the local carpenter;
- clay water jars (*stamnia*) used for the transport of water from a well or spring (the mouths of these were lined with *stamnagathi*, used as a strainer) (plate 6.49) and for water storage;
- low stools (*skamnakia*) made of plant roots (*koutsoures*);
- chairs made of mulberry, walnut, or plane tree wood, with reedmace seat rests;
- copper *kazania* (cauldrons) for the boiling of milk and cooking, and other smaller copper pots and pans (*bakiria*);
- a range of clay casseroles (*tsikalia*, primarily imported from the island of Siphnos) for baking in the oven and cooking over the fire;
- small and large clay bowls (*lekania, lekanides*), and clay plates (*piata*);
- the equipment for spinning and weaving, including spindles (*rokes*) made from dried wild plants with tall spiked stalks or from split reeds, a wooden loom (*argaleio*), the *tiligadi* and the *anemi* (plate 6.47), wooden implements used in the creation of skeins (plate 6.48) following the cleansing of wool yarn in water, *saites,* the wood and reed shuttles for the loom, and the spinning wheel used for cotton thread;
- metal knives made locally in Moires and a whetstone (*akona*) made of a river cobble meant to be used with water;
- the handmill (*cheromylo*) (plate 6.20) made by a craftsman in Kamilari of a granule- to-pebble-conglomerate;
- a breadboard (*pinakoti*) and a wooden basin (*skaphi, skaphida*) used for breadmaking and for washing;
- aprons (*podies*) and shoulder-sacks (*trouves, vourries*) used for home and fieldwork;
- cloth sacks of flour; smaller cloth sacks of sugar (purchased as molded cones and spheres);
- honey in a small clay jar (*kouroupi*);
- boiled grape syrup (*petimezi*) in a *kouroupaki;*
- vinegar (*ksydi*) kept in a clay jar near the hearth, as far away from the wine barrel and the oil *pitharia* as possible;
- small containers of cumin, pepper, salt, and other spices; a wood or clay container of salt;
- smaller stackable clay containers (*kouroupakia*) or a special cloth (*elaiopani*) for food brought to the fields at midday;
- pickled olives in smaller storage jars (*kouroupes*);
- pickled vegetables (*toursi*) such as artichokes (*anginares*), cucumbers (*angourakia*), peppers (*piperies*), and eggplant (*melitzanakia*) stored in clay *kouroupes* and more rarely in glass jars;
- *kapnista*, or smoked pig meat immersed in boiled down pig fat (*glina*) and kept in clay *kouroupes*; and,
- cotton and/or wool *tsouvalia* (sacks) of oven-baked dried bread or rusk (*dakkos*) for use in the field and for home meals.

Permanent fixtures could include the stone-built *tzaki* or low, clay-lined *parathuia* (hearths for cooking and for heat), and the bed, wooden boards laid on a hollow stone framework that could alternate in use as a *patitiri* (basin for crushing of grapes) and as a storage place for grain or blankets (*battaniyes*), and embroided covers (*kouvertes*) that were woven in the home.

DAILY LIFE (*Kathimerini zoi*)

Etan kopiastike zoi (it was a wearisome life).

—Mesara farmer

As recalled by all elderly villagers, before World War II a farmer rose one hour before sunrise and came home from the fields one hour before sunset (*me tin anatoli eliou stin ergasia, me tin dusis eliou sto spiti*). Between four and five a.m. the family ate a hot meal (*to fai*), consisting usually of cooked pulses accompanied by water or a glass of wine. The farmer then watered the oxen before leaving the village. By sunrise he was in the fields (*stis exodoulies*) (plates 6.8 and 6.9) engaged in planting seed, plowing, spreading manure, weeding, pruning trees, irrigating, building and/or repairing terraces, harvesting crops, collecting firewood, or any of the other myriad labors required of a subsistence farmer. As needed, his wife followed him into the field, frequently carrying the midday meal, which might consist of a *laini* (small clay vessel) (plate 6.50) of water, plus bread, cheese, and olives wrapped in a cloth called the *elaiopani*, or the cold leftovers of the breakfast meal, contained in small clay vessels called *kouroupakia*. Frequently the same food (cooked pulses) that had been served hot that morning was heated again for the evening meal at home (ideally, it was expected by all that hot meals would be served at the beginning and end of each day). Meat for many was served only two times a week at a main meal, or as little as once a month for less prosperous families in the plain proper. In the mountain flanks where shepherding was common, meat was more readily available, as were all of the milk products. After the evening meal the family retired until the next day. The ideal in each home was to store two years worth of grain and oil in the *apotheke*, as insurance against future subsistence needs. If this was not possible, the farmer, at minimum, saved from the annual food supply of grain enough seed (in a small sack) to sow for a second year. On average, a family of five to six individuals could subsist on the following amounts of basic foodstuffs:

- olive oil, around two to three hundred *okades* per year = one large *pithari* (*trakosioka*) (plate 6.36) or two smaller *pitharia*;
- barley, around nine to eleven hundred *okades* per year = five medium or three large *pitharia*;
- wine, around two hundred fifty to three hundred *okades* per year, or one barrel;
- pickled eating olives, one hundred or more *okades* per year = one large or three small *kouroupes*; and,
- pulses, usually twenty to thirty *okades* each of different varieties, including chickpeas, lentils, peas, and beans stored in smaller *kouroupes* holding twenty to thirty *okades*, or larger amounts of fewer types of pulses contained in medium-size *kouroupes* of sixty to seventy *okades*.

At home the farmer's wife was responsible for food processing and preparation, cleaning, washing, breadmaking, child care, animal care, and spinning and weaving, as a basic minimum in addition to her field labors. Bread was made of barley, or if possible, of the much desired *tagidomigado* (a three-grain mix of barley, wheat, and oats) ground at the local water mill as needed (plate 6.16). The bread dough was mixed and left to rise during the evening (*zumoname tin nichta*). *Dakkos* or rusks of barley bread (plate 6.18) were made in large quantities from fresh bread baked twice in private or common ovens and were kept for midday meals in the field and for breakfast and dinner if fresh bread was not available. As many as four hours before sunset the woman of the house would begin preparation of the meal for the next day and would feed the oxen (*apachniaze ta vodia*) a basket of straw or other fodder.

Blankets (*battaniyes*) and bed covers (*kouvertes*) were woven of wool (*malli*) on the household loom, many of them embroidered with a wide variety of colors drawn from vegetable and synthetic dyes. Sacks of cotton or wool (*tsouvalia, sakkia*) were also woven at home in vivid stripes of madder red, indigo blue, onion yellow, and black against the white cotton or natural wool background, and were used to transport grain to the local water mill (plate 6.16) and to store barley or wheat flour in the home.

The clothing of male villagers was referred to as *salvaria* and was distinctive for its *vraches,* voluminous (*ballomena*) trousers that were made of many meters of cloth dyed black or deep blue by the local *bougiatzides* (dyers) in specially fashioned clay jars (plate 6.57). *Salvaria*, in addition to *vraches* (plate 6.8) included a head scarf (*mentani*, *mentili, mantili, sariktzi*), a vest (*geleki*), with or without silk embroidery (*stolidia*), cotton shirts (*poukamisa*), a wide cloth waistband or belt (*zoni*), high leather work boots (*botes*) for fieldwork or fine polished boots (*stilvania*) for holidays and leisure time, and in the shepherding villages especially, a cloak of woven and then compacted wool (*kapo*, *kapoto, raso*) that had been finished (stamped, and thus felted) in a basin and frame called the *gouvelos* and *katergosa*. A few individuals might also wear a stiff felt hat called a *koukos* (plate 6.9). For daily labors all men wore the *andriki podia* or *petomandilo* (also called the *sporopodia*) a full-length cotton or wool apron that was employed by men for all fieldwork (plates 6.8 and 6.9), but especially sowing and gathering. Women's wear included a cotton headscarf (*tsemperi*), a shorter apron (*podia*), and less distinctive blouses and skirts of cotton, linen, or wool.

Maintenance and washing (*bougada*) of family clothing was only one of the labor-intensive activities in the domain of women prior to World War II. Clothes were placed in a *kazani* (copper cauldron) of clear cold water that had been drawn from a well or transported in *stamnia* in many trips to and from a spring. The clothes were then wrung out and were beaten with a wooden *kopano* and lathered (*ta sapounizame*) using soap made from lye and olive lees, either homemade or purchased from one of the local soap factories (*sapounopoies*) such as that in Pobia. The cauldron of water was then boiled and the soaped articles of clothing were spread one by one in a basket (*kophini*) that had been set either in a wooden wash tub (*skaphi*) or in a stone basin (*gourna*). A fine linen or cotton cloth called the *athomantila* was placed over the clothing in the basket. A large quantity of sieved ash (*atho* or *stakti koskinismeno*) saved from the household hearth (*parathuia*) was placed in the *athomandila*. Boiling water was poured on the ashes and they were stirred to mix them thoroughly with the water (*kai skalisame tin stakti kai epefte pio grigora*, we stirred the ash and it worked faster). The clothes then soaked overnight. In the early hours of the morning the housewife took the basket to a village well or spring where she rinsed the clothing in stone basins and spread it out on the tops of stone walls that in many cases had been intentionally covered with branches of spiny broom (*ta aploname ta roucha stous kserlithies (traphoi) me aspalathous epano*). Following this, she went to work in the fields (*kai meta pegame stis exodoulies*). When describing the cleaning of cotton and linen clothing all elderly females are in agreement that as a result of this process "the clothes shone and they blinded you with their whiteness" (*lampane ta roucha kai se tuflonane apo tin asprada*).

MEALS (*To Fai*) IN THE MESARA SUBSISTENCE SYSTEM

Ta osprea etane to fai mas (pulses were our meals).
—Mesara farmer.

In periods of economic deprivation and political instability such as the last half of the nineteenth century and in the early years of the twentieth century leading up to the *katochi*, between 1940 and 1945, there were various means employed in Mesara households to stretch available food resources. As stated above, during periods of economic stability, pulses (*osprea, psimika*) were considered the basic component of everyday meals (*fai*, meaning hot cooked food). In stressful periods, when grain was in short supply, bread could be made of ground chickpeas (*rovithi, revithi; Cicer arietinum*) or ground broad (*koukia)* or fava (*fava*) beans *(Vicia faba*) (plates 6.23–6.25), and even of ground species of *Lathyrus* (essentially grass pea, or grass or chickling vetch) and *rovi* (bitter vetch, *Vicia ervilia*). These, as animal fodder, were used only in times of hardship in the preparation of bread or hot meals. A family in difficulty might also eat ground oats (*tagi*) or lupines (*loupina, Lupinus* sp.), normally considered animal fodder, and could also produce from lupines an oil (*loupinolado*). All of the fodder crops above were commonly perceived as *kako fai* (bad food). Elderly farmers who had lived through such economically difficult times stated that you were an independent householder (*nukokiris esouna*) if your family had everything it needed to eat. As noted previously, the bottom line was perceived as enough grain and oil to support the family for a year. Pulses were consistently listed second on this scale of bare necessities, although it was highly desirable to have small amounts available. The successful cultivation and storage of large quantities of pulses was considered remarkable before 1950 (one elderly farmer was cited in villages throughout the Mesara for filling a 300-*oka pithari* with lentils during the later World War II period). Repeatedly, elderly farmers stated that you had successfully achieved complete and necessary sustenance for your family if you produced and stored substantial quantities of pulses (*eichate tin porepsi tou spitiou ean eichate polla osprea*).

An extraordinary selection of wild greens (*horta*), primarily herbs (for example, plate 6.53), were a consistent element of Mesara subsistence in good and bad periods (see "Wild Plant Use," below). Land snails (*cochlious*, *salingaria*) (plates 6.58, 59), which in prosperous times were served as a delicacy with sauce, became in stressful periods the components of a stretched meal. Where there was a great need (*megali anangi*), mulberries (*mournies*) were consumed, and carobs (*haroupia*) were beaten, soaked in water for two days, and then boiled to make a syrup with sugar content (*haroupia,* essentially a form of *petimezi*, or syrup). Meat from wild animals was also used in periods of economic stress. The wild hare (*lagos*, always a much sought-after meat source), partridges (*perdikes*), fox (*alepou*), and birds of all types and sizes were caught in addition to *trigonia* (turtles), crabs (*kavourakia*), and eels (*chelia*) from the manmade freshwater channels (*saites*) feeding into the Ieropotamos River.

The kitchen garden (*kipos*, *perivoli*) and small-scale orchard (*bakse*) (plate 6.43) provided the family with vegetables, fruit, and nuts. Tomatoes, squash, cabbage, onions, cauliflower, spinach, *vlita* (*Amaranthus blitum*), leeks, purslane, melons, various herbs, and if enough water was available, potatoes, were planted in the garden and were identified as *kipeftika*. Fruit-bearing trees included almond, walnut, pear, plum, fig, loquat, and the water-thirsty citruses, such as orange, lemon, and citron (with only one or a few of these in each garden orchard). Within the villages it was rare to find in each home more than a few plants in clay pots (*glastres*) maintained by each housewife. This absence of plant growth by village houses was a concomitant of the difficulty in procuring and transporting water (with *stamnia* from springs, wells or from a watercourse) on a daily basis. Throughout the Mesara, however, women considered it essential to maintain a small complement of potted plants called collectively *vasilikous* that were used in cooking: *vasiliko* (basil), *diosmos* (mint), *matzourana* (marjoram) and *karanfili* (a garden pink with a clovelike scent).

In addition to the cooking of pulses, the following are basic recipes cited by elderly inhabitants as common before World War II, many of them used to stretch meals and food supplies:

- *kreas ksidato xeirinou*. Pig meat soaked for two to eight days in vinegar, and boiled on the fire with pepper;
- *loukaniko*. Sausage made from the small intestine of the pig. Intestines were cleaned for two days with water mixed with lemon and then filled with finely chopped pig meat mixed with salt, pepper, and other spices, all of which had been soaked in vinegar for two to three days. The intestines were stuffed, hung over the fire, and then smoked with *faskomulia* (sage). For storage they were hung from a beam (*to kremoune sto arra*).
- *tsiladia* or *pichti*. Feet and head of pig boiled and allowed to sit for four hours. The boiled liquid was removed and sieved. The head and feet were then mixed in a *tsoukali* with vinegar, lemon juice, pepper, and gravy and baked in the oven.
- *hontro* (coarse ground wheat soaked in milk) mixed with almonds, pepper, cinnamon, sesame and pig liver. This mixture was fried in pig fat (*glina*).

As noted below (see "Farm Animals"), these foods were dependent upon the family's ability to raise and butcher a pig at least once a year. In households that were perennially caught short, and generally, in periods of economic stress, the following were standard cooking recipes to stretch minimal food supplies in Mesara homes:

- *chilos*—small amount of flour, some salt, mixed with water in the *tigani* (frying pan), cooked with oil, scrambled (could be served with carob syrup (*siropi*, *haroupia*), *petimezi* (grape syrup), or honey (*meli*);
- *gredia*—wheat coarsely ground in the home handmill, mixed with water, cooked in the frying pan, and served as above with carob syrup, grape syrup, or honey;
- *cheromiliasti tiganites*—recipe for *gredia* as above with *prozymi* (yeast) added to it to make it rise (served with carob syrup, grape syrup, or honey as above);
- *panada*—small amount of *bizi, bizelia* (peas), *koukia* (broad beans), or *revithia* (chickpeas) soaked the night before, or leftover from the previous evening meal. Added to two *okades* of water and one handful (*fouxthia*, *fouchta*) of salt and oil. Boiled together. Then poured over broken-up fragments of twice-baked bread (*dakkos*). Served for breakfast and eaten by the entire family from a single large open bowl (*lekanida*) (plate 6.51);
- *salingaria me hontros*—snails cooked with coarse ground wheat soaked in milk;
- *tholostasis*—hot soup made of oil, flour, wild greens (*horta*) mixed with the juice of cooked meat (*zoumi*);
- *tiganitous*—handful of flour, fried in oil in the frying pan;
- *mangiri*—juice from cooked meat mixed with a little boiled water and oil, and fried in a pan;
- *zorbas*—soup made of ground wheat or barley (*hontro*), lots of water, some salt, and some oil. Boiled and served hot.

As noted above, salt (*alati*) was an important element in cooking and in the preservation of foods. Many farmers estimated that a five- to six-person family could consume up to fifty *okades* of salt per year in cooking, food preservation, and storage. The sea salt, after eight to ten days of drying in the sun, was collected by farmers from pockets (*lakkous*) on the rocky shorelines north and south of Matala, and along the south coast of the Asterousia (shepherds who spent the summers in the Asterousia lowlands also collected salt to peddle it in mountain villages). In addition to cooking, it was an essential element in the pickling of eating olives (*chondres elaies*) and in the production of *toursi,* pickled vegetables such as peppers, cucumbers, artichokes, and eggplant, all of which were stored in brine and vinegar mixtures (in *kouroupes* or more rarely in glass jars) and were used to supplement meals.

Locally produced sweets in the Mesara consisted of honey, grape syrup (*petimezi*), and carob syrup (*haroupia, siropi*) (all stored in smaller clay vessels). Sugar in a spherical or conical molded form was infrequently purchased in Moires or Herakleion and was stored in a sack. During holiday periods in the summer, snow was brought down from the Idaean range and *kanellada*, a sweet cinnamon syrup, was poured over it. *Soumada*, a liquid made of ground almonds, was also considered a special drink, and in towns such as Rethymnon, snow drenched with carob syrup could be purchased from street vendors (*planodioi*) as the treat called *haroupia*. *Salepi*, a sweetened hot drink made of the dried and ground corms of wild orchids was available during the winter in Herakleion and a number of the local Cretan orchids were used in the production of this drink. In more difficult periods, potatoes were dug up in May and June, dried, and ground into a powder that was then sweetened.

Ultimately, the widest variety of sweets and special drinks was available in the village *kafeneio,* which before World War II was a male domain. Coffee was a rarity in Mesara homes and was prepared by the coffeehouse owner with great care. Coffee beans were roasted over the *kafeneio* coals in a perforated metal container known as the *karvoudistiri.* A large marble or hard limestone mortar (*havani*) (plate 6.68) and iron pestle (*matsa*) were then used to crush the beans before sieving them in double sieves so as to separate the fine grounds. In addition to coffee, village cafes offered *raki* (distilled spirits), *roumi* (rum), *krasi* (wine), cognac (*koniaki*), *soumada* (sweetened almond drink), *kanellada* (sweetened cinnamon drink) and various local teas, including *faskomilia* (sage) and *tsai vounou* (mountain tea). In most homes, barley was roasted and made into a hot coffeelike drink if a farmer could not afford visits to the *kafeneio*.

SOCIAL AND ECONOMIC STRUCTURES IN THE MESARA VILLAGES—THE VALUES OF LIFE *(Axies tis Zois)*

Evgala tin porepsi mou (I earned what I needed).
—Mesara farmer

Social relations in the Mesara villages of the early twentieth century centered around ideals that were often quite different from the realities of everyday life. Elderly farmers repeatedly stated that before World War II, there was a serious emphasis within villages, and between villages, on helping one another (*allelovoethia*), a phenomenon that was not restricted only to immediate family members and more distant relations (*suntechnoi*). Frequently a village priest would announce in church who needed help and of what kind. The response to this was assistance from one's neighbors and from neighboring villages (*me t'alla horia eichame desmous,* we had ties with other villages). In contrast, there was also a persistent effort in avoiding, if possible, obligations (*upokreoseis*) that could threaten the place of the family within the village social structure.

As is evident in the quote that begins this section, economic independence was a major goal that affected the social role of the family. It was matched by prevailing rules of good behavior as summed up in the saying (*paroimia*) that follows here: *Me kameis, me sou kamoume*. *Mi pis, na me sou poune*. *Tin kseni porta me ktipas*. (Treat others as you would be treated. Do not speak badly of others. Do not ask for help outside of your family.)

Even allowing for a nostalgic view of these early years of the twentieth century, it is obvious that relations among Mesara villagers in that period were important not only in the social success of family members, but in the economics of the extended family. The terms *embistosini* (trust), *kalosyni* (kindness, goodness), *anthropia* (humaneness, civilized behavior), *allelovoethia* (mutual aid), *pisti* (faith), *timi* (honor), *philotimo* (dignity, self-respect), *kali charactira* (good character), *sevasmos* (respect) were used repeatedly by elders in describing social interactions before World War II. These social values were always, throughout the years of this study, contrasted with today's system of living, in which *kaloperasi* (the easy life, prosperity) is paramount and, in which, according to elderly villagers, a lack of spirituality and disinterest in others characterizes society.

In ideal terms, it was considered essential to share with or give to those in less prosperous situations. The less well-off, in everyone's recollection, were treated well. Ideally, when a wedding took place, the entire village was invited, regardless of family ties or economic status. Marriage between individuals from local villages and between Mesara inhabitants and individuals farther afield—for example, the Sphakia region, the Rethymnon nome, the Anogeia area—was not uncommon. In some cases, it was a result of economic interconnections, for example, Sphakia shepherds wintering their herds in the Mesara or in the southern flanks of the Asterousia. Visiting between villages and *panegyria* (festivals centered around saints' days and church celebrations) were occasions for *diaskedesis* (enjoying oneself) and for renewing ties with distant relatives or villagers whose land bordered on your own. In broad terms, the collective landholdings of a village were consistently described as having *sinora* (borders) with the collective landholdings of other villages. On a smaller scale, this meant that landholders from different villages whose boundaries met at individual field margins were engaged in a more immediate social and economic obligation that was emphasized by the importance of actual boundary stones (see "Landscape Management," below).

Economic considerations, although influenced by social structure, revolved around the perceived need to continually increase the landholdings of the family, a process characterized by all as a driving force in life (*to pio spoudaio* *etan na exeis horafia*, the most important thing was to have fields). Whenever possible, with even the smallest of surpluses in grain or oil, a farmer attempted to sell the extra crop (referred to as the *portofoli*) and, over a period of time, to save enough to buy more land. Barley, with a much greater yield than wheat, was thus an important grain for food production and for the accumulation of some kind of surplus, however small. As noted below, however (see "Trade"), engaging in trade (*emborio*), the buying and selling of commodities on a larger scale for profit, was viewed with distrust. A frequently cited economic ideal was to grow enough to live and to offer to a guest (*mousafiri*), and neither to sell nor to buy. A further stated ideal in this respect was to avoid becoming rich, for in that case everyone else would envy you and your family, an insecure situation for any villager.

Environmental and economic concerns were widespread among traditional farmers, and in many cases did not support the ideals cited above. All farmers stated that "this way of life was something you endured" and that "the chance to improve was minimal," comments based in part on the vagaries of the environment. It was understood that sufficient rains in March and April, called *psumonera,* would ensure the successful cultivation of all crops that year. However, it was also perceived that even with sufficient rainfall two years in a row, a severe heat wave in the spring of one year could burn off all of the olive flowers and terminate a crop. Thus, many farmers observed that one should count on nothing and expect nothing. In years with less rainfall there was always some production, and in periods of shortage it was "simply necessary to eat less." In the case of total crop failure, the immediate response of a farmer was to work for others as day labor.

Overall perceptions of the Mesara population included descriptions of successful communities of farmers as *douleftades* (hard workers) and of less prosperous villages as either not working hard enough, or restricted by the resources in their locale. However, in the case of Listaros, a small, struggling village on poor land in the southern margins of the Mesara, a curse (*katara*) resulting from a local crime involving the saintly figure Evtuchianos was constantly cited as an additional reason for its lack of success.

A belief in divine intervention in the agricultural cycle was not uncommon before World War II. In years when there was insufficient or no rainfall, villagers would participate in *deisis,* a ritual procession of man and animal led by the village priest throughout the community and the fields in its immediate environs. Oxen and other farm animals were kept unwatered and unfed for a day prior to this procession so that God would hear their suffering and respond with rainfall. Pervasive spiritual beliefs such as this were paralleled in the sacred value assigned by all elders to fresh baked bread from the family oven, which was expressed frequently in the following caveat: *me myrizeis to psomi, einai to soma tou Christou,* do not smell the (newly baked) bread, it is the body of Christ.

Landscape Management—Field Borders, Terraces, and the Tools of Agriculture

O traphos megalone kathe chrono
(the terrace wall grew each year).

—Mesara farmer

Among the ten to fifteen plots of land owned by an average Mesara farming family in any given year, there could be fields (*horafia*) that were left uncultivated for that year or that had reverted to a wild state (*thamnous*) over a long time as a result of disuse. The most common shrub plants found in these wild conditions were lentisc (*schinos*), thorny burnet (*astivides*), thyme (*thumari*), wild sage (*faskomilia*), and spiny broom (*aspalathos*), followed by wild olive (*argoulida*) and wild pear (*agrioachladia*). Once they had been cut from a field, the regrowth of these plants was understood as a three- to four-year process, and the grazing of goats and sheep was believed to encourage their further dispersal throughout the landscape.

Well-defined field borders (*sinora*) were not only important in evaluating the landholdings of an entire village in relation to the collective landholdings of a neighboring village (all farmers could identify the other communities with which their own village had *sinora*), but were equally significant on an individual level. The *sinoro* at each of the corners of a field consisted of a large stone laid over a circular hole (*lakkos*) into which were placed four smaller stones (*martyries*), one each at the four cardinal points of the compass. The hole itself was filled with earth (the smaller stones were covered over with soil), and the large corner stone (the actual *sinoro*) was thus the only visible sign of a field border. In cases of dispute, where the *sinoro* might have been moved from its original location, the earth beneath it was dug up to verify the position of the four *martyries*.

In the case of terraced fields, to pass from one landholding to another it was necessary to leave around 30 cm on either side of the terrace wall so that a pathway (called by some a *perasa*) existed. As noted above, the unworked stone for terrace construction was in many cases abundant in the fields, especially those on hillslopes with eroded bedrock deposits. The terrace itself, the earth shelf, was called a *pezouli* or *pezoula* (plate 6.7). The stone wall holding the soil shelf in place was referred to most commonly as a *traphos,* and less frequently as a *kserotoichos* or *kserolithi.* All farmers remarked that the individual labor involved in terrace construction was extraordinary and could be attempted only with sufficient time on hand, and preferably some help. As stated above, the terrace was perceived to "grow" each year, with the erosional deposition of up to 50 cm of earth, which then required the addition of a new layer of stones in the *traphos* to hold it back. In some areas of the southern Mesara hillslopes it is still possible to locate terrace walls of up to 4 m in height. On steep (*apotoma*) slopes with downhill water flow this annual addition of stones was an essential part of terrace upkeep. It was also understood that on less dramatic slopes it was not necessary to build terraces as long there was no plowing.

Villagers who owned land on the *kampos* frequently had a large enough yield from their bottomland fields that they did not need to cultivate any hillslopes they might own (everyone agreed that "the land was better down below"). Thus, in the Mesara proper, farmers in villages with few or no landholdings in the alluvium of the plain were dependent on terracing. Terraces were built to save the soil on slopes plowed with teams of oxen (*orgoname me vodia*) (plates 6.8 and 6.9) to keep the sown seed crops (*ta sparmena*) from eroding downhill, to keep animals out of a field, to create level spaces (*sopata*) for easier cultivation, and to render what would be poorer fields more fertile. In the hilly margins of the pre–World War II Mesara, olives, grain, pulses, and vines were all, in various combinations, planted on *pezoulia*.

Whether on terraced slopes or on the flat, in good fields or bad, it was only possible to engage in multicropping, for example, planting grain below olive trees, if there was sufficient rainfall throughout the winter. Fertile fields (usually white soils) with high yield were described as *pachis* and were said to retain moisture. It was also understood that plowing as many as four times a year in a fertile (usually a white soil) landholding would not jeopardize this moisture content. Poor fields, labeled as *ftina horafia* or *adunata horafia* with less fertile soils, were more difficult to maintain, and multiple plowings in these resulted in only a small increase in yield, if any.

Overall, the yield of a landholding was perceived as dependent on its location (bottomland, slope, etc.), the quality of its soil, the availability of water, the system of tillage employed, and the possibility of fertilization. As a general rule, there was no plowing in wet weather. The plow (*aletri*) (plate 6.9) was fashioned by the *aletras*, a craftsmen who could also provide yokes for oxen and threshing sledges. An *aletras* worked in Voroi and in other villages around the Mesara producing plows of *platano* (plane tree) or *druias* (deciduous oak). The *zugos,* or yoke for the oxen, was usually made of willow (*ethia*), considered the lightest and most practical wood for this purpose. The threshing sledge (*voloseiro*) (plates 6.14 and 6.15) was fashioned from a variety of woods, with plane wood, oak, and pine (*koukkounaria*) the most commonly mentioned. Two or three planks of wood were joined together in this sledge, and chert blades were driven into the base with a wooden hammer. The finished (knapped) chert blades (*anuchia*, *nuchia*) were sold in one-*oka* sacks in Moires and were known by all to come from outside of Crete (a number of farmers knew that they were from Anatolia).

Following World War II it was common to replace the chert blades with strips of serrated iron (*sarakakia*) (plate 6.15), and combinations of chert and iron on a threshing sledge were not uncommon. Harrows (*svarnes*) were also used in the Mesara to break up clods of earth created during plowing. Threshing forks (*thrinakia*) (plate 6.21) were produced in Agia Varvara and could be made of a variety of woods, although plane wood was preferred by many. *Palamia*, or winnowing shovels, were also fashioned of plane or beech wood. A heavy wooden club (*kopano*) used in the beating of pulses was made of almost any wood, frequently by the farmer himself. Sickles (*drepania*) (plate 6.10) for the harvest of grain and pulses were produced by ironworkers who then cut shafts of oleander (*sphaka*) for handles. Oleander was the preferred wood for most metal tool handles because it was water-resistant and could easily be hollowed out. Hoes (*skapetia*) made of iron were also fashioned locally and were essential for tillage in kitchen gardens and around vines and trees. A wide variety of brooms (for example, plate 6.12) made of sedge, rush, Spanish broom, restharrow, thyme, and thorny burnet (see "Wild Plant Use," below) completed the basic equipment for cultivation and processing of grain, vines, and trees in the Mesara.

Water and Irrigation *(To Nero kai to Potisma)*

An uparchoun ta psumonera, oles oi kalliergeies pane kala
(if you have the rains of March and April, all of the cultivated crops will do well).
—Mesara farmer

All Mesara farmers were in agreement on the agricultural importance of water (*ta nera*) and the nutrients (*ousies*) it transported from slopes to bottomlands. Mesara winters were perceived and recalled in terms of rainfall: *a(e)lafrocheimonia* was the name given to a dry winter with almost no rain, sometimes as little as 20 cm, and a winter with heavy persistent rainfall that might result in flooding was described as *varocheimonia*. Of these, the first, a dry rainless winter, was considered the most difficult to survive. Indeed, many farmers stated that before World War II "we grew crops that did not need water" as a form of insurance against drought. Until the introduction of piped water in the decades after the war, most Mesara villages on the plain and in the foothills were dependent on springs (*piges*), wells (*pigadia*), pole and bucket levers (*gerania*), and natural (*potamia*, *potamakia*) and manmade watercourses (*saites*, *avlakia*, *katapotes*, *kanalia*) (plate 6.43) or a combination of these, for household needs, as well as for the irrigation of fields.

As a result of heavy winter rainfall in the years before World War II, farmers remember serious flooding (in 1936 to 1937 especially), as more than the usual amount of standing water collected in the bottomland of the plain, especially in the Levadia (plate 3.2; figure 11.14) at the foot of the Phaistos ridge. In less extreme years this was a dry and weed-covered area for the grazing of animals between May and October. Villagers described the lake which developed that year as a sea (*thalassa*) from Moires to Pobia and from Petrokephali to Agios Ioannis (figure 6.2). Villagers in communities such as Voriza at higher elevations recall destructive mountain flows that began above them at springs, evolved into cataracts, and washed away buildings in their violent journey down the hillslopes. In Voroi, villagers recall a huge flood when the Koutsoulitis flow, which began in the mountains to the north at the Votamos, an abundant spring near Zaros, and ran by the village, met the Ieropotamos and forced animals into trees. Many recall yearly changes in the path of the Ieropotamos before World War II. The Ieropotamos River (plate 6.3), and the primary manmade flow connected with it, the *Gria Saita*, might collect too much water and flood during a rainy year, a phenomenon that was described as *kalathas*. When that occurred, the well-established olive trees planted on the margins of the Ieropotamos could suffer from this overabundance of water.

According to all, the Gria Saita, the largest and most extensive manmade water channel (*saita*) in the alluvium of the Western Mesara, was located in the environs of Agios Ioannis and was established during the nineteenth century. The watercourse was built to feed the grain mill at

Falantra, immediately below and to the north of the Phaistos ridge, and indirectly aided in the drainage of the plain bottomlands. The water in the Gria Saita, the channel itself, was described by all as *tou mylou* (belonging to the mill). In Agios Ioannis, in the early years of this century, the Gria Saita was annually closed off for roughly twenty days during the month of September. The main channel of the *saita* was cleaned out by workers hired by the water mill, and those farmers whose smaller channels (*mikres saites*) fed into the Gria Saita were obliged to do the same. In the landholdings around the Ieropotamos and the Gria Saita, farmers dug *saites* feeding into the main watercourse to control and speed up drainage in their fields. These smaller *saites* contained large populations of eels (*achelia*) and freshwater crabs (*kavourakia*) that were collected at night, usually in October during the first winter rains, by villagers using lamps and woven rush or sedge traps called *kirtaria*. Farmers from other villages in the Mesara came to buy the crabs and eels, and thus, these *saites* were acknowledged as rich in nutrients and as productive of an additional food source for locals.

A less permanent and much smaller type of channel that branched off from a *saita* was the *katapota* (*katapoti*) (plate 6.43) or *avlaki*, a watercourse of up to roughly 80 cm in width that was dug and walled with earth using a *skapeti* (hoe) so as to irrigate fields. Even narrower excavated channels, sometimes distinguished as *avlakia,* were dispersed throughout fields to irrigate rows of crops. With the use of these of water channels, both temporary and permanent, farmers were able to conserve water during dry periods (*mazeveis to nero na min liothei*) and to control water when it collected in excess. In the irrigation process, the *katapotes* and *avlakia* were regularly opened and closed (*klino to ena avlaki, anoigo to allo,* I close one channel and open another) with small earthen dams so as to direct the flow in sequence to thirsty crops. In the autumn barrage of the Gria Saita with a wood and mud dam, the process was referred to as *desame to dema* (the contained water was the *dema*). In villages located at higher elevations (for example, Phaneromeni) the winter flow from the mountains (called *cheimoniko nero*) was channeled into *saites* and *katapotes* as available. In Voroi, which was at the receiving end of the main Zaros flow (the Votamos), irrigation was also possible via heavy to light seasonal waterflows. In addition to the two water mills around Phaistos, villagers could patronize a mill in Petrokephali, three more in Tymbaki, and one in Magarikari.

The clarity and coldness of water from springs (*piges*) made these natural phenomena preferred water sources throughout villages (figure 6.2) within and on the margins of the plain. Magarikari had one spring within the village and many outside of it that flowed from natural openings called *charakes*. Sivas maintained one inside the village and another at the toponym Agia Marina on the road to Pitsidia. Phaneromeni had springs; Kouses had two; Pitsidia had one; Kamilari had two springs, one of which was an *exopigi*; Listaros had one. Voriza had one spring below the village that ran full in the winter with a lesser flow in the summer, but above Voriza there were five separate springs used in watering the large herds of the village. Zaros had an unending supply of water from its main spring, the Votamos, and was always able to water its crops. The villages of Petrokephali, Agios Ioannis, and Voroi did not have springs and as a result were dependent on wells (*pigadia*). With a high water table, families in Voroi were able to dig individual wells for household use. In addition, there were three public wells (*koinonika pigadia*) within the village and the sharing of *pigadia* was not unknown. In Petrokephali every house had a *pigadi*, and in Sivas, with its spring, there was also a public well. In Agios Ioannis on the margins of the Levadia there was one public well dug in addition to those of individual households. Listaros and Voriza each had a *pigadi*. At springs and from public wells, women would draw water and fill *stamnia* (clay water jars) (plate 6.49) for household use. Kitchen gardens and small orchards could be irrigated via multiple trips to sources if there was no seasonal flow available.

In order to use the water from wells for irrigation, a number of villages employed the *gerani,* or pole and bucket lever. Among these, villagers from Agios Ioannis, Sivas, and Pitsidia employed *gerania* in their fields near the Levadia. Kouses maintained *gerania* at its landholdings in the plain bottomland. Listaros had *gerania* in its environs both for household use and for kitchen gardens. Petrokephali maintained *gerania* and was able to grow substantial crops of vegetables (*nopa*) because there was so much water available for irrigation (*potisma*). One *stremma* (one-quarter acre) of cultivated land would take half a day to water with the *gerani*, using it to feed water into *katapotes*. Platanos, with its year-round flow, had no need of *gerania*; Voriza and Magarikari employed both *gerania* and *sternes* (reservoirs) near their springs to collect winter flows.

The Cultivation of Grain (*O Karpos, Ta Sitira, Ta Sparmena, Ta Demetriaka*)

O kosmos koitaze posotita, ochi poiotita
(everyone was looking for quantity, not quality).

—Mesara farmer speaking of the widespread cultivation of barley

There is no question that in the decades before World War II, grain (*karpos, sitira*, *sparmena*, *demetriaka*), specifically barley, was the foundation of traditional Mesara life (plate 6.6). Farmers thought in terms of barley when they spoke generally of grain, when they used measures relating to seed and to transport of food goods, when they planned the distribution of crops in their fields (*ta horafia kreiazomaste gia karpo*, we needed our fields for grain) and when they considered what would sustain their families for a year. Barley (*krithari*, *krithos, Hordeum vulgare*), in contrast with wheat (*sitari, stari, Triticum* sp.), yielded greater quantities (as in the quote above) per amount of seed and per field, and according to some, was hardier in years with severe weather conditions. Some farmers stated, however, that if you had trouble with one variety of seed crop during the growing season, you had problems with all of them. Wheat was considered the food grain of more prosperous families and if planted at all by most Mesara farmers, was used in small quantities for special baked goods on holidays, in minute amounts for some everyday recipes (for example, *hontro*, wheat mixed with milk), and for sale in order to buy more land. With the exception of these few prosperous families, everyone else ate barley bread (plate 6.18). The third grain cultivated in the Mesara was oats (*tagi*, *vromi, Avena sativa*). While oats were primarily employed as animal fodder, a three-grain bread called *migadi* or *tagidomigado* was baked in the Mesara from barley, wheat, and oats. The grains were mixed (two *tenekedes* each of barley, wheat, and oat seed), sowed together in one field, and harvested and milled together. *Migadi* was considered by all elderly farmers "the very best bread you could imagine."

According to elderly farmers, the Mesara in the late nineteenth and early decades of the twentieth century was "golden with grain." This is hard to imagine today as extensive olive groves completely blanket not only the fields around villages, and the slopes and foothills, but also the level bottomlands of the Mesara as far as the eye can see from the Phaistos ridge, well into the Eastern Mesara. In the early decades of the twentieth century, however, there were few olives in the plain bottomland (for example, plate 6.5) and those that did exist were frequently centuries-old remnants of the Venetian mandate to plant olives in the Mesara (see chapter 14) and of the increased planting during the Ottoman period.

Grain measures were based upon the amount of barley needed to plant one *stremma* (one-quarter acre) of land. The actual measure for this, a *mouzouri,* was most commonly made of wood and held fifteen *okades* of barley seed. The *miso mouzouri,* known as a *pinaki,* held 7 *okades.* Half of a *pinaki* was called a *pratiko* and held 3 1/2 *okades.* In contrast, a *mouzouri* of wheat, the individual seed of which was thinner and weighed less than barley, held 13 to 14 *okades* of seed. Likewise, for oats, which were extremely lightweight, a *mouzouri* held roughly 12 *okades*.

In all fields, barley was observed to grow faster than other grains and to produce a higher yield. The yields cited here (table 6.2) however, were related to the following conditions, each of which would affect the productivity of a landholding:

- *Analoga me to kairo* (according to the weather). Overly dry or wet conditions could affect the grain yield even in a potentially fertile field.

- *Analoga me to horafi* (according to the field). Fields with eroded white soils that did not need irrigation in the dry months would yield more grain than fields with red soils that required year-long watering, and which, if denied this irrigation, produced very little. If red soils were irrigated year-round, the yield would be substantially greater than any amount possible in eroded white soils.
- *Analoga me tin kalliergeia* (according to the amount of cultivation). All fields were considered to yield more if they were plowed more than once a year. Two and three plowings were perceived as advantageous for grains, and some farmers even suggested four plowings before planting. Tillage to this degree was ultimately more successful in the eroded white soils that retained moisture. Red soils were considered to lose too much moisture from such vigorous tillage.
- *Analoga me to mina ta spernoume* (according to the month we sow). A saying in the Mesara, *ton Oktovri den espires, to mai pos perimeneis okto sorous* (if you don't sow in October [on time] how can you expect eight big piles [a large amount of grain]?) was repeated over and over in regard to planting. It was believed that the later you planted in the year, the lower your yield would be, because the grain would have less time to mature properly.

Thus, providing grain yields from Mesara fields, all of which were subject to the above restrictions in addition to individual family concerns with available time and labor, is a complex process. The numbers presented here are the overwhelmingly consistent figures for barley cited by more than three-fourths of the farmers in this study. Qualifying remarks are included for each field type in table 6.2.

A family of five to six persons was considered to need one-half *oka* of barley per person per day, a rough estimate verified by many. This meant that roughly three *okades* of barley per day was consumed by one family, a total of more than one thousand *okades* of barley for one year. This is somewhat of an ideal figure, since many farmers revealed that their families had lived, in difficult years, on roughly seven to eight hundred *okades* of barley, that is, two large *pitharia* (*trakosioka* size) full of grain. In addition, it was standard annual practice to set aside and save roughly fifteen to twenty *okades* of each grain for seed, as protection against the possible loss or diminution of the forthcoming crop.

Wheat (*sitari*, *stari*) was rare among Mesara farmers before World War II and was considered to yield less overall and to be more sensitive to climatic variation. The yields cited for one *stremma* of land, planted with one *mouzouri* of wheat seed, ranged from two hundred *okades* (a ratio of 1:14) to three hundred *okades* (1:21), although in well-watered fields in the bottomlands, what all farmers considered to be extraordinary yields (for example, 1:26) were possible. Wheat was believed to give phosphorus back to the soil and was thus beneficial in a planting cycle, especially beneath olive trees. Prosperous families that produced wheat cited figures of roughly six hundred *okades* per year, an amount that would fit, once again, into two large *pitharia*.

TABLE 6.2. Mesara grain yields

Amount Seed	Measure of Land	Yield	Field Type
15 *okades*	1 *stremma* (1/4 acre)	200–250 *okades*	"meson'oro" (1 mouzouri) (average field) not best, not worst 1:13–1:19 yield ratio (1 *oka* seed = 13–19-*oka* harvest.
15 *okades*	1 *stremma*	350 *okades*	"excellent" field, good white soil, bottomland. 1:23 yield ratio.
15 *okades*	1 *stremma*	400 *okades*	very good white soil, bottomland, no fertilizer, 3 plowings, 1:26–1:27 yield ratio.

Oats (*tagi, vromi*), the lightest of the grains, also had the lowest yield (sometimes as low as one *oka* of seed to six *okades* yield). As a food for the donkey, mule, or horse, roughly five hundred *okades* was considered necessary for the year, all of which could be stored neatly in goat-hair, cotton, or wool sacks, in two large *pitharia*, or in a wooden *cassoni.*

A cyclical program of planting was considered essential for each field (table 6.3). The sequence varied from farmer to farmer, and village to village, and could be based on a three- or four-year cycle. In a three-year cycle, the field was planted in the first year with barley, in the second year with oats or wheat, and in the third year was left fallow (*ksekourasi*). Oats were believed to be less wearing on a field, and as stated above, wheat was understood as returning phosphorus to the soil. In the four-year cycle, barley was sown the first year, wheat or oats the second, pulses such as *fava* or *rovi* the third and in the fourth year, the field was left fallow. Rules of production included the required number of plowings, usually in January, March, and August (three plowings) and possibly a fourth time just before the seed was sown. Within the planting season, barley was sown first (in October), then oats, and in October/November, wheat. Sowing was carried out using the *sporopodia*, the long cotton or wool apron worn by men or the *sporotrouva*, a woven wool sack that was slung over the shoulder.

During the harvest in May and later, grain was harvested (*therizame*) with a metal sickle (*drepani*) (plate 6.10) in handfuls (*fouchtia*) of which five to six *fouchtia* equaled one *agalia* (apronful). One *demati* (large sheaf) (plate 6.19) was equivalent to five to six *agalies* of unthreshed grain. Six *dematia* of grain equalled one *gomari* or *forteio* (one donkey load) (plate 6.19). Sheafs were tied up with grain stalks or with other malleable plants such as oleander, *Vitex*, lentisc, rush, sedge, bean trefoil, or even *Thymelaea.* They were then transported to the threshing floor (*aloni*) (plate 6.11, 6.13) which was 10 to 12 m in diameter and coated with a special mud and *kopria* (dung) lining (plate 6.12)

TABLE 6.3. The Mesara grain cycle

Month	Labors
January	Plowing for barley, wheat, and oats
February	—
March	Plowing for fall planting of barley, wheat, and oats
March/April	Plowing for fall planting of barley, wheat, and oats
April	Plowing for fall planting of barley, wheat, and oats
May	Harvest for barley, wheat, and oats
May/June	Harvest and threshing for barley, wheat, and oats
	Washing, drying and storage of grain
June/July	Harvest and threshing for barley, wheat, and oats
	Washing, drying, and storage of grain
August	—
September	Plowing, then sowing of oats
October beginning:	Plowing for barley, wheat, and oats
October/November	Sowing of barley, wheat, and oats
October/mid November	Manuring and sowing of barley after *protes vroches* (first rains)
End October, end November	Manuring and sowing of wheat after *protes vroches*
End November/ beginning December	Manuring and sowing of oats after *protes vroches*
December	Late sowing for barley, wheat, and oats (considered guarantee of low yield)

replaced in the spring of each year by the farmer. The *alonia* for each village were situated so that spring winds would assist in the winnowing of the grain (*lichnoume*). *Alonia* could not be built in the plain bottomlands because the grain lying on the threshing floor absorbed moisture overnight and would not thresh easily. Even the villages closer to the plain bottomlands maintained their *alonia* at higher elevations (*pros tin riza*). The actual threshing was always begun after the sun had been up for several hours and had dried out the grain sheaves or the pulse bales (plate 6.22) stored on the *aloni* overnight.

The sheaves of grain were laid down on the threshing floor (plate 6.13) and the wooden threshing sledge with chert or iron blades (plate 6.14) was dragged over the piles, which were constantly spread out and replenished with the wooden threshing fork or *thrinaki* (plate 6.21) (this activity was called *doules*). Once the chaff and seed (*karpos*) had been separated, they were winnowed using a variety of metal sieves (plate 6.21) and shovels (*palamia*) and the grain was then measured into sacks (*tsouvalia*) of roughly fifty *okades* each, and taken home or directly to the water mill (plate 6.16). Grain was frequently washed in water and then spread out on the house roof to dry. Grain stalks and longer pieces of chaff were baled using a wooden box and string or plant fibers as binders. The barley or wheat roots left in the fields after harvest were called *kalamia*. Local animals grazed on them and the remaining root growth was then plowed back into the field.

The water mills at Petrokephali (which ran infrequently), and at Voroi, Zaros, Magarikari, and Tymbaki (all of which used millstones imported from Melos) (plate 6.17) were available for the grinding of household grain at a fee of 10% of each sack. Most Mesara farmers ground their grain as needed (a sack, fifty to sixty *okades*, at a time). In some years a family might run out of grain before the new harvest and would cut twenty to thirty *okades* of green barley and bake it in the oven so that it could be ground into flour with the Kamilari-made conglomerate handmill (plate 6.20), although it was admitted that fine-ground barley flour was only possible if you repeatedly turned the handmill quite slowly, a time-consuming activity.

The storage of grain and grain products in the Mesara involved specially made containers as well as rooms that were specifically constructed for that purpose. The *acheironas*, a room with a roof aperture, adjoined the stable and was used for hay (*sana, sanos*), which was dried on the roof and then pushed into the *acheironas* via a roof opening (*acheironuchtis*) sealed with a stone slab. In older houses there was also an *odas*, a wooden half-story room that could hold the grain in sacks or that was filled with wooden storage containers called *cassonia*, each of which could hold five to six hundred *okades*. *Pitharia* of three hundred, two hundred fifty, two hundred, and one hundred fifty *okades* were also used to store grain. Sage, *Vitex*, and fig leaves and branches were placed in the *pitharia* holding grain in order to deter insects and microbial growth. In some houses grain was stored under the bed in a stone-built basin that could also be used for crushing grapes. The base of a long wooden bench or *kanapes* could also serve as a *cassoni* for grain. Another container used in the Mesara was the *kophinida* (see "Manure and its Uses," below), a large-scale reed and lentisc container lined with a mixture of oxen dung and chaff (this container type was cheaper than a *pithari*). If the grain had been cleaned with water and sun-dried on the roof of the house, it kept fairly well for two years in a carefully sealed *pithari*. The storage life of grain was at maximum two years despite the use of fig leaves, *Vitex*, or sage, and it was expected that invasive insects and microbes would spoil the grain after that time. It was considered impossible to store it for as long as three years (*adunato na kratiseis tria chronia*). Sacks of grain made of *linatsa* (coarse linen) or *kannavis* (hemp) could hold up to sixty to seventy *okades* each but were considered less than adequate storage containers.

THE CULTIVATION OF PULSES
(Ta Osprea, Ta Psimika)

Eichate tin porepsi spitiou 'an eichate polla osprea (if you had lots of pulses, you had what you needed for your household).

—Mesara farmer

As noted above (see "Daily Life") pulses (*osprea, psimika*) were perceived as the main ingredient of prepared cooked meals in traditional Mesara homes. Small quantities of a variety of pulses were stored in *kouroupes* (small clay storage jars) of twenty to seventy *okades.* Among the pulses grown in the Mesara (tables 6.3 and 6.4) in the first half of this century were those eaten by humans and those eaten by animals:

- Eaten by humans: *rovithia, revithia* (chickpeas, *Cicer arietinus*); *facches* (lentils, *Lens culinaris*); *koukia* (broadbean, *Vicia* sp.); *bezelia, bizelia* (pea varieties, *Pisum sativum, Pisum* sp., also called *arakas* by some); *fava* (fava bean, *Vicia faba*); *fasolia, fasoulia (*green beans, *Phaseolus* sp.); *fasoles kseres* (bean varieties, dried, *Phaseolus* sp.).
- Eaten by animals: *arakas* (*Vicia* sp., vetch varieties), a name also used by some farmers for pea varieties; *lathouri* (grass pea, vetch, *Lathyrus* sp.); *rovi* (bitter vetch, *Vicia ervilia*); *vikos* (common vetch, *Vicia* sp. [*sativus*?]); *bizi, biza* (vetch variety, *Vicia* sp.); *loupina* (lupine, *Lupinus* sp.). Many farmers used interchangeable names for vetches and peas (for example, *arakas*, *vikos*), and it was not uncommon to hear arguments about the correct names for partcular pulses.

Overall, pulses required little water during the growing season and grew well with three to four plowings before they were sown. Because in some villages water for irrigation of other crops such as potatoes was a problem (*ta nera den etan thetika*, water was not a sure thing), pulses were important in the annual diet, and those who did not plant them were considered at risk for basic nourishment.

Individual varieties of pulses had special requirements. Fava was said to do well only at a higher altitude and in cold conditions. All pulses were considered to replenish soils with phosphorus and were perceived as good crops to plant under olives, in contrast with barley (*ta sitira pairnoun apo tin elaia*, grains take from the olive). Pulses overall were viewed as more susceptible to adverse climatic conditions, one reason why, perhaps, they were planted in small quantities. Vetch was also planted under olives. Green peas were introduced only after World War II. Beans and chickpeas were the least demanding of the pulses and gave the least trouble as they grew. Broad beans did not need extensive plowing but required a great deal of water as compared with other species. Bitter vetch was planted in field cycles after barley and wheat. In terms of cultivation, lentils, chickpeas, and the pea varieties were considered to have common requirements. Likewise, broad beans, fava, bitter vetch, and lathyrus were considered similar in terms of their cultivation needs.

Yields for pulses were variable, based, as with grains, on individual field characteristics and soil types. The yields listed in table 6.4 were the most commonly cited for each pulse variety.

Small crops of pulses were beaten by hand (with a wooden *kopano*) (plates 6.23–6.25) and sieved, frequently on the roof of the house, in the entryway, or in the *apotheke*, using metal sieves with large apertures (*volistria*) (plates 6.21, 6.25). They were then left to dry for as long as necessary in the sun. Larger quantities of pulses (for example, vetch and pea varieties used for fodder) were harvested in the field with sickles and were bundled into *dematies* (plate 6.22), transported, and spread on the threshing floor to dry prior to threshing on the same *aloni* used for grain.

Pea varieties, broad beans, lentils, chickpeas, fava beans, smaller bean varieties, and green

TABLE 6.4. Mesara pulse yields

Crop	Seeds/Plot	Yield
Chickpea	12 *okades* seed sown on one *stremma* of land	150 *okades* (1:12)
Peas	8 *okades* seed sown on one *stremma* of land	80 *okades* (1:10)
Broadbeans	7 *okades* seed sown on one *stremma* of land	120 *okades* (1:19)
Fava beans	8 *okades* seed sown on one *stremma* of land	120–150 *okades* (1:15–1:18)
Lentils	5 *okades* seed sown on one *stremma* of land	75–80 *okades* (1:15–1:16)

TABLE 6.5. The Mesara pulse cycle

Month	Labors*
January	Plowing for future sowing of chickpeas, lentils, pea varieties *(bizi and bizeli)* Sow pea variety *(bizi)* Sow broadbeans
January/February	Sow broadbeans, fava, pea varieties *(bizeli)* Sow *arakas*
February	Plowing for future sowing of chickpeas, lentils, pea varieties *(bizi, bizeli)*
February/March	Sow chickpeas
March/April	Plowing for sowing of chickpeas, lentils, pea varieties (*bizi, bizeli*) Sow chickpeas, lentils, pea variety *(bizi)* Harvest *arakas* from November sowing
April	Sow lentils, chickpeas, pea varieties *(bizi and bizeli)*
May	Harvest broadbeans from December/January/February sowing Harvest fava bean, pea varieties *(bizi, bezeli)* Harvest *arakas*
May/June	Harvest chickpeas, lentils, pea variety *(bizi)*
June	Harvest lentils, chickpeas, pea varieties *(bizi* (2 1/2 mos. growth), *bezeli)*
October	Sow fava beans
November	Sow *arakas*
December	Sow broadbeans

* The choices in sowing and harvesting indicated here are based in part on the farmer's obligations in relation to other crops and show the annual planting and harvesting possibilities.

beans were eaten by humans, cooked as hot meals or ground with the handmill (plate 6.20) into flourlike mixtures (see the use of these ground pulses in "Meals in the Mesara Subsistence System," above). *Lathyrus*, some of the pea varieties, and the vetches (*Vicia* sp.) were reserved for animals except in extreme economic conditions, when they too were consumed by humans. Roughly twenty *okades* of each of these three fodder varieties would be stored each year for household animals. As with the grains, an amount suitable for the seeding of next year's fields was kept aside from each crop of pulses.

To facilitate good storage conditions, some pulses (for example, broad beans) were baked in the oven to discourage insects (*mamounia*). Peas were washed and then dried for storage. Beans would keep for a fairly long time, but chickpeas were especially susceptible to insects and could last no more than a year. As with grain, sage, *Vitex*, and fig leaves were added to the small clay storage jars (*kouroupes*), to deter insects and microbe growth.

DOMESTICATION AND CULTIVATION OF THE OLIVE *(E Elaia, To Dendri)* AND THE ESTABLISHMENT OF OLIVE GROVES *(Elaiones)*

Gia tin alli geneia (for the next generation).

—Mesara farmer speaking of the reason for planting olives

All discussion of traditional olive cultivation in the Mesara rests on its importance for the future. Elderly farmers stated that they tried to plant as many olives (*elaies*) (plates 6.6, 6.26, 6.27) as possible (often this was not very many) to provide economic stability for upcoming generations (*gia tin alli geneia*) who, at the maturation of the tree roughly fifty years or two generations later, would benefit from its steady growth and production. Just as olive oil was frequently characterized as the *portofoli* (literally, the wallet or spending power), a cash source for the family, so olive trees were identified as "the first choice for planting." However, the subsistence farmer's ability to increase the number of olive trees on his land throughout his lifetime was severely restricted by the time and effort required in producing sown crops (grain and pulses) that would sustain his family on an annual basis. In effect, in the agricultural system operative in the pre–World War II Mesara, the cultivation of grains and the domestication and planting of olives were activities in competition with one another. Some farmers recall no more than a handful of trees on their landholdings at toponyms such as "*Treis elaies*" (three olives), for example, as they inherited them, and all farmers who were alive in the first decades of the twentieth century remember "very few olives" in the plain that produced "very little olive oil." Statements such as *o pateras mou archise tin zoi tou me tesseres elaies* (my father began his [adult] life with four olive trees) were common. As an example, elderly Listaros inhabitants remember no more than fifty olive trees in the combined landholdings of the village (plate 6.4) and farmers in other villages recalled mature trees with individual names (for example, *tou Vasili e elaia,* Vasili's olive) going back generations.

The oldest olives (*Olea europaea* L.) in the plain today (plate 6.28) with trunk diameters of 1.5 m and greater are relics of the Venetian-period mandate to plant olives in the plain (see chapter 14) and of the Ottoman period (seventeenth through nineteenth centuries). In the botanical study for this survey project (chapter 5) J. Shay found that a tree of 1.5 m diameter could have as many as 350 growth rings, thus establishing its planting in the Late Venetian to Early Ottoman period on the island. Historical events such as the widespread cultural and environmental devastation of the Mesara in the last half of the nineteenth century (see chapter 14), and the deliberate burning of olive trees that had been in Turkish hands ("so that they would not return"), clearly determined the layout of the present-day landscape and the distribution of olive trees within it.

Two types of olive trees defined Mesara olive cultivation before World War II:

- the *chontroelaia,* which yielded fairly large fleshy olives that were used for eating but were also used for oil if the farmer owned only that type; and,
- the *psyloelaia* (plate 6.27), which produced smaller olives similar to those now grown in the southern areas of mainland Greece (*koroneiki, koronio*) intended primarily for oil production.

The small olive trees (*mourelles*) that are now being planted in the hundreds throughout the present-day Mesara are essentially the *psyloelaia* variety (*koroneiki*) now regularly pruned to a maximum height of 2+ m. These small, modern versions of *psyloelaies* are beaten during harvest, severely pruned, heavily irrigated throughout the year, annually fertilized, and yield immense quantities (50 kg) of fruit after only five to six years of growth. The physical contrast between these modern plantings and those of the early twentieth century (and earlier) is evident throughout the Mesara. Both the traditional *chontroelaia* and the *psyloelaia* trees in the plain are immense, some as much as 15 m in height (plates 6.26, 6.28) and have not been extensively pruned. As fewer and fewer of these old trees remain (with the help of massive bulldozers they are literally being torn out by the roots so that *mourelles* can be planted), the centuries-old face of olive cultivation in the Mesara is gradually disappearing.

In the nineteenth and early twentieth centuries, domesticated olive branches were grafted onto wild olive (*argoulida*, *agrilida*, *agrilia*) trunks that had been removed from their dry maquis environments (*an etheles elaia tin evgales apo tin thesi tis*, if you wanted an olive you removed it from its source). Wild olives growing in poor soil (*adunato meros*) in a waterless maquis context filled with other wild growth (*thamnos*) were considered the best, that is, the most durable choices for transplanting, grafting, and domestication. When planted in the richer manured and watered soil of a tilled field within the plain, these scrubby wild olive trunks were said to be capable of outstanding growth and substantial yield in the years following a successful graft.

Figure 6.1 illustrates the main sources for wild olive trunks in the pre–World War II Mesara. Substantial numbers of wild olives grew in the following locations and were regularly tapped by Mesara farmers:

- in the northern margins of the plain: in Kartellos near Magarikari; in Kardiotissa between Voroi and Magarikari, in the lands belonging to Moni Vrontisiou; around the villages of Lagholio, Kamares, Kissoi, and Kalochorafitis; at the toponym Efta Porous just across the border of the Rethymnon nome, and in the vicinity of Agia Galini; in the Voriza area; and at To Gialo in Melambes. Villagers from Pitsidia, Kamilari, Phaneromeni, Voroi, Agios Ioannis, and those to the west tended to use these wild olive source areas;
- in the south: at the toponym known as Charakas in the locality of Matala; at Moni Odigitira; at Kaloi Limenes (especially heavy growth), Vathy, Martzalos, Lithinas, and Agio Pharango, all on the southern flanks of the Asterousia mountains. Villagers from Pitsidia, Listaros, Sivas, Petrokephali, and those in villages further east used these locations.

Not only were farmers able to freely dig up wild olive trunks from monastic landholdings or from wild and uncultivated areas, but some villagers, such as those in Voriza and Kamares in the northern flanks of the Mesara, seasonally extracted the trunks of wild olives (at elevations of up to 550 m) and peddled them to farmers in the villages at lower elevations around the plain. Some recalled a price of twenty drachmas per wild olive trunk in the years prior to World War II. Villagers from Lagolio, Kamares, Kissoi, and Kalochorafitis also dug up trees from their environs and transported them to the plain for sale. Likewise, farmers from the plain journeyed to these mountain villages to purchase wild olives or to extract them on their own. There were, however, occasions when mountain villagers objected to the removal of wild olive trunks from their locale, a problem in the Kardiotissa area. Farmers from villages throughout the plain could even go to the water mill at Falandra, directly below and to the north of Phaistos, where extracted wild olives soaked for a month at a time in the millpond (see the domestication process, below) and were available for sale. These *argoulida* trunks, roughly 2 m in height (from rootstock to tip) and circa 20–25 cm thick, were dug up between November and January (see 2b below) or, alternatively, in July (see 2a below) and from that point the wild trunks were carefully manipulated toward domestication.

In addition to transplanting wild olive stock, Mesara villagers could also graft onto wild olive shrubs that had grown in cultivated fields as a result of the germination of fallen seed. This resulted in irregularly spaced trees within fields already characterized by orderly rows of trees that had been transplanted. Such patterns within olive groves are noticeable, especially for the periods preceding the twentieth century.

The olive domestication process commonly employed in the Mesara Plain, that is, grafting (see plate 6.29 for the physical form of a graft), onto a wild olive trunk, included the following steps:

1. A wild olive with a trunk diameter of 10 to 25 cm, and roughly 1.5 to 2 m in height (including its extensive root system), would be dug up in July (2a, below) or between November and January (2b, below), with its roots intact and a ball of earth around the roots called the *trapouza.* The wild olive trunks chosen were always tall enough so that when grafted, foraging animals would not be able to reach up and graze on the shoots. The olive trunk was then tied to a donkey saddle and transported carefully down to the plain (from the mountains or foothills, figure 6.1) so as not to bruise the bark (*floudi*).

2a In July, the trunk was placed on a slant in the dug earth of a pit (*lakkos*), half-covered with soil, and half-exposed, with all of the smaller wild branches cut off. It was then said of these trunks "*koimazane*" (they slept) for a period of seven to nine months (some farmers state that they slept for one year).

2b. Alternatively, the olive trunks were dug up from their wild location between November and January and were soaked in the water of a millpond for twenty to thirty days. Following this soaking, the trunk was planted upright in the ground. If the wild trunk was not soaked in water for this length of time it was imperative that it sit in the *lakkos* (step 2a) for nearly a year.

3. After seven to nine months or as much as a year in the *lakkos* (step 2a) the trunk was removed from the *lakkos* (step 2a) or from the millpond (step 2b) in February or March and was planted, with a ball of earth around its roots, in a cultivated field, in a specially prepared pit, around 80 cm to 1 m in diameter and 70 to 80 cm deep. Rich earth was put in the pit, and the wild olive trunk was placed on top of it. A layer of *Sarcopoterium spinosum* (thorny burnet), *Ononis spinosa* (restharrow), and/or *thumari (Thymus capitatus*) was spread like a blanket over the ball of earth, covering the roots. Earth was then deposited on top of this plant layer to keep the roots moist. At this point roughly one-quarter of the wild trunk was sunk into the pit and was watered regularly and not allowed to dry out. In very good soil it was necessary to water the wild trunk constantly for one year. In poorer soils it required watering for two years. Over this one- or two-year period, depending on the soil, the wild trunk required one canister (*mia kanistra*, roughly fifteen *okades*) of water every day. Plant material, including the shrubs cited above, was also spread on the ground surface at the foot of the trunk to preserve moisture.

4. After one or two months in the cultivated field, the wild trunk sprouted shoots. These new branches were cut and pruned, leaving only three or four on opposing sides of the trunk. These were the locations where the grafting (*emvoliasma, voliasma*) would be carried out. Four weeks after Easter (*apo Lambra, emvolio*) was the usual time for the *voliasma* or *kentrisma* (grafting).

5. Before the wild olive trunk was grafted, it was necessary to remove all of the plant matter that had been packed around its roots and to replace this with soil. Small shoots with a leaf, each not more than 10 cm long, were then cut from a domesticated olive. Each of these was put in the grafter's mouth to moisten it. A slit was cut in the three or four locations near the top of the trunk where the base of wild shoots had been retained. The small piece with the leaf was put into the slit, an action repeated for each of the three or four shoots, and the full diameter of the branch or trunk wrapped with string or linen cord. The diameter might also be coated with soil or heavy cloth such as burlap, as for example, in plate 6.29. The small shoot from the domesticated olive then began to grow and the leaf fell off. Grafting was only carried out when the *chimous* (the sap of the tree) was flowing, that is, in the spring (April, May). A graft could easily be traumatized by poor placement of the inserted shoot or by the severity of the weather. There were farmers who were very skilled and were commonly known as successful at grafting.

6. Every ten to twenty days the other wild shoots that grew from the trunk were pruned off and the three or four newly grafted shoots remained as the only branches. As stated above, the plant was watered regularly for a minimum of one year. In the second year of growth, the area around the newly grafted trunk was plowed twice, once in January, and once in May. Manure was spread at the base of the trunk after two years. Thus, the labor involved in shepherding a grafted olive to the vegetational stability of four or five years of age was complex. The description above clarifies the labor-intensive nature of this activity and its demands in terms of a farmer's time.

All farmers agreed that the best soil for olive cultivation was *asprochoma* (white soil) although a few stated that *ammoudara* (the sandy alluvium near the waterflows in the plain) was also good (most farmers did not own fields with sandy alluvium). Olives were planted in straight lines in fields where possible, but in some older groves (plate 6.26, 6.28) in the Mesara it is possible to identify sporadic plantings that were the result of the grafting in situ of wild olives that had germinated from seed spilled during the fruiting and harvest of already existing trees. Olives planted on slopes were recognized as yielding much less fruit than those in the plain. *Chontroelaies* (eating olives) and the early forms of *psyloelaies* (oil olives) were planted, on average, 9 to 15 m apart in cultivated fields (*liofita*) although some farmers stated that every 20 m was the ideal spacing. Thus, on one *stremma* of land it was possible to plant roughly eight to ten *chontroelaies*. In contrast, recent generations of *psyles elaies,* that is, *mourelles*, were planted every 5 to 6 m, with roughly twenty-five trees per *stremma*. April through May was the period in which olives bloomed and at that time they were very susceptible to heat waves, hailstorms, and other climatic catastrophes such as sudden freezes. The flowering of the olive in the spring was recalled by many farmers in the following *mantinada* in which an olive tree speaks to an almond: *vre kaimen'amigdalia, pou anthezeis to Iennari, perimene amigdalie, n'anthizoume omadi* (you there, almond tree, blooming in January, wait for me, almond tree, so that we may bloom together).

Chontroelaies were not beaten in order to collect the olives, nor were they heavily pruned, if at all. If pruning of broken branches was necessary, it took place in January through March, after the harvest was complete. It was understood that if you beat a *chontroelaia* after a rainfall it would "die immediately," and in dry conditions it was equally inadvisable to do so. The eating olives were thus left to fall onto cloths (made of hemp, linen, or cotton tarp, called *pania* or *anaples*) spread underneath the trees. This permitted the gathering of olives at each tree once a week during the collection season. If no groundcloths were owned by a family, the olives were permitted to fall to the ground and were collected more frequently. As they were collected, the olives were bagged in hemp sacks weighing up to fifty or sixty *okades*. The harvest of olives began generally in October and continued, depending on the weather, until January or February. Yields (table 6.6) from *chontroelaies* were *analogos me to topos* (dependent on the location), and olive trees of similar size and age could provide drastically different yields depending on where they were planted. A constant threat to productivity of olives was the olive fly, *Dacus oleae*, referred to in the Mesara as *dakos*. This pest caused the olives to fall from the trees before ripening and thus a reduction in the amount of oil produced. One means of dealing with this omnipresent problem (it exists today as well) was to harvest the olives as soon as possible during the season.

In general, in the early part of the twentieth century, the *chontroelaies* were said to require seven *okades* of olives per one kilo of produced oil (*ladi*) (this from many farmers who no longer owned them), a ratio that was considered both inefficient, a result of the types of wooden oil presses then available, and unrewarding. The ratios listed in table 6.6, however, center on the figures of four to five *okades* of fruit to one *oka* of oil. Thus, the *chontroelaia* was perhaps more productive in its heyday, despite inefficient pressing equipment, than is presently claimed.

Some massive *chontroelaies* in very rich soil (plate 6.28) could yield up to five hundred *okades* of fruit in a good year but the average for most trees studied in the Western Mesara was two

TABLE 6.6. Mesara olive yields

	Age of Tree at Recording	Amount Fruit Produced	Amount Oil Produced in Fabrika	Ratio Fruit to Oil in *okades*
Tree 1	10 yrs.	40 *okades*	10 *okades*	4:1
Tree 2	15 yrs.	25 *okades*	5 *okades*	5:1
Tree 3	50 yrs.	200 *okades*	50 *okades*	4:1
Tree 4	10 yrs.	25 *okades*	6 *okades*	4+:1
	50 yrs. (from records kept by farmer)	350 *okades*	70–80 *okades*	4+:1

hundred fifty to three hundred fifty *okades*. *Psyles elaies* (oil olives) consistently produced greater amounts of oil in comparison with *chontres*, with ratios beginning at 5:1 and usually greater (3:1).

Beneath the olives it was possible, especially in the bottomlands, to sow grain or pulses in a regular cycle. However, there were restrictions perceived by most farmers. Mesara farmers would not plant grain beneath olives more than once every five years. Lentils were also planted once every five years, even though the saying "pulses give to the olive, grains take from the olive" was quite commonly repeated. Many plowings (*orgoma*) (1 February, first plowing; 15 March, second plowing; 15 April, third plowing; September/October, fourth plowing) were also necessary to enrich the soil, and weeding (*votanisma,* removal) or plowing under of weeds was also considered important. Equally, many farmers believed that in the primary year when the olive bore fruit (the trees alternated, bearing in quantity every two years, depending on the chronology of grafts), it was better not to plant beneath it at all, but rather to plow and let the land lie fallow. On some trees, however, single branches could bear one year and other branches the next. This was not uncommon on many of the larger and older trees.

In the preparation of eating olives for storage over a year there were a number of individually preferred recipes. If the family ran out of the previous year's olives before the new harvest began, they collected unripe (green) olives (*kopanistes*) from the trees and prepared them in the same manner as the later ripe fruit. In general, a basic liquid called *almyra* (salty water) was put into a *kouroupa,* and the olives sat in this mixture for varying periods of time. In addition, ripe olives could be preserved in salt with no water (these were called *sketes*). Various herbs went into individual mixtures, including bay leaves. Smaller *kouroupes* of twenty-five to thirty *okades* capacity were preferred in the storage of pickled eating olives.

Olive oil, referred to as the *portofoli* (cash source or wallet), was produced in mills that developed from a simple nineteenth-century type called the *aletogoudio* (*aletrogoudio*). This workspace included a crushing mill (*aloni*) (plate 6.33); wooden screw press (*ardakti*) made of beech or oak (the later iron version is shown in plate 6.34), a wooden winch turned via manpower, and sacks or folded envelopes made of goat hair (*boxades, dorbas*) (plate 6.35). A single stone driven by an animal or by manpower was used to crush the olives on the *aloni* or crushing bed in these older mills. Thus, this early form of olive mill was considered, in comparison with examples from later periods, to be quite inefficient in pressing oil from olives. Most farmers stated that the 10 kg of oil one would produce today from a set amount of fruit would result in only 5 kg from the *aletrogoudio.*

The newer twentieth-century olive mills were called *fabrikes* (plates 6.30, 6.32–6.35). From one to three millstones (plate 6.33) made locally of hard limestone (*sideropetra*) or *amigdalopetra* (a limestone conglomerate) were set up to rotate on a crushing floor. A horse or mule drove the stones around. Small amounts of olives, usually two sacks at a time, were crushed in the *fabrika*—more than in the earlier *aletrogoudio*—and the *zoumi* (crushed olive paste or pomace) was removed and put in a stone basin (*gourna*). A flat square or rectangular stone next to the *gourna* served as a platform where the *boxas* (plate 6.35) was filled with *zoumi,* was folded over, and was then placed in piles on the screw press, which was now made of iron (plate 6.34). Another *gourna* measuring 2 m in length, 80 cm in width, and 50 cm in depth was located below the press. This basin collected the *kasigaro*, the black waste water that was left after the oil had risen to the top and flowed out via two apertures. The oil was measured and bagged up in goatskin sacks (*aschia*) ranging from forty to sixty *okades* each. As a fee, the miller took 10% of the oil from each sack of olives that was processed. On average, from each five *oka* of olive fruit the following were produced: one *oka* oil, two *okades* waste water, and two *okades pirines* or crushed and broken olive stones.

In the early twentieth century, olive mills were set up in already existing houses, frequently on the ground floor of two-story homes, as well as in rooms added onto houses (plate 6.30). The number of olive mills in the early twentieth-century Mesara villages was remarkable. As an example, at one time, Pitsidia had eight *fabrikes*, Magarikari eight, Voroi three to five, Kamilari at least one, Sivas seven or eight, and Phaneromeni five. Starting an olive mill was one of the means by which a subsistence farmer could improve the economic situation of his family. This was a perception expressed by all elderly farmers, and it clarifies why there would be so many olive mills per village at a time period when the oil was produced less efficiently, in less quantity, and subsistence living was the norm. Equally, the inefficient process by which olive oil was produced (the screw press) resulted in a delay in processing if not enough mills were available, and a possible loss of sustenance and income.

An average family of five to six persons could consume roughly two to three hundred *okades* of oil per year (two small *pitharia*, or one large *trakosioka*). One year's surplus was also stored if possible. Eating olives were kept in *kouroupes*; a family could consume from fifty to one hundred *okades* of pickled olives per year. Eating olives could last for one to two years; after that, bitterness (*dagada*) affected them, making them suitable only for consumption by animals.

Olive oil was stored in clay *pitharia*, but not without some special preparation in the cleaning of the individual *pitharia* as well as a frequently used system of moving the oil from one jar to another during the first months of storage. Newly made oil, when first stored in a *pithari*, was permitted to remain in that vessel for only one month. After roughly a month it was removed and poured into another newly cleaned *pithari*. This was believed to diminish the *oxea* (acidity) that plagued traditional olive oil production. *Pitharia* were cleaned with boiled water mixed with *raki*, a mixture intended to prevent the oil from permeating the clay. It was also possible to clean *pitharia* with a mixture of boiling water and ashes (*staktes*). A scrub brush was made of fig leaves, thyme branches bound together, or of *Spartium junceum*. By moving the oil from one clay vessel to a newly cleaned one, it was possible to reduce acidity and to leave behind lees (*kathoura*; *to katakathi tou ladiou*) of the olive oil that were also called *fetsa* or, less frequently, *triga* (this terminology was used interchangeably by some for the leftovers of grape processing). In addition, it was believed that if you did not remove the *kathoura* from a *pithari*, the vessel base was structurally weakened because it ate away at the clay structure, and the vessel itself was ruined.

The storage life of olive oil in this subsistence system was not great. If completely sealed, it was possible to keep it safely for two to three years, but very few farmers had sufficient quantities to do this. In general it was considered advisable to have two years' worth in the *apotheke* or storeroom at any one time since most olive trees bore fruit in quantity only once every two years. After five years, an unlikely storage event in this subsistence system, the stored oil was bitter to the taste and might reach a figure of twenty *oxeo* (very bitter). In this case it was suitable only for soap production (presently, edible oil is 0–1 in *oxitita*, or acidity). There were various ways of describing the best quality oil (*katharo*, *lambanta*, or *giali*), and the trader (*emboros*) to whom the oil was sold used these terms in assessing its marketability. In addition, oil that had been successfully moved from one *pithari* to another was called *ladi lampiko*.

Not only was oil traded and sold, but the waste products of oil production were equally valuable in the larger world of buy-and-sell. After milling, the oil was loaded into goatskin sacks of forty to sixty *okades* (usually fifty *okades*) each and was transported to Herakleion by donkey. Muleteers, *kiratzides* or *agogiades*, small-scale local traders who worked in groups of three or four, sold the surplus oil (called *akopi*) to a city vendor in Herakleion who would hold it short-term for the best sale price in the extra-Crete market or would sell it to other villages in Crete.

Pirines, the crushed olive pits from the pressing of the oil were used as fuel in portable household hearths (*mangalia*), and were sold occasionally as a fuel for lime or pottery kilns. In addition, there were factories (*pirinelaia*) that removed via chemical means the 7% oil content of the crushed olive stones and produced a low-quality oil useful in industrial activities.

Trigades (or, as they were called less frequently, *fetzades*) were individuals who journeyed around the Mesara villages, especially in August/September and October, collecting the *trigolada* (or *fetza*), the lees in the base of the oil *pithari*. This waste material was used with lye in the manufacture of soap at home, and, if sold to a traveling vendor, was brought to *sapounopoieia* (soap factories) in Pobia, Moires, and Tymbaki (figure 6.2). The lees were transported from the village *pitharia* in leather *aschia* and were bought by the soapmaker (*sapounas*), who then sold his finished products to vendors in Moires and Herakleion. In order to remove the lees, the *trigas* placed a *tsisve* (small copper or tin container) into the *pithari* and lit a match so that he could then assess how much oil residue was present. The *trigas* (or *fetzas*) also traveled around collecting wine lees in season.

As the *portofoli* (spending power) and means of exchange for traditional Mesara farmers, olive oil was used as payment for day labor. In years when Mesara inhabitants ran out of oil, they traveled to Palaiachora in the Sphakia region of West Crete and bought or worked for oil. A *tsoukos*, a gourd container of eight to ten *okades* carried in a *vourria* (backpack) was a standard wage measure. Villagers from Pitsidia recall journeying to Kissamou in the northwestern part of the Chania nome for seasonal work during the olive harvest. From roughly 1920 to 1940, each woman who worked in the Mesara harvesting

Table 6.7. The Mesara olive cycle

Month	Labors
January	Collect olives; early pruning of trees; fertilize with animal dung; mill olives; store olives (in clay jars, basketry containers, cloth sacks, wooden bins, metal containers); store oil (in clay jars, metal containers); transport olives (basket, cloth sacks) and oil (leather sacks) for trade by land (pack animals, cart) and sea. **Irrigate newly grafted wild olive; required first annual plowing of roots for grafted tree in second year; daily irrigation of wild olive in 7- to 9-month *lakkos*; dig up wild olive trunks from *thamnos* and soak wild trunks in check dam pools or millpondsof water mills, or in stream flows or *saites* for at least one month but preferably for a minimum of three months.**
February	Collect olives; prune trees; fertilize with animal dung; in established olive groves, first annual plowing at base of olives; mill olives; store olives; store oil; transport oil for trade by land and sea. **Irrigate newly grafted wild olive; irrigate wild olive in 7- to 9-month *lakkos*; dig up wild olive trunks from *thamnos* and soak wild trunks in check dam pools or millponds of water mills, or in stream flows or *saites* for at least one month but preferably for a minimum of three months.**
March	Collect olives; final pruning of trees; in established groves, second annual plowing of roots on March 15; mill olives; store olives; store oil; transport for trade by land and sea. **Irrigate newly grafted wild olive; irrigate wild olive in 7- to 9-month *lakkos*; dig up wild olive trunks from *thamnos* and soak wild trunks in check dam pools or millponds of water mills, or in stream flows for at least one month but preferably a minimum of three months.**
March/ April	Latest pruning; milling; storage; transport for trade by land and sea. **After 7 to 9 months of burial remove wild olive trunk from horizontal position in prepared slit trench (7- to 9-month *lakkos*) or remove from 1–3 month soaking in check dam pool or water flow; plant wild olive trunk vertically in prepared field holes, prune all shoots, leaving 3–4 for later grafting; irrigate newly grafted wild olive.**
April	In established groves, third annual plowing of base of olives on April 15. **Irrigate newly grafted wild olive; after 7 to 9 months of burial remove wild olive trunk from horizontal position in prepared slit trench (7- to 9-month *lakkos*) or remove from 1–3 month soaking in check dam pool or water flow; plant wild olive trunk vertically in prepared field holes, prune all shoots; leave 3–4 shoots for later grafting.**
April/May	Olive trees in flower, beginning of fruit. **Transplant wild olive from *lakkos* to prepared field holes; continued pruning of shoots on newly planted wild olive trunk; graft 3–4 shoots only on wild olive trunk; remove weed growth from base of planted wild trunk; irrigate newly planted wild trunk for one year from date of grafting (if rich soil in field at least 12 *okades* (one *kanistra*) per day or two *kanistras* each 8–10 days; if poor soil in field, watering is continued for two years minimum; irrigate newly grafted wild olive; grafted tree, second year growth, required second annual plowing at base of trees.**

Continued on next page

TABLE 6.7. The Mesara olive cycle *(continued)*

Month	Task
June	Irrigate newly grafted wild olives.
July	Irrigate newly grafted wild olives.
August	Sale of olive lees to sap factories via lees peddlers; cleaning of clay storage jars with combinations of water, ashes, herbs and/or distilled spirits; tempering of new clay storage jars via soaking. **Irrigate newly grafted wild olives.**
September	Sale of olive lees to soap factories via lees peddlers; cleaning of clay storage jars with water, ashes, herbs and/or distilled spirits; tempering of new clay storage jars via soaking; gross weeding of fields *(katharisma apo kato; votanisma).* **Irrigate newly grafted wild olives.**
September/ October	In established olive groves, required fourth annual plowing of base of olives; in four-year olive intercropping system: first year, planting of barley; second year, planting of wheat; third year, planting of oats or pulses (*rovi* or *fava*); no planting, only plowing in fourth year; in three-year intercropping system: first year, planting of pulses (*koukia* or *araka*); second year, planting of barley; third year, no planting, no plowing; commencement of olive harvest; sale of old olive lees to soap factories via lees sellers; cleaning of clay storage jars; tempering of newly purchased clay storage jars; preparation of early pickled olives (*toursi*); early milling of olives; exchange of oil from filled jar to clean empty jar after one month of storage. **Dig up wild olive trunks from original locations and bury horizontally in prepared trench for approx. 7–9 months until spring grafting period; irrigate newly grafted wild olive.**
October	Harvest olives; mill olives; prepare early pickled olives (*toursi*); clean clay storage jars; storage of oil; storage of olives; exchange of oil from filled jar to clean jar after one month storage period; transport for trade by land and sea. **Dig up wild olive trunks from original growth locations and bury horizontally in prepared trench until spring grafting period; irrigate newly grafted wild olives; irrigate wild olive in 7- to 9-month *lakkos*.**
November	Harvest olives; mill olives; prepare pickled olives; storage of olives; storage of oil; cleaning of clay storage jars; exchange of oil from filled jar to clean jar after one month of storage; transport for trade by land and sea. **Dig up wild olive trunks from original growth locations and bury horizontally in prepared trench until spring grafting period; irrigate newly grafted wild olive; irrigate wild olive in 7- to 9-month *lakkos*.**
December	Harvest olives; mill olives; begin pruning of trees; prepare pickled olives; storage of oil; storage of olives; transport for trade by land and sea. **Dig up wild olive trunks from original growth locations and bury horizontally in prepared trench until spring grafting period; irrigate newly grafted wild olive; irrigate wild olive in 7- to 9-month *lakkos*.**

NB: Plain text entries indicate agricultural activities in already established groves. Boldface entries indicate agricultural activities relating to the planting of newly domesticated trees and the establishment of new groves.

olives as day labor received a *trikourpo*, or two *okades* of oil for one day's labor. Communities such as Voroi that produced larger quantities of oil kept supplies available for sale each year to farmers from the other, less productive villages of the Western and Eastern Mesara.

Table 6.7 illustrates the complex nature of olive cultivation within the Mesara subsistence system and its annual requirements.

GRAPE CULTIVATION *(Ambelia)*

Until the introduction of *staphides* (grapes dried in the sun), the varieties of which were sold either as raisins or, more rarely, as currants, the grapes (*staphilia*) (plate 6.6) grown in the Mesara were intended for production of wine at the household level. As all farmers relate, there were many fewer vines (*ambelia*) (*Vitis vinifera* and *Vitis* sp.) visible throughout the Mesara before the decade between 1920 and 1930. At that point, when the planting of *staphides* was encouraged, villagers then began to reserve their best fields for these productive vines. Even so, villagers in Pitsidia stated that the wine (*krasi*) and distilled spirits (*raki*) produced in their environs were sold to other villages within the Mesara, to villages in the Rethymnon nome, and to middlemen in Agia Galini on the Libyan Gulf, where they were then transported to villages in eastern Crete via small sailing vessels (*kaikia*).

In December and January new *ambelia* for wine were started by cutting a small branch (*klima*), approximately 50 cm in length, from an already existing vine and placing it in water that was regularly replenished. In April, this clone, the *klima*, would have produced about two inches of leaf and root. In that same month a slit trench (*lakkos*) 1.80 m long by 70 cm in depth was dug in a well-cultivated field and the branch was planted so that only 15 cm protruded above the ground level. From one to one and a half months later one new unpruned shoot (*mati*) was visible and it was held with a string or thread to a wooden vine support. In a good vineyard it was possible to produce two to three *okades* of *staphides* per *klima* after a number of years. *Ambelia* required constant cultivation and it was said by all Mesara farmers that a well-cared for vine would never die out. Only vines that had been left undug between January and March, and were unpruned (pruning was called *kladevma*) would not bear.

In fields of *staphides,* one *stremma* could be planted with 350 individual vines that might then produce from three hundred to 600/700 *okades* of grapes. For *staphilia* or wine grapes, roughly one hundred *klimata* per *stremma* would begin to bear after two years of growth. After ten years of growth, each vine would produce from five to ten *okades* of grapes. As with *staphides*, pruning was essential every year for wine grapes. Raisins were originally sun-dried on clay drying floors (*alonia*), frequently on a paper backing. They were then cleaned with water mixed with ashes and a small amount of oil. They sun-dried in roughly five to eight days and were then prepared for transport or storage. Once the *staphides* were cleaned in water and dried in the sun or oven, they were packed into *kouroupes* (from twenty-five to fifty *okades*) with *daphni* (bay leaves) and *garuphallo* (clove). Dried raisins and currants could not last more than one year even if stored in a carefully sealed clay vessel (*kouroupa*); the usual period of storage was six to eight months. After longer periods the raisins became "like sand" because their sugar was crystallized, and they were susceptible to insects (*skoulikia*). Dried grapes that were sent for sale to other markets were packed into *tsouvalia* (cloth sacks) and could last fifteen to thirty days in this condition if they were cleaned beforehand.

Fresh grapes were transported to the crushing bed (*patitiri, linos*) in *kofes*, baskets made of *Vitex agnus-castus* (*lugaria*) (plate 6.37). Wine for households was produced in the grape-crushing vat and then was aged and stored in oak (*prinos, prinari*) barrels that generally averaged in size from two hundred fifty to three hundred *okades,* although some households owned barrels holding as much as five hundred *okades*. If carefully sealed, wine could last for as long as twenty years. Roughly two to three *okades* of wine grapes would produce one *oka* of liquid (*musto krasi*). Wine could also be stored in *pitharia*, but the possibility of the wine turning to vinegar was, in that case, more of a risk. Bay leaves were used in the flavoring of wine and the sealing of the wooden barrel could include a cork, surmounted by a layer of clay, covered with lime. Oil was sometimes poured into the barrel to produce a fairly deep slick that also protected the wine from the air in the barrel.

Vinegar, made in small amounts, was stored in a small sealed clay *kouroupa* in the living area of the home, as far away from the wine barrel as possible. *Petimezi*, or grape syrup, was a boiled down version of the grape juice (*musto*) produced in wine making. As it boiled, a handful of lime was added, and the mixture was then sieved, and boiled further until a foam was created. The foam was removed from the pot and half of this liquid was boiled down further to make the syrup called *petimezi* (after the Turkish *pekmez*). The other half was mixed with flour, sesame, and cinnamon and became *mustalevria*, a gelatinous cake decorated with walnuts and almonds that was considered a treat at the time of wine production.

TABLE 6.8. The Mesara grape cycle

Month	Labors
January	Plant grapes *(klimata)* Pruning of already established vines
February	Plant grapes *(klimata)* First digging *(skapsimo)* of roots to open them to the air, to weed To avoid moisture accumulation
March	Second digging *(skapsimo)* of roots
March/April	Third digging *(skapsimo)* of roots
April	For wine grapes—broadcasting of sulphur dust *(thiafisma)* Commencement of leaf removal and removal of excess bunches in staphides
April/May	For *staphides*—leaf removal and removal of excess bunches, trimming
May/June	For *staphides*—late leaf removal and removal of excess bunches, trimming Commencement of harvest of *staphides*
Mid-July–mid August	Harvest of *staphides*; drying in sun for eight days Harvest of wine grapes for about fifteen days Production of wine Production of distilled spirits Production of *petimezi*
August	Harvest of *staphides*; drying in sun for eight days Harvest of wine grapes for about fifteen days Pressing, production of wine Production of distilled spirits Production of *petimezi*
September	Harvest of *staphides*; drying in sun for eight days Harvest of wine grapes for about fifteen days Pressing, production of wine Production of distilled spirits Production of *petimezi* Production of vinegar
October	*Kselakisma*—Cutting of upper roots, removal of soil
November	Broadcasting of manure *(kopria)* in specific fields of vines *Kselakisma*—Cutting of upper roots *Katharisma*—Pruning so as to leave branches that will bloom
December	Plant grapes *(klimata)* Pruning of already established vines

Raki (distilled spirits) was produced from the leftovers of wine production (stems, skins, etc.) over a fire using an alembic (plate 6.38) and two specially fashioned *pitharia* with metal tubes. This distilled liquid was usually retained as a household product and was rarely (Pitsidia was the exception) sold elsewhere. The cycle of cultivation and harvest are given in table 6.8 for grapes in the Mesara.

Other Cultivated Foods and Harvested Products in Field and Garden

Carobs (*haroupia, Ceratonia siliqua*), planted as seeds, were perceived in the Mesara primarily as animal fodder, despite their wider economic importance in the nineteenth-century Mediterranean economy, as exemplified by the extensive carob groves that covered many parts of East Crete. A carob seed placed in a ball of cow dung was planted in October and by November had sprouted. The carob harvest from older established trees was in late August through September, and the pods themselves could be stored for a year in sacks or clay jars after baking in the household oven. Carobs in the Mesara were sparsely planted, intermixed with other trees including olives, and might also be found on terraces and in the margins of scrub habitats. The use of carob in the production of syrups, baked sweets, and even sweet drinks (a local Cretan carob-based drink named *biral* was popular) and its decline as a commodity within the Mediterranean economy after World War II resulted in the cessation of tillage and the wholescale abandonment of trees.

In order to establish a fig tree (*sukia, Ficus carica*), a branch (a clone) from the root of a domestic tree was cut in October or November and planted. Very few domesticated fig trees are evident in the Mesara despite the fact that traditional farmers recall *kouroupes* with twenty to fifty *okades* of dried figs that sufficed for one family for a year. The trees were planted on the margins of fields, intermixed with olives, and more rarely on the margins of gardens. In late July the figs began to ripen, and from August to September they were harvested, dried in the sun, frequently on the roof of the house, and cleaned with water. They were then dried a second time, again in the sun, and were stored, intermixed with bay leaves, in sealed *kouroupes*. One fig tree could produce as many as eighty to one hundred *okades* of fresh figs. The trees were pruned in November and December, considered a nasty task because of the caustic drippings of fig sap and the inutility of the resulting branches, and throughout the winter the dried fruit was consumed by the household, sometimes in combination with carobs.

Rice (*rizi, Oryza sativa*) as a Mesara product was introduced after 1950 and was only possible in the very wet and flooded fields near the Levadia. It was planted in May by Voroi inhabitants, was watered (flooded) daily, and was ripe and collected in September. The labor and amount of water needed for this crop precluded any long-term role in the twentieth-century Mesara economy.

Sesame (*sisami, Sesamum indicum*) intended for use in baked goods, prepared sweets, and in a few everyday recipes, was another seed crop planted only when suitable land and enough time were available. In order to sow the sesame, one cup of wet seed was mixed with two *okades* of soil. It was then broadcast over a field during the first half of May, preferably at night. Preparation for the planting of sesame included three plowings, one each in January, February, and March. It was understood that the field needed extensive tillage before sowing. In August the sesame was harvested and was stored in small clay jars (*kouroupes*) or cloth sacks.

Flax (*linari, Linum usitatissimum*) was sown in the winter, primarily in October/November, immediately after a plowing, and grew well over the colder months in fertile soil as well as in poorer quality land that had been enriched with manure. The secret of its successful growth was lots of water (via rainfall) over the winter. The more seed broadcast in sowing—figures as great as four *okades* of seed to one plot of land were cited—the better the crop. In late April/May the plant was harvested, tied into bunches, and was soaked continuously over a period of ten to twenty days into May/June in water such as a river, streambed, millpond, catch-dam pond, or water canal. In June/July it was removed from the water and allowed to dry in the sun on the roof of a house or on the threshing floor. It was then beaten with the *spathi,* a specially fashioned wooden stand, or with a *koutsouri* (large tree root) or a *kopano* (a handheld wooden beater) to remove the outer stem casing and to separate the fibers. In July and August it was spun and woven into cloth for use in the home.

Cotton (*vamvaki, Gossypium* sp.), which also needed vast quantities of water via irrigation, was planted in late April/May. Six to seven *okades* of seed were broadcast after a minimum of three plowings during the months of March and

April. In July or August the cotton was harvested. It was successfully grown in small amounts on the margins of the Ieropotamos prior to World War II and was processed in the home.

Small quantities of tobacco (*kapnos, Nicotiana* sp.) were grown in the Mesara, especially in the nineteenth century, for use in the *kafeneio*. The tobacco was smoked in the *nargile* (the water pipe), which in the Mesara region was called the *argile.*

Honey (*meli*) was produced in squat clay beehives (*flaschia, dypselia*) made by potters from Thrapsano (plates 6.44 and 6.45). The hives were placed in walled and/or cleaned and cleared spaces in the fields near flowering plants (for example, thyme) considered to produce suitable amounts of pollen. Ten *okades* of honey could be collected from one hive. The first (pure) honey crop was poured from the comb. A second, poorer quality crop of dark brown honey called *choumeli* was then produced via the heating and boiling of the comb. Storage containers for honey included double-lipped clay *kouroupes* that were filled with water at the rim to discourage ants and other insects.

In contrast with broadcast seed crops or trees planted in fields as components of extensive groves, a few examples of fruit and nut trees were planted in the Mesara as components of kitchen gardens (*perivolia, kipoi*) and small orchards (*bakse, bakses*). Wild pear (*agrioachladia*) and wild almond (*agrioamigdalo*) trees were grafted (plate 6.29) to produce domesticated pear (*achladia*, *apidia, Pyrus communis*) and domesticated almond (*amigdalia, Amygdalus communis*). Likewise, wild plum trees (*agriobournellies*) were grafted to produce many varieties of domesticated plums, including the highly regarded *damaskina* (Damson plum). The pear and almond trees were usually planted singly in fields where space was available and could also be dispersed in rows on the margins of fields or, in the case of almonds, as a fairly confined grove of trees for a small cash crop in the future. Many families might own one or two plantings of these fruit and nut trees in their well-watered gardens, not far from the house, where the damp greenness and the odor of water made these tiny stretches an oasis in the dry seasons of the year. The word *bakse* itself conjures up for elderly farmers the green of fruit-bearing trees and the running of water in streambeds and channels (*katapotes*), clearly a Cretan parallel of the long-established Islamic idea of the garden (*bahce*). Exotic introduced fruit trees such as loquat (*mousmoulla*, *despoula*, *despoura—Eriobotyra japonica*), apricot (*verukoko, Armeniaca vulgaris*) peach (*rodakino*, *Amygdalus persica*), all of the citruses (orange, citron, lemon, mandarin orange, and bitter orange) (*Citrus* sp.) (table 6.9) as well as pomegranate (*rogdia*, *Punica granatum*) and quince (*kydoni, Cydonia vulgaris*) added to the idea of the *bakse* as a rich, fertile oasis.

The kitchen garden was composed of a wide array of fresh vegetables (*nopa*, *kipeftika*) including cucumbers, tomatoes, okra, green beans, cauliflower, artichoke, eggplant, cabbage, beets, peppers, onions, leeks, garlic, and spinach as well as purslane, *Amaranthus*, and herbs such as dill, all of which supplemented the basic food elements described in previous sections.

The plants in table 6.9 include plant types that have been domesticated by the farmers in the Mesara, imported plants, introduced plants, and their uses. All plants are listed by their Mesara names, followed by their scientific classification, whether specific or general, and their agricultural context within the Mesara system.

TABLE 6.9. Domesticated plant cultivation and use in the Mesara

Plant Name in Mesara	Species	Common Name/ Plant Type	Where Grown	Use
Achladia (ἀχλαδιά), apidia (ἀπιδιά)	*Pyrus communis*	Pear / tree	Garden and field	Component of kitchen garden (*perivoli*) and small orchard (*bakse*) [tree] Fresh food for humans [fruit, green] Food for animals [fruit, spoiled] Spoon carving [wood, branches]

TABLE 6.9. Domesticated plant cultivation and use in the Mesara

Plant Name in Mesara	Species	Common Name/ Plant Type	Where Grown	Use
Amigdalia (ἀμιγδαλιά)	*Prunus amygdalus*	Almond / tree	Garden and field	Component of kitchen garden and field margins [tree] Fresh food for humans [nuts, ripe, dried] Sweet drink (*soumada*) and prepared baked sweets [nuts, ripe, dried] Trade and sale crop [nuts, ripe, dried] Food for animals [leaves, green (especially goats), nut casings (especially pigs)] Spoon carving [wood, branches]
Anginara (ἀγκινάρα)	*Cynara scolymnus*	Artichoke	Kitchen garden	Food for humans (fruit, green) Pickled in vinegar and spices (*toursi*) (fruit, green)
Angouri (ἀγγούρι)	*Cucumis sativus*	Cucumber	Kitchen garden	Element of kitchen garden [entire plant] Food for humans [fruit, green] Food for animals [fruit, remains and spoils] Pickled in vinegar, spices (*toursi*) [fruit, green]
Anithon (ἄνηθον)	*Anethum graveolens*	Dill	Kitchen garden	Component of kitchen garden [plant, entire] for food preparation
Arakas (ἀρακάς)	*Vicia* sp. *Lathyrus* sp	Vetch and Lathyrus	Field	Food for animals [plant and fruit, green and dried] Famine food for humans [fruit, dried, ground] NB: Arakas is also used by some farmers to refer to pea varieties.
Aravosito (ἀραβόσιτο), kalamboka (καλαμπόκα), lazarous (λαζάρους)	*Zea mays*	Corn	Garden and field	Food for animals [fruit, green, dried] Food for children as treat [fruit, boiled]
Asparagos (ἀσπάραγος)	*Asparagus* sp.	Asparagus	Garden	Food for humans [plant, green]
Bamies (μπάμιες)	*Hibiscus esculentus*	Okra	Garden	Food for humans [plant, green]
Bezelia, bizelia (μπεζέλια, μπηζέλια)	*Pisum sativum*	Peas	Field	Food for humans [seed, fresh, dried]
Bizi (μπήζι)	*Vicia* sp.	Vetch variety	Field	Food for humans [seed, dried] Food for animals [seed, dried]
Bournellia (μπουρνελλιά)	*Prunus domestica* spp.	Plum tree	Garden	Food for animals [fruit, green] Food for humans [fruit, green]

Continued on next page

TABLE 6.9. Domesticated plant cultivation and use in the Mesara *(continued)*

Plant Name in Mesara	Species	Common Name/Type	Where Grown	Use
Dafni, vaio (*δάφνη, βάϊο*)	*Laurus nobilis*	Bay shrub, tree	Garden	Flavoring for wine in barrel [leaves, dried]
				Household spice [leaves, dried]
				Flavoring for pickling of olives [leaves, dried]
				Preservative in storage of dried figs in clay jar [leaves, branches, green, dried]
Damaskinea (*δαμασκινέα*)	*Prunus* sp.	Damson plum tree	Garden	Food for humans [fruit, green]
Dendrolivano, arismari (*δενδρολίβανο, ἀρισμαρί*)	*Rosmarinus officinalis*	Rosemary shrub	Garden	Spice in cooking [leaves, green, dried]
Domata (*ντομάτα*)	*Lycopersicum esculentus*	Tomato	Garden	Food for humans [fruit, green]
Elaia (*ἐλιά*)	*Olea europaea*	Olive tree	Field	Firewood (considered one of best in oven and hearth) [wood, branches, dried]
				Spoon carving, household vessel carving [wood, branches]
				Animal fodder (especially goats) [fresh shoots, leaves, green]
				Eating olives, pickled, sealed with oil [fruit, green]
				Oil for cooking [fruit, crushed, pressed, separated]
				Oil for lighting (*lichnaria*) [fruit, pressed]
				Fuel for kilns and *mangalia* [pits, crushed]
				Pirinelaio (3rd quality oil drawn from pits) [pits, crushed]
				Commercial (soap manufacture) [olive oil lees]
				Household soap manufacture with lye [oil lees, leftover used cooking oil]
				Sealant for wine in wooden barrels and clay storage jars (poured to thickness of at least one centimeter) [oil]
				Sealant/preservative for meats/cheese stored in clay jars [oil]
				Fuel for charcoal manufacture [wood, prunings, roots]
Faches (*φακκέ*)	*Lens culinaris*	Lentils	Field	Food for humans [seed, dried]
				Food for animals [plant, fresh, dried]
Fasoles (*φασόλες*)	*Phaseolus* sp.	Green beans	Garden	Food for humans [seed, green]
Fasolia (*φασόλια*), fasoulia (*φασοῦλια*)	*Phaseolus* sp.	Beans	Garden and field	Food for humans [seed, dried]
Fava (*φάβα*)	*Vicia faba*	Field bean	Field	Food for humans [seed, dried]
Flaschi (*φλασχί*)	*Lagenaria vulgaris*	Bottle gourd	Garden	Gourds [fruit casing, dried]

Table 6.9. Domesticated plant cultivation and use in the Mesara *(continued)*

Plant Name in Mesara	Species	Common Name / Type	Where Grown	Use
Fliskouni (*φλισκούνι*)	*Mentha pulegium*	Mint	Garden	Spice in cooking [leaves, green, dried]
Garuphallo (*γαρύφαλλο*)	*Carophyllus aromaticus*	Clove	Import	Spice in cooking [fruit, ground]
Glustrida (*γλυστρίδα*)	*Portulaca oleraceae*	Purslane	Garden	Fresh greens (*horta*) for humans [entire plant, green]
Haroupia (*χαρούπια*)	*Ceratonia siliqua*	Carob tree	Field	Export crop for nylon production, processed animal food [pods] Sweet syrup (*haroupia*) eating on snow from mountains of Crete; sold by *sarapzis* (streetseller) [pods, ground, boiled] IN MEMORY ONLY *Kafeneio* drink known as *biral,* made from syrup [pods, ground, boiled] Baked in oven with fig layers; stored as sweet in clay jars [pods]
Kanella (*κανέλλα*)	*Cinnamomum* sp.	Cinnamon	Import	Spice in cooking [fruit, ground]
Kapnos (*καπνός*)	*Nicotiana* sp.	Tobacco	Field	Leaves for smoking in water pipe [leaves, dried]
Karemfili (*καρεμφίλι*), karanfili (*καρανφίλι*), varsamo (*βάρσαμο*)	Unidentified	Karanfili	Garden	One of basic spices (*vasilikous*) grown in *glastra*
Karidia (*καριδιά*), kares (*καρές*)	*Juglans regia*	Walnut	Garden and field (high elevations, idaean margins)	Food for humans [nuts] Firewood [wood, prunings] Furniture manufacture [wood, trunk, branches]
Karoto (*καρότο*)	*Daucus carota*	Carrot	Garden	Food for humans [root, green]
Karpouzi (καρπούζι)	*Citrullus lanatus*	Watermelon	Garden	Food for humans [fruit, green]
Kerasia (*κερασιά*)	*Prunus cerasus*	Cherry tree	Garden and field (Agia Varvara and Idaean area only)	Food for humans [fruit, green] purchased seasonally by Mesara inhabitants
Kimino (*κύμινο*)	*Cuminum cyminum*	Cumin	Import	Spice in cooking [seed, ground]
Kitron (*κίτρον*)	*Citrus medica*	Citron tree	Garden	Food for humans [fruit, green]
Kolokithi (*κολοκύθι*)	*Cucurbita* sp.	Squash variety	Garden	Food for humans [fruit, green]
Koukia (*κουκιά*)	*Vicia faba*	Broadbean	Field	Food for humans [seed, dried, cooked]
Kounoupidi (*κουνουπίδι*)	*Brassica oleracea*	Cauliflower variety	Garden	Food for humans [fruit, green]
Krithari (*κριθάρι*), krithos (*κρίθος*), krithia (*κριθιά*)	*Hordeum vulgare*	Barley	Field	Food for humans [seed, dried]

Continued on next page

TABLE 6.9. Domesticated plant cultivation and use in the Mesara *(continued)*

Plant Name in Mesara	Species	Common Name/ Type	Where Grown	Use
Krommidi (κρομμίδι) , kremmidi (κρεμμίδι)	*Allium cepa*	Onion	Garden	Food for humans [bulb, fresh]
Kydoni (κυδώνι)	*Cydonia vulgaris*)	Quince tree	Garden	Food for humans [fruit, fresh]
Lachana (λάχανα)	*Brassica oleraceae*)	Cabbage	Garden	Food for humans [leaves, fresh]
Lathouri (λαθούρι), lathyri (λαθύρι)	*Lathyrus sativus*, *Lathyrus* sp.	Grass pea	Field	Food for animals [seed, dried]
Lefko (λεΰκο)	*Populus nigra*	Poplar tree	Field	Wood for home [trunk, branches] IN MEMORY ONLY Wood as investment IN MEMORY ONLY
Limonia (λιμονιά)	*Citrus limonia*	Lemon tree	Garden, field (rare)	Food for humans [fruit, green, dried]
Linari (λινάρι)	*Linum usitatissimum*	Flax	Field	Fibers for string, cord, weaving of cloth [stalk, crushed, dried]
Loupina (λούπινα), loupino (λούπινο)	*Lupinus* sp.	Lupin	Field	Food for animals [seed, dried] Food for humans [seed, dried] in periods of economic stress only
Maidanos (μαϊντανός)	*Petroselinum sativum*	Parsley	Garden	Spice in cooking [leaves, green, dried]
Mantarinia (μανταρινιά)	*Citrus delicosa*	Mandarin orange tree	Garden	Food for humans [fruit, fresh]
Matzourana (ματζουράνα)	*Marjorana hortensis*	Marjoram	Garden	Spice in cooking [leaves, fresh, dried]
Maratho (μάραθο)	*Foeniculum vulgare*	Fennel	Garden	Spice in cooking [leaves, dried] Condiment for salad [leaves, fresh]
Marouli (μαρούλι)	*Lactuca sativa*	Lettuce	Garden	Food for humans [leaves, fresh]
Melitzana (μελιτζάνα)	*Solanum melongena*	Eggplant	Garden	Food for humans [fruit, green]
Melia (μηλιά)	*Malus pumila*	Apple tree	Garden and field high elevations (Idaean margins)	Food for humans [fruit, green]
Moskokarido (μοσκοκάριδο)	*Myristica fragrans*	Nutmeg	Import	Food for humans [fruit, green]
Mournia (μουρνιά)	*Morus nigra*	Mulberry tree	Garden and field	*Lyra* (musical instrument) manufacture [wood] Silk manufacture [leaves, fresh] *Kopano* for washing clothing [wood] Chair production [wood] Stool production [roots] Threshing sledge production [wood]

TABLE 6.9. Domesticated plant cultivation and use in the Mesara *(continued)*

Plant Name in Mesara	Species	Common Name / Type	Where Grown	Use
Mournia (*μουρνιά*) (cont.)				Production of other agricultural tools [wood] Famine food for humans [fruit, fresh]
Mousmoulla (*μούσμουλλα*), despoula (*δέσπουλα*), despoura (*δέσπουρα*)	*Eriobotyra japonica*	Loquat tree	Garden	Food for humans [fruit, green]
Nerantzea (*νεραντζέα*)	*Citrus aurantium*	Bitter orange tree	Garden	Food for humans [fruit, green]
Pantzari (*παντζάρι*)	*Beta vulgaris*	Beets	Garden	Food for humans [root, green]
Patata (*πατάτα*)	*Solanum tuberosum*	Potatoes	Garden	Food for humans [tuber, green]
Peponi (*πεπόνι*)	*Cucumis melo*	Melons	Garden	Food for humans [fruit, green]
Piperia (*πιπεριά*)	*Capsicum* sp.	Peppers	Garden	Spice in cooking [fruit, dried, ground] Pickled in brine, vinegar [fruiit, green]
Portokallia (*πορτοκαλλιά*)	*Citrus sinensis*	Orange tree	Garden	Food for humans [fruit, green]
Prasa (*πράσα*)	*Allium porrum*	Leek	Garden	Food for humans [bulb, green]
Revithia (*ρεβίθια*), rovithia (*ροβίθια*)	*Cicer arietinum*	Chickpea	Field	Food for humans [seed, dried]
Rizi (*ριζι*)	*Oryza sativa*	Rice	Field	Food for humans [seed, dried]
Rodakina (*ροδακινιά*)	*Prunus persica*	Peach tree	Garden	Food for humans [fruit, green]
Rodia (*ροδιά*)	*Punica granatum*	Pomegranate, pomegranate tree	Garden domesti-cated	Cloth dye from skin and seed [skin, seed, boiled] IN MEMORY ONLY Fruit for humans [fruit] (grown in *bakse*) Placed in sowing sack (*sporotrouva*) for good grain yield [fruit] IN MEMORY ONLY
Rovi (*ρόβι*)	*Vicia ervilia*	Bitter vetch	Field	Food for animals [seed, dried]
Sisami (*σησάμη*), sousami (*σουσάμι*)	*Sesamum indicum*	Sesame	Field	Condiment for cooking, baking [seed, dried]
Sitari (*σιτάρι*), stari (*στάρι*), karpos (*καρπός*)	*Triticum* sp.	Wheat	Field	Food for humans [seed, dried]
Skordo (*σκόρδο*)	*Allium sativum*	Garlic	(Garden)	Food for humans [bulb, green]
Spanaki (*σπανάκι*)	*Spinacia oleracea*	Spinach	Garden	Food for humans [leaves, green]
Staphida (*σταφίδα*)	*Vitis* sp.	Raisin, currant	Field	Food for humans (dried as raisins) [fruit, dried]
Staphilia (*σταφίλι*)	*Vitis vinifera*	Wine grape	Field	Food for humans [fruit, fresh] Wine production [fruit, crushed, fermented] Vinegar production [fruit, crushed]

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TABLE 6.9. Domesticated plant cultivation and use in the Mesara *(continued)*

Plant Name in Mesara	Species	Common Name / Type	Where Grown	Use
Sukia (*συκιά*)	*Ficus carica*	Fig tree	Garden and field	Food for humans [fruit, green, dried] Annual cleaning of oil *pitharia* [leaves, green]
Tagi (*ταγί*) vromi (*βρῶμη*)	*Avena sativa*	Oats	Field	Food for animals [seed, dried] Food for humans [migadi] [seed, dried]
Vamvaki (*bambaki*)	*Gossypium* sp.	Cotton	Field	Fiber for cloth, string, cord, thread, wicks [plant]
Vasilikos (*βασιλικός*)	*Ocimum basilicum*	Basil	Garden	Spice in cooking [leaves, stems, green, dried]
Verukoka (*βερυκοκιά*)	*Armeniaca vulgaris*	Apricot tree	Garden	Food for humans [fruit, green]
Vikos (*βίκος*)	*Vicia sativa*	Common vetch	Field	Food for animals [seed, dried]
Vlita (*βλῆτα*)	*Amaranthus blitum*	Amaranth	Garden	Food for humans [leaves, stems, green]
Zafora (*ζαφορά*)	*Crocus sativus*	Saffron	Import from Rethymnon area	Spice in cooking [flower parts, dried]
Zingkiveri (*τζιγκιβέρι*)	*Zingiber officinale*	Ginger	Import	Spice used in cooking [root, ground]

THE FLOWERING OF MESARA PLANTS—A SEQUENCE OF VISUAL CHANGES IN THE ENVIRONMENT

The sequence of flowering plants below was observed during a single year of extremely heavy winter rainfall. As a sample visual record of the environmental changes observed by the Mesara farmer between December and March, it provides the reader with a basic perception of the Mesara surroundings in which the farmer worked and the colorful sequence of wild growth that marked a period of time in the annual subsistence system.

The common habitats, colorations, and local names in parentheses of these flowering plants are also provided. The dates indicate the earliest point at which these plants begin to flower. Flowering may continue for long periods—up to a month—and it should be noted that the earliest dates of flowering were in many cases different in the beginning of the twentieth century than they are now, remarked upon by all farmers. Table 6.10 gives the most commonly occurring plants in the first half of the twentieth century; other plants flowered as well during these periods, but in smaller numbers.

WILD PLANT USE IN THE WESTERN MESARA—AN ETHNOBOTANICAL CLASSIFICATION

While the plants listed in table 6.10 provide some idea of the sheets of color and growth (*vlastisi, prasinada*) that marked the passage of time for the Mesara farmer, the full range of wild plants used by traditional farmers is overwhelming in its detail. Not only were Mesara farmers aware of an extraordinary array of useful plants, but the number of uses per plant species is, in many cases, equally extraordinary. In effect, the subsistence farmers of the late nineteenth- and early twentieth-century Mesara were economic botanists with a lifetime of experience in assessing and using the plants of their locale.

All plants in this source list of table 6.11 have been utilized over the past century within the Western Mesara region, from the flanks and interior valleys of the Asterousia Mountains in the

TABLE 6.10. Plant flowerings in the Mesara

Date	Plant	Description
December	*Prunus dulcis* (*agrioamigdalia*)	Almond, wild variety from early in month to second half; frequently in disturbed habitats; pink-white flowers
January 15 onward	*Oxalis pes-caprae* (*ksinida*)	Bermuda buttercup, introduced weed that has destroyed the habitats of indigenous weeds and herbs in cultivated fields throughout the Mesara; described as a *skepasma* (covering); bright yellow flowers on green clover-like mat
	Narcissus tazetta (*manousakia*)	Narcissus, disturbed areas in damp fields; ivory colored flowers
	Prunus dulcis (*amygdalia*)	Domesticated Almond tree, from mid-January through early February; pink-white flowers
	Anemone coronaria (*paparouna*)	Crown Anemone, throughout fields; white, bluish-purple, pink, and red flowers;
	Iris unguicularis ssp. *cretensis* (no local name)	Iris, streambed margins, rocky areas at damp field margins; purple with golden centers
February 1–5	*Arisarum vulgari* (no local name)	Arum (Friar's Cowl) open and cultivated areas; silvery grey to purple
	Mandragora officinarum (*tou korakou t'avga*)	Mandrake, rocky and disturbed habitats; deep purple-blue flowers
February 10	*Asphodelus microcarpus* (*asphodelo*)	Asphodel, rocky and disturbed habitats; silvery white flowers
February 20	*Papaver rhoeas* (*paparouna*)	Poppy, fields and disturbed habitats; bright red flowers
	Malva sylvestris (*amolocha*)	Common Mallow, disturbed habitats; purple flowers
	Anchusa undulata ssp. *hybrida* (no local name)	Alkanet, disturbed habitats; deep purple-blue flowers;
	Gladiolus communis (*machairida*)	Common Gladiolus, in cultivated fields (especially grain) and disturbed rocky habitats; deep purple-red flowers
February 23	*Ophrys scolopax* (*salepi* [rare])	Woodcock Orchid, rocky and disturbed habitats; white/yellow/purple blooms;
	Saponaria calabrica (no local name)	Soapwort, disturbed rocky areas; pink flowers
February 28	*Calicotome villosa* (*aspalathos*)	Spiny Broom, scrub, rocky areas and disturbed habitats; bright yellow flowers
	Orchis papilionacea (*salepi* [rare])	Pink Butterfly Orchid, rocky areas; pink flowers
March 12	*Hermodactylus tuberosus* (no local name)	Widow Iris, rocky areas; black-purple to yellow
	Chrysanthemum coronarium (*mandilida, margarites* [recent])	Daisy, disturbed habitats; yellow, white-yellow
	Ophrys bombyliflora (*salepi* [rare])	Bumblebee Orchid, rocky and disturbed habitats; purple-blue to brown flowers

south, to the foothills and lower reaches of the Idaean Mountains in the north, and from the Libyan Sea shoreline eastward, to the districts of Agia Deka, Platanos, and Plora, running north to south. The functional information on each plant is derived from the life experience of elderly Mesara inhabitants and reflects only their use and understanding of the plant as described and demonstrated to me during my fieldwork. No possible or probable uses from comparative Aegean and Mediterranean bibliographic sources (such as those identified in chapter 5) are included in this list of Western Mesara plants. The functions as described here reflect only Mesara categorizations of plant use; for example, the cultural distinction between tinder and kindling is a specific Mesara categorization, as are any other classifications of use in this list. And finally, this description of plant use in the traditional Mesara cannot claim to be complete.

It became obvious over the course of many years of study that only the most elderly of farmers were aware of uses for specific plants that had long been abandoned, for example, the varieties of ground orchid corms used in the production of the hot winter drink called *salepi.* Likewise, the application of specific names to plants that were no longer in use was an age-based form of knowledge. The numerous orchid varieties, for example, were all called *salepi* by elderly farmers, and the use of madder (*Rubia tinctorum*) as a dye plant by women was almost a forgotten activity, with only the most elderly having knowledge of the local name for the plant (*rizari*).

During the course of this study I read intensively on the subjects of plant classification systems, ethnobiological classification, plant systematics, terrestrial plant ecology, plant anatomy, plant physiology, seeds, plant communities, and in the research areas of ethnobotanical and ethnobiological studies applicable to the Eastern Mediterranean and Mediterranean ecosystems generally. I also collected hundreds of samples (pressed and dried) of all of the plants described below, including samples of their various parts as they are used throughout the Mesara and I personally used (or observed the use of) these plants in the functions listed below. This enabled me to place the local knowledge of plants of the Mesara inhabitants within a wider cultural and environmental context and made possible my understanding of human interaction with plants and the ecological results of these interactions. This comparative field research on human/plant interaction throughout the Aegean continues to the present day.

The elderly villagers of the Mesara, who are the source of all information following here, taught me how and when to collect, process, and use these plants. I thank them especially for the privilege of their company, for their patience while I was learning all of these plants and their functions, and for their willingness to instruct me despite adverse weather conditions in the field. The most memorable event in these yearly lessons occurred when an elderly farmer, enraged at my repeated ignorance of a plant type, yelled out: *den prosecheis*! (you're not paying attention!).

Verification of some of the specific Latin (scientific) classifications of these plants was made by Dr. J. Shay during the overlap of our fieldwork from 1984 until 1987. Dr. Shay checked my preliminary list of plants, corrected classification errors, and added family names. In the years of ethnographic research from 1987 through 1985, this verification was not possible. In those cases I have given the family, genus, or species where I could identify it on the basis of my repeated ethnographic recording of the characteristics and use of the plants and my accumulated (albeit amateur) knowledge of botanical classifications. In all other cases I have marked the plant "Classification Not Identified."

The reader should note that, just as in the indigenous labeling of plants within the Mesara, variable scientific classifications of plants pervade the published botanical literature for the Aegean. All Latin classifications here follow Tutin et al. (1966–1975) *Flora Europaea Volumes I–V*, which was used throughout the years of my fieldwork for initial botanical classification and relation to ethnographic categories and was rechecked in the final assembling of this list. Some of the herbs (primarily fresh winter/spring greens, or *horta*) remain unidentified except by their Mesara names. It should be noted that many of the names applied to specific types of *horta* in the Mesara are used for completely different plants (often from different families) elsewhere in Crete. Where a plant is used but has no name in the Mesara region this is noted ("No Mesara Name"). There are cases where plant names are applied by Mesara villagers to more than one species or family of plant; this is identified where it occurs. Extremely common plants that are known to villagers, have specific names, and are not used (they are marked "NOT USED") are included here as prominent components of the various Mesara plant communities. And finally, there are local names applied to Mesara flora that may seem confusing to nonlocals, for example, the use of the name *amanita* for an edible mushroom of the *Boletus* family, a label that is assigned elsewhere in the world to poisonous forms.

The Mesara functions of each plant are outlined here. Where villagers have not used the plant in this way but recall its use this is noted as "In Memory Only." Where the use is a rare occurrence in the Mesara it is identified as "Rare." The everyday activities in which the plants are used are discussed in relevant sections of the chapter. Microregional variations in plant communities and locations—differences between use in the plain bottomlands, north and south mountain foothills, Idaean Mountains and Libyan Gulf shoreline—are distinctive (see chapter 5) and are identified throughout the text of this chapter as they apply to plant use. In table 6.10, those plants that are culturally identified as more specific to particular habitats—for example, mountains, marshland, and so on—are so noted. All plants are arranged here in alphabetical order based upon a transliteration of the most commonly used Mesara name.

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Achimades (*ἀχιμάδες*)	Various species	General name for hirsute spiny shrubs used in the animal enclosure known as *cheimadio* (e.g., *agrio-achladia, aspalathos, astivida, thumari*	Shrubs	Enclosure on the margins of *aloni* (threshing floor) to prevent field animals from leaving the workfloor [entire plant, branches dried] Enclosures, fencing of corrals, gardens [entire plant, branches, dried] Movable doorway/ fieldwall closures [entire plant, branches, dried]
Achinopodi (*ἀχινοπόδι*)	*Genista acanthoclada* fam. Leguminoseae	Genista variety Spiny genista	Shrub	Kindling (*prosanama*) [entire dried plant, branches] Firewood (*ksula, kavsoksula*) [entire dried plant, branches, roots]
Afrata (*ἀφράτα*), psatha (*ψάθα*)	*Typha* sp. fam. Typhaceae	Reedmace family Bulrush	Reed	Woven matting (*psatha*) for ceilings [entire stem, split] Stuffing (insulation) in roofing [entire plant, crushed] Chair and bench woven seats [entire stem, split, leaves] Baskets for harvest of grain [entire stem, split, leaves] Thread holder for *saita* (wooden loom shuttle) [stem, cut] Floor covering [entire stem, split, leaves] IN MEMORY ONLY
Agarathia (*ἀγαραθιά*), stravoagarathia (*στραβοακγαραθιά*), agalathia (*ἀγαλαθιά*)	*Phlomis* sp. fam. Labiatae *Phlomis fruticosa*	Jerusalem sage	Shrub	Kindling [branches, dried] Firewood [entire plant, branches, or roots, dried] Mattress stuffing (*kalokoimithes*) [branches, dried]
Agathia (*ἀγάθια*), agathites (*ἀγαθίτες*)	Various species	General name for spiny shrubs	Shrubs	Tinder [leaves, small branches, dried] Kindling [branches, dried] Firewood [entire plant, branches, roots, dried]
Agathita (*ἀγαθίτα*)	*Agaricaceae*	Mushroom	Fungus	Food for humans [entire fungus, fresh, December]
Agoglossos (*ἀγόγλωσσος*)	*Eryngium* sp. fam. Umbelliferae	Eryngo	Herb	Fresh greens (*horta*) for humans [entire plant, green]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Agoudouras (ἀγούδουρας)	*Hypericum* sp. fam. Cruciferae *Hypericum empetrefolium*	St. John's wort, Hypericum	Herb	Lining between wood slats and stone slab cover of *flasches*, clay beehives [entire plant, dried] Stuffing/insulation (*vromerides*) of house roofs [entire plant, green, dried] Lining of earthen drying floors (*alonia*) for fruit (currants, figs) [entire plant, dried]
Agrioachladia (ἀγριοαχλαδιά)	*Pyrus* sp. fam. Rosaceae *Pyrus spinosa*	Wild pear	Shrub, tree	Kindling [branches, thin, dried] Firewood [entire shrub, branches, thick, dried] Spoon carving [wood} Trunk grafted to produce domesticated pear tree [wood, trunk] Whisk in cheese production [spiny branch, pruned, plaited] Animal fodder (especially pigs/goats) [fruit, leaves] Animal corral and garden enclosures [branches, dried] Movable doorway closures [branches, dried] Famine food for humans [fruit]
Agrioamigdalia (ἀγριοαμιγδαλιά)	*Prunis webbii* fam. Rosaceae	Wild almond	Shrub, tree	Kindling [wood shavings, prunings] Grafted to produce domesticated almond tree [wood, trunk] Animal fodder (especially goats) [leaves, nut casings, nuts] Oil for childrens' stomach aches [nuts, beaten, crushed] Spoon carving [wood, branches] Glue, adhesive [sap] Carved decorative household items (*bibela*) [wood] Famine food for humans [nuts]
Agrioanginara (ἀγριοαγκινάρα)	*Cynara* sp. fam. Compositae	Wild artichoke	Herb	Fresh greens (*horta*) for humans [plant, green]
Agriobournellia (ἀγριοβουρνελλιά)	*Prunus* sp. fam. Rosaceae	Wild plum	Shrub, tree / in mountains	Glue made from sap [sap] (found wild in Idaean Mts. Only [e.g., Zaros])
Agrioharoupia (ἀγριοχαρουπιά)	*Ceratonia siliqua* L. fam. Leguminosae	Wild carob	Shrub, tree	Firewood [wood, branches] Charcoal manufacture [wood, roots] Animal fodder [pods, dried] Famine food for humans [pods]

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Agriokritharo (ἀγριοκρίθαρο), kritharohorto (κριθαρόχορτο)	*Hordeum bulbosum* fam. Gramineae	Bulbous barley	Grass	Animal fodder [entire plant, green] NB: When dry, hairs of this grass (*agana*) catch in throats of grazing animals and choke them
Agriokrommido (ἀγριοκρόμμιδο), skulokrommido (σκυλοκρόμμιδο)	*Allium* sp. fam. Liliaceae	Wild onion	Herb	*Toursi* (pickle) for humans [bulb, green] Flavoring in soups, salads [bulb, leaves green] NB: Sheep/goat milk and cheese considered ruined if animals eat this—"terrible odor" and flavor imparted.
Agriomaroulo (ἀγριομάρουλο), molyvdaina (μολύβδαινα) lepidohorto, agriomarouli, leichnohorto, laktouki, thrida	fam. Compositae	Wild lettuce	Herb	Fresh greens (*horta*) for humans [leaves, green]
Agrioskordo (ἀγριόσκορδο), vromoskordo (βρομόσκορδο), skordolakko (σκορδόλακκο)	*Allium* sp. fam. Liliaceae	Wild garlic	Bulb/herb	Pickle (*toursu*) for humans [bulb, green] Cooking [bulb, green] NB: Sheep/goat milk and cheese considered ruined if animals eat this—"terrible" odor and flavor imparted. Harvested early February via digging with hoe in sand dunes of coastline.
Agriosuko (ἀγριόσυκο)	*Ficus carica* L. fam. Moraceae	Wild fig	Shrub, tree	Scouring brush for cleansing of clay jars [leaves, green] Animal fodder (especially goats) [leaves, green] (*Ornos*) sweet from fruit [fruit, boiled] NB: Wood considered useless because of heavy smoke, low heat, caustic sap during prunin
Agriovarsamo (ἀγριοβάρσαμο)	*Mentha* sp. fam Labiatae	Mint variety	Herb	Wild greens (*horta*) for humans
Agriovikos (ἀγριόβικος)	*Vicia* sp.	Wild vetch, bird vetch, cow vetch, crow vetch	Herb	No use recorded
Akoniza (ἀκονυζά)	*Inula* sp. (*Dittrichia viscosa*) fam. Compositae	Aromatic inula	Herb	Disinfectant lining of clay beehives against illness via microbes/insects [entire plant, green, crushed] Disinfectant in chicken coops agains illness via lice (*ornithopseires*) [engire plant, green] Cleaning agent for wooden barrels with boiling water and ashes (*alousa*) [leaves, green]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Akoniza (ἀκονυζά) *(cont.)*	*Inula* sp. (*Dittrichia viscosa*) fam. Compositae	Aromatic inula	Herb	Disinfectant scent for household [entire plant, green] Dyeing agent (*fadia*) in boiling water sprinkled on *sultani* (yellow) currants drying on *aloni* (drying floor) to improve their color [leaves, green] Dyeing agent for color green in sheeps wool [leaves, green] Mosquito repellent [plant, green] NB: Considered to have a pungent odor; not eaten by animals or humans Stuffing/insulation of roof (*vromerida*) [entire plant, green]
Akrevatos (ἀκρέβατος)	*Smilax aspera* fam. Liliaceae	Lily family		Basketry [branches, thin (*vitses*)] Firewood [wood, branches]
Akritamo (ἀκρίταμο)	Classification not identified	Wild green	Herb	Pickle (*toursi*) for humans *Horta* (greens) for humans, boiled and fresh [leaves]
Aladania (ἀλαδανιά)	*Cistus* sp. fam. Cistaceae	Rockrose family	Shrub	Animal grazing food (described as *san to thumari*, like thyme) [leaves, green] NB: This is the plant family from which laudanum is produced; knowledge exists in the Western Mesara of the process of producing a gum opiate from beating of the leaves and branches; this processing activity, occurring in July on the north coast of the the Rethymon nome, is not part of plant use in the Mesara.
Alimatses (ἀλιματσές)	Various species	General name for bunches (*dematies*) of dried wild plants for kilns and fires; also refers to Thymelaea	Shrubs	Firewood [entire plants, dried]
Amanita (ἀμανίτα)	*Boletus* sp.	Boletus mushroom variety	Fungus	Food for humans [entire fungus, fresh, growing at base of *platano* trees in winter (December onward)]
Amolocha (ἀμολόχα)	*Malva sylvestris* and *Malva* sp. fam. Malvaceae	Mallow	Herb	Animal fodder [entire plant, green (in field) and dried (winter) Food for humans (horta) [entire plant, green] Boiled medicament for human diarrhea (*evkolies*) [flowers/fruit, green] Pollen source (considered one of the finest) for bees [flowers, green] Poultice made with milk opens suppurating wounds [leaves, beaten]

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Angelamos (ἀγκέλαμος)	*Avena barbata* fam. Gramineae	Wild oat	Herb	Animal fodder (especially goats) [entire plant, green (May/June), dried (winter)
Anithon (ἄνηθον)	*Anethum* sp. fam. Umbelliferae	Wild dill	Herb	Spice used in cooking
Anonida (ἀνωνίδα)	*Ononis spinosa* fam. Leguminosae	Restharrow Spiny restharrow	Shrub	Tinder [tiny pieces of branches, dried] Kindling [branches, whole shrubs, dried] Firewood [larger entire plants, dried] Rough broom (*paraseira*) for sweeping of threshing floor [entire plant/branches, flattened, dried] Stuffing/insulation (*vromerides*) in house roof [entire plant, dried]
Apiganos (ἀπήγανος)	*Ruta* sp. fam. Rutaceae	Rue family	Herb	Strong smell
Argoulida (ἀργουλίδα), agrielaia (ἀγριελαιά), agrilida (ἀγριλίδα)	*Olea europaea* L. subsp. *oleaster* fam. Oleaceae	Wild olive	Shrub, tree	Kindling [shoots, branches, dried] Firewood [wood, prunings (*kladevmata*), roots (*koutsoures*)] Charcoal manufacture [wood, trunk, prunings, roots] Basketry (especially cheese mold baskets (*toupia*) and smaller household baskets (*kofinia*) [thin shoots, cuttings, green] Trunk grafted to produce domesticated olive tree [wood, trunk] Spoon carving [wood] Household container carving [wood] Walking stick (*bastoni*) production [large branches] Netting needle (*veloni*) for fishing [wood] Whisk for cheese manufacture [spiny branch, pruned, plaited] Animal fodder (especially goats) [leaves, shoots, green]
Armiriki (ἀρμυρίκι)	*Tamarix parviflora*	Tamarisk		No use recorded
Ascheletoura (ἀσκελετούρα), askotizara (ἀσκοτιζαρά), askeleti (ἀσκελέτη)	*Urginea maritima* L. fam. Liliaceae	Sea squill	Bulb	Animal fodder [leaves dried. Sheep noses run if they eat green leaves] Rubbed on animal hooves (especially sheep and goat) to prevent them from cracking [bulb, green, cut into pieces] Apotropaic (against the *mati* [evil eye]) and good luck piece hung in each household every January 1, frequently behind the door to the house [bulb and leaves, green]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Ascheletoura (ἀσκελετούρα), askotizara (ἀσκοτιζαρά), askeleti (ἀσκελέτη)	*Urginea maritima* L. fam. Liliaceae	Sea squill	Bulb	Apotropaic hung over lime kiln entrances during firing [bulb and leaves, green]
				Preservative and disinfectant against microbes/insects in the storage of grain [bulb, green, cut into pieces and placed throughout clay storage jars, woven baskets, wooden containers and/or storage rooms]
				Ceramic cooking pot repair and enhancement of heating qualities, especially for *tsoukalia* (imported Siphnian casserole dishes) [bulb, green, cut and rubbed on exterior base of *tsoukali* to seal cracks and to increase heat retention]
				Household baking oven construction and repair [bulb, green, cut up, rubbed on clay floor of oven as sealant; rubbed on clay oven wall lining and floor in order to repair cracks]
				Disinfectant for beehives [bulb, green, cut up or whole if small, placed in hives]
				Sealant/disinfectant for earthen threshing floors (*alonia*) [bulb, green, cut into pieces and rubbed on floor]
				Sealant for final upper most clay (*lepida*) roof lining [bulb, green, cut into pieces, rubbed over smoothed clay to prevent cracking in sun]
				NB: In everyday discussion this plant is often described as toxic (*deleterio*)
Askotizara (ἀσκοτιζαρά)	*Conium maculatum* fam. Umbelliferae	Parsley Family	Herb	Used to make corks for narrow necked clay vessels and glass bottles [stem, leaves, dried]
Aspalathos (ἀσπάλαθος)	*Calicotome villosa* fam. Leguminosae	Spiny broom	Shrub, tree	Kindling [branches, dried]
				Firewood (especially for breadmaking in household oven) [entire plant, branches, flattened, dried]
				Fuel for lime kiln [entire plant, dried and green]
				Animal corral and garden fencing [entire plant, branches, dried]
				Movable doorway and fieldwall closures [entire plant, dried]
				Animal fodder (especially sheep/goat *aigoprovata*) herds) [leaves, flowers, pods, green, in field]
				House construction (beams of mezzanine story [*odas*]) [wood]

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Aspalathos (ἀσπάλαθος) *(cont.)*	*Calicotome villosa* fam. Leguminosae	Spiny broom	Shrub, tree	Broom for sweeping of corrals and stables [entire plant, branches, green and dried, flattened] Stuffing/insulation in house roof [branches, green] RARE USE
Aspharangia (ἀσφαραγκιά)	*Asparagus* sp.	Wild green, unidentified species	Herb	Food for humans (*horta*) [plant, green]
Asphendamos (ἀσφένδαμος), afoulakas (ἀφούλακας)	name for shrub form *Acer sempervirens* L. fam. Aceraceae	Wild maple	Shrub, tree, mountains	Spoon carving [wood] Threshing sledge manufacture [wood} Threshing fork (*thrinaki*) manufacture [branches] Lining of corral (*mandri*) margins [branches]
Asphodelo (ἀσφόδελο)	*Asphodelus aestivus* fam. Liliaceae	Wild asphodel	Bulb/herb	Not used
Astirakas(ἀστύρακας)	*Styrax officinalis* L. fam. Styracaceae	Storax	Shrub, tree / mountain locations	Donkey basket (*kofa*) production [large-scale branches, green, split] Heavyweight basket (*petrokofino*) production (used for transport of rocks and other heavy items) [midsize branches, green, whole] Low household stool (skamni) for use at hearth [wood, roots] Binding medium (*lugodetes*) for grain sheaves [branches, green] Fruit strung as worry beads (*komboloi*) [fruit, dried] NB: considered to have a strong scent when cut, scraped
Astivida (ἀστοιβίδα)	*Sarcopoterium spinosum* L. fam. Rosaceae	Thorny burnet	Shrub	Tinder [small branch fragments, dried] Kindling [entire plant, branches, dried] Firewood (household hearth [*parathuia*]) [entire plant, roots, dried] Fuel in bunches (*dematies*) for lime kiln [entire plant, dried] Stuffing/insulation for household roofing [entire plant, green] (Considered preferable to other *vromerides* because it knits together when crushed Insulation for clay beehives between wooden slats and stone slab cover [entire plant, dried, crushed] Sieve bedding for distillation of *raki* and *faskomilolado* [branches, crushed] Rough sweeping broom for household, threshing floor (*aloni*) and *ahiri* (stable) [entire plant, dried]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Astivida (*ἀστοιβίδα*) *(cont.)*	*Sarcopoterium spinosum* L. fam. Rosaceae	Thorny burnet	Shrub	Corral/kitchen garden fencing [entire plant, dried] Animal fodder (especially goat and sheep) [leaves, green] Mulch placed around roots of newly planted grafted wild olive trunk [entire plant, branches] Mattress stuffing (with thyme) [branches, dried] Packing material for storage, transport [branches, green and dried]
Athanatos (*ἀθάνατος*)	*Agave americana* fam. Agavaceae	Century plant	Cactus introduced	Sharp picks for eating [leaf tips, cut off, dried for several months in sun] Fibers for twine thread, string, cord [interior fibers of leaf]
Atrivolos (*ἀτρίβολος*), strivolos (*στρίβολος*)	*Medicago* sp. fam. Leguminosae	Medick	Herb	Animal fodder [entire plant, green in field, dry in stable]
Atrivolos (*ἀτρίβολος*)	*Onobrychis* sp. fam. Leguminosae	Onobrychis	Herb	Animal fodder (especially sheep) [plant, dried]
Avizites (*ἀβιζίτες*)	Classification not identified	Unidentifed wild green	Herb	Fresh food for humans (*horta*) [plant, green]
Avronies (*ἀβρωνιές*)	*Bryonia* sp. fam. Cucurbitaceae	Bryony species	Herb	Fresh food for humans (*horta*) [plant, green]
	fam. Dioscoreaceae	Yam family		Served boiled, made into *pites* [plant, green]
Azogyros (*ἀζόγυρος*)	*Anagyris foetida* L. fam. Leguminosae	Bean trefoil	Shrub	Binding medium [branches, thin, split] Poultice for oxen/cattle to remove *psakoma* [entire plant, crushed] Animal fodder (especially goats, but considered poor fodder) [pods, leaves, green and dry, with strong odor in resulting milk which may be considered offensive] Stuffing/insulation of household roof (*vromerida*) [entire plant] Kindling [plant, dried] RARE
Chamokares (*χαμοκαρές*)	Classification not identified	Unidentified wild green	Herb	Fresh greens (*horta*) for humans [plant, green]
Chamologes (*χαμολογές*)	Classification not identified	Unidentified wild green	Herb	Fresh greens (*horta*) for humans [plant, green]
Chamomili (*χαμομήλι*)	*Anthemis* sp. fam. Compositae	Chamomile	Herb	Tea (*tsai*) for stomach ailments [leaves, branches, dried]
Dictamos (*δίχταμος*), erotas (*"ερωτας*)	*Origanum dictamnus* fam. Labiatae	Dictamo	Herb, mountains	Tea [stems, leaves]
Druias (*δρυιάς*), druia (*δρυιά*), dri (*δρῦς*)	*Quercus pubescens* fam. Fagaceae	White deciduous oak	Tree, mountains	Low household stools [wood, roots (*koutsoures*)] Plow manufacture [wood] Threshing sledge manufacture [wood}

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Druias (*δρυιάς*), druia (*δρυιά*), dri (*δρῦς*) (*cont.*)	*Quercus pubescens* fam. Fagaceae	White deciduous oak	Tree, mountains	Barrel production [wood] House construction [wood] Pig fodder [fruit] Cloth dye [fruit, galls]
Erika (*ἔρικα*)	*Erica arborea* and *Erica* sp. fam. Ericaceae	Tree heather	Shrub, tree, mountains	Firewood [entire plant, dried] Charcoal manufacture [wood]
Ethia (*ἐθιά*), etia (*ἐτιά*)	*Salix* sp. *Salix alba* fam. Salicaceae	Willow	Tree	Animal fodder (especially goats) [leaves, branches, green] Oxen yoke (*zugos*) manufacture [wood] NB: Considered lightest/strongest wood for this implement Spoon carving [wood] Firewood [wood, branches]
Faskomilia (*φασκομηλιά*) sphakomilo (*σφακόμηλο*)	*Salvia* sp. *Salvia fruticosa* fam. Labiatae	Wild sage	Shrub	Kindling [branches, leaves] Firewood, entire plant [dried] Food for humans [fruit (*koukoutsia* or *mela*), green] Tea (*tsai*) [leaves, dried, boiled in water] Good pollen source for bees [flowers, green]. NB: thus influences siting of beehives Fuel for smoked pig meat (*kapnisto*) and smoked sausages (*loukanika*) [plant, branches, leaves, dried] Sage oil (*faskomilolado*) distilled from plant using alembic [entire plant, green] NB: Used as medicament for stomach ailments, mixed with *raki* and as an external medicament Animal fodder [leaves, stems, green]; RARE Cigarette ingredient [leaves, dried] in times of economic stress Glue [distilled sage oil, boiled down] Stuffing/insulation in household roofs (*vromerides*) [entire plant] Additive to clay storage jars (*pitharia*) and wooden trunks (*caselles*) for storage of grain, against insects and microbes [branches]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Finokalia (*φινοκαλιά*)	*Thymelaea hirsuta* L. fam. Thymelaceae	Thymelaea	Shrub	Firewood (excellent for hearth/oven) [entire plant, branches, dried] Fuel for lime kiln (*dematies*) [entire plant, dried] Animal fodder [leaves, green] Tea as medicament for high blood pressure [leaves, boiled] Binding medium (*lugodetes*) for grain, other bundles of objects and organic materials [branches, green]
Frangosuka (*φραγκόσυκα*)	(*Opuntia ficus-indica*)	Cactus	Succulent / introduced	No Mesara use
Galastivida (*γαλαστοιβίδα*)	(*Euphorbia acanthothamnus*) and *Euphorbia* sp. fam. Euphorbiaceae	Spurge family	Shrub	No use
Galatzida (*γαλατζίδα*)	*Euphorbia helioscopia* fam. Euphorbiaceae	Spurge family	Herb	Fresh greens (*horta*) for humans [plant, green]
Glukoriza (*γλυκόριζα*)	fam. Leguminoseae	Pea family	Herb	Fresh greens (*horta*) for humans (NO LONGER GROWS IN MESARA)
Goules (*γοῦλες*)	Unidentified	Unidentified	Herb	Fresh greens (*horta*) for humans
Horta (*χόρτα*)		General name for all green leafy herbs used fresh, boiled, baked or fried		
Iska (*῎ισκα, ῎υσκα*)	Polyporaceae, several species	German tinder, surgeon's agaric, punk, touchwood, amadou	Fungus	Tinder for *tsakmakopetra* (strike-a-light) used with flint and iron (Entire bracket fungus, twice boiled with ash (*staktes*), beaten and dried) NB: Grows at base of carob, *velanidi*, *itea*, *melo*, *karidi*, *phillyrea*, and *oxia* trees, especially if rotten
Kalami (*καλάμι*)	*Arundo donax* L. fam. Gramineae	Giant reed	Reed	*Kofinides* (large baskets) for storage of grain [stem, split] NB: Lined with a mixture of *copria* (ordure) and chaff Household ceilings [stem, whole] *Psatha* (woven reed matting) to line ceilings, cover floors [stem, split] Stuffing/insulation of household roofs [stem, split, crushed] *Kalamotes* (large wood framed trays) for silkworms (IN MEMORY ONLY) and for drying fruit [stem, whole, cut] Harvest tools for collection of fruit from olive, fig, almond, other fruits [stem, whole, with shaped end] *Vitses* (thin branches) for production of *madaria* and *toupia* (*anthoturo* and head cheese basket molds) [stem, split] Thread/yarn holder for wooden *saita* (loom shuttle) [stem, immature, cut into segments]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Kalami (καλάμι) *(cont.)*	*Arundo donax* L. fam. Gramineae	Giant reed	Reed	Music pipe [stem, cut, drilled, shaped] Secondary (dividing) wall construction (coated with mud/clay plaster) [stem, cut] Shepherd's crook (*klitsa*)/walking stick (*bastoni*) [stem and attached root, cut, shaped] *Ktenia* (combs (2) of weaver's loom) [stem, cut into slivers]
Kalokimithia (καλοκοιμιθιά), tsi panagias to dakruo (τσι παναγιάς τὸ δάκρυ)	*Helichrysum stoechas* fam. Compositae	Helichrysum everlasting	Shrub	Animal fodder [plant, green] Mattress stuffing [plant, dried]
Kappari (κάππαρη)	*Capparis spinosa* L. fam. Capparidaceae	Caper	Herb	Condiment for humans [immature buds, green, pickled]
Kardamilines (καρδαμηλινές)	Classification not identified	Wild green, unidentifed species	Herb	Fresh greens (*horta*) for humans [plant, green] NB: No longer grows in the Mesara.
Karnaras (καρναράς)	Classification not identified	Wild green, unidentified species	Herb	Fresh greens (*horta*) for humans
Kastania (καστανιά), kastano (κάστανο)	*Castanea sativa* fam. Fagaceae	Chestnut	Tree	Chair (furniture) manufacture [wood]
Kavkalida (καυκαλίδα), kavkalithra (καυκαλίθρα)	*Scandix, Tordylium* fam. Umbelliferae	Parsley family	Herb	Fresh greens (*horta*) for humans
Kedros (κέδρος)	*Juniperus communis* fam. Cupressaceae	Juniper	Tree	Wood, import
Klounida (κλούνιδα)	Classification not identified	Wild green, unidentified species	Herb	Fresh greens (*horta*) for humans
Kolitsani (κολιτσάνι)	*Galium* sp.? fam. Rubiaceae	Galium species?	Herb	Fresh greens (*horta*) for humans
Koudoumalia (κουδουμαλιά)	*Crataegus azarolus* L. fam. Rosaceae	Mediterranean medlar	Shrub, tree	Firewood [wood]
Koukkounara (κουκουνάρα)	*Pinus* species fam. Pinaceae	Pine	Tree	Wood, for threshing sledge, import
Kournoupodi (κουρνουπόδι)	Classification not identified	Wild green, unidentified species	Herb	Fresh greens (*horta*) for humans [plant, green]
Koutsounada (κουτσουνάδα)	*Papaver rhoeas* L. fam. Papaveraceae	Poppy	Herb	Fresh greens (*horta*) for humans
Krasita (κρασίτα)	*Boletus* sp.	Mushroom, Boletus family	Fungus	Mushroom for human consumption (found in Levadia)
Ksinida (ξυνίδα)	*Oxalis pes-caprae* L. fam. Oxalidaceae	Bermuda grass	Herb introduced from South Africa	Animal fodder (imparts a sour taste to milk of goats, sheep) RECENT INTRODUCTION
Ktenida (κτένιδα)	*Onobrychis* sp. fam. Leguminosae	Onobrychis species	Herb	Animal fodder

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Kyparissia (*κυπαρισσιά*)	(*Cupressus sempervirens*) L. fam. Cupressaceae	Cypress	Tree, imported from Sphakia	*Traves* (main support beams) for house construction [wood, trunk] *Dokaria* (secondary cross beams) for house construction [wood, branches] *Argalio* or *argastiri* (loom) construction [wood] Support posts in house construction [wood] *Telaro* [wood] Furniture manufacture [wood]
Lagoudohorto (*λαγουδόχορτο*)	Classification not identified	Wild green, un-identified species	Herb	Fresh greens (*horta*) for humans
Lamarina (*λαμαρίνα*)	Classification not identified	Wild green, un-identified species	Herb	Fresh greens (*horta*) for humans
Lambada (*λαμπάδα*)	*Rumex* sp. fam. Polygonaceae	Dock family	Herb	Fresh greens (*horta*) for humans
Lapsanida (*λαψανίδα*)	*Brassica* sp. fam. Cruciferae	Mustard	Herb	Fresh greens (*horta*) for humans (before flower has opened) Ingredient for soup (humans) Animal fodder in field (sheep, goats)
Louloudaki (*λουλουδάκι*)	*Silene* sp. fam. Caryophyllaceae	Campion	Herb	Sapounada
Lugia (*λυγιά*), lugaria (*λυγαριά*)	*Vitex agnus-castus* fam. Verbenaceae	Chaste tree, monks' pepper tree	Shrub, tree	Heavy-duty baskets for stone transport (*petrokofinides*) [branches, thick, woven] *Lugodetes* (binding media) for sheaves of grain [branches, split, tied] *Lugodetes* (stringing media) for fruit, herbs [branches, split, tied] Base of reed (*kalami*) baskets (*kophinia*), for greater strength [branches, woven] Sack-shaped donkey load baskets (*kofes*) for grapes [branches, woven] Small stools and benches [wood] Goat masks to prevent browsing [branches, thin, woven] Beehives [branches, woven] IN MEMORY ONLY
Luoprini (*λυοπρίνι*)	*Ilex aquifolium* fam. Aquifoliaceae	Holly	Shrub	Wood
Machairida (*μαχαιρίδα*)	*Gladiolus* sp. fam. Iridaceae	Gladiolus	Bulb	Cut for beauty in home
Maidanos (*μαϊντανός*)	*Petroselinum* sp. fam. Umbelliferae	Parsley	Herb	Herb in cooking [fresh, dried]
Manitaria (*μανιτάρια*)	Various families	All species of mushrooms (amanites, krasites, agathites)	Fungus	Food for humans

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Manousa (μανούσα), manousakia (μανουσάκια)	*Narcissus tazetta* fam. Amaryllidaceae	Narcissus	Bulb	Glue from bulb (used by shoemakers) Cut for flower to display in home [leaves, flower]
Mantilida (μαντηλίδα)	*Chrysanthemum* sp. fam. Compositae	Crown daisy	Herb	Fresh greens (*horta*) for humans Fodder for animals (sheep/goat, especially) [entire plant, November] Green fodder for *vodia* [entire plant, green]
Marathon (μαραθόν), amaranthos (ἀμάρανθος)	*Foeniculum vulgare* fam. Umbelliferae	Dill	Herb	Spice used in cooking, served fresh for humans [leaves, stalks] Beaten into *plastrokolis* for healing of cuts [leaves, stalks]
Matzourana (ματζουράνα)	*Origanum* sp. fam. Labiatae	Parsley family		Spice used in cooking Boiled *horta* for humans (considered good for heart)
Mavri (μαύρη), mavragathi (μαυραγάθι)	*Rhamnus lycioides* spp. *oleoides* fam. Rhamnaceae	Buckthorn	Shrub	Fuel for oven (considered excellent) [branches, dried] Green fodder for animals, especially goats [leaves, flowers] Firewood [branches, dried]
Maza (μάζα)	Classification not identified	Not identified	Grass	Grazing fodder for cows, donkeys (not eaten by sheep/goat)
Mersefli (μερσεφλί)	Classification not identified	Not identified	Herb	Fresh greens (*horta*) for humans
Murtia (μυρτιά), merthia (μερθιά), stephano (στέφανο)	*Myrtus communis* L. fam. Myrtaceae	Myrtle	Shrub, tree	Firewood [branches, dried] Bouquets and decorations (*stephana*) in church and home for holidays [branches, green] Berries (*merta*) eaten whole and cooked in *stifado* (stew) [fruit] Bunches stored in home to deter flies [branches with leaves, berries] Bunches kept in home and church for scent [branches with leaves, berries] Eel trap and fish trap (*kertaria*) production [branches, thin, woven] Basket (*kophinia*) production [branches, woven] Animal fodder (especially sheep/goat) [branches, leaves, green] Raw material for smoking pig meat (*kapnista*) [branches with leaves, wood] Sealing of clay water jar (*stamni*) with numerous thin branches bunched [branches] Production of goat masks to prevent grazing [branches, thin] Binding and stringing medium (*lugodetes*) [branches, thin, split]

Continued on next page

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Murtia (*μυρτιά*), merthia (*μερθιά*), stephano (*στέφανο*) *(cont.)*	*Myrtus communis* L. fam. Myrtaceae	Myrtle	Shrub, tree	Production of cheese mold baskets with vroulo [branches, thin] Cut pieces used in loom (*argalio*) production [wood] Medicament made from berries [berries, boiled]
Oxia (*ὀξιά*)	*Fagus* sp. fam. Fagaceae	Beech	Tree, import	Picture frames [wood] Furniture production [wood] Barrel production [wood] Olive screw press production (*aletrogoudio*) [wood] Threshing shovel (*palami*) [wood] Wooden mortars (*havania*) [wood]
Paches (*παχές*)	Classification not identified	Unidentified wild green	Herb	Fresh greens (*horta*) for humans
Panagiahorto (*παναγιάχορτο*), *tsai panagias* (*τσάϊ παναγιάς*), tsi panagias to dakri (*τσὶ παναγιάς τὸ δάκρυ*)	*Phagnalon graecum* fam. Compositae	Phagnalon	Undershrub	Baths for newborns [plant, boiled] Animal fodder [plant, green] Medicament (*pharmaka*) for children [plant, boiled]
Peratzouni (*περατζούνι*), speratzouni (*σπερατζούνι*), meratzouni (*μερατζούνι*), asperatzouna (*ἀσπερατζούνα*)	*Lotus edulis* L. fam. Leguminosae	Bird's food trefoil	Herb NB: This grows in the astivida (*Sarcopoterium spinosum*)	Animal fodder [entire plant, green] Food for humans [pods, green]
Pevko (*πεῦκο*)	*Pinus* sp. fam. Pinaceae	Pine	Tree	*Retsini* resin (known only by hearsay) Bark (*floudi*) used to dye cotton nets (*dixtia*) [bark, boiled] Firewood [wood] Yoke production (*zugos*) [wood]
Phliskouni (*φλισκούνι*)	*Mentha pulegium* L. fam. Labiatae	Mint	Herb	Spice, food for humans [plant, green]
Phrangosuka (*φραγκόσυκα*), papoutsoukia (*παπουτσουκιά*), klapsosukia (*κλαπσοσυκιά*)	*Opuntia ficus-indica* fam. Cactaceae	Prickly pear	Cactus introduced from new world	Fruit eaten by children
Pigounitis (*πηγουνίτης*)	*Tragopogon* sp. fam. Compositae	Salsify	Herb	Fresh greens (*horta*) for humans [plant, green] Animal fodder [plant, green and dry] Root eaten separately without skin [root, green, peeled]

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Platano (πλάτανο), platania (πλατάνι)	*Platanus orientalis* L. fam. Platanaceae	Plane tree	Tree	Firewood for hearth [wood]
				Butcher's cutting blocks [trunk, roots (*koutsoures*)]
				Saddle (*somari*) production [wood]
				Agricultural implement production including threshing sledges (*voloseira*) plows (*aletria*), threshing forks (thrinakia), sickle handles (*drepania*), winnowing shovels (palamia) [wood]
				Container and tool production (e.g., Wooden grain measures (mouzouri, *pinaki*), cotton and wool beater's bow (*doxari*), jar and bottle stoppers [wood, trunk, branches]
				Household roofing beams [wood, trunk, heavy branches]
				Tsokara (wooden shoes, clogs) [wood] IN MEMORY ONLY
				Kafasa cages, latticing, grating latticed window [wood] goat mask?
Poupoula (πούπουλα), alimatsa (ἀλιματσά), egidohorta (ἐγιδόχορτα)	*Ebenus cretica* L. fam. Leguminosae	Cretan ebenus	Shrub	Good source of pollen for bees (thus apiaries located near) [flowers, green]
				Stuffed mattresses (*stromata*) and pillows (*maxillaria*) [flowers, dried] (collected in May and June)
				Animal fodder (especially sheep/goat) [plant, eaten all year]
Prikorodiko (πρικορόδικο)	*Cichorium spinosum* L. fam. Compositae	Chicory	Herb	Fresh greens (*horta*) for humans [plant, green] (makes best salad)
				Animal fodder [plant, green and dry]
Prinos (πρῖνος), prinari (πρινάρι), katsoprini (κατσοπρίνι)	*Quercus coccifera* L. fam. Fagaceae	Kermes oak, holly oak	Shrub, tree (tree size is also called *velanidi*, scrub form is called *katsoprini*)	Firewood for hearth and oven [wood, branches, trunk, especially roots]
				Fuel for charcoal manufacture [wood, thick branches, trunk, roots] NB: Considered best with lentisc and carob
				Plow (*aletri*) manufacture [wood]
				Stool (*skapeti*) production [wood]
				Barrel manufacture [wood]
				Animal fodder (especially goats) [leaves, shoots]
				Agricultural tool production including threshing sledge, hoe handles, grain measures, sickle handles, [wood, trunk, branches]
				Bow production for *stivaktis* (cotton and wool beater) [wood]
				Building construction in mountainous areas [wood, truck, branches]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Prinos (*πρῖνος*), prinari (*πρινάρι*), katsoprini (*κατσοπρίνι*) *(cont.)*	*Quercus coccifera* L. fam. Fagaceae	Kermes oak, holly oak	Shrub, tree (tree size is also called *velanidi*, scrub form is called *katsoprini*)	Spiny lining of sheep and goat corral [branches] Olive screw press (*aletrogoudio*) [wood, trunk] Whisk (*tarachtis*) for cheese production [branch] Pig fodder (*velanidia*) [fruit] Insect galls for red dye [galls on leaves] IN MEMORY ONLY
Psares (*ψαρές*)	Classification not identified	Unidentified green (identified generally as an *osprea*, thus perhaps Leguminosae)	Herb	Fresh greens (*horta*) for humans [plant, green]
Radikia (*ραδίκια*), rodiko (*ρόδικο*)	*Cichorium endiva* L. fam. Compositae	Endive	Herb	Fresh greens (*horta*) for humans [plant, green] Animal fodder [plant]
Rizari (*ριζάρι*), kolitzani (*κολιτζάνι*)	*Rubia tinctorum* L. fam. Rubiaceae	Madder	Herb	Root used for dye [root, ground, boiled] IN MEMORY ONLY
Roka (*ρόκα*)	Classification not identified, possibly *Asphodel* sp.	Unidentified	Bulb	Tall spiky branch/flowers used as spindle [plant, dried]
Salepi (*σαλέπι*)	*Orchis* or *Ophrys* sp. fam. Orchidaceae	Orchid	Bulb NB: found in Herakleion in early 20th century; brought from there	Thick winter drink served with cinnamon [corms, dried, ground] IN MEMORY ONLY
Schinos (*σχίνος*), (*σκίνος*)	*Pistacia lentiscus* L. fam. Anacardiaceae	Lentisc	Shrub, tree	Firewood for hearth and oven [wood, branches, especially roots] NB: In Mesara considered best overall firewood Charcoal manufacture [wood, branches, trunk, roots] NB: In Mesara considered best overall raw material for charcoal Fuel for lime kiln [entire plant] *Lugodetes* (binding medium) for grain and other sheaves [branches, split branches] String material for suspended bunches of fruit/vegetables [branches, thin, split] Animal fodder (especially sheep/goat) [leaves, shoots] Food for humans (berries) [fruit] *Vitses* (thin fibers) for cheese mold basket production (*madaria* and *toupia*) [thinnest shoots]

TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Schinos (σχίνος), (σκίνος) *(cont.)*	*Pistacia lentiscus* L. fam. Anacardiaceae	Lentisc	Shrub, tree	*Kofa* (50-*oka* sack like donkey basket) production [branches, medium size, split] Branches hung in windows to repel flies [branches]
Sentralida (σεντραλίδα)	Classification not identified	Wild green	Herb	Fresh greens (*horta*) for humans [plant, green]
Sparto (σπάρτο), sparti (σπάρτι)	*Spartium juncium* fam. Leguminosae	Spanish broom	Shrub, tree	Animal fodder (sheep/goat browsing especially) [flowers, leaf tips] Plaited brooms (*paraseires*) for stable and threshing floor [branches] Basket production (*panieria*) [branches] *Lugodetes* (binding medium) for grain and other sheaves [branches] Stringing and suspension of fruit/vegetables for storage [branches] Cloth production for mens' pants, for sacks, for tarps (*anaples*) [branches, soaked, beaten, spun] IN MEMORY ONLY Thread, string, twine, cord production [branches, fibers] IN MEMORY ONLY All-purpose household binding medium (tools etc.) [branches, fibers]
Sphaka (σφάκα), pikrodaphni (πικροδάφνη)	*Nerium oleander* L. fam. Apocynaceae	Oleander	Shrub, tree	Handles of sickles and other metal hand tools [branch, hollowed out] NB: These are said not to rot when consistently exposed to water Production of donkey baskets (*kofas*) [branches, split] Planted for beauty around the home [plant] Stuffing/insulation in construction of house roofs [branches, green] Firewood for oven [branches, dried] Production of spinning tool *anemi* [wood] *Lugodetes* (binding medium) for grain sheaves, for fuel loads (*dematia*) [branches] Production of stools, low chairs[wood] General household binding and stringing medium [branches, thin shoots]
Stamnagathi (σταμναγάθι)	*Cichorium spinosum* fam. Compositae	Spiny chicory	Herb	Strainer placed in mouth of clay water jar (*stamni*) [branches, dried] Fresh greens (*horta*) for humans (February, much sought after) [leaves, green] Animal fodder (especially sheep/goat [leaves, in field]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Staphilinakas (σταφιλίνακας), staphilina (σταφιλίνα)	*Daucus carota* fam. Umbelliferae	Queen Anne's lace, wild carrot	Herb	Fresh greens (*horta*) for humans [leaves, green] Root used as food for humans if outer skin removed [root, boiled] Animal fodder [plant, green, in field, before flowering]
Starida (σταρίδα), astarida (ἀστάριδα)	*Crepis* sp. fam. Compositae	Hawksbeard	Herb	Animal fodder [plant, green and dry, in field] Pods (*vizakia*) gathered for animals in stable [pods, green or dried]
Stythnos (στύθνος)	*Solanum nigrum* Solanaceae	Nightshade	Berries poisonous, leaves somewhat	No use recorded
Throumbi (θροῦμπι), throumba (θρύμπα)	*Satureja thymbra* fam. Labiatae	Savory	Shrub	Kindling [branches, dried] Firewood (wood considered to have fine odor) [entire plant, dried] Cleaning of wooden barrels [branches with leaves, flowers, boiled in water] Used as mulch at base of tomato plants in kitchen garden to prevent destruction by insects (*mamounia*) [branches, green] Placed in clay *pitharia* and wooden casseles to prevent grain decay via microbes/insects [entire plant, green] Excellent pollen source for bees (apiaries situated nearby) [entire plant, green] Spice used in pickling of table olives [leaves, green and dried] Spice/condiment in cooking of meat/other foods [leaves, green and dried] Animal fodder (primarily donkeys) [leaves, shoots, green] Boiled as a tea [leaves, boiled] Used in storage of cloth and other items in house, as house freshener [branches} *Vrastes omelettes* (boiled messes) for animals [shoots, leaves, boiled] relation to *phliskouni*
Thumari (θυμάρι), thumos (θύμος)	*Thymus capitatus* fam. Labiatae	Thyme	Shrub	Tinder [branch fragments, dried] Kindling (considered better than *astivida*) [branches, dried] Firewood [entire plant, roots, dried] Fuel for lime kiln (*dematia*) [entire plant, bunches, tied] Coarse brush to spread new *kopria*/earth/chaff mixture on threshing floor each spring [plant, branches]

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TABLE 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Thumari (θυμάρι), thumos (θύμος) *(cont.)*	*Thymus capitatus* fam. Labiatae	Thyme	Shrub	Animal fodder (especially donkeys) [leaves, flowers, branch tips] Medicament as contained in donkey ordure (applied to cuts and other wounds) [leaves, flowers, branch tips, digested] Broom for sweeping threshing floor during threshing/winnowing [branches, tied] Mattress stuffing (*kalokoimithies*) [entire plant, branches] Spice/condiment used in cooking [leaves, dried] Small-scale scouring brush for copper pots in shepherd's huts [branches, thin, bound] Mulch around roots of newly planted grafted wild olives [branches] Stuffing/insulation of house roofs [entire plant, branches]
Tou korakou t'avga (τοῦ κοράκοῦ τ᾽ἀυγά)	*Mandragora* sp. fam. Solanaceae	Mandrake, mandragora	Root/tuber	Fruit (*koukoutsia, korakodomata*) eaten by animals and humans [fruit, green]
Vatos (βάτος)	*Rubus* sp. fam. Rosaceae	Blackberry, bramble	Shrub	Eaten by animals
Volvous (βολβούς), askordoulakka (ἀσκορδούλακκα)	*Muscari* sp. fam. Liliaceae	Grape hyacinth	Bulb	Food for humans (*toursi*)
Vroulo (βροῦλο), vroula (βρούλα), vourlo (βοῦρλο)	*Juncus* sp. fam. Juncaceae	Rush family	NB: Each of these plant groups is used in interrelated activities, and many villagers make no distinction among them other than to identify their physical characteristics, frequently in anthropomorphic terms. Other villagers know only one type.	Chair and stool seats [plant, woven]
	Scirpus sp. fam. Cyperaceae	Sedge family Clubrush		Eel and fish trap (*kirtari*) production [plant, woven]
	Cyperus sp. fam. Cyperaceae	Sedge family Galingale		Pack saddle (*somari*) stuffing [plant, crushed]
	Carex sp. fam. Cyperaceae	Sedge		Stuffing/insulation of house roofs [plant, crushed] Baskets (*panieria, kalathia*) for holidays, woven by women [plant, woven] Plaited brooms (*paraseires*) for threshing floor [plant, plaited] Used with myrtle in production of cheese mold baskets (*madaria* and *toupia*) [plant, woven] *Lugodetes* (binding medium) for sheaves and other materials in field [plant, green] Stringing medium for suspension of fruits/vegetables in *apotheke* [plant, green] General household binding medium (tool handles etc) [plant, green]

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Table 6.11. Wild plants *(agria fita)* used in the Western Mesara *(continued)*

Greek Names in the Mesara[1]	Latin Name	Common Name	Plant Type[2]	Plant Use[3] in Mesara [Plant Part/Condition][4]
Vrouves (βροῦβες), vrouvastacha (βρουβάσταχα) *(cont.)*	*Rapistrum* sp. fam. Cruciferae	Wild radish	Herb	Fresh greens (*horta*) for humans [plant, green] Boiled with pulses (especially *koukia*) [plant, green] Animal fodder in field and stable [plant, green] *Vrastes omelettes* (boiled messes) for animals NB: Described by all as a wonderful food
No Mesara Name	*Bromus* sp. fam. Gramineae	Wild oat variety	Herb	Animal fodder [entire plant, green, dried]

1 Transliterated Greek name(s) as pronounced in the Mesara, with the most common Mesara name listed first. Utilized plants that have no local Mesara name ("No Mesara Name") are so identified.

2 Plant type (for example, shrub (*thamnos*), herb (*horto*), tree (*dendro*), sedge, reed, grass, seed crop, tuber, bulb, root, fungus

3 Traditional plant use(s) in the Western Mesara region only as described by Mesara inhabitants (common uses unless noted as "Rare")

4 Part(s) and condition of plant, for example, green (fresh) or dried utilized in these activities. Plants collected and dried as winter animal fodder and those eaten green by animals during spring/summer field browsing are noted.

Farm Animals for Labor, Food, and Secondary Products

The number of farm animals needed to sustain a family of five or six before World War II was perceived in various ways by traditional Mesara farmers, depending in part on the extent and distribution of family landholdings and the work capability of family members. However, to successfully maintain a fundamental number of cultivated fields and to occasionally supplement the products of agriculture, all Mesara farmers emphasized repeatedly that the minimum essential was:

- a pair (*zevgari*) of oxen (*vouia*, *vodia*); or one ox (*vodi*) shared with another family also owning one ox (draft animal);
- one type of *forada* (transport animal) such as a mule (*mulari*), horse (*allogos*), or donkey (*gaidouri*);
- one to two goats (*aiges*, *gides*, *katsikes*);
- one to two sheep (*provata*);
- chickens (*kottes*, *kotopoula*).

In contrast, a smaller number of more prosperous Mesara families owned a wider range and a greater number of animals that provided them not only with labor, food and secondary products beyond the minimum cited above, but also allowed them to participate more fully in local trade for essentials and luxuries. This agricultural ideal, a more substantial holding of farm and herd animals that was cited as a distinguishing characteristic of prosperous families, and which occurred rarely in the traditional Mesara included:

- one pair (*zevgari*) of oxen (*vouia, vodia*), each about 200 kg, considered medium-sized (draft animals)
- one or two donkeys (transport animals) and/or, one or two mules or horses (transport animals)
- around ten to twenty sheep (a small flock or *kopadi*)
- several goats

- chickens
- rabbits (*kunellia*)
- one or two pigs (*gourounes*, *cheirina*) per year
- a dog (*skylos*)

Villagers in Magarikari recall the ownership of around one hundred oxen (plate 6.9) distributed among as many households prior to World War II, and farmers in Voroi state that 130 pairs of oxen, and an equal number of threshing floors (*alonia*) (plate 6.12) were maintained in the village circa 1930. Families in poorer circumstances, that is, owning only enough land beyond immediate family needs to grow sufficient fodder for one draft animal, were required to coordinate with others in similar straits to share their oxen, alternating the labors of plowing, harrowing, and harvesting in the fields (see the concept of helping one another (*allelovoethia*) in "Social and Economic Structures," above).

Daily trips to and from landholdings, continual collection of kindling and firewood, gathering of wild foods for man and animal, transportation of goods to and from the market town of Moires or the more distant city of Herakleion, and local efforts at peddling and trade, required that a donkey, horse, or mule be owned by each family. In prosperous villages such as Voroi, where a number of individuals engaged in longer-distance trade for profit, many families might have more than one mule or horse (overall, horses were much less common), and might also own two donkeys.

Everyone, whether rich or poor, would have some sampling of sheep and/or goats that served as occasional sources of meat and as regular sources of milk, and thus cheese, which could be sold or traded as necessary, with the possibility of trading or marketing of cured skins after butchering. Goat skins could be sold to a local shoemaker (*tsangaras*) who sewed them into *aschia*, leather sacks for the transport of olive oil or wine, and for the storage of a liquid form of cheese (*mizithra*). The wool from the shearing of sheep (*kourres*) in March through April was used in the household or was exchanged, if sufficient in quantity, with a local trader (*emporos*) for needed goods brought in from elsewhere. Cuttings of goat hair could be accumulated and sold locally, for example, to the goat hair cordmaker (*schinoplochos*) in the village of Peri (in the Eastern Mesara), or to regional craftsmen, many of whom were concentrated in the Rethymnon nome, who wove the goat-hair mats (*boxades*) used as frails in nineteenth- and twentieth-century olive oil presses.

Chickens provided eggs that were incorporated into the naturally restricted daily menus (see "Meals in the Mesara Subsistence System") and, if sufficient in number, could be exchanged within the village for other necessities. Rabbits and pigs were considered supplementary sources of food maintained by Mesara families who could afford them. These served as special foods at celebrations and supplemented the occasional butchering of a young sheep or goat (offspring of a mature animal that was kept for its full life-cycle) or a chicken. The average life of these farm animals was twelve to fifteen years for oxen, twenty to thirty-five years for a donkey, about thirty years for a mule, thirty years for a horse, seven to eight years for a goat, seven to eight years for a sheep and two to three years for a chicken. Thus, in a single agricultural generation (considered here to be roughly twenty-five years) a sequence of several pairs of oxen could be necessary for the consistent maintenance of family landholdings.

In the winter months, from October through March of each agricultural year, farm animals spent long periods of time and all overnights in the household stable (*ahiri, stavlo*). In the spring, however, from March through October, they were tethered in the fields (*sta horafia*), frequently in those near the kitchen garden, and could on occasion be left outdoors overnight. A wide array of foods was employed in the feeding of these animals, including hay (*sanos*, *sana*) from barley (*krithari*), wheat (*sitari*), and oats (*tagi, vromi*); whole grains such as oats; pulses such as *vikos* (common vetch, which was adopted after World War II), *lathouri* (vetch, grass pea), *rovi* (bitter vetch), and *lupina* (lupines); cuttings (*kladia*) from olive and almond trees in pruning season (plate 6.41); and a selection of wild greens (*horta*) (plate 6.40) including many otherwise ignored weeds from cultivated fields, gathered herbs that were also edible by humans, and cuttings from shrub plants such as wild olive (*agrilida*, *argoulida*) in leaf or flower.

Each animal had its own *pachni*, or manger (plate 6.33), usually a wooden beam (frequently cypress, *kyparissia*) laid across a stone platform of sufficient height for each type of animal, that was located most commonly in the corners of the stable. Larger animals were fed from a clay *vraschi*, an open vessel with a wide mouth that could hold *vikos* drenched with water, and were watered from *gournes*, carved limestone or wood basins, that could also be employed in the fields where the animals were tethered from March through October. Oxen were sustained on barley or wheat straw in bundles (*dematia*) of full-length stalks (plate 6.19) or loose chaff from the threshing of grain, as well as wild greens and plant cuttings, including those of wild olive. During periods of heavy field labor, the woman of the house, very late in the evening, at midnight or 1 a.m. as she began to prepare the family meal for the day, would feed the team of oxen a *zembili* (a woven straw basket) filled with straw or a pulse such as *rovi*. Chopped straw from the threshing floor (*aloni*) (plate 6.13) was gathered up after winnowing and transported in sacks to the flat roof of the *acheironas*, the room in which loose chaff and bound shocks of grain were stored as winter fodder. After drying on the roof in the sun, the straw was pushed through a square ceiling aperture, the *acheironuchtis*, into the storage room below. The ceiling aperture was then sealed with a laminar slab of local limestone. This fodder room frequently adjoined the household stable and could also be used for the storage, in hemp (*kannavis*) or cotton (*vamvakera*) sacks (plate 6.16) (*tsouvalia*, *sakkia*), of any excess grain supplies that would not fit into rectangular storage containers (*cassonia*, *caselles*) built of wooden boards, into the *odas*, a separate room and floor for grain storage, or into clay storage jars (*pitharia*, *kioupia*) (plate 6.36) located in the living and storage areas of the home. While oxen were unshod, mules, horses, and donkeys required iron shoes (*petalides*) that were made by *charchiades* (ironworkers, also called *albanides*) in Herakleion and were sold by craftsmen and merchants in Moires. *Voudodepsia*, the leather harness and other straps used in tethering animals, were also purchased from dealers in Herakleion and Moires.

Mules, horses, and donkeys ate straw and oats grown specifically for that purpose. Donkeys were said to prefer grazing on thyme (*thumari*), of all wild shrubs available in the locale and would also eat wild olive (*argoulida*). Goats were perceived as eating all day and would consume any plant material provided as fodder in the stable or in grazing in the field. Their voracious appetites resulted in much damage to cultivated trees (especially olives) and fields if they were allowed to roam free. The leaves of carob (*haroupi*), spiny broom (*aspalathos*), and lentisc (*schinos*) were much sought after by both goats and sheep in the summer months. Leaves of the almond tree (*amigdalia*) after summer harvest and pruning were a special treat for ovicaprids (*aigoprovata*) in general (plate 6.40), as were new growth on domesticated olive trees (*elaies*), and wild greens in the winter and spring. Chickens ate all leftovers from household food preparation and, along with rabbits, many varieties of domesticated and wild greens. Pigs were supplied with anything remotely edible, including the remains of all household meals and large-scale food processing, rotten foods from unsuccessful harvests and storage, harvests of the fruit of wild plants such as wild pear (*agriachladia*), and any plant debris that was not useful for other purposes.

In some households, a pig was raised and fattened between June and December, and then slung up high on a crossbeam, and butchered for the New Year. This annual butchering provided a family not only with holiday foods such as crackling, but also with six months of *glina* or *ladi cheirino*, pig fat boiled down in a large *tsikali* (a clay casserole dish) and then stored in clay jars (*kouroupes*) of small (twenty-five to thirty *okades*) or medium (sixty to seventy *okades*) size. *Glina* was used for everyday cooking, as a storage medium, over a period of many months for the preservation of pork meats such as *sunglina*, and as a spread on bread. Ideally, a family would hope to fatten a pig to a weight of approximately ninety to one hundred *okades*, which would result in around seventy to eighty *okades* of meat, meat products, and boiled-down fat intended to last a family for roughly half a year, although the use of this fat source could be stretched to as many as nine months.

Prosperous families might also fatten a second pig from January until June, when it was slaughtered, thus providing them with an additional six months of *glina*. In most households, only one pig per year was kept, from June to December, and in poorer families, none at all. In the slaughter of pigs, first the skin was removed and cooked as crackling, then the fat layer (which was immediately boiled down to *glina*), and finally the meat and innards, which were either stored in the boiled-down fat in *kouroupes*, smoked, made into sausage, traded for other necessities among neighbors, or used immediately.

In villages such as Magarikari and Voriza, where large numbers of farm and herd animals were common, the animals were restricted to the fields (*horafia*), and flocks (*kopadia*) especially, were not permitted in the village proper. In every Mesara village, small numbers of animals kept in the stable (*ahiri, stavlo*) or in the fields, and larger flocks and herds kept in a fold (*stani*), all produced manure (*kopria*). For smaller numbers of animals the manure was, ideally, collected on a daily basis and stored in a specially excavated manure pit (*koprolakkos*). In each Mesara household, as in households throughout Crete and the southern Aegean during the nineteenth and early twentieth centuries, farming families maintained a *koprolakkos,* in the village, by the side of the house, and/or in the fields at an accessible location by the kitchen garden where animals were frequently tethered. In the Mesara, this manure pit was dug into the ground, up to 2 m in depth, and was usually 1.5 to 2 m in diameter (some examples of up to 3 m in diameter were cited). Each day, depending on the season, the manure (*kopria*) was swept out of the stable or up against the walls of the stable (it was generally considered unhealthy to leave it for long periods of time around the animals), or was gathered from the tethering area and thrown into the *koprolakkos*. Broken clay vessels, broken tools, unusable raw materials, food processing and food preparation debris, human ordure, inedible weeds from cleared fields, and other refuse of daily life were also deposited in these pits. This was where a farming family disposed of unwanted fragmentary objects and raw materials from home and field. In the fields, where water jars (*stamnes*) used for the watering of trees and vines broke frequently, there were numerous fragments of these vessels in and around the area of the *koprolakkos*.

Manure (*Kopria*) and Its Uses

Until the more common use of chemical fertilizers after 1930, the distribution of manure (*kopria, kopries, kopros*) was, with the exception of plowed-in green fodder, or thick ash deposits produced from the burning of a deliberately deposited layer of pruned wild shrubs, the preferred means of fertilizing fields and gardens. Kitchen gardens were fertilized when possible with *seribeti*, a mixture, with water, of longstanding *kopria* that had been homogenized in the lower levels of an accumulation of manure in a stable. All Mesara farmers emphasized that the minimum number of farm animals cited above annually produced barely enough manure for the enrichment of an extensive kitchen garden with fruit trees (*perivoli, bakse*) or perhaps one small field or a selected group of olive trees. In many villages *kopria* was viewed as the only available high-quality fertilizer. With the post–World War II dependency on chemical fertilizers for extensive agriculture, *kopria* has once again been reserved especially for the kitchen garden.

In October of each year, at the time of the first winter rains, the *koprolakkos* or manure pit was emptied and the contents were spread on a single field (*adeiasame to koprolakko kai skorpisame tin kopria sto horafi*) around the base of a select number of olive trees, (*kai meta kamame orgoma kai anagkaivame tin kopria me to choma*, and afterward we plowed it in and joined the manure with the soil), or was dug into the kitchen garden. In villages at the foot of Ida, manure from the *oza* or *aigoprovata* (larger mixed herds of sheep and goat) was used in the *perivolia* and was, as a highly desirable commodity, sometimes sold to farmers from other villages including those at lower elevations. Thus, because of its intensive use in kitchen gardens, frequently the most fertile soils in village landholdings could be found quite close to the settlement where these manured gardens and small fruit orchards (*bakse*) were located.

Overall preferences among the types of manure existed. Some farmers described the manure of goats as *aristi kopria* (the best manure) providing that its acidity was reduced by sitting exposed for a period of time before use, and others applied this same description to the manure of oxen. Oxen manure was cited especially for olives and fields planted in grain. A number of farmers recall the use of donkey manure, described as *elafri* (light or mild) to bind wounds. Donkeys were regularly fed oats and straw and preferred to graze primarily on thyme, resulting in a product that was perceived as both antiseptic and healing, and not at all caustic.

Manure of various animals was used in the Western Mesara not only in the fertilizing of the kitchen garden and fields (all types) and in the special enrichment of the kitchen garden (goat and sheep manure), but also in the annual spring relining of threshing floors, the number of which was always a close approximation of the number of oxen teams (*zevgaria*) maintained in each village. Manure specifically from oxen was used each year for the thick lining spread on the threshing floor (plate 6.11 and 6.12) or *aloni*, (*voutsoname to aloni*, we lined the threshing floor). Spread on the newly trampled earth floor with a brush made of thyme cuttings, this floor surface, composed of a mixture of ox manure, a small quantity of soil, and water, was dispersed in a layer two to three cm thick to prevent it from cracking off in the heat and pressure of the threshing (*alonisma*).

Ox dung was also considered essential in the planting of carobs. In October, the seed of the carob was placed in a *voutsa* or ball of ox manure and then planted in a small hole. In approximately one month, in November, the seed would have sprouted and the plant was nurtured until it could be moved to a field location.

Manure was employed in the production of the *kophinida*, a grain storage basket woven of split shafts of giant reed (*kalami*) and the cuttings (*vitses*) of lentisc (*schinos*). These large-scale basketry containers were as tall as 2 m in height, with a diameter ranging from 60 to 70 cm to about 1.5 m (this was considered the outside dimension). In Voroi and other villages, farmer/craftsmen specialized in the production of these storage baskets, the smoothed and dried lining of which consisted of the *kopria* of oxen mixed evenly with water and chopped straw (*acheiro*). *Kophinides* were cheaper than *pitharia* and were said to keep grain (*sitira*, *karpos*) in good condition for a "long a period of time," defined by most as one to two years. Some farmers suggested that the weaving (*pleximo*) of the *kophinida* allowed for more balanced preservation than in a *pithari*. *Kophinides* could hold from six to seven hundred okades of grain, twice as much as the largest *pithari*, and could be made larger if desired. (Many farmers who saw military service in Northern Greece were aware of the use of this type of container in the mainland, where *kophines* more than a thousand *okades* in size were manufactured). In the Mesara, *kophinides* were kept in the *avli* (entranceway) and in the storage area (*apotheke*) of the house.

In the Eastern Mesara Plain, called the Epano Mesara (figure 6.1) to the east of Moires and the village of Platanos, dung cakes (*voutses*) were commonly used for fuel, a practice that resulted in the Western Mesara use of the term *voutsades* for the villagers of the Eastern Mesara region. Residents of the Western Mesara noted that beyond Moires, in villages throughout the Epano Mesara (figure 6.l) such as Kapariana, Gavgales, Trypeta, Agioi Deka, Akamatos, Vagio, Asimi, Stoli, Louras, Mesochoria, Tefele, and Monofatis, there was not enough wood available for home use (*den eichane dendra katholu*) but there were *polla vouia* (many oxen) as a result of the exclusive cultivation of the eastern plain in grain and pulses. There were no extensive olive groves in the Eastern Mesara (plate 6.5) that might provide substantial seasonal prunings, and the villagers had limited access to the distant Asterousia scrub growth, making it difficult for them to collect firewood regularly (*duskolepsane*). Villagers in Platanos, a community on the margins of this area, recall shortages of wood and the collection of manure for dung cakes used in hearth fires, for the washing of clothes, or, less frequently, because of the odor produced, for cooking.

Fuel for the Home

It was standard practice in the cutting and collection of firewood (plates 6.39, 41, 42) for home use, one of the prominent labors of the dry months of the year, for the Mesara farmer to collect one *gomari* of wood at a time (one *gomari* = one donkey load consisting of two *dematies* [bundles] of around fifty *okades* each tied to either side of a saddle). Of these *dematies*, one was collected for immediate use, and the other was put aside for the upcoming winter. Most farmers in villages in and around the margins of the plain (for example, Sivas, Pitsidia, Agios Ioannis) agreed that a family needed a minimum of one thousand *okades* or ten *gomaria* (ten donkey loads) of wood in a year of good weather and a mild winter, and at least fifteen hundred *okades* or fifteen donkey loads (a figure cited in Pitsidia and Petrokephali) in a variable year with severe winter conditions. In prosperous villages such as Voroi the estimate was as high as two thousand *okades* or twenty donkey loads per year in mild weather and three thousand *okades* or thirty donkey loads for years with hard winters. Villages at higher elevations such as Voriza and Magarikari cited an annual average figure of fifteen hundred to two thousand okades (fifteen to twenty donkey loads) with very good weather, and, more commonly, two to three thousand *okades* (twenty to thirty donkey loads) for years with severe winter weather. Other farmers in villages such as Kouses figured firewood needs on a daily basis and stated that a household needed one *gomari* of wood (around one hundred *okades*, one donkey load) every five days in severe winter weather. And finally, a few farmers throughout the plain estimated firewood use on the basis of two donkey loads gathered every twenty days. In all of these figures there was a clear distinction made between *chontra ksyla,* heavy, thick pieces of wood such as trunks and prunings of large diameter from mature trees; *koutsoures,* solid tree roots and thick mature shrubs; and *lepta ksyla,* the lighter weight full growth of spiny and hirsute shrubs such as *astivida* (thorny burnet, *Sarcopoterium spinosum*); *thumari* (thyme, *Thymus capitatus*); *aspalathos* (spiny broom, *Calicotome villosa*); and *sphakomilia* (sage, *Salvia officinalis*). In addition, all of these figures were based on the premise that in the spring and summer the hearth fire was lit only in the morning and at night, in part because the family was out in the fields, but in the winter months was used for longer periods on a regular basis.

In order to light a household fire it was considered necessary to have tinder, kindling, and firewood (all local distinctions) ready for use. The flame itself was started with a *tsakmakopetra,* a chert fragment, blade, or flake that was struck against a hammered, curled iron bar (*sidero*) and created a spark against a wisp of tinder. The tinder was frequently *iska,* a light fluffy material produced from a shelf mushroom growing at the base of mature trees such as carob (see "Wild Plant Use," above). The shelf mushroom was boiled, beaten, and then boiled again in a mixture of water and ash. When dried, it had the texture and consistency of wisps of cotton. A cotton wick (*fitili*) could also be used in starting a fire, and equally, small dried branches of thorny burnet, spiny broom, and thyme were also used. When started, the fire was then kindled with a number of full-size dried bunches of plants such as sage or thorny burnet that burned quickly. These plants provided the foundation for consumption of heavier woods such as branches of leafy plants, including lentisc and olive prunings, and massive roots (*koutsoures*) of olives, lentisc, and other woods.

Mesara farmers consistently cited the steady and long-lasting fires produced from *schinos* (lentisc, *Pistacia lentiscus*) (plate 6.43) considered by all to be the best overall fuel source for the household, ranging in size from small shoots and branches to substantial trunks and heavy roots. Spiny broom (*aspalathos*, *Calicotome villosa*) was also a much-preferred woody shrub as was olive wood, from mature domesticated trees that had been pruned (plate 6.63). In addition to these three preferred fuels, the following were consistently described as important for household fires: *argouilida*, *agrilida* (wild olive, *Olea europaea* subsp. *oleaster*); *prinos*, *prinari* (wild varieties of oak as available, including Kermes oak); *thumari* (thyme, *Thymus capitatus*); *sphakomilia* (sage, *Salvia officinalis*); wild carob (*agriocharoupia, Ceratonia siliqua*); wild pear (*agriachladia*, *Pyrus* sp.); wild almond (*agriamigdalia, Prunus webbi*); *achinopodi* (spiny broom variety, *Genista acanthoclada*); *anonida* (restharrow, *Ononis spinosa*); *agarathia* (Jerusalem sage, *Phlomis fruticosa*); and *finokalia* (thymelaea, *Thymelaea hirsuta*). A wide variety of other spiny and hirsute woody shrubs from the maquis (see chapter 5) was also employed on a less regular basis. For baking in the oven, thymelaea, thyme, spiny broom, and lentisc were stated by all to be the most useful. *Mangalia* (portable metal basins on legs) were used in homes to provide heat in corners distant from the central hearth. The fuel in this case was *pirines,* crushed olive stones from the production of oil, which were set into a bed of coals.

Villagers from each community cut wood and shrubs (*ksylevame*) from locations in their immediate environs as well as more distant localities. With this consistent use of wood and shrubs in households throughout the Mesara, it was not uncommon for farmers to travel from 15 to 20 km to gather firewood (farmers from Pitsidia and Kouses in particular described this). Most farmers, however, commonly cited distances of 2 to 5 km in their search for firewood.

Villagers from Agios Ioannis in the middle of the plain traveled at least two times a week, both north and south of the village to collect wood because there was none available in their immediate surroundings. In the north, the closer location, they collected from the Kardiotissa district, in the Idaean foothills, and the area of Kalochorafitis (figures 6.1 and 6.2) and in the south, from the uncultivated lands of the Odigitria Monastery and the valleys and hills around Vathi Martsalos, at the foot of the Asterousia. In both of these locations they were able to gather lentisc, thyme, spiny broom, wild olive, and wild carob. Petrokephali villagers, living in the plain with no firewood immediately at hand, journeyed regularly to the Asterousia in the south, especially to the public lands of the Odigitria Monastery, and to Martzalo on the south coast, where, among others, they collected lentisc, thyme, and spiny broom. Kouses, in the southern foothills of the Mesara, collected its wood from locations in the Asterousia as far as 15 km away (this was nearest forest growth, described as *dasos*), including Agio Pharango, Kephali, Kaloi Limenes, Agia Kuriaki, and Odigitria. Among the plants cited were lentisc, thyme, spiny broom, and Jerusalem sage. Sivas villagers were able to gather wild shrubs from fields near the village, which were described as *elefthera* (free) for the gathering and cutting of wood, and from the Asterousia, at the toponym of To Gialo, and Odigitria, including lentisc, thyme, wild carob, spiny broom, restharrow, thorny burnet, and wild olive. In the years after World War II it was remarked by Sivas villagers that they ventured to more and farther distant locations throughout the Asterousia.

Pitsidia farmers were not averse to traveling up to 20 km to collect firewood (10 to 15 km was described as average). They, and other villagers in the southern margins of the plain (for example, Pobia, Kamilari, Listaros) used the Asterousia as a source and went particularly to toponyms such as Gavolitina on the south coast. The nearest oak wood was located in Asimatos near Kouses, and the firewood collected from the Asterousia (Pitsidia farmers ranged up and down the Asterousia at many of the above-listed locations) included wild olive, lentisc, and spiny broom. Toward the north, however, in villages such as Voroi and Phaneromeni, the foothills and flanks of the Idaean range provided most of the fuel consumed. In Phaneromeni, villagers went to uncultivated land in the toponyms Koulourida and Lagos as well as to the forest in the Kardiotissa area (figure 6.1). Among the fuels listed were lentisc, thyme, thymelaea, and sage. In Voroi, to the west, the monastery lands in the area of Kardiotissa were frequently listed as a most important source for wild carob, wild olive, wild pear, and lentisc, in addition to lighter plants such as thyme, restharrow, and thorny burnet. Voroi villagers might travel to Kamares and Voriza for oak. Voriza villagers, on the flanks of the Idaean mountains, collected spiny broom, thorny burnet, and had a clear advantage over villagers in the lowlands of the plain because shepherds were free to gather wood in less accessible locations. In Magarikari, to the south and west of Voriza, the best woods were listed as lentisc, oak, and wild olive. The closest growth (*dasos*) was cited as the toponym of Trapeza, and in addition to the above-mentioned woods, wild pear and wild carob were also collected.

This wholesale stripping of uncultivated fields and wild shrubland and bedrock locations was carried out annually. Most farmers stated that they would not remove the roots of plants such as lentisc unless the growth was already disturbed. Thus, in periods ranging from two to three years (for lentisc), three to four years (for varieties of scrub oak), and three to five years (for thyme, restharrow, thorny burnet, spiny broom) the local cover could regenerate, given sufficient winter rains.

The Shepherd and the Herd
(O Tsopanis kai to Kopadi)

Proveio turi kai katsikos athoturos
(the best head cheese [*kephalotyri*] from sheep and the best *athotyros* from goats).
—shepherds in the Idaean Mountains

Within the Mesara and in the mountainous margins around it, both north and south, shepherds were known as *tsopanides* or *voskoi,* and their herds, large and small, were variously called *kopadia, aigoprovata*, and *oza*. The relationship between shepherds and farmers in the Western Mesara was not always a smooth one. Herds that were annually driven from the southern flanks of the Idaean range (figure 6.2) and from as far away as the Nida Plain, the villages of Anogeia and Kroussonas, and from the region of Sphakia in West Crete (the villages of Askyphou, Palaiochora, Azogyres, Sphiniakiades, Boliotis, and Ksyouchia), migrated to the Asterousia for winter grazing. Along the way they could ravage cultivated fields and were especially drawn to the flowering and fruiting branches of the olive tree. In the recollection of farmers in the southern villages of the Mesara, for example, Listaros, Sivas, Pobia, and Platanos (figure 6.2), these damages (*zimies*) frequently resulted in friction and disputes. Goats were considered to be the most destructive, eating anything and everything along the way. Nonetheless, the shepherds from the Idaean flanks above the Mesara, in Voriza, Zaros, and Kamares, all considered Moires in the plain proper to be their market town, maintained close relations (*epaphes, desmous*) with farmers and tradesmen in the villages of the plain, and regularly participated in the Saturday *pazari,* selling cheese (*kephalotyri* and *athoturos*), *mizithra* (a liquid form similar to cottage cheese), meat, skins, and wool.

As a subsistence activity, the maintenance of herds in disparate locations was distinctly seasonal. In the winter, smaller herds stayed in the mountains (for example, in Kamares and Voriza) near the villages. Larger herds were driven down the Idaean Mountains, across the Mesara Plain, and into the southern Asterousia mountain slopes where shepherds either owned fields (for example, the Kroussonas shepherds owned land in Kaloi Limenes) or rented grazing land from local farmers. Shepherds maintained a stone structure for cheesemaking called a *mitato* at their designated winter grazing area which was called a *metochi.* As these shepherds and their herds passed by villages in the Mesara they were permitted to graze for short periods in the readily available uncultivated fields (they paid for this privilege, and the shepherd resided overnight in a *kaliva* or temporary hut made of local plant materials) and were then expected to move on toward their southern destination. As an example, the route taken by shepherds from Voriza was as follows: Voriza, Skourvoula, Voroi, Agios Ioannis, Sivas, Listaros, Odigitria, and south.

Among the locations where Idaean shepherds wintered were Kaloi Limenes, Odigitria, Lenta, and Chrysostomos, that is, along the southern flanks of the Asterousia. In addition, shepherds from Sphakia wintered in the area of Kouses village from November or December to April, and some Anogeia shepherds wintered in the areas near Listaros. Shepherds from villages such as Voriza might remain in the northern part of the Mesara, with *metochia* at Galia near Moires (figure 6.2), at Laloumas, and at Mesiskli, while Magarikari shepherds rented grazing lands in the plain itself.

The annual schedule was as follows, with slight variations: in September, October, and November, the herd grazed in the mountains and there was no milking. In December the herds descended from the mountains on their annual trek to the lowland *metochia*, and from December to January the sheep gave birth. If they were extremely late in giving birth they were caught in the mountains. From December/January to April/May the herds grazed in the lowland *metochia*. In March through May they returned to the mountain folds and along the way, grazed on the weedy green growth (*chloro*) that was a result of the winter rains. From March/April through June it was necessary to milk twice a day (morning and night) and to follow the herds over extensive grazed areas in the mountains. In June, and in some cases in earlier months the animals were sheared (*kourres*). From June through

August milking took place only once a day. And in September, October, and November, again there was little or no milking.

If the shepherds actually owned plots in the lowland *metochia* (for example, the Anogeia and Kroussonas shepherds in Kaloi Limenes) many of the fields were planted with olives. Thus, in December, the shepherds were able to harvest their own olive crops at these low elevations while also grazing their herds. Villagers from Voriza, who wintered in the hilly area north of Moires, also harvested their olives during this lowland stay, and in some cases hired others to begin this process earlier as needed.

In lowland agricultural villages such as Sivas, the inhabitants pooled their sheep and goats and formed one large herd that was cared for by a single individual. Herd sizes in villages that subsisted from shepherding ranged from five to seven hundred in Magarikari to one thousand to twelve hundred or more animals in the villages of Voriza, Kamares, and elsewhere in the Idaean range (figure 6.2). The composition of the *kopadi* could be half sheep and half goats (in which case they were called *aigoprovata*) or any other combination of these animals.

The summer *mitato* or cheese-making establishment was located high in the mountains, for example, 5 to 6 km from a village such as Voriza; some *mitata* were near the Nida plain. The *mitato* was built of stone. Some of them were domed (fairly round in shape) and others were square in plan. There was usually one room with stone platforms bearing mattresses stuffed with thyme and Jerusalem sage on which the shepherd and his family slept. *Lichnaria* (copper oil lamps) with cotton or linen wicks provided illumination. The shepherd's cloak, which was essential in the mountain cold, was made of woven, stamped, and felted wool and was called the *kapoto* or *kapota*. The *mitato* could also be called the *tyrospiti* and the fold was known as the *mandra* or *mandri*. Inside the *mitato* was a storage space called the *tyrokeli* or *tyrospito*, dug into the ground as much as 3 m and extremely cold (*sunkratei to kruo*, it holds the cold). One or more hearths of three stone slabs set upright in a pi-form were called the *parathuia, parasuia*, or the *kaniastra*. There were generally at least two *parasies* in the *mitato*, one for the *tigani*, for cooking, and one for the *kazani* (cauldron for the boiling of milk in cheese production). The *mantra* or fold was lined with oak (*prinous*) and *asphendamos* (larger wild maple), and *afoulakas* (smaller scrub maple). An aperture (*lakkos*) to hold the metal milking can (*tsingkos* or *pinakas*) was cut into stone slabs at the entrance to the *mandra*. Once the herd was milked, the liquid was poured into a large copper cauldron (*kazani*). It was stirred with a large spoon made of perforated tinned copper. An average *kazani* held seventy *okades* of milk and was roughly 1.25 m in height by 70 cm in diameter.

To process seventy *okades* of milk, the milk (*gara, gala*) was sieved with a fine-mesh cloth (*seironoume me pania*). Roughly ten *okades* was removed and put aside. The remaining milk was heated to around 40° C (the shepherd put a finger in the cauldron to see how hot it was). The shepherd then added dried *agkastera*, sheep stomach from an animal no more than twenty days old that had been soaked in water, or the modern enzyme reduction called *pithia*. The milk was stirred (*taraksame to gara*). When the milk had jelled (*meta pou tha piksei*) the shepherd added salt. The congealed mixture was then stirred with the *tarachtis*, a whisk made from a spiny branch of wild pear or oak. With his hands the shepherd gathered the jelled cheese into *volous* (balls). A wooden shelf-rest called the *touposkilo* was placed over the mouth of the cauldron. *Toupia* (*kephalotyri* cheese molds) made of *myrtia* (myrtle), wild olive (*argoulida*), or grape cuttings (*verges*) and *vroulo* (rush species) were placed on the shelf. The molds were filled with balls of cheese pressed down by hand and placed back in the liquid for a short period. In storage the *kephalotyri* was aired on one face for fifteen days and was then turned to its opposite face for ten days, at which point it was placed in the *tyrokeli* (essentially the icebox).

The liquid remaining from this initial cheesemaking process was called the *oros*. The fire under the cauldron was relit and the extra milk that had been set aside was added. This secondary mixture congealed into *mizithra*, a liquid cottage-cheese-like product that was spooned into the mold basket called the *madari*. *Athotyros* was made on the second day of cheese production and took five to ten days to dry. Yogurt was produced in March through June when the greatest quantity of milk was available. In this cheese-making process, milking 1,150 to 1,200 animals produced 70 *okades* of milk, which resulted in 4 *goulides* of cheese (= 4 *kephalia* or heads, each one 2.5 kg in weight); 4 to 5 kg of *mizithra*, and 10 kg of liquid leftover, which was frequently fed to the animals.

Maintenance of the herd included rubbing the liquid from the freshly split bulb of the sea squill (*Urginea maritima*, *ascheletoura*) on the hoofs of animals so that they would not split. Sheep and goats were frequently purchased from the Sphakia region, which was considered to have the best *aigoprovata*. Bells (*koudounia, leres*) were made in Herakleion by local craftsmen and by Armenian metalworking specialists in Rethymnon. Large bells were called *koudounies*; small bells were *leres* or *sklaves* and were suspended from leather halters (*me louri kai souvli*). Leather sacks called *touloumia* (goatskin with the hair on the exterior) were used to store *mizithra* and another sack cheese called *touloumoturi*. Talented shepherds in Voriza and other villages made the musical instrument called the *askomantoura* (essentially a bagpipe) from elaborately carved wooden tubes and a goatskin sack.

Table 6.12 identifies the indigenous classifications of sheep and goats in the mountainous margins of the Mesara, a set of descriptions that is also used in the plain bottomlands.

TABLE 6.12. Categories of sheep and goats in the Western Mesara

Name	Description
Categories of sheep in the southern flanks of the Idaean Mountains	
Kokkinomates	Red on cheeks
Feggaromates	White on cheeks
Mavromata	Temples black near eye
Magoula	All black cheeks
Asprokavkala	All black sheep with white head
Kapales	Black feet
Fardales	Half black/half white
Rodopes	*Fardales*
Categories of goats in the southern flanks of the Idaean Mountains:	
Mavri	Black
Chelieia	White in parts
Kokkines	All red-brown
Aspres	White
Kephalopi	White with black head
Kokkinokephalope	Red with black head
Mavrokephalopes	All black with white head
Psares	Grey
Kouvia	Half white/half black
Kourni	White and black mixed
Karampati	Brown
Koumari	Medium beige
Charki	Half grey/half black
Maksellatou	Red cheeks, black body
Psarafta	Grey ears, black body

THE LIME KILN (*To Asvestokamino*)

Kaminiazoume (we're firing).

—Mesara farmer

In describing the specialized craftsmen (*mastoroi, technites*) found in Western Mesara villages prior to 1960, elderly farmers rarely included those who ran lime kilns (*asvestokamina*) (plates 6.60, 61, and 62). The lime produced was used for whitewashing houses or as a plaster mortar. In the decades before and the years immediately following World War II, the manufacture of lime (*asvesti*) was perceived as a means of producing additional income for the families of informal groups (*companies, synetairismi*) of four to six farmers who shared equally in the labors of production and in the profits. In some villages as many as nine kiln groups, at separate kilns, could be in operation at one time (for example, in Sivas). In other villages such as Listaros, Phaneromeni, Magarikari, and Pitsidia, all communities with access to a preferred range of limestone types and varying amounts of fuel there were different *companies* operating from year to year. In many instances, a "black" limestone (*mavropetra*) found near the village of Pobia in the southern margins of the plain was cited as the best raw material for lime. Other villagers throughout the Mesara had access to supplies of "white" limestone (*aspropetra*) that was also of good quality. Overall, the village of

Voroi maintained roughly twenty lime kilns to the north, in the hills of the Kardiotissa area, a location with substantial supplies of wood (figure 6.1).

In part, this large number of kilns and working kiln groups was the cause of severe deforestation in the immediate locale of each lime kiln. Massive amounts of spiny, hirsute, and woody shrubs (*thamnous*) from the high and low maquis were annually collected for fuel in units called *dematies* (one *dematia* = roughly fifty *okades*). In figures agreed upon by all, as much as ninety to one hundred thousand *okades* (approximately 127,000 kg) of shrub growth from the immediate vicinity and sometimes from farther afield could be used in one annual firing of a large kiln. The scale of this environmental depletion is immediately comprehensible when one considers that for a kiln group to manufacture lime each year, they needed to build as many as three or four lime kilns in separate, shrub-covered locations (for example, plate 6.60). Situated at a substantial distance from one another, each of these kilns was then used only once within a three-to-four year period, usually between May and September. If the successive winters following a firing at one kiln site were sufficiently wet, a *compania* could plan on returning to that same location in approximately three to four years, the average time needed for these low shrubs to regenerate from their roots, which were always left intact during the collection of fuel. Many farmers observed that some plants such as spiny broom (*aspalathos*) and lentisc (*schinos*) responded vigorously to this severe pruning, providing even more shoots for the firing three or four years hence. Woody branches with small diameters (*mikra kladia*) from many of these shrubs were considered the best in a lime kiln because they burned quickly, with a short intense heat, and did not form charcoal as might the thicker, heavy prunings from a full-grown tree such as olive or oak.

The shrubs used most commonly as fuel in lime kilns included lentisc (*schinos, Pistacia lentiscus*), branches and leaves; spiny broom (*aspalathos, Calicotome villosa*), branches and leaves; the scrub form of Kermes oak (*prinos* or *prinari, Quercus coccifera*), branches and leaves; thyme (*thymari, Thymus capitatus*), the entire plant; hawthorn (*mavres, Rhamnus oloides*), branches and leaves; thorny burnet (*astivides, Sarcopoterium spinosum*), the entire ball of the plant; and thymelaea (*finokalia, Thymelaea hirsuta*), branches and leaves. As many as fifty *stremmata* of uncultivated land, or of fields that had been uncultivated for long periods of time, could be stripped of their plant cover for this bulk fuel. Toponyms in these locations might record not only the existence of the kilns (for example, a common locale name was *Sta Kaminia*), but also, on occasion, the existence of suitable limestone supplies. While most *companies* carried out only one firing a year, there are accounts of groups that worked continuously over the summer months, moving from one kiln to another.

The lime kiln itself was usually cut into the bedrock on a hill slope (plates 6.60–6.62), resulting in a cylindrical space known as the *lakkos* or *vithri*. Depths of 4.5 to 5 m were standard in these kilns, with a diameter ranging from 4 to 5 m and greater. A bedrock shelf was built or cut around the interior margins of the bottom of the kiln (plate 6.62) and served as a base for stacking the largest pieces of limestone. On the slope face of the kiln, above the level of the bedrock, a wall of limestone slabs was erected, perforated by a door of about 1.5 m in height, through which the fuel was continually added during the firing. All of these lime kilns were unroofed.

The labor in constructing and firing a lime kiln was divided as follows among the members of the kiln group: breaking up the limestone into boulder size slabs, cobble-size chunks, and smaller pieces; digging the *lakkos* in the bedrock, and building the wall and door in the slope face; gathering the fuel; and, systematically assembling the mound of limestone pieces within the kiln. From bottom (largest pieces) to top (smallest fragments) the raw material put in the kiln included *kleidia* (large shaped boulder-size pieces), *chontra* (cobble size fragments), *psyla* and *katrida* (smallest bits and pieces). In effect, a hollow mound of stone was created beginning at the shelf (plate 6.62) and terminating at the uppermost margins of the kiln. Once assembled, the kiln was fired nonstop, from four to seven days and nights, and was cooled for roughly one day. At the base of the kiln were heavy waste deposits of ash and gray-green to black slag (*giali*), much of which might adhere to the kiln walls.

The lime, measured in units called *kantaria* (one *kantari* = around 44 *okades* or one sackful), was shared equally by the group members, each of whom received roughly eight to ten thousand *okades* (around two hundred *dematies*) or one hundred donkey loads, which were then peddled throughout the region.

Essential measurements for fuel-gathering in the production of lime were as follows, using the *oka* as the standard unit, although it should be noted that this is a somewhat elastic system in which the decisive numerical figure is the maximum weight that a donkey can carry in one load. This consists of about 60 kg (fifty *okades*) of weight on each side of a saddle, for a total of roughly 120 kg (one hundred *okades*) per donkey load:

- l *agalia* = 10 *okades* = roughly 12.8 kg fuel (an apronful)
- l *demati* or *dematia* = 5 *agalies* = 50 *okades* = roughly 63.5 kg fuel (a large tied-together bunch, shock, or outsize sackful)
- l *gomari* = 2 *dematies* = one hundred *okades* = roughly 128 kg fuel (one donkey load, which was most commonly called a *gomari* and more rarely a *forteio*)
- 10 *gomaria* = twenty *dematies* = 1,000 *okades* = roughly 1 *tonnos* fuel (ten donkey loads)

Using these figures, three sets of production statistics for kilns fired in the decades after World War II are cited here:

Kiln 1

Fuel use: 1,300 *dematies* fuel = 650 *gomaria* (donkey loads of fuel) = 65,000 *okades* fuel = roughly 82,550 kg fuel burning four to five days and nights

Lime produced: 44,000 *okades asvesti* (around 44 *tonnos*) sold at 1.2 drachmas the *oka*, thus, approximately 1.47 *okades* fuel to produce l *oka asvesti*

Kiln 2

Fuel use: 1500 *dematies* fuel = 750 *gomaria* (mule loads of fuel) = 75,000 okades fuel = 92,250 kg fuel burning 7 days and nights

Lime produced: 30,000 *okades asvesti* (thirty *tonnos*) sold at one drachma the *oka*, thus, around 2.5 *okades* fuel to produce l *oka asvesti*

Kiln 3

Fuel use: 2000 *dematies* fuel = 1000 *gomaria* (mule loads of fuel) = 100,000 *okades* fuel = 127,000 kg fuel burning 8 days and nights

Lime produced: 56,000 *okades asvesti* (56 *tonnos*) sold at around one drachma the *oka* = thus, around 1.785 *okades* fuel to produce l *oka asvesti*

These variations in the amounts of fuel used and lime produced were dependent on the following environmental conditions and site-specific factors cited by most farmers:

- the degree to which the wind blew during the firing;
- the percentage of impurities other than lime contained in the limestone raw material;
- the composition of the fuel (for example, more lentisc and less thorny burnet);
- the dimensions of the kiln; and,
- the amount of limestone processed at one firing.

The resulting lime was intended for use in the whitewashing of Mesara houses and in the creation of plaster mortar, although as already noted above, few in the Western Mesara villages could afford to mortar their stone houses with anything but plain earth or earth mixed with clay. Only the prosperous could mix lime and earth, an early twentieth-century cultural distinction that has also been repeatedly identified for this writer by the elderly in villages throughout other parts of southern Greece as well.

The Potter and His Ceramics (*OAngeioplastis kai Ta Keramika*) in the Mesara

Angeia saxane (they made pots).

—Mesara farmer

Of the ceramic products used in the nineteenth- and twentieth-century Mesara, a major portion was imported or was produced in the plain during annual visits of craftsmen known as *pitharades* (*pithos*-makers) or *stamnades* (water jar or small vessel makers), and collectively as *angeioplastes* (potters) from the potters' villages of Margarites Vrontisiou in the Rethymnon nome, and Thrapsano in the Pediada of Central Crete. A single potter resided in the Western Mesara during this period, a son-in-law (*sogambros*) from Margarites who had married into a Sivas family. This local potter, who was referred to as a *stamnas*, indicating that he manufactured primarily smaller household vessels on a kick wheel, built updraft kilns (*kaminia*) in the village of Sivas (constructed above ground) and later in Matala (dug partially into the bedrock).

Other small-scale ceramic wares were shipped by sea to the ports of the Libyan Gulf shoreline, to Agia Galini, in the years after World War II to Kokkinos Pyrgos, and most frequently over the past century to the port at Matala (figure 6.2). In addition, clay vessels from Piraeus (most commonly vessels from the potters in Amaroussi) and standardized casserole-shaped cooking vessels (*tsikalia, tsoukalia*) from the island of Siphnos were shipped to Herakleion on the north coast and transported overland via cart and donkey caravan to merchants in the Mesara and frequently to the Saturday market (*pazari*) in Moires. Otherwise, they were distributed by local Cretan sailing ships (*kaikia*) that circumnavigated the island, stopping first at Ierapetra in the Siteia nome before proceeding to Matala. At Ierapetra, these *kaikia* also onloaded *stamnes* or *stamnia* (large water jars) (plate 6.49) and *laia* or *lainia* (smaller water jars) (plate 6.50) from the Ierapetra potters' village of Kendri, which was said to produce the very best *stamnia* (*Ierapetretika stamnia kamoun to kruo nero*, Ierapetra water jars make the coldest water). The Ierapetra *stamnia* were in fact underfired compared with hard-fired Thrapsano, Margarites, and Sivas examples, which while structurally sturdier and functionally longer-lasting, were viewed as less desirable. Older residents in the Mesara recall ships from Egypt that also transported pottery, specifically water jars, to the port at Matala. This recollection refers both to Egyptian traders in their own ships stopping at ports along the south coast (including Ierapetra) and on- and off-loading local (ceramics, carobs, currants) as well as imported products (for example, rum from Egypt), and to local Cretan traders in their own sailing ships with crews of mixed nationality, which came from the direction of Ierapetra (thus, the east, and the direction of Egypt). And finally, clay roof tiles (*keramidia*), both hand-made (*koutsounares*), and machine-made mold-pressed types (*Gallika*) were known to be imported into the Mesara from mainland Greece (*alli Ellada, epano*) via the north coast of Crete. There are also elderly farmers of the Mesara who do not know the source of *any* of the small-scale ceramics in everyday use over the past century.

Thus, Mesara inhabitants went to the coastal locations of Matala, Agia Galini, and Kokkinos Pyrgos (figure 6.2) as well as to the market town of Moires to buy pottery. In addition, Thrapsano, Margarites, and Ierapetra potters peddled large-scale and smaller clay vessels produced in their home centers during additional marketing trips throughout Central Crete, using donkeys to transport to the Mesara quantities of commonly needed vessels such as water jars (*stamnes*). Potters from Margarites are recalled as transporting the multibanded and hatched Margarites type of *pithari* from their village kilns to the Mesara area and selling them to villagers in Pitsidia. And, during their annual production visits from Thrapsano and Margarites, potters employed Mesara inhabitants as helpers, both in production (Magarikari inhabitants recall this activity) and in peddling finished large-scale vessels such as *pitharia* (plate 6.36) from village to village, with two *pitharia* loaded on either side of a donkey.

The types of clay vessels used by nineteenth- and twentieth-century inhabitants of the Western Mesara can be divided into the following groups:

- Storage vessels, namely *pitharia* (plate 6.36) and *kouroupes* (*kouroupia*) that were most commonly described collectively as *kioupia*, and including more specialized vessels such as *imbrikia,* substantial spouted containers for distilled spirits. *Pitharia* were made by visiting potters in container sizes ranging from 150 to 200 to as much as 300 *okades* (*trakosioka*) although 180 to 200 and 250-*oka pitharia* were most common in the Mesara. *Pitharia* were commonly employed for grain (barley and wheat), for water, and less commonly for wine. A type of *pithari* around two meters in height (*bougiadopitharo*) (plate 6.57) was also fashioned for traveling dyers (*bougiatzides*) who worked regularly in the Mesara preparing deep black and dark blue lengths of cloth for men's costumes. *Kouroupes* (more rarely called *pitharakia*), existed in small (twenty-five to thirty *okades*), medium (sixty to seventy *okades*), and large (around one hundred *okades*) sizes and were used to store olives, pulses of all types, vinegars, dried fruits such as figs, currants, and raisins, pig fat and meat products, cheeses, honey (a special *kouroupa* with a double rim as a protective water-well against insects), grape syrup (*petimezi*), prepared sweets (carob/fig mixtures), and other less common elements of the Mesara diet.

- Smaller vessels for everyday and more specialized household use, including *stamnia* (water jars) in three sizes (plate 6.49), *lekania* (bowls), *lekanides* (plate 6.51) (large-scale basins with low walls), *lainia* (plate 6.50) (smaller round-bottomed water containers for home and field), *flaschia* (pilgrim-flask style water canisters carried on pack animals into the field, and rarely made after World War II), *kouroupakia* (small containers used to carry midday meal to the fields), *kanates* and *mastrapades* (jugs and mugs for drinking), *bougadovraschia* (large deep basins for washing), *glastres* (rare except in small sizes) for the planting of herbs by the house, and *piata* (plates) and *tsikalia*, *tsoukalia*, *tsikalakia* (cooking ware), both of which were imported from outside of Crete. Rarer vessels in this category included the *fougou* or *fouvou*, a portable grill, and a clay alembic for the production of distilled spirits (*tsipouro*, *tsikadia*, *raki*), a vessel that is recalled by only the most elderly of Mesara villagers. Cooked midday meals were carried out to the fields in containers made of clay (less common) or of copper (*sefertas*) but only a small number of villagers recall this practice. *Stamnia*, by far the most common household and field vessels, were used in the transport of water from local sources to the home and garden (a task for women), and for the watering of fields (a task for men), and were made in three sizes, small (*mikro* 5 to 6 *okades*), medium (*mesi*, 12 *okades*), and large (*megalo*, 15 *okades*). *Lainia* of 5-kg size were used as water containers in the home, and as water-carriers hung on pack animals and from trees.
- Vessels for use in the stable, the garden, and the field, including the *stamni* for the transport of water and watering of crops, animals, and the home; the *petroflaschi*, a large vessel shaped like a pilgrim's flask that continued to be used on transport animals even into the twentieth century, and which existed as a container made from gourds as well; the *vraschi*, a deep high-walled basin used for watering and feeding animals; and *flaschia, dypselia,* or beehives, low cylindrical containers (plates 6.44 and 6.45) of equal diameter and depth (the central Cretan, or Thrapsano type) that were placed throughout the fields in specially prepared apiaries with stone borders and clean weeded enclosed spaces.

Local resources employed in the production of pottery in the Mesara included *koumoulias*, the very heavy gray earth located in deposits outside of the village of Sivas, and clays located near the church of Agios Stephanos, about 2 km from Matala. This Matala clay was not suitable for the production of *pitharia* and was used only by the local Mesara potter who rarely attempted larger storage vessels.

A number of kilns (*kaminia*), in addition to those of the Sivas potter, were located throughout the plain, and were reused each year by the visiting Thrapsano and Margarites potters. Among these were kilns situated (figure 6.2) below the Kardiotissa monastery (these were held to be commonly used before 1900), in the Kamares area (in the toponym Masa tis Kamares), kilns on the margins of the village of Kouses, in Magarikari (in the area of Kalochorafitis), and at Voroi, examples at the village toponyms of sti Panagia and sta Kaluvia. Clay for the production of *pitharia*, was preferred, however, from the Sivas clay beds.

Each year, a small number of Mesara inhabitants learned the rudiments of *pithari* production by working as assistants (*voethous*) for a daily wage during the annual visits of Thrapsano potters. The average size of a visiting potter's workshop group was four to five, with as many as three of these drawn from the Mesara villages. However, once these annual visits ceased, in the decades after 1960, local knowledge of pottery production was once again restricted to the workshop of the Sivas potter.

Pottery used by monasteries in the Mesara was frequently marked with a cross and thus monastic storage vessels were referred to as *stavropithara* although this type of storage jar could also be procured by secular customers. And, while *kophinides* or reed storage baskets were certainly less costly storage containers that could serve the same purposes as *pitharia*, the large-scale clay storage jars were preferred by most.

New *pitharia* required a breaking-in period before they could be used to store food goods in the Mesara. When first purchased they were placed in the *avli* (courtyard) of the house and filled with water for five to six days. It was stated that *to pithari epine to nero* (the *pithari* drank the water), and the level of water dropped roughly "four fingers worth" during that time period, at which point *to pithari etane hortato apo ugro* (the *pithari* was sated with moisture). In addition, the *pithari* foamed and blew bubbles (*ekame fouskales*) as it soaked up the water for the first six days. Following this first week the *pithari* was emptied and left to dry out (*to adeiasame kai to afiksame na stegnosi*). In addition, to make sure that it had dried out completely, a long period was allowed to elapse before it was used in food storage and a laminar limestone slab was used to seal the mouth of the *pithari*. This process was considered essential: *ekamame afto na zvisei to pithari na einai stereo* (we did this to quench the *pithari* so that it was stable).

A similar settling-in process was employed for all new clay vessels, including *vraschia*, *stamnia*, and imported *tsikalia*. Cooking pots from the island of Siphnos were considered fragile until they had been tempered, and if this was not done, "you heard a piece spalling off from the exterior or interior of the pot" (*akouses na feugei ena kommati apo exo i mesa*). As a further protective measure, the bulb of *Urginea maritima* (the sea squill), known locally as *ascheletoura*, was frequently cut into pieces and rubbed on the exterior surfaces of these imported cooking pots to seal possible manufacturing faults and to increase heat retention. This practice was also important when large cracks resulted from use on hearth fires and in ovens.

Cleaning of clay vessels, both large and small, involved an enormous amount of effort and was carried out with great care, especially in regard to the persistence of microbes and insects that could cause food spoilage in storage. Cleaning large *pitharia* used for the storage of olive oil involved substantial amounts of boiling water containing a heavy admixture of distilled spirits (*tsipouro*). This kept olive oil from permeating the clay and coming to the surface of the *pithari*. Bunched leaves of the fig tree were employed as a scrub brush in all of these cleanings. And, in the initial storage of oil in a newly cleaned or newly purchased *pithari*, the oil was placed in one jar for a period of a month, and then was switched to another to avoid the accumulation of *oxes* (acidity) that plagued olive oil storage until recently (see "Olive Cultivation," above). Equally, *pitharia* and *kouroupes* for grain and pulse storage were cleaned with a mixture of sieved fireplace ashes (*staktes*) and boiling water. To aid in the preservation of this stored grain (barley and wheat) and pulses (all varieties), the farmer would add cuttings from wild sage (*faskomilia*, *sphakomilia*) and Vitex (*lugia*), or fig leaves (*sukofila*) that would help to keep the commodities from spoiling. Vinegar (*ksidi*), kept in small amounts in carefully sealed clay *kouroupes* (and more rarely in glass containers) was always located as far away from the wine containers, whether wooden barrels or clay *pitharia*, as possible, and also at some considerable distance from the olive oil. In many houses it was stored near the *parathuia*, or fireplace, for easy use in cooking.

Ultimately, the potter was an essential participant in the Mesara subsistence system, providing as few as two or three hundred *oka pitharia* (*trakosioka*) (= approximately 380 kg) or many as eight to ten 180–200 *oka* size for the storerooms of Mesara homes. Despite the existence of wooden *cassonia*, reed *kophinides*, wooden barrels, and metal *tenekedes* (small) and *dines* (large) for all types of food goods, the clay *pithari* remained a constant in the material culture of the Mesara until the last quarter of the twentieth century. And although the products of the potter were so important to the functioning of a household, the following verse known in the Mesara and throughout Crete indicates clearly that his labors were not held in high regard:

> *Πάρε ἕνα σταμνί, τοῦ παλαιοθραψανιότι. Που κάνει τα σταμνιά βαριά, Και καταλἓι τήν νιότι*
>
> (Choose a water jar from a Thrapsano potter
> Who makes heavy water jars and wastes
> away youth)

Markets, Merchants, and Craftsmen: Mechanisms of Mesara Trade in Village, Town, and Region

> *Ti na se paro sto Irakleio? Na me pareis ena koulouri* (plate 6.70).
>
> (What should I get for you in Herakleion? Get me a *koulouri*.)
>
> —Query of a Mesara farmer before his marketing trip to Herakleion and the response of his neighbor

Richly recalled details of local trade (*emborio*) and exchange in the late nineteenth- and early twentieth-century Mesara focus on the market town of Moires (figure 6.2) in the northern margins of the plain, at the opening of the hilly land route to Herakleion. Every Saturday the *pazari* or *laiki agora*, an open-air market held in the streets of Moires (plate 6.69) drew villagers with laden donkeys and mules from throughout the Western and even the Eastern Mesara region. Shepherds from villages on the southern flanks of Mount Ida (figure 6.2) went *upokreotikos* (by obligation) to the Moires *pazari* to sell their cheese, meat, wool, goat hair (*tricha*), and other products of herding. All of the villagers of the Western Mesara, from the high mountain flanks to the bare coast south of the Asterousia, acknowledged their strong connections (*schesis, desmos*) with Moires as a social and economic center for the region (*ste perioche*).

Not only were common agricultural products bought and sold at the Moires *pazari*, but seasonal items were available for purchase or exchange with visiting traders (*emboroi*) or with Mesara villagers (*horiani*) who collected wild food products, for example, herbs, wild greens, and freshwater fauna from the *saites* (agricultural water channels) in the locale. Some Mesara inhabitants sold or consigned their bulk produce (grain, olive oil, wine) to local traders, frequently at the Moires *pazari*, even though by traveling individually to Herakleion they could, without this local middleman (*emboros, mesetis*), sell their goods at a higher price and barter at a better rate for imported or hard-to-find products such as sugar and rice.

Travel to and from Herakleion with a pack animal for purposes of sale and/or trade of goods took three days according to most Mesara inhabitants, although a few cite the trip as a two-day sojourn. It was common for villagers to leave the Mesara proper late in the afternoon and to stay that night at a *hani* (inn) (*sta Kyparissia*) in Agia Varvara (figure 6.2), at Avgeniki, at the inn known as *Sto Nikolaki to spiti*, or at an inn located between the northern villages of Sivas and Venerato. Early the next morning the traveler made his way to Herakleion, spent the day carrying out his business, and then returned to the Agia Varvara *hani* late that evening. The following morning he arrived in the Mesara. Some families went rarely to Herakleion and others had personal dealings with Herakleion *emboroi* as frequently as once a week. Traveling to Herakleion was for many a special event, whereby they could procure, in addition to rice, sugar, and other locally hard-to-find goods, the frills of city life, including imported fabrics and ribbons, Malvezi *staphides* (raisins/currants), white bread (*Franzola*), *zaharota* (prepared sweets), *karamelles* (candies), and *koulourakia* (biscuits). It was considered important and courteous (*evgeniko*) to ask what your neighbors might need in Herakleion, and the standard response, as in the quote heading this section, was always the token gift of a *koulouri*, a ring-shaped roll of white flour, coated with sesame seeds, and considered a special treat by all (plate 6.70).

The routes to Herakleion (figure 6.2) chosen by Mesara travelers included:

1. in the villages in the southern part of the plain, for example, from Pitsidia or Listaros,

via Sivas, Petrokephali, Moires, Siderospelia (Pigi), Rouphas, Apomarma (called locally Pomarma), Agia Varvara and thence, via the current route through Avgeniki, Venerato, and Sivas of the north, to Herakleion;

2. from villages on the northern margins of the plain, such as Magarikari, via Voriza, Zaros, Nivritos, Gergeri, Panassos, Agia Varvara and, as above to Herakleion; and,

3. from the villages of Voroi and Phaneromeni, via Rouphas, Moroni, Apomarma, Mouliana, Agia Varvara, and, as above, to Herakleion.

In addition to the main commercial center in the city of Herakleion, Mesara inhabitants were aware of other regional markets such as Arkalochori in the eastern Pediada of Central Crete, and Voukolies Chanion in Kissamou (west of Chania on the north coast). Shepherds in the Idaean villages facing onto the Mesara (figure 6.2) regularly patronized craftsmen in Rethymnon for goods such as animal bells and cheese baskets.

Prior to the 1930s, individual transport of family produce was carried out with laden pack animals (donkeys and mules, and less frequently, horses) (plates 6.16, 6.37, 6.39) but in the years preceding World War II there were occasional mechanized vehicles (called *arabades*) that supplemented, but did not replace, the locally made two-wheeled wooden cart (*karo*) purchased from a craftsman in Moires (plate 6.73) and the rarer four-wheeled wooden wagon (*arabas*) that was usually fashioned in Herakleion. Elderly villagers easily recalled the first person in each village to own a *karo,* and could name with ease all cart or wagon owners, an indication of the social and economic significance of these vehicles in a society dependent upon pack animals. The first mechanized vehicles in the Mesara began to appear circa 1925 to 1930, and roads that could bear this type of transport, such as the one between Voroi and Moires (built in 1928), were also constructed.

Trade (*emborio*), considered by all to be the only means of accruing capital, was also viewed with loudly proclaimed disapproval if carried out on any scale greater than simple village interactions. The *emboros* (trader), therefore, was viewed as profiting from the labor of others. However, individual small-scale trades and exchanges within a village were common, usually formulated on the need for basic commodities, especially toward the end of the agricultural year (for example, running out of grain before the harvest in late May or June; running out of eating olives before the fall harvest; running out of olive oil before the first pressing in the fall), and on the procurement of various special items such honey, nuts, and fruit tree products.

The local medium of exchange (*antallagi*) in the Mesara villages was *ladi* (olive oil) (*to ladi etan to portofoli mas*, olive oil was our wallet [spending power]) which was traded or was used at the village *bakalis* (*grocer*) to purchase necessities. Likewise, any other crop surplus (for example, barley, and more rarely wheat) that could be sold was also called the *portofoli* and was directed when possible toward the purchase of more land (see "Social and Economic Structures in the Mesara Villages—The Values of Life," above).

The ideal in life, as stated above, was neither to buy nor to sell. Elderly farmers emphasized this in their frequent exclamation of: *evgala tin porepsi mou* (I earned what I needed). In this ideal situation, most people preferred not to engage in *emborio*, but aimed for only enough to eat the next day and to offer to a guest (*na prosferei ston mousafiri*). In addition, the ideal level of subsistence was defined for many by the production and storage of quantities of pulses (*eiches tin porepsi spitiou ean eiches polla osprea,* you had what your household needed if you had lots of pulses). Extravillage or extraregional interactions (for example, transporting bulk goods such as other people's oil or wine, on commission, to middlemen in Herakleion) was viewed as participation, specifically for profit, in a more complex trade, an activity that was only possible because of economic and political developments outside of the region.

Trade (*emborio*) in its elemental form was carried out by a range of individuals identified by terms used interchangeably in the Mesara in different social and economic contexts. The flexible nature of the descriptions below reflects a fluid definition of trade and its practitioners in the early twentieth century Mesara:

- *emboros*: The *emboros* was considered a trader, a dealer, and a merchant. Anyone who acted as *emboros*, essentially a middleman, had made a serious commitment to trade for profit. As an example, at one point in the prosperous village of Voroi, villagers recalled approximately thirty individuals who acted as *emboroi* and traveled regularly to Herakleion.

- *planodios*: The *planodios* was a street vendor in Herakleion and other cities (for example, plate 6.70) who engaged in the sale of baked sweets, sherbets, water, hot drinks such as *salepi* in the winter, and other special edibles (chestnuts, etc.).

- *kiratzis*: The *kiratzis* (from the Turkish *kiraci*, meaning freighter, hirer out) traveled to Herakleion with a *karo* (cart) (plate 6.73) drawn by one mule or horse, which could haul up to five hundred *okades* in weight, or with a caravan of pack animals, usually donkeys. Frequently, three to four individuals in a village would join together as a work group (a form of *compania*) to become *kiratzides* and transport olive oil, in 50-*oka asches* (goatskin sacks), via caravan or cart. Wine in bulk was also transported in this fashion. There were only a few of these two-wheeled vehicles in each village of the Western Mesara prior to World War II. More prosperous villages, such as Voroi, had three or four *kara* before 1920. There were three carts in the village of Sivas before the war; in contrast, the village of Listaros had only one *karo* during the same period. The cart was a rare enough (and costly enough) piece of equipment in the Mesara system of trade that in each village the owners of these vehicles before World War II were, as stated above, recalled without difficulty (most individuals before 1930 owned pack animals). The transport of bulk goods was described broadly as *metafora*.

- *agogios*, *agogiatis*: The *agogios* was perceived as a muledriver or a carter.This term was used by some as a synonym for *kiratzis*. The load or burden (*agogion*) transported by the *agogios* was similar to that of the *kiratzis*. *Gkargkanes*, a rarely used term, were traders (*emboroi*) who had two or three animals and transported oil and other bulk commodities.

- *pragmatas*, *pragmatevtis*: This local trader or dealer in wares (a handler of goods) owned a donkey laden with two *sentoukia* (boxlike wooden containers also known as *cassones*) strapped on either side of a saddle. *Pragmatades* did their own vending and came frequently to the Saturday *pazari* in Moires to sell shoes (*papoutsia*) and clothing (*roucha*, *foremata*). One *pragmatevtis* from Sivas was well known for peddling goods from his *sentoukia* throughout the Western Mesara villages.

- *gurologos*: Another Mesara name for peddlers who traveled around in villages was *gurologos*. These were essentially dealers in small wares who hawked their goods, frequently items such as threads and other sewing equipment, via a pack animal, from house to house. This type of vendor was also called a *metapratis* (plate 6.71).

- *metaprates*: *Metaprates* transported a smaller array of goods to Herakleion on commission (for example, a sack of almonds, a container of honey) and brought back ordered goods after taking a percentage of the sale. These individuals had two large *vourries* (sacks) on either side of a donkey that were filled with small commissions from many individuals. *Metaprates* with *vourries* or other woven or built containers such as *sentoukia* also sold cloth (*uphasmata*) and food items to women in the Mesara villages. The term *metapratis* was used interchangeably with many of the others listed above.

Many services in the Mesara were provided by itinerant craftsmen, including the following, all of whom met the needs of individual households on a small, personal scale and became known, especially to the housewives in the region, for their skills and the regular timing of their annual visits:

- *kareklades:* These craftsmen were primarily itinerant, although some did live in villages such as Voroi, and went from village to village repairing wooden chairs, especially the woven rush seats, using local plant materials. They were also involved to some extent in the repair of woven mats (*psatha*) used for various purposes (for example, ceilings) in homes.

- s*tivachtides*: The final processing of wool and, less frequently, cotton before spinning and weaving, or before use as stuffing, involved the annual visit of the *stivachtis* with his *doxari* (a wooden frame with goatskin string) and wooden mallet, tools for the fluffing and expansion of fibers. This activity, in which he dealt with the women of the Mesara households, was also coordinated in earlier periods with the work of the *paplomatas* or quilt-maker, an individual who exists only in the memory of today's elderly farmers. The heavy season for this labor in preparing wool and cotton for use as stuffing in quilts, mattresses, and pillows was concurrent with the *kourres*, or spring shearing of the sheep. One *stivachtis* resident in Pitsidia was frequently cited for his work throughout the Western Mesara.
- *ganomatides*: Tinkers (*ganomatides*) usually descendants of craftsmen from Anatolia (they were referred to as *Mikrasiates*) or from the northern parts of mainland Greece (especially Ioannina and Thessalonike), went from house to house relining tinned copper pots and pans purchased primarily from the copperworkers in Herakleion. These cooking and baking vessels were once important in the kitchens of Cretan homes, and in prosperous villages, as many as twenty or thirty copper vessels might be found in the living area of a house. As a result of heavy use, many of these needed annual tinning, an activity carried out by the *ganomatis* using a portable bellows over a temporary fire built in a household courtyard or other outdoor location. The current absence of these copper vessels (*bakiria*) from the material record of Crete (there are now comparatively few visible in contrast with mainland houses) is a result of the sale of many such traditional items during the economically difficult period of the *katochi* and after World War II. Some of the Mesara *ganomatides* lived in Moires and others in Herakleion. Occasionally, tinners from northern Greece traveled to Crete for finite periods and worked from village to village.
- *bougiatzides:* Traveling cloth dyers (*bougiatzides*), some of them resident in the Mesara, were essential to the outfitting of Mesara farmers, most of whom wore *vraches*, a workday pair of gathered baggy breeches (plate 6.8) requiring many meters of sturdy cloth. These fabrics were usually dyed black or deep blue in specially made clay jars (plate 6.57) called *bougiadopithara* that could hold many lengths of wool or cotton cloth. *Bougiatzides* also dyed the fabrics for women's clothing and for other household items. These craftsmen worked in union with *terezides* or *raftes,* tailors of men's costumes (*salvaria*) and seamstresses (*modistres*) for women, who produced clothing from these freshly dyed fabrics on commission.

Other services provided in the late nineteenth- and early twentieth-century Mesara included traveling individuals who purchased leftovers from annual agricultural production and storage, or who purchased, for merchants elsewhere in Crete, agricultural produce in bulk:

- *trigades*: The lees of olive oil that had settled in the bottom of *pitharia* were collected annually by *trigades* (a few called them *fetzades*) who went from house to house literally cleaning out the dregs of the oil from nearly empty clay jars. They assembled this waste material (*kathoura*) in goatskin sacks (*asches*) in the late summer/early fall and sold it to soap-makers (*sapounopoioi*) in local production establishments, for example, at Pobia, or even to lye-soap factories in Herakleion outside of the plain.
- *fetzades*: The lees of the wine, referred to in the Mesara as *fetza vareliou,* or *zahari vareliou*, were collected by itinerants called *fetzades* who paid for this "hard sugar" and sold it at what were considered costly rates. The lees were *kopanizmeno* (beaten) as a sweetener. This annual collection from barrels, and more rarely *pitharia,* took place just before

the production of new wine in the late summer and was followed by the thorough cleansing of the storage containers.

- *ladades*: Individuals who traveled throughout the Mesara region as agents for agricultural commodity traders in main centers (for example, Herakleion) thrived in the early twentieth century. Oil merchants (*ladades*) in Herakleion stored quantities of purchased olive oil in massive metal containers (*dines*) and in clay jars (*pitharia*) for later trade and sale (see Blitzer 1990a for a description of this bulk storage of oil by *ladades* in Crete). The oil was then sold as prices fluctuated in the wider market of the Mediterranean, and the economic welfare of these merchants was ultimately dependent on factors operative outside of Greece (for example, the oil needs of French soap factories in Marseilles).

In addition to itinerants providing goods and services, established local craftsmen in villages and in the market town of Moires provided goods and services particularly within the Mesara. Prominent among these were:

- *aletrades:* The *aletras* was essentially the plow-maker, but also the producer of many other agricultural tools, including the animal yoke (*zugos*) (plate 6.9) and threshing equipment (sledges, forks, shovels). The production of this woodworking craftsman overlapped with that of the *marangkos* (carpenter).
- *marangkoi:* The carpenter (*marangkos*) who could be involved in the manufacture of agricultural tools, including yokes and plows, might also produce threshing sledges of local plane and imported pine wood and threshing forks (plates 6.14, 6.21) as needed. The village carpenters (in Voroi, Magarikari, Petrokephali, Pitsidia, and Kouses, for example) also produced a wide variety of wooden household equipment such as *caselles* (storage bins) and *skaphides* (carved wooden basins) and were on call for construction purposes.
- *charchides*, *siderourgoi:* Ironworkers (*charchiades*) in villages such as Voroi, Petrokephali, and Pitsidia worked with hand-operated bellows in the early years of the twentieth century to produce iron tools. A wider array of metal agricultural implements was available in cities such as Herakleion, where the ironworker was known most commonly as the *dermitzis*. Metalworking craftsmen known as *albanides* made iron shoes for animals in the villages (in Voroi and Petrokephali among others) as well as in Moires and Herakleion;
- *kophinades:* Basket-makers (*kophinades*) existed in villages throughout the Mesara, including Phaneromeni (which was well-known for the quality of its woven containers) and Voroi, as well as Herakleion. Regional centers such as Gonies Pediados in the Lasithi nome were also cited in the Mesara for the quality of their heavy-duty transport baskets, including *kofes*, made of *lugaria* (*Vitex agnus-castus*) or *schinos* (lentisc) (plate 6.37), and *petrokofinia*, made of storax (*astirakas*). Eel traps made from sedge and rush and fish traps (*kertaria*) made of various woods including myrtle (*Myrtus communis*) for freshwater fishing (plate 6.55) and other woven fishing equipment such as *paragadia* (reed baskets with multiple-hooked fishing lines) were also produced as needed in the Mesara. *Kophinides,* large split-reed storage baskets with an ox-dung lining, split reed cheese-molds (*madaria*), open-mouthed *panieria* (made of sedges or the stems of wheat and barley), and other smaller baskets could also be ordered. Many shepherds in the margins of the Idaean Mountains preferred wheel cheese (*kephalotyri*) molds made of olive and grape cuttings bound with sedges by Rethymnon craftsmen. Others cited the basket production center at Gonies Pediados for the durability of their cheese mold baskets.
- *upodematopoioi, tsangarades:* Footwear for labor in the fields as well as for Sundays was produced by shoemakers (*tsangarades*) and boot-makers (*upodematopoioi*) resident in Voroi, Agios Ioannis, Petrokephali, Pitsidia, Kouses, and other villages. Everyday boots (*botes*) were fashioned for both men and women of thick heavy leathers, but highly polished Sunday boots for men (*stilvania*)

were a source of pride for villagers. Shoemakers were also responsible for the sewing of goatskin sacks (*asches*) used in the transport of olive oil and wine, and in the storage of liquid forms of cheese such as *mizithra.*

Household handmills (*cheromyloi*) (plate 6.20) were fashioned of a local conglomerate in the Western Mesara by a Kamilari craftsman cited for the excellence of his product. Virtually every household in the Mesara owned a handmill. Likewise, in Kamilari there was one *varelas* (barrel-maker) who provided, via the use of local and imported oak planks, many of the wine barrels in use during the early twentieth century. Saddles (plate 6.37) were made by local saddlemakers (*somarades* or *samarades*) who lived in many of the Western Mesara villages (Magarikari, Petrokephali, Kouses, Pitsidia among them) and were constantly on call for repairs to this heavily used and essential piece of equipment.

Within most villages there was a general dependence on the *kafetzis* (cafe owner) who might also serve as the *bakalis* (grocer) for immediate necessities such as matches, some canned goods, and other small items. The local butcher (*hasapis*) would also be a regular source of meat for more prosperous families.

Individuals who ran olive mills (*elaiotrivades*) were also usually farmers who had added on a room or used an already existing space to run a mill. The olive mill owner took 10% of the oil from each sack of processed olives just as the water mill owner charged 10% of each sack of grain milled. The *mylonas* at the water mills of the Mesara (for example, at Zaros, Phaistos and Petrokephali) was a necessary figure for biweekly grinding of grain in the production of a sufficient amount of dried bread (*dakkos*) for the family.

Builders (*ktistes, oikodomoi*) and plasterers (*sofades*) were either settled members of the Mesara community or were traveling craftsmen, as in the case of Karpathiote builders (see "House and Home," above) who might then pass on their skills to locals who assisted them each year.

Charcoal production (plates 6.63–6.67) was carried out in and around the Western Mesara by itinerant charcoalmakers (*karvounades*), frequently from the island of Ikaria in the Dodecanese, and by Mesara locals who learned the process by working as helpers, and then attempted it on their own. In villages such as Kamares, with access to substantial wood supplies, the thicker branches of the carob (*haroupia*) and of the wild olive (*argoulida*) were the most commonly used fuel in charcoal production. In Magarikari, where locals and Ikariotes engaged in this activity, the scrub form of *prinos* (Kermes oak) which took at least four years to grow back, prunings from domesticated olives, and cuttings from wild olive were employed. In Sivas, locals and Ikariotes worked together using all types of wood as available. In Listaros, this activity was considered essential to annual subsistence. In Voroi, *karvounades* worked at the topothesia *Lochria*. Two locals occasionally worked as charcoal makers locally, but until the decades after 1960 (when Mesara inhabitants began to cut down the centuries-old *chondroelaies*) there was not enough wood to make it practical or profitable. The woods used, in addition to domesticated olive prunings, were heather (*erika*), wild carob, wild olive, wild pear, and lentisc.

And finally, there were fishermen, *psarades,* primarily at the port of Matala, who peddled small catches of fish within the Mesara and provided other useful materials including sea salt. Shepherds from the Idaean Range who spent long periods in the southern margins of the Asterousia were also suppliers of salt to the Mesara communities.

There were possibly as many as ten *kaikia* (sailing vessels) for fishing in the Mesara before World War II. At Matala, ten- to twenty-ton sailing vessels with three to four sails called in regularly for trade, with smaller craft in evidence as well. In addition to local fishing, fishermen provided shellfish (*cochlious*) such as limpets (*petalides*) and murex (*skulakia*) for use as food. Freshwater fishing took place in the Ieropotamos where the river was blocked off (villagers made a weir called a *parapotamo*) and they fished with their hands. From *saites* (water channels feeding into the Ieropotamos) eels, frogs, and crabs were also collected, usually by farmers.

In summary, at any one time, the more prosperous villages within the Western Mesara had a substantial number of craftsmen. In the village of Voroi, for example, before World War II, there were the following individuals, and sometimes more than one of each: cafe owner, plasterer, carpenter, saddlemaker, shoemaker, ironworker, dyer, basketmaker, bootmaker, builder, tailor, quiltmaker, chairmaker and repairer, as well as people who worked in lime and ceramic production. In contrast, in the same period, the more sparsely populated village of Listaros on its recalcitrant soils had a carpenter and individuals who worked in charcoal and lime production.

Day Labor

Day labor with a daily wage called *emerokamato* or *emeromisthio* was not uncommon in the Western Mesara, especially among villagers with poor landholdings who might work for more prosperous families owning many parcels of land. Before World War II, in villages such as Kouses, the daily wage was two *okades* of oil, then called the *trikourpo*. In 1918 and 1919 the *emeromisthio* was eight drachmas. Pitsidia inhabitants recall their parents and grandparents journeying as far west as Kastelli Kissamou in the Chania nome to work during the olive harvest, at a point when "there were few olives in the Mesara Plain." Western Mesara villagers traveled west along the south coast of Crete to Palaiochora in Sphakia to work during the olive harvest and to be paid in oil. Elderly inhabitants recall the early twentieth-century journey of a Pitsidia woman to Selino in Sphakia to collect olives for the entire season with a final payment of ten *okades* of oil.

Others from Pitsidia went with *asches* to sell oil in Agia Galini. In the Mesara itself you could cut wild wood in the area of Kaloi Limenes (figure 6.2) and then sell it in Moires. One *forteio* (*gomari*) of wood would bring in twenty-five drachmas or could be traded—approximately sixty *okades* of wood for five *okades* of potatoes. In Pitsidia, people sold cheese, wool, and meat for additional income. In Listaros, family members went to the Pediada in Central Crete to work the olives when there was a specific need. Asvous in Arkadi (in the Rethymnon nome) was cited as a work possibility during the annual grape harvest. Movement of Mesara villagers for day labor not only involved a public admission of the needs of the family, but absences from home that placed additional stress on the family structure and its ability to subsist.

Trade Connections Within the Plain and Without

Trade by Land

Based upon the needs of the family, and the limited free time available to a Mesara farmer, he might decide to peddle small amounts of his household produce elsewhere in Crete or exchange it for local specialties in other regions. Pitsidia villagers themselves sold wine and *raki* to inhabitants of the Lasithi Plain, and while there, might trade their goods for Lasithi potatoes or other vegetables. In equal fashion, Lasithiotes traveled regularly into the Western Mesara to sell their potatoes and to trade for Mesara goods. Sphakia villagers were known for coming to the Moires *pazar*i to sell clothing. East Cretans from the Isthmus of Ierapetra traveled as far as the Mesara to sell ropes made of *Lygeum spartum* (*silos*) used particularly for wells and for other agricultural activities. Basketmakers with a sufficient stock of goods, such as those from Gonies Pediados in the Lasithi nome, might move from village to village in the Mesara selling their products and taking special orders for new ones.

On a broader scale, there was trade by land between Symi in East Crete, to Moires, and later (after World War II) to Tymbaki. Venerato, on the land route to Herakleion, was cited as an important place for commercial interaction. The short distances of land routes were emphasized by all; longer-distance trade was, by definition, sea trade. Magarikari inhabitants went themselves to Herakleion to sell *asches* of oil, and many families in Voroi carried out the selling and trading of their own goods without middlemen. In individual sales, Mesara villagers purchased sheep and goats in Sphakia (in West Crete) and in return, visiting Sphakiotes purchased barley, wheat (more rarely) and pulses from farmers in the Mesara. Shepherds from the Idaean villages such as Kamares or Voriza might bypass the Moires market and sell their cheese directly to *emboroi* in Herkleion. Listaros inhabitants sold the rare excess barley and oil from their village in Herakleion and made purchases there as well as in Moires, and at the Sivas grocers.

Trade by Sea

The importance of Matala as the primary Mesara port in the late nineteenth and early twentieth centuries is evident in the perception of elderly villagers. Both large and small sailing craft stopped regularly at Matala with its *teloneion* (customs house) in their circumnavigation of the island. From as far away as Charakas and villages beyond it (*pros to kato*) in the Eastern Mesara (figure 6.2) farmers came to Matala to sell goods. *Pirines* (crushed olive stones) from the production of oil were regularly consigned in bulk to Matala storerooms (*apothekes*) by villagers from throughout the Western Mesara who also traded specifically for items that had been deposited there by passing ships. It is only in the case of shepherding villages on the southern flanks of Mount Ida that the remembered contacts with Matala are few, or nonexistent. Voriza (figure 6.2), Kamares, and Zaros villagers stated that they had no direct contact (*den eichame skesis*) with Matala. All other villages in the plain appear to have been in regular contact with the port.

The storerooms (*apothekes*) at Matala were filled with Mesara-produced *pirines*, carobs, barley, oats, and, less rarely wheat, for trade and shipment. As farmers deposited these bulk items on commission for trade at Matala they had access to imported pine and cypress (*kyparissia*) beams (*traves*) brought in by ship from Sphakia and pottery transported by sail from Ierapetra (Ierapetra *stamnia* were much desired) and elsewhere in Greece (including Siphnos and Athens). It was also possible to purchase clay vessels from Thrapsano (Central Crete) and Margarites (West Crete) potters at the Matala port. On occasion, farmers could leave short-term items such as fresh grapes for trade with the Sphakia middlemen who then deposited cypress beams and picked up quantities of grapes or grain for their return to Sphakia. The exchange between the Mesara (a source of grain) and Sphakia (a source of cypress wood) was well-defined in the memories of Mesara farmers.

Sailing craft from Egypt also made stops along the south coast of Crete and brought clay vessels to Matala after having put in at Ierapetra. Many elderly Mesara inhabitants did not know the origin (Ierapetra, Siphnos, or Athens) of the clay vessels transported by these Egyptian merchants. This local ignorance of the actual production source of specific ceramic and other goods is a revealing element of late nineteenth- and early twentieth-century trade in the Mesara.

While Matala was referred to by all as the *protos limin* (major harbor) (figure 6.2), after World War II both Agia Galini and Kokkinos Pyrgos were also important to the region. A repeated theme of Mesara elders is the memory of regular trade with Egypt in the late nineteenth and early twentieth centuries. Sailing ships (*kaikia*) with traders, (frequently the captain and the trader were one and the same), came from Egypt to the Matala port to purchase carobs, grain, and *pirines*. In addition to carrying ceramics from the Ierapetra port, they brought wood (probably from Sphakia) and also high-quality barrels of rum (*roumi*) made of a much admired oak (*druias*).

Most Mesara elders believed that the Egyptian ships came via Libya (this was cited as their route). Others recalled the regular back-and-forth trade between Matala and Marsa Mantrucha (Marsa Matruh, in Egypt) and some stated that Greeks lived there. The sailing craft from Marsa Mantrucha purchased fresh grapes at Matala and returned immediately to Egypt. In a more general way, Mesara elders recall "Arabs" and *mavrous* (blacks) who sailed to Matala to buy and sell. The Matala *teloneion* was clearly an active port for trade in the late nineteenth and early twentieth centuries.

Table 6.13 illustrates the types of goods moving through the Mesara economic system and the individual interactions that characterized their distribution.

TABLE 6.13. Mesara commodities

Crops and Crop Products	
Wild olive trees for domestication	SOLD to Mesara inhabitants by villagers from Idaean range
	SOLD to Mesara inhabitants by water mill owners
Olive oil	BOUGHT day labor from those who had run out of their own oil
	SOLD to villagers who had run out of oil (Voroi always had oil for sale)
	SOLD to travelling agents for oil merchants in Herakleion
	SOLD at Saturday *pazari* in Moires to local and regional traders who then transported oil in goatskin sacks (*aschia*) of 40 to 60 *okades*, via donkey caravan to Herakleion, where it was sold to city traders
	TRADED within each village for other commodities, e.g. At village store and among families (*to ladi etan ta lefta mas*), a standard element
Olive oil lees	SOLD to *trigades* annually in August/September (before the storage of newly pressed olive oil) by *fetzades* (also called *trigades,* travelling dealers)
	SOLD by *trigades* to soap factories in Pobia, and later in Agia Galini and Tymbaki
	SOLD by trigades to large scale soap factories in Herakleion
Crushed olive stones (*pirines*)	SOLD to middlemen with storerooms in Matala
	SOLD to *pirenelaio* factories that removed remaining 7%of oil
	TRADED to lime kiln production groups in exchange for lime
	TRADED to potters in exchange for storage and household vessels
Grapes (fresh)	SOLD to traders in Matala for transshipment off-island (e.g., to Egypt)
	SOLD to villagers who did not own vines for wine production
Grapes (dried)	SOLD on consignment or outright to traders in Matala
	TRADED to middlemen who transported to Herakleion
Wine and distilled spirits	SOLD to central east cretan villagers by farmers themselves
	TRADED to central and east Cretan villagers via middlemen
Wine lees	SOLD to wine lees collectors annually
Barley	SOLD at Saturday market in Moires to Mesara inhabitants
	SOLD to regional traders in Moires who then shipped via pack animal to Herakleion
	SOLD or TRADED to middlemen with storerooms in Matala and shipped to Sphakia
	TRADED via consignment to Sphakiotes
Wheat	SOLD by consignment to Sphakiotes
	TRADED by consignment to *apothekes* in Matala and exported to Sphakia
Potatoes	BOUGHT directly by Mesara inhabitants in the Lasithi plain
	SOLD to Mesara villagers by visiting Lasithiotes
Pulses	BOUGHT by Mesara villagers with olive oil when annual supply had run out
	SOLD to Sphakiotes from *apothekes* in Mesara
Carob	SOLD or traded on consignment to traders in Matala
	SOLD or TRADED to traders in Moires for shipment to Herakleion

Continued on next page

TABLE 6.13. Mesara commodities (continued)

Livestock, Equipment and Secondary Products	
Sheep and goats	BOUGHT from Sphakia shepherds
Wheel cheese	SOLD and traded to villagers throughout Mesara
	SOLD to traders in Moires at Saturday *pazari*
	SOLD to traders in Herakleion by individual shepherds from Idaean villages
	TRADED for necessary equipment such as *toupia*
Mizithra and yogurt	SOLD and traded to villagers throughout Mesara
	SOLD to traders in Moires at Saturday *pazari*
	SOLD to traders in Herakleion
Wool	SOLD and traded to villagers throughout Mesara
	SOLD to traders in Moires at Saturday *pazari*
	SOLD to traders in Herakleion
Skins	SOLD to shoemakers to be made into *aschia* and *touloumia*
	SOLD to traders in Herakleion
	TRADED to middlement in Moires
Animal bells	BOUGHT from craftsmen in Herakleion, Rethymnon, and Chania
	BOUGHT from merchants and craftsmen in villages and Moires
	TRADED for with cheese from merchants in all locations
Bagpipes	SOLD on commission in Voriza and Zaros
Wild Food and Natural Resource Products	
Eels and crabs	SOLD within villages and at Moires *pazari*
Salt	SOLD by shepherds and fishermen throughout Mesara
Fish	SOLD at Matala and peddled throughout villages
Lime	SOLD by local *companies* in Mesara
	TRADED by work group members for goods and services
Charcoal	SOLD to *kafeneio* owners in Mesara
	SOLD to middlemen in Herakleion and transported there by traders
	TRADED by work group members for goods and services
Firewood	SOLD to villagers throughout Mesara
	TRADED for needed commodities late in year when supplies have run out
Production, Storage, and Transport Containers	
Barrels	SOLD in Moires *pazari* by visiting craftsmen from Herakleion
	BOUGHT or TRADED for from local craftsmen in Kamilari or Agia Galini
Transport baskets (*kofes, petrokophinia*)	SOLD in Moires *pazari* by visiting craftsmen (e.g., from Gonies Pediados
	BOUGHT or TRADED for from Gonies Pediados craftsmen
	BOUGHT from middlemen in Moires or Herakleion
Cheese mold baskets (*toupia, madaria*)	SOLD by craftsmen in Rethymnon, Herakleion, and Gonies Pediados
	BOUGHT or TRADED for from craftsmen using commodities
	TRADED for with commodities in Moires *pazari*
Baskets (all types)	BOUGHT by local Mesara inhabitants directly from craftsmen or in Moires
	SOLD by local Mesara craftsmen at Moires *pazari*
	TRADED for with local commodities in villages and in Moires

TABLE 6.13. Mesara commodities *(continued)*

Production, Storage, and Transport Containers *(continued)*	
Eel traps and fish traps	BOUGHT or traded for from craftsmen in Voroi and other villages
Clay storage jars	SOLD in Moires and in Matala storerooms
	SOLD by Margarites and Thrapsano craftsmen who peddled their wares within the Mesara
	BOUGHT from Margarites and Thrapsano craftsmen who manufactured jars on annual visits
	TRADED for with Mesara commodities during annual production visits
Smaller clay vessels (water jars etc.)	SOLD by visiting craftsmen (from Margarites, Thrapsano, and Kentri) peddling wares via pack animal in Mesara
	SOLD by middlemen at Matala port and in Moires
	BOUGHT from Sivas potter
	TRADED for commodities from Sivas potter
	TRADED for with commodities from Ierapetra potters
	BOUGHT on consignment (plates from Syros) via Matala middlemen
	BOUGHT on consignment (cooking pots from Siphnos) via Matala middlemen
	BOUGHT (Siphnos cooking pots) from Moires merchants *tsoukalia* (clay cooking and baking casseroles) produced in Siphnos were shipped to the port at Matala via traders who circumnavigated Crete, and were sold to Mesara villagers from there; *tsoukalia* were also shipped to Herakleion and brought by *caro* or caravan to the Mesara
Household Goods and Equipment	
Copper vessels	BOUGHT from copperworkers in Herakleion
	TRADED for with oil, cheese, or other commodities in Herakleion
Knives	BOUGHT from knife makers in Moires and Herakleion
	TRADED for with oil, cheese, etc. in Moires and Herakleion
Metal agricultural tools	BOUGHT from ironworkers in villages, Moires, and Herakleion
	TRADED for from ironworkers in villages, Moires, and Herakleion
Shotguns	BOUGHT or TRADED for in Matala port; imported from outside of Crete
Wooden spoons, large and small	SOLD by shepherds in Moires *pazari*
	TRADED for with Mesara commodities in villages and Moires
Cart (2 wheel)	SOLD by local carpenters and wheelwrights in Moires
Wagon (4 wheel)	SOLD by carpenters and wheelwrights in Herakleion
Agricultural tools (threshing sledge, plow, yoke, threshing fork and shovel, *kopano*)	SOLD by Agia Varvara craftsmen at Moires *pazari* (threshing forks)
	BOUGHT or TRADED for from merchants and craftsmen in Moires
	BOUGHT or TRADED for from merchants and craftsmen in Herakleion
Wooden bowls	BOUGHT or TRADED for from local Mesara carpenters
Wooden beams, and cut wood (cypress and pine)	BOUGHT or TRADED for from local middlemen in Matala
	BOUGHT or TRADED for from Sphakia middlemen
Handmill	BOUGHT or TRADED for from Kamilari craftsman
Goat-hair string or cord	BOUGHT from craftsman in Eastern Mesara
	TRADED for from craftsman in Eastern Mesara

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TABLE 6.13. Mesara commodities *(continued)*

Household Goods and Equipment *(continued)*	
Rope made of *Lygeum spartum*	BOUGHT or TRADED for from visiting makers from East Crete (exchanged for Mesara commodities)
Cloth (fabric by meter)	SOLD at Saturday market (*pazari*) in Moires
	SOLD in Mesara by local and outside *metaprates* with pack animals laden with large *vourries* (cloth sacks) on both sides of saddle
	TRADED for or purchased in Herakleion during trips to city for sale of commodities
Clothing	SOLD by Sphakiotes at Saturday *pazari* in Moires
	TRADED for (with olive oil) by local Mesara inhabitant who sailed to Smyrna, bought bulk clothing, and returned to peddle it in the Mesara
Sweets and candies	BOUGHT or traded for in individual marketing trips to Herakleion
	SOLD by peddlers with pack animals to villagers throughout Mesara
Millstones (for grain mill)	BOUGHT from producers on island of Melos

AFTERWORD

This study of subsistence, with its specific emphasis on man-land relationships within the Western Mesara region of Crete, not only illustrates the complexity of human interaction with the natural world in a premechanized system, but demonstrates how this complexity was reflected in patterns of human behavior. In effect, this text attempts to display all of the parts of a relict system of living and how they relate to one another. As interrelated elements of a definable cultural whole, these parts resist the preconceived notions of any researcher and demand not only extensive background preparation, but also consistent and regular validation and revalidation in the practice of fieldwork. A theoretical override, necessary in the short-term, targeted ethnographic recording of only one, or a few systemic elements of a recent culture (and now the fashion in such archaeology-driven fieldwork) has no appropriate role in this type of study.

The early modern history of the Western Mesara and of Greece frequently forced many of the patterns of cultural development we see in the late nineteenth and early twentieth centuries. Disturbances such as the uprisings and destructions of the last half of the nineteenth century in Crete (see chapter 14), the population exchange of 1923/1924, and the *katochi* beginning in 1941 literally disrupted and dispersed many of the material correlates of Western Mesara culture and in some cases resulted in the almost complete loss of entire assemblages of objects within the region. As an example, during the economic deprivation of the German and Italian occupations, categories of inherited and valuable accumulated material goods (for example, copper vessels, woven goods from dowries, jewelery, elaborate forms of clothing for feast days, inherited and imported ceramics) were sold in exchange for food, to dealers who then marketed these traditional objects in the wider context of Athens and Europe throughout the twentieth century. During this period, belongings of immediate cultural and local ideological value thus disappeared more rapidly from the material assemblages of the Mesara than they might do under ordinary circumstances.

As such, this study raises some additional issues about generalizations relating to the archaeological past. The concept of environmental degradation, now so popular in our perceptions of antiquity, perhaps needs reconsideration in light of beneficial agricultural and cultural advances resulting from erosional episodes in the Western Mesara. Our assumptions about the cultivation, processing, and storage of foods in the past are also in need of questioning, given that many food-processing activities are based on the necessity to make do, using detailed knowledge of local resources, in an unyielding natural environment or sociopolitical context.

This attempt to reconstruct a history from below is a humbling experience. The ebb and flow of the knowledge of natural capital within the Western Mesara region was clearly an important element in the development of culture, but it cannot compete with the overriding effects of social and political structures. And while there are no completely accurate paradigms for the past, the shaping of this post-Ottoman population in the Western Mesara resides firmly and prominently in the category of essential knowledge for any archaeological researcher in the region. I extend here my gratitude to the elders of the Mesara for their unending kindness, and I dedicate this work, their life, to them μέ τιμή.

Part III:
Prehistoric Settlement and Society

7

Initial Growth in Social Complexity (Late Neolithic–Early Minoan I)

L. Vance Watrous and Despoina Hadzi-Vallianou

In the first part of this chapter, we consider the settlement data gathered by our archaeological survey (with our site numbers rendered in **bold type**), and other aspects of Late Neolithic society in our region, including subsistence, social organization, and exchange. In the second part, we examine the Early Minoan I settlement expansion, the introduction of polycrop agriculture, craft specialization, and emergent social hierarchy.

The Late Neolithic Period: Settlement Data, Land Use, and Trade

The earliest signs of human habitation within our survey area are nine settlement sites of the Late Neolithic period, circa 4000–3300 BC (table 7.1). Two additional sites (**106** and **108**) were identified just outside the survey zone. To the southwest of our area, the Kommos survey (Hope Simpson et al. 1995) produced an additional three Late Neolithic sites, bringing the total of known local Late Neolithic sites to fourteen (figure 7.1). Late Neolithic sites have been identified on the south coast at Kaloi Limenes (Vasilakis 1987), on the Gortyn acropolis, at Kannia immediately south of Gortyn (Vagnetti and Belli 1978), at Miamou Cave (Taramelli 1897), at Kamares Cave (Taramelli 1901b; Pendlebury 1965:44) and near Agios Kirillos (Sakellarakis 1968) (figure 7.2). Also, it is certainly not a coincidence that all of the Late Neolithic sites discovered by our survey were in areas of minimally eroded Entisols: an unknown number of Late Neolithic sites must be hidden under local alluvial and colluvial mantles (see chapter 4).

Phaistos (site **1**), first settled during the Late Neolithic period, was probably the largest settlement in the region. The Italian excavators reported finding Late Neolithic pottery and walls in their trenches across the ridgetop now occupied by the Minoan palace, on the south slope, in the west court area, south of the Italian School storerooms, and on the east slope of the hill (called Chalara). Discounting the Chalara finds as slope wash, one arrives at a minimum size of approximately 20,000 m^2, perhaps 2 ha, for Late Neolithic Phaistos, or about the size of the Neolithic village of Sotira Teppes (Areas I–V) in Cyprus (Dikaios 1961: Plate 4). If one estimates thirty to fifty persons per hectare (see chapter 1), the Late Neolithic settlement at Phaistos would have had a population of sixty to one hundred persons, although, for reasons discussed below, it is far from clear that all of its inhabitants were often present together at the site. In addition, Phaistos was not the only large settlement in the Western Mesara, as site **48** near Kamilari may have reached similar dimensions.

The village-sized settlement at Phaistos was large relative to other local sites (with the possible exception of site **48**). Late Neolithic settlement hierarchy (figure 7.3) in the Phaistos–Kommos area consisted of one, or possibly two villages, three hamlets, six farms, and three field sites. However, given the length of the Late Neolithic period, there is little assurance that all of these sites were occupied contemporaneously. Additionally, most of the smaller sites probably

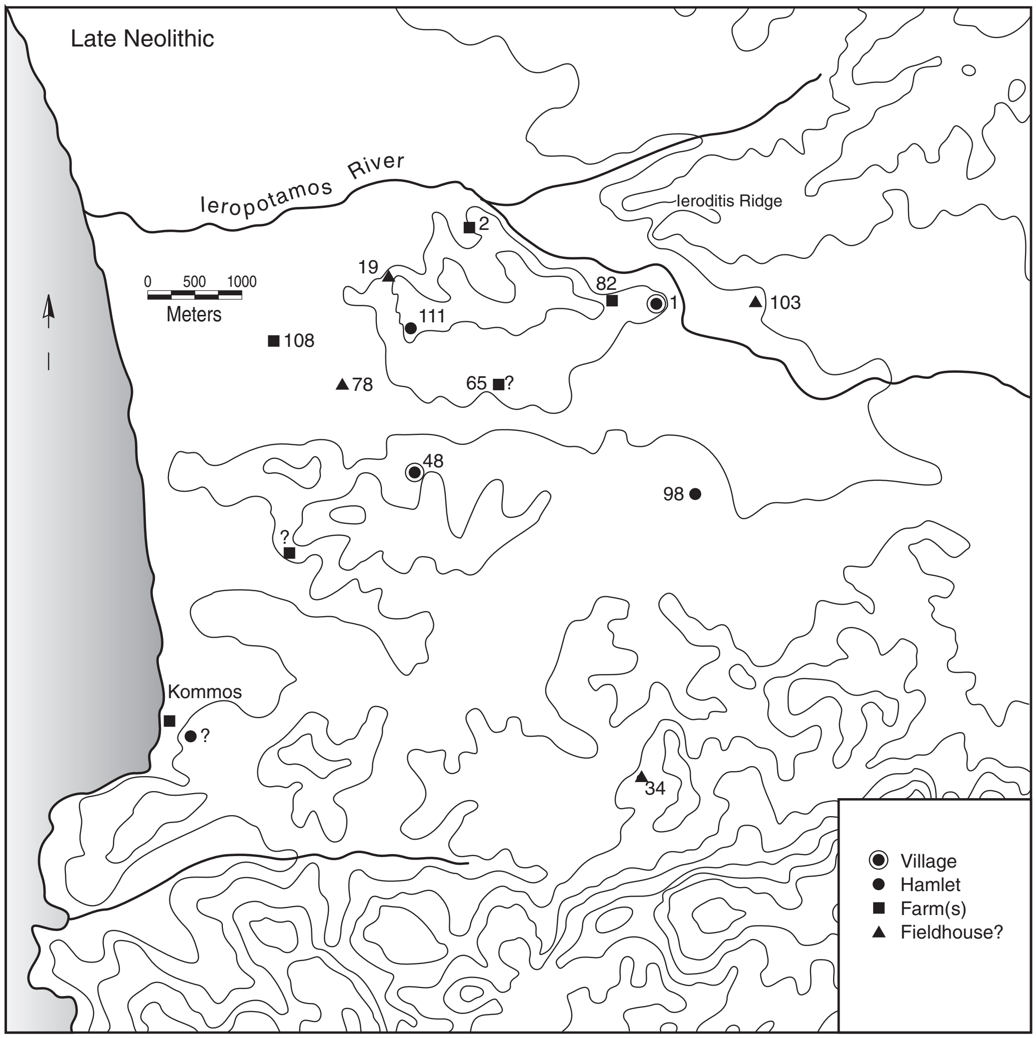


FIGURE 7.1. Late Neolithic sites in the Western Mesara. Kommos survey sites unnumbered.

TABLE 7. 1. Late Neolithic sites in the survey area

Site	Size	Land Class	Function
1	200 x 200 m	I	settlement
2	small	I	settlement
19	15 x 40 m	I	settlement
48	120 x 30? m	I	settlement
65?	70 x 40 m	I	knapping/habitation site
78	1 x 2 m	II	camp site?
82	20 x 20 m?	II	settlement
98?	150 x 60 m	I	settlement
103	30 x 30 m	I	settlement

A question mark following an individual number (i.e. site 48, 120 x 30? m) refers to the uncertainity of that specific measurement (30?), whereas a question mark at the end of the complete site size (i.e. site 82, 20 x 20 m?) indicates the uncertainity of the entire calculation.

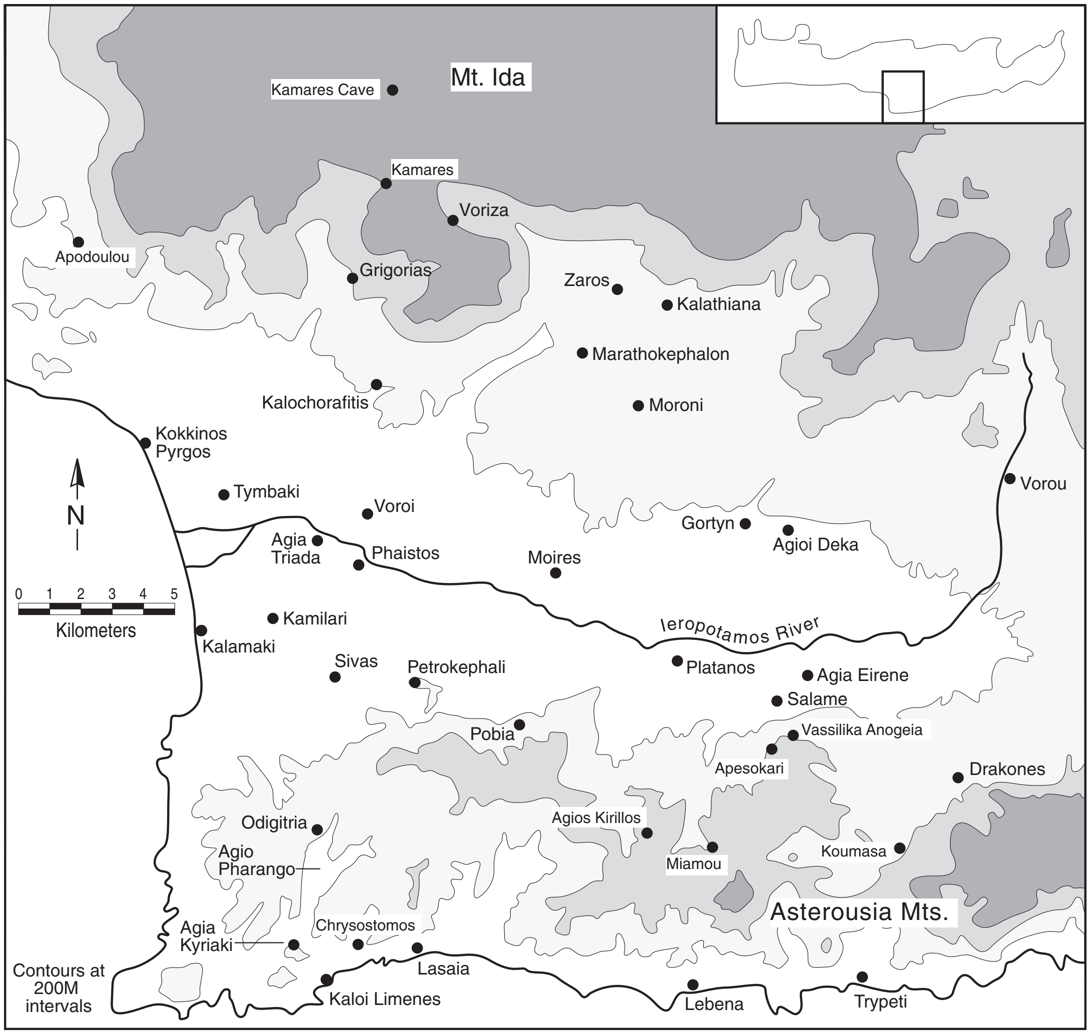


FIGURE 7.2. Map of the Western Mesara, showing LN sites.

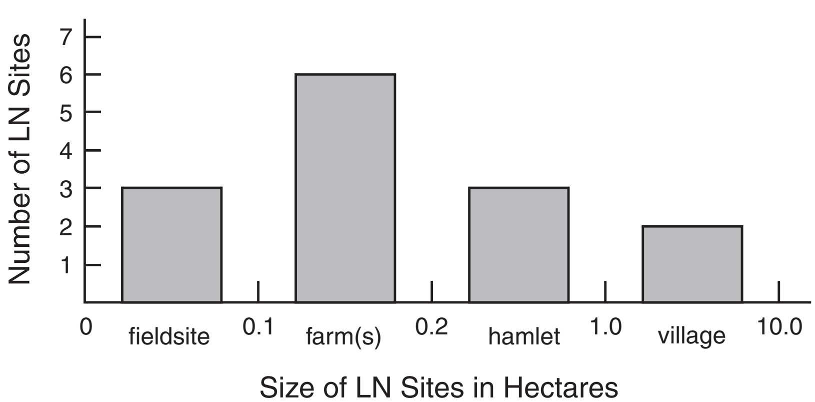


FIGURE 7.3. Late Neolithic settlement hierarchy in the Western Mesara (including the area of Kommos)

represent relatively brief seasonal occupation. Located at an outcropping of chert, site **34** was used for the knapping of stone tools (see appendix C). Seven of the eight Late Neolithic settlements (table 7.1) in the Western Mesara were situated close (within 200–300 m) to a perennial water source, either the Ieropotamos River or a spring, and close to productive soils. For the reader's convenience, table 7.2 and figure 7.4 rank the past agricultural usefulness of land (to be compared with figures 7.1 and 7.5) for ancient settlers based on a combination of geology (e.g., schist, marl, limestone), soil type and depth, topography (extent of level land and degree of slope), distance from settlement, and availability of water. A close correlation exists between site size and proximity to a water source. Larger sites were invariably near water. Kommos and the two Late Neolithic sites near it were also situated near streams or springs and good land. All Late Neolithic sites (except for **82,** adjacent to Phaistos) were situated an average of 1–2 km apart. Such a pattern suggests that the siting of settlements was dictated primarily by considerations of subsistence.

The large size of the Late Neolithic settlement at Phaistos does not necessarily imply that its inhabitants practiced an economy that was based exclusively on agriculture. In the Near East, early village settlements have been shown to predate the beginnings of agriculture. And even after the introduction of domesticated cereals and animals, hunting and gathering continued to be an important source of sustenance at village settlements such as Ali Kosh (Hole, Flannery, and Neely 1969) in Iran and Abu Hureyra in Syria (Moore, Hillman, and Legge 2000). At Phaistos, Late Neolithic faunal data points to a local subsistence based largely on hunting, gathering, and seasonal pastoralism, supplemented by animal husbandry and spring-fed agriculture, the latter two on irrigated(?) alluvial bottomland. Late Neolithic levels at Phaistos (Pernier and Banti 1935:85–93; Vagnetti 1972–1973:131; Wilkens 1996) produced the following faunal remains (in order of decreasing frequency): wild goat and hare, wild cat, boar, badger and large birds, cattle, and domesticated caprines. Fish and whale (rorqual) bones testify to the use of sea resources. Shellfish (*Glycymeris* sp. and *Cardium* sp.), gathered along the coast (see Reese 1995:240–257), were part of the diet. The striking diversity of food types and their sources indicates that the Neolithic settlers depended on a variety of mobile subsistence strategies exploiting different environments, probably on a seasonal basis. Most of the small Late Neolithic sites in the region can be explained in terms of such seasonal use.

Late Neolithic settlers also exploited areas away from the Class I lands of the plain, such as the Late Neolithic cave site at Miamou (elev. 500 m) in the Asterousia Mountains and the cave at Kamares on Mount Ida (figure 7.2). Located above a spring-watered valley, Miamou Cave (Taramelli 1897) provided shelter for a small group of occupants who consumed large numbers of cattle, sheep/goat, as well as deer, hare, shellfish, and marine crab. They ground and pulverized their foods (including grains) with

Table 7. 2. Agricultural land classes in the Western Mesara

Class	Description
Class I	Irrigatable alluvium along streams or land next to springs. (This land today often supports kitchen gardens and orchards.)
Class II	Level land close to settlement on moisture retentive (white) soils or with a high water table. (Planted today in cereals, olives, vineyards.)
Class III	Land relatively close to settlement, but on clayey or drier (red) soils, or on eroded ridge-tops. (This land, often planted today in cereals and trees, produces a poorer yield than Class II land.)
Class IV	Land distant from settlement on poor, dry, or shallow soil, or hilly slopes with little available water. (Land used today for almond trees, fodder, and grazing, if used at all.)

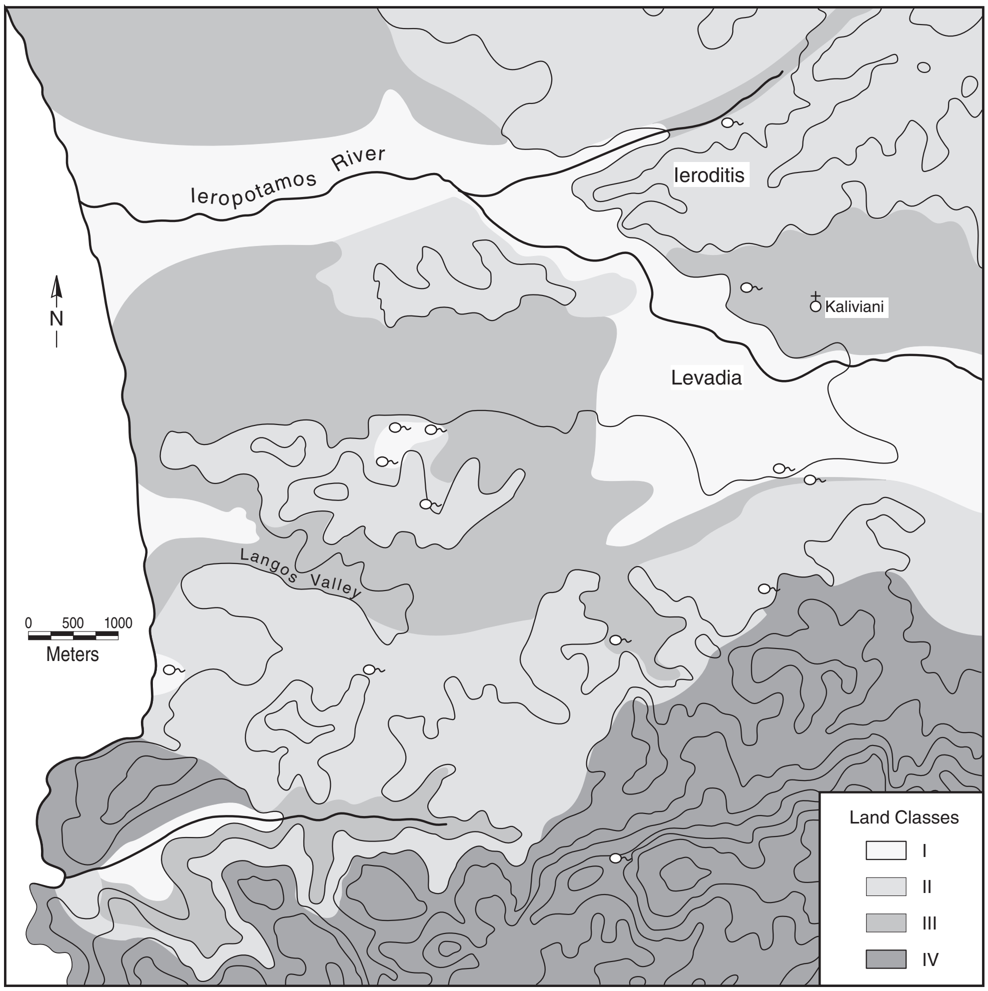


Figure 7.4. Map of agricultural land classes relative to ancient settlers in the Western Mesara

querns and mortars. One trachytic mortar from the cave is a foreign import probably obtained via the north coast. The inhabitants of the Miamou Cave practiced a mixed economy, which included the keeping of caprines and oxen for meat, farming of cereals, hunting of hare and deer, and gathering of mollusks and crustaceans along the south coast. The spread of Late Neolithic settlement into the mountain areas of the Mesara and elsewhere on Crete (Watrous 1982:10) can be correlated with the increased numbers of sheep/goat bones at contemporary sites, indicating a new emphasis on herding and grazing. Instead of keeping small flocks for meat, as was the earlier Neolithic practice at Knossos, settlers had probably learned how to convert milk from their livestock into storable produce, in the form of cheese and yogurt (Sherratt 1981). Since milk products provide at least four to five times more nutrients (protein, fat, and sugar) than meat, larger herds could be maintained and would have produced far more food, thus becoming an economically attractive practice.

The people of the Western Mesara maintained foreign trade relations (Vagnetti 1972–1973:126–128). Late Neolithic levels at Phaistos contained plentiful amounts of obsidian, far more than of chert (Vagnetti 1972–1973:92). Vagnetti (1972–1973:94) considers the single copper tool from Phaistos an import, and Late Neolithic Phaistian vases have been tentatively identified at Knossos (Wilson and Day 1994:85). Certain elements of material culture at Phaistos, for example, steatopygous figurines and a village plan consisting of both rectangular and round buildings accompanied by intramural burials, have parallels on Cyprus (Dikaios 1961: Plate 10; Hood 1985).

Late Neolithic society in our region already exhibits signs of social complexity. Subsistence data suggests that Late Neolithic Phaistos was an egalitarian group (namely, a society in which status is achieved, not inherited). Such groups possess both complexity and individual status (Hayden 1995). While social hierarchical (vertical inequality) features seem absent in our region, social heterogeneity (horizontal diversity) is present. Divisions of labor and gender roles are clearly distinguished. In addition to domestic tasks, Late Neolithic subsistence includes a particularly wide range of activities: hoe agriculture, gathering, fishing, hunting, animal husbandry, and pastoralism. If hunting, fishing, and shepherding as well as long-distance trade can be identified as predominantly male activities, then textile production, gathering of shellfish and plants, food preparation, and perhaps agriculture are likely to have been carried out by women. Hayden (1995) has shown that hunter-gatherer groups survive by means of sharing, interfamily exchange, and cooperation. What is interesting in this regard is that within the Late Neolithic Phaistian assemblage, categories of material culture (based on extent of production time) associated with women's roles were of notably high status. Such artifacts include the elegantly burnished domestic vessels for food, decorated spindle whorls, and imported obsidian tools. Some form of craft specialization in pottery production—Vagnetti (1972–1973) recognizes seven distinct ceramic styles at Late Neolithic Phaistos, including the regional Red Incrusted Ware—and perhaps in stone knapping also existed in the Western Mesara (see appendix C).

THE EARLY MINOAN I PERIOD: SETTLEMENT EXPANSION AND SOCIAL HIERARCHY

Early Minoan I in the Mesara is a period of population expansion and the establishment of independent and permanent rural settlement. Settlement numbers within our survey area rose from five Late Neolithic sites to thirteen Early Minoan I examples (table 7.3 and figure 7.5). Within the Kommos survey zone to the south, six Early Minoan I settlements replaced three Late Neolithic sites. Settlement in the Agio Pharango Valley multiplied from one or two Late Neolithic settlements to at least eleven and possibly as many as seventeen Early Minoan I examples. Along the south coast, Early Minoan I communities were established at Kaloi Limenes, Lasaia, Chrysostomos, Lebena, and Trypeti (figure 7.2), at spots possessing water and a minimum of arable land (Blackman and Branigan 1975; Vasilakis 1988, 1989/1990). East of our survey area, settlements and tholos tombs appeared at Agia Eirene, Koumasa, and Salame (Xanthoudides 1924). Finally, groups also settled in the Idaean foothills at Marathokephalon (Xanthoudides 1918) and on the coast west of Tymbaki at Kokkinos Pyrgos (Hadzi-Vallianou 1979:384).

The most prominent monuments erected by these early rural settlers were giant cyclopean tholos tombs. As many as twenty-five tholoi of this period are known in the Mesara (Branigan 1993:143–148), including tombs at Agia Triada(?), Sivas, in the Agio Pharango Valley, at Kaloi Limenes, Lebena, Koumasa, and Marathokephalon (table 7.4). Phaistos, apparently, was unique in the Mesara, in that its community interred their dead in individual graves, located on the Ieroditis Ridge north of the site (figure 7.5), near the church of Agios Onouphrios (sites **24**, **83–85**, and **99**). It must be significant that the residents at Agia Triada (site **2**), only 2 km east of Phaistos, had different funerary customs: their dead were buried in Tholos A. Perhaps the earliest settlers at Agia Triada were a distinct cultural group. A more radical hypothesis would be that the dead in the tholos at Agia Triada and an undiscovered tholos at Phaistos represent elite burials, and the interments at Ieroditis are commoners.

Early Minoan I Phaistos was the largest settlement in the Western Mesara (figure 7.6). The Late Neolithic settlement (**48**) near Kamilari seems to have shrunk in size by this time, as only one part of the site (labeled separately as site **8**) yielded Early Minoan I material. Four settlements, sites **2**, **52** , **98,** and **111**, plus Vigles at Kommos and Sendones near Kalamaki, are ham-

Table 7. 3. Early Minoan I sites in the survey area

Site	Size	Land Class	Function	New
1	4 hectares?	I	Settlement	—
2	hamlet	I	Settlement	—
8	60? x ?	I	Settlement	—
19	15 x 40 m	I	Camp	—
24	80 x 100 m	—	Cemetery	Yes
39	40 x 55 m	I	Settlement	Yes
50	7 x 7 m	I	Camp	Yes
52	150 x ? m	I	Settlement	Yes
65	70 x 40 m	II	Settlement	No?
77	40 x 110 m?	I	Settlement	Yes
82	20 x 20 m?	I	Settlement	—
83	40 x 35 m	—	Cemetery	New
84	20 x 20 m	—	Cemetery	New
85	130 x 40 m	—	Cemetery	Yes
88	20 x 50 m	I	Settlement	Yes
98	150 x 60 m	I	Settlement	Yes?
99	90 x 165 m	—	Cemetery	—
101	15 x 15 m	III	Camp	Yes
111	?	III	Settlement	?

TABLE 7. 4. Sites reported in the Agio Pharango Valley

	LN	EM I	EM II	EM III–MMIA
Tombs	0	8 + ?1	8 + ?2	7 + ?1
Settlements	2	6 + ?5	15 + ?5	9 + ?4
Total Settlements	2	11 + ?5	18 + ?5	11 + ?4

Settlement numbers are based on known and probable settlements plus assumed sites at tombs where no site was recognized. Probable settlements are designated by a question mark.

let-sized. Farms, located at **8**, **39**, **65**, **77**, **82**, **108**, and **109**, were more numerous, totaling more than half the total number of Early Minoan I settlements. Seven of these sites, probably single farmsteads, were within our survey area (plus at least three near Kommos). All the Early Minoan I sites in the Agio Pharango area were also of this size, excepting four slightly larger sites (Branigan site E11/14; Vasilakis sites 7, 16, and 24), which may have been hamlets. Two extremely small sites in our survey zone, **88** and **101**, can probably be interpreted as seasonal camps (fieldhouses) or work areas. Settlement size within the Western Mesara seems to have been hierarchical (table 7.5): the village-sized community at Phaistos was surrounded by smaller hamlets, farmsteads, and field sites.

Most of the newly founded Early Minoan I settlements identified by our survey favored the same type of soils (Entisols), location, and Class I environment chosen by Late Neolithic settlers. Sites **77** and **101** are on a slope near a riverbank;

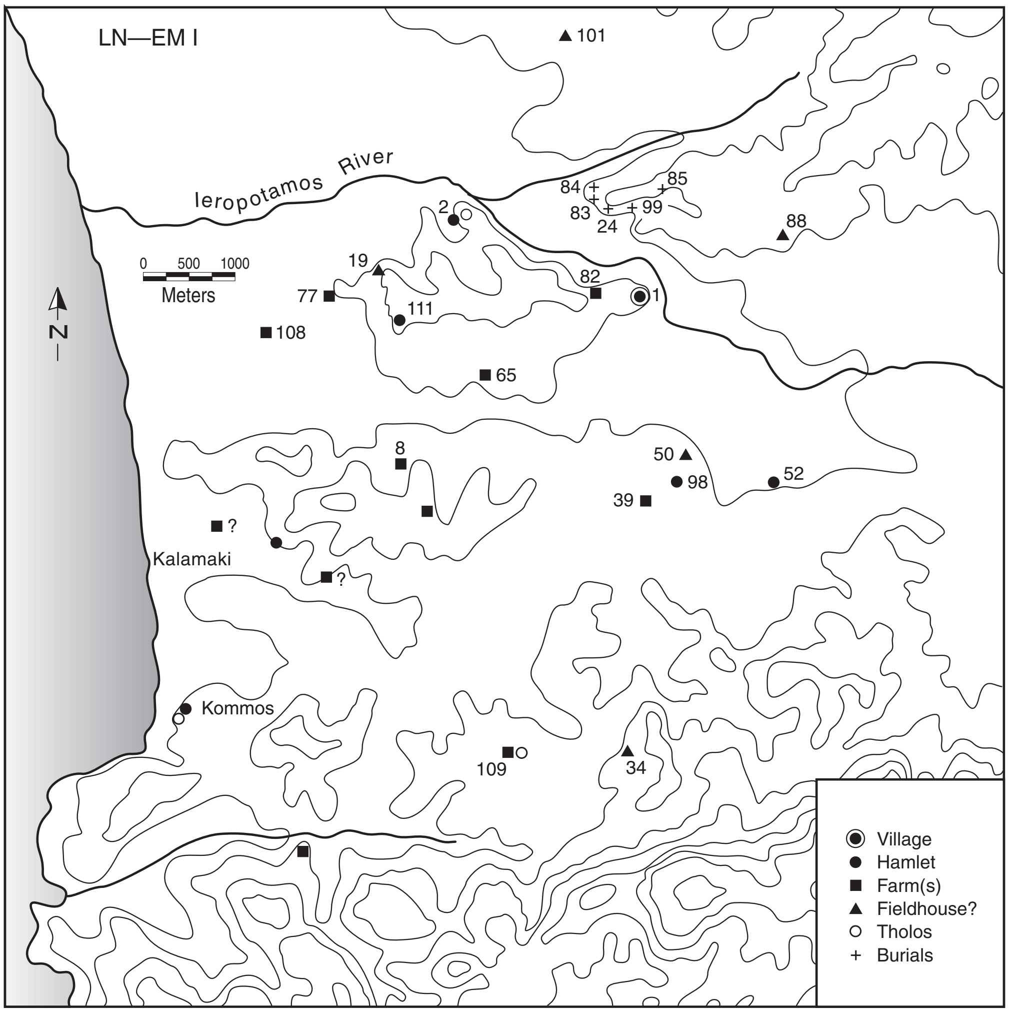


FIGURE 7.5. Late Neolithic–Early Minoan I sites in the Western Mesara. Kommos survey sites unnumbered.

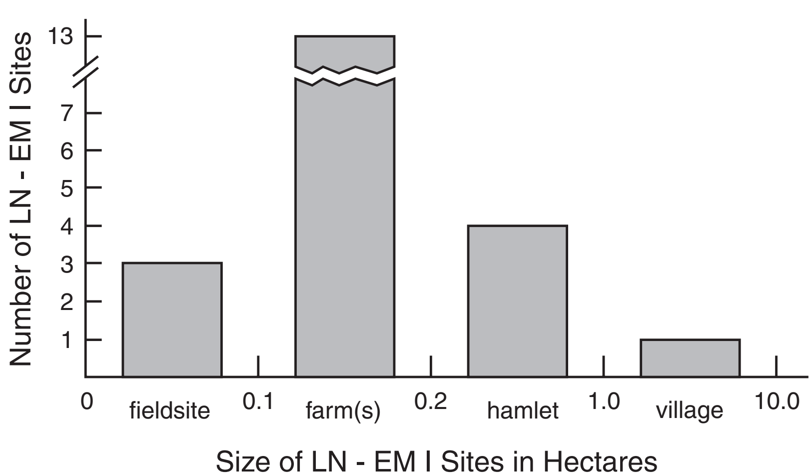


FIGURE 7.6. Late Neolithic–Early Minoan I settlement hierarchy in the Western Mesara (including the area of Kommos)

sites **39**, **50,** and **52** are near the alluvial bottomland of the Ieropotamos River. Southeast of Kamilari, a small site was located at Selli (La Rosa 1972/1973), adjacent to two springs. In other environmental zones, agricultural potential also seems to have influenced site placement. Sites **8**, **89**, and **111,** located away from the alluvial bottomland of the Mesara, possessed large potential catchments, while those sites (**39**, **50**, **52**, and **98**) with access to the rich alluvium of the Levadia were situated relatively close together. In the Agio Pharango Valley, three Early Minoan I sites (Branigan sites E 10/11, E12, and E18) were settled on the narrow slopes above the seasonal river (Bintliff 1977b).

Early Minoan I settlements in our survey area, sites **39**, **50**, **98** and **19**, **77**, and **111** (figure 7.5), in the Kommos zone and the Agio Pharango Valley, often appear in clusters. These clusters may represent the growth of nuclear families into multifamily groups. Pairs of contemporary tombs found together, as at Agia Triada, Sivas, Kaloi Limenes, Megali Skinoi, and Chrysostomos, almost certainly indicate separate, contemporary families residing in permanent settlements (Blackman and Branigan 1975, 1977:38–40). On the other hand, some sites (for example, **65**, **82**, and **88**) located near Phaistos may have been used seasonally, like traditional *metochia* (see chapters 6 and 14), by residents at Phaistos. Early Minoan I settlements were mostly located along alluvial land of the Mesara Plain, indicating that the local economy continued to rely on farming and animal husbandry. Early Minoan I chipped stone at Phaistos consisted primarily of obsidian blades, perhaps used for harvesting (of grains and legumes?). Bottema's (1980) pollen core from Agia Galini, 3 km northwest of Kokkinos Pyrgos (figure 7.2), produced pollen from garigue plants and oaks in this period, pointing to local expansion of settlement and grazing (chapter 4). Greater heterogeneity of local Early Minoan I site size probably also reflects a more regular use of the land than in the Late Neolithic period.

Land use in Early Minoan I was more intensive in some areas than in others. In the Asterousia, exploitation of land was especially intense. Bintliff (1977b) has suggested that the settlers in the Agio Pharango used the limited best lands for cereals, less-favorable land for olives, and the least favorable for grazing. Pre-tomb levels at Agia Kyriaki contained evidence for fishing, spinning, and weaving (Branigan and Blackman 1982:43). New settlers along the south coast subsisted by means of cereal farming and grazing as well as fishing and maritime trade in the summer months. Permanent settlement and exploitation of the poorer environment of the Asterousia suggests that Early Minoan I settlers could survive in more marginal circumstances than had been possible in the Late Neolithic period.

Even allowing for the length (3500–2700 BC) of the Early Minoan I period, the number of new permanent settlements implies a rise in the local population, especially if one recalls the diminishing effects of erosion on Early Minoan I site discovery (chapter 4). The increasing importance of agriculture must have enabled population growth—a documented trend in societies worldwide. Nevertheless, population growth is not likely to be the sole explanation (Hassan 1981:161–175) for increased Early Minoan I settlement, since demographic growth rates in the preindustrial world have rarely been very sharp (Cowgill 1975). Differing social customs and material culture within the region hint that some of the local population may have been immigrants. Phaistos, the earliest settlement in the region, apparently only buried its dead in jars, as was usual on the north coast of Crete, while other settlements used tholos tombs. The remarkable number of Mesara ceramic styles—wiped ware, black gritty ware, dark burnished (appendix E, plate E.2), gray burnished, Pyrgos, Salame, Lebena, and Agios Onouphrios I wares—may also have their origins in different local workshops. In addition, some Early Minoan I vases (e.g., Alexiou 1960:227, Figure 14, lower left) have close parallels with the Erimi culture on Cyprus (Dikaios and Stewart 1962:119, Figure 58:10).

Nevertheless, simple demographic growth does not explain why so many of the new permanent settlements were established in less-productive environments (Class II and III lands). Such a move seems better explained by economic factors. Zohary and Spiegel-Roy (1975), Amouretti (1986:41–45), Blitzer 1993, and Zohary and Hopf (2000:243–249) have argued that olive cultivation was introduced from the Near East during the Neolithic–Early Minoan I period; olives are first known in settlements in Early Minoan I (Blitzer 1993). Olives yield twice as many calories per acre as cereals or pulses. By the Early Bronze Age a more diversified agriculture favoring barley, wheat, olives, and grapes (C. Renfrew 1972:274–280) as well as certain legumes had taken hold in Crete. Polycrop agriculture, especially olives that can grow on poorer, dry soils, made it possible for settlers to live in more marginal environments, and hence, to grow in number.

This dispersion of the Early Minoan I population, then, is both contemporary with and the result of the introduction of new crops and methods of subsistence in the Aegean (Hansen 1988). As a result of this economic transition, rural communities of the Mesara found it worthwhile to begin building permanent structures, that is, houses and tombs, rather than to live in caves as they had during the Late Neolithic period. Early Minoan I agriculture apparently did not completely replace the older, more diverse subsistence practices of the Neolithic period, since both upland caves at Miamou and Kamares continued to be used as habitations into Early Minoan I. We can therefore distinguish three overlapping "phases" in what was probably a continuous process of settlement dispersion (table 7.5).

Unlike hunter-gatherers, the sedentary Early Minoan I farming communities relied primarily on the working (improvement and maintenance) of specific land surrounding them, a long-term investment that spanned many generations. Under such circumstances, the community's dependence on one's ancestors would have become an important reality, requiring some form of social acknowledgment. It may be no coincidence, therefore, that regional burial practices begin to show signs of complexity in Early Minoan I. Mesara communities constructed tombs adjacent to their settlements, at Agia Eirene, Agia Triada, Agia Kyriaki, Koumasa, Lebena, Marathokephalon, Megali Skinoi, Odigitria, and Sivas (figure 7.2). Agia Kyriaki, Agia Triada, and Koumasa possessed built courts next to their tombs in Early Minoan II. Pedestaled bowls, used outside the tomb at Agia Kyriaki, were already in use in Early Minoan I (Blackman and Branigan 1982:54). These specialized drinking vessels indicate that they were used for libation ceremonies in honor of the dead, as in North Crete (Branigan 1970b; Haggis 1997). The reverence paid to these ancestors may suggest that they were regarded as having power over the prime necessities of life—water and fertility (Early Minoan II figurines emphasize both these aspects). Funerary cult in the Mesara moved from the earlier practice of intramural burial centered on the individual household to a communal ceremony in Early Minoan I. Such a change implies the introduction of some form of harmonizing social ideology. In these monumental tomb complexes, rural communities celebrated their group identity (Hodder 1982) and proclaimed their ancestral right to the surrounding land.

Phaistos seems to have been unique in the region in that its community did not employ tholos-court complexes. Instead, the Early Minoan I Phaistian community deliberately left a central area within the settlement open (Vagnetti 1972–1973:12–13, Figure 2a) for ceremonial purposes. This central court may point to the existence of some type of social rite and accompanying ideology. Support for this interpretation comes from Early Minoan I Knossos. Scholars have followed Evans (1921–1935, I:35) in assuming that Early

TABLE 7. 5. Types of rural settlement sites and their subsistence systems

	Rural Site Type	Main Subsistence Type
LN	Caves	Hunter-gatherer/pastoralism
EM I	Small open sites	Pastoralism/agriculture
EM II	Hamlets, villages	Dry farming (plow)

Minoan houses existed under the later central court of the palace but were scraped away during the palace's construction in Middle Minoan I. However, the Palace Well, located under the later Minoan palace, has produced substantial amounts of specialized Early Minoan I drinking vessels, suggesting that large-scale drinking ceremonies were taking place somewhere nearby (Wilson and Day 2000). Thus, some form of open space may already have existed at Knossos prior to the constructed central court of the first palace.

By placing an open ceremonial area over Neolithic houses and intramural burials, the Phaistian community seems to have deliberately distinguished itself from other Mesara sites as the only social group in the region whose roots went back to the Late Neolithic period, the time of the first settlers. The lack of individual tholoi at Phaistos may also suggest that, in contrast to surrounding settlements, ceremony was group-oriented (Blanton et al. 1996) rather than focused on a single lineage. Since a substantial proportion of the regional population in the Western Mesara was probably derived from Phaistos, it is possible that rural groups periodically gathered at Phaistos to celebrate their common origins. If so, these Early Minoan ceremonies would provide a precedent for the use of the central courts in the later Minoan palaces.

Craft specialization, another potential sign of social complexity, had begun in our region by Early Minoan I. Ceramic workshops in the Western Mesara began to send substantial numbers of Agios Onouphrios vases (compare plates E.3, middle and lower row; E.4, upper row and lower row, middle) to Knossos during this period (Wilson and Day 1994), probably in return for Aegean metals (Stos-Gale and Macdonald 1991), including copper. Local artisans fashioned this copper into bronze daggers (Branigan 1968). Imports at Agia Kyriaki included Melian obsidian, an Early Minoan I Pyrgos ware chalice from northern Crete, and possible Agios Onouphrios vases imported from the Phaistos area (Blackman and Branigan 1982:41). Brumfiel and Earle (1987) describe different degrees of craft specialization that can be used to infer social conditions. They distinguish between independent and attached craft specialists: the former, often in less complex societies, producing basic goods for an unspecified market, and the latter working on contract to produce prestige objects (for display, ritual, or exchange) for an elite patron (Helms 1988, 1993). In this regard it may be significant that obsidian occurs at Phaistos (**1**) and sites around it (**65**, **84,** and **99)** or along the coast. In contrast, at other inland sites (**39**, **77**, **101,** and **106**) our survey found no obsidian, but only flake tools of chert. Metal daggers are also concentrated at central sites (chapter 8). Craft evidence seems to suggest that some form of social hierarchy had appeared in local society by Early Minoan I.

Settlement of rural areas in the Western Mesara created separate and distinct lineage groups, with their own territories. Goodwin's study (1998), for example, has identified two different groups of Mesara tholoi: one group has a solar alignment, while the other has a lunar orientation. Early Minoan I settlement distribution introduced the potential for economic cooperation on a regional scale, and, at the same time, for competition and conflict. We may see signs of both these trends in the appearance of specialized ceramic workshops (chapter 8) located in marginal areas, such as the Asterousia, and in the replacement of domestic ceramic wares by metal daggers as the prime Early Minoan I prestige item. This regional pattern of autonomous Early Minoan I communities, each with its own ceremonial complex and potential for distinctive economic activities (C. Renfrew 1972:278–288; see chapter 8), set the stage for the social trajectory of the Western Mesara in Early Minoan II.

8

Emergence of a Ranked Society (Early Minoan II–III)

L. Vance Watrous and Despoina Hadzi-Vallianou

THIS CHAPTER BEGINS BY presenting the evidence for certain cultural aspects, for example, settlement, population, subsistence, craft specialization, exchange, and ideology, of Early Minoan (EM) II society in the Western Mesara. Drawing upon this information, and using data from elsewhere in Crete, we address the question of EM II social complexity on the island. The chapter ends with an analysis of the problematic EM III period in the Mesara.

EARLY MINOAN II SETTLEMENT

Within our survey area we identified thirteen EM II settlements (table 8.1), the same number as in EM I, and five EM II cemeteries (figure 8.1). During the EM II period, the Ieroditis Ridge continued to serve as the main cemetery for the settlement at Phaistos. An EM marble figurine (Watrous et al. 1993: Plate 53a) found south of site **64** may also be a sign of burials located south of Phaistos. Outside our survey area, the number of new EM II settlements, including Sopata Kouse (site **112**), rose more sharply. Within the Kommos area there were thirteen EM II settlements (up from seven in EM I), although excavations at the coastal site of Kommos show that it was uninhabited in EM I–II (in preference for the EM I–II site on the adjacent hilltop of Vigles). In the Agio Pharango Valley (figure 8.2) the total number of settlements jumped from eleven certain EM I examples to eighteen probable EM II

TABLE 8.1. Early Minoan II sites in the survey area

Site	Size	Land Class	Function	New
1	5 ha	I	Settlement	—
2	Hamlet	I	Settlement	—
16	5 x 5 m	II	Settlement	New
24	80 x 100 m	—	Cemetery	—
39	40 x 55 m	I	Settlement	—
50	7 x 7 m	I	Settlement	—
52	150 x ? m	I	Settlement	—
65	70 x 40 m	II	Settlement	—
68	80 x 35 m	II	Settlement	New
77	40 x 110 m	I	Settlement	—
80	Small	I	Settlement	New
83	40 x 35 m	—	Cemetery	—

Continued on next page

Table 8.1. Early Minoan II sites in the survey area *(continued)*

Site	Size	Land Class	Function	New
84	20 x 20 m?	—	Cemetery	—
85	130 x 40 m	—	Cemetery	—
88	20 x 50 m	I	Settlement	—
98	150 x 60 m	I	Settlement	—
99	90 x 165 m	—	Cemetery	New
109	Small	III	Settlement	—

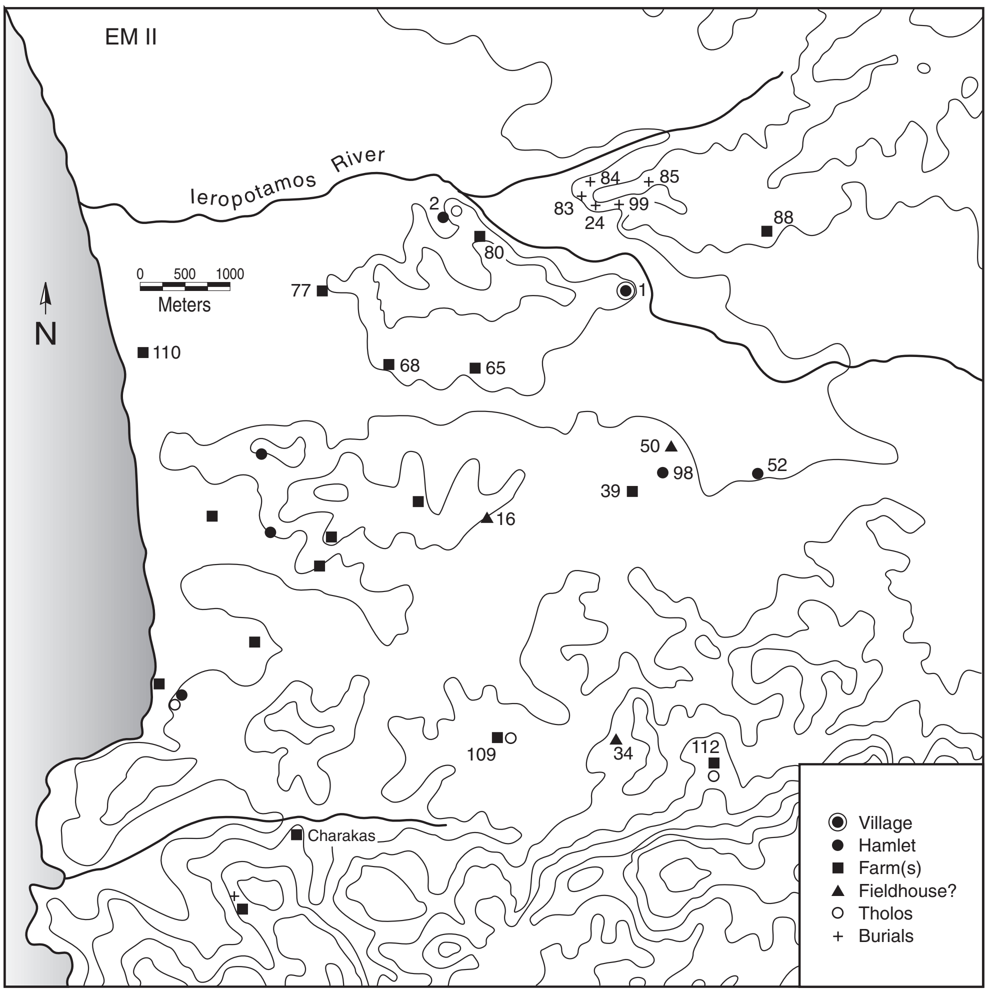


Figure 8.1. Map of Early Minoan II sites in the Western Mesara. Kommos survey sites unnumbered.

occupation sites (Blackman and Branigan 1977). Vasilakis's survey (1989/1990) of the western Asterousia also produced additional small EM II settlements and tholos tombs. At Moni Odigitria in the Asterousia two excavated tholos tombs began to be used at the end of EM I or the beginning of EM II (Vasilakis 1989/1990).

EM II Phaistos (site **1**) was appreciably larger (about 5 ha) than any of the surrounding sites in the region. House walls and EM II pot-

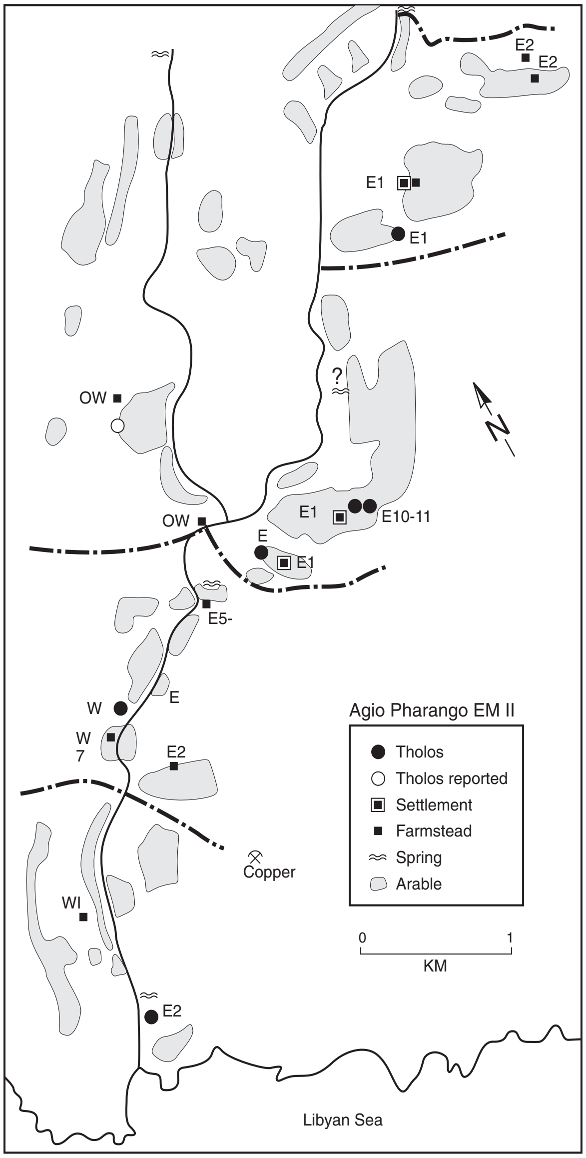


FIGURE 8.2. Early Minoan sites in the Agio Pharango Valley (modified after Blackman and Branigan 1977: Fig. 34)

tery are reported in the area of the later palace, in the west court, beneath and south of the Acropoli Mediana (where the Italian School storerooms are presently located), and at Chalara, but not on the slope of Agia Photini northeast of the palace. In EM II, Agia Triada (site **2**) may have grown from one to two small communities, one east of Tholos A and one west of Tholos B. Separated by only 2 km, Phaistos and Agia Triada overlook the two largest expanses of well-watered fertile land in the Western Mesara.

EM II sites, now buried, must have existed in the Levadia east of Phaistos and in the coastal plain west of Agia Triada (chapter 4). Currently broad alluvial tracts, these two areas in the EM II period would have consisted of gentle slopes running down to the margins of the Ieropotamos River and to the coast. Today, the heavy alluviation (at least 3 m since Hellenistic times alone) has turned the Levadia into poorly drained meadowland. During the Bronze Age, the land surface of the Levadia would have been lower and better drained Class I land. Our site **52**, the hamlet at Agios Spyridon, revealed to us by the digging of a deep irrigation ditch in the Levadia, would not have been unique. A second EM II site near Kalamaki was discovered by quarrying under at least 10 m of aeolian sand (Hope Simpson et al. 1995:368). Our surface survey recognized no off-site EM I–II pottery. Given the high quality of the land next to the Ieropotamos, there may have been a string of small sites on the slopes (now covered by alluvium) above the Ieropotamos River east of Phaistos and west of Agia Triada (the estimate of seventeen sites in table 4.2 should be regarded as a minimum).

In the Kommos area, each small valley was occupied by one to three EM II farmsteads located about 750–1,000 m apart from one another. All told, there were eight hamlet-sized settlements in the area of Phaistos and Kommos, a slight increase over EM I. Single farmsteads, however, increased substantially, from nine EM I examples to eighteen in EM II. In the Agio Pharango Valley (figure 8.2), all of the EM II settlements can be characterized as farmsteads consisting of one or two structures, with the exception of the hamlet at Megali Skinoi (Branigan site E 14). Vasilakis's survey (Vasilakis 1989/1990) in the Asterousia produced three hamlets (Vasilakis site nos. 7, 16, and 24) probably consisting of two to three households, while the rest are identified as single- or double-family farmsteads.

Further east in the Mesara (figure 8.3), EM II settlements are known at Platanos, Koumasa, Koutsokera (near Salame), Agia Eirene, Agios Kirillos, and Krotos (Xanthoudides 1924; Vasilakis 1983, 2001). The settlement at Platanos had access to a wide expanse of flat land that could have been irrigated from the nearby Ieropotamos

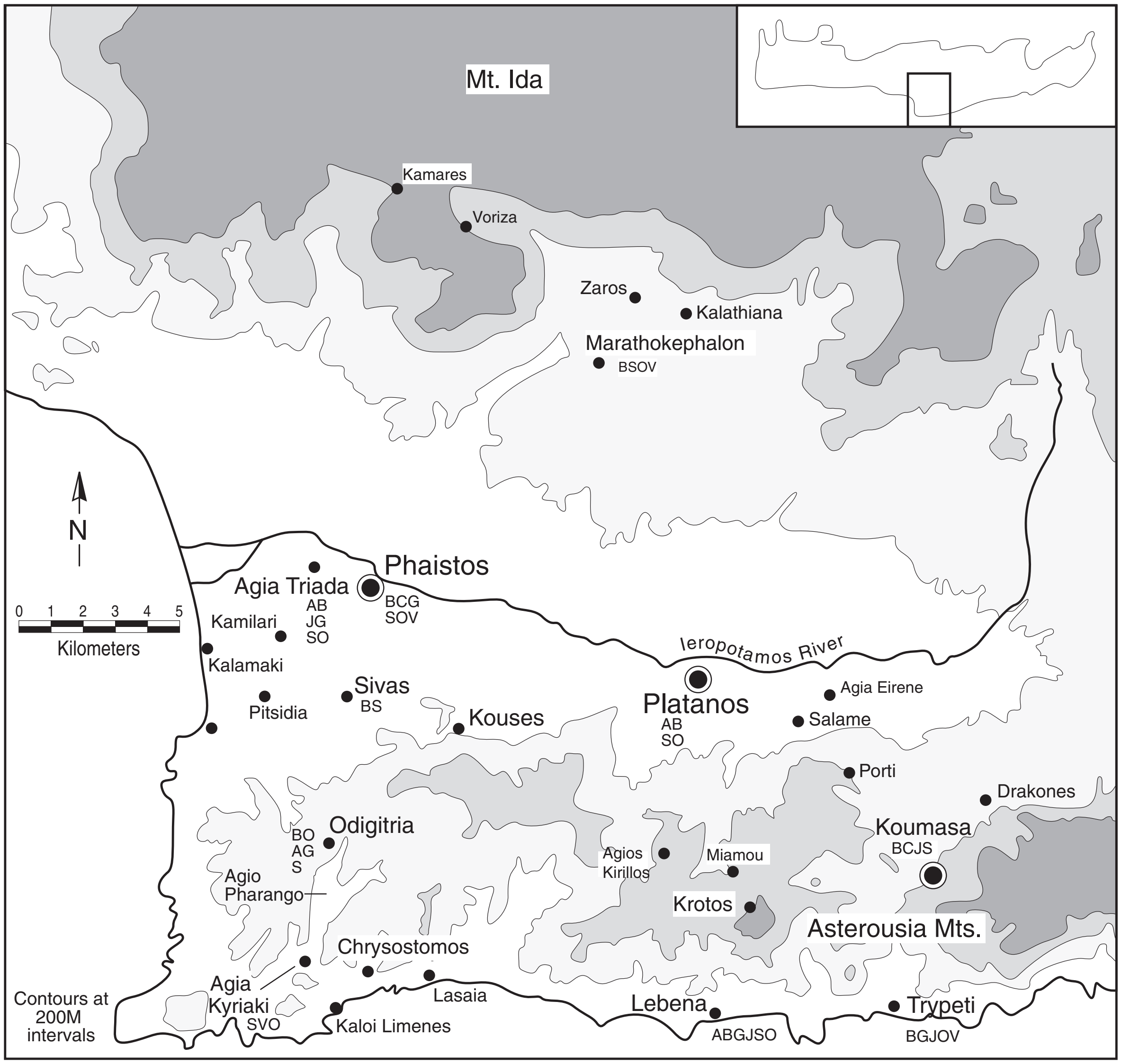


FIGURE 8.3. Map of the Mesara in the Early Minoan II period. Legend: A = gold diadem or gold jewelry. B = Bronzeworks (daggers). C = Cycladic import. G = Seals. J = Jewelry. O = Obsidian. S = Stone vases. V = Vasiliki ware.

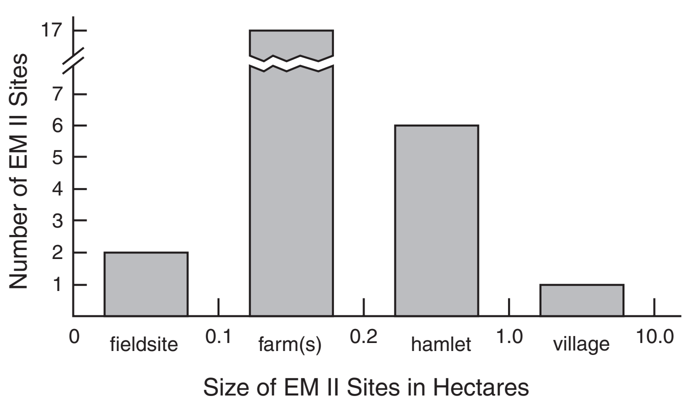


FIGURE 8.4. Early Minoan II settlement hierarchy in the Western Mesara (including the Kommos area)

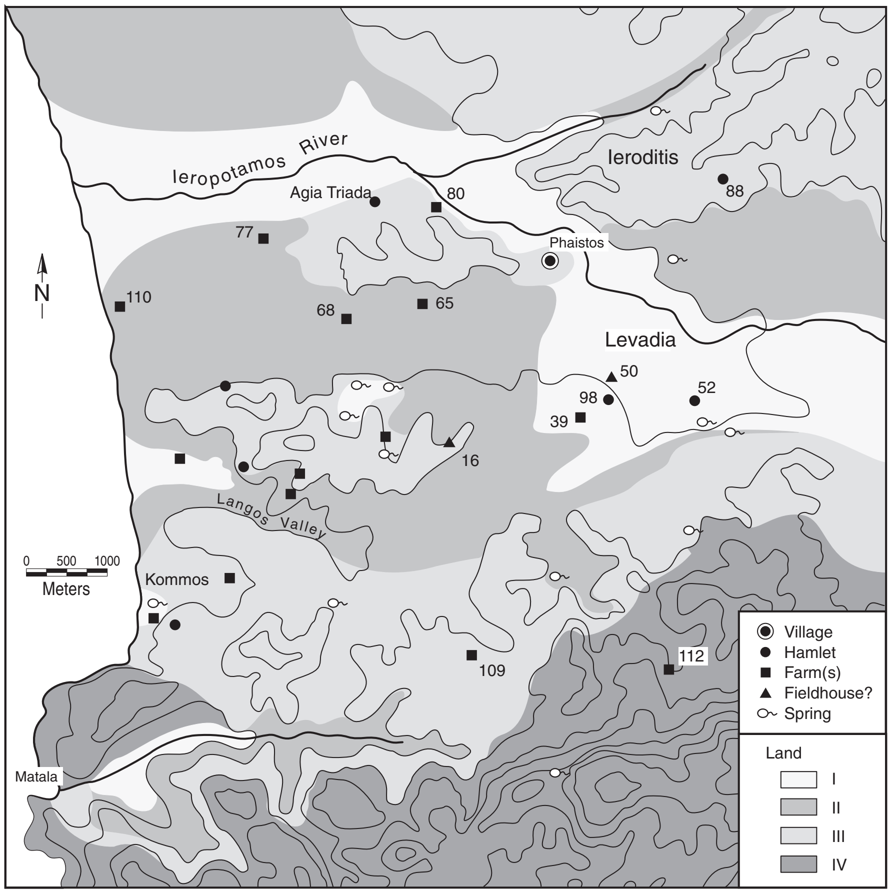


FIGURE 8.5. Early Minoan II sites and land classes relative to EM II settlers. Kommos survey sites unnumbered.

River. In the foothills of the Asterousia, the EM II hamlet (approximately 140 x 60 m) at Koumasa is located above a spring on the steep ridge of Korakies, surrounded by gentle slopes suitable for dry farming. The Miamou Cave ceased to be inhabited in EM II; instead, it was used for burials. At Lebena (Alexiou 1992) three EM II settlements and five tholos tombs (an increase from one EM I settlement and tomb) were situated adjacent to the narrow strip of arable land along the coastal plain (plate 8.1). Plentiful water was provided by a spring and a (perennial?) stream at the west end of the plain. Two EM I–II tholoi at Chrystosomos mark the presence of a community situated above and to the west of the small coastal plain of Lasaia, while two other tholoi and an additional settlement were located on a ridge immediately east of the plain (Blackman and Branigan 1975). Many new EM II settlements are located in catchments that consist of small arable valleys or plains, like the ones described above.

In the Idaean foothills north of the Mesara Plain, two EM II settlements, Kalathiana and Marathokephalon, have been excavated (Xanthoudides 1918, 1924). Kalathiana (approximately 200 x 150 m in size during the Protopalatial period) is situated on the top of a ridge with three sheer sides. Water for the site comes from a small spring at Chermousi, about 400 m to the east at the base of the hill. The hamlet-sized (?) site at Marathokephalon is on the top of a steep hill; its water comes from a spring to the south at the bottom of the hill. At Zaros an EM II farmstead (60 x 40 m in size) occupied the hilltop west of the Votamos spring (Hadzi-Vallianou 1987:548).

Settlement in the Western Mesara becomes more hierarchical in EM II (figure 8.4). As in EM I, the village-sized site at EM II Phaistos was surrounded by hamlets and farmsteads. Disparities begin to appear in local landholdings. In the EM I period, sites were evenly and widely spaced across the region and were usually situated next to Class I or II land. EM II settlements were located next to a wider range of agricultural lands and their soil types (figure 8.5) (chapter 5 and table 5.1). Around Phaistos the land had a relatively high agricultural potential: the alluvial bottomland of deep Entisols in the Levadia was rated 81–108 (see chapter 5 and table 5.1 for ratings), and the nearby low rolling hills were rated 103–108. In contrast, the ridges of Entisols (rated 33), red Alfisols soils (rated 47), and slopes of shallow Entisols (rated 33) further removed from the Mesara Plain were poorer agricultural lands. By EM II, Phaistos and Agia Triada together controlled a broad area of the best arable land in the region. Site **8,** in a choice location near a spring north of Kamilari, was no longer occupied in EM II. Phaistos was the only settlement without a hamlet in its immediate proximity (a radius of approximately 1.5 km), a sign of its special status. The Phaistian community, given its estimated size (see also below), seems to have had access to more and better quality land than the group of farms located to the south of the Kamilari Ridge.

Settlements newly established in EM II tended to be located on more marginal agricultural land (figure 8.5). For example, site **16** sits on the top and south slope of a marl ridge overlooking a small dry valley. Sopata Kouse (site **112**), in the dry foothills of the Asterousia, is situated a considerable distance from the nearest spring. Several EM II farmsteads were settled on the thin soils of Class III land (Parsons and Gifford 1995:304) on the ridge south of Kamilari. Five new settlements founded on ridges in the Kommos zone favor situations on gentle, south-facing marl slopes overlooking a seasonal water source located at distance of approximately 500 m to 1 km. These sites produced no signs of associated tombs and therefore were probably part of the Phaistian community. If so, the disparity between the catchment of this new group of farms and that available immediately around Phaistos may be a sign of emergent economic ranking. Similarly, the distances between settlements (sites **2, 52, 77,** and **110**) around Phaistos and between those in the Agio Pharango Valley indicate that the more fertile site catchments around Phaistos were much larger. These disparities within the local EM II landholdings suggest the presence of economic inequality.

EM II Population

The size of the EM II population at Phaistos is important because it has implications for the social complexity of the community. Whitelaw (1981) has estimated that the architectural space of EM II Phaistos was at least 1.13 ha in size, and therefore the minimal absolute population was approximately 300–450 persons. It is necessary to examine this question more closely. Population estimates of archaeological sites have depended on different variables; many methods have been tried, with varying degrees of cogency (Hassan 1981:63–93; Manning 1992; Whitelaw 2001). Several factors militate against a reliable estimate. In only a few cases do we have architectural plans of settlements that allow us to come up with a fairly precise population estimate based on the actual numbers of rooms and houses. In most cases, our data is simply an areal distribution of sherds representing a buried site. Converting surface sherd distribution to house-based absolute population estimates is difficult. Excavated sites on Crete reveal that the density of settlement plans varies both synchronically and diachronically. Thus, there is no absolute yardstick for figuring the density of occupation of a buried site with any precision.

Based on excavation data, the areal distribution of EM II sherds at Phaistos has been estimated at approximately 5 ha. Whitelaw's estimate of 300–450 persons was not based on a complete EM II architectural plan for Phaistos. Unfortunately, the unique size of the settlement precludes our extrapolating its housing density from smaller EM II sites. Nevertheless, if one accepts that the sherd distribution represents roughly the extent of housing, then, assuming 30–50 persons per ha (chapter 1), one would arrive at a population of 150–250, perhaps thirty to fifty families, for EM II Phaistos. In fact, the settlement may have been larger than our estimate, since evidence of occupation is particularly dense along the undefined southwest edge of the excavated area. Thus, we are left with a combined estimate for the population of EM II Phaistos ranging from 150 to 450.

In EM II, settlement continued to expand across the Western Mesara. New tombs were built at settlements. In the Langos Valley south of Kamilari there were two sites in EM I and at least four in EM II (Hope Simpson et al. 1995). On the confined coastal strip of Lebena, one EM I tholos was joined by three separate tomb complexes in EM II. At Koumasa the number of tombs grew from two in EM I (Tholoi B and E) to four (Tholoi B and E and Tombs A and G) in EM II (Branigan 1970b:166). If EM II Koumasa (perhaps 140 x 60 m in size) had six to eight households, then each tomb may have been the burial place of two nuclear families. All these new constructions suggest population growth.

Increases in regional net population over a period of a millennium (Cowgill 1975) normally consist of 1 or 2 persons per 1,000 per year (with the population doubling in 350 to 750 years). Surges of 3 to 7 persons per 1,000 per year in regions sustained over two or three centuries (a doubling of population in about 10 to 240 years) are known in agricultural societies over the last several thousand years but are interspersed with periods of very slow growth or decline. The increase in EM II settlements and tombs therefore implies a real population growth in the Mesara, one well within the trajectory of normal demographic increase. Nevertheless, EM II settlement expansion seems to have been a moderate one, as certain areas with springs and arable land, for example, near Kouses and Pitsidia, apparently remained unsettled during the Early Bronze Age.

Significantly, this settlement growth did not occur uniformly throughout the region. In places like the Agio Pharango Valley (figure 8.2), the EM II population has been estimated as approximately 120 persons (Blackman and Branigan 1977:70), while the carrying capacity of the valley has been figured as 70–140 individuals (Bintliff 1977b:27–28). Average landholding size in the Asterousia (Burgel 1965) is reported as 15 acres, thus 5 ha for a family of 5, or 1 ha per person. Later census figures (Blackman and Branigan 1977:79) indicate that the peak of population seems to have been reached in 1881 with nineteen households, plus nine monks, or about 104 persons. Based on Branigan's and on Vasilakis's survey findings, one could estimate thirteen farmsteads or hamlets, with an EM II population of about twenty-one families (approximately 115 persons). Bintliff (1977b:30) estimated that the valley possessed approximately 517 acres (215 ha) of good-to-poor arable land capable of supporting a total of approximately seventeen families. Thus, for EM II a rough population of 115 persons in the Agio Pharango lived off 215 ha of land, that is, about 1 person per 2 ha of marginal land.

At the same time, however, we can estimate a maximum of approximately 610 inhabitants living off of the 4,700 ha of land around Phaistos (figure 8.1). Prior to mechanization, an average family of 5 with landholdings in the well-watered bottomland of the Mesara Plain (see chapter 6) could live on a minimum of approximately 25 *stremmata* (2.5 ha), that is, 0.5 ha per person. As an estimate, if we extend the known settlement pattern over the alluviated areas near the Ieropotamos River, we might be missing three hamlets and six farms, a total of approximately 81 persons, bringing the total local population to approximately 691. With this estimate, the individual settler near Phaistos and Agia Triada was living off of approximately 7 ha of predominantly excellent land. Admittedly, these figures are inexact, but for our present purposes they serve to show that the EM II population in the Agio Pharango was living near that area's carrying capacity, on substantially much less and poorer land than their contemporaries around Phaistos. Such a situation would have constituted a form of economic circumscription (Carneiro 1970).

EMERGENCE OF AN AEGEAN AGRICULTURE

Following the introduction of a variety of crops into the Late Neolithic–Early Bronze I Aegean (Hansen 1988), a new form of agriculture, dependent on the use of the plow (Pullen 1992) and cereal cultivation, evolved. Signs of this new subsistence appear in the EM II Mesara. At Agia Triada, two EM II houses produced mortars, querns, and *pithoi* for the processing and storage of agricultural produce (Laviosa 1972–1973). Our survey noticed that querns seem to be especially numerous at EM II sites. Olive cultivation is indicated by the local presence of olive stones, wood, and pollen (Alexiou 1960; Warren 1972; Bottema 1980). In the Agio Pharango, settlers are thought to have practiced a mixed agriculture (mainly cereals on the better land and olives on more marginal land) and substantial herding (Bintliff 1977b). Trypeti (Vasilakis 1988, 1989/1990) produced (?EM I–Middle Minoan I) bones of cattle, sheep/goat, pig, hare, fish, and birds; snails and seashells; and carbonized wheat, peas, vetch, and figs. Also on the south coast, the EM II inhabitants at Myrtos/Fournou Koriphi near Ierapetra subsisted on mixed farming (barley, wheat, grapes, and olives), on raising of livestock (cattle and pigs), on herding (90% of the bones from Myrtos/Fournou Koriphi are sheep or goat, listed in Manning 1994:232, Table 8.3), and the gathering of shellfish. Both of these small south coast settlements seem to have depended on a more highly diversified economy than communities in the Mesara Plain.

As in other parts of the Aegean (Sherratt 1981; Hansen 1988), new plant species were probably introduced into the Mesara, creating a more diverse subsistence, based on grains, olives, legumes, grapes, and the production of cheese. During the EM I–II period, the first phase (chapter 4) of erosion in the Western Mesara produced mixed soils that were more responsive to agriculture (chapter 6) than the earlier Pleistocene red soils. Such economic and environmental changes created a potential for greater agricultural productivity and made it possible for settlers to support themselves on poorer (Class III) land. The EM II settlement at Sivas (**109**) is a good case in point. Situated in the foothills of the Asterousia, this hamlet occupied a well-defined valley (plate 8.2) formed of Class III red soils, possessing a single water source that today is a seep at the north edge of the settlement.

EM II agricultural artifacts in the Mesara also point to a greater reliance on dry farming. EM II sites, at Agia Triada and Myrtos/Fournou Koriphi, have produced large numbers of stone querns, handstones, and chipped stone, an assemblage that differs markedly from tool-poor Late Neolithic Phaistos (Vagnetti 1972–1973:92). Whereas storage jars at Neolithic Phaistos were rare and relatively small, houses at these two EM II sites contained groups of large storage *pithoi*, a change that points to the greater efficiency of EM II agriculture. The spread of new settlements into marginal valleys at Sopata Kouse, Agio Pharango, and along the south coast, at Trypeti and Myrtos/Fournou Koriphi, following the same pattern observed on the Early Helladic mainland (Runnels and Van Andel 1987), only seems comprehensible as a result of these new agricultural improvements. Population growth in EM II seems therefore to have been a consequence of agricultural innovation.

Most important, however, was the introduction of the plow in Crete. Direct evidence for the plow's use in EM II Crete, as exists in Early Helladic IIA mainland Greece (Pullen 1992), has yet to be found. We may, however, be able to infer the existence of plow-driven agriculture in EM II Crete from the fact that new settlements, such as Sivas, Odigitrias, Zaros, and Lebena, were established away from the riverine plain in medium-sized valleys (plates 8.1 and 8.2) where the plow would have been used efficiently. In smaller and more marginal environments, such as the Agio Pharango and at Fournou Koriphi, where ox-driven plowing was not worthwhile, the older and more labor-intensive technique of planting seeds singly with "dibble sticks," used to poke a hole in the earth into which a seed would be placed (Warren 1972; Plate 79 c–d for dibble stick weights), would have continued.

Once introduced, the plow would have had the greatest beneficial effect in the land around Phaistos and Agia Triada, where sizeable level tracts of arable land existed. Farmers owning this land would have been able to produce greater yields in less time (Halstead 1984). Land on the valley floor away from the river and lower slopes of the Mesara Plain would have been especially good for cereals, which can have a storage life of two years (chapter 6). On the other hand, it is doubtful that settlers in the Asterousia and the south coast would have benefited to the same extent from this innovation. Arable land there was marginal in quality, steep, and severely restricted. Plow agriculture created local differences in wealth, and thus the potential for sociopolitical inequality between members of the Phaistian community and outlying settlements. Consequently, as a hedge against years of bad harvests, it seems likely that these marginal communities began to bring local products, including specialized goods, to the settlement centers in the plain in exchange for basic foods, such as grains, pulses, and legumes.

CRAFT SPECIALIZATION

Widespread craft specialization, in the form of pottery (Day, Wilson, and Kiriatzi 1997), stone vases, seals, and bronze daggers, appears in the Western Mesara by EM II. Wilson and Day (1994) have shown that during the EM I–IIA period, workshops making vases for export drew their clay from the edges of the Mesara Plain, from more outlying areas, and from the Asterousia Mountains. Fine Painted (Agios Onouphrios style) vases were made in substantial numbers at various locations in the area of the Asterousia and the southern edge of the Mesara Plain and were widely exported across Crete. Wilson and Day (1994) identified one particular workshop ware, the products of which are known at Agia Kyriaki, Koumasa, Phaistos, and Knossos. A coarser ware group (Day/Wilson Group 18) found at Knossos probably originated from the west coast area or the south edge of the Mesara Plain, while a third group (Day/Wilson Group 10) existed in the Kaloi Limenes-Lebena coastal area.

Our survey located a specific clay source for pottery production at a location near Sivas, approximately 300 m east of site **109**, where Minoan pottery, a potter's wheel and a waster have been found. Since the only known Early or Middle Minoan (MM) site near this work area is site **109**, this settlement may have produced pottery to supplement its agricultural base with income by means of exchange with Phaistos. Since most of the clay sources of local specialized EM IIA wares exported to Knossos have been linked petrographically (Wilson and Day 1994) to peripheral areas of the Mesara, it appears probable that local EM II pottery production was located in these marginal areas of our region.

The local manufacture of EM II stone vases seems to follow the same geographically decentralized pattern. A group of some twenty vases, made of steatite that probably comes from the Asterousia (Warren 1969:129, 138–139), were found in an EM II stratum in Tomb II at Lebena (Daux 1961:890, Figure 7). They are likely to have been made at or near Lebena. Other EM II steatite vases were traded to the large settlements in the Mesara, for example, Platanos, Phaistos, and Agia Triada and probably to Koumasa and Marathokephalon.

EM II seals have been identified at Phaistos (Platon 1969: nos. 432, 425), Agia Triada (minimally Platon 196/1/211–14, 32, 35, 46, 49, 61, 75, 87, and 91), Lebena (Pini 1981:422), and Trypeti. Blasingham (1983, 1992) has identified local groups of (EM II–MM I) Mesara seals by their distinctive technical features. Sbonias's (1995:73–83) stylistic groups, on which table 8.2 is based, suggest that, as a minimum, seals were made at centrally located settlements such as Agia Triada and Platanos as well as at peripheral places such as Lebena, and in the Asterousia. Unfinished seals from the hamlet of Myrtos/Fournou Koriphi

TABLE 8.2. Distribution of EM II seal groups in the Mesara

Sites	Lattice/Bone	White Stone	Epomia	Total
Agia Triada	31	3	3	37
Sivas	2	1	1	4
Kalathiana	2	1	1	4
Marathokephalon	2	1	1	4
Porti	2	1	1	4
Asterousia	18	4	4	26
Kaloi Limenes	5	5	5	15
Lebena	17	3	3	23
Platanos	-	10	10	20
Koumasa	-	1	1	2

Totals from Sbonias 1995.

also show that seals could be made at small, marginal sites.

The local production of EM II bronze daggers seems complementary to that of other specialized artifacts, for they were made, or at least used, primarily at central settlements such as Agia Triada and Platanos (Branigan 1968:127). Craftsmen at each of these communities specialized in a distinctive type of dagger, perhaps a material sign of local identity (Hodder 1982:204). At Agia Triada, the triangular dagger appears almost exclusively, while at Platanos and Koumasa, the long dagger was most popular. Daggers from Platanos were practically all of a single type (Branigan type V), while the daggers at Koumasa consisted of several different types. Triangular daggers (Branigan 1968:26, dated mainly to the EM period) found at these sites used different hafting techniques. One specific haft type (Branigan 1968: Figure 6), for example, is only known at Platanos. If Branigan's comparison (1968:56) of the arsenical content (Agia Triada, 75%; Platanos, 13.7%; Koumasa, 45%) of copper artifacts has not been greatly skewed by the practice of remelting, it appears that each center also had its own alloying technique.

A high proportion of Mesara craftsmen specializing in the production of pottery, stone vases, and seals seem to have been rural dwellers (see Schwartz 1994 for the same phenomenon in the Near East). In the nineteenth century (chapter 6), it was the rural poor in the Western Mesara who created a surplus for their families through economic specialization involving local natural resources. Inhabitants of the Asterousia, for example, transported wild olive stock, local wood and brush, livestock, and cheese to sell in Moires. Drawing upon ethnographic cases worldwide, Dean (1985) has shown that specialized ceramic craftsmen have often been marginalized, socially displaced figures. In contrast, the production of metal daggers appears to have been concentrated, or daggers were at least primarily consumed, in centrally located settlements. Bronze daggers, made of an imported material (see "Exchange," below), seem to have been an elite artifact. Since Mesara pottery was traded northward in return for Aegean metals that were fashioned into elite possessions, it is possible that some of the producers of export pottery were "attached craft specialists" (Brumfiel and Earle 1987), that is, dependent artisans producing prestige or export goods for elite patrons. This conclusion is not certain, however, since recent studies (Smith 1976a; Santley 1994) have also documented other types of craft specialization that operate outside of direct political control. It is worth pointing out that since EM II elite goods remained for the most part in settlement centers, the regional economic network does *not* seem to have involved the redistribution of prestige goods (wealth finance) by the centrally located elite to followers in their area (Earle 1997:70–75).

Exchange

EM II Mesara communities obtained foreign imported goods, such as pottery, obsidian, stone vases, and copper (figure 8.3). Obsidian, copper, and gold found in the Mesara testify to trade connections with the Cyclades and Attica. Analyses of copper artifacts found in the Mesara tombs at Platanos, Agios Onouphrios, Marathokephalon, Agia Triada, Koumasa, Kalathiana, and Porti have shown that their copper came primarily from the Cycladic island of Kythnos (south of Kea) and Lavrion in Attica (Gale 1990). Analysis of two EM II daggers from Platanos has shown that they contain tin (Branigan 2002), so this material had apparently begun to be available in the Mesara. Agia Kyriaki on the south coast is said to have produced EM IIB Vasiliki ware vases from East Crete (Blackman and Branigan 1982:41–42). Imports at Trypeti included obsidian, Vasiliki ware, and a copper pin (Vasilakis 1989). Two marble pyxides from the cemetery (Agios Onouphrios) at Phaistos and a marble figurine from Koumasa were probably imported from the Cyclades (Sakellarakis 1977).

Imported prestige materials, however, were not widely distributed across the region. Instead, they were restricted to the large settlements. Bronze and gold, for example, are concentrated at Agia Triada and at Platanos. The distribution of bronze (EM II–MM I) triangular daggers in the Western Mesara tombs illustrates this pattern: Agia Triada (unrobbed tomb), 41; Platanos (half-destroyed), 14; Marathokephalon (one-third destroyed), 5; Koumasa (unrobbed), 5; Sivas (robbed), 3; Lebena (unrobbed), 1.

In simplified form, one can imagine three possible economic networks that would explain this restricted distribution. In the first network, central settlements in the plain such as Agia Triada and Platanos sent their surpluses of agricultural produce to the north coast in exchange for copper, gold, obsidian, and other products. In the second possible network, these same centers obtained certain specialized goods, such as Fine Painted ware, from peripheral Mesara sites in return for surplus agricultural produce. The centers then traded these specialized goods northward for copper and other valuables. According to this second scenario, outlying sites would have obtained some foreign materials, such as obsidian and smaller amounts of metals, through their center. In such a network (figure 8.3), Phaistos and Agia Triada would have exchange connections with Sopata Kouse, Moni Odigitria, Agia Kyriaki, and Kaloi Limenes. Platanos may have exchanged goods with smaller communities within its own orbit, for example, Porti, Krotos, and Lebena. Koumasa would have dealt with Saleme, Agia Eirene, and Trypeti. The third possible network would consist of all settlements, large and small, in the Mesara trading directly with the north coast.

All three of these networks probably existed to some extent. Nevertheless, only the second network explains both the export northward of specialized Mesara ceramics and the southern centers' retention of control over imported copper (used for bronze weapons). Our second network resembles, in miniature, "center-periphery" economic structures (Frankenstein and Rowlands 1978; Rowlands, Larsen, and Kristiansen 1987; Stein 1999) that have been identified in prehistoric Europe and the Near East. Such systems can consist of a core area with a large(r) population and favored natural resources, surrounded by more sparsely settled marginal environments, or a populous resource-poor core and richly endowed marginal areas. In either case, peripheral groups seek economic and social relationships with powerful families in the core area, while core groups seek materials and labor from the periphery. At the same time, the heads of certain kinship groups within the core use their access to foreign resources to gain political status within their society (Kipp and Schortman 1989).

Trade contacts between the Mesara and Egypt began to grow closer in EM IIB, stimulated perhaps in part by the Mesara's loss of access to Aegean markets (see below). At Lebena, four small rectangular rooms were added to tomb II (Alexiou 1960) at this time, probably in EM IIB. Alexiou interpreted these annexes as cult rooms where libations were offered to the dead. Close parallels for this practice existed in contemporary Egypt, where food and drink in vases were placed in the antechambers of mastabas (Smith 1938: Plates 21 and 22; Spencer 1982:56–63, 222–223 and Figure 98). "Fruitstands" (a pedestaled offering stand) from the tombs at Agia Triada, Koumasa, and Agia Kyriaki are clearly clay imitations of an Egyptian serving table with a plate (Emery 1961:243, Figure 142 and Plate 37) known from funerary contexts. The foot amulet from an EM II level in tomb IIA at Lebena is also derived from an Egyptian type (Pini 1972). Additionally, two Sixth Dynasty-type stone vases found at Mochlos on the north coast may have arrived at the site then (A. Bevan, pers. comm., 2001).

In EM IIB, Mesara trade connections with Knossos apparently ceased (Wilson 1994:41) or at least were reduced (Whitelaw, pers. comm., 2000). Additionally, both Knossos and the Mesara lost contact with the wider Aegean in EM IIB. Wilson (1994:43) has suggested that the cessation (or reduction) of trade relations between Knossos and the Aegean may be related to disruptive conditions in the Cyclades during the time of the Kastri-Lefkandi I and Agia Irini groups. These conditions, however, do not explain the stoppage of trade between the Mesara and Knossos, since both areas continued to import Vasiliki ware from East Crete. Wilson (1994:42) has also hypothesized the rise in EM IIA of a central authority at Knossos. If so, a rivalry may have developed between Knossos and the Mesara in EM IIB. Perhaps the two areas became competitors over Aegean materials that were no longer easily accessible.

Ideology

Evidence for EM II ideology in the Mesara comes mainly from funerary contexts (Pini 1968; Branigan 1970b, 1993). The dead were buried in tombs with food and drink, implying a concept of the afterlife. Some Mesara tombs were provided with seashells and beach pebbles, as if the soul were set to journey across the water to reach the afterworld, as was believed in Egypt. Libations were made outside the main burial chamber in veneration of the dead ancestors. The unique monumentality of the tholoi (plate 8.3) indicates their symbolic importance. Tholoi give the impression of having been markers that defined the kindred identity of each group through their buried ancestors, and hence that group's claim to the surrounding land. On the basis of tomb finds, Branigan (1993:124–139) has identified tomb-side ceremonies involving dancing, bull fighting, feasting, and music.

Symbolic artifacts from domestic contexts in the Mesara are more rare. Many small, thin figurines, most likely worn as amulets, are recognizably female, while more schematic, oblong, and phallic-shaped ones were probably male (Branigan 1969; 1970a; Warren 1973b). These figurines may depict ancestors and/or deities. Kernoi, slabs whose surfaces bear sets of small depressions, found in courtyards outside houses at Myrtos/Fournou Koriphi and Vasiliki, and inside a room at Trypeti, may have been used in family-based cult. A domestic bench shrine with a female figurine is known from Myrtos/Fournou Koriphi (Warren 1972 and 1973b). EM II cult in the Mesara seems to have been celebrated at the level of the family or individual community. Goodwin's demonstration (1998) that the Mesara tholoi exhibit solar and lunar alignments may point to some form of religious belief connecting the dead to cosmic elements.

EM II Social Organization

Identifying social complexity on the basis of archaeological data is rarely straightforward. Aside from basic theoretical ambiguities involved in interpreting material culture, distinguishing standard stages of social evolution, such as chiefdoms, has become increasingly problematic (see chapter 2). A neoevolutionary view (Branigan 1988; Warren 1984a) of Minoan social development posits that Prepalatial society in Crete passed through a "chiefdom" phase before state formation. A chiefdom, we remember, is defined as an autonomous and hierarchical regional polity comprising a number of communities organized along kinship lines under the two-tiered control of a paramount leader (Flannery 1972; Carneiro 1981; Earle 1991a). Most archaeologists (Earle 1991a; Flannery 1972; Peebles and Kus 1977; Wright 1977, 1984) agree that a combination of several of the following archaeological features, or correlates, constitute evidence of hierarchically organized complex societies that, for the sake of convenience and cross-cultural comparison, have been called chiefdoms (Stein 1999:122). These features include:

- multilevel settlement hierarchy
- differentiation in grave goods
- agricultural intensification
- monumental public architecture
- concentrations of precious (or exotic) raw materials in regional centers
- long-distance trade in these materials
- attached craft specialization
- centralized storage and redistribution facilities
- complex, centralized administration

Let us consider each of these correlates as they apply to the EM II Mesara. In a few cases, additional evidence from elsewhere in Crete will be adduced.

Settlement hierarchy. Within our survey area, site ranking is certainly present. Village-sized Phaistos was the largest settlement in the region (figure 8.1). The local settlement hierarchy (figure 8.4) suggests that Phaistos possessed a core catchment area with a radius of 2–5 km, perhaps 35–70 km^2 surrounded by a larger "territory" with a radius of approximately ten kilometers (300 km^2 in area). Further to the east, Platanos may have been the center of a similar society, controlling a core area of approximately 40 km^2 (figure 8.3). The borders of Phaistos's core catchment are marked by the settlements at Kommos, Sivas (site **109**), and Sopata Kouse (site **112**), where families buried their dead in local tombs rather than in the cemeteries at Phaistos or Agia Triada. At Phaistos and Agia Triada a small group of families would have controlled the best agricultural land and foreign trade. Below this group, there would have been less prosperous families at Agia Triada and Phaistos (some of whom probably worked on the farms 1 to 3 km from Phaistos (that is, sites **16**, **39**, and along the ridge south of Kamilari) as well as separate kinship groups living around Kommos, Sivas, Odigitria, and in the Agio Pharango Valley. Rural settlements outside the immediate core area, situated near pockets of poor arable land and water, possessed their own tomb complexes. These smaller rural communities thus had their own ceremonial funerary centers and controlled their surrounding territories, usually no more than 2–4 km in extent.

Phaistos possessed a population of approximately 150–450 persons. Kosse (1990) has suggested that because 500 persons represents the human limit of face-to-face information processing, a "political unit" of 500 represents something of a threshold for the necessary formation of hierarchical social structure. Worldwide ethnographic studies (Kosse 1990:281) suggest that this decision-making unit is almost always restricted to adult males, hence the total settlement population (assuming nuclear families of five persons) for such a threshold would be 2,500. Kosse's synthesis of ethnographic and historical data concludes that there are three thresholds that affect the social structure of a society.

Speaking of the decision makers or managerial elite, Kosse (1990:287) writes: "Finally, while ethnohistoric and historic data suggest the presence of thresholds at 500 ± 100 and 2500 ± 500 and also possibly at 150 ± 25 in human groups, it may be objected that the thresholds are an artifact of the classificatory used." A number of studies based on different samples seem to show the presence of the same thresholds, however. Using a random sample of twenty-five ethnographic examples, Naroll (1962) finds the 500 threshold significant: "where gatherings normally never exceed a few hundred, no authoritative officials are needed . . . But . . . when [gatherings at] settlements contain more than about five hundred people they must have authoritative officials." Lekson (1984), in a random sample of forty-five nonindustrial agricultural societies, finds a clear boundary between simple and politically complex societies at a settlement size of 2,000–2,500. Hence, according to these studies, the estimated population resident at Phaistos (approximately 450?), the total population in the core area of Phaistos (approximately 700?), or the overall population (approximately 1,200+?) of the greater region surrounding Phaistos (figure 8.3) would not necessarily imply social complexity.

Differentiation in grave goods. In an excellent study, Keswani (1989:38–98) has discussed the many physical and theoretical problems inherent in the social interpretation of finds from collective tombs. She emphasizes that investigators should pay attention to the amount of energy expended on artifacts, the array of status items in one tomb relative to others, and the presence of varied artifact assemblages. EM II burials in the Mesara include obsidian, pottery, a few stone vases, daggers, necklaces of clay and stone beads, sealstones, figurines, and, rarely, gold items (Pini 1968; Branigan 1970b). The concentration of prestige goods in the Agia Triada-Phaistos area, and at Platanos, should reflect the wealth of these communities relative to other settlements in the Mesara. EM II elite items (Branigan 1970b: 165–169), such as bronze daggers, gold jewelry, Cycladic imports, and stone vases (Warren 1969:117–123), were concentrated in tombs at Agia Triada, Phaistos, Platanos, and Koumasa. It may not be coincidental that in Old Kingdom Egypt, inscribed stone vases (Roth 1991:145–195) were used by kinship groups for rituals. The large settlement and tomb size (see below) at Agia Triada, Platanos, and Koumasa as well as the tomb contents corroborate the elite standing of these three sites.

This ranking also receives some corroboration from the finds within the tombs themselves. Kalathiana was robbed, but did produce daggers and many gold objects. Xanthoudides (1924:83) believed it to have been one of the richest tombs in the Mesara. Agia Triada A, Platanos A, and Koumasa B yielded significantly large numbers of copper daggers. (Phaistos cannot be discussed here because its cemetery on the Ieroditis Ridge remains almost completely unexcavated.) EM II stone vases also cluster at these same tomb sites: Agia Triada (3–5), Platanos (3–5), Koumasa (2?). Gold items that can be securely dated to EM II are only known at Agia Triada, Platanos A, and Kalathiana.

Tomb contents at these three main sites also point to some degree of internal social ranking within each of these communities beginning in EM II (and continuing at least into MM I). At Agia Triada, Tholos A is larger than Tholos B, and unlike Tholos B, continued to have large annexes added to it after EM II. Despite the fact that Tholos B was half-destroyed, we can see that it was not as rich as Tholos A. Tholos A produced 50 daggers, while B yielded two to eight examples; Tholos A contained 12 figurines, 108 sealstones, and 29 amulets; Tholos B apparently lacked any of these artifacts (Branigan 1970:165). At Koumasa, tombs A, B, and Gamma were built in EM IIA, but only the largest tomb, Tholos B, continued in use beyond the EM IIA period. Similarly, Koumasa Tholos B contained 8 figurines, 24 daggers, and 20 sealstones, while Tholos A had only one figurine and fewer daggers and seals (Xanthoudides 1924). Since each tomb almost certainly represents a single social group, these tomb contents seem to indicate that by EM II one group within each of these communities was socially ascendant.

However, emblematic goods associated with ascribed rank (Wright 1984; Keswani 1989, for example, unique items, foreign-inspired objects, and objects with cosmic iconography, made for elite display, are missing from EM II tombs. On the other hand, if one were willing to assume that each dagger found in the tombs at Agia Triada, Platanos, and Koumasa was owned sequentially, then the Mesara dagger might be interpreted as a chiefly insignia, a unique status object like the later MM II gold-hilted dagger (Xenaki-Sakellariou 1986) from Odigitria. The Mesara daggers may have well have been status objects. But to assume that the daggers from Phaistos, Agia Triada, or Platanos were chiefly insignia, and on that basis, posit the existence of chiefdoms, would be circular reasoning.

EM II tombs at Mochlos in East Crete exhibit the same hierarchical patterns (Soles 1986). As in the Mesara, the EM II tombs at Mochlos (Soles 1992:42) are all of one type, house tombs, whose differentiation consists of variation in wealth and tomb size, rather than in distinct tomb type and assemblages or ascribed artifacts (such as the leopard-shaped stone ax or long swords from the Malia palace, that only appear in the MM period). It is worth remembering that variability in tomb content may be due to any of a number of reasons—group size, wealth, and trade contacts—rather than structured rank distinctions (Keswani 1989). Hence, the EM II material record is best interpreted as the product of a ranked, rather than a stratified, society.

Intensified agriculture. Land use in the Asterousia does intensify in EM II but seems related to local population levels rather than to a need to pay centrally prescribed tribute.

Monumental public architecture. The only monumental architecture known in the EM II Mesara is the tholos tomb. These structures, often gigantic in size (plate 8.3), can possess inner diameters in excess of 8 m and walls built of boulders weighing over two tons. Branigan (1970b:143–150) reports almost forty examples located in the area between Agia Triada and Drakones. As burial places of social groups, tholoi exhibit signs of ranking. Four tholos tombs, Agia Triada A, Platanos A, Kalathiana, and Koumasa B are distinctly larger than other EM II tombs in the region (table 8.3). Each of these large tombs is located in its own area of the Western Mesara, with no nearby tombs of comparable size.

Domestic architecture in the Mesara is poorly documented. The only EM II houses known, at Agia Triada and Trypeti, show little differentiation. In East Crete, however, at Vasiliki, one, or probably two, large, two-storied EM IIB houses (Zois's Red House) dominate the summit of the settlement (figure 8.6a). Two ancillary structures (Zois's West and Southwest Houses) were subsequently built next to the Red House. Their excavator, Seager, called them "sheds" and "servants' quarters or storerooms"

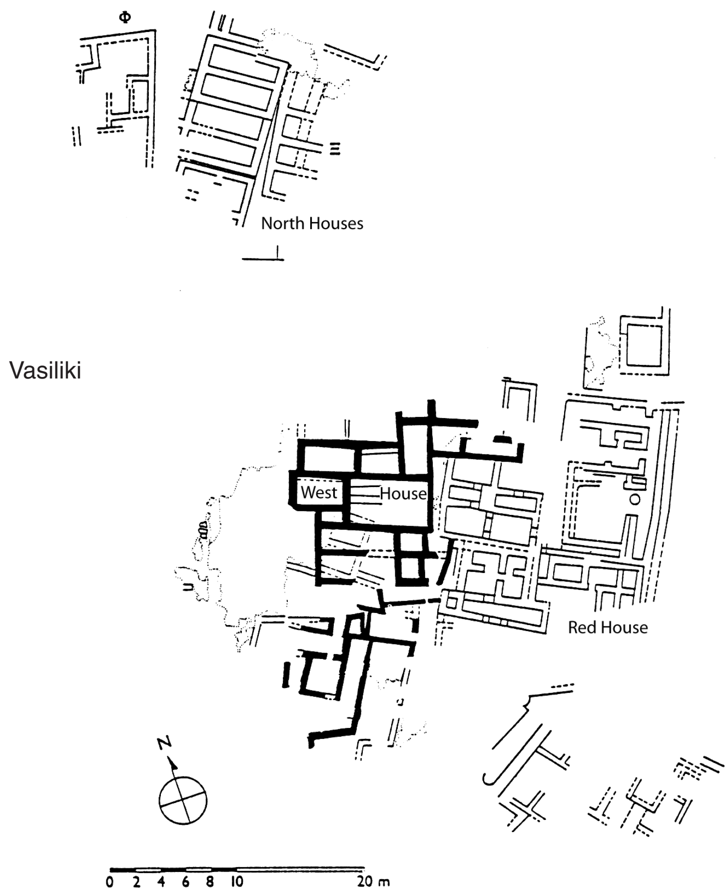
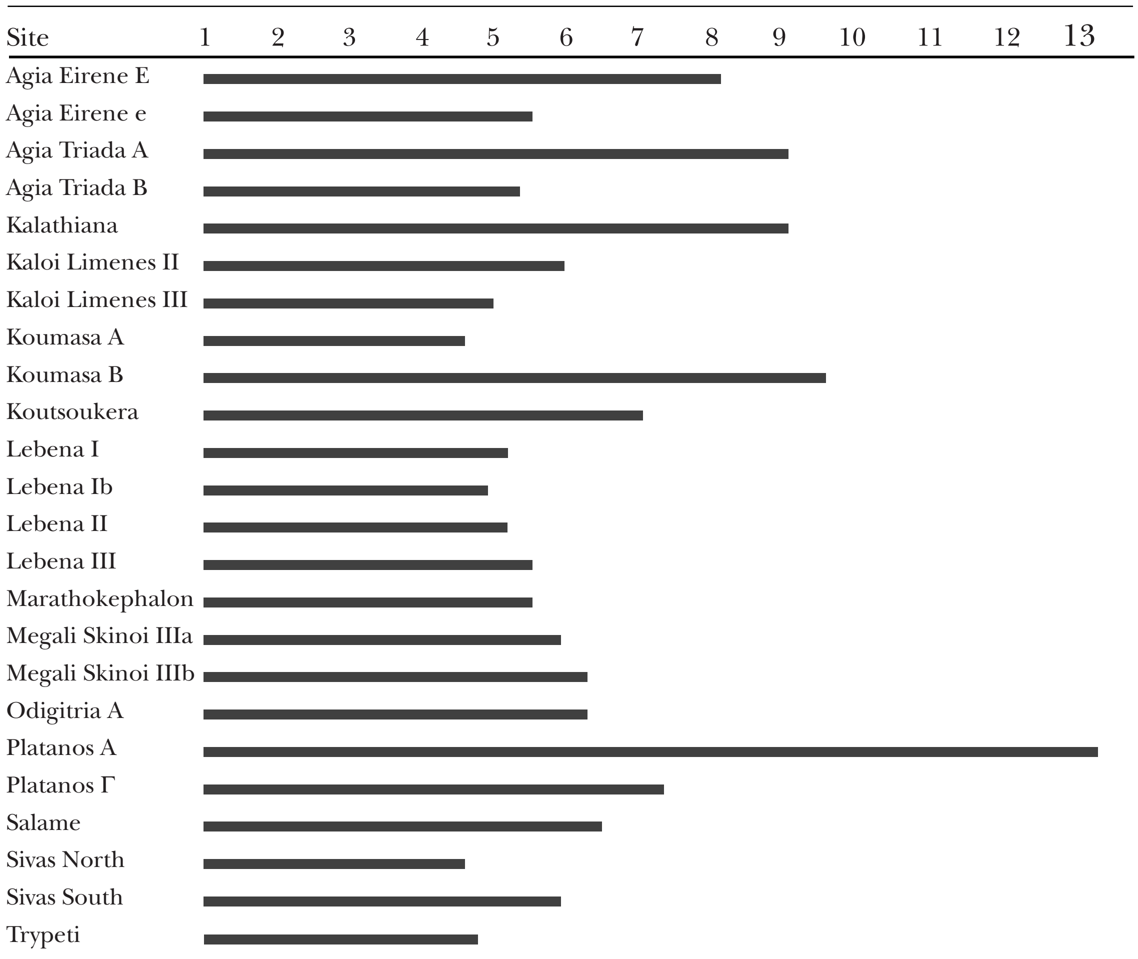


FIGURE 8.6A. Plan of EM II Vasiliki

FIGURE 8.6B. MM II Quartier Mu at Malia

TABLE 8.3. Size of Minoan II tholoi



Source: Branigan 1970:30

(Seager 1905:210; Hawes et al. 1908:49). Groups of *pithoi* were reported from south of room 43 in the Red House and in the Southwest House, suggesting that Zois's Red House may actually be two houses (Watrous 1995:709). During EM IIB, Vasiliki was the largest site in the northern Isthmus of Ierapetra, an area of approximately 10 km^2. Hence, it is tempting to identify the residents of these houses as the leading families in the northern Isthmus. The owners of the Red House(s) imported Aegean copper that may have been smelted at Chrysokaminos on the coast (Betancourt et al. 1999) and probably controlled the local production and widespread exportation of Vasiliki ware. If it could be shown that individuals lived and/or worked as dependents in the West and Southwest Houses, then there would be an EM II precedent for the MM II social organization of dependent labor visible at the complex of Houses A and B and their ateliers in Quartier Mu at Malia (figure 8.6b).

Nevertheless, it is important to keep the evidence from Vasiliki in perspective. The elite families at Vasiliki and at Mochlos (the owners of Tombs I/II/III and IV/V/VI) possessed disproportionate amounts of inherited wealth and hence are evidence of a ranked society. However, this is not the same thing as a chiefly society with an ascribed ruler. Nowhere in EM II Crete (Zois 1982) does there exist a sign, in domestic or funerary architecture, of an administrative authority, as, for example, does seem present in the Corridor Houses on the Early Helladic (EH) II mainland. The EH II Corridor

Houses exhibit a crucial feature—administrative control over a centralized storage facility—that is missing at Vasiliki. Three other observations are also relevant. First, the Corridor Houses are a formal architectural type known in several parts of the mainland, suggesting that they represent an ascribed social position for a ruler. No such formalized ruler's house has yet been recognized on Crete. Secondly, seals, representative signs of administrative practice, were more complex (compare Sbonias 1995:74–81 and Heath 1958: 81–121) in the EH II mainland than in contemporary EM II Crete (Sbonias 1995:144–145). Thirdly, settlement size, a rough correlate of social complexity, on the mainland (20+ ha) (Konsola 1986) was larger than even the largest EM II settlements (approximately 5 ha) (Whitelaw 1981) known on Crete.

Concentration of prestige goods at regional centers. As noted above, the cemeteries at Agia Triada, Phaistos, Platanos, and Koumasa do show a higher proportion of imported and specialized goods than other tombs in the region. The distribution of bronze daggers indicates certain groups within the communities of Agia Triada, Platanos, and Koumasa had privileged access to elite goods (figure 8.3). The degree to which one interprets these daggers symbolically will determine one's willingness to identify a prestige element in the EM II economy (Friedman and Rowlands 1977) of the Mesara. Based on the stratigraphy in Tholos A at Platanos, triangular daggers can be dated primarily to EM II and long daggers to MM I–II. Table 8.4 suggests that at each site, one social group within the community had privileged access to bronze weapons.

Long-distance trade in these materials. During EM I and EM IIA, local ceramics were exchanged with the north coast in return for metals. Vasiliki ware found in the Mesara tombs indicates that trade with East Crete continued in EM IIB.

Attached craft specialization. Some of the Mesara potters who produced the Fine Painted ware for export may have been attached craft specialists. The long period (EM I–IIA) of this exchange may imply that over time some families specialized in certain local crafts.

Regionally centralized storage and redistributive facilities. Evidence of a centralized redistributive economy, such as a central storage facility, is missing in the Mesara.

Complex, centralized administration. Evidence for EM II administrative activity remains scarce: that is, sealings from Myrtos/Fournou Koriphi, Trypeti, and Knossos, a nodulus from Malia, and several pots bearing a seal stamp (Perna 1999). Based on the lack of differentiation in EM II glyptic designs, Sbonias (1995:145) has concluded that EM II seals were not used to administer trade networks beyond the individual community level. Weingarten (1990:105) has also pointed out that the use of seals on pottery need not imply the existence of a complex administrative system. On the other hand, Schoep (1999) has recently suggested that the EM II sealings,

TABLE 8.4. Distribution of triangular and long daggers in tholos tombs

Triangular Daggers (EM II–MM II, mostly EM II)					
Agia Triada	A	35	B -		A or B: 5
Platanos	A	10	B -	G 1	A, B, or G: 3
Koumasa	A/E	2	A/B 1	E -	A/E, A/B, or E: 2
Long Daggers (EM II–MM II, mostly MM I–II)					
Agia Triada	A	3	B	3	A or B: 2
Platanos	A	37	B -	G -	A, B, or G: 11
Koumasa	A	-	B 20	E -	A or B: 9.

nodulus, and stamped vases imply the existence of complex centralized administration in the Prepalatial era. However, as Schoep admits, these artifacts do not come from contexts indicative of a central authority, and thus they may have been part of a network that functioned at the household or kinship group level within and between settlements.

Schoep's argument might imply that complex administrative features are equivalent to political centralization. However, current studies of social complexity (chapter 1) demonstrate that this need not be so. It does not necessarily follow that the existence of EM II seals and sealings implies that they were part of a centralized system governing a regional economic network. EM II seals, sealings, and their contexts, in fact, suggest the opposite. In contrast to the Protopalatial pattern, they are largely decentralized and local, as at Trypeti and Myrtos/Fournou Koriphi.

Hence, it seems that Bronze Age social evolution in Crete (chapters 8 to 10) passes through three separate phases: ranking (EM II), stratification by class (MM IA), and political centralization (MM IB).

Based on the above discussion, we can conclude that the EM II Mesara

has signs of:	does not have signs of
three-tiered settlement pattern	subordinate village pattern
staple finance	wealth finance
social and economic ranking	centralized redistribution
prestige economy?	ascribed rank
attached craft specialization	centralized storage
cosmic ideology	royal burials

Our archaeological data indicates that social complexity, probably in the hands of hereditary elites, existed in the EM II Mesara. At centers where we possess burial data, the tombs suggest that the local community was divided into two or three probably competitive social groups. At Agia Triada, the community apparently consisted of two separate groups, buried in Tholoi A and B; Platanos had three groups, represented by Tholoi A, B, and G. At EM II Mochlos there were two elite tombs within the larger cemetery, and at Vasiliki the Red House complex seems to have actually been two houses. Writing about socially complex groups, Renfrew (1974:74) distinguished between "individualizing" and "collective" (or "group-oriented") societies. The latter type of society stressed communal monuments, collective ritual, kinship affiliation, and group decision making, with less emphasis on individual wealth or status (see chapter 2). Communities in the EM II Mesara were socially complex: they were territorial societies with systems of elite kinship. Their social practices suggest that they were group-oriented communities. Communal customs, such as collective burials in tholoi and group ceremonies held in communal courts, prevail in the EM II Mesara, whereas individual chiefly traits, such as royal burials or residences, ruler's insignia or iconography, and centralized storage or redistribution, are absent. In addition, the Early Bronze Age pattern of settlement, consisting of separate and independent communities, established a traditional regional structure of equal social groups, a lasting feature of Minoan culture.

Following the discussion above, it may be appropriate, for methodological reasons, to refer briefly to the ancient political situation in a much studied area of the New World. In the Basin of Mexico during the Early Terminal Formative Period, circa 300–100 BC, just before the formation of the first state at Teotihuacan, there is clear social ranking without evidence for individual rulers or "chiefs." On the basis of neoevolutionary theory, earlier archaeologists (Sanders, Parsons, and Santley 1979) assumed that the first city-states in Mesoamerica had been preceded by chiefdoms. More recently, a new generation of scholarship (Drennan 1991; Santley 1993; Blanton et al. 1996) emphasizes the integrated, cooperative, and corporate nature of the economic, political, and religious strategies within and among stratified kinship groups of the region (Charlton and Nichols 1997:183). This same situation appears to exist in the EM II Mesara.

In the Western Mesara, EM II communities outside the immediate catchment of Phaistos were smaller and less powerful by virtue of their reduced population, agricultural capacity, and access to elite goods. Fissioned in large part from Neolithic and EM I Phaistos, peripheral communities may have acknowledged derivative kinship ties to the ancient center. In addition, these communities were also probably bound to Phaistos by varied and fluctuating degrees of economic dependence. Thus, relations between central elites and peripheral communities in the Mesara may have been voluntary and mutually beneficial at some times and constrained or even forced at other times.

Nevertheless, these rural EM II communities possess features suggestive of political independence. Settlements were widely spaced, divided by rugged landscape, and, at least ideally, agriculturally self-sufficient. Quite a few, for example, Sopata Kouse, Kommos (Vigles), Charakas south of Kommos (Shaw and Shaw 1995: Plate 7.15), Marathokephalon, Kalathiana, Lebena, Trypeti, Koumasa, Kephala Odigitrias, and Megali Skinoi were defensively situated on ridges or hilltops (Alexiou 1979). Most importantly, these communities also possessed their own monumental ceremonial courts. In the recent ethnographic record, the mountain and plains communities of the Mesara (chapter 6) have displayed a similar oscillation between violently guarded independence and economic interdependence.

THE PROBLEM OF EM III

The EM IIB period (figure 8.7) was marked by the destruction and abandonment (or near abandonment) of certain sites on Crete, such as Myrtos/Fournou Koriphi, Myrtos/Pyrgos (Cadogan 1977/1978), and Vasiliki. Kommos (Betancourt 1990:27; Rutter, pers. comm., 2001) was deserted in EM II (for the hilltop of nearby Vigles?). We know little about Phaistos during this period. A deposit over the EM II house under Cortile LXX produced pottery stylistically assignable to MM IA, although some of the material could have been earlier (Levi 1957/1958:169–178). Several excavated tombs in the Mesara, at Agia Eirene, Agia Triada (tomb B), Lebena (tombs I, IB, II, IIa, and III), and Platanos (tombs A and Gamma), show a gap in use between EM II and MM IA (Warren 1969:193–197; Soles 1992:201). Alexiou (1960:227), who excavated the unrobbed tombs at Lebena, stated explicitly that there was a gap

Comparative Chronology of the Aegean and the Near East, ca. 2500 – 1800 B.C.

	Knossos	Mallia	Vasiliki	Mochlos	Cyclades	Troy	Tarsus	Kültepe	Ebla	Egypt
2500 B.C. – 2400 B.C. (EM IIA)				Wealthy Tombs 1–8, 9,10, 13, 19, 20, 21, 23, possess: bronze, gold,	EC IIA	II	EB II; Final EB II destruction	Mound 17–14		Dynasty V
2400 B.C. – 2300 B.C. (EM IIB)	South Front Early Houses Deposit; RRN, floor V		Seager III; Red House West Houses		EC IIB; Lefkandi I/ Kastri Phases	International contacts	EB IIIA; Contacts with Syria and West Anatolia		Mardikh IIB1	Dynasty VI ca. 2340–2180 B.C.
2300 B.C. – 2200 B.C.	Imported Egyptian stone vases	Destruction by fire	Access to obsidian, copper		Anatolian Contacts	Trade with the Cyclades; IIg; Fortifications City looted		Mound 13–12; Three destructions in EB II–III	Sargonic period; Destruction ca. 2250 B.C.	Internat'l trade
2200 B.C. – 2100 B.C. (EM III)	Upper East Well; "period of isolation"		Destruction by fire; Seager IV; "poorly built hovels"	"time of retrenchment"; "decline in population"	EC III; Kea, Kastri deserted	III; Decline	EB IIIB	Mound 11; Little sign of trade	IIB2; "Economic Recession"	F.I.P. ca. 2180–2134 B.C.; Peak period of drought & famine
2100 B.C. – 2000 B.C. (MM IA)	West Court Houses	Premier Charnier	Seager V	Blocks A, C, D, MMIA Building and Tombs 1–3, 7, 11, 13, 16–17, 22	MC I; Phylakopi Iii	IV			EB IV destruction	Dynasty XI
2000 B.C. – 1900 B.C.	RR Basement, lower level	South Houses	Houses A, B, G, F, X		Exports to Crete, Mainland	V	MB I	Karum Kanesh IV–III; Karum Kanesh II	IIIA	1963 B.C.; Dynasty XII
1900 B.C. – 1800 B.C. (MM IB-II)	Early West Magazines; Trial KV: Village	Town Group; Quartier Mu		House D	Increase in overseas interconnections	Renewed international contacts		Old Assyrian trade; Karum Kanesh Ib	Foreign contacts	Expansion of foreign trade

Revised May 2000

FIGURE 8.7. Chronology of Crete and the Eastern Mediterranean

in the use of the tombs between EM II and MM IA. In one case (tomb IIa), this gap was observed stratigraphically.

As in the Agio Pharango survey (Blackman and Branigan 1977:68), our project recognized no EM III pottery. No EM III deposits from the Mesara have yet been published, but Andreou (1978), Warren and Hankey (1989:17–21), and Walberg (1983:91–104) have described the post–EM II ceramic development (appendix E) in central Crete. The EM II ceramic phase is a mixture of old and new traditions: dark-on-light decoration (in local Agios Onouphrios style) continues, but becomes less common than light-on-dark designs. EM IIB shapes, such as the footed goblet and beaked jug and bowl with an everted rim, persist alongside new forms, such as the flat-based tumbler, one-handled rounded cup, and bridge-spouted jar.

The crucial question is whether our failure to recognize this ceramic phase was due to: (a) problems of ceramic identification, or, (b) the actual absence of such pottery in the region. The only possible feature of EM III that we were able to recognize was small amounts of Agios Onouphrios decoration, which is also the hallmark of local EM I–II. Thus, there is the possibility that some of the pottery we identified as EM II was actually EM III in date. It is also possible that at present we cannot recognize the EM III style in the Mesara. Without excavated deposits of local EM III, we cannot resolve this problem with any certainty. Intuitively one would assume that the first explanation (a) is partially true. Nevertheless, if the problem of ceramic identification has some validity, the abandonment of sites in the region may have been a slow process, with some sites continuing into EM III. Rural abandonment may have only became substantial by the end of the EM III period. This possibility is discussed more fully in appendix E. For the above reasons, the EM III period does not appear on our chronological maps.

On the other hand, there is some evidence that the EM III gap in Mesara settlement is real. The overarching problem with identifying an EM III ceramic phase on Crete has stemmed from the rarity of stratified material assignable to this phase everywhere on the island (see appendix E). For our present purposes, it is enough to point out that this rarity alone implies that the period was one of population loss. Stratigraphy at local excavated sites, much more trustworthy than survey data on this question, also indicates that widespread settlement abandonment began in EM III and continued into the early part of MM IA. Presently, we cannot date the beginning of the EM II–III abandonment phase of Cretan sites precisely. At Knossos, however, there is now some evidence that the nucleation of the MM settlement may have begun in EM III (Momigliano 1991; Whitelaw 2000). For the Mesara, our MM IA evidence (chapter 9) indicates that the period of rural abandonment certainly dates in part to the early phase of MM IA.

In summary, both of the above explanations seem partially true. The possible causes of this phenomenon are discussed in the next chapter.

9

State Formation (Middle Minoan IA)

L. Vance Watrous

"... a fresh attempt [at explaining the rise of Aegean complex societies, as was first done in Renfrew, *The Emergence of Civilisation*, 1972] today would set more emphasis upon social and political factors, especially in Crete. It might well emphasise the crucial nature of the transition there to the first palaces in what was probably a rather short space of time."

—C. Renfrew, *Approaches to Social Archaeology*, 1984:254

In the first section of this chapter, we present data for the settlement, craft production, exchange, and ideology of Middle Minoan (MM) IA society in the Western Mesara. In the second part, we assess earlier scholarship on the question of Aegean state formation. The third section offers a reconstruction of the MM IA (late Prepalatial) process of state formation in the Western Mesara and in Minoan Crete.

Middle Minoan IA Society

Settlement Data

In the MM IA period, settlement in our survey area was nucleated at Phaistos. The number of MM IA settlements (figure 9.1) in our area dropped radically, perhaps as much as 78%, from Early Minoan (EM) II levels. Aside from the excavated sites of Phaistos (**1**) and Agia Triada (**2**), our survey identified four certain and three possible MM IA settlements (table 9.1), as compared to fourteen EM II settlements. We recognized offsite MM IA pottery near Agia Triada (**2**), at Patrikies (**80**), on the slope north of the Kamilari tholos tomb (**7**), and on the Ieroditis Ridge. While Tholos A at Agia Triada contained MM IA vases (Banti 1930/1931), the settlement at Agia Triada has to date produced no MM IA deposits or architecture, although a few MM IA sherds have been recognized from later contexts. Within our survey area, the only new MM IA settlement (**93**) was established in a telltale location—in the Asterousia foothills on the back (south) side of a ridge, hidden from view from the Mesara Plain. In the Kommos survey zone, site numbers also dropped: thirteen EM II settlements were replaced by two certain MM IA settlements. The site of Kommos seems to have been abandoned in this period (Betancourt 1990:27, 64).

Blackman and Branigan (1977:68) have claimed that most of the sites in the Agio Pharango Valley continued from EM II into MM I. However, they acknowledge that they distinguished little EM III and very little MM IA material (discussed in appendix E). They identified one possible MM IA settlement, as compared to eleven EM II settlements (nine certain, two possible). Five tombs (two certain, three possible) were said to be in use in MM IA, a drop from six EM II tombs (five certain, one possible). Regardless of one's assumptions about the local ceramic sequence (see appendix E), settlement in the Agio Pharango also seems to have dropped off in this period.

Elsewhere in the Western Mesara, the pattern of settlement, although less well documented, was similar to that around Phaistos (figure 9.2). Larger sites continued and perhaps even grew in this period, while rural settlement seems to have decreased. Numerous MM IA finds from tombs at Platanos and Koumasa suggest that their communities were sizeable. Other tombs, at Platanos, Koumasa, Lebena, Marathokephalon, Odigitria, and Porti also indicate that their settlements were inhabited in MM IA.

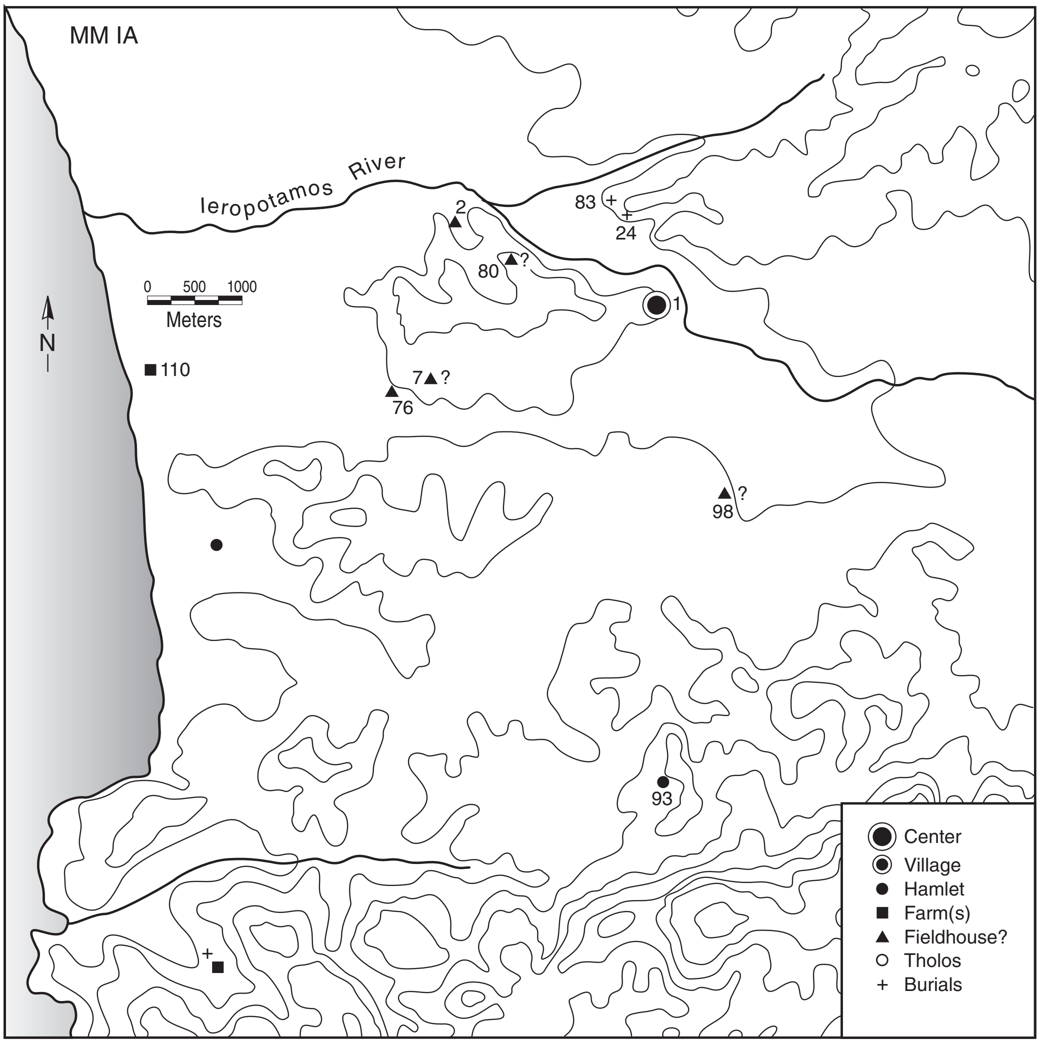


Figure 9.1. Middle Minoan IA sites in the Western Mesara. Kommos survey sites unnumbered.

Table 9.1. Middle Minoan IA sites in the survey area

Site	Size	Land Class	Function	New
1	27 ha?	I	Settlement	—
2	Small	I	Settlement	—
7?	Small	II	Settlement	New
24	80 x 100 m?	—	Cemetery	—
76?	Small	II	Settlement	New
80	50 x 50 m	I	Settlement	—
83	40 x 35 m?	—	Cemetery	—
93	80 x 110 m?	II	Settlement	New
98?	Small	I	Settlement	—

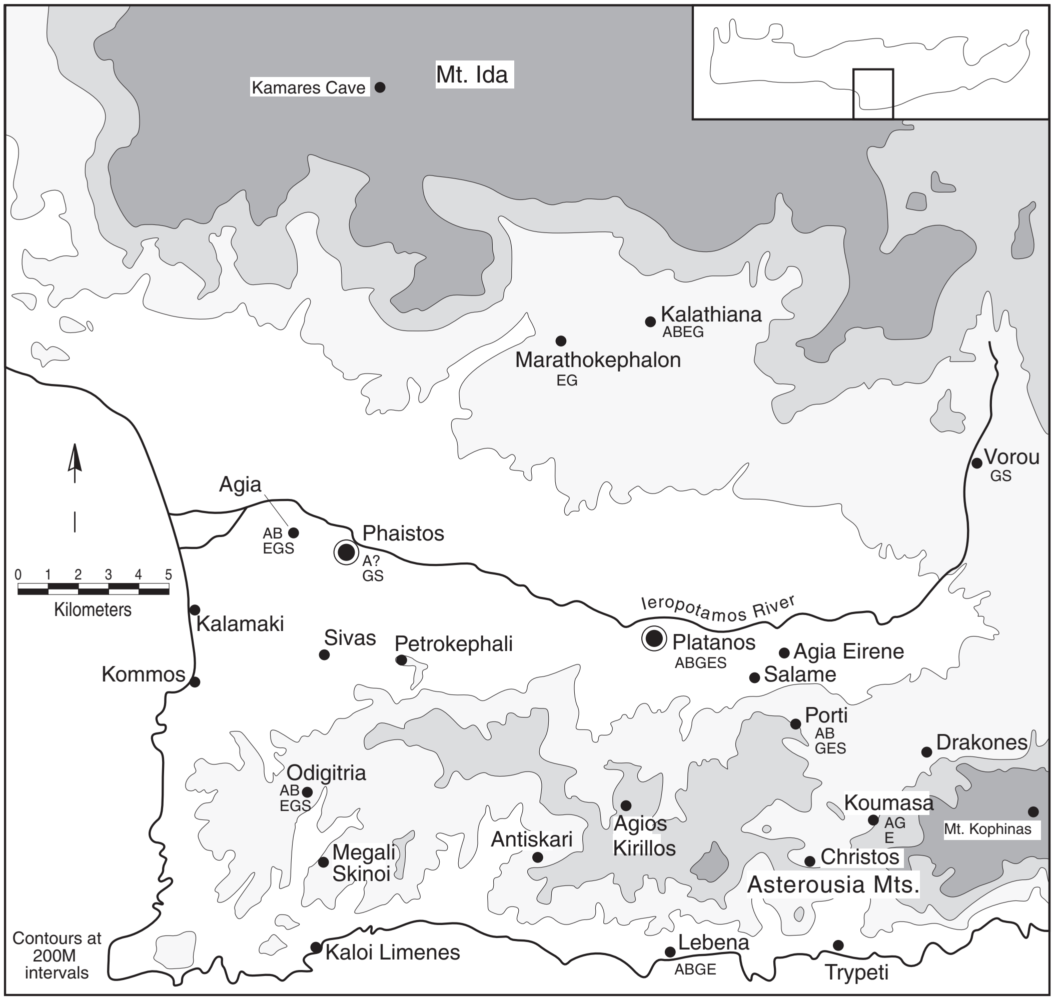


FIGURE 9.2. Map of the Mesara in the Middle Minoan IA period. Legend : A = Gold object. B = Bronze objects (daggers). C = Cycladic import. E = Egyptian or Egyptianizing object. G = Seals. J = Jewelry . O = Obsidian. S = Stone vases.

Several tombs, however—Koumasa (Tholoi A and Gamma), Sivas (North), Salame, and Megali Skinoi (Tholos IIIb)—were abandoned before the MM period (Warren 1969:193–196). The only stratified MM IA tomb deposit known is at Lebena Tomb IIA, where the basal EM II stratum was deliberately sealed with a level of sand before the tomb was reused in MM IA. As the excavator (Alexiou 1960:227) remarked, this stratiraphy does not suggest continuity of use. Other tombs, such as Agia Eirene, Agia Triada B, Sivas, and Kouse Sopata (**112**), may also have ceased to be used in this period. This discontinuity suggests that some local inhabitants may have emigrated from the Mesara to other parts of the island—perhaps to Archanes, Knossos, and Viannos, where Mesara-type tholos tombs were built in MM I. Other locals may have moved elsewhere within the region, since at this time new tombs were constructed at Agios Kirillos, Christos, Vorou, and probably Kalathiana (Xanthoudides 1924). The settlements associated with these new tombs were situated on steep, defensible hills or ridgetops, like our site **31** (figure 9.1), above and/or some distance from the Mesara Plain. This is a phenomenon that occurs in many areas of EM III–MM I Crete. In East Crete, for example, defensively situated or fortified sites were established, at Chamaizi, Kato Chorio, Vasiliki, Myrtos/Pyrgos, Agia Photia, and Palaikastro (figure 9.3).

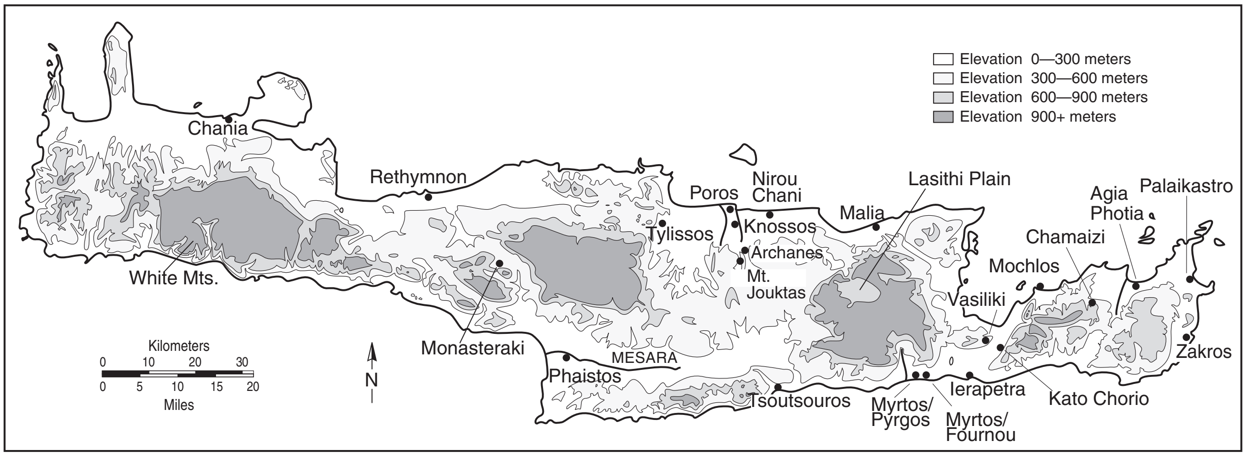


FIGURE 9.3. Map of Crete

One might account for the absence of MM IA sites if rural land had reverted to a more seasonal exploitation, involving use of temporary shelters (compare Bintliff, Howard, and Snodgrass 1999:159 for a similar hypothesis concerning mainland Greece). The case of Agia Triada may strengthen such an impression, for, while the tombs at the site have produced MM IA vases, the excavated settlement has only yielded MM IA sherds. This situation might be explained by a transient, dispersed, or temporary population. Alternatively, the former residents of Agia Triada may have lived at Phaistos and only visited Agia Triada periodically.

Phaistos is poorly known in this period. Pernier and Banti (1935:139–142) found a MM IA building beneath the palace, the walls of which were on a different orientation from the palace. Prepalatial houses and MM IA pottery have also been found in the area of the west court. MM IA pottery was recovered below Piazzale I, in the northeast sector of the site, below room XII of the palace, and in area Zeta on the east slope at Chalara.

Our survey found MM IA sherds on the west slope of the peak of Ephendi Christos, some 600 m beyond the known western boundary of EM II Phaistos, an indication that the settlement at Phaistos grew substantially in MM IA. A parallel development took place in the Amari Valley north of Phaistos; in MM I an extremely large new settlement appeared at Monasteraki (figure 9.3), which apparently represents the nucleated population of the Amari Valley (Kanta, pers. comm., 1994). If we assume that Phaistos was continuously occupied between the areas cited above, we would arrive at a rough estimate of approximately 27 ha for the extent of the late Prepalatial town. Such an estimate may appear generous, since we do not know the density of settlement on the site, but, in fact, it may be minimal, since it does not take into consideration the large southern sector of the MM IB–II city, the area between the palace and the village of Agios Ioannis, about which we know little. Following our demographic estimate (50–100 persons per ha), Phaistos may have had a population of 1,350–2,700 in MM IA. Assuming median demographic values for the sites in our survey area, our local MM IA population appears to have been four times that of EM II.

Craft Production

MM IA crafts showed little continuity of practice from the Early Minoan period. Nevertheless, an increased craft production of MM IA objects, such as bronze weapons, ivory seals, and stone vases, suggests a sharp rise in prosperity. Elite items were no longer confined to centers as in EM II, which may point to a wider distribution of wealth and a more complex economic network.

Warren (1969:183) first noted that there was a sharp rise in the number of new types of stone vases produced in the Mesara beginning in the MM I period. Prepalatial stone vases were either EM II or MM IA (–MM II) types. EM II-type vases were not produced later, and MM I vases differed from earlier categories (Watrous 1994: 715–717). Seals showed the same discontinuous development. According to Sbonias (1995:131 and 150–151), MM IA seals "do not continue any of the older glyptic traditions." MM IA seals were markedly dissimilar from EM II examples, in their material, size, shapes, and motifs (Watrous 1994:714–715). Local ceramic specialization is evident by the end of MM IA, when a workshop at Patrikies (**80**) began to produce a small range of specialized shapes, mostly jugs so-called (teapots). Patrikies-type vases (plate E.5) have been found in the earliest Protopalatial levels at Phaistos, in some of the Mesara tholos tombs (for example, Xanthoudides 1924: Plate 41, nos. 4962, 4964, and 5682 from Drakones; and Daux 1961:844, Figure 7 middle row, left, from Lebena), and Kamares Cave (Dawkins and Laistner 1912/1913:13 and Plate 4). Based on the above evidence, we can see that MM IA Mesara material culture exhibits discontinuities similar to the settlement data from our survey.

Most daggers were produced for centers such as Agia Triada and Platanos. These two sites had their own distinct metallurgical techniques (Branigan 1968:56, 1974:127–128, Figures 11 and 12) and dagger types. Nevertheless, some daggers came to peripheral sites around these MM IA centers—a distribution markedly different from the centralized EM II pattern. The short daggers (type II) typical of Agia Triada are also found at Sivas, Moni Odigitria, and Marathokephalon, just as the Platanos-type and Koumasa-type long daggers (types II and IV) are found at Lebena.

Similarly, large numbers of Mesara seals cluster at the regional centers of Agia Triada, Platanos, and Archanes and sites around them (table 9.2 and figure 9.2). The main stylistic group of Mesara seals, the Parading Lions/Spiral Complex (Yule 1980; Younger 1988; Sbonias 1995:89–99; Blasingham 1989) is concentrated at Platanos. The fifty-six examples that make up this group are of imported ivory. Pini (1981:430) has noted that these seals exhibit Egyptian influence in certain details (hair and lion manes) and motifs (scorpions, lotus blossoms, and ape). A second seal group, the Waveband/Meander Group (Sbonias 1995:151), is concentrated at Agia Triada. "White Piece" seals, a third group, were probably made by workshops on the south coast (Pini 1990; Sbonias 1995:80–83; 102–121). These workshops adopted the Egyptian scarab form and a glazing technique imitative of faience derived from Syria-Palestine and/or Egypt (Pini 2000).

Exchange

The opening of the Middle Bronze Age brought a tremendous expansion of foreign trade in the Eastern Mediterranean. Middle Minoan IA pottery

TABLE 9.2. Distribution of Late Prepalatial seal groups in the Mesara

	Waveband/M.	Spiral	Lion/Spiral	Blade/Ivory	Total
Agia Triada	11	5	7	1	24
Platanos	5	3	21	4	32
Kalathiana	3	1	—	—	4
Porti	3	1	—	1	5
Marathokephalon	1	1	7	1	10
Asterousia	3	1	10	3	17
Kaloi Limenes	3	1	5	1	10
Lebena	2	1	—	1	4
Koumasa	—	1	3	1	5
Krotos	—	—	2	—	2
Agios Kirillos	—	—	1	—	1

Source: Sbonias 1995, Chapter 3.

found at Aegina, Lerna V, Samos, and Cyprus are signs that the Minoans reopened trade routes to mainland Greece, Anatolia, and Syro-Cilicia. In the Mesara, contemporary tombs contained numerous foreign materials: local daggers made from Kythnian copper (Gale 1990:314), gold jewelry, and Egyptian stone vases and scarabs (Lambrou-Phillipson 1990:51–54). Some Mesara daggers show specific influence from Syro-Cilicia, in their shape and hafting details (Branigan 1966, 1967). The same exchange systems responsible for importing these materials into the Mesara may have also brought the Knossian Cycladicizing pyxides (MacGillivray, Day, and Jones 1988) found at Koumasa (Xanthoudides 1924: Plate 18, upper) and Agia Triada (Banti 1930/1931: Plate 18d). It is noticeable, however, that the exportation of Mesara ceramics to Knossos does not seem to have begun until MM IB (Momigliano 2000b:101).

At the same time that contacts were renewed between Syria-Palestine and Twelfth Dynasty Egypt (Weinstein 1992; Ward 1987), trade relations between Egypt and the Mesara also revived. Ivory was generally available in the Mesara, as the seals of the principal MM IA groups were of ivory, probably hippo tusk imported from Egypt (Krzyszkowska 1988:229). Three imported Egyptian scarabs of the Twelfth Dynasty, found in a MM IA level at Lebena (Platon 1969:180, 201, 204), are particularly important, because they are incontrovertible evidence of Cretan–Egyptian contact during the MM IA period. A recent study (Ben-Tor 2002) has assigned the earliest scarabs in Crete to a Middle Kingdom group of circa 2025–1850 BC. Other scarabs and local imitations of scarabs are known on many Mesara sites (figure 9.4). According to Quirke and Fitton (1997), spiral designs that first appear on scarabs in Egypt during the period circa 2150–2000 BC were Aegean inspired. Large numbers of MM IA–II stone vases, such as alabastra, goblet, cylindrical, and tubular cups, and block vases from the Mesara (Watrous 1994:730–731), were local Mesara imitations of Egyptian shapes.

Seals point to an increasingly complex economic network in MM IA. In this period seal designs were differentiated by the use of variants of a single motif and combinations of two motifs (Sbonias 1995:147), as if for the first time individual families within larger social groups were searching for distinct designs of their own. These kinship groups may have existed in the EM period, but now they appear to have functioned as distinct units within a wider regional socioeconomic system. Bifacial seals are another innovation of this period. Single-face seals were the traditional form and presumably were used primarily to identify individual family property within the community. Adding a second engraved face to a seal implies the owner's need to record a transaction separate from that function. In the Near East, different types of seal designs (figural and abstract) have been linked to separate types of transactions: those guaranteed by an individual, and those probably involving a larger corporate or institutional group (Nissen, Damerow, and Englund 1993:15, 18). Hieroglyphic, the earliest known script in Crete, made its appearance on Cretan seals (e.g., at Archanes) in MM IA.

Objects made of expensive and exotic MM IA materials, such as gold, ivory, and copper, became numerous and were more widely distributed than in EM II (figure 9.2). Jewelry in sard, amethyst, alabaster, ivory, and silver, much of it imported, was produced in myriad new shapes. In contrast to EM examples, MM IA seals were large, quite numerous, made of imported ivory, and possessed sophisticated shapes and designs (Sbonias 1995:73–121). Several of the Egyptian scarabs (figure 9.4) imported into the Mesara during this period were found at small coastal sites, presumably their ports of entry. The distribution of MM IA elite goods form hierarchical clusters around settlement centers and their outlying communities (figure 9.2)—Agia Triada/Phaistos, with Sivas, Marathokephalon, and Kaloi Limenes, and Platanos, with Porti, Lebena, and Koumasa—that probably reveal local economic and social interrelationships.

Ideology

The most important changes in the material record of Crete at this time are those observable in funerary customs and amulet or seal types.

During the EM II period, a deceased male or female was usually buried with one or two daily possessions, perhaps a dagger, seal, clay vase, or a piece of jewelry (Branigan 1970b:56–85). During

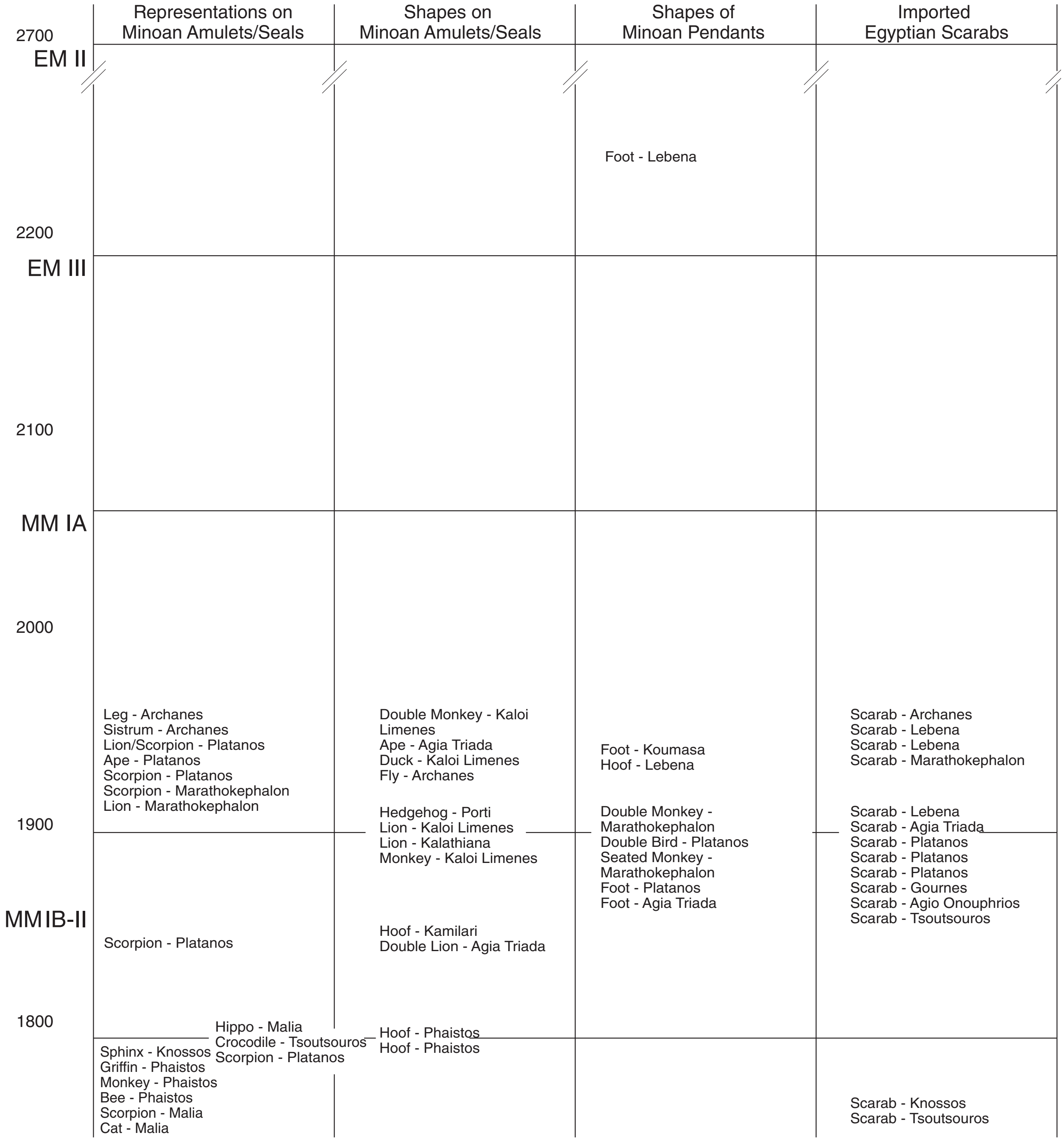


FIGURE 9.4. Chronological chart of Egyptian and Egyptianizing motifs on Crete

the MM IA period, traditional burial customs became much more elaborate. Single burials, made in *larnakes* (clay coffins) and jars, point to a rise of individual status in MM IA society (Maggidis 1998:94–95). By MM II, this custom had replaced communal burial in the Mesara. As conspicuous consumption of wealth in burials grew in MM IA, many new types of offerings were placed in graves. In addition to personal possessions, late Prepalatial burials began to include imitations of Egyptian funerary paraphernalia, such as stone cosmetic palettes (Xanthoudides 1924:79), special stone vases, and clay models of bread loaves (Xanthoudides 1924: Plate 29a upper left). Mesara tombs were filled with large numbers of stone vases, including carinated bowls, tumblers, block vases, miniature amphorae, and goblets (Warren 1969: types 1A, 4, 8, 20, 28, and 29A), that were direct imitations of Egyptian funerary vessels (Watrous 1994:329, 375). Tomb finds appear to imply that the local population of the Mesara had accepted new funerary beliefs (Pini 1968:21–35; Branigan 1970a:104–138), probably under the influence of Egyptian eschatology. In contrast to EM communal funerary practice, MM IA burials place greater emphasize on individual status and wealth.

During MM IA, inhabitants in both the centers and peripheral sites of the Mesara began to wear amulets carved with Egyptian imagery (Yule 1980:209, Tuart, baboon, lion, sistrum, and scorpion; Pini 1981:430; Watrous 1998 supplies Egyptian parallels). Seals were also carved into new shapes—ape, lion, duck, fly, hedgehog, and scarab beetle—that had Egyptian parallels (figure 9.4). These images appear in the Asterousia and along the south coast where such motifs must have first entered the island. Hence the imagery may have been brought back by local mariners, or, in some cases, perhaps belonged to foreign women brought back to Crete.

In Egypt, the shapes and motifs of amulets had specific meanings (Wilkinson 1992; Bourriau 1988). The scarab beetle represented Khepera, a god of creation identified with Ra, and was a popular symbol of resurrection and fertility. Tuart was the goddess of protection in childbirth. Scorpions were the symbol of the goddess Serqet, associated with the maternal deity Isis. The monkey (baboon) was the protective animal associated with the benevolent sun god Ra. Egyptians believed that at the Last Judgment a baboon supervised the weighing of the soul. A recumbent lion was the protective sentinel and solar animal associated with Ra and Horus. The sound of the sistrum, a musical instrument associated with the popular maternal goddess Hathor, was regarded as protective and symbolic of divine blessing.

While we cannot immediately assume that the Egyptianizing amulets in MM IA Crete (figure 9.4) retained the original meanings they possessed in Egypt, it must be significant that the Cretan motifs were not a random sample of Egyptian amuletic imagery (Bourriau 1988). Missing from the Cretan assemblage were a wide range of Egyptian types (Watrous 1998:25). Instead, the Egyptianizing motifs found in Crete consisted overwhelmingly of an Egyptian category called “amulets of assimilation” (Andrews 1994:36–73). These amulets provided strength or protection by assimilating the powers that certain animals possessed naturally or by association with a kindred deity. Many of the Cretan amuletic images were associated in Egypt with maternal protection and with help during childbirth. Hence, it is likely that the Minoans chose these amulet designs deliberately, and that these objects may therefore represent new funerary beliefs in MM IA Crete.

Social Relations

MM IA society in the Mesara exhibited increased wealth and social diversity, and for the first time, distinct class stratification.

Wealth in MM IA was distributed more hierarchically *and* more diversely than in the EM period. Bronze weapons, ivory seals, and stone vases were buried in the tholoi at Agia Triada, Platanos, and Koumasa but also at outlying tombs (figure 9.2). Gold, ivory objects, and imported Egyptian scarabs also occurred on many peripheral Mesara sites. Individual burials begin to be made in *larnakes* and jars, both inside and outside of tholoi. Individual child burials appeared. These trends are also observable in other parts of Crete. Vasiliki in EM IIB possessed one to two elite houses, whereas in MM IA there were as many as eight well-built houses (for example, Houses A, B, G, Phi, X, and Omega) at the site. At Archanes, there were two tombs (E and G) in the Phourni cemetery in EM II; by MM IA at least four, rich, monumental burial structures existed. According to Evans (1921:106), MM IA Knossos possessed two early hypogaea. Greater social diversity is apparent in different tomb and seal types. At Archanes, three of the four MM IA structures (Tholoi B and G and Building 6–8) in the Phourni necropolis were different in form. Tomb B is a large rectangular structure capped by a central tholos, Tomb G is a simple tholos, and Building 6–8 is a multimagazine ossuary. MM IA seals were objects of social status. Large numbers of these seals were of imported material and displayed high-quality workmanship and sophisticated designs.

Unlike EM communal burials, MM IA tomb types and their contents can be distinguished as either elite or lower class. At Platanos (Xanthoudides 1924:90–92, Plate 62), rich MM IA burials accompanied with gold jewelry, bronze weapons (sixty out of a total of seventy daggers from the site), ivory seals, and stone vases were placed inside Tholos A. In contrast, Tholos B lacked bronze or gold items for the most part and was noticeably poorer. Outside of Tholos A, even simpler inhumations were being made in ancillary cells 1–5, "huts," and trenches outside Tholos A. Of the cell burials, Xanthoudides (1924:90) says, "the accompanying objects were so poor that it may be inferred that only poor persons or slaves had been buried there." Such simple MM IA burials are also known at Agia Triada in the small annex compartments south of Tholoi A and B (La Rosa 1999b:274, Figure 4). At the Archanes cemetery, at least four monumental structures (plus Tomb 19), containing much wealth, dominated the MM IA cemetery, while poor burials were placed in one portion of the "Area of the Rocks" on the margin of the necropolis and in other peripheral areas, including Karnari, Katsoprinias, Anephoros, Kaballaropetra, Ontades, and Mesambela (Maggidis 1998:95–99). Maggidis, in fact, refers to the "advanced social stratification" of the late Prepalatial Archanes community inferable in the cemetery. According to Maggidis (1998:98–99), the architecture, contents, and funerary ritual of the MM IA tombs at Archanes belonged to an intermediate stage between a ranked and a highly stratified (that is, a state) society.

Ostentatious burial became fashionable in MM IA. At Archanes, Building 7 was constructed next to Tholos G; soon thereafter, Tholos B was built on top of Building 7, making it the highest structure in the cemetery. This competitive construction of funerary buildings is one of the clearest signs that the social structure of MM IA Crete was not politically centralized. The pretentious late MM IA Chrysolakkos tomb at Malia represents the culmination of this social process. Within cemeteries, single tombs (Archanes Tomb 19, Mochlos Tomb I/II/III, Chrysolakkos) were provided with altars for worship, emphasizing elite family status within the larger community, a sign of social competition.

Based on our evidence above, we can see that MM IA society in Crete

had signs of:	did not have signs of:
urban nucleation	three-tiered settlement pattern
class stratification	centralized redistribution
attached craft specialization	agricultural intensification
social competition by elites	royal burials
long-distance trade	centralized administration
wealth finance?	regional sanctuaries
prestige economy	dispersed settlement

Before we try to understand how the first palace state was created at Phaistos at the end of the MM IA period, we turn to previous theories of Aegean state formation. For the purposes of our present study, we define a state as a stratified society, with at least three levels of administrative hierarchy and a permanent, centralized, and institutionalized political authority that has coercive power over its subjects (see Tainter 1988:26–31 for earlier definitions).

THEORIES OF MINOAN STATE FORMATION

Neoevolution

Neoevolutionary theory explains Minoan states as the inevitable evolution resulting from the incremental growth of Prepalatial population and economy (Warren 1984a; Branigan 1988). These explanations are in fact only descriptive: they equate economic and demographic growth as being in themselves causative, without identifying either the specific causes of Minoan social complexity or the process whereby it takes place. Survey data from across Crete contradicts this reconstruction, since surveys show a drop in overall regional settlement before the appearance of the palaces in MM IB. In addition, archaeological fieldwork worldwide has cast doubt on the idea that urbanism per se is necessarily a cause of social complexity (Falconer 1987:26–47). Finally, our MM IA settlement data makes clear that the development toward the state in the Mesara was certainly not a gradual, uninterrupted evolution.

Economic Chiefdoms

The second type of explanation for the rise of the Minoan palaces is economic. C. Renfrew (1972: 296, 364, 498) explained the rise of the palaces by pointing to one of their features, their redistribution of commodities, much like a market center. According to his theory, during the Early Bronze period, the diversity and inequality of resources within a region led to an interactive economic network and a social hierarchy. The regional economic system created the necessity for a managerial authority, who became the chief. Hence, the palaces assumed the role that a chieftain had performed in the Early Bronze Age. Once established, given the natural human desire for self-enhancement, the chief devised ever more complex and symbolic ways to accumulate power, hence the state. This explanation suffers from several obvious defects. Our data in the Mesara, for example, does not bear out Renfrew's hypothesis of an EM chieftain overseeing a regional system of redistribution.

The second part of Renfrew's explanation—that the "chief" became a state leader by means of increasingly complex and symbolic methods—is vague. In addition, to argue that because the palaces stored quantities of agricultural produce, they must have been established for that purpose (see also Halstead 1986; Branigan 1988) is circular reasoning. This type of argument, based primarily on the supposed effects of population pressure on ecology, has been rejected by most fieldworkers (chapter 2). In his classic study of state origins, Service (1975:19–20) pointed out that the institutions of a state can often change their function over time. Hence, it is methodologically unsound to identify an institution's original purpose by extrapolating later features into the past. The storage capacities of the first palaces are more profitably understood as part of a system of relatively limited redistribution introduced for sociopolitical reasons rather than for economic ones (chapter 10).

Social Storage

Halstead (1981; Halstead and O'Shea 1982) has suggested a variation on Renfrew's economic explanation, the "social storage" hypothesis. In his ethnographic work, Halstead observed that farmers often use certain strategies, such as the storage of food or the lending and exchange of surplus, to cope with the uncertainties (unreliable weather and crop failures) inherent in agricultural life and to increase their standing within their communities. According to Halstead, the Bronze Age chief and, later, the state ruler, came into power through essentially this same process. Thus, the first palaces, built around their storage magazines and "grain silos" (*koulouras*), arose as institutionalizations of these payback strategies. Perhaps the main problem with this theory is that it is not realistic. As history unfortunately shows, the powerful in society are not necessarily just. Once in power, they do not pay back their debts. Ethnographic research (Earle 1977; Brumfiel and Earle 1987:2) has also shown that redistribution of a significant amount of produce between different environmental areas is not usually a feature of chiefly economies and early states. In addition, MacGillivray's (1994) and Strasser's (1994) recent reexaminations of the Old Palace *koulouras* at Knossos and Phaistos, and the conditions needed to store grain underground, have shown these structures are not likely to have been storage granaries. Halstead interprets the existence of storage areas in the Minoan palaces as a sign that their owners were propelled into rulership through economic power, but this is also a circular argument.

In the ethnographic record, the regular redistribution of food (Manning 1996:113–123) typically happens between social peers (rather than as part of a client-patron relationship), and is usually unconnected to craft specialization. The pattern of late Prepalatial settlement in Crete also makes it impossible to accept Renfrew's and Halstead's hypothesis that the diversification of regional agriculture led to increased regional cooperation. The nucleated regional settlement pattern and preference for defensible sites indicate that this period is one of rural depopulation and implied conflict, not of regional economic cooperation.

Wealth Finance

Manning's study (1994, 1996) of state formation is a more elaborately argued version of Renfrew's economically driven model. He envisions an EM III–MM I elite at Knossos and other centers who achieved their status based on an intensified agriculture to produce marketable surpluses, technological innovations, centralized control of specialized crafts, and foreign trade. His scenario is not supported by the contemporary settlement data. The EM III–MM IA settlement pattern is conspicuous for its lack of outlying farm sites capable of producing a surplus for regional centers. Manning hypothesizes that the transformation of the elite into state rulers was accomplished primarily through their control and use of aggrandizing prestige goods, mainly metal, imported from foreign sources such as the northern Aegean and the Near East. To illustrate this process, he cites the analogy of early-contact Polynesia, where local chiefs prized European objects, used them to enhance their status, and in this way effected a number of social innovations (Manning 1994:246). Such an explanation, however, is anachronistic in the socially complex and stratified society of MM IA Crete. Moreover, if it were correct, one could expect the distribution of MM IA prestige items, such as metal daggers, elaborate jewelry made from expensive and imported materials, ivory seals, and stone vases to be limited to the centralized urban location of the "elite" classes at Knossos or Phaistos, but they are not.

To turn to an example from outside of the Aegean, Early and Middle Bronze Age Byblos illustrates a society where the control of prestige goods was centralized. Byblite princes associated themselves with the Egyptian pharaoh by assuming royal titles and making wealthy offerings to local shrines dedicated to imported Egyptian deities. Hence, Egyptian imports and local imitations at Byblos are found exclusively in royal tombs and in elite urban temples (Watrous 1998). But this is not the case in the Mesara. Imported prestige items (figure 9.2) were widely spread across the region in MM IA, including at peripheral sites such as Lebena (gold, bronze, Egyptian imports, ivory seals, and stone vases), Koumasa (Cycladicizing vase, gold, Egyptianizing object, and ivory seals), Odigitria (gold, ivory seals, bronze, and stone vase), and Porti (gold, bronze, ivory seal, and stone vase). Such a distribution points to an initial assimilation of Egyptian goods and their ideas at a popular level for some time *before* the state formation of MM IB. Thus, the process envisioned by Manning, where new foreign goods and ideas were controlled by a central individual who used them to enhance his status, is unlikely. Hastorf (1993:11–17) has pointed out that the methods used by elites to maintain the production of prestige goods at the onset of political change are not necessarily connected to the process of social inequality.

Peer-Polity Interaction

The third explanation for state formation involves the theory (Renfrew and Cherry 1986) of "peer-polity interaction." This is the particular case when a group of similar, neighboring societies (at the level of chiefdoms or early states) develops shared cultural features through the process of mutual emulation, competition, and the exchange of ideas and goods. Cherry (1986) lists a number of features common to the later Minoan polities, including the layout and design of the palaces, the ideology of peak sanctuaries, and writing systems that he suggests evolved through peer-polity interaction within Crete. This explanation is compelling—up to a point. Cherry (1986:38) also argues that the shared nature of these traits on Crete means that they must be the product of a completely indigenous development. But this does not follow. A society may develop an institution, based on a concept learned overseas, which is then emulated by neighbors. It is revealing that Renfrew's exposition (Renfrew and Cherry 1986:11) of Greek peer-polity interaction uses just such an example, the *kouros* statue, a Greek sculptural type borrowed from Egypt.

The Minoan situation was similar. The features shared by the later Minoan states that Cherry cites also possess certain significant details that have earlier Near Eastern parallels but no Cretan precedent. For example, the first Minoan palaces are based on plans formulated in Crete, but specific features, such as their ashlar orthostate facades and their administrative sealing systems, suggest that the core idea of a palace was something the Cretans learned from abroad. Minoan sanctuaries established on mountains (on peaks, in caves, or at springs) can be understood as a Cretan adaptation to local circumstances of the Near Eastern belief that the gods lived in the mountains, manifest in the Egyptian sign for the mountain (Wilkinson 1992:133–134) which was often combined with signs of deities, the Levantine Early Bronze Age sacred *bamah* (high place), and the Mesopotamian ziggurat.

Historians have recognized that the process of cultural innovation has taken a broad range of forms (Diamond 1997). At one end of the spectrum there is "independent invention," that is, a society creates an innovation entirely on its own. At the other end of the spectrum is "blueprint copying" when one culture literally copies or slightly modifies a detailed plan, formula, or idea from another. Midway between these two interactions is "idea diffusion," or stimulus diffusion. In the latter case, one culture receives an idea from another culture, but reinvents most of the details to suit local needs.

Within the context of world history, the process of independent invention is actually relatively rare when compared with instances of blueprint copying and idea diffusion. For example, worldwide, many writing systems (syllabaries and alphabets) have been developed over time, yet only two or three examples (Sumerian, Mesoamerican, and Chinese) can be said to be independent inventions. More common is the process of idea diffusion. Diamond (1997:228–230) gives the following example of idea diffusion. In 1820 an illiterate Cherokee named Sequoyah, who worked with European settlers, invented the Cherokee alphabet. Seeing the usefulness of writing, he developed an alphabet for the Cherokees by adopting some twenty English letters to which he added sixty new characters of his own. This example is analogous to the Minoan Hieroglyphic syllabary. The Minoan Hieroglyphic script possesses some ninety characters, of which at least ten are derived from Egyptian hieroglyphic (Evans 1921:280–283) and is therefore regarded as a result of idea diffusion (Olivier 1986:378).

Instances of idea diffusion are especially numerous during periods of increased international communication. If deprived of historical records, we would be able to guess today that early medieval Europe was in contact with and learning from the Islamic world, because of Near Eastern relics, artistic decorations, and new techniques in textile manufacture and architecture observable in Europe (Singer 1956:755–767). During the early Renaissance, many new inventions, such as sophisticated glass-making, the cannon, and printing, appeared in the West and quickly spread throughout Europe. If, as is the case in Aegean prehistory, we did not have historical records telling us of the eastern source of these inventions, we would still be able to come to this conclusion, because certain details of the innovative technical processes point eastward. Modern manufacture of glass, for example, is dependent on alkali, a loan word from Arabic (*al-Qali*). Early European cannons (that used gunpowder, a Chinese invention) have a peculiar bottle-shaped form that matches their Chinese prototypes. Transfer of technologies between cultures often involves modifications to suit local conditions, which in turn may stimulate fresh innovation. The invention of the printing press in fifteenth-century Europe is a well-known example. Gutenberg's invention was based on two ideas derived from China, paper and moveable type, which he then combined with local European techniques (the screw press, oil-bound inks, and steel dies) to produce the printing press, an innovation subsequently adopted across Europe. The first phase of Gutenberg's invention is idea diffusion, the subsequent modification and spread of the printing press is similar to peer-polity interaction.

Returning to Minoan Crete, the discussion above strongly suggests that state formation in MM Crete involved two phases similar to the Gutenberg situation: (1) one or more Minoan groups, stimulated by a foreign idea, created their own local version of this concept and/or they simply adapted a foreign idea to local conditions, and, (2) the innovation was subsequently imitated or adapted (peer-polity interaction) by neighboring Minoan communities.

Some distinctive features of the first palace states at Phaistos and Knossos seem to point to their having been adapted independently from one another. Phaistos, for instance, used Linear A script and page-shaped tablets and roundels, while Knossos employed hieroglyphic script and inscribed bars and medallions. On the other hand, the fact that certain features are found at all MM I states, such as orthostate masonry and the central courts of the places, and a single regional extra-urban mountain sanctuary, are probably the result of peer-polity interaction.

At one level, peer-polity interaction may explain an unanswered question about Aegean state formation articulated by Lewthwaite (1983), that is, why did the process occur on Crete, but not on other large islands (that is, Cyprus or Sardinia) or at other places in the Mediterranean? A partial answer would be that Crete was near enough to more-developed Near Eastern civilizations to be aware of them as sources for ideas, and Crete also consisted of a collection of similar, competitive communities. The presence on Crete of a group of competitive communities created a situation that greatly increased the chance that innovations would be adopted by one group or another. Diamond (1997:413) supplies a contrast that is a useful historical analogy for this process, drawn from the fifteenth century AD. In the politically unified China of 1450 the emperor made a decision to stop all overseas trading by the Chinese, whereas, after having been turned down at four European courts, Christopher Columbus was, in Spain, finally successful in finding a patron for his idea of a transatlantic expedition.

Nevertheless, at a deeper level, peer-polity interaction is less useful. The concept only accounts for the second, imitative process, or phase, of Minoan state formation. Peer-polity interaction cannot explain any initial innovation on Crete, such as the construction of the first palace, or the emergence of literacy. To understand the initial phase of Minoan state formation, we must examine its specific context.

FORMATION OF THE MINOAN STATE IN CRETE, CIRCA 2200–1900 BC

As we have described in chapter 8, EM IIB Crete consisted of a number of territories occupied by ranked societies. Fieldwork worldwide (Service 1975:20) has shown that the great majority of such pre-state societies do not become states. Therefore, while the existence of complex EM II societies may form the foundation for subsequent social development on Crete, these societies are not, in themselves, a guarantee of, or an explanation for the rise of the Minoan states (*pace* C. Renfrew 1972; Manning 1996). States require a combination of preexisting conditions and specific pressures in order to come into being. Moreover, the societal changes leading directly to state formation are not a matter of incremental evolution from earlier levels (*pace* Carneiro 1970). These changes are different from earlier transformations because the state is fundamentally distinct from lower levels of social complexity in its organization and ideology (Yoffee 1990). In Crete, for instance, there are no credible precedents in the Early Bronze Age for the palaces, for writing, or for peak sanctuaries. Nor is it a sound historical argument to focus on a particular feature of Minoan palatial society, such as its systems of redistribution (Halstead 1981) or overseas trade (Manning 1996), and extrapolate this feature back into the Prepalatial period as a causal factor.

Minoan state formation must be understood in its particular chronological (figure 8.7) and cultural context, which is the late Prepalatial period on Crete, the MM IA period. In the Mesara, several signs of growing instability and conflict began to appear in the region during EM IIB. Some local settlements, such as Charakas near Matala, seem to have gravitated toward more defensive locations. Kommos was deserted. Myrtos/Fournou Koriphi, and Pyrgos on the south coast were destroyed. In view of the evidence cited below, it seems likely that the abandonment of the countryside accelerated after circa 2200 BC. The settlement at Phaistos was much larger in the MM IA period than before (EM II), and therefore one assumes that at least some of the rural population of the region moved into Phaistos. At Knossos, recent reassessment of several late Prepalatial deposits suggests that the process of nucleation/expansion there may have already begun in EM III (Momigliano 1991).

Environment

Environmental factors may have played a significant role in the settlement changes that we have been describing. A recent historical study (Grove and Conterio 1995), based on Venetian archival sources, of the climate in Crete during the period 1548–1648 AD has documented that multiyear periods of disastrous climate, mainly droughts and severe winters, resulted in widespread crop failure, famine, and plague (Grove and Conterio 1995: Table 1) on the island. Similarly, in the Near East during the period from circa 2200 to 1900 BC there is an impressive array of evidence—scientific, literary, archaeological, and artistic (gathered in Dalfes, Kukla, and Weiss 1997; Weiss 2000)—for desiccation, population loss, and movement in the various areas stretching from the Nile, Lake Turkana in East Africa, and Syria-Palestine, to upper Mesopotamia. The geographic scale of these events, involving the Near East, North Africa, Anatolia, and the Aegean, also points toward a major underlying phenomenon.

In a classic article (1971), Bell synthesized the written and artistic data for the peak period of extreme dryness and low Nile floods during the First Intermediate period (circa 2180–2134 BC) that caused widespread hunger, death, and migrations within Egypt. During that period, settlements in the Libyan desert were abandoned for the Nile Valley, and temple and tomb reliefs depict a change in animal species and landscape (Bell 1971). Egyptian inscriptions (Bell 1971:9–13), dated by the middle chronology to 2210/2185, 2100, and 2002, mention famine, lack of water, and lawlessness in the land. A First Intermediate period document from the tomb of Ankhtifi near Luxor records that "All of Upper Egypt was dying of hunger, to such a degree that everyone had come to eating their children . . . . The entire country had become like a starved(?) grasshopper, with people going to the north and to the south." Hassan (1991) and Weiss (2000) have added new data that corroborates Bell's conclusions. For example, the level of the Dead Sea dropped 100 m at circa 2200 BC (Weiss 1997). Egypt experienced a loss of rainfall toward the end of the Fifth Dynasty (probably manifest in the famine scene from the causeway of the pyramid of Unas) that became even more widespread in the Sixth Dynasty. Geological investigations of lakeshore deposits at the Nile-fed Lake of Birket Qarum in the Fayum revealed a recession in Nile inundations.

Across the Near East in this period (Early Bronze IV, circa 2250–2000 BC) evidence has been recovered for the destruction of urban centers, desiccation, population loss, and migration (for Palestine: Mazar 1990:151–173; Falconer 1994). Kültepe, Tarsus, Ebla, Ugarit, and Byblos were destroyed by fire at the end of the Early Bronze Age (Watrous 1994:196). In upper Mesopotamia, Syria, Palestine, and Egypt, archaeological surveys have also revealed a radical abandonment of rural settlement accompanied by migration to riverine environments with sustainable agriculture (Weiss 1997:714; 2000). Sites such as Carchemish, along the middle-upper Euphrates River, experienced expansion, as did village-level settlements in southern Mesopotamia in the Ur III period, circa 2100–200 BC (Adams 1981:142). Around 2300 BC Cyprus also began to exhibit signs of an increasingly dry climate (Renault-Mikowsky 1985) and settlement dislocation (Peltenburg 1992:20).

The Aegean has produced evidence of similar conditions. Toward the end of the Early Cycladic IIB period (circa 2350–2200 BC) Cycladic settlements, such as Kastri, Panormos, and Mount Kythnos, were fortified. Kastri, on Siphnos, a new settlement built on a steep rock outcropping surrounded on three sides by cliffs, illustrates the concern for safety. Nor was this concern misplaced. By the close of EC IIB, many (perhaps all) sites in the Cyclades were abandoned, including Kastri, Agia Irene on Kea, Panormos, Mount Kythnos, and probably Phylakopi on Melos. Little is known about the Cyclades during Early Cycladic III period (circa 2200–2050 BC). On the Greek mainland the chiefly (Corridor House) settlement centers at places such as Lerna, Tiryns, Thebes, and Akovitika, were abandoned during the period from circa 2400 to 2200 BC. After these destructions major settlement centers exhibit new Anatolian-like cultural features that may point to immigration. Mainland Greece experienced a major population drop after Early Helladic II (Rutter 1993:772, 781). Environmental data for this period is inconclusive (Forsen 1992:241–260), except at Lerna, where faunal analysis indicated that birds confined to a drier climate appeared in EH III.

Crete follows the same pattern. Many settlements and cemeteries on Crete, including Vasiliki, Malia, Fournou Koriphi, and Pyrgos/Myrtos were destroyed and/or abandoned during the

Early Minoan IIB period (Watrous 1994:717). Surveys (chapter 8; Watrous 1994:718) imply that the Cretan countryside outside the major settlement centers was largely deserted after Early Minoan IIB. In the Mesara, as we have seen, the main settlements at this time are located at Phaistos and Platanos, immediately adjacent to the Ieropotamos River, the principal watercourse in the region. Environmental data also suggests a worsening of conditions. Moody's core (1987:93; Moody, Rackham, and Rapp 1996) taken near Chania showed a peak of olive pollen in the middle of the Early Bronze Age with a decrease in wild species, such as oak, pine, and hornbeam. Toward the end of the Early Bronze Age, grass pollen, probably including domesticated cereals, and olive pollen decreased, while wild maquis/woodland and garigue species rose. In addition, the moisture-loving linden, alder, and lime, now only found further north in Central Europe, disappeared completely (Moody, Rackham, and Rapp 1996). In this case, pollen of the moist deciduous oak lost ground to the drier evergreen oak. Moody and Rackham (1996:126) interpreted these patterns in the pollen core as a result of a combination of man-induced changes, a decline in agricultural activity toward the end of the period, and a climatic drying.

Archaeological evidence may also point to drought on Crete toward the end of the third millennium. MacGillivray (1994:54) has interpreted the EM III–MM IA hypogaeum at Knossos as a cistern that was connected to an aqueduct. Strasser's study (1994) of the MM IB *koulouras* at Knossos and Phaistos concluded that they acted as cisterns (one at Knossos was provided with a stone water channel) to catch the runoff of water from the paved courts. It has been objected that Minoan *koulouras* could not have been cisterns because their walls are unplastered, but similar Venetian and Ottoman period *sternas* (plate 9.1), large cisterns built with dry stone, demonstrate that unplastered walls can hold water. In one case, at Pyrgos/Myrtos (Cadogan 1977/1978), a *kouloura* was filled at the same time that a cistern was constructed elsewhere on the site. Subsequently, it is possible that the *koulouras* came to be used for ceremonial purposes (Carinci 2001).

Agriculture in the Mesara would have been vulnerable to the conditions described above. As Pope explains in chapter 4, Early Bronze Age settlement expansion and the concomitant land clearing and loss of vegetation is likely to have led to a major episode of soil erosion. Deforestation and vegetation loss could have contributed to a drop in the water table, increased runoff and wind erosion, all of which would have made subsistence on marginal lands more difficult. Based on the dry farming of grains, the Minoan agricultural system, like that of the nineteenth century AD (chapter 6), would have been particularly vulnerable to a drop in rainfall. Within the Mesara, areas around Phaistos and Platanos that possessed perennial water and moisture-retentive soils would have fared better than marginal zones such as the Asterousia, where agricultural intensification, increasing arable land, and fallowing, all possible responses to poor crop yields, were severely constrained.

Harsh climatic conditions undermine social stability. In Egypt, written records (Wilson 1951:104–124) describing the First Intermediate period mention provincial groups fighting to expand their control over territories. So, too, scholars recognize a combination of causes in the contemporary disturbances in the Early Bronze IV Levant (Mazar 1990:169–171; Dever 1995). Throughout the Aegean, the site destructions and population dislocations that began in Early Bronze II may have been partly due to conflict for desirable land, exacerbated in some places by the arrival of immigrant peoples. Late Prepalatial nucleation of the regional population in the Western Mesara may also have been caused by local instability.

Based on environmental and archaeological data, at the end of the third millennium the Eastern Mediterranean (figure 8.7), including Crete, seems to have suffered a period of severe disruption, one of whose underlying causes was climatic.

Social Changes

With the advent of more settled conditions in MM IA Crete, society changed in several fundamental ways. As documented above, several aspects of MM IA society—population, wealth, social hierarchy, diversity, and elite competition—dramatically increased.

Whatever the causes, it seems certain that the settlements at Phaistos, Knossos (Hood and

Smyth 1981:8; Whitelaw 2000) and Malia (van Effenterre 1980:30–41) expanded considerably in this period. Platanos also may have grown, since two new MM IA tombs, Tholoi B and Gamma, were constructed next to the EM II Tholos A. Regional population was nucleated at Phaistos as the surrounding rural areas remained depopulated. Earlier EM II settlements around Phaistos, at Kommos, Agia Triada, Kalamaki, Sivas (**109**), and Petrokephali (**52**) were apparently not reinhabited in MM IA. Similar demographic nucleations have been documented at Knossos and Malia, making it probable that this was an island-wide phenomenon. It is striking that the rural Mesara was not resettled in MM IA, as one might expect, given the evident rise in prosperity. This fact is an important clue to the sociopolitical development of the late Prepalatial Mesara (see below).

What caused the nucleation at Phaistos, and at other urban settlements? Flannery (1999) has suggested that the demographic nucleation observable at incipient state centers has invariably been caused by a local leader who conquered his neighbors and moved them into his capital as a subject population of his newly formed state. Under such a scenario, the chief at Phaistos or Knossos would have forcibly gathered the regional population into his settlement. For the Mesara this interpretation seems unlikely, since some rural sites and their tombs in the Western Mesara and elsewhere in Crete either continued in use or show signs of reuse in MM I following a break during the EM III–MM IA period. Additionally, nucleation at Knossos, Phaistos, and Malia took place in EM III–MM IA, but the palaces did not appear for roughly another hundred years, until the very end of MM IA or the beginning of MM IB. Urban nucleation and state formation do not appear to have been synchronous events in Minoan Crete.

Alternatively, one might argue that population growth at centers such as Phaistos and Knossos was the result of the economic opportunities offered by a flourishing urban center of a region. Such a scenario is contradicted by two facts. First, the rate of late Prepalatial growth discernible at Knossos, from 4.8 ha in EM II to 35 ha by late MM IA, is a demographic growth rate of about 5% per annum over perhaps 150 years; such a rate cannot be accounted for by normal population growth. It has been estimated that population growth in prehistory averaged approximately 0.1% per year, and that growth in excess of 1% annually was unusual and could not be sustained for long (Hassan 1981:253; Cowgill 1975). Second, Phaistos was not the center of a prosperous, vertically integrated network of secondary settlements in the region. Instead, no settlement sites existed in the area surrounding Phaistos (figure 9.1) and the rural countryside seems to have been almost deserted in MM IA. Only in the MM IB–II period did the Phaistians erect permanent buildings on this agricultural land. The implication, which we will consider below, is that the descendents of the original rural residents were not free to return to their ancestral homes.

Finally, the MM IA period was brought to an end by the construction of a palace at Phaistos and the establishment of a sanctuary at Kamares Cave. Unused since the EM I period, Kamares Cave became the recipient of worshippers' votives, including Patrikies teapots (see Warren and Hankey 1989:20 for the early MM IB date of the Patrikies pottery). Comparisons of these early ceramic offerings at Kamares with parallels at Phaistos and Patrikies indicate that the Kamares cave sanctuary, like that at Psychro (Watrous 1996:47–48), was founded at the same time that the first palace was built at Phaistos (Dawkins and Laistner 1912/1913: Plate 4 upper compared with Bonacasa 1967/1968:32, Figure 26, and Dawkins and Laistner 1912/1913: Plate 8a compared with Bonacasa 1967/1968:46, Figure 35 lower). Similarly, the palace at Knossos and its peak sanctuary on Mount Jouktas were constructed during the same ceramic phase (MacGillivray 1998:99).

Peatfield (1990) has suggested that extra-urban sanctuaries like Kamares Cave and the peak sanctuary on Mount Jouktas were a grassroots religious phenomenon that began in the EM period. This hypothesis is contradicted by the fact that they were not randomly distributed. Instead, each political territory or community possessed one sanctuary, which in case of major communities, overlooked the nearby palace (Peatfield 1990; Watrous 1996:73–96). Like other extra-urban shrines (for example, Mount Jouktas, which is visible from the Knossian palace), the sanctuary at Kamares Cave can be linked to the palace at Phaistos, by virtue of its location and votive offerings (Cherry 1981a). The sanctuary on Mount Kophinas presumably fulfilled a comparable role for the central Mesara (see chapter 10). Similar "high places" are now known in the contemporary Levant, for example, the Early Bronze IV open-air shrine at Har Yeruham (Ben Tor 1993:154; Mazar 1990: 156).

Urban Nucleation: A Recent Greek Example

What was the effect of this relatively sudden urban nucleation on the population at centers such as Phaistos and Knossos? Recent Greek history illustrates two effects of urban nucleation that may be relevant to our case.

During the years following World War II, Third World capitals grew at the extraordinary rate of approximately 4% annually (Leonitidou 1990:106). In Greece, the massive refugee movements and internal migration during the years 1951–1967 (and earlier, after 1923) caused Athens to experience an urban explosion (figure 9.5). During the earlier peak migratory period (1890–1909), one-third of the rural population of Greece abandoned their villages for the cities, especially Athens. Unlike our case in the Mesara, these migrations were spurred by the promise of

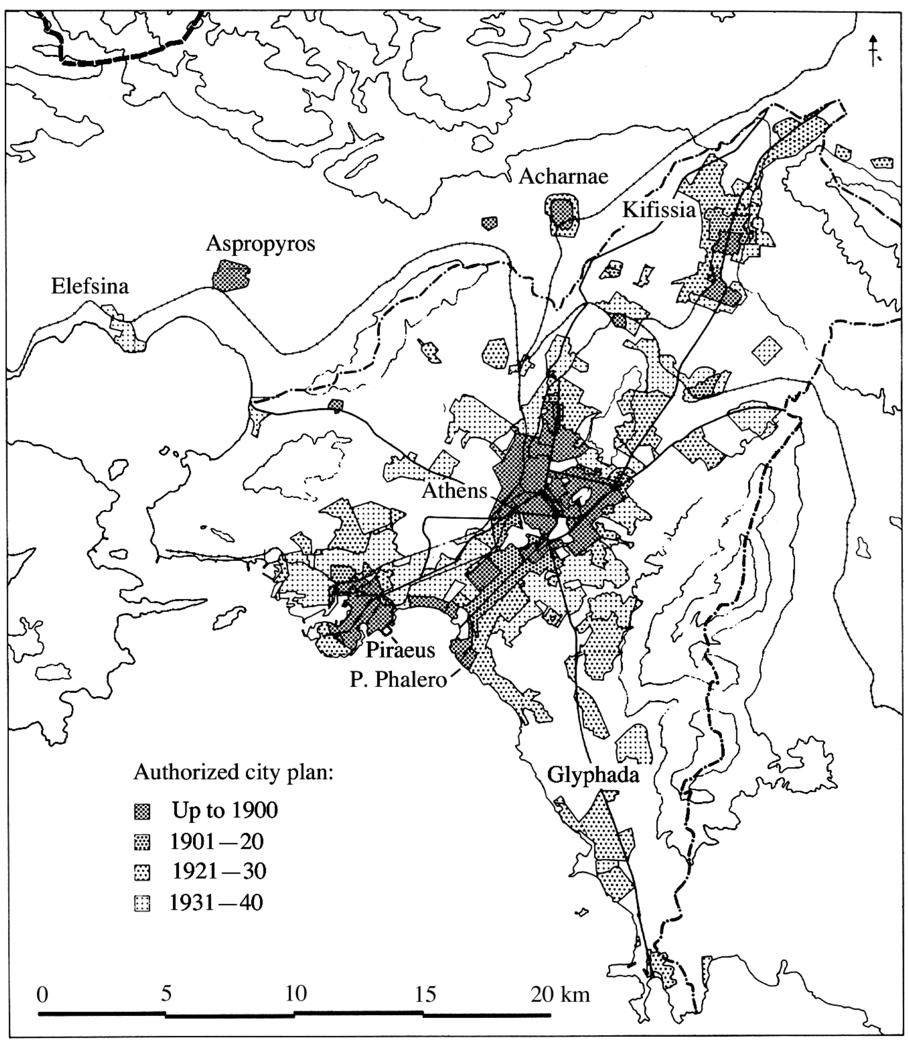


FIGURE 9.5. Urban growth of Athens, 1900–1940 (after Leonitidou 1990:55, Fig. 2.1)

a better life made possible by industrialization (Leontidou 1990:47–63). Nevertheless, dislocated from their family land, the new urban refugees in Athens were deprived of their principal source of sustenance, and so were quickly forced into servile labor, that is, as servants and poorly paid laborers, and lost their political independence. As a consequence of these events, Athenian society became polarized into two classes, one of affluence and the other of extreme poverty (Leontidou 1990:59 and 112, Figure 3.8). As we have seen, MM IA society was transformed in a similar way. The Athenian developments also had a physical effect, that is, an ever-widening ring of temporary buildings and slums around the original urban core of Athens (figure 9.6), that resembles the peripheral growth at centers such as Phaistos and Knossos. If this peripheral settlement had consisted of temporary structures, this would explain why MM IA occupation at centers such as Agia Triada have left so few traces.

The Athenian case suggests important implications for the MM IA period. Rural settlers arriving at the center at Phaistos would have found themselves living in a place where they had no direct access to nearby land on which to support themselves. Such a condition would have forced long-distance travel to their old landholdings, and/or forced them to turn to the original Phaistian families who owned the rich land in the immediate locale of Phaistos. This situation resembles Carneiro's (1981) condition of social or geographical "circumscription," which he has suggested was a leading cause of state formation. Circumscription is a situation where a group becomes physically or economically trapped, through war or some other process, and is integrated into society from below as a lower class, as serfs, or as slaves (Webster 1975).

Beginning in EM III, urban nucleation in the Western Mesara would have forced certain families into dependent labor, pastoralism, clientage, or specialized crafts as an alternative to farming, all of which would have created greater social differentiation and stratification, conditions that are manifest in the MM IA material record. The end result of this process of increasing social stratification is visible in the organization of MM II Quartier Mu at Malia where the elite Houses A and B (figure 8.5b) have attached to them the small residences of the dependent families of

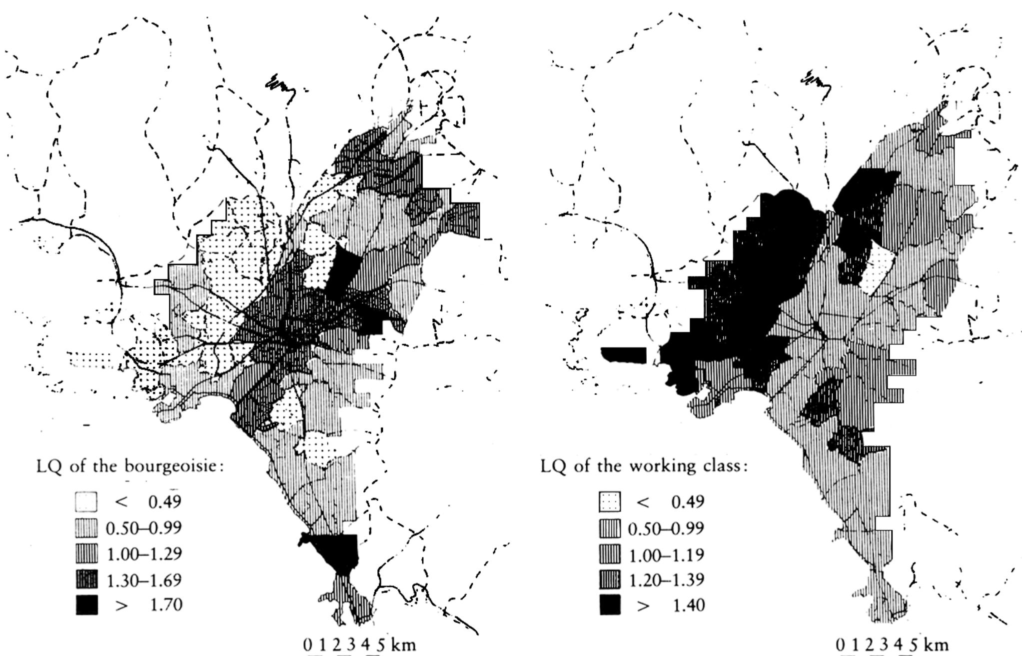


FIGURE 9.6. Urban distribution of the bourgeoisie and working classes in Athens, 1971. LQ = location quotient (population density) (After Leonitidou 1990:129: Figs. 4.1 and 4.2)

craftsmen (Poursat, Detournay, and Vandenbeele 1980). The process of class stratification would in turn have encouraged an increase in population. This is because, as Brumfiel (1992: 555) has noted, in cases of documented social change, the creation of social inequality and complexity has involved some form of population increase in order to meet the greater demands of dependent labor needed to support new elites.

Social Collapse and Recovery: A Cross-Cultural Comparison

We can gain some insight into the causes of the social changes described above by briefly comparing certain developments in Sixth–Twelfth Dynasty Egypt and EM IIB–MM IA Crete. Both countries experienced a parallel string of events that produced similar economic and political results. Several cultural innovations in MM IA Crete bear a close resemblance to Egyptian examples, which suggests that Minoan society adopted certain ideas from Egypt (see Wylie 1985 and Peregrine 2001 on the use of cross-cultural analogy). These events leading to the creation of the Minoan state seem have taken place in a relatively short period of time, that is, between the reopening of Cretan foreign relations with Twelfth Dynasty Egypt (circa 1963 BC) and the construction of the first palaces circa 1900 BC (figure 8.6).

In Egypt, the catastrophic drought, famine, population loss, and displacement that began in the Sixth Dynasty (O'Connor 1974) affected Egyptian funerary practices. Contemporary and later literature vividly describe the anarchy and pessimism following the end of the Old Kingdom, and, with the dissolution of central authority, provincial Egyptians began to seek magical protection in amulets as well as royal spells and rites formerly reserved for Old Kingdom pharaohs (Bourriau 1988:85–87). First Intermediate Period and Middle Kingdom Egyptians buried their dead with many more funerary objects than before (Breasted 1954:257–311), including many new types of amulets, such as the scarab, cylinder amulet, knot, and oyster shell (Andrews 1994:11). In the Old Kingdom the vision of the afterlife open to the populace had been greatly inferior to that of the king, but by the Middle Kingdom, graves of commoners and royalty bore the same basic texts, both ritual and magic (Wilson 1951:116–117).

The worsening environmental conditions in Egypt also probably contributed to the great rise in popularity of the funerary god Osiris (Bell 1971:123). According to Egyptian tradition, Osiris had drowned in the Nile, been brought back to life, and taken up residence in the underworld. As the god of resurrection, Osiris personified the crucial cycle of annual rebirth of Egyptian agriculture and the resurrection of the dead . During the late Old Kingdom, Osiris's importance rose in royal cult, and by the Sixth Dynasty, he figured more prominently in royal texts than the traditional sun god Ra (Frankfort 1978:181–198). By the beginning of the Middle Kingdom, the populace of Egypt had expropriated the worship of Osiris, and the deity had become central to funerary cult at the popular level. Individuals could look forward to resurrection in the afterlife through the protection and favor of Osiris—hence the greater attention paid by commoners to their burials and the goods intended for their afterlife.

The First Intermediate Period breakdown in social order eroded the authority of later kings who reacted by emphasizing the benefits of their reign (Wilson 1951:104–124, 132–133). Middle Kingdom pharaohs legitimized their rule by means of propaganda, for example *The Instruction of King Amenemhet*, which proclaimed the king's connection with the popular Osiris. The kings identified the god Osiris as the mythic ancestor of the royal house of Egypt (Frankfort 1978:201–212). Hence, the great summer procession and festival in Osiris's funerary sanctuary was at Abydos, where the burial place of the kings of the first dynasty was located. Middle Kingdom kings also started to publicly depict themselves as sources of order and social justice (*ma'at*). King Amenemhat I, for example, claimed "I gave to the destitute and brought up the orphan. I caused him who was nothing to reach (his goal), like him who was (somebody)" (Wilson 1951:116–117). By the Twelfth Dynasty kings routinely incorporated the term *ma'at* in their official names.

Crete, like contemporary Egypt, underwent a similar period of social disorder in EM IIB–III (discussed above), followed by an expansion of popular funerary practices in MM IA, and, finally, the establishment of Minoan states at the beginning of MM IB. New funerary customs included individual burial in a clay coffin (Maggidis 1998:94–95). A wider range of MM IA funerary goods, many of them of Egyptian derivation, were buried with the dead, implying an enlarged sense of the afterlife. The Chrysolakkos tomb expressed the new elite status of a social group at Malia by means of its size and its Egyptian form. Several features of the Chrysolakkos structure—its plan, exterior orthostate walls surmounted by semicircular coping blocks, and interior niched corridor—imitate the *mastaba* shape used by the Egyptian nobility (Demargne 1945; Watrous 1994:729; Arnold 1991:148, Figure 4.72:1, and 150, Figure 4.76). Chrysolakkos may well be the earliest royal monument on Crete, appreciably earlier than the palaces. Finally, in MM IB, the construction of the first Minoan palaces marked the elevation of an individual to royal status, a case of social "promotion" as defined by Flannery (1972).

The function of the Minoan palaces has been much debated (Hägg and Marinatos 1987). Most scholars agree that, to some degree, the palaces operated as administrative, religious, and commercial centers. At Malia, it is possible to gain some insight into the function of the first palaces by comparing them to Houses A and B in MM II Quartier Mu. Houses A and B have, in fact, all of the characteristic functions of the palaces, albeit on a smaller scale, except for one, namely, the large palatial courtyards intended for public ceremonies. What this in turn suggests is that the distinctive feature of a Minoan palace is primarily its communal ritual aspect. The palaces, then, were monumental structures meant to publicly represent the identity of new religious rulers.

It is of interest, therefore, that the first palaces display a number of Egyptian architectural elements. Preziosi (1983) has pointed out that the layout and unit of measurement used to construct the Minoan palaces can be traced to Egypt. MacGillivray (2000:152) suggested that the architect of the first palace at Knossos chose crystalline white gypsum in imitation of the white alabaster and white limestone (in exterior casing blocks) used in Egyptian royal monuments. Gypsum in the first palaces was used to line orthostate walls, pillars, doorjamb bases, and corridors, as it was in Egypt. During the Old and Middle Kingdoms Egyptian builders often employed ashlar orthostate, or similar casings of valuable stone, to embellish certain important areas of their monuments, especially the walls of mortuary temples (Arnold 1991:154, 164, 175 on the temples of Mycerinus and Chephren at Giza, and Sahure at Abusir), and Mentuhotep at Deir el-Bahari (Arnold 1991: Figure 4.81). Minoan architects used identical ashlar orthostates on the facades of the Chrysolakkos tomb and on the first palaces at Knossos and Phaistos. At the Minoan palaces, the placement of ashlar orthostate walls facing the public west courts implies that this architectural design possessed a symbolic significance. One detail at Phaistos may suggest what this significance was. In the MM II palace at Phaistos one of the three most active seals (Pini 1970: no. 268/9) in the palatial administration (Weingarten 1994) depicts a bull battering down a fortified settlement with battlements. Derived directly from Egyptian royal iconography, this seal (figure 9.7) should be understood as the Phaistian ruler's explicit attempt to enhance his authority by suggesting his connection with the great Egyptian pharaoh.

What little we know about the Minoan kings from later Greek tradition (Lexicon Iconographicum Mythologiae Classicae:626–628; Gantz 1994:259–270), reveals that they resembled the Egyptian pharaohs in several fundamental ways. The two Minoan rulers known by name, Minos of Knossos and Rhadamanthys of Phaistos, were of divine descent (as sons of Zeus). Minos established the first laws ("Laws of Minos") on Crete and acted as judge of the living and dead (Aristotle *Constitution of the Cretans,* fragment 611, 14). Renowned for his justice, Rhadamanthys ruled as king of the dead in the Elysion Fields (for the Egyptian origin of the Elysion Fields see Nilssson 1951:621–633;Vermeule 1979: 72–77). The Minoan rulers were divine, established a system of law and order, and were know for their social justice—characteristics that find obvious parallels in the pharaohs of the Middle Kingdom. It seems possible therefore

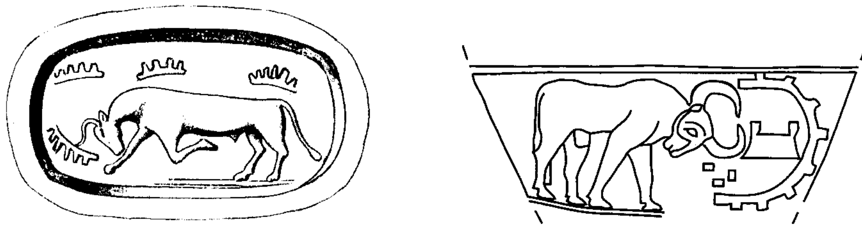


FIGURE 9.7. Seal from MM II Phaistos (CMS ii 5, 268/9) and the scene of the Egyptian Pharoah as a bull conquering a fortified settlement from the Palette of Narmer

that Minoan rulers modeled themselves to some extent on their royal Egyptian counterparts.

Agency

Can we explain how the Minoans may have created their first states? The social background may provide a few clues. In the years prior to the construction of the MM IB palaces, Cretan society had experienced several major upheavals. Many inhabitants had abandoned their rural homes for urban centers where they were put at a severe economic and social disadvantage. One result of this dislocation was the rise of distinct social classes within MM IA society. Wealthy individuals or groups began to initiate international trade expeditions into the Aegean, the Near East, and Egypt. New contacts introduced new ideas: Egyptian magical and funerary customs, for example, were adopted in MM IA. Competition and factionalism among the elite increased, intensifying social tensions and instability which are inferable from the settlement pattern and defensively located sites of the MM IA period.

Late Prepalatial competition among different social groups within a single community can be seen most clearly in elaborate MM IA funerary constructions (at Archanes) and ceremonies celebrated outside of individual tombs, for example, at Archanes, Koumasa, and Mochlos. If one could demonstrate that peak and cave sanctuaries represent an outgrowth from funerary cult (Soles 1992:238–242), then one might argue that a group at Knossos, Phaistos, or Malia transferred their ancestral worship in MM IA to a "high" place, such as Mount Jouktas, Kamares Cave, or the Psychro cave—where remains of very early (Late Neolithic or Early Minoan I–II) settlement existed—in an attempt to proclaim their preeminent social status as the ancestors of the first settlers in the region. But this argument is not convincing, because memory of prior settlement on the site of Knossos or Phaistos, for example, surely must have existed. Similarly, if this hypothesis were valid, one would expect funerary cult at certain "royal" tombs, such as Chrysolakkos, to have ceased or changed after MM I, but this was not the case. Rather, peak and cave sanctuaries seem to have been integrally connected with the appearance of the first palaces (Cherry 1986; Watrous 1996:73–96).

Minoan state formation seems traceable to social competition among elite groups at urban centers such as Knossos, Phaistos, and Malia. We might suggest that, at some point in the mid-twentieth century BC, a member of one of these groups realized that he could use his knowledge of Egyptian society to gain greater political power. To cite one possible strategy, this individual may have claimed a revelation from an ancestral divinity who demanded communal worship and a reordering of society that included his elevation as a religious leader. In reward for these changes, the deity promised to protect and care for his worshippers, to provide social order and justice, and to ensure plentiful harvests and flocks. Given the conditions of life in MM IA Crete, much of the population would have found such a message appealing.

Helms (1988) has discussed similar cases in the anthropological literature where local elites exploit foreign ideas to leverage themselves into power. In the Minoan case, creation of a divine ruler and a system of obligations and responsibilities between the king, elites, and commoners (see chapter 10) made for a stable society. Minoan class structure became further stratified (chapter 10). Aristotle (*Politics* 1329a 40–b5) connects the similar class systems of Crete and Egypt—societies with a separate warrior and farmer class—by pointing out that they were established at the same time by Minos and Sesostris (circa 1943–1899 BC, revised chronology), suggesting another possible connection between Egypt and Crete. At regional sanctuaries, standardized figurines of armed males, interpreted as representations of ephebes (Koehl 1986; Lebessi 1985; Watrous 1996: 89–90) were dedicated in large numbers, implying a ceremony where males were initiated into a new military institution within society. The new Minoan states were supplied with an ideology that explained the recent changes. Studies of historical states have shown that as they arise, they are provided with an ideology that defines the national identity by supplying metaphors of kinship, and myths of origin and morality, often made real through performance (Anderson 1983; Herzfeld 2001:10–13). This must have been one of the principal underlying functions of the great public ceremonies held in the courts of the first palaces (Marinatos 1993: 38–75).

At Phaistos the emergent royal family created a region-wide sanctuary at Kamares Cave (Watrous 1996:75–96) whose cult transcended the earlier localized ancestral rites of individual communities. The fact that funerary cult (Soles 1992:238) continued through the MM I–II period at a number of tombs, such as Agia Triada, Kamilari, Platanos, and Apesokari, indicates that the worship at Kamares differed from local funerary ceremonies. It is tempting, therefore, to infer that the deity, or deities, worshipped at Kamares were of a greater magnitude than the ancestral spirits placated at tombs—perhaps like the Egyptian hierarchical system of "great gods" and minor deities.

Like many Cretan nature sanctuaries, Kamares Cave has earlier remains, dating to the Late Neolithic and the EM I period. Peatfield (1990) and others have interpreted these early remains as the first evidence of cult, but, in cases where substantial early deposits have been excavated—at the Psychro cave, the Idaean cave, and at Mount Jouktas—the excavators (Hogarth 1899/1900 for Psychro; Vasilakis 1990 for the Idaean cave; Karetsou, pers. comm. 1994, for Mount Jouktas) have identified these deposits as domestic occupation levels. Once the ruling family had gained power, they may have advanced the claim that their ancestors were the first occupants of the cave, thus supplying an additional justification for their premier political status (as Fried 1967; Webster 1976). In this respect, the Minoan sanctuaries resemble the tomb and hero cults of the Greek Geometric period that were superimposed over earlier Bronze Age graves (Antonaccio 1995). Minoan sanctuaries were often sited with three considerations in mind, on a site with LN–EM remains, for height, and for visibility. The importance of the first consideration is shown by the fact that the Phaistians chose Kamares Cave rather than one of the more prominent twin peaks of Mount Ida.

With the establishment of regional sanctuaries, each Minoan region became a theocratic state possessing its own pilgrimage center—Kamares Cave for the Western Mesara, Mount Jouktas for the Knossos area, and the Psychro cave for the Malia region. Cult at these shrines created a communal sense of religious identity within each polity. We can see the popular response to these new cults in the thousands of small clay votives found at these sanctuaries, as their shapes reveal the hopes of their dedicants—for the successful conception and birth of children, mother's milk to nurse, restoration of health, increased herds, and plentiful harvests.

The Minoan palaces themselves tend to confirm this interpretation. Palatial courtyards and storage quarters accommodated and served religious festivals aimed at the populace, while smaller dining facilities (Gesell 1985:120–124 for MM II Phaistos; Hue and Pelon 1992 for MM II Malia; Graham 1962:125–129 for the new palaces) in the palaces were used for elite meals. Recently, Carter (1995) has connected the banquets held within Late Bronze Age Aegean palaces with *worgiones*, mentioned in the Linear B tablets (in later Greek, *orgeones* were members of a religious organization). She suggests that members of elite local families gathered at these banquets to celebrate a common ancestry whose founder, or patron deity, was identified with the king. This system would have bound potentially rival kinship groups to the royal family by means of a new genealogically based hierarchy.

Such a suggestion is similar to Webster's hypothesis (1976) that early theocratic states arise through "moral and cosmological sanctions."

Wider Questions

Given the explanation advanced above, the question invariably arises as to whether state formation would have occurred on Crete if the probable environmental episode of EM III had not taken place. In order to answer this question, we must look back at Crete prior to circa 2200 BC. At this time (EM IIB), Crete seems to have consisted of regional or subregional ranked polities centered at places such as Knossos, Phaistos, Platanos, and Vasiliki. For some 250 years their societies (chapter 8) were able to maintain a balance between social hierarchy (unequal access to agricultural produce, foreign trade, and prestige items) and heterogeneity (independent farmers with local cult complexes). If we move forward in time to the MM IB–II period, we can see by comparison that the basic features of Protopalatial society—greatly intensified agriculture, large nucleated urban centers, centralized surplus, regional sanctuaries, and palaces—cannot be convincingly extrapolated from what we know of EM II Crete. Craft specialization, which did exist in both periods, was already present in EM I, and therefore cannot be cited as a possible cause of increasing social complexity. Still, even without the radical changes caused by the EM III period, most of the MM IA innovations noted above—increased wealth, economic growth, craft specialization, international connections, social diversity, and new funerary beliefs—would undoubtedly have come about in any case, although within regionally integrated and homogenous social contexts. What would have been missing in this scenario was the *acute degree* of social stratification, competition, conflict, and consequent instability that we detected in the MM IA period. It was these pressures that drove some self-aggrandizing individual, or social group, perhaps out of fear of a rival faction, to initiate the radical steps that led to the creation of a Minoan state. Nevertheless, the substantial societal and economic changes that had already begun in MM IA would, in time (perhaps by the end of the nineteenth century BC), have probably produced enough social pressure to prompt attempts at consolidating a position of political power.

Finally, we return to the crucial question posed by Lewthwaite (1983) about early state formation in the Aegean—why did it happen on Crete and on no other island in the Eastern Mediterranean? Why not on Cyprus, or on the Greek mainland? At first glance, Cyprus, roughly the same size as Crete, would seem an equally plausible candidate for early state formation. However, Cyprus suffered from two fundamental disadvantages in respect to the evolution of social complexity. The first was environmental. Cyprus possessed a volcanic landscape (hence its mineral riches) that has agriculturally poor soils and lacks aquifers and springs, a severe restriction on settlement, population, and economic development. Crete, on the other hand was a karstic landscape supplied with plentiful springs and good soils that can sustain dense settlement. The Western Mesara alone has dozens of springs, while the Mesaoria Plain in Cyprus, comparable in size to the Mesara, has few natural springs (S. Swiny, pers. comm. 1994).

Despite the fact that a few Early and Middle Cypriote sites along the coast reached 15 ha in size (Swiny 1989), most of the island's settlements were thinly scattered and relatively isolated rural communities. Early settlement hierarchy remained undeveloped and no Cypriote site stood out in terms of its size, architectural development, wealth, or imported materials during this period, as did EM–MM I Knossos or Phaistos in Crete. Similarly, Cypriote burials and their contents before 1700 BC exhibit little sign of social stratification (Swiny 1989:27), in contrast to the ranking visible in the contemporary EM Mochlos tombs (Soles 1986). As Knapp (1986:39) has noted, pre–Late Cypriote I sites in Cyprus appear "in socio-political terms . . . to have been simple agricultural villages."

Cyprus's second disadvantage was political. Within relatively easy access of the Anatolian and Levantine mainland, Cyprus has repeatedly been under foreign domination by nearby continental powers—Hittites, Assyrians, Egyptians, and Turks. Throughout history, the Cypriotes have had little opportunity for political self-determination. The political power of neighboring kingdoms may have slowed the local communities from developing toward greater social complexity. During the Middle Cypriote period, under an opportune range of (internal and foreign) economic and social pressures (Knapp 1986: Table 1), Cyprus developed complex societies. State societies only subsequently appeared in the Late Bronze III period. During the Early and Middle Minoan periods, Crete was under no such constraints.

Like Cyprus, the Greek mainland produced no state societies until the Late Helladic III period. Obstacles to early state formation on the mainland may have been demographic rather than geographical. In Early Helladic II, southern Greece possessed complex polities centered at the so-called Corridor Houses. Helladic cultural development, however, was cut off by the destructions, unrest, and almost certainly, by large-scale immigration at the end of the Early Bronze Age (Mellink 1986; Hood 1986; Forsen 1992). If foreign groups did enter Greece, their presence would have created fear and defensiveness among the local population that would take time to dissipate. Whatever the causes of these changes, regional surveys have shown a large-scale drop in population after Early Helladic II (Rutter 1993:772), and that most Early Helladic III sites were smaller than their Early Helladic II predecessors. Monumental architecture, sealing systems, settlement hierarchy, and the Early Helladic II koine in material culture disappeared in Early Helladic III. In central and southern Greece, regional surveys have documented a sharp reduction in population during the Early Helladic III–Middle Helladic I period (Rutter 1993:781). Crete, in contrast, seems not to have experienced any major immigration or a break in ethnic continuity during the EM II–MM I period.

10

Palatial Rule and Collapse (Middle Minoan IB–Late Minoan IIIB)

L. Vance Watrous and Despoina Hadzi-Vallianou

THIS CHAPTER IS DIVIDED into chronological sections that present data on settlement in the Western Mesara during the Protopalatial (Middle Minoan IB–II), Neopalatial (Middle Minoan III–Late Minoan I), and Final Palatial (Late Minoan II–IIIA1 and Late Minoan IIIA2–B) periods. Each section begins by detailing the results of our survey around Phaistos. We also consider cultural aspects as they relate to regional social organization, such as population, land use, craft production, trade, and the territory of the Phaistian state.

THE PROTOPALATIAL PERIOD (MM IB–II)

Survey Data and Settlement

Settlement in our survey area jumped to thirty-eight Middle Minoan (MM) IB–II sites from seven MM IA sites (figure 10.1). Thirteen, or possibly fourteen, cemetery sites are known from this period. Of the thirty-eight MM IB–II settlements (table 10.1), twenty-two are new foundations in this period. Eight of the MM IB cemetery sites are also new in this period, including the great Kamilari tholos (Levi 1961/1962) next to site **7**. Similarly, the Kommos survey (Hope Simpson et al. 1995:395) revealed a pattern of sharp settlement growth: there were twenty-eight Protopalatial sites as compared to ten Early Minoan (EM) II examples. In the Agio Pharango Valley the number of settlements also rose: several sites there (Branigan sites W7, W8, and W11a) were new in the Middle Bronze Age. Elsewhere in the Mesara, virtually all known EM and MM I sites were (re)occupied in the Protopalatial period.

Bronze Age Phaistos reached its greatest size (at least 55 ha) in the MM IB–II period (figure 10.2). Deposits of this date have been found at the southern edge of the village of Agios Ioannis (Alexiou 1972:622), on the northeast slope of the site at Agia Photini (Levi 1961/1962:469–477), and above the tourist ramp (Levi 1976:612 and Plate 44b). Our survey also found MM IB pottery as far as 200 m west of Ephendi Christos. A trench 450 m southwest of the church of Agios Georgios Falandra exposed large amounts of MM IB–II pottery approximately 2 m below the surface, giving us a total area of approximately 55 ha covered by MM IB–II pottery. This estimate is a minimal one, since deep, post-Minoan colluviation covers the land surfaces immediately north, east, and south of Phaistos. It does not seem likely that this entire area was fully and completely occupied with houses, nor that the settlement fitted neatly within the area where MM IB–II sherds are presently visible or known. Consequently, we identify a core area of 60 ha as representing the area of dense urban settlement at Phaistos. With this figure, the population of Protopalatial Phaistos would have been (at 50–100 persons per ha) between 2,750 and 5,500 persons. At this time, Knossos had reached a size of approximately 75 ha, which gives a population estimate of between 3,750 to 11,250 (Hood and Smyth [1981] estimate 12,000 persons). Protopalatial Phaistos dwarfed all other sites in the Western Mesara, leaving little doubt as to its central, urban status.

Other settlements in the Western Mesara (figure 10.1) also grew in size. For the first time since the Early Bronze Age, permanent structures were constructed across the site of Agia

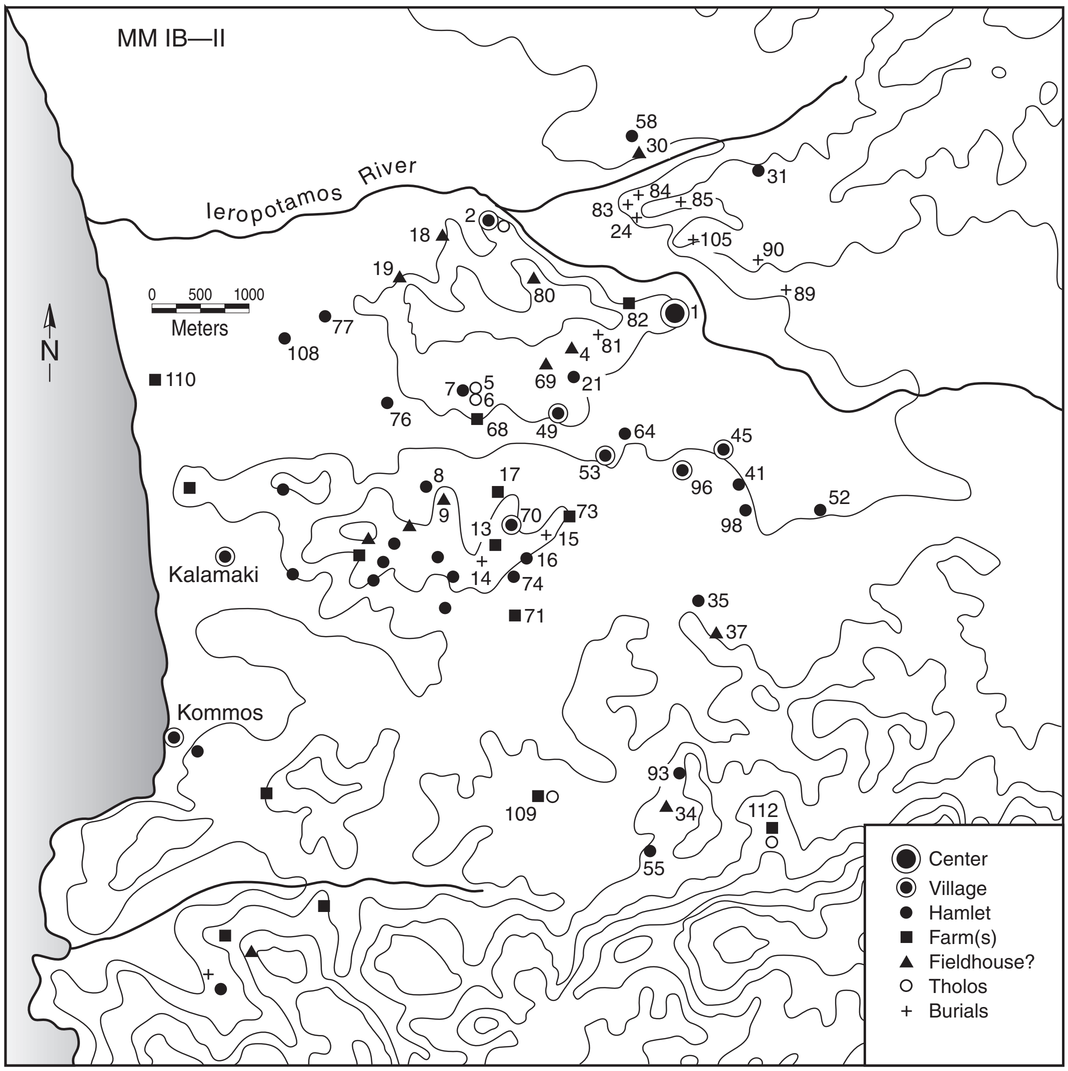


Figure 10.1. Map of Middle Minoan IB–II sites in the Western Mesara. Kommos survey sites unnumbered.

Triada (**2**). The earliest walls and pottery in the area of the shrine and north of the Bastione are said to date to MM IB (Laviosa 1972–1973). Near Kamilari, a new settlement (site **7**) and tholos (Levi 1961/1962) were established. Kommos became a large settlement in MM IB–II (Betancourt 1990:26–28). Near Sivas, our site **93** seems to have expanded in MM IB–II to twice its late Prepalatial size. Within the Kommos survey area (Hope Simpson et al. 1995), the Protopalatial size of Selli (Kommos site 53), southeast of Kamilari, was at least three to four times the size of the original EM II site (75 x 75 m). Protopalatial settlement at Arolithia (Kommos site 40) was at least twice the size of the EM II habitation.

The urban center at Phaistos was surrounded by eight village-sized sites, including Kommos, Kalamaki, and Agia Triada (**2**) during the Protopalatial period. Outside these large settlements there were twenty-seven hamlets, fifteen farmsteads, and eleven very small sites. One can get some idea of the scale of population growth in this period by comparing the MM IB–II settlement hierarchy (figure 10.3) with that of the EM II period (figure 8.4). While absolute population estimates are not trustworthy (or are so wide as to be meaningless), we can see that in relative terms, using median population estimates and leaving aside "fieldhouses" that are apt to be seasonal, the MM IB–II population

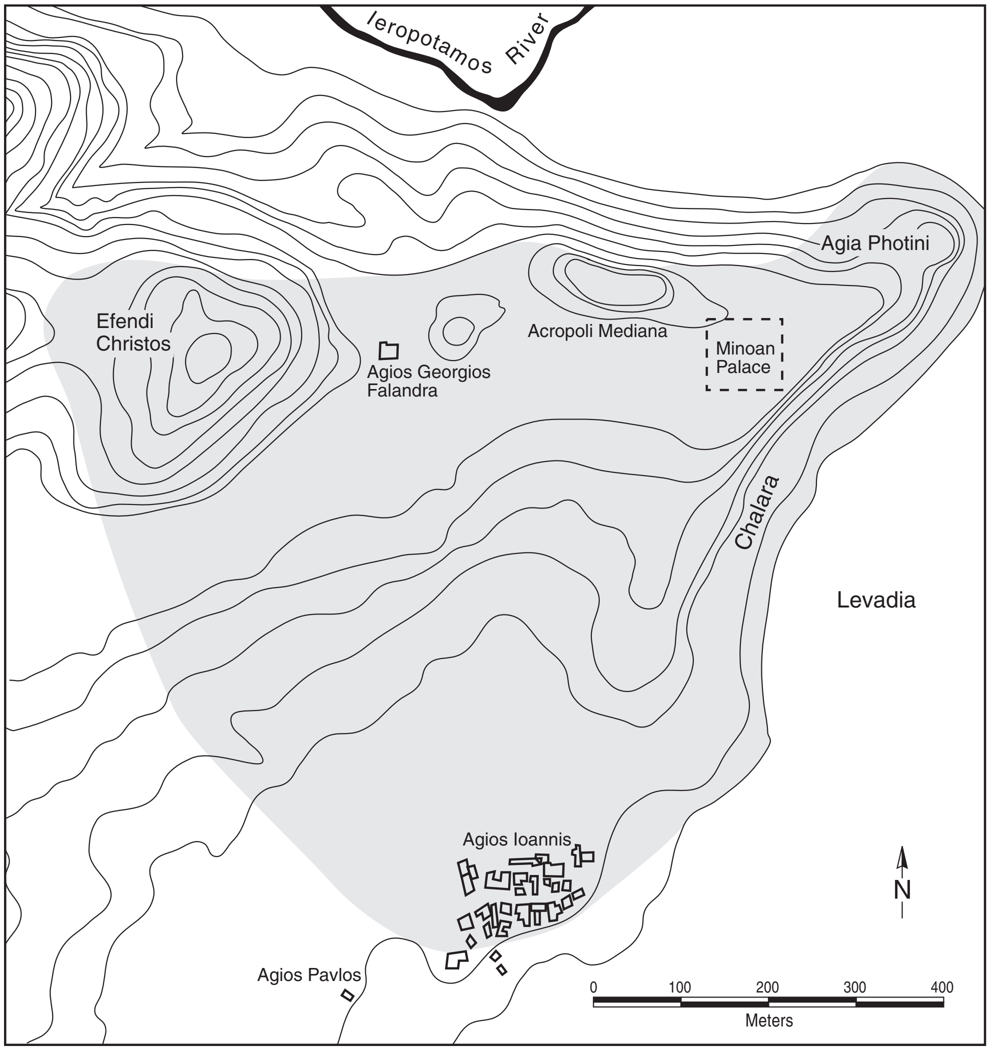


FIGURE 10.2. Physical extent (shaded) of the MM IB–II settlement at Phaistos

within the Phaistos–Kommos area would appear to have grown about ten times larger since the EM II period (bearing in mind the qualification that individuals often occupy or use more than a single site). Figure 10.3 also indicates that MM IB–II settlement density is greater. Most people lived in the center or in villages, whereas during the EM II period, the opposite was true.

This Protopalatial pattern of settlement suggests that there was a rise in occupational specialization and social diversity. Several of the larger MM IB–II sites have specialized functions. Kommos was a port, Kamares Cave a regional sanctuary, and Patrikies a ceramic workshop. Site **18** near Agia Triada was a stone quarry. The large number of village- and hamlet-sized sites in this period points to both an increased population and to more intensive land use. By MM II, Kouses (**37**), and perhaps the settlements at Apothestres near Kalamaki (Hope Simpson et al. 1995:369) and Arado near Pobia (Pendlebury et al. 1932/1933:90; Zielinski 1998:264), possessed elite cyclopean residences. Most of the sites in our survey area were concentrated within the marl hills between 2 and 4 km from Phaistos, presumably to take advantage of the land outside the immediate agricultural catchment of Phaistos. Protopalatial settlement within the Western Mesara was far denser than during the EM II period.

TABLE 10.1. Protopalatial sites in the survey area

Site	Size	Land Class	Function	New
1	55+ha.	I/II	Polity center	—
2	Large	I/II	Settlement	—
4	6 x 28 m	II	Farm/graves?	New
5	15 x 25 m	—	Tholos	New
6	Small	—	Tholos	New
7	150 x 300 m?	II	Settlement	New
8	170 x 100 m	II	Settlement	—
9	7 x ? m	II	Farmhouse?	New
13	75 x 75 m	II	Settlement?	New
14	40 x 35 m	—	Graves	New
15	17 x 31+m	—	Graves	New
16	Large	II	Settlement	—
17	50 x 60 m	II	Settlement	New
18	Small	—	Quarry	New
19	15 x 40 m?	I/II	Farm	—
21	130 x 95 m	II	Settlement	New
24	80 x 100 m	—	Graves	—
30	40 x 40 m	I	Settlement	New
31	80 x 80 m	I/II	Settlement	New
34?	155 x 125 m	—	Knapping site	—
35	60 x 50 m	II	Farm?	New
37	12 x 12 m	II/III	Farm	New
41	80 x 115 m	II/III	Hamlet	New
45	75 x 200 m	I/II	Settlement	?
49	200 x 130 m	II	Settlement	New
52	150 x ? m	I/II	Settlement	—
53	160 x 200 m	II	Settlement	New
55	150 x ? m	II/III	Settlement	New
58	Large?	II/III	Settlement	New
64	50 x 100 m	—	Cemetery?	—
68	80 x 35 m	II	Farm?	—
69	25 x 10 m	II	Farm	New
70	225 x 90 m	II	Settlement	New
71	90 x 20 m	II	Farm	New
73	Small	II	Farm?	New
74	140 x 80 m	II/III	Settlement	New
76	70 x 80 m	II	Settlement	New
77	40 x 110 m	I/II	Settlement	—
80	50 x 50 m	I/II	Pottery workshop	?
81	10 x 35 m	—	Graves	New

continued on next page

TABLE 10.1. Protopalatial sites in the survey area *(continued)*

Site	Size	Land Class	Function	New
82	90 x 50 m	I/II	Settlement	—
83	40 x 35 m	—	Cemetery	—
84	20 x 20 m?	—	Cemetery	—
85	130 x 40 m	—	Cemetery	—
89	Large	—	Cemetery	New
90	3 x 3 m	—	Cemetery	New
93	80 x 110 m	II/III	Settlement	New
96	130 x 160 m	I/II	Settlement	New
98	Large?	I/II	Hamlet	—
105	Small	—	Graves	New
108	Small?	I/II	Settlement	—
109	Small	II/III	Hamlet	—
110	Small	I	Farm?	—
112	Small?	II/III	Hamlet?	—

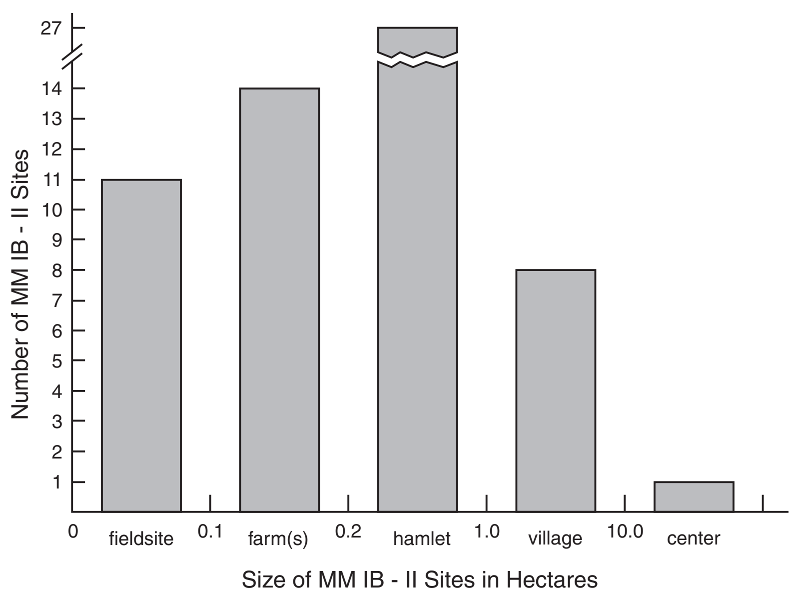


FIGURE 10.3. Middle Minoan IB–II settlement hierarchy in the Western Mesara

Protopalatial Land Use

During this period, settlement expanded onto new types of land. In the EM II period, seven of the eleven known settlements in our survey area were on Class I or II land. In contrast, the largest proportion of Protopalatial settlements was situated on a combination of Class II and III land at a further distance from Phaistos. This distribution may have been influenced to some extent by ameliorating climatic conditions (Moody, pers. comm., 2000), but settlements even sprang up on the very poorest soils (Class

IV) of the Asterousia foothills. Larger settlements were usually located at the edge of Class I or II land, whereas virtually all of the smaller sites were on Class II or III land. Some new settlements, such as our site **7** near Kamilari, were so large in size that they may be the result of some form of centralized planning. Several sites (**9, 69**, and perhaps **82**) were situated along the edge of narrow stream-fed ravines that could have been manipulated to provide water for irrigation. Especially striking is the large number of new sites on the thin soils along the top and southern flank of the ridge south of Kamilari, in locations removed from any immediate water source. Within this densely settled area, Hope Simpson (Hope Simpson et al. 1995:377 and Plates 7.28 and 7.74) found two Minoan check dams spanning a narrow valley. These walls (plate 10.1) were built with two faces of cyclopean blocks, probably to create reservoirs of water for the nearby settlements. About 100 m to the south of the lower wall Watrous found a large in-situ fieldstone bearing a Protopalatial mason's mark in the shape of a star (plate 10.2). Dense local settlement on poorer land points to the existence of a lower (serf?) class that carried out a newly intensified agriculture.

Our survey found abundant pottery in off-site areas. Protopalatial pottery was recorded in a total of sixty-one fields (figure 10.4). While many (forty-nine) of these instances probably derive from adjacent sites, twelve examples, located north of Kamilari and on Ieroditis, and seven others around Sivas and on Ieroditis, probably come from activities connected with the use of the land (that is, from pots brought out to the fields for storage of food, seeds, feed, water, or the cooking of meals).

Once the Phaistian state had been established, the large and increasing population of the city would have created pressure to expand its intensively cultivated catchment. If we assume that the population of Phaistos was 3,000 persons (our minimum estimate), an area (figure 10.5) of approximately 1,500–3,000 ha would be needed (at 0.5–1.0 ha per person) to feed the urban populace. Thus, it seems relatively certain that the farms along the Kamilari Ridge must have contributed food to the Phaistian center. This cluster of farms approximately 3 km south of Phaistos, then, should represent the southern boundary of the city's densely farmed catchment. A "halo" of supportive farmsteads is relatively clear in figure 10.1, outlining an immediate catchment for Phaistos that consisted of approximately 3,000 ha. An area of this size would imply that the Phaistian population was between 3,000 and 6,000. Nevertheless, even if we assume a minimal population size of approximately 3,000 for Phaistos at the beginning of MM IB, the relatively rapid dispersion of rural sites remains unexplained, since the local population would not have risen naturally at such a fast pace. In other words, the rural settlement of land for agricultural purposes cannot be explained by population growth alone.

Sutton (1991) and Whitelaw (1991) have considered this same pattern of relatively sudden rural dispersion of settlement on the island of Keos during the nineteenth and twentieth centuries. During the early and middle nineteenth century, the population of Keos increased substantially, and yet settlement at that time remained nucleated within the single town on the island. It was only in the second half of the nineteenth century, after the large landowning families had emigrated from Keos, that land became available to the population at large. By the late nineteenth century, farming hamlets started to appear in rural areas outside the main town. Thus, despite a rising population, rural settlement dispersion only took place when basic changes in Kean social hierarchy made land available. The Phaistian situation may have been similar. Prior to MM IB, most of the surrounding land was probably owned by a group of elite Phaistian families, so that the increased rural land use and settlement in MM IB–II presuppose changes in social structure.

The amounts and types of agricultural land in use tend to corroborate this hypothesis, since they were not distributed equally among the new farms in the region. Choicest land (Class I) would have been immediately south and east of Phaistos in the present-day Levadia. Next would have been the land (Class I/II) between one to two kilometers away from Phaistos where the Protopalatial sites **21, 69, 68, 49, 64, 53, 96, 41, 45,** and **98** were located (figure 10.1). Least desirable was the land on the more distant Kamilari ridge,

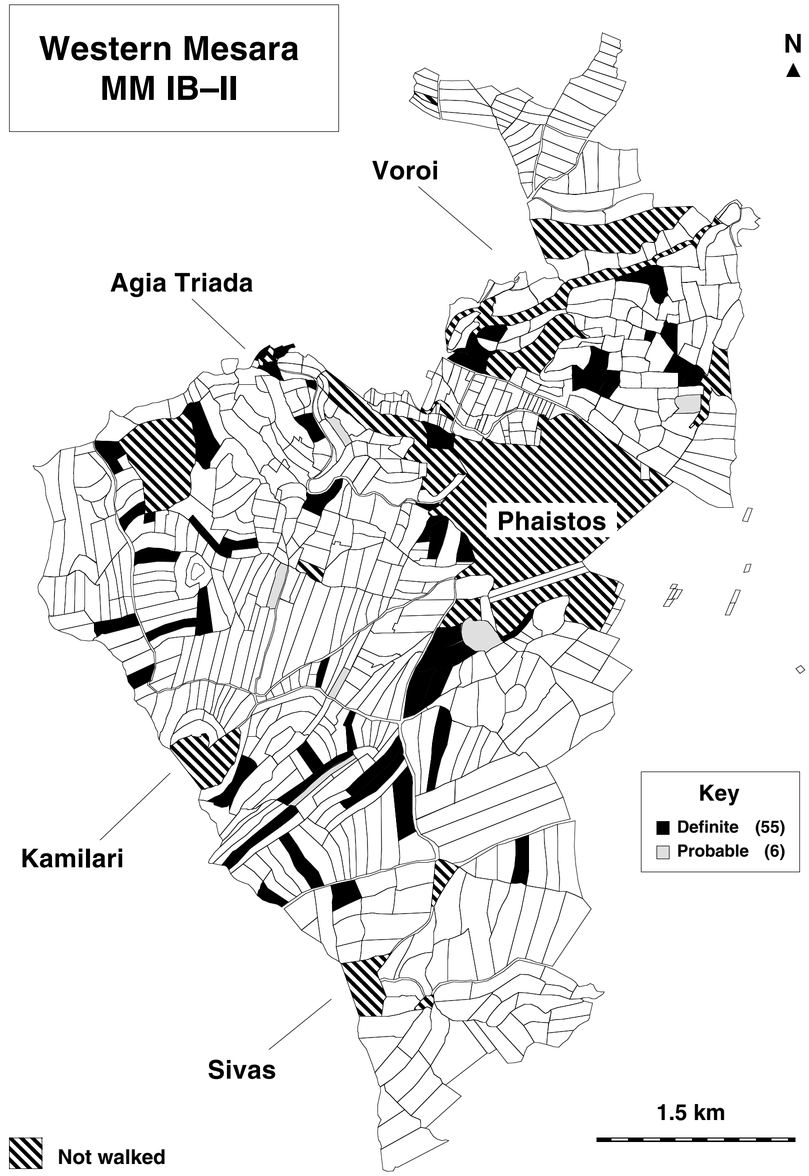


FIGURE 10.4. Off-site Protopalatial pottery found by the survey

where sites **8, 9, 16, 17, 70, 13, 73, 74,** and **71** were situated. Contrary to what one might expect, these last farms were proportionately larger and located closer together than sites nearer to Phaistos, and thus had access to smaller amounts of inferior (exclusively Class II) land.

In other words, landholding at MM IB–II Phaistos shows signs of ranking. These inequalities of land tenure are a result of state formation (see below). A comparison of the distribution of the Phaistian extra-mural sites in the EM II and MM IB–II periods illustrates this development. The size of EM II landholdings, that is, the amount of land between sites (table. 8.1), does not vary greatly, whereas the size of MM IB–II landholdings (table 10.1) does differ significantly. If the expansion of sites around Phaistos had been the sole result of overall population growth, one would expect an evenly distributed increase in sites and their sizes, but, in fact, this did not happen. Instead, proportionately more people settled on inferior tracts of land, farther from the Phaistian center. Such a pattern of MM IB–II rural resettlement implies, then, that the

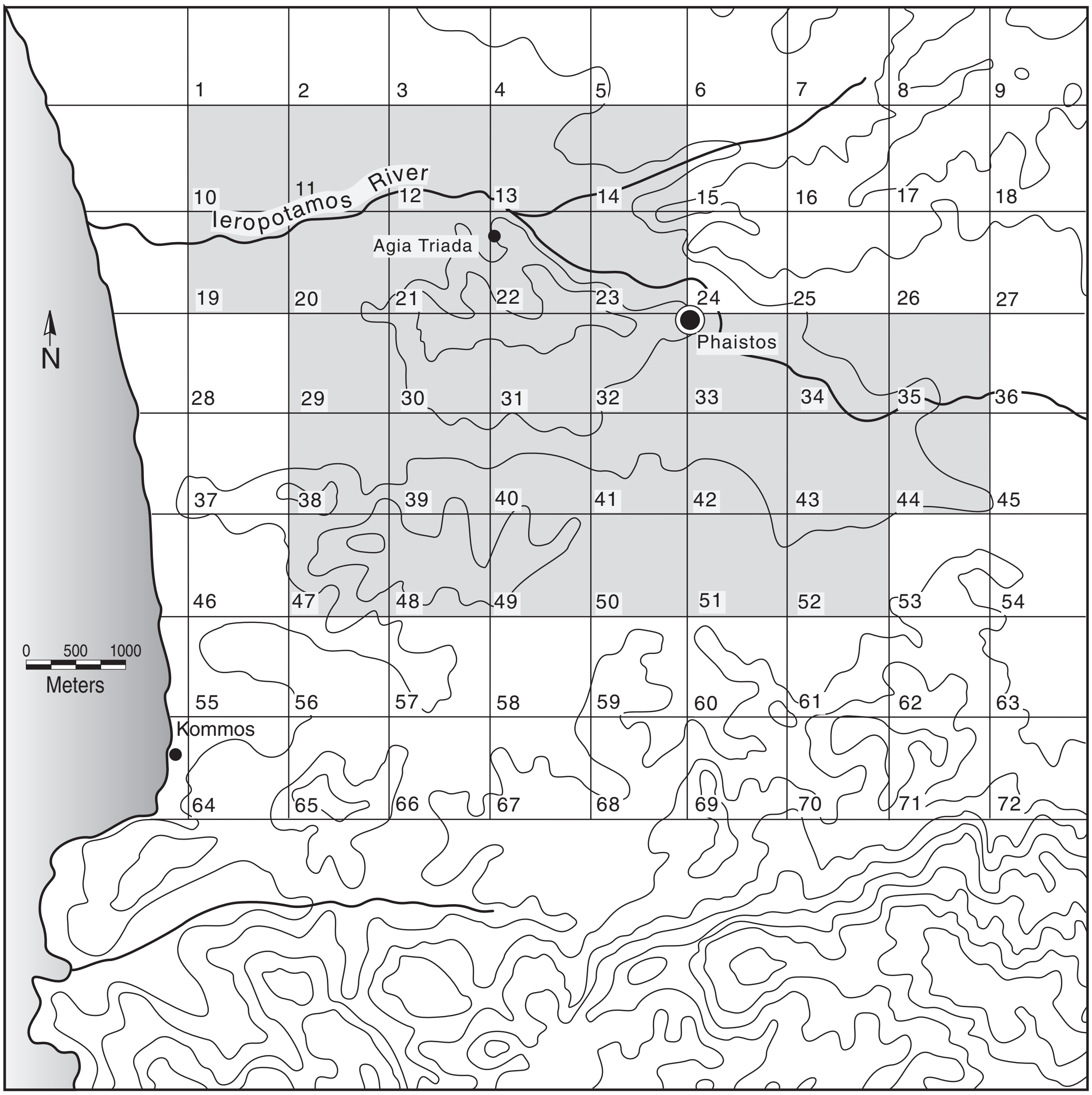


FIGURE 10.5. Protopalatial Phaistos and the minimum hypothetical size of its catchment in available arable land (shaded). Each numbered square represents a square kilometer (100 hectares)

process of state formation included the settling of a lower class on the land, probably with the purpose of raising an agricultural surplus required by the elite.

Territory of the Phaistian Polity

Scholars (Warren 1975; Palaima 1990) have assumed, on the analogy of the Linear B kingdoms, that the Minoan palaces exercised centralized political and economic control over an extensive hinterland. Renfrew (C. Renfrew 1972:258), for example, imagined that Neopalatial Phaistos controlled the entire Mesara; this is unlikely (see below). Similarly, Cadogan (1994) suggested that "the Malia state" controlled much of East Crete on the basis of a stylistic similarity between pottery from Malia and Pyrgos/Myrtos on the south coast. On this last point, however, Knappett (1999) has demonstrated that the Pyrgos/Myrtos pottery is, in fact, mostly local and manufactured differently from Malia products. Knappett emphasized that trade networks are not equivalent to spheres of political control, and that other factors absent at Pyrgos/Myrtos, such as ideology and social status, may have been far more important in unifying a palatial territory.

In order to define the size of Phaistian territory, we must turn to other types of evidence. Cherry (1981, 1986) noted that each Minoan palace was closely connected to an extra-urban sanctuary, and that these sanctuaries were located on high places in the mountains from which the territory surrounding the palace could be seen (Peatfield 1990; Watrous 1996). In some cases, these sanctuaries were also situated on natural topographic borders between states, suggesting that they marked the boundaries between the regional states. The distribution of these mountain sanctuaries indicates that the territories of Protopalatial polities were relatively small. For example, Kamares Cave (Watrous 1996:75–78 and Plate 4a), located on the southern face of Mount Ida (figure 10.6), looks directly down onto Phaistos and the Western Mesara. The sanctuary would have marked the northern boundary of the Phaistian state along the base of Mount Ida, while the nearby Idaean cave on the east-facing slope of Mount Ida defined the eastern limit of the adjacent Minoan state. In the Amari Valley (figure 10.7) northwest of Phaistos, the large centrally organized center at Monasteraki had extremely close administrative and ceramic

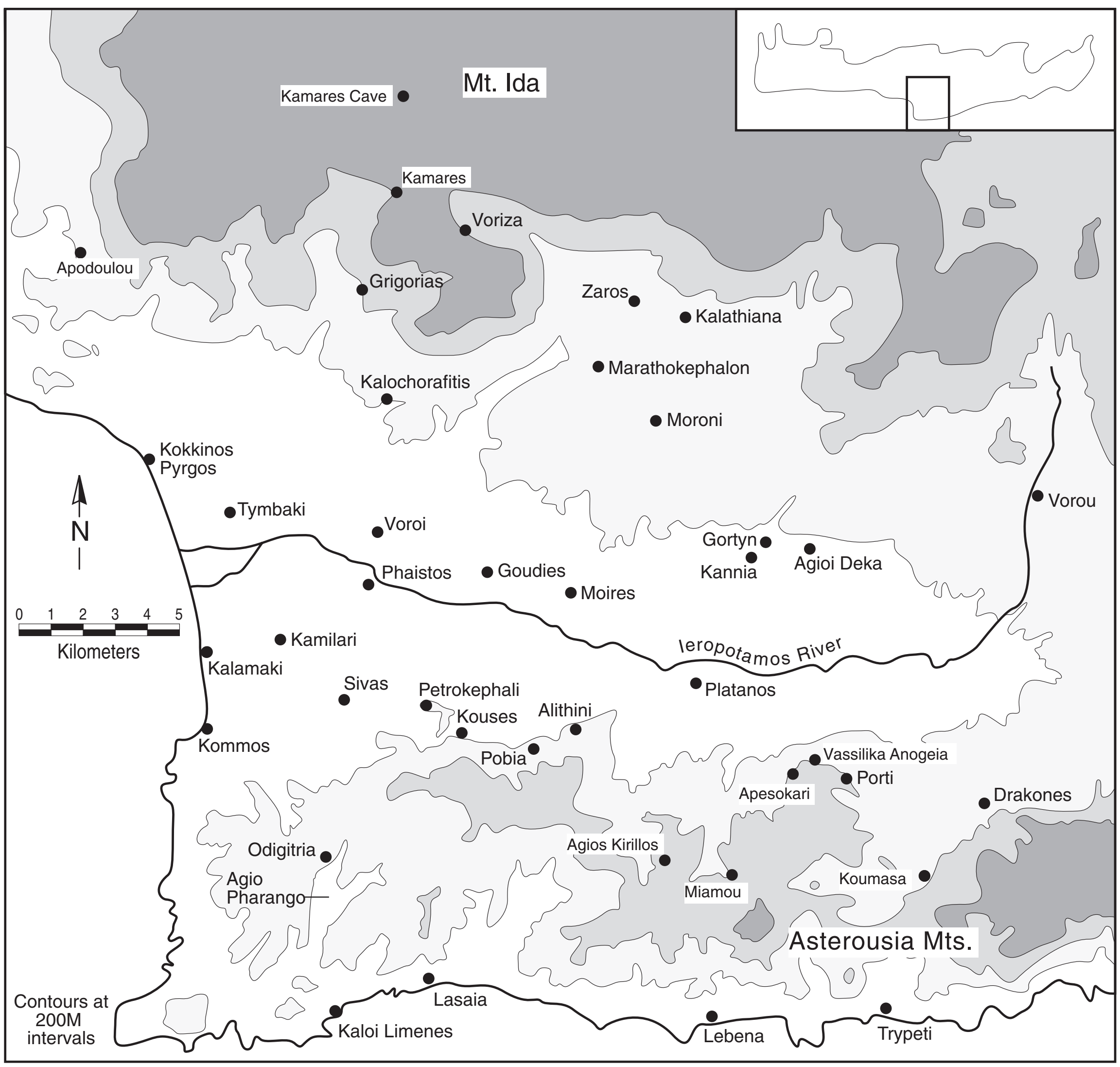


FIGURE 10.6. Map of the Western Mesara

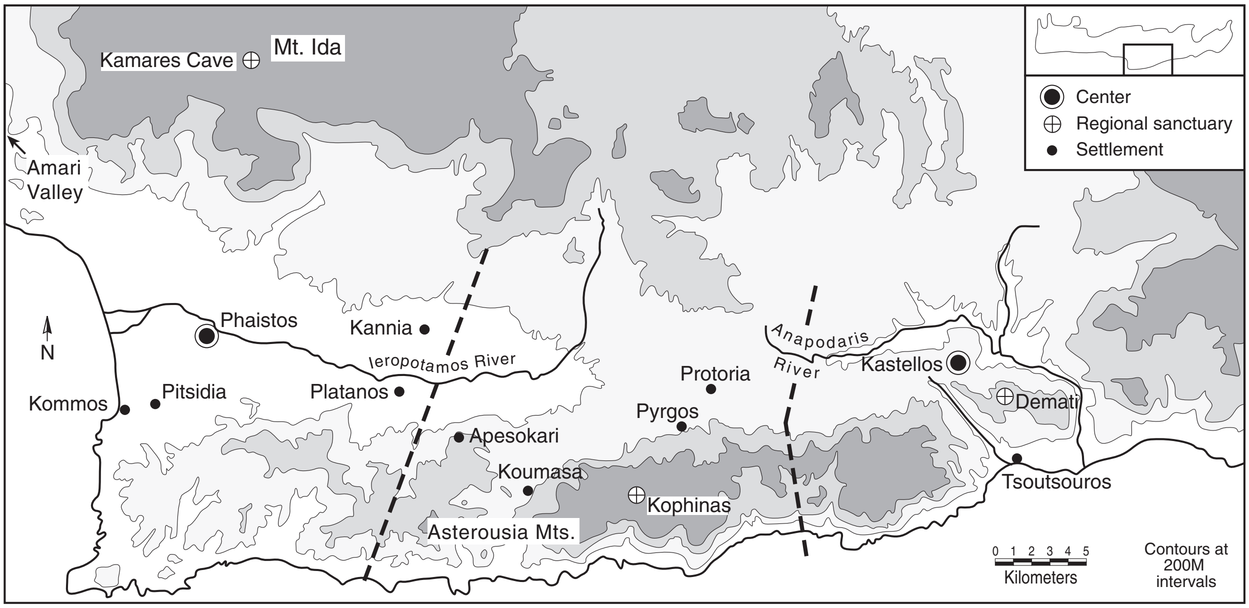


FIGURE 10.7. Map of the Mesara during the Protopalatial period

connections with Phaistos in MM IIB (Kanta and Tzigounaki 1999). By MM IIB the ruler at Monasteraki seems to have had a close relationship with Phaistos, perhaps as an ally through kinship, marriage, or as the result of conquest.

South of Phaistos, the settlements along the Agio Pharango Valley ending at Kaloi Limenes on the south coast (figure 10.6) were also probably part of Phaistian territory, since no creditable peak sanctuaries have been found there. The eastern edge of the early Protopalatial territory of Phaistos may be discernible by a drop-off in sites to the east of the village of Petrokephali. Further east, MM IB–IIA Platanos (figure 10.6) seems to have been an independent center that produced its own distinctive pottery, seals, stone vases, and metalwork and enjoyed trade ties with Phaistos and the north coast.

Like other early states, for example, Uruk (Rothman 2001), Tikal, and Monte Alban (Marcus 1998), Protopalatial Phaistos soon began to expand its territory. To the north, the Amari Valley came into its orbit. On its east flank, two cyclopean structures were built in rural areas, at Kouses (**37**) and Pobia (Pendlebury, Eccles, and Money-Coutts 1932–1933:90). Studies (Tzedakis and Chryssoulakis 1990; MacGillivray 1997) of "fortified" rural cyclopean structures in areas of East Crete have shown that these networks began to be constructed by MM II for strategic purposes. At the same time, Platanos, located in a vulnerable position in the middle of the Mesara Plain, ceased to make wealthy burials in its tholoi and adopted poor individual inhumations (Xanthoudides 1924:93). These developments may signal the expansion of Phaistian power eastward across the region.

The MM IIB pattern of settlement east of Platanos reinforces this impression (figure 10.7). Two kilometers east of Platanos, at Apesokari, the settlers moved in MM IB from the plain to the defensive hilltop of Vigles (Schorgendorfer 1951). At nearby Koumasa, the tholoi ceased to be used in MM II. Settlement continued at Koumasa, but was situated on the ridge top of Korakies that was fortified with a cyclopean wall (Xanthoudides 1924:49). Apesokari and Koumasa, therefore, appear politically independent from Phaistos. Phaistian territory in MM IIB, then, may have included the Western Mesara as far east as Platanos and Kannia (figure 10.7) and the Amari Valley to the north.

By MM II B, the Phaistian state appears to have directly controlled all of the Western Mesara, a total of perhaps 300 km^2. Like the other Minoan states, Phaistos expanded control of its territory by the construction of roads connecting rural cyclopean structures, the so-called cyclopean forts, or fortified farms. Only two such cyclopean structures are presently known in the Western Mesara, but entire networks of such buildings have been documented around Malia and in East Crete. During the Protopalatial period, the Malia state, for example, extended its control southward into the Lasithi Mountains by building a "garrison" the size of a hamlet with a massive encircling fortification wall on the ridge top above the pass into the Mochos Valley in MM IB. Similarly, further south, cyclopean buildings were placed at the north (Papoura), east (Vigla), and west (Tsouli to Mnema) entrances to the Lasithi Plain. Some of these forts were connected by built roads (Tzedakis and Chryssoulakis 1990) and seem intended for centralized control by the state.

In the face of territorial expansion, Protopalatial states formed alliances with one another. The best known example is that between MM II Phaistos and Monasteraki, the central settlement in the Amari Valley located 25 km to the northwest of Phaistos (Kanta and Tzigounaki 1999). Such an "alliance" of these two centers would have almost doubled the size of Phaistian territory and may have provided Phaistos with a valuable outlet to the north coast. In all probability, these rival alliances continued to grow during the early Neopalatial period. The Late Minoan (LM) IA destruction of peripheral centers, such as Galatas south of Knossos, would be a sign of Knossian territorial growth.

As part of this expansion, Phaistos became the center of a multipolity state. In central Crete, Phaistos's rival, Knossos, probably had political ties with the large surrounding communities at Tylissos, Amnissos, Nirou Chani/Gournes, Lykastos (Kanli Kastelli), and Archanes. Some of these communities were polities in their own right. Tylissos, for example, possessed its own separate peak sanctuary, at Pyrgos. These multipolity states would have held their alliances together through a combination of methods, including outright force, intermarriage, political alliance, common ideology (celebrated at sanctuaries and at palatial feasts), and trade. It is likely that relations among the allies within an alliance were brittle and changed over time. In this respect, Minoan states were no different from archaic states worldwide, which often consisted of clusters of interconnected states (Feinman and Marcus 1998). Some Minoan states took a further step—toward empire—by establishing overseas colonies on foreign lands, for example, on Rhodes, at Miletos, and in the Cyclades. Increasing social hierarchy brought a corresponding increase in territory (Marcus 1998).

The extra-urban sanctuaries in the Mesara—Kamares Cave in the Western Mesara, the peak sanctuary on Mount Kophinas in the Central Mesara, and the peak sanctuary above the village of Demati in the Eastern Mesara—suggest that in the Protopalatial period the Mesara was divided politically into three parts (figure 10.7). Phaistos was the center of the western polity. Kastellos Belvedere (Pendlebury 1965:125), the later Classical site of ancient Priansos, was probably the eastern center during the MM IB–LM I period. The middle center would have been in the area of Protoria and Pyrgos. This tripartite political division of the Mesara occurs again in the Classical period, when Phaistos, Gortyn, and Lyttos were the three main poleis in south central Crete.

Craft Production and Trade

Protopalatial evidence suggests that attached craftsmen produced specialized goods for elite consumption and export. Rare prestige versions of earlier types of artifacts begin to be manufactured: the gold-hilted dagger from Odigitria, and the silver (!) "parade swords" from Koumasa, Knossos, and Viannos (Vasilakis 1996:82–86). Phaistian Kamares ware was exported to Knossos (MacGillivray 1987, 1999), Malia, and Platanos (for example, Xanthoudides 1924: Plates 9, no. 6862; 51, no. 6888). Petrographic analysis of MM IB–IIB Kamares Ware vases from Knossos shows that the majority of the vases were produced in the Western Mesara, from clay, the origin of which is in the hills bordering the Mesara Plain (Day and Wilson 1998:355). The exotic nature, elite find contexts, and long-distance exchange of these artifacts indicates that their production was controlled by the elite.

Foreign exchange in the Mesara continued to expand. Near Eastern imports include the Babylonian cylinder seal from Platanos Tholos B, Egyptian scarabs (found at Agia Triada, Platanos, Phaistos, Koumasa, Lebena, Marathokephalon, and Tsoutsouros), Cypriote copper (Stos-Gale and MacDonald 1991:267) and pottery (J. Shaw 1998) and tin. Known exports from the Mesara were mainly pottery: MM IIA vases from Hagara and Kahun in Egypt (MacGillivray 1998:105–106). The economic organization of such Protopalatial trade can be seen best at Malia (figure 8.6b), where the grand Houses A and B in Quartier Mu had their own dependent ateliers producing goods for export (Poursat 1992). One must be careful, therefore, not to interpret the MM IIB harbor facility at Kommos as a sign of strict palatial monopoly on trade. The Near East (namely Ugarit) provides examples of similar states where trade, while protected and overseen by the state (primarily for the purpose of taxation), was nevertheless predominantly in private hands (Heltzer 1978).

Social Organization

The social structure of Protopalatial society has been variously reconstructed. Evidence from the Mesara and elsewhere in Crete points to a socially hierarchical but diverse society headed by a religious authority.

Early states (Feinman and Marcus 1998) worldwide have varied in the degree to which their political control was centralized. While Mycenaean rulers exercised considerable administrative control over the political and economic affairs of their kingdoms, early Mesopotamian states were decentralized polities (Stone 1997). Stein (1994:11) therefore distinguishes between unitary (centralized) and decentralized states. In the latter case, vertically ranked kinship groups possessed substantial amounts of economic, political, and religious power, while the ruler was a primarily symbolic, unifying figure who represented society in some external aspect. In such decentralized states, the power of the central authority tends to decline as one moves farther from the capital. Groups near the center pay higher levels of tribute and provide labor more frequently than more distant, semiautonomous groups (Stein 1994). The concepts of unitary and decentralized states are, of course, modern theoretical models at the opposite ends of a political spectrum.

Where did the Protopalatial state at Phaistos fit into this spectrum? Many scholars (Cherry 1986; Halstead 1986; Palaima 1990:87) have viewed the structure of the Minoan polities as controlled by a strong centralized palatial administration. Let us examine their reconstruction by looking first at the data from Protopalatial Phaistos. The first palace at Phaistos (figure 10.8), about 8,000 m^2 in size, possessed a monumental ashlar facade and entrance portal, a paved central and west court (the latter supplied with the so-called *koulouras*—probably cisterns), storage magazines, kitchens, an archive, a dining complex, a pair of grand resident suites, and a warren of ancillary rooms that included living quarters for palace attendants, workrooms, and storage facilities. Religious rituals and ceremonies were performed in the central court and probably also in the west court (Marinatos 1993: 38–75). Storerooms and clay administrative documents in the west wing indicate that the palace performed a redistributive function (Fiandra 1968; Weingarten 1994) involving agricultural goods. Commodity signs on the few preserved palace texts identify the farm products given to the palace as barley, figs, and possibly sheep and wine. Large numbers of broken sealings found fallen into Room 25 of the palace imply that the contribution and dispersal of goods took place repeatedly. Since no seals corresponding to the palace sealings have been found in the outlying tholoi of the Mesara (Yule 1980:228), it seems reasonable to conclude that these contributors lived in and near Phaistos. This pattern resembles that of a decentralized state.

One of the groups receiving rations from the palace consisted of the officials and artisans living within the palace. A small, elite group was also fed within the palace in a small dining complex (Rooms V–X) supplied with cult objects (Gesell 1985:120, Upper West Court Sanctuary). This complex and a MM II hall at Malia (Hue and Pelon 1992) are the antecedents for the "banquet halls" found in the Neopalatial palaces (Graham 1962:125–129). Food for these diners would have come from the adjacent storerooms. As noted before, Carter (1995) has suggested that the adjective *wo-ro-ki-jo-ne-jo* found in the LH III B Pylos tablets and referring to a group of landowners is the origin of the later Greek term *orgeone*, who were members of

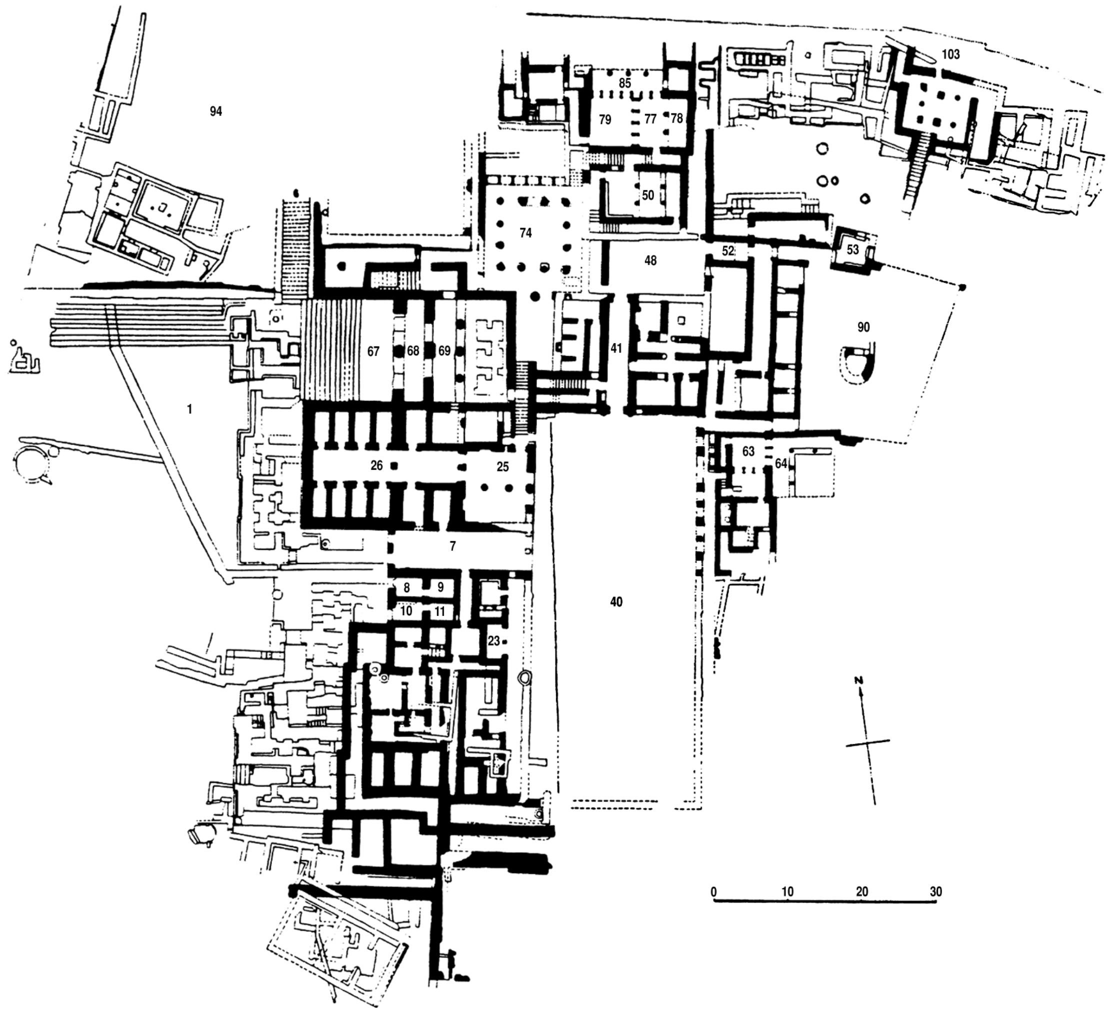


FIGURE 10.8. Plan of palace at Phaistos. The MM IB–II palace is marked by the outer walls in outline. Solid black walls belong to the Neopalatial palace. *Courtesy of Cambridge University Press.*

a kinship-based, religious organization that met for ritual feasts. Cult banquets at Phaistos and the other Minoan palaces look like precursors for the Pylos group. One wonders if these meetings were not also the occasion for communal decision making. Additionally, quantities of storage vases and cups, especially the *pithoi* in the southern storeroom LVIII at Phaistos (Gesell 1985:124) that opened onto the lower west court, suggest that the palace may also have hosted a large communal ceremony, or festival outside, in the west court.

Halstead (1981) has viewed the Minoan palaces as central economic repositories, like modern banks, that stored and redistributed sustenance for the regional community (but compare Strasser 1997). Since the MM III–LM I evidence in Crete for palatial redistribution is particularly well preserved, we will focus first on this data.

At Neopalatial Knossos, a small group of elite houses without storage facilities was apparently sustained by the palace storerooms. These households, such as the Royal Villa, South House, and Southeast House, surrounding the Knossos palace constituted a minute fraction of the total population of the town. At Malia and Zakros the pattern is the same. While the heads of households living in the well-built homes in the city attended ceremonial feasts in the palace, their houses possessed substantial storage facilities and evidence of food processing of their own. Even if these palace meals were a regular event, the so-called banquet halls recognized at Malia and Zakros are limited by their size to small groups of no more than two or three dozen individuals.

Palatial storage capacities are also limited relative to the size of the overall urban population. Completely preserved Neopalatial storerooms at the palace at Phaistos, for example, have no more than roughly eight times the storage capacity of House A at Tylissos, or of Nirou Chani (compare Graham 1962: Plates 4, 19, and 31). If calculated in relation to the MM II population of Phaistos (approximately 3,000–6,000 persons), the storerooms at the contemporary palace could only have fed an extremely small percentage of the community.

At MM II Malia, Houses A and B in Quartier Mu (figure 8.6b), situated less than 200 m from the palace, had their own storerooms, redistributive system, and ateliers run by attached craftsmen. Such an urban arrangement has important implications: it demonstrates the existence in Minoan society of a powerful redistributive economy, independent of the palace. The widespread distribution of workshops (Platon 1988; Dimopoulou 1993) outside the palaces also suggests that the economy of Minoan Crete was decentralized until LM IB. Branigan (1987) has emphasized how little evidence (a small ceramic and lapidary workshop) there is at Phaistos for the first palace's involvement in craft production. The palaces, then, do not seem to be administrative centers in control of the Minoan economy.

The Minoan palaces are better interpreted as the residences of the communal religious authority (contra Schoep 2002). By comparing Houses A and B at Malia with the Minoan palaces, we can see that the defining characteristics of the palaces were their large courts and their ritual paraphernalia. In the palace courts the population celebrated communal ceremonies. Such ritual is a source of power, because it can be used to integrate diverse social units (Potter and Perry 2000). The divine status of the ruler was in turn derived from his relationship to the patron deity or deities worshipped at the regional sanctuary. It is difficult to imagine one without the other, because the two are related by means of common cult paraphernalia, literacy, and iconography, and they justify one another within a shared ideology (Cherry 1986). Minoan kingship seems to have been based on its religious status (Rehak 1995), rather than on any economic role.

The social hierarchy of the Phaistian polity can, in outline, be reconstructed from seals found at the MM II palace. At the top was the owner or owners (the king and his officials?) of the three most-used seals (Pini 1970:165, 168, and 268/269), the last bearing an Egyptianizing royal design (figure 9.7). Below these seals was a group of 41 seal owners who repeatedly used (more than ten times each, representing 53% of the total sealings) the palace storerooms. The third group of 283 seal owners (seals used on average two times each) was a larger and more infrequent user of the storerooms. At the bottom of the community was the largest sector of the population that did not own seals. Society in the MM II Phaistian state seems, then, to have included a ruler, a literate bureaucracy, a group of elite families, and lower classes.

Protopalatial architecture, artifacts, and burials reveal a similar social hierarchy. The monumental MM IB–II palaces, built of ashlar orthostate masonry, dwarf all contemporary houses. Large elite households, such as House B in Quartier Mu at Malia, belonged to elite families. Rubble-built houses located at the edge of the urban centers and in rural areas are of lower rank. Finally, the residences and work areas of the lowest class can be seen in the eighty-room warren in the southern area of MM II Monasteraki (Kanta and Tzigounaki 1999:194, Figure 1, b).

Separate social classes are also distinguishable in Protopalatial material culture. The Pharonicizing seal (Pini 1970:268/269) from Phaistos (figure 9.7), a stone axe in the shape of a leopard, and the set of gold-handled long sword and dagger (Vandenabeele 1992: Plates 49, 51, 64) from the palace at Malia, can, for the first time, be identified as royal objects. Specialized goods are produced exclusively for the elite. As in life so in death: social classes are buried differently. At Malia the monumental Chrysolakkos complex, with its rich contents (for example, the gold wasp pendant), overshadows simple jar burials and inhumations within the Malia cemetery. Poor individual burials of the lower class become common in the Protopalatial period (Maggidis 1998).

Society under the early Phaistian state was also broader and socially more diverse. New institutions and social roles appear. Scribal officials and a wide range of attached craftsmen—potters, lapidaries, ivory carvers, masons, metalworkers, textile workers—are discernible in the archaeological record. Seals depict professions or professional tools of the trade for the bureaucrat, priest, potter, weaver, maritime trader, agriculturist, hunter, and soldier. Massive amounts of cheap new votive types, dedicated at regional sanctuaries such as Mount Jouktas and Petsophas (Watrous 1996:64–72), suggest that the state has institutionalized the initiation of young men and young women into the adult community.

The lower class would have provided corvée and agricultural labor as well as craftsmen. Pernier identified at least thirty-five masons' marks inscribed on blocks from the first palace at Phaistos (Pernier and Banti 1935–1951:399–409). Found also at Minoan quarry sites (plate 10.2), these marks, used to track blocks prepared by quarry crews to their placement within the palace, also have some social significance. Like their Egyptian counterparts (Roth 1991), masons' marks imply that the workers of the lower class had been organized into groups (in Hellenistic Egypt called *phylai*, or tribes) for the purposes of part-time labor. In Egypt, masons' marks included the signs belonging to the four to five divisional groups of the lower class responsible for providing corvée labor, which included quarrying, construction crews, service in temples, and ships' crews. One wonders if the Minoan lower class was not organized along similar lines.

Based on the above evidence, we can see that Protopalatial society in the Mesara

possessed:	did not possess:
class stratification	social competition among elites?
three-tiered settlement pattern	royal burials?
at least one administrative network	
religious ruler	
monumental public architecture	
attached craft specialization	
prestige economy	
long-distance trade	
agricultural intensification	

Finally, the Protopalatial period in the Mesara comes to an end with a horizon of destructions by earthquake, observed at Phaistos (La Rosa 1995) and Kommos (Wright and McEnroe 1995:189).

NEOPALATIAL SETTLEMENT (MM III–LM I)

The number of settlements within our survey area dropped during the Neopalatial period (figure 10.9). Settlements decreased in number from thirty-eight in the Protopalatial period to thirty-three (table 10.2). The number of cemetery sites fell from fourteen to six. A number of sites (**45**, **96**, **49**, **76**, and **35**) that continued into this period apparently did so at a reduced size. Three settlements (sites **28**, **66**, and **100**) and one cemetery (site **12**) were new in this period. Seven settlements (sites **4**, **64**, **68**, **69**, **80**, and **98**) and three cemeteries (sites **14**, **24**, and **83–85**) ceased to be used at this time. Settlement hierarchy (figure 10.10) also experienced a change. Centers, such as Phaistos (**1**) and Kommos, seem to have shrunk in size, and the numbers of villages and hamlets dropped off, at the same time that the number of farms apparently increased. In other words, the population loss seems to have been concentrated in the larger settlements. The rise

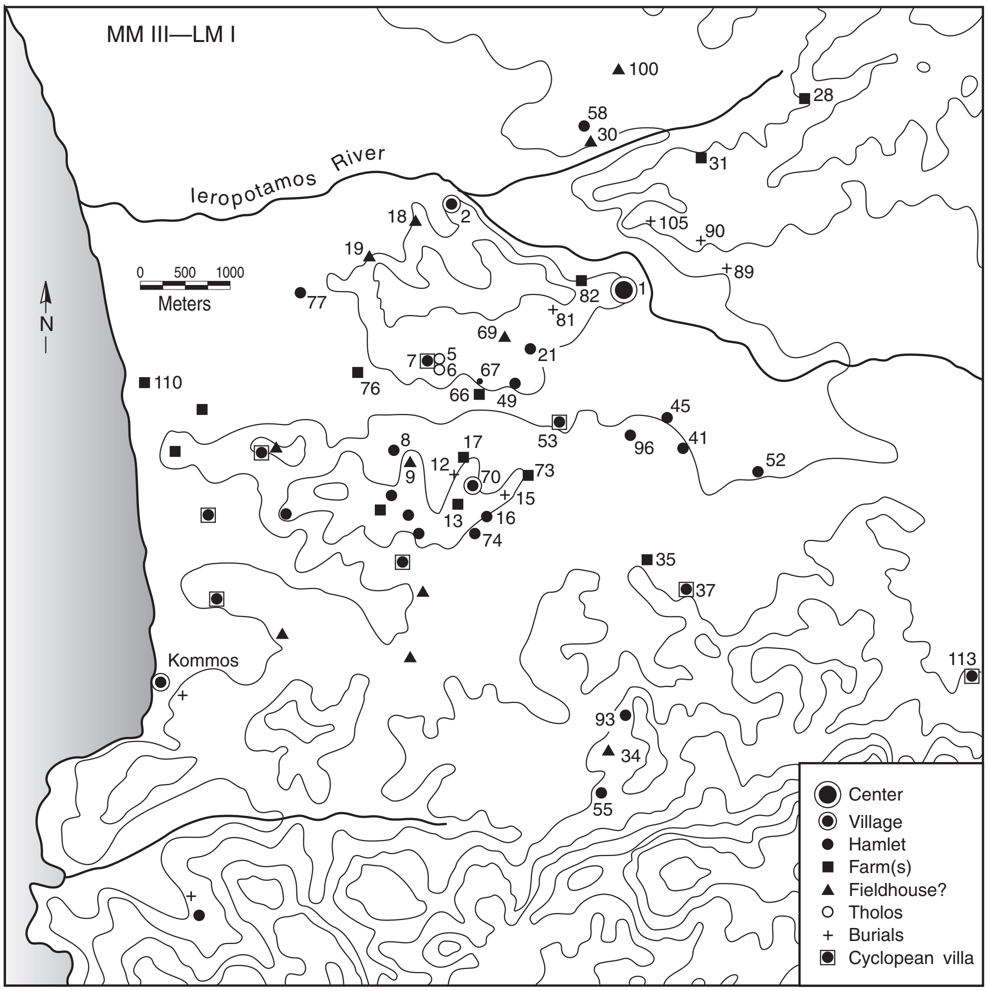


FIGURE 10.9. Middle Minoan III–Late Minoan I sites in the Western Mesara. Kommos survey sites unnumbered.

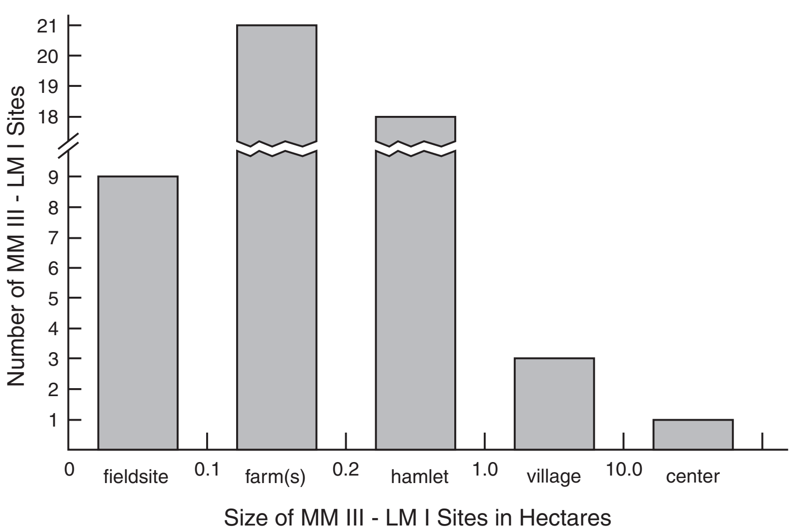


FIGURE 10.10. Neopalatial settlement hierarchy in the Western Mesara

in MM III–LM I farms (if not exclusively MM III) may point to a (forced?) ruralization of the population. Off-site pottery identified by our survey (figure 10.11) was rarer in the Neopalatial period (MM IB–II, 61; MM III–LM I, 30). All instances of off-site pottery, except one on Ieroditis, are on or near known sites. Sites in the Kommos survey zone fared no better: settlements dropped from sixty (in the Protopalatial period) to forty-eight in the Neopalatial period. In the Agio Pharango Valley (Blackman and Branigan 1977:68) there was an extremely sharp drop in settlement, from perhaps twenty MM I–II settlements to only three LM I sites (E 12, E18, and the tomb W8). Vasilakis (1989/1990) found nine Protopalatial settlements that apparently did not continue into the Neopalatial period (as well as three that did). Some excavated Protopalatial settlements, such as Kalathiana and Apesokari (figure 10.6), also do not appear to have survived into this period. Worship continued without a break at Mount Kophinas (Karetsou and Rethymniotakis 1990) into LM I.

Neopalatial Phaistos was reduced in size and sparsely settled. In MM III, a smaller palace (figure 10.8) was rebuilt over the earlier palatial ruins. Neopalatial remains recovered by the Italian excavations (La Rosa 1985:48) were limited to the

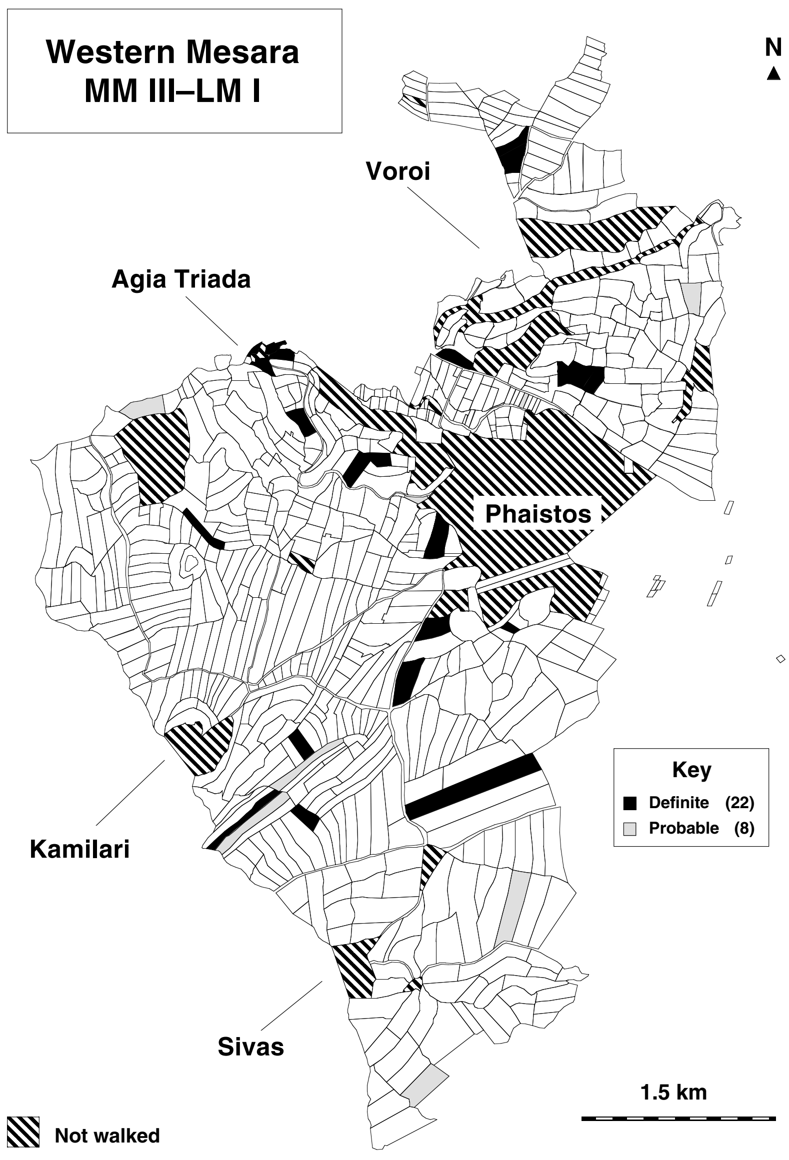


Figure 10.11. Off-site Neopalatial pottery found by the survey

TABLE 10.2. Neopalatial sites in the survey area

Site	Size	Land Class	Function	New
1	ca. 56 ha	I/II	Polity Center	—
2	Large	I/II	Settlement	—
5	15 x 25 m	—	Tholos	—
6	Small	—	Tholos	—
7	150 x 300 m?	II	Settlement	—
8	170 x 100 m	II	Settlement	—
9	7 x ? m	II	Farmhouse?	—
12	Small	—	Graves?	New
13	75 x 75 m	II	Settlement?	—
15	17 x 31+ m	—	Graves	—
16	Large	II	Settlement	—
17	50 x 60 m	II	Settlement	—
18	Small	—	Quarry	—
19	15 x 40 m?	I/II	Farm	—
21	130 x 95 m	II	Settlement	—
28	65 x 75 m	II	Farm	New
30	40 x 40 m	I	Settlement	—
31	80 x 80 m	I/II	Settlement	—
34?	155 x 125 m	—	Knapping site	—
35	60 x 50 m	II	Farm?	—
37	11 x 11 m	II/III	Farm	—
41	80 x 115 m	II/III	Hamlet	—
45	75 x 200 m	I/II	Settlement	—
49	200 x 130 m	II	Settlement	—
52	150 x ? m	I/II	Settlement	—
53	160 x 200 m	II	Settlement	—
55	150 x ? m	II/III	Settlement	—
58	Large?	II/III	Settlement	—
66	70 x ?m	II	Farm	New
67	5 x 4 m	II	Knapping site	New
70	225 x 90 m	II	Settlement	—
73	Small	II	Farm?	—
74	140 x 80 m	II/III	Settlement	—
76	70 x 80 m	II	Settlement	—
77	40 x 110 m	I/II	Settlement	—
81	10 x 35 m	—	Graves	—
82	90 x 50 m	I/II	Settlement	—
89	Large	—	Cemetery	—
90	3 x 3 m	—	Cemetery	—

Continued on next page

TABLE 10.2. Neopalatial sites in the survey area *(continued)*

Site	Size	Land Class	Function	New
93	80 x 110 m	II/III	Settlement	—
96	130 x 160 m	I/II	Settlement	—
100	10 x 20 m	III	Farm	New
105	Small	—	Graves	—
110	Small	I	farm?	—

palace area, under the Italian School storerooms (Akropoli Mediana) and the present parking lot, at Chalara, and at Agia Photini. Neopalatial walls and sherds are also reported from Agios Ioannis (Alexiou 1972:622). Our survey found little definite MM III–LM I pottery west of Ephendi Christos, in contrast to the masses of MM I–II pottery there. Phaistos also seems to have lacked the many grand urban villas or houses that surrounded the contemporary palaces at Knossos, Malia, and Zakros at this time (La Rosa 1985:48). Instead, in the LM I period, these elite residences seem to have been located at Agia Triada. During the early Neopalatial period, Kommos was a prosperous international harbor town, possessing a monumental port complex with an open court, ship sheds, workrooms, and storage magazines (Shaw 1986; Watrous 1992).

During the early Neopalatial period (MM III–LM IA), new urban and rural "villa" sites (figure 10.12) point to an increasingly wealthy upper class. The elite resided in the pretentious ashlar "villas" at Agia Triada and Kommos and in newly built cyclopean style mansions in the countryside at Plakoures (Kommos site 55) (Hadzi-Vallianou 1998, 1990), at Kannia (Levi 1959) near Gortyn, at Kamilari (**7**) and near Pobia (**113**), at Kouses (**37**), Kalamaki (Kommos site 26), Asphendilias (Kommos site 58), and perhaps at Apothestres (Kommos site 35) (Hope Simpson et al. 1995:369). These "villas" are evenly spaced across the region, and each seems located to take advantage of a separate valley or plain. Some of the cyclopean structures, that is, at sites **37** and **113**, appear to have been isolated, and so they may have been the centers of large estates. Cyclopean residences at Plakoures, and sites **7** and **53,** may have had some form of control over the hamlets and farms directly surrounding them. Finally, the lower class occupied the numerous, small, rubble-built houses common at most sites.

Wealth was widely distributed in this period. Elite households controlled a redistributive system parallel to, and larger than that of, the palace. In this respect, Crete resembles New Kingdom Egypt (Kemp 1989:183–260), which possessed two powerful social structures—the central monarchy and a semiautonomous network of elite institutions and families. As Eyre (1987:205–206) points out, while landholding in Egypt was nominally by royal endowment, "… the great official's estate functioned as a complete economic unit, producing and trading on its own behalf." Even common houses at Selli (Di Vita, La Rosa, and Rizzo 1984:196; La Rosa and Cucuzza 2001) and Kommos (Wright and McEnroe 1995:167–199) were prosperous households with substantial storerooms and valuable metal objects. Administrative functions were decentralized (Schoep 1999), a sign of the greater number of Neopalatial households involved in trade. Palace and elite in Crete were, as in Egypt, parallel and, perhaps to some extent, competitive. In Neopalatial Crete the growth of elite urban and rural residences is accompanied by smaller-sized palaces.

The early Neopalatial Phaistian state may have expanded its territory eastward to include Koumasa, where a large structure was built in the center of the site. On the other hand, the Kophinas peak sanctuary continues, implying some sort of autonomy for the Central Mesara. To the north, Monasteraki was not rebuilt after the destruction in MM II. The Amari Valley may, then, have been wrested from Phaistos, or alternatively,

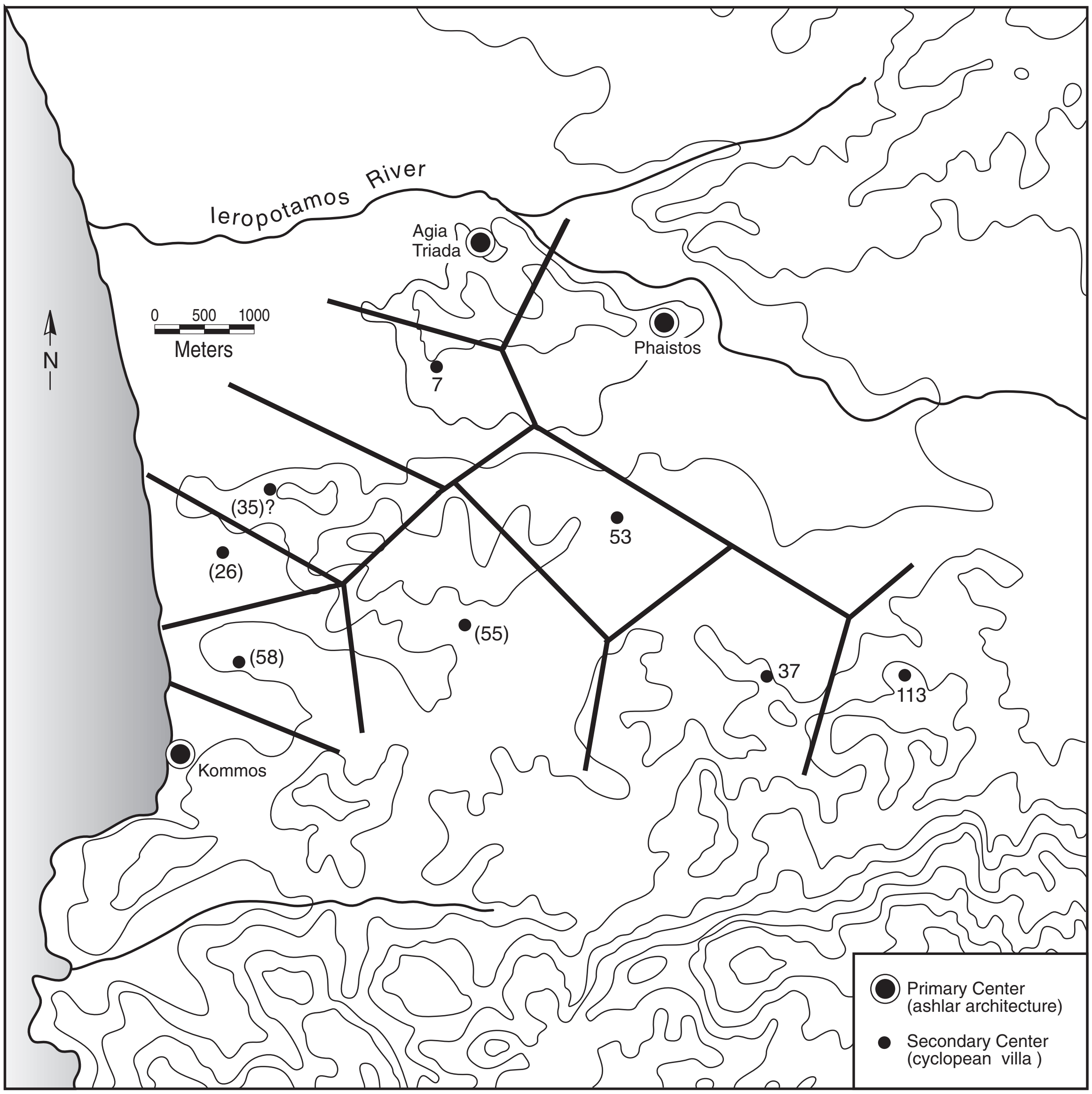


FIGURE 10.12. Neopalatial secondary centers in the area of Phaistos

may have been subsumed under direct local control.

Nevertheless, the MM III–LM I settlement pattern does imply a drop in local population. Possibly the earthquake at the end of MM II was a factor, but excavated sites, at Phaistos, Agia Triada, Kommos, Selli (near Kamilari), and Kouses (**37**), show sitewide continuity of occupation. Several excavated sites produced evidence of a destruction or abandonment in LM IA. The palace at Phaistos suffered damage during LM I (Carinici 1989). Four sites (**24, 83, 84,** and **85**) that formed part of the Ieroditis cemetery ceased, probably a reflection of the demographic drop at Phaistos. At Kommos, parts of the monumental Building J were destroyed (Shaw and Shaw 1997). Judging from its pottery, the farmhouse at Kouses (**37**) was abandoned in LM IA. One house at Selli (Di Vita, La Rosa, and Rizza 1984:196; La Rosa and Cucuzza 2001), southeast of Kamilari, had MM IIIB and LM IA pottery on its floors when it was destroyed by fire. Rooms in the "rustic villa" at Plakoures excavated by Hadzi-Vallianou

(1989a, 1990) also went out of use in LM IA. This pattern of destructions, abandonments, and population loss in the Western Mesara also appears in other parts of Crete (Driessen and Macdonald 1997).

New Neopalatial sites sprang up in areas that had been previously sparsely settled, that is, north of Phaistos, around Kommos, and on Class II or III land. Absence of sites in the Class I land east of Phaistos may have been due to environmental factors, since Pope's core (chapter 4) at the base of the hill east of Phaistos indicated that the Levadia had become marshy in the LM period. On the other hand, the overall choice of less-desirable land distant from Phaistos may have had other causes. Certainly, such a pattern of settlement is a curious trend, given that regional population seems to have dropped. It seems likely, therefore, that the MM III–LM I settlement pattern masks several separate chronological phases of change. First, settlement may have continued to expand in MM III. Secondly, population dropped in LM IA, perhaps partly as a result of the Thera eruption. Thirdly, new settlements were established in LM IB in marginal areas, hinting at a local dispossession of land. The creation of a wider catchment around Phaistos at a time when the central settlement had shrunk may, therefore, have had a political rather than a demographic cause. Writing about the Valley of Mexico, Brumfiel (1976) interpreted a similar shift as a deliberate step taken to raise the agricultural surplus necessary for a newly emergent elite. Such a pattern of settlement has also been observed around Neopalatial Gournia on the north coast (Watrous and Blitzer 1999). These changes may have been initiated in LM IB to enable local authorities to collect larger quantities of produce.

Following the disruption caused by the LM IA Thera eruption, Knossos seems to have assumed control over much of Crete. Cretan society under Knossian control became more hierarchical and centralized. Hallager (1996:236–239 and pers. comm., 1999) has outlined a four-tiered society at LM IB Knossos: 1) royalty (owners of the seals with bull-leaping scenes), 2) elite bureaucracy (owners of gold rings), 3) "consumers" (those who sealed roundels), and 4) the lower class (those without seals). A number of peak sanctuaries (Watrous 1996: Plate 4) ceased to be used in LM I, and it is possible that all but Mount Jouktas had been abandoned by LM IB, as Knossos exerted central control over the island. Consumption and display of wealth in burial seems only to have been practiced at the uppermost level of society, for example, the Temple Tomb at Knossos (Lowe 1996:202) and the Poros tomb (Muhly 1992).

Local developments at Phaistos, Agia Triada, and Kommos also hint that the Knossian state took control of the Western Mesara during LM IA. At Phaistos, the palace lost its preeminent role. Storage and work areas went out of use or were remodeled for industrial purposes, such as pottery production, and perhaps pressing of olive oil and metalworking (Driessen and Macdonald 1997:195–200). Many local sites were destroyed or abandoned, while other sites experienced a change of function (Driessen and MacDonald 1997:36, Figure 4.1 and 52, Figure 4.12 document this pattern island wide). La Rosa (1997b) and Militello (1988) have argued that by LM IB, the local ruling authority had been shifted from the palace at Phaistos to the "Royal Villa" at Agia Triada under the direction of Knossos. Gypsum slabs at the site of Kannia near Gortyn suggest that the complex may have been remodeled with a new function requiring an enlarged storage capacity. Weingarten's (1987) examination of the LM IB sealings at Agia Triada provides a tentative outline of the administrative structure attached to the LM IB "Royal Villa." Sealings exist at Agia Triada for 150 seals involved in over a thousand transactions. Seventeen of these seals, that had stamped 81% of the nodules, represent the administrative elite, as compared to the remaining 127 seals used on 210 nodules. Palmer's study (1995) of the Linear A tablets at LM IB Agia Triada has shown that the administrative system there included large groups of personnel (approximately five hundred persons), substantial amounts of barley and figs, as well livestock, olives, olive oil, wheat(?), wool, and textiles. On the basis of seal impressions (Muller and Pini 1999) from Agia Triada made by rings linked to Knossos, Betts (1967) and the Hallagers (1995) have also suggested that Knossos had administrative control over Agia Triada. All these studies indicate that Agia Triada's administrative purview was not limited to its immediate area west of Phaistos, but was actually regional in scope.

Villa A ("Royal Villa") at Agia Triada, built in MM III, was remodeled in LM IA. The size of the so-called Royal Villa is defined by its archives, located at both ends of the building, that recorded incoming goods at its entrances. In its second phase, after its LM IA remodeling, the villa exhibits a number of Knossian features, in its architecture and frescoes. Cameron (1999:242) attributed the fresco from the villa to a Knossian school. Similarly, the finest vases found at Phaistos, Agia Triada, and Kommos are also recognizable as Knossian products. Based on his study (1992) of masons' marks at Agia Triada, Cucuzza has concluded that LM IA architectural renovations on the Royal Villa and the "Casa Est" were carried out by two teams, one local, and one Knossian. At this time the lower court, stoa, and large storage facility (Bastione) were added to the villa complex at Agia Triada.

In the Neopalatial period Kommos seems to have lost its former role as the primary harbor complex of the Mesara. After a late LM IA destruction, the grand port complex (J/T) at Kommos was converted into a collection of industrial areas. The frescoed north stoa became a bronze-working area, and a massive kiln for pottery was built on top of the central court (Shaw 2001). On the hilltop, a private house was converted into an oil-processing establishment (Shaw and Shaw 1996: Plates 2.165–166). The court-stoa-Bastione complex at Agia Triada seems to have taken over some of the trade functions of Kommos. Three of the major aspects of Minoan power—religious, commercial, and administrative—formerly located at Phaistos and Kommos were centralized at Agia Triada in LM IB.

The Neopalatial period ends with a LM IB horizon of destructions and the Mycenaean takeover of the island.

LM II–IIIA1 Settlement

During the LM II–IIIA1 period the Western Mesara, occupied by a new Mycenaean elite, experienced a massive drop in population. In the LM IB period, Phaistos, Agia Triada, and Kommos were destroyed by fire. In the following period, the number of sites in our survey area plummeted (table 10.3). Only nine settlements (figure 10.13) in the survey zone produced evidence of LM II–IIIA1 occupation, in comparison to thirty-four settlements of the previous period. No off-site pottery of this period was recognized. Four cemeteries (sites **5**, **6**, **92,** and **104**) yielded LM II–IIIA1 material, as opposed to twelve MM III–LM I burial sites. The Kamilari tholoi (**5** and **6**) and site **92** hint that their associated settlements (sites **7** and **93)** may have been occupied at this time, even though we found no LM II–IIIA1 pottery on the site (and hence we have not included them on figure 10.13). One farm site (**95**) and the cemeteries **92** and **104** were new in this period. South of our survey area, only Kommos, and perhaps two other sites, have yielded LM IIIA1 pottery. Before interpreting these figures, it must be borne in mind that LM II and LM IIIA1 are rarely recognized on surface survey because the periods are short, and diagnostic ceramic features are confined to a few fine ware shapes. Nevertheless, this drop in the number of sites is corroborated by local excavations, at Selli, Kouses, and Kannia, where a gap in LM II–IIIA1 occupation was also noted. Population in the Western Mesara seems, therefore, to have dropped sharply from its LM I level.

Excavated settlements tell the same story. Signs of LM II–IIIA1 occupation at Phaistos are said to be sporadic. Partly inhabited, Agia Triada was also smaller than it had been during the Neopalatial period (La Rosa 1997a). A Mycenaean presence at Agia Triada is suggested by the unique LM IIIA 1 tomb (La Rosa 1999a) with its famous painted sarcophagus, which contrasts with simple burials in the chamber tombs located several hundred meters to the southwest of the site. Rich warrior tombs ("Tombei dei Nobili") at Kalivia (**104**) contained weapons and gold and silver jewelry (as well as new cremation burials) and seem to belong to a new Mycenaean elite.

At Kommos, scattered finds of LM II pottery indicate that portions of the settlement were inhabited (Shaw and Shaw 1997). The grand LM I harbor complex was converted into small areas

TABLE 10.3. Late Minoan II–IIIA1 sites in the survey area

Site	Size	Land Class	Function	New
1	Smaller	I	Settlement	—
2	Smaller	I	Settlement	—
5	—	—	Tholos	—
6	—	—	Tholos	—
16	Small	II	Settlement	—
41	5 x 5 m	I/II	Fieldhouse?	—
55	150 x ?	II/III	Settlement	—
58	?	II/III	Settlement	—
70	Small	II	Settlement	—
92	70x70 m	—	Cemetery	New
95	25x45 m	II/III	Fieldhouse?	New
104	90 x 20 m	—	Tombs	New

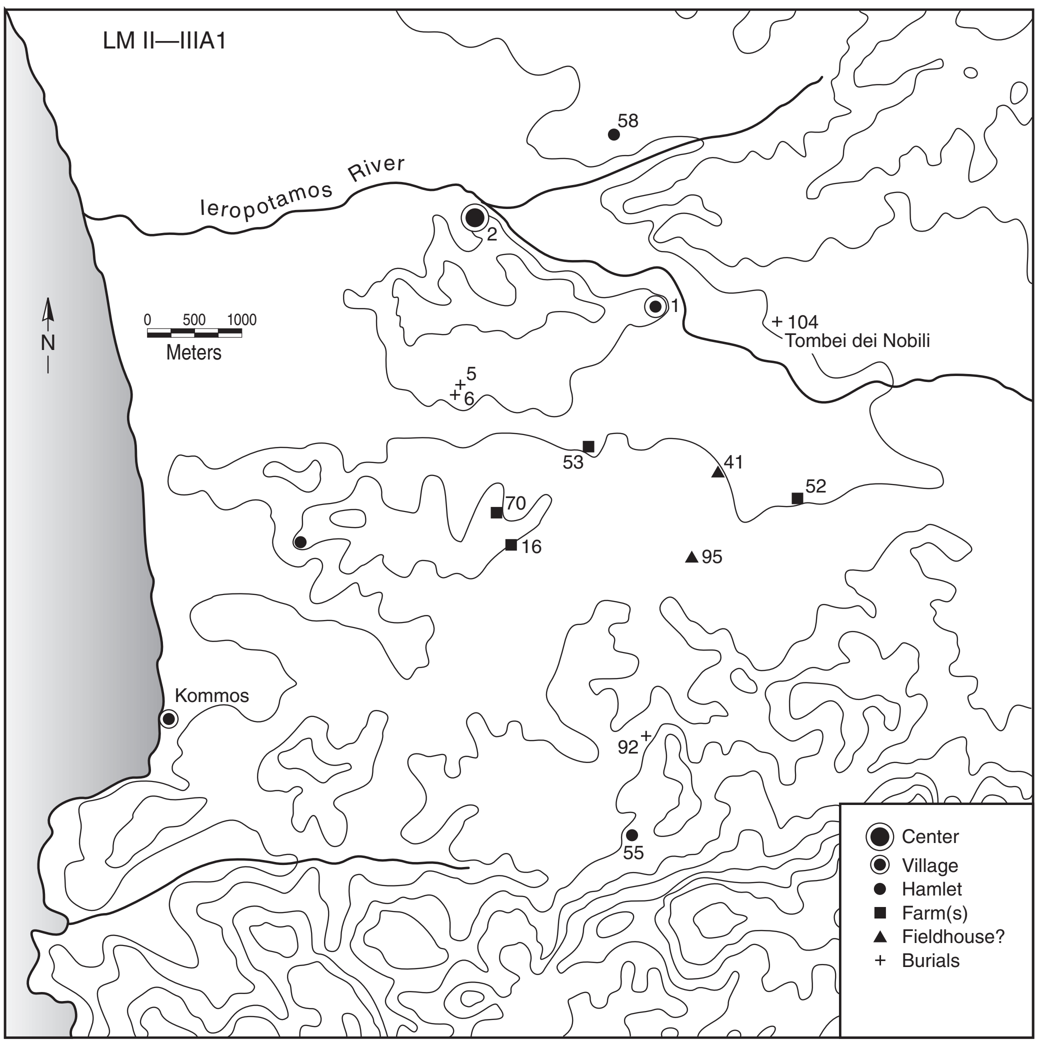


FIGURE 10.13. Late Minoan II–IIIA1 sites in the Western Mesara. Kommos survey sites unnumbered.

where food processing and domestic activities took place. Blitzer (Watrous and Blitzer 1997) has also noticed a vivid economic change at Kommos during the LM I–IIIA period. The LM I family houses at Kommos, supplied with querns, handstones, mortars, basins, and storage jars, enjoyed an agriculturally based domestic prosperity. But, by LM IIIA2, domestic implements in the settlement had decreased in numbers and storage jars had disappeared. Houses, some subdivided, were now used as workshops that produced, among other things, metal tools and olive oil primarily for export. Kommos seems to have been transformed from a prosperous agricultural and commercial community to an industrial depot manned by dependent laborers. Similar changes in man-land relationships in the Valley of Mexico have been interpreted (Steponaitis 1981) as the result of increased demands for agricultural produce upon subject communities from a newly centralized regime.

Following the drop in population after LM IB, the remaining local settlers did not move to take advantage of the best land. As noted in chapter 4 (table 4.2), sites of this period occur on unexpected soil types. After sites **77, 19,** and **52** along the rich Ieropotamos alluvium were abandoned in LM I, no new settlements were established in the area. Instead, settlement on poor, Class III land seems to have increased. Local Neopalatial settlement in Class IV land was 6% of the total; in LM II–IIIA1 it more than doubled, to 14%. Statistics like these cannot be explained in terms of independent food-producing communities.

During LM II–IIIA1, the Western Mesara became a province of the newly established Mycenaean kingdom based at Knossos. The local governor (*ko-re-te*) may have been located at Agia Triada: in LM IIIA2–B, his residence may have been in the Megaron there (La Rosa 1985). Under him would have been the local nobility whose burials are known at Agia Triada (the famous Agia Triada sarcophagus) and Kalivia ("Tombei dei Nobili"). Most houses in the Mesara at this time are extremely small and humble. Social inequality in the Mesara reached a peak in the LM III period.

The Western Mesara was exploited as a source of grain by the Mycenaean rulers, a pattern of foreign exploitation repeated during the Venetian and Ottoman periods (chapter 14). A tablet from Knossos (Chadwick 1976a:54, F 852. 1) mentions at least 10,900 units of cereal at Da-wo (usually identified with the site of Agia Triada), of which a small portion was due at Knossos (Bennet 1985:247 n. 76). Such an amount of grain, depending on the type of agricultural practice, implies approximately 1,000–6,000 ha of land planted in cereals. The Mesara Plain consists of a total of approximately 5320 ha of arable land. Bennet (1985:237) has noted the large amounts (2,440) of sheep recorded in the Knossian Linear B tablets in connection with Phaistos (Pa-i-to). Linear B tablets at Knossos not only mention sheep at Phaistos, but systematically favor sheep over oxen, probably for the production of textiles (Driessen 2001). The absence of settlement in the lowland area around Phaistos, which had become marshy (chapter 4), may therefore indicate its use primarily as pastureland. A final note of caution—only if D series Knossian tablets predate the LM IIIA2 period do they refer to the early LM IIIA Mesara. It is equally possible that they refer to the subsequent LM IIIA2–B period.

LM IIIA2–B SETTLEMENT

Settlements in our survey area (table 10.4) more than doubled in LM IIIA2–B, from eight in LM II–IIIA1 to nineteen in this period. Cemeteries also increased in number, from four to seven. Since many of these sites were in use in the previous period, there is a strong impression of local continuity (figure 10.14) from the LM IIIA1 period. Some sites, such as Kouses (**37**) and Kannia, deserted during LM II–IIIA1, exhibit limited reuse. Single, previously occupied settlements often were a part of a small cluster of sites, for example, **93/55, 95/35, 70/74,** and **7/66/76**, suggesting local growth. Certain survey sites, for example, **35, 77,** and **55**, yielded abundant LM IIIA2–B material, and a few others (sites **92** and **95**) seem to have grown in size. Pottery recorded from off-site fields (figure 10.15) is more numerous than the previous period, but less than Neopalatial levels (Neopalatial, 30: LM III, 19). Four instances (north of the Kamilari tholos and on Ieroditis) may be off-site finds, possibly from pastoral activities. Around Kommos, the number of sites rose slightly. In the Agio Pharango area, a total of three sites for the whole LM III period are known (Vasilakis 1989/1990:75) Elsewhere in the Western Mesara (figure 10.6), LM III remains have been published for Kalochorafitis, Goudies, Moires, Kannia, Moroni, Pobia, Alithini, Vassilika Anogeia, and Porti (Kanta 1980:88–113).

Beginning in LM IIIA2, both Agia Triada and Kommos grew in size and were transformed by monumental building programs. The Mycenaean-looking Megaron and the grand lower Stoa and Bastione mark Agia Triada as the administrative center of the region (La Rosa 1985:53; 1997b). Several of the new buildings at Agia Triada show Mycenaean and/or a mixture of Mycenaean and Minoan influence (Cucuzza 1997). La Rosa (1997b) writes of two sectors at Agia Triada, one political and religious, around the upper court, and the other administrative and commercial, located in the lower town .

At Kommos, a large new architectural harbor complex (Buildings N and P) was built in LM IIIA2 (Shaw and Shaw 1997). The site was an international port with commercial connections from Sardinia to Egypt and the Levant, exporting local (uninscribed) stirrup jars and amphorae overseas (Day 1996). Within the town of Kommos, the inhabitants did not rebuild their houses, but reused, or at times subdivided, the remaining LM I structures. Phaistos (La Rosa 1985:50) also shrank and consisted of a scatter of small houses located in the area of the palace and west court, on the hill occupied by the Italian School storerooms, and probably west of Ephendi Christos. Chalara and Agia Photini at Phaistos apparently were uninhabited. Burials continued at the Phaistian cemetery at Liliana (**103**) and Kalivia (**104**), but were poor in comparison to those of the earlier LM II–IIIA period. Most of our survey sites did not regain their Neopalatial size. Sites **5, 7, 16, 37, 41, 66, 70, 74, 80, 93,** and **96,** mostly multistructure settlements

TABLE 10.4. Late Minoan IIIA2–B sites in the survey area

Site	Size	Land Class	Function	New
1	Large	I	Settlement	—
2	Large	I	Settlement	—
5	—	—	Tholos	—
7	Small	II	Settlement	—
16	Small	II	Settlement	—
30	Small	II	Settlement	—
35	60 x 50 m	II/III	Farm?	—
37	—	—	Larnax burials	—
41	5 x 5 m	I/II	Fieldhouse?	—
52	100 x ?	II/III	Settlement	—
55	150 x ?	II/III	Settlement	—
58	?	II/III	Settlement	—
66	25 x 85 m	II	Farm?	—
92	70x70 m	—	Cemetery	—
93	Small	II	Settlement	—
95	25x45 m	II/III	Fieldhouse?	—
96	Small	II	Farm?	—
98	Small	—	Graves	—
103	Large	—	Cemetery	New
104	90 x 20 m	—	Tombs	New
105	5 x 5 m	—	Grave	—

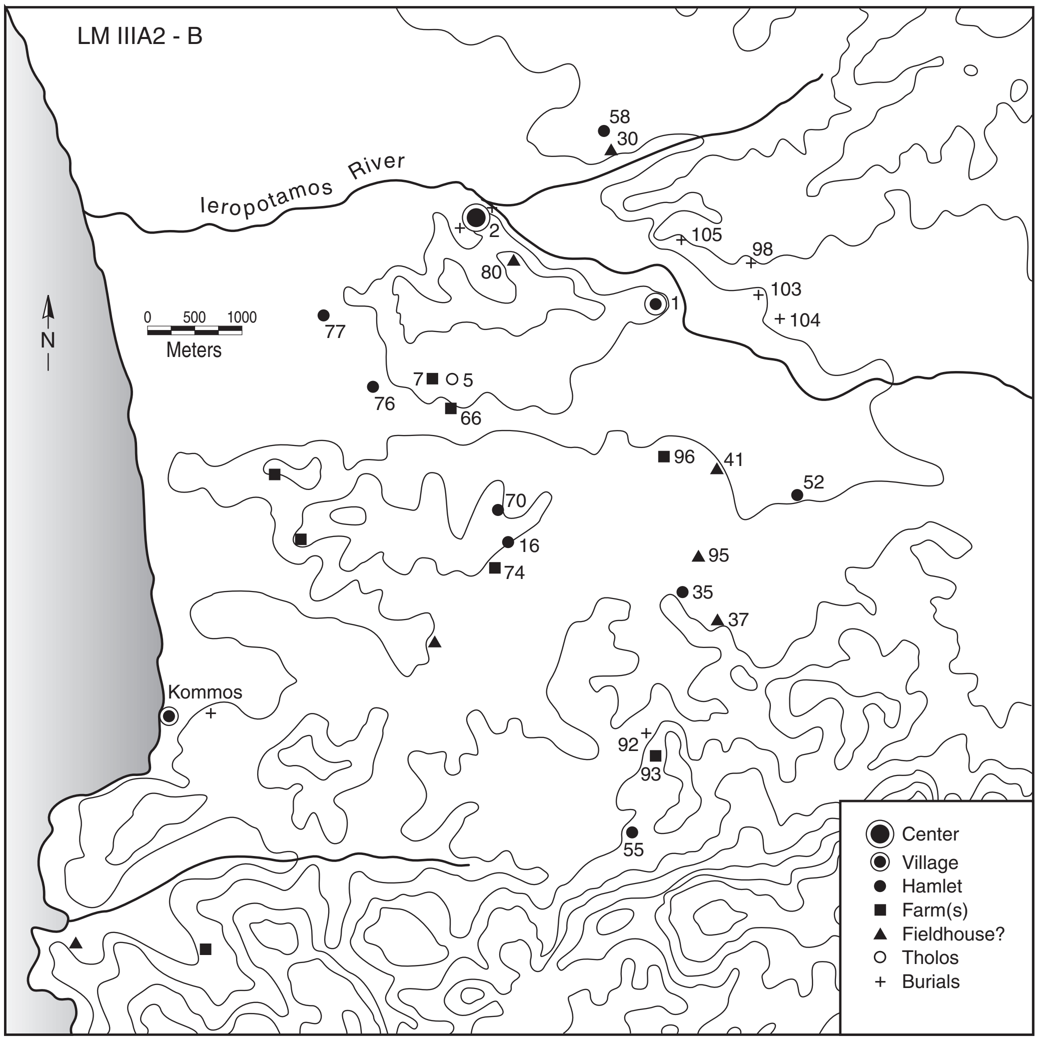


FIGURE 10.14. Late Minoan IIIA2–III B sites in the Western Mesara. Kommos survey sites unnumbered.

in the Neopalatial era, only produced a thin spread, or small patches, of LM IIIA2–B pottery. Regional population in the region seems, therefore, to have grown since LM IIIA1, but remained well below Neopalatial levels.

New settlements in the LM IIA2–B period were concentrated mainly in Class II and III areas. Settlement on Class IV land was also relatively common, at 12%. As in the LM IB–IIIA1 period, the marshy Levadia east of Phaistos remained unsettled and may have continued to be used as pastureland. Sites **55** and **93** were both situated at the entrance to the Agio Pharango Valley and the Asterousia Mountains, traditional grazing areas. LM IIIA2–B settlement was nucleated at Agia Triada, Phaistos, and Kommos, while rural settlement along the Mesara Plain was relatively sparse. In this period, regional settlement is again hierarchically organized (figure 10.16), with Agia Triada at its top.

Architectural constructions at Agia Triada also look like implementations of a centrally controlled economy. Two new complexes were built in LM IIIA2: the Megaron, stoa, and shrine facing onto the upper court, and the grand stoa, the NW Building, and refurbished Bastione below (La Rosa 1997b). Functionally, these two complexes replace the palace at Phaistos and the redesigned Building J/T at Kommos. Economic activities seem concentrated in the area of the NW-Stoa-Bastione at Agia Triada. In LM IIIA2, a new complex at Kommos was built, including

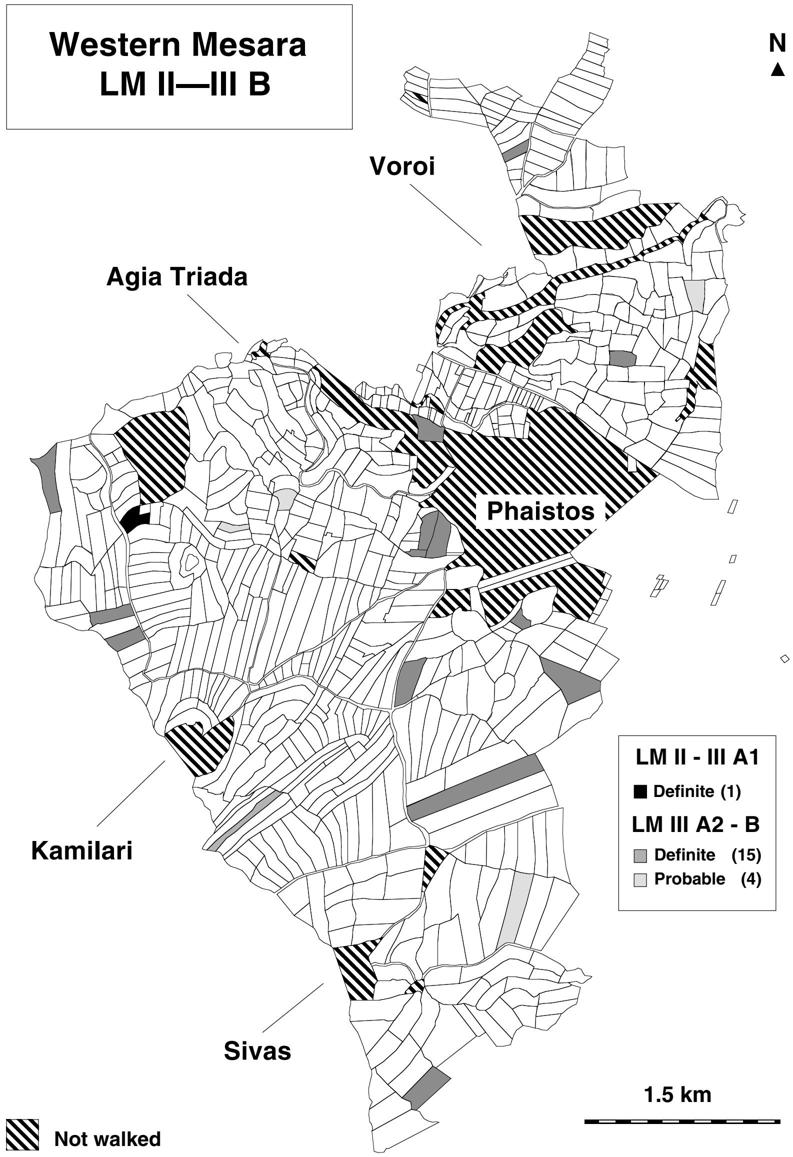


FIGURE 10.15. Off-site Late Minoan II–IIIB pottery in the Western Mesara.

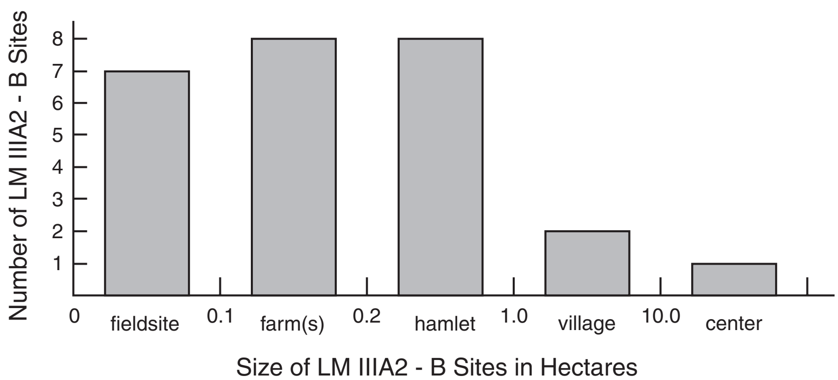


FIGURE 10.16. Late Minoan IIIA2–B settlement hierarchy in the Western Mesara

the west rooms of J/T (offices/residence?) and the warehouses/ship sheds of Building P (Shaw and Shaw 1997). Kommos and Agia Triada at this time, in function, were complementary sites whose local authority resided at Agia Triada (Shaw and Shaw 1997; La Rosa 1997b).

The end of the LM IIIB period in the Western Mesara is marked by a widespread destruction and/or abandonment of sites. Agia Triada and Kommos were deserted at this time. The latest pottery (Kanta 1980:88–113) published from other settlements, at Selli and Kouses; cemeteries, at Kamilari, Kalochorafitis, Pobia, and Vasilika Anogiea; and shrines, at Kamares and Kannia (figure 10.6), indicates that these sites also apparently failed to continue into the succeeding LM IIIC period.

Part IV:
Historical Settlement and Society

11

The Polis of Phaistos: Development and Destruction (Late Minoan IIIC–Hellenistic)

L. Vance Watrous and Despoina Hadzi-Vallianou

THIS CHAPTER PRESENTS our survey evidence in five chronological sections, from Late Minoan (LM) IIIC to the Early Hellenistic period. The first four sections also discuss certain related historical issues: "the Dorian Invasion," the political relationship between the city-states of Phaistos and Gortyn, and the rural estate of the Classical Cretan citizen. In the Hellenistic section, we present archaeological data for population, the territory and organization of the Phaistian polis, and foreign trade. Based on this data, the following chapter (chapter 12) analyzes the social structure of the Phaistian polis and its evolution during the Early Iron Age.

DEVELOPMENT OF THE DORIAN CITY-STATE AT PHAISTOS

LM IIIC Settlement

The invasions of Greek-speaking peoples at the end of the LM IIIB period marked the end of Bronze Age society in Crete. Within our survey area, twenty-five of the twenty-six LM IIIB rural settlements in the region were deserted in LM IIIC (figure 11.1). Within our survey area there are only three LM IIIC settlements known (table 11.1). Excavations at Agia Triada and Kommos have shown that both sites were abandoned toward the end of LM IIIB. Only one small site (**93**) near Sivas, hidden on the back slope of the Asterousia foothills, produced signs of LM IIIC habitation. This settlement may have been formed from the nearby LM IIIB community (site **55**) located at the base of the foothills. Elsewhere in the Western Mesara (figure 11.2), previously inhabited settlements at Kannia, and probably at Stavros Gallias near Kalochorafitis, Moires, and Pobia (Kanta 1980:89–95), produced no material later than LM IIIB. LM IIIC appears to be a period of sharp depopulation. Such a radical demographic loss has a historical parallel during the bloody period from 1821 to 1832, when the Turks put down the Cretan uprisings following the Greek War of Independence. Documents (chapter 14) relate that the Mesara lost 65% of its local population at that time.

The LM IIIC pattern of settlement farther east in the Mesara is similar. Large settlements existed at Tacheiroi just north of Moires, on the mountaintop of Vigla south of Pobia (Vasilakis, pers. comm., 1998), on the Gortyn acropolis (Kanta 1980:91), and on Mount Kophinas overlooking the Central Mesara. Nothing is known about the Kamares Cave in this period, but Taramelli (1901b:437) mentions a LM IIIC settlement near the village of Kamares. LM IIIC pottery (Kanta 1980: Figure 94:6) is known from the Idaean Cave. Outside of the Phaistos area, our evidence for population change is more fragmentary, although a few patterns seem discernible. At Valis, east of Agioi Deka, the community using the Vorou tombs in LM III (Kanta 1980:95) can be traced to the south, to a LM IIIC–Orientalizing settlement on an adjacent hilltop. Similarly, the Dark Age site on Mount Vigla above Pobia is probably the successor of the LM IIIA–B settlement at the base of the mountain (Kanta 1980:95). We know little about the LM IIIA–B sites around Moires, and we are therefore unable to assess what proportion of the population at the extremely large LM IIIC hilltop settlement at

TABLE 11.1. Late Minoan IIIC sites in the survey area

Site	Size	Land Class	Function	New
1	Large	I/II	Settlement	—
2	Small	—	Shrine	—
31	Small	II/III	Settlement	—
92	70 x 70	—	Cemetery	—
93	Small	II/III	Settlement	—
103	Large?	—	Cemetery	—

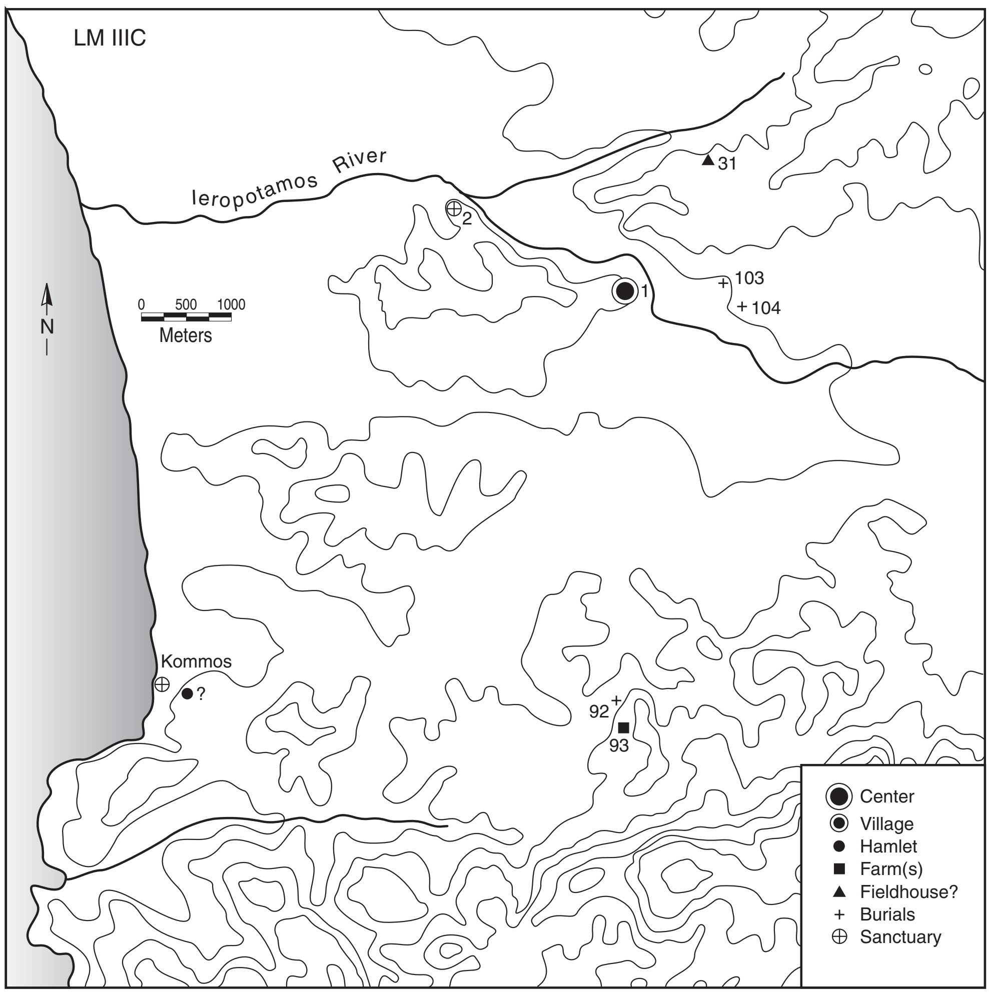


FIGURE 11.1. Late Minoan IIIC sites in the Western Mesara

Tacheiroi may have been Minoan. At Gortyn, the LM IIIC situation is similar—the only known LM IIIB site in the vicinity is a small LM III settlement located immediately north of Kannia.

While LM IIIC Phaistos remains largely unpublished, preliminary reports (compiled in Kanta 1980:96–98) indicate that there was occupation in the palace area, in a large house west

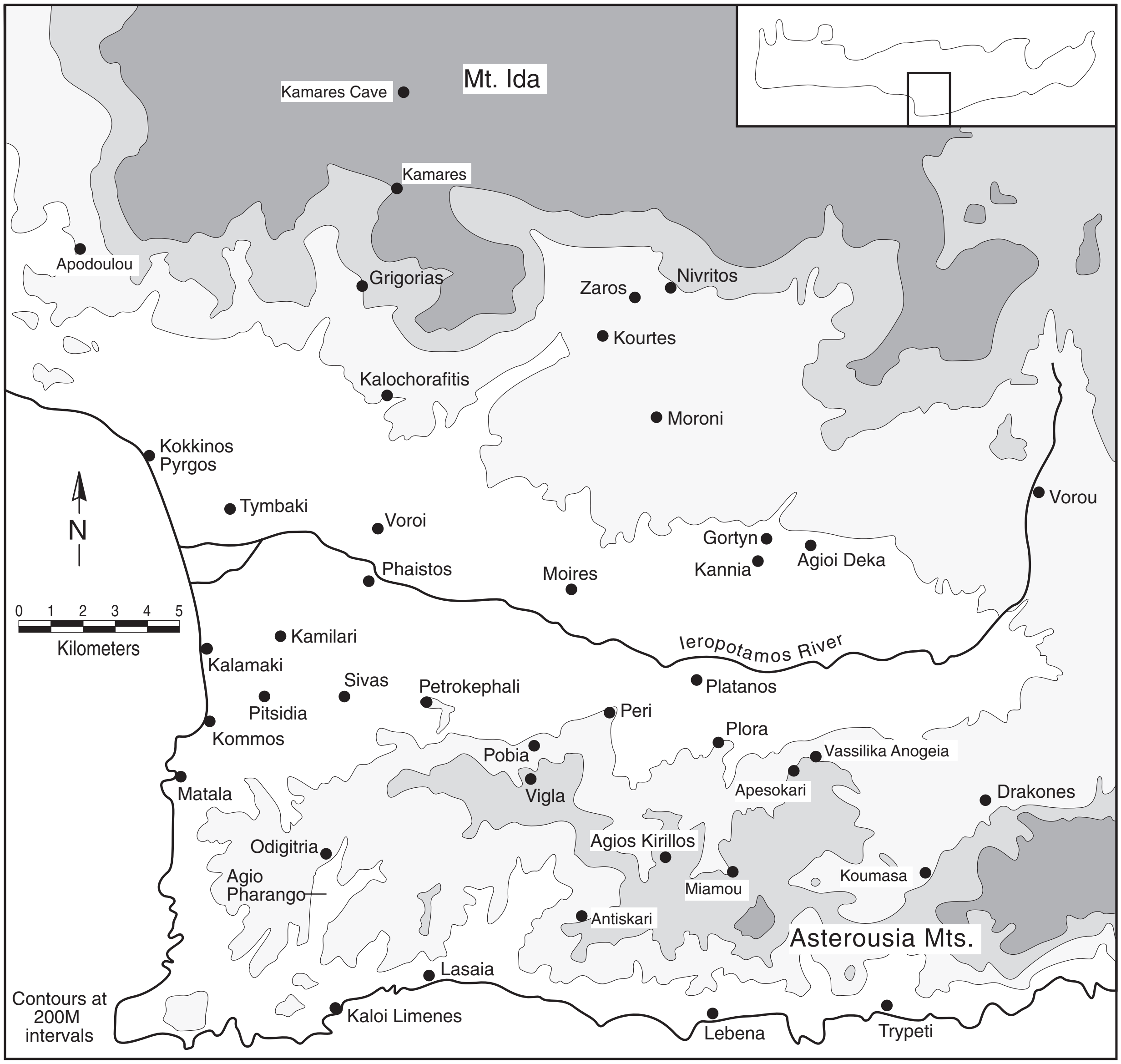


FIGURE 11.2. Map of the Western Mesara

of the palace, on the ridgetop under the Italian storerooms (Acropoli Mediana), and probably at Chalara. Late Mycenaean sherds are said to be particularly common in the area of the west court, under Protogeometric–Geometric levels (Rocchetti 1974/1975:173). Given the abandonment of local sites in LM IIIB (chapter 10), one might infer that the regional population had become nucleated at Phaistos in LM IIIC. Several bits of evidence, however, suggest that events were more complicated. First, LM IIIC pottery is not reported from the peripheral areas of Phaistos, at Agia Photini, or Phalandra, and thus settlement at Phaistos apparently did not grow appreciably in this period. Secondly, the appearance of refuge settlements in the Western Mesara, at Kourtes, Vigla (Pobia), Kamares, Vorou, and perhaps Vigles (Kommos) indicate that some, at least, of the local population did not move to Phaistos, but fled to defensive locations away from the valley floor.

Archaeological finds at Phaistos also suggest that the settlers there consisted of a mixed population of Minoans, Mycenaeans, and newly arrived mainland Greeks. LM IIIB mixed with LM IIIC sherds from the west court area (Rocchetti 1974/1975), for instance, may be a sign of continuity of occupation. On the other hand, the LM IIIC pottery from the area of the Acropoli Mediana differs strongly from Phaistian LM IIIB products in that it is extremely Mycenaeanizing in its fabric, shapes, and decoration (Borgna 1997a). LM IIIC cooking pots from Phaistos include both Minoan and Mycenaean types (Borgna 1997b). Distinctive Mycenaean-type figurines found in Court 40 of the palace (Pernier 1902: columns 123–124, fig. 52) are new at the site. Outside of Phaistos, eight simple *larnax* burials in and around the old cemetery at Liliana (**103**), and other graves east of Kalivia (**104**), are traditional Minoan-type graves, while the cemetery (site **59**) just north of Phaistos is new. Off-site LM IIIC pottery just south of Agios Ioannis probably represents a burial. Our survey found the face of a clay Karphi-type statuette on the peak of the western acropolis (Ephendi Christos) of Phaistos, possibly the sign of a shrine. Rich and poor graves (as well as different types of burial) within the separate cemeteries suggest that each different Phaistian group consisted of two classes.

Immediately after the Mycenaean center at Agia Triada (**2**) was abandoned in late LM IIIB, a shrine was established in front of the Megaron (Banti 1941/1943; Kanta 1980:103) that continued in use into the seventh century BC (D'Agata 1993 and 1997). Worshippers using this shrine probably lived at Phaistos, the only nearby Early Iron Age settlement. Although Kommos has produced a few LM IIIC sherds (Watrous 1992:147), the harbor site apparently was deserted at this time. In the eleventh century BC (Shaw 1998:18) a shrine was established at the abandoned settlement of Kommos. Visitors to the shrine (Temple A) dedicated figurines of horses and bulls, weapons, and bronze pins (Shaw 1984; 1986; Shaw and Shaw 1993). Kraters from the shrine suggest the ceremonies there involved the drinking of wine by men.

The Kommos shrine is almost certainly the Amyklaion (Cucuzza 1997a; Shaw and Shaw 2000), named in the Gortyn Law Code (Guarducci 1950:128, no. 72, lines 9–10). On the basis of the names Mu-ka-ra and O-mu-ka-ra on Linear B tablets from Knossos, Cucuzza (1999) has suggested that an Amyklaion may have existed near Phaistos in the LM III period. A third- to second-century BC decree, probably from Gortyn (Guarducci 1950:234, no. 172) describes a community, called the Amyklaioi, who are to provide certain materials, probably in association with a procession (from Gortyn?) and a religious festival. Since the Gortynian decree gives legal provisions in the case of default, Gortynian control of the Amyklaion seems likely. Later literary sources refer to the Amyklaion as a seaport, making the identification of the Kommos sanctuary as the Amyklaion fairly secure. Recent excavations at Kommos have produced epigraphic evidence for the worship of Athena, Zeus, Poseidon, and probably Apollo as well as a roof tile inscribed with the letters *Am*, that is, Amy[klaion] (Shaw and Shaw 2000; *Supplementum Epigraphicum Graecum* 28:745 [1978]).

Settlement in the Western Mesara seems to have become polarized in LM IIIC, consisting mainly of two types: large settlements located on the Mesara Plain, for example, Phaistos and Gortyn, and smaller sites situated in defensive, mountainous locations, for example, Vigla, Kourtes, and Kophinas. Many settlements of this latter type existed in other, mountainous areas of Crete in the LM IIIC period (Nowicki 1987, 1988, 2000). Such a pattern of settlement implies three population groups, the Dorian newcomers, Mycenaeans who had arrived in LM III, and the displaced Minoan lower class. It seems reasonable, therefore, to identify the Mesara settlements (figure 11.2) at Vigles, Vigla, and Kourtes as perioikic communities, later referred to as *apetairoi* in the Gortyn Law Code (Willetts 1955:37–40). *Apetairoi* communities were dependent poleis of Phaistos and Gortyn (Perlman 1996). Their members were free and had their own laws and courts, but they did not enjoy the privileges of Phaistian and Gortynian citizenship. Aristotle (*Politics* 1271b) says that even in his time, these Cretan perioikic communities continued to use the laws of Minos.

By the late seventh century BC, the dialect of the Archaic inscriptions at Phaistos and Gortyn testifies to the presence of a Dorian population. The archaeological data above indicates that the main groups of Dorian settlers arrived in the

Mesara in the LM IIIC period. Memory of these events survived in later tradition. Herodotus records that the people of the East Cretan polis of Praisos believed that:

> men of various nationality, but especially Greeks, came to settle in Crete after it was depopulated by the expedition to Sicily (by Minos and his fleet); then in the third generation after the death of Minos came the Trojan war, in which the Cretans proved themselves by no means the most despicable champions of Menelaos; their reward for this service on their return home was famine and plague for both men and cattle, so that for the second time Crete was denuded of its population. Thus it happens that the present Cretans, together with the remnant of the former population, are the third people to live on the island. (Herodotus, *The Histories* 7, 173)

The first phase of resettlement in Herodotus's account may correspond with the arrival of Mycenaeans after LM IB (Popham 1976; Watrous and Blitzer 1997). If we accept an early-twelfth-century date for the Trojan War, then the second depopulation of Crete mentioned in the Eteocretan tradition could be identified with the LM IIIB abandonment of sites in the Mesara, and throughout Crete. Herodotus's final phase, when the Dorian settlers arrived in the Mesara, could then be connected with the archaeological evidence at LM IIIC Phaistos cited above. In fact, Phaistos was said to have been founded by a son of Herakles (that is, a Dorian) named Ropalos (Guarducci 1935:268). According to literary tradition (Pausanias 8.53, 4; Plato *Laws* 4, 708a), Gortyn was also founded by Greek Achaeans from the Peloponnese.

PROTOGEOMETRIC–GEOMETRIC SETTLEMENT

Our survey documented five settlements outside of Phaistos during this period (table 11.2). The number of cemeteries also increased: sites **51** and **59** as well as tombs just south of Phaistos are new (figure 11.3). Some of the burials (both inhumations and cremations) were rich, containing bronze weapons, pins, fibulae, and a cauldron, while others were poor. South of Phaistos, the Protogeometric tholos tomb at Agios Ioannis possessed weapons, jewelry, and imported vases (Vasilakis 1994/1996). Such contrasting burial practices point to a social hierarchy within the Phaistian community. At Agia Triada, a Geometric period structure near the "piazzale dei sacelli" has been recently uncovered (La Rosa, pers. comm., 2001). Two settlements, at Voroi (**30**) and Agios Dimitrios (**53**), are new foundations. Burials at site **51** point to the existence of a Geometric settlement on the hill of Petrokephali. One or two Geometric sherds—not enough to rate inclusion on the period map (figure 11.3)—were found at each of the five other sites (**16, 31, 45, 73,** and **82**). Burials, including examples in reused *larnakes,* continued at Kalivia (**104**) and in a wide area around Liliana (**103**). One tomb at Kalivia is reported to have had spears and swords as well as over a hundred Protogeometric vases. D. Hadzi-Vallianou has also seen Geometric sherds at Kamilari, unearthed during construction on the hilltop of the village. Land use appears to have been light, since only seven fields, unrelated to sites **53, 92,** and **103/104,** produced off-site pottery (figure 11.4).

The Geometric settlement at Phaistos is relatively well known archaeologically (Cucuzza 1998). Levi's excavations (Levi 1957/1958; 1961/1962b) revealed a quarter of large, well-constructed houses lining a paved street southwest of the palace. Geometric levels were found on the Acropoli Mediana, over the palace, in the west court, and at Chalara. West of the palace, a large house, similar to examples at Kavousi and Vronda in East Crete, may have hosted communal meals. It has been identified as a chieftain's house (Hayden 1981:180, Building AA, P, Q) or as an *andreion*, that is, a mess hall (Cucuzza 1998:66). Another house and two pottery kilns are also reported north of the palace, at Agia Photini. A fortification wall was built on the Acropoli Mediana where the Italian storerooms are today. Streets of the Geometric period are known at Chalara, near the palace, and at Agios Ioannis. Our survey also found Geometric pottery on the west slope of Ephendi Christos.

During the early part of the Early Iron Age, the Phaistos settlement may have been confined to the Acropoli Mediana (Cucuzza 1998) and Ephendi Christos. Since no Geometric pottery has been reported between Ephendi Christos

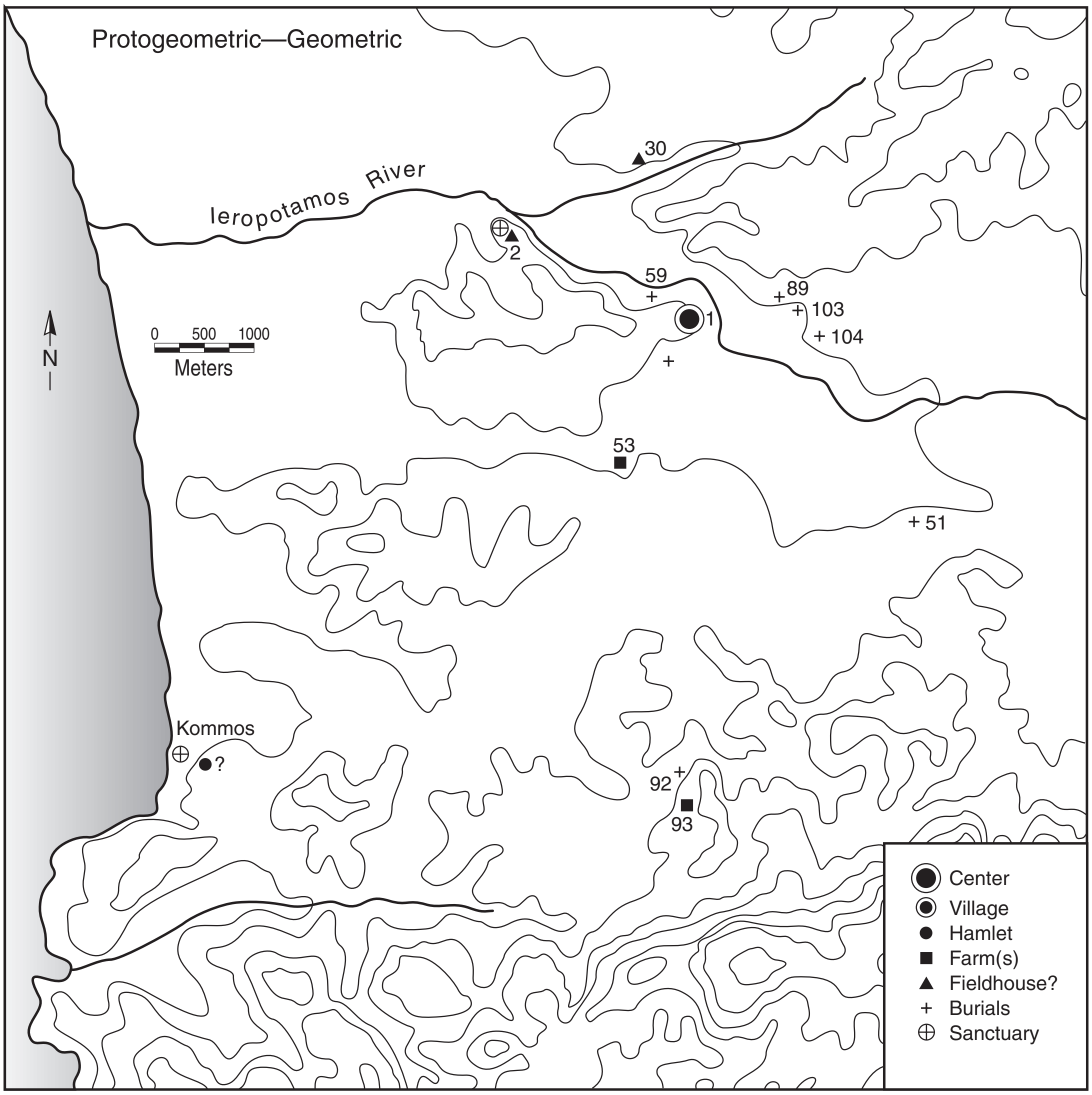


FIGURE 11.3. Protogeometric–Geometric sites in the Western Mesara. Kommos survey sites unnumbered.

TABLE 11.2. Protogeometric–Geometric sites in the survey area

Site	Size	Land Type	Function	New
1	Large	I/II	Settlement	—
2	Small	—	Shrine/settlement	—
30	40 x 40?	I/II	Settlement	New
51	Small	—	Cemetery	New
53	Small	I/II	Settlement	New
59	Small	—	Cemetery	New
89	Large	—	Cemetery	?
92	70 x 70	—	Cemetery	—
93	Small	II/III	Settlement	—
103	Large?	—	Cemetery	—
104	Large	—	Cemetery	—

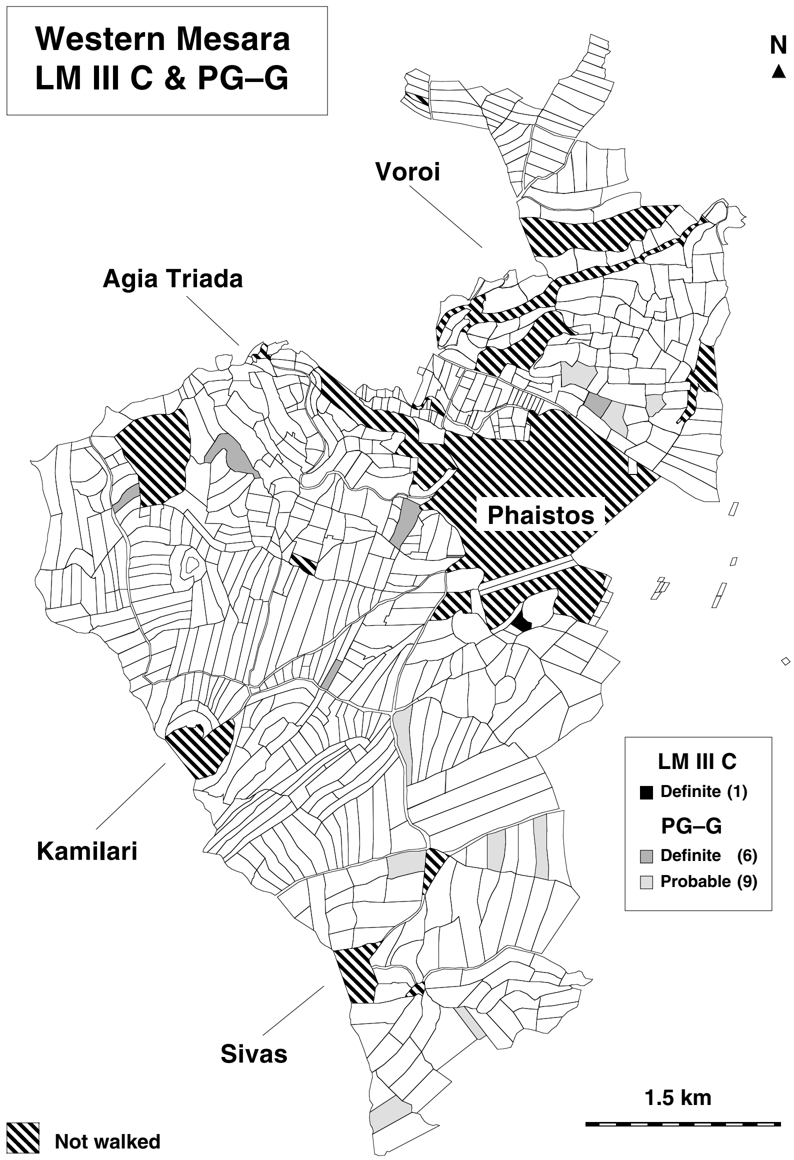


FIGURE 11.4. Off-site LM IIIC–Geometric pottery in the Western Mesara

and the palace, it seems probable that the site at Phaistos was not continuously settled. The southwest quarter of the town, below the West Court, shows possible signs of destruction and was abandoned in the Geometric period (La Rosa 1997c:80) Houses at Chalara suffered two destructions by fire. Ceramic imports at Phaistos testify to the city's commercial links with the Cyclades, Samos, East Greece, Cyprus, and perhaps Attica (Rocchetti 1974/1975:298). Phaistos was well enough known to appear in the Homeric Catalogue of Ships (*Iliad* 2.648).

ORIENTALIZING–ARCHAIC SETTLEMENT

Settlement around Phaistos grew appreciably during the seventh century BC (figure 11.5). A few settlements, for example, sites **2, 30, 44,** and **54,** may date to the earlier part of the century. Pottery from rural sites in our area indicates that the real increase came during the period from circa 625 to 550 BC. At least eleven of these Archaic settlements were new in this period (table 11.3). A Phaistian citizen built a farmstead (site **85**) at

TABLE 11.3. Orientalizing–Archaic sites in the survey area

Site	Size	Land Type	Function	New
1	Large	I/II	Polis Center	—
2	—	—	Shrine	—
8	Small	II	Settlement	New
16	Small	II	Settlement	New
30	Small	II/III	Settlement	—
44	60 x 135 m	I/II	Farm	—
51	—	—	Cemetery	—
53	10 x 50?	II	Settlement	—
54	—	—	Graves	New
58	?	II/III	Settlement	?
64	100 x 100 m	II	Settlement	New
70	Large?	II	Settlement?	New
72?	Small	II	Farm?	New
77	Large?	I/II	Settlement	New
79	100 x 100 m	II	Hamlet	New
82	90 x 50 m	II	Farm?	New
85	40 x 30 m	II	Farm	New
96	Small	II	Farm	New
98	40 x 40 m	I/II	Farm	New
104	?	—	Cemetery	—
105	Small	—	Grave	New

Ieroditis, apparently unaware that the area had been a Minoan cemetery. Typically, the seventh- or early-sixth-century sherds on these sites were concentrated in a small area (less than 50 x 50 m, when definable), marking the first phase at the site of large Classical–Early Roman settlements. Pottery recognized at these sites, that is, cups, *pithoi,* basins, and bowls or jugs, is similar to that used at later Classical and Hellenistic farmsteads, suggesting a continuity of function. During the seventh century, a shrine to Artemis was established near Kalamaki, north of Kommos (Hope Simpson et al. 1995:369–372). With the greater dispersion of Archaic sites, the amounts of off-site pottery (figure 11.6) also rise sharply (Archaic, 43; Geometric, 15) from previous totals. Eleven of these examples, located around Sivas and north of Kamilari, do not come from known sites and so may derive from land use.

Our survey identified three cemetery sites (**53, 104,** and **105**), a drop of two from the Protogeometric–Geometric total. Burials are known to have continued at Kalivia (**104**) and Petrokephali (**51**), but two of the burial sites, **54** and **105**, are new. Several Geometric sites, for example, **2, 92** and **93**, do not continue in use into this period. Two of these are settlements, Agia Triada (**2**) and site **93**, with its cemetery at site **92**. Rural burials, at Petrokephali (**51**), Selli (**54**), and near Kommos (Hope Simpson et al. 1995:362) probably belong to settlements outside of Phaistos. Settlement hierarchy (figure 11.7) at this time is sharply hierarchical: Phaistos outranks all other settlements in size.

By the seventh century, Phaistos had grown substantially in size. Archaeological remains of this period have been found over a wide area of Phaistos, stretching from west of Ephendi Christos, to Agia Photini, across the palace area, and at Chalara (Cucuzza 1997a:75–76). A large religious or civic building and architectural terracottas have been identified at Falandra (Cucuzza 1998). Recently, a public building and two *boustrophodon* inscriptions were discovered near Ag-

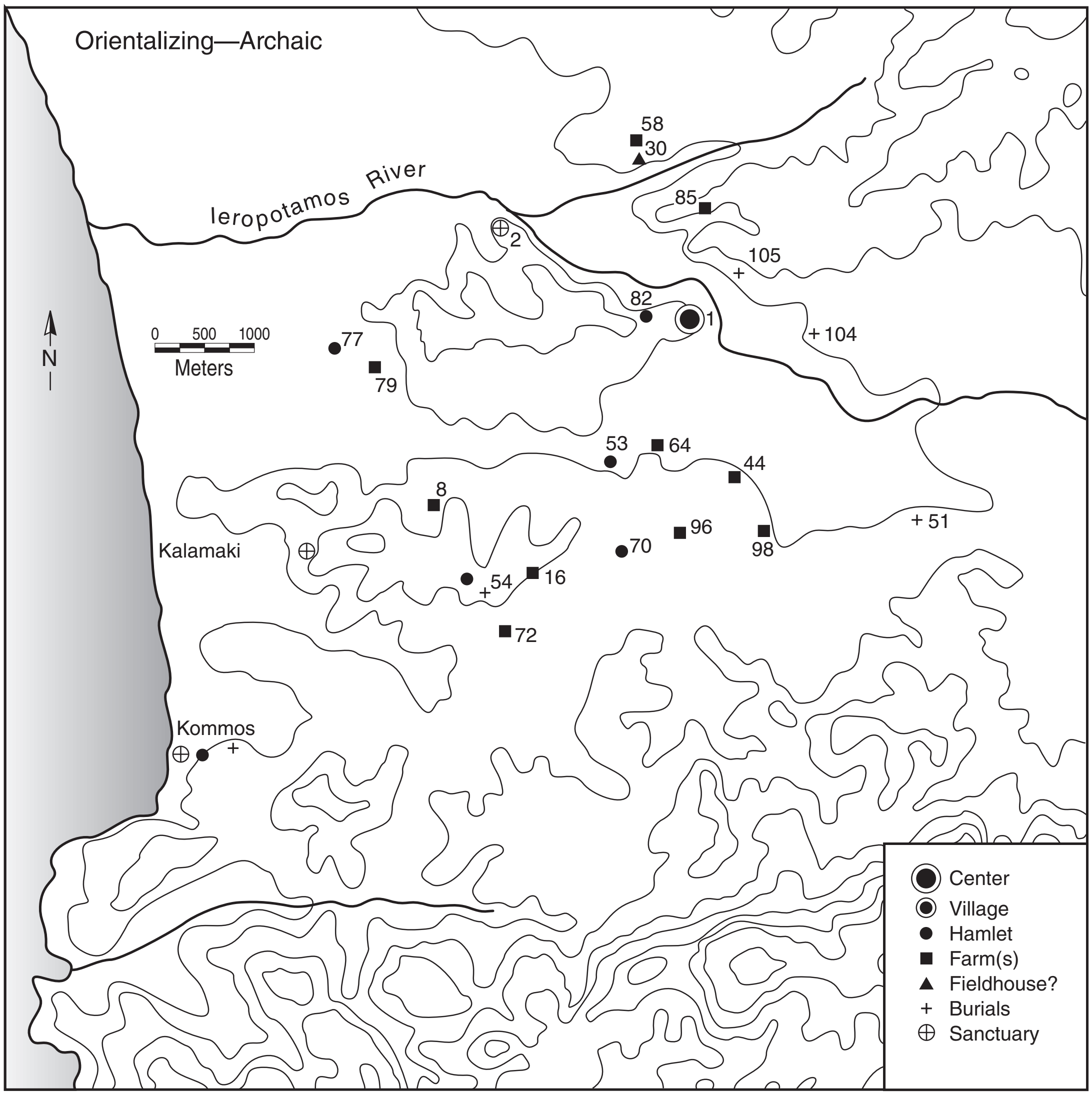


FIGURE 11.5. Orientalizing–Archaic sites in the Western Mesara

ios Ioannis (Pariente 1994:825). From Chalara, a late-sixth-century inscription mentions an agora at Phaistos (Di Vita and Cantarella 1978). La Rosa has hypothesized the existence of two possible shrines at the site, one on the Acropoli Mediana and one on the slope southeast of the palace (La Rosa 1997c). Phaistos continued to have overseas trade relations (for example, Rocchetti 1974/1975: Figure 110, a Rhodian jug). Despite the lack of published Archaic pottery from Phaistos, the settlement appears to be a sizeable and prosperous one during this period. Colonists were apparently sent out from the Mesara during the Early Iron Age, since the imported Cretan pottery found at the Cretan colony at Gela, founded in 688 BC, can be traced to the Mesara (Coldstream 1968:375).

The urban center of Phaistos was radically reorganized during the seventh century BC. Geometric houses in the quarter west of the palace were abandoned, and a monumental temple (to Lato?) was built on the slope southwest of the palace at the end of the seventh century (La Rosa 1997c). A second temple, with late-seventh/early sixth-century antefixes, was constructed on the summit of the Acropoli Mediana (La Rosa 1997c). Large *pithoi* (Palermo 1992) found at the east end of the Acropoli Mediana may mark a public

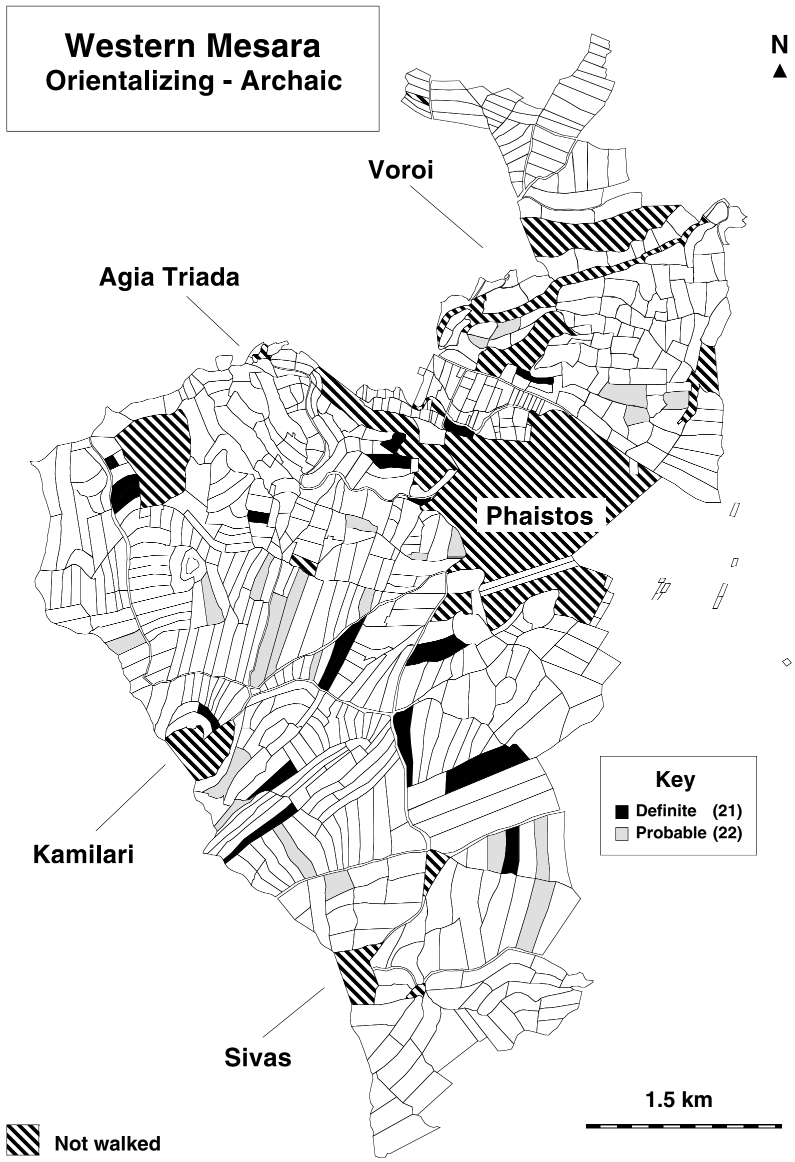


FIGURE 11.6. Off-site Orientalizing–Archaic pottery in the Western Mesara

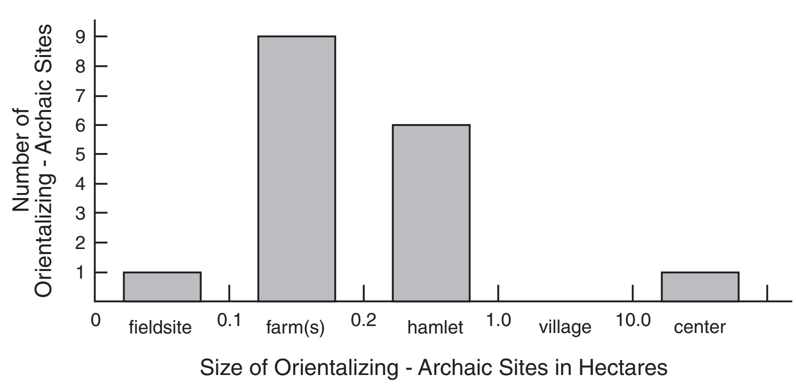


FIGURE 11.7. Orientalizing–Archaic settlement hierarchy in the Western Mesara

FIGURE 11.8. Map of Greece

building there (or may come from the temple on the nearby summit). Domestic structures were built over the Geometric kilns at Agia Photini.

The nucleated pattern of settlement around Phaistos before the Classical period need not imply either a mode of subsistence based on intensified agriculture or pastoralism, although the Levadia east of Phaistos did remain a marshy area ideal for pasturage during the Early Iron Age (chapter 4). Aristotle's description (*Politics* 1272a–b20) of the Cretan constitution and references in the Gortyn Law Code make it clear that the land was only owned by the Dorian citizens. In other words, the land was primarily in the hands of the few. Such a sparse pattern of settlement implies a nonintensive use of the land, a pattern that has been linked elsewhere in Greece to aristocratic societies (Alcock 1989a:27–29).

The Amyklaion at Kommos attracted an increasing number of dedications in the seventh century. Late-seventh-century pottery from the sanctuary included imported wares from Attica, Boeotia, Corinth, Lakonia(?), East Greece, and North Africa (figure 11.8) (Johnston 1993; 1998). A seventh-century Gortynian cup (M. Shaw 1983) from Kommos depicts a ceremony that may have taken place at Kommos. As part of their adult initiation, young men in Crete ran a race at this festival, called Dromeus, probably held under the auspices of their phratry, the Cretan *hetaireia*.

Around the end of the seventh century BC, several closely datable settlements, including the excavated sites at Kommos and Agia Triada, were apparently abandoned (Johnston 1993: 339). Sixth-century remains have been rarely reported at Gortyn, but a Sophilos *dinos* (Johannowsky 1955/1956) found at the site suggests that this gap in the material culture may be more apparent than real. In addition, Erickson's recent examination (2000) of pottery deposits at Gortyn has shown that there is no ceramic gap within that settlement. However, at this time, settlements around Gortyn disappear: La Torre (1988/1989) has suggested this nucleation marks a synoikism. Several sites in the Kommos area, excluding the shrines at Kommos and near Kalamaki, were also abandoned circa 550 BC (Hope Simpson et al. 1995:361–362, 375).

Our survey recognized little later sixth- or fifth-century pottery on the rural sites around Phaistos, and thus these sites also may have been deserted, or used without permanent occupation, from circa 550 to 375 BC. This apparent retraction of rural settlement does not appear in our figures 11.5 and 11.10, which are based on longer ceramic phases. Erickson (2000:142–146) has suggested that Gortynian territorial expansion was responsible for long gaps in occupation at Prinias (figure 11.9) and at Knossos after circa 600 BC, and that the local desertion of sites around Phaistos may have had the same cause. His suggestion does not explain, however, why the Gortynian sanctuary at Kommos was also deserted, and further afield why there was an abandonment of the Lasithi Plain (Watrous 1982:22) in the Classical period. Such a widespread phenomenon does not seem attributable to the expansion of a single polis. Increased interpolis tension throughout central Crete may have been partly responsible. Viviers (1994), for instance, has concluded that Lyttos in the Eastern Mesara began to expand its territory in the sixth century. Difficulty in identifying local late Archaic and Classical pottery may have in part contributed to this gap (but see Erickson 2000). The environment may also have played an underlying role. Herodotus (4, 151) mentions a seven-year drought on nearby Thera that can be dated to the late seventh century; the early-third-century writer Theophrastus (Wood 1894:27–29) refers to another drought whose severity had much reduced the population of Crete by his time.

CLASSICAL SETTLEMENT, ESTATES, AND PHAISTIAN-GORTYNIAN RELATIONS

In the Classical period, twenty settlements and two burial sites within our survey area (figure 11.10) represent a small increase (three) in the number of settlements (table 11.4). New Classical settlements (sites **11, 12, 17, 20, 31, 46,** and **76**), however, may point to a discontinuity of rural settlement from circa 550 to 375 BC. At Phaistos there seems to be a similar lack of evidence for settlement during the same period (but see Erikson 2000 for a different interpretation). The fact that nine of the twenty-one sites of the pre-

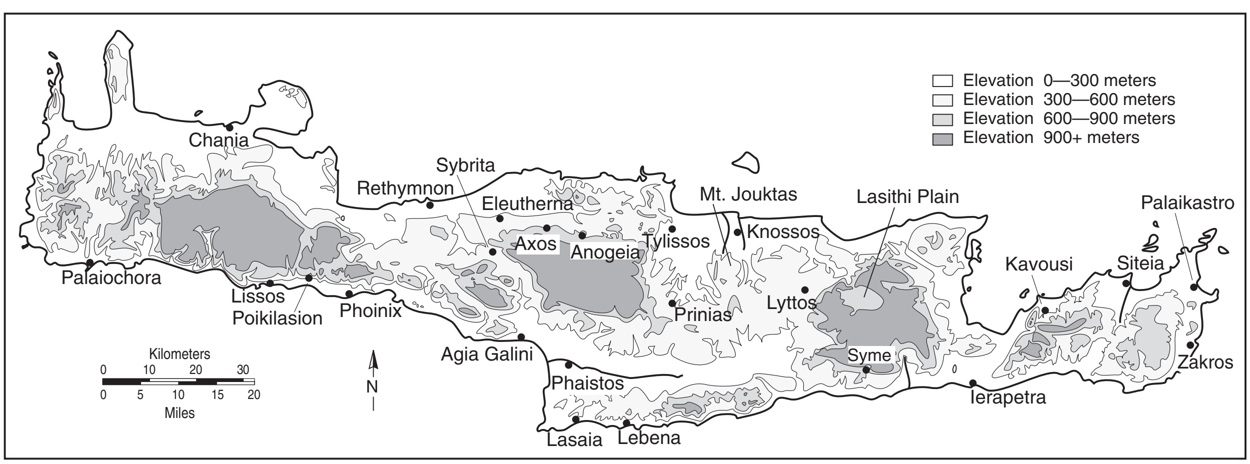


FIGURE 11.9. Map of Crete

ceding Orientalizing–Archaic period did not continue into the Classical era tends to support this suggestion. Agia Triada has produced no certain sixth- or fifth-century remains, and Kommos has yielded only sporadic finds of this date. Rural sites in our survey area yielded Black Glaze cups, *skyphoi* (including one Attic import), bowls, lamps, *kantharoi,* and basins as well as tiles, plain amphorae, and cooking ware that may date no earlier than the fourth century.

Only one cemetery (site **12**) was found by our survey, a row of cist graves (now destroyed by terracing for olives). One of the graves (marked by unnumbered +'s on figure 11.10) in the valley northeast of Kamilari, about 2 km from Phaistos, contained an inscribed Classical tombstone (Guarducci 1935:275). Poor burials also continued at Kalivia (**104**). Settlements were situated for the most part in a circle outside the central catchment area of Phaistos (approximately 2.5 km away from Phaistos). Such a scarcity of rural Classical settlement differs markedly from the pattern known in the Southern Argolid (Jameson, Runnels, and Van Andel 1994:381–394) and Keos (Cherry, Davis, and Mantzourani 1991:327–347). Almost certainly, this contrast is due to the differing political systems of these three areas. In city-states of a democratic nature,

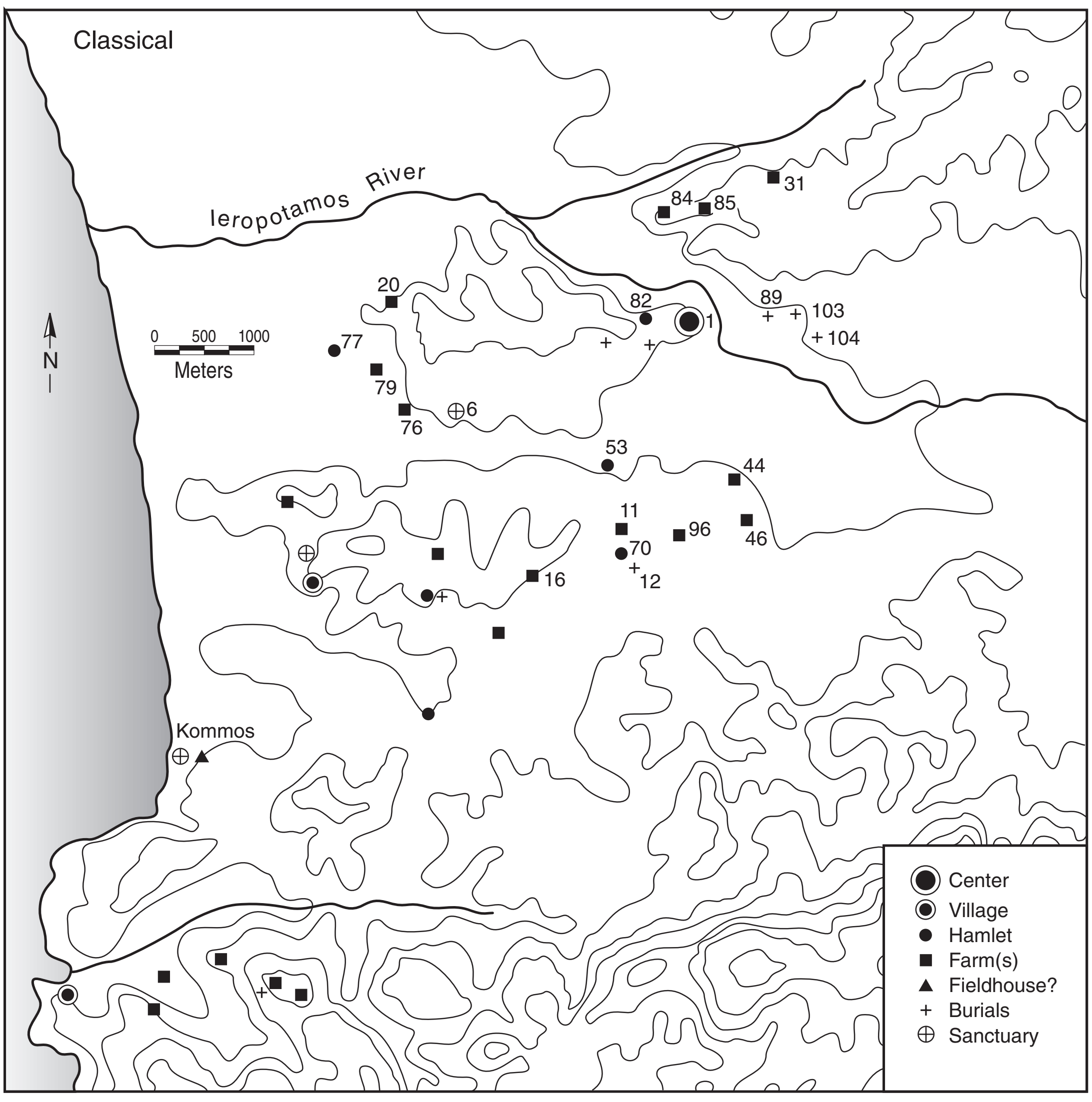


Figure 11.10. Classical sites in the Western Mesara. Kommos survey sites unnumbered.

TABLE 11.4. Classical sites in the survey area

Site	Size	Land	Function	New
1	Large	I/II	Polis Center	—
6	Small	—	Shrine	New
11	50 x 50 m	II	Farm	New
12	—	—	Graves	New
16	Small?	II	Settlement	—
20	Small?	I/II	Farm	New
31	80 x 80 m	II	Farm	New
44	Small	I/II	Farm	—
46	Small	I/II	Farm	New
53	110 x 50?	II	Settlement	—
70	Large?	II	Settlement?	—
76	70 x 80 m	II	Farm	New
77	Small?	I/II	Farm	—
79	100 x 100 m	II	Hamlet	—
82	90 x 50 m?	II	Farm?	—
85	40 x 30 m	II	Farm	—
89	60 x ?m	—	Graves?	—
96	Small	II	Farm	—
103	Small	—	Cemetery	?
104	Large?	—	Cemetery	—

for example, Keos, and Halieis in the southern Argolid, there existed a large, landowning "middle class," whereas in the Dorian system, the land was owned and controlled by a smaller proportion of the total population. Despite the increase in Classical sites within the region, settlement hierarchy (figure 11.11) remains the same, reflecting Phaistos's status as a polis center.

Relatively little is known archaeologically about Phaistos during the fifth century BC. Cucuzza (1998:67) reports that the quarter west of the palace, abandoned in the seventh century, was reoccupied late in the fifth century. This gap in our knowledge—also observed at other Cretan cities—may be partly a function of the history of Phaistos, which apparently suffered an earthquake (Blackman and Branigan 1977:73–74) in the fourth century. Construction in the city following this event may have removed traces of the earlier phase. Certainly, other types of evidence indicate continued habitation at Phaistos. Coins, for example, were minted at Phaistos in the mid-fifth century (Le Rider 1966:84–98, 131–132), and a small amount of Classical pottery (for example, La Rosa 1997c:67, Figure 9) has also been published. In addition, our survey found many fifth- and fourth-century sherds west of Ephendi Christos and a few sherds west of Agios Ioannis. Evidence of habitation at Phaistos, on the other hand, is said to only become plentiful again in the fourth century BC (Portale 1994/1995).

In the Western Mesara at this time a few new sites (**17, 31,** and **85**) were established on relatively poor, thin soils of Class III land. Where measurable, Classical settlements conformed to Archaic dimensions, probably representing a single structure. New sites were situated further away from Phaistos than in the previous period and in clusters, on Ieroditis (**31, 84,** and **85**) and west of Agia Triada (**20, 76, 77,** and **79**). Within the Kamilari-Agios Ioannis-Sivas triangle three new farms (sites **11, 17,** and **46**) were established near already

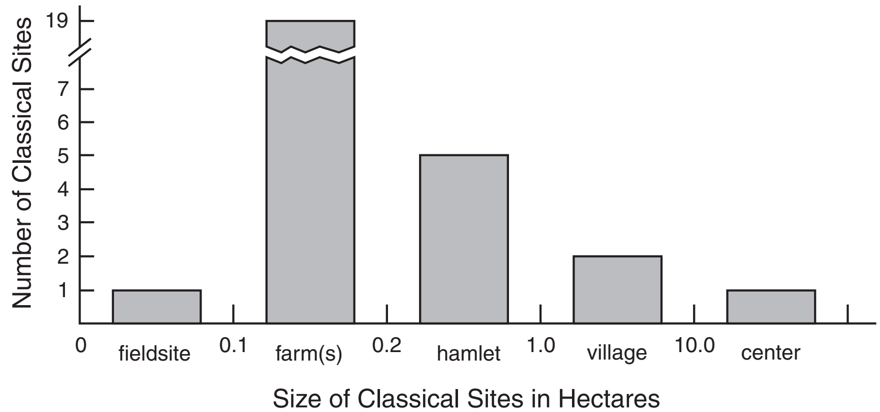


FIGURE 11.11. Classical settlement hierarchy in the Western Mesara

existing farms. Elsewhere in Greece, the spread of small rural sites has been interpreted as an intensification of land use by free, single family farmers in times of increasing prosperity (Whitelaw 1991). In the Western Mesara, the pattern may reflect a growth in population among citizen families whose children each inherited portions of the family estate, as stipulated by the Gortyn Law Code (Guarducci 1950:130–132, no. 72, col. IV).

Along with the increase in rural settlements, the number of off-site fields with Classical pottery (Archaic, 43; Classical, 86) rises in this period (figure 11.12). What is new is that at least twenty-seven of these fields are not directly associated with known sites, a pattern that suggests a more intensified use of the land. Evidence for a halo of off-site sherds around Phaistos associated with manuring (urban refuse carried out to surrounding fields) is minimal. Instead, the increase in off-site sherds takes place outside the immediate catchment of the urban center (*asty*). It seems more likely, therefore, that this Classical pottery came from rural farms. This is particularly clear in the fields north of Kamilari and on Ieroditis.

Classical written sources (Aristotle *Politics* 1271) distinguish land outside the Cretan city as either public or private. Public land provided crops and cattle used to support the polis. At Phaistos, some of this land may have been located near the city in the area immediately surrounding Phaistos where few individual dwellings seem to have existed. The marshy Levadia, for instance, may have been public grazing land. Private land was owned by the citizens in the form of estates (called *klaroi* in the Dorian dialect). In the Gortyn Law Code, the household property of a citizen consisted of a city house, and a country estate (*klaros*) composed of a house and surrounding fields (Guarducci 1950:132, no. 72, line 30). The rural farmsteads located by our survey mark the location of Phaistian *klaroi.* Estate land and buildings belonged to the owner, while the live-in serfs (*klarotai*) worked the land and cared for the livestock of the estate as well as their own animals (Willetts 1955:49 and Guarducci 193/1/2133–134, no. 17, lines 17 and 20). In the Hellenistic period a citizen paid a tenth of his produce to his phratry, while each slave contributed a certain amount of produce, by weight (Dosiades *apud Ath.* 4.143a–b). According to Aristotle (*Politics* 1272a), portions of the estates' produce, of the cattle raised on public land, and of the tribute paid by the non-Dorian freemen (*apetairoi* or *perioikoi*), went to the common meals of the polis, to the gods, and to the service of the state. Rural farms around Phaistos, then, produced enough food for the owner's household, for his serfs and slaves, as well as a portion for the polis.

According to written sources, *klaroi* possessed a variety of crops and livestock. Decrees from Gortyn (Guarducci 1950:181–183, no. 79 and 254–259, no. 181) mention barley, figs, and wine. As a comparison, each Spartan *klaros* was expected to produce 82 *medimnoi* of barley, a portion of which went to the common mess hall (Plutarch *Lygurgus* 8.4). A *medimnos* (Foxhall and

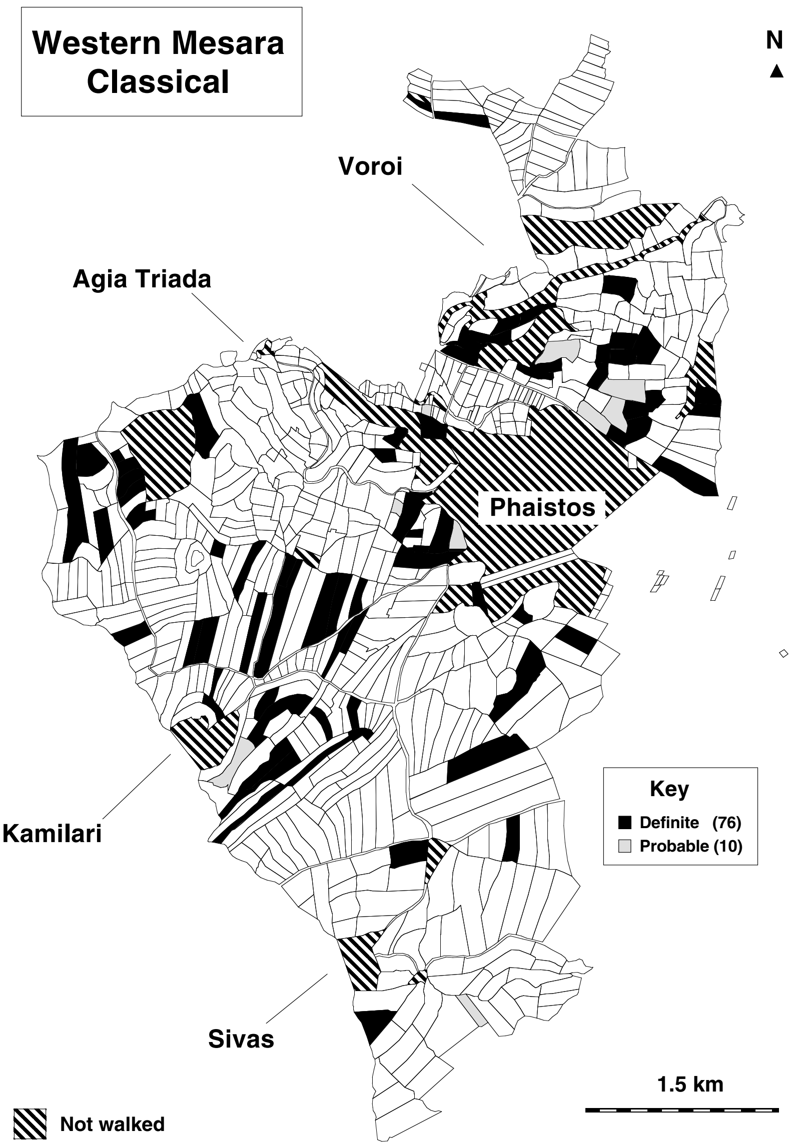


FIGURE 11.12. Off-site Classical pottery in the Western Mesara

Forbes 1982) has been calculated at between 46 and 52 l, so the Spartan contribution would be equal to 3,772 to 4,264 l. Jameson (1992:137) has estimated that Spartan *klaroi* were approximately 10 to 18 ha in size. As we shall see in the following section, the local pattern of settlement in the Hellenistic pattern suggests that the Phaistian *klaroi* were at least the size of the Spartan examples. One imagines that the village-sized (site **70** and sites near Kalamaki) and hamlet-sized **(8, 16, 20, 35, 53, 64, 79,** and **97**) rural sites may have been settled by freemen and serfs who worked the nearby land (as Xenophon *Hell*. 3.3.5). According to the Gortyn Law Code (Guarducci 1950:132, no. 72, col. IV, lines 30–35), a *klaros* not only included serfs but also a house, trees, cattle, and sheep. *Klaroi* also possessed pigs, cattle, sheep, goats, and mules (Willetts 1955:218). An inscription from Gortyn (Guarducci 1950:174, no. 75 B) lists the property of a freeman, probably on a rural estate: weapons, a loom, wool, iron tools, an ox yoke, a plough, and a stone hand mill. Our survey found numerous loom weights and beehives in the countryside (figure 11.13). One of Plato's "agricultural laws" (*Laws* 482e–846d) for the ideal Cretan city-state covers the stealing of bees from hives on farms (*Laws* 843e). Sheeps' wool was woven into clothing. The Gortyn Law Code (Guarducci 1950:72, no. 72, line 51) specified that, upon divorce, a woman was to keep half of what she had woven.

During the fourth century, probably after circa 375 BC, the Phaistian and Gortynian states began to take a greater civic interest in their countryside. New farms were settled, and a major investment was made in the rebuilding of rural sanctuaries. At Kommos, the temple, civic building, altars, and residence within the sanctuary were constructed at this time (Shaw 1981). At the same time Gortyn began construction at the port of Lebena in the south. The large size of the new building program at Kommos may imply that it was carried out by both Gortyn and Phaistos. In the Kalamaki Valley to the north, a building phase of the temple to Artemis (Hope Simpson et al. 1995:369–371) probably dates to this period. Next to the temple, a factory (plate 11.1) or workshop with stone press beds and a large *mortarium* (plate 11.2) for the processing (crushing) of agricultural produce was constructed in the fourth century (Hadzi-Vallianou 1992).

A rural shrine, probably dedicated to Demeter, was established at the Kamilari (**6**) tholos

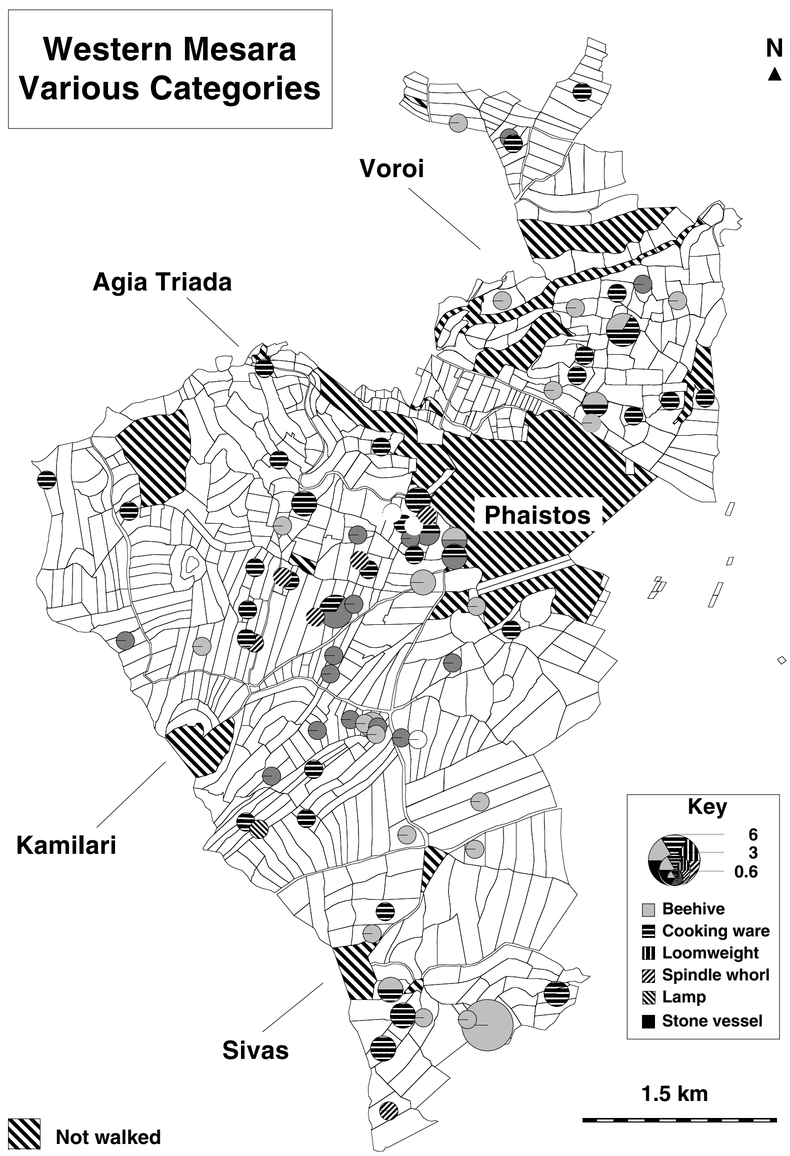


FIGURE 11.13. Off-site finds in the Western Mesara

tomb (plate 11.3) in the fourth century (Englezou 1988/1989). The shrine seems to have been placed at the Minoan tomb to emphasize the local worshippers' ancestral connections and legal claim to the surrounding land. If this shrine belonged to Gortyn, it represented a new encroachment on Phaistian territory. Nevertheless, the presence of the large Gortynian-controlled Amyklaion nearby makes it more likely that the Kamilari shrine belonged to Phaistos. Given that the nearby Amyklaion and Artemis shrines seem to have been shared by Phaistos and Gortyn (see below), the establishment of a third, Phaistian shrine may reflect heightened territorial tensions.

These developments inevitably raise the question of political relations between Phaistos and Gortyn during the Classical and Hellenistic periods. Hemmed in between two mountain ranges and a single coast, these two poleis (figure 11.14) were competitors for local land, water, and access to the sea. As will be argued below, Phaistos and Gortyn apparently resolved their rivalry by enacting a treaty with each other. The exact nature of this treaty is controversial for two reasons. First, the Kommos sanctuary near Phaistos, almost certainly the Amyklaion, was under Gortynian control, while the harbor at Matala, immediately to the south, belonged to Phaistos (Polybios 24.3.1). These facts create an unlikely scenario in which a large sanctuary in the middle of Phaistian territory belonged to another polis.

Second, the wording of several Hellenistic decrees suggest that Phaistos and Gortyn were joined in some form of political alliance, but that Gortyn was the more powerful polis. For these reasons, the epigraphers, Guarducci and Manganaro, as well as the archaeologists, Da Vita and La Rosa, have inferred that Phaistos was a perioikic community under Gortynian control, at least until the Hellenistic period. Guarducci's (1936) and Manganaro's (1965) conclusions, however, are based on ambiguous epigraphical passages or are arguments from silence (for example, the absence of references to Phaistian officials in Gortynian decrees). The mention of an "*ano polis*" and a "*kato polis*" in a joint Phaistian-Gortynian treaty of the mid-third century (Guarducci 1950:226–228, no. 165) with the community of the Kransopeioi, as Guarducci (1943:70) herself pointed out, refers to the two poleis' positions relative to the Kransopeioi, not to each other. The most that these inscriptions imply on this question is that Phaistos and Gortyn had bound themselves in some form of *synpoliteia*, or political alliance. Certainly by the Hellenistic period there were a number of settlements (figure 11.14) in the Mesara, for example, Pobia, Pyranthos, and Rhytion, that were dependencies of Gortyn (Perlman 1996).

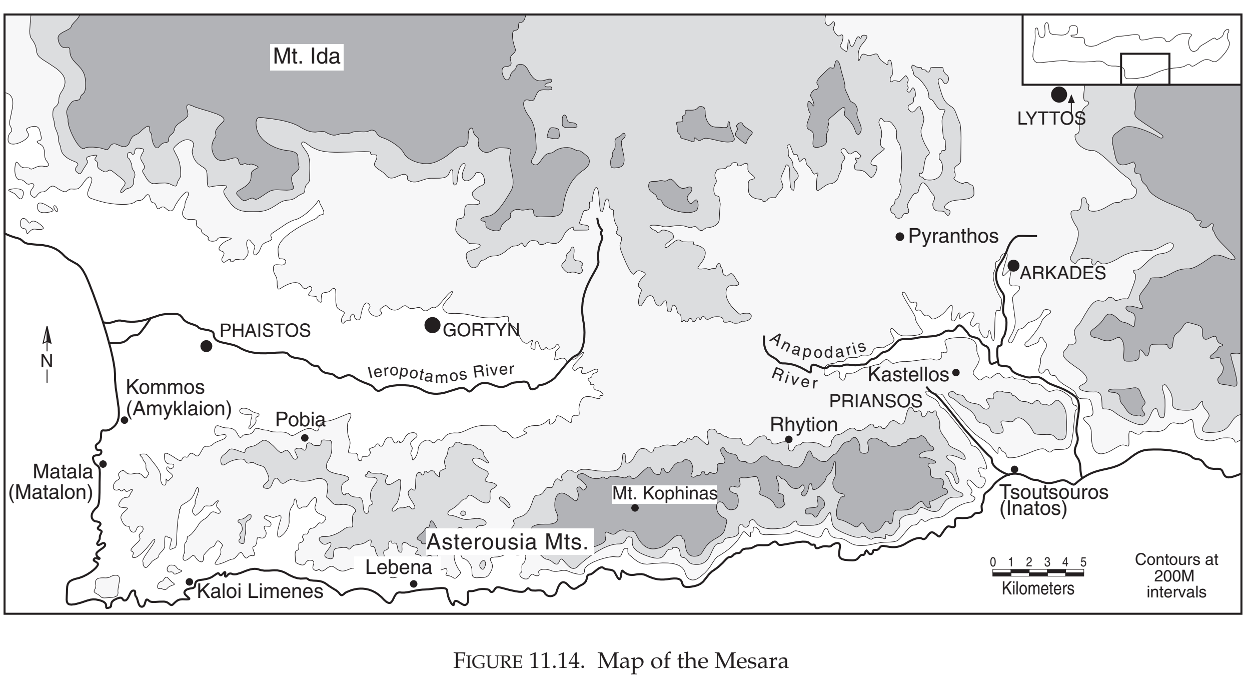


Figure 11.14. Map of the Mesara

Recently Cucuzza (1997) has suggested a solution to this problem, that is, that Phaistos and Gortyn were united in some early form of *synpoliteia* by the sixth century BC. Written evidence for *synpoliteia* between Cretan city-states exists from the fifth through the first centuries BC (Van Effenterre 1948:154–156; Van der Mijnsbrugge 1931). Inscriptions recording such treaties mention dual rights and responsibilities shared by citizens of the allied poleis—citizenship, participation at cult ceremonies, business transactions, taxation and tribute, military expeditions, asylum, landownership, and pasturage—implying that varying degrees of integration and political power could exist between the enjoined communities. Guaranteed access to a common sanctuary between neighboring city-states is one feature of these alliances (Petropoulou 1985:65–69). This political right was recognized as early as the mid-fifth century, as is implicit in the treaty between Knossos and Tylissos (Meiggs and Lewis 1969:99–105). The well-known Hymn to Zeus (West 1965), from the temple of Dictaean Zeus at Palaikastro, an invocation made by the citizens of several Hellenistic poleis, also implies an interpolis festival held at a common sanctuary. All of this evidence provides a precedent for the suggestion that the sanctuary at Kommos was in fact shared by Gortyn and Phaistos as early as the seventh century BC.

The coinage of Phaistos and Gortyn shows that the two cities were closely linked. In the fifth century, circa 450–425 BC, both poleis began to mint their own coins. Phaistos used a Gortynian type (obverse: Europa sitting on a bull; reverse: lion's head). Only the written legend distinguishes one group of coins as Gortynian and the other as Phaistian. Le Rider (1966:160–162) interprets this series as evidence of a *synpoliteia* between Phaistos and Gortyn. During the fourth century, both poleis used a series with the same reverse (a bull), but separate obverses: Gortyn used Europa sitting in a tree and Phaistos employed Velchanos in a tree. Only after circa 350 BC did the two poleis issue their own separate series of coins. Later treaty decrees testify that the Phaistos-Gortyn *synpoliteia* continued into the second century BC.

EARLY HELLENISTIC HISTORY, SETTLEMENT, AND LANDOWNERSHIP

With the advent of the Hellenistic era, written documents begin to inform us about specific historical events that took place in the Western Mesara. Inscriptions record that, amidst increasing internecine warfare, Phaistos made treaties with other Cretan poleis during the third and second centuries, at least until 183 BC (Guarducci 1935:269). According to Polybios (24.31), these civil wars left two principal surviving city-states in central Crete, Gortyn and Knossos. In the second century BC, Gortyn received Ptolemaic reinforcements in its struggle (Guarducci 1950:273–275, no. 195). Polybios (4.53) narrates the details of a civil war that broke out in Gortyn from 221 to 219 BC. Knossos came to the aid of one side in the strife, and the other side was subsequently expelled from Gortyn. These exiles fought a battle near Phaistos in which they seized Matala, the port of Phaistos (Guarducci 1935:62, no. 7, line 15). During the second century, wars between Cretan poleis became even more frequent and, increasingly, arbitration by Rome became necessary. Beginning in the third century, literary sources also mention the activities of Cretan mercenaries and pirates (Willetts 1955:246–248; Spyridakis 1992:55–81). In 222 BC the city garrison in Alexandria, for example, was manned by one thousand Cretan soldiers (Frazer 1972:613).

Signs of rivalry between Phaistos and Gortyn increased during the Hellenistic period. In the fourth century, Gortyn constructed a sanctuary, dedicated to Aesclepius, on the south coast at Lebena. This shrine was the first of many new sanctuaries dedicated to foreign deities (mainly Egyptian) that sprang up along the south coast, at Ierapetra (Hierapytna), Lasaia, Phoinix, and Poikiliasion (Bowsky 1999), in the Hellenistic and Roman eras (figure 11.9). Lebena was particularly popular, attracting visitors from as far away as Libya (Philostratos *Life of Apollonios* 4.34f). In response, Phaistos seems to have established a rival shrine, also dedicated to Aesclepius as well as Zeus and Apollo, in the Agio Pharango Valley near the south coast, west of

Lebena (Pariente 1994:824). This sanctuary may have been connected with the city shrine of Aesclepius at Phaistos (Guarducci 1935:271, no. 1). During the third century, Gortyn constructed defensive city walls and Phaistos, too, built a fortification wall (Minto 1921/1922; Watrous et al. 1993: Plate 52d). Finally, in the middle of the second century, Gortyn destroyed Phaistos and took over its territory (Strabo 10.476).

Returning to archaeological data, we see that settlement (figure 11.15) outside the Phaistian *asty* became extremely dense in this period. Hellenistic sites in our survey area total forty-five, almost double the number of Classical sites. Thirty-eight of these sites are settlements, eighteen of them new foundations (table 11.5). Cemetery sites also increased, tripling in number, to six. Some new settlements continued to favor elevated locations (for example, sites **2, 27, 42, 47, 97,** and **99**) within 300 m of well-watered land. For the first time, most settlements, however, were established on dry, Class III land. These spots include the marl ridges of the central valley between Phaistos and Kamilari and the dry plateau on top of Ieroditis. Settlement (sites **36** and **94**) on the foothills near Sivas also began, the latter site in a Class IV location. In the Agio Pharango Valley the same pattern of settlement, on land removed from a water source, is observable (Blackman and Branigan 1977:75).

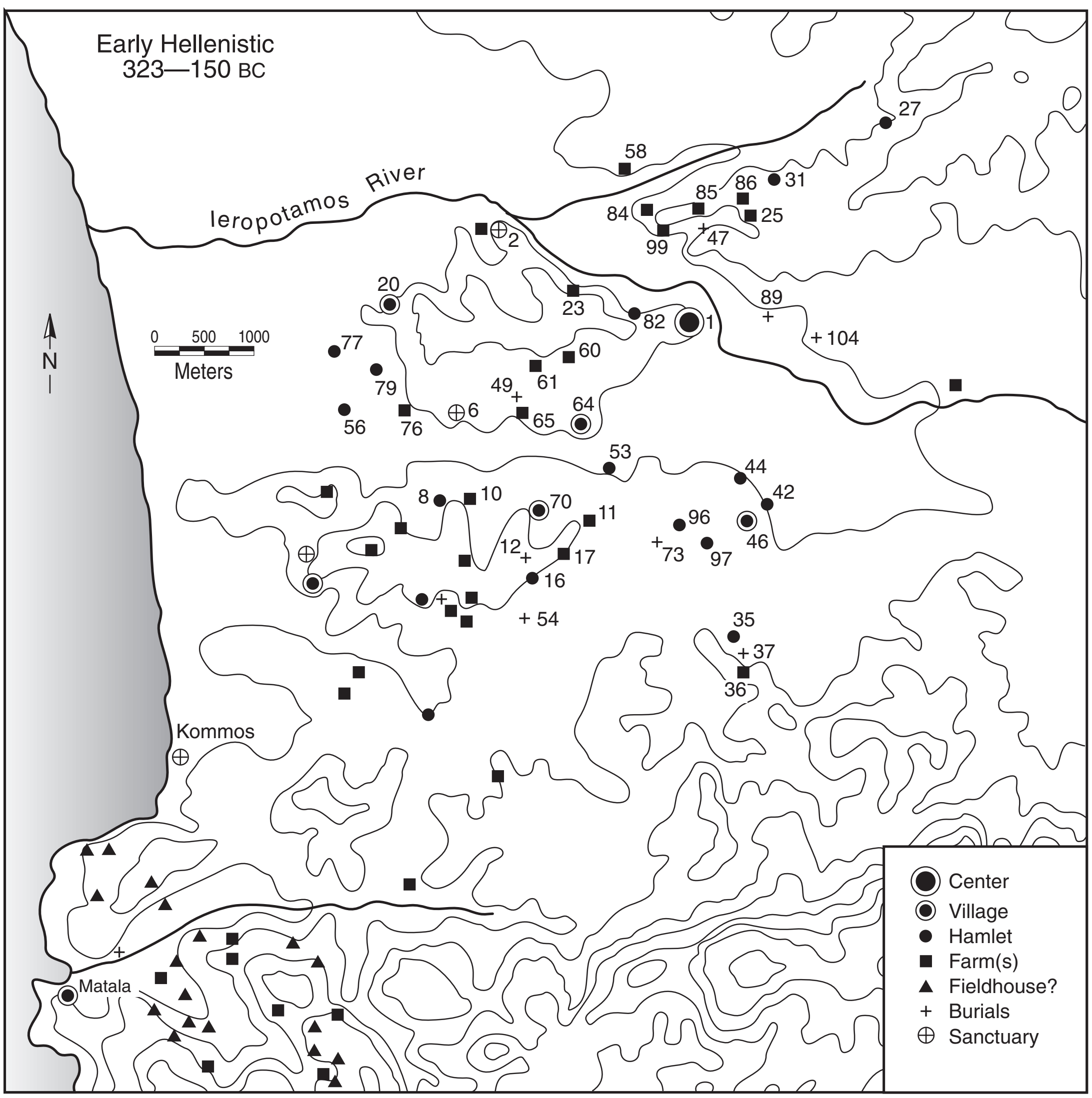


FIGURE 11.15. Early Hellenistic sites in the Western Mesara. Kommos survey sites unnumbered.

TABLE 11.5. Early Hellenistic sites in the survey area

Sites	Size	Land	Function	New
1	60+ ha	I/II	Polis center	—
2	Small	I/II	Hamlet/shrine	New
6	Small	—	Shrine	—
8	Small?	II	Settlement	New
10	Small	II	Hamlet	New
11	50 x 50 m	II	Farm	—
12	—	—	Graves	—
16	70 x 175 m	II	Settlement	—
17	25 x 30 m	II	Farm	New
23	10 x 40 m	II	Farm	New
25	85 x 30 m	II	Farm	New
31	80 x 80 m	II	Farm	—
35	Small?	II/III	Hamlet?	New
36	35 x 40 m	II/III	Farm	New
37	—	—	Graves	New
42	130 x 110 m	I/II	Hamlet	New
44	60 x 135 m	I/II	Farm	—
46	180 x 300 m	I/II	Settlement	—
47	—	—	Chamber tombs	New
49	—	—	Graves	New
53	110 x 50 m	II	Hamlet	—
54	150 x 150 m	—	Tombs	New
56	50 x 130 m	II	Farm	New
58	?	II/III	Settlement	—
60	150 x 25 m	II	Farmstead	New
61	40 x 30 m	II	Farm?	New
64	250 x 200 m	II	Hamlet	New
65	40 x 50 m	II	Farm	New
70	250 x 90 m	II/III	Hamlet	—
73	—	—	Graves	New
76	70 x 80 m	II	Farm	—
77	40 x 110 m	I/II	Farm	—
79	100 x 100 m	II	Hamlet	—
82	90 x 50 m	II	Settlement	—
84	70 x 70 m	II	Farm	New
85	40 x 30 m	II	Farm	—
86	25 x 20 m	II	Farm	New
89	60 x 60 m	—	Graves	—
96	Small?	I/II	Farm	New
97	150 x 165 m	II/III	Hamlet	New
99	Small	II	Farm	New
104	Large?	—	Cemetery	—

One of the hallmarks of the Hellenistic period in the Western Mesara is the extensive use of the countryside. The number (figure 11.16) of rural villages, hamlets, farms, and field sites all grew rapidly compared to the Classical period (figure 11.11). Distribution of tiles (figure 11.17) corresponds to the actual location and proximity of Hellenistic and Early Roman sites (as well as to the Venetian-Ottoman sites **10, 96,** and **97**; see Appendix D). Land use, too, apparently intensified, as the number of fields (Classical, 86; Hellenistic, 208) with Hellenistic pottery more than doubles in this period (figure 11.18.), affecting all parts of the Western Mesara, including the Levadia. Beekeeping (in clay beehives) on and near rural farms of this period was relatively common (figure 11.13). Loom weights and spindle whorls found in rural areas indicate that textiles were woven on these farms.

Turning to Phaistos, we are reasonably well informed about the Hellenistic city from archaeological evidence. The city was rebuilt, probably following an earthquake in the third century (Blackman and Branigan 1977:73–74). Numerous spacious Hellenistic houses have been found in the urban center: west of Ephendi Christos, at Falandra (a large civic? building, with internal columns, benches, and a central hearth), east of Falandra, at Agia Photini, immediately west of the palace (another civic building?), at Ambela (near Agios Pavlos), north of Agios Ioannis, and at Chalara. City streets were paved. Urban settlement covered an area of approximately 57 ha (figure 11.19). The boundaries of the Hellenistic city are fairly certain, despite problems created by colluviation and alluviation. To the north and east of the Phaistos Ridge the original Hellenistic land surface lies deep (approximately 3 m) under the present-day alluvium (see chapter 4). Nevertheless, it seems unlikely that the urban settlement extended to any degree onto this alluviated surface, as this land was a prime agricultural zone and vulnerable both to flooding and attack. Our survey identified the western edge of the urban settlement: large quantities of Hellenistic pottery and tiles south and southeast of the fortification tower on Ephendi Christos (but few sherds found further west) indicate that city dwellings did not extend much west of the tower. Within the city, cut blocks and dense Hellenistic pottery as far south as the village of Agios Ioannis probably marks the southern edge of the Phaistian *asty*.

The Phaistian community buried its dead in cemeteries north and south of the city. Chamber tombs (plate 11.4) north of Phaistos were particularly wealthy. One of the five recently excavated Hellenistic graves produced two vases, containing 320 and 279 foreign silver coins, most of which date to the mid-second century BC. It is tempting to see these coins as a cache belonging to a well-paid Phaistian mercenary who had returned home. About 1.5 km southwest of Phaistos, some twenty graves, funerary monuments,

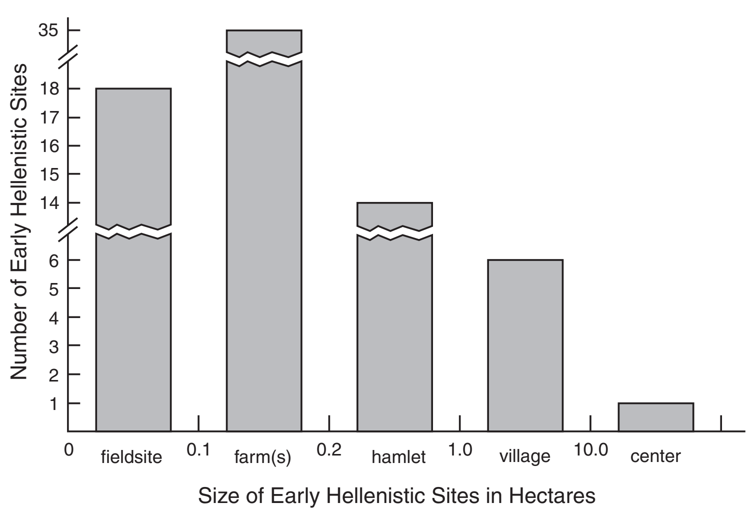


FIGURE 11.16. Early Hellenistic settlement hierarchy in the Western Mesara

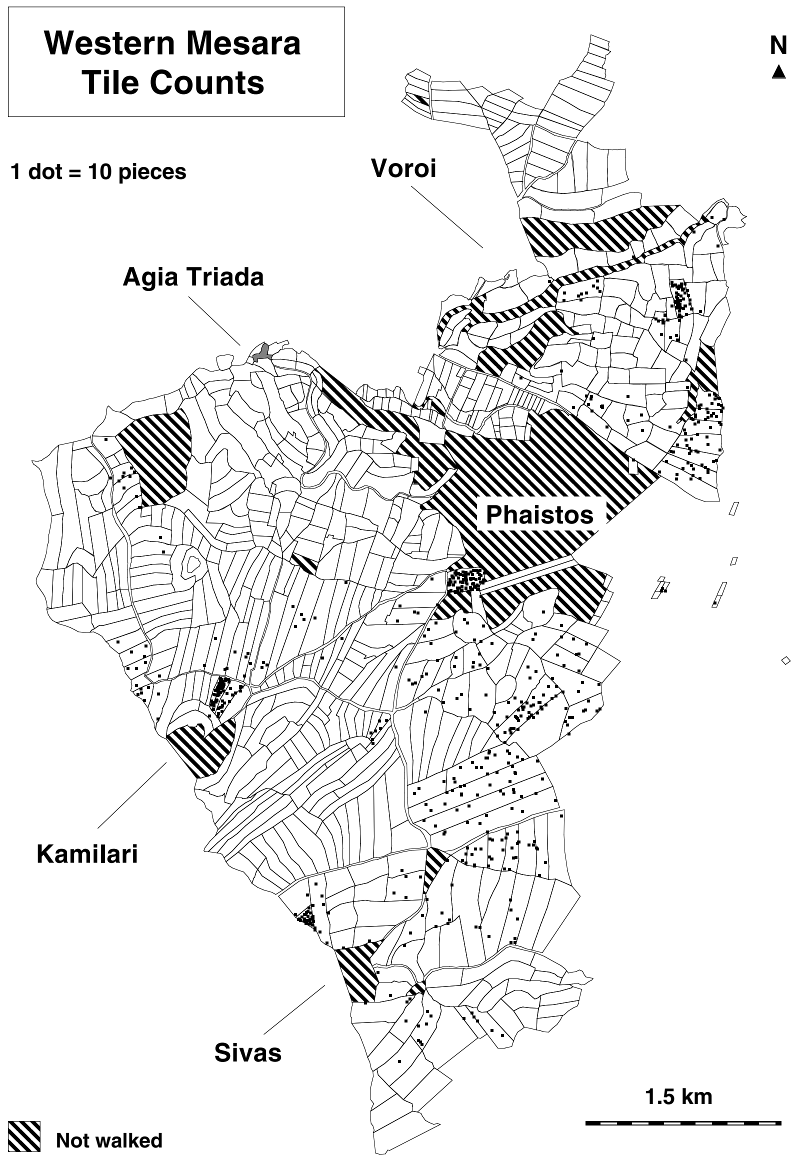


FIGURE 11.17. Distribution of roof tiles found in the survey

and inscribed gravestones of the late fourth–second century (Guarducci 1935:272–278; Hadzi-Vallianou 1989:435–436) mark the location of another of the city cemeteries. Inhumations were also found by our survey in the vicinity of Loures (**49**), 1 km southwest of Phaistos. Additional burials are known from the cemetery (site **104**) near the village of Kalivia.

During the Classical period, the land in the immediate vicinity of Phaistos had been unsettled. Beginning in the early Hellenistic period (figure 11.15), numerous small sites (**23, 25, 49, 60, 61, 65, 96,** and **99**) were established in this area, transforming the countryside around Phaistos into a busy patchwork of small farmhouses and agricultural fields. One of these farm buildings (with a tiled roof, *pithoi* containing olive stones, and two wells) was found in the Levadia southwest of Phaistos, at a depth of 1.70 m below the present surface (Hadzi-Vallianou 1988, 1995b). Our survey found little archaeological evidence for the individual size of these farms and their fields, but contemporary documents make clear that field boundaries existed and were carefully

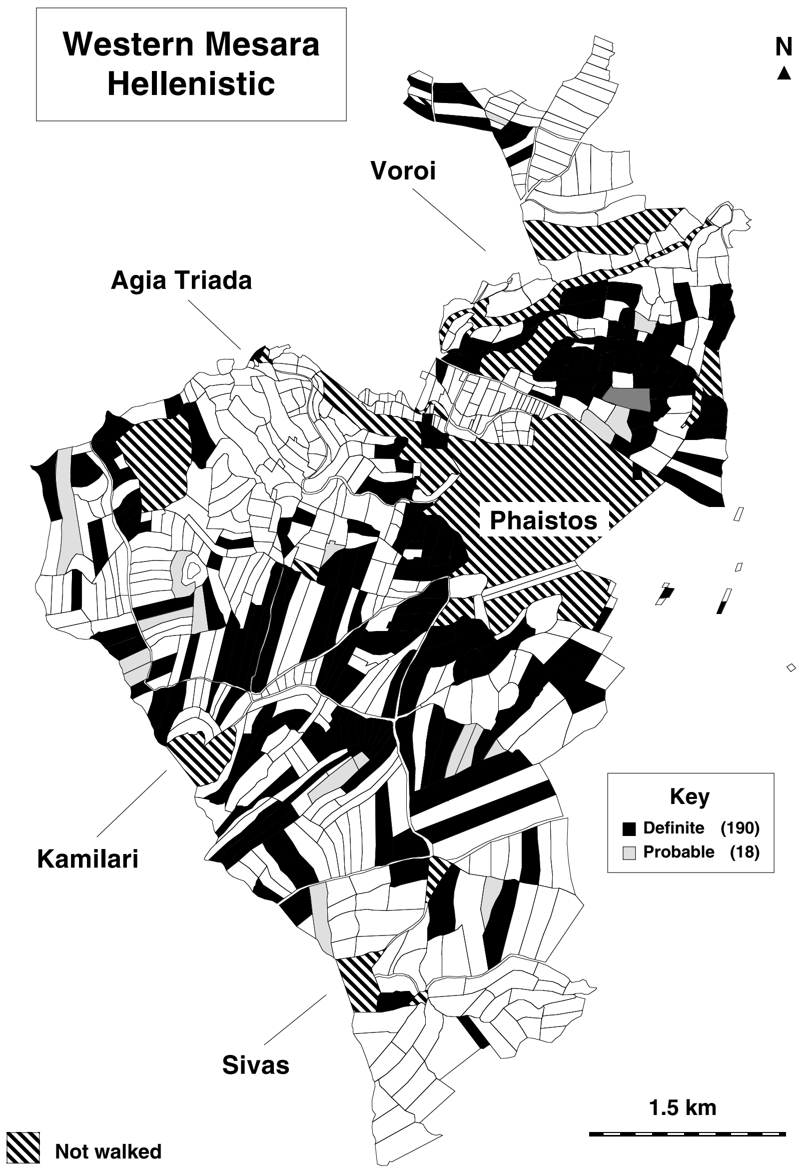


Figure 11.18. Off-site Hellenistic pottery in the Western Mesara

observed. Classical decrees at Gortyn set out the proper procedures (and penalties) for channeling irrigation water across a neighbor's field or vineyard (Guarducci 1950:111–112, no. 52 and 171, no. 73 A). Disputes concerning boundaries were of such importance that a strict schedule for their legal resolution was spelled out at Gortyn (Guarducci 1950: No. 42 B). Even a funeral procession that crossed another's property without permission was subject to a fine (Guarducci 1950:104, no. 46 B). Similarly, when Plato (*Laws* 843–846c) describes the farms in his ideal Cretan state, he also lays out a series of laws concerning boundary markers (sacred to Zeus), trespassing, the spacing of planted trees, water supplies, the right to channel water from a river to one's field, control of rainwater, and the picking of neighbors' grapes (prohibited) and figs, pears, apples, and pomegranates (permitted).

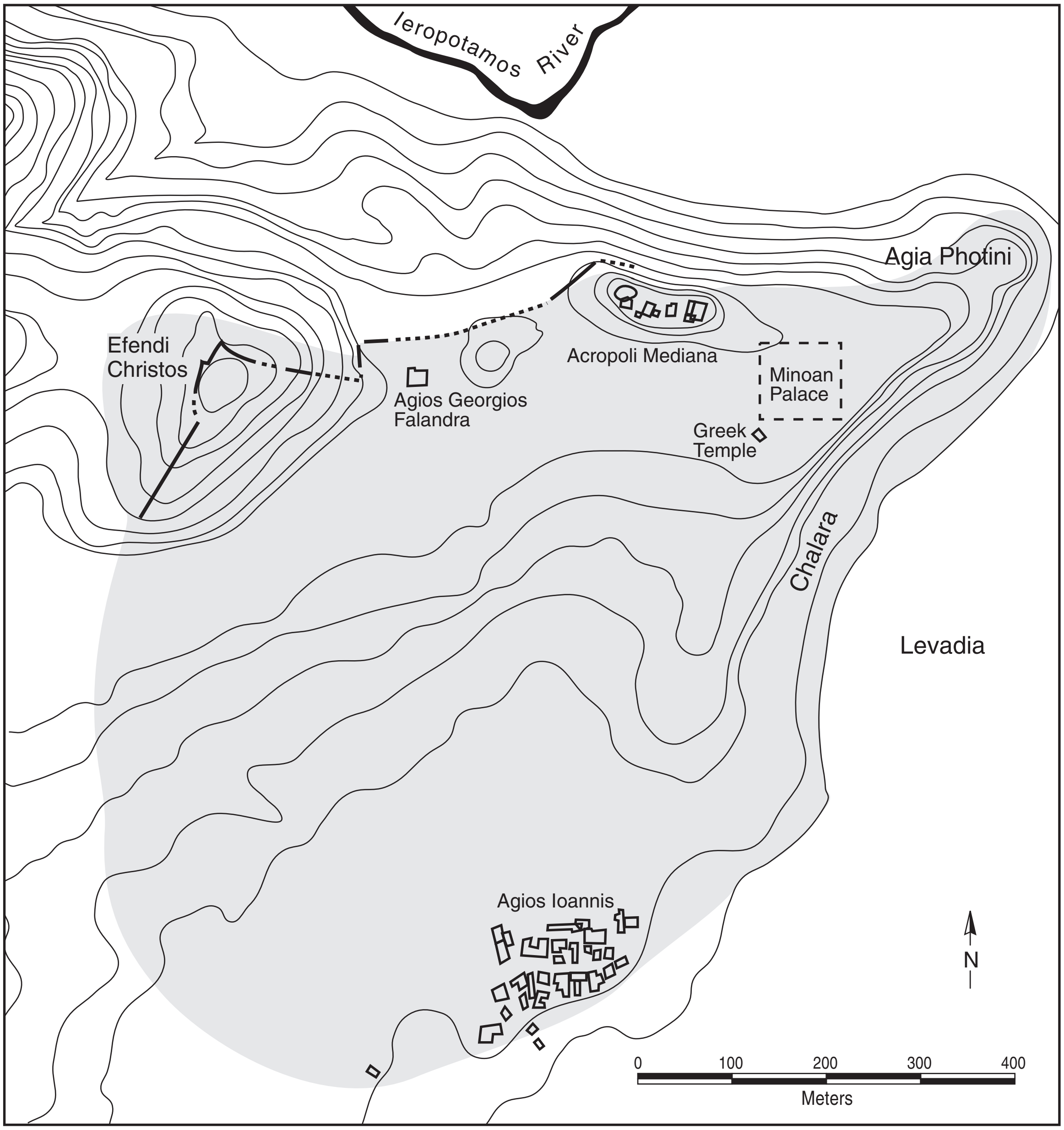


FIGURE 11.19. Physical extent of Hellenistic Phaistos

Our survey identified a unique farmstead (site **60**) in the valley between Phaistos and Kamilari (figure 11.15). Unlike other farm sites, its boundaries were marked with walls made of upright fieldstones, enclosing an area 150 m north-south by 25 m east-west. Roof tiles in the upper, northern end of the lot marked the location of a building. The total enclosed area, 150 x 25 m, equals roughly 313 Dorian square feet, or approximately 3 *plethora*, a size that falls within the range of epigraphically described fields in Crete (Boyd and Jameson 1981: *Inscriptiones Graecae* IX 1, 693; *Sylloge Inscriptionum Graecarum* 3, 940: measurements of 2, 4, 6, 10, 20, and 22 *plethora*). Given its proportions and small size, the enclosed area may represent the subdivision of a larger piece of land, which the Gortyn Law Code (Guarducci 1950:130–132, no. 72, col. IV, lines 24–40) stipulates be given to children on their father's death. Strabo (10.480–484, citing Ephoros) stated that the free status of an individual within a Cretan polis was defined in terms of the right to own property. Our farmstead (**60**), then, was probably owned by a Phaistian citizen.

Rural Hellenistic tombs erected in the area around Phaistos linked the land to families living within the city. Suburban landholdings contained burial plots, such as those near Kamilari (Guarducci 1935:277; Manganaro 1965), that were marked by carefully dressed and inscribed tombstones identifying their owners. Epitaphs inscribed on the tombstones identified the deceased as landowner and citizen or freeman. Similarly, in Attica, epitaphs were meant to announce the Athenian citizenship of the deceased and his/her family (Meyer 1993). Guarducci has suggested that the names listed on a tombstone (Guarducci 1935:276, no. 18) found at Agios Ioannis near Phaistos belonged to its citizen owner, Pythagoras, and his three freemen laborers. In Attica, inscribed gravestones on rural farms also list citizens and noncitizens together (Lohmann 1995:529; Meyer 1993).

Practically all of the deceased named on the Phaistos tombstones (Guarducci 1935:277, no. 19) are women—Antiphani, Eukleidi, Fastoni, Kalliboi, Nymphoni, Onasimi, and Peisidiki. These women's names are explained by the high legal status with respect to property enjoyed by Dorian women (relative to their Athenian counterparts) (Willetts 1967:23–27). In describing Sparta, whose laws concerning land were similar to those of Crete, Aristotle (*Politics* 1270a) stated that in his time nearly two-fifths of the land was owned by women. At Gortyn, in the event that the ownership of rural land was contested, the law (Guarducci 1950:174, no. 75A and 187–190, no. 81) stipulated that the size of the landholding was to be reckoned and the question of its ownership decided by oaths sworn by the nine nearest (citizen) neighbors. Such a provision presupposes that the urban citizens themselves had firsthand experience and knowledge of their land.

TERRITORY OF THE PHAISTIAN POLIS AND ITS ORGANIZATION

We can infer the approximate territory belonging to the Hellenistic polis at Phaistos (figure 11.14). The Phaistian territory (*chora*) must have extended as far as the base of Mount Ida, since we know of no large settlement in the Idaean foothills north of Phaistos. To the south, the Phaistian *chora* stretched to the coast along Kaloi Limenes, on the evidence of the Aesclepion discussed above. To the west, Phaistian territory ran to the coast and Matala, its port. As a *synpolitis* with Gortyn, Phaistos had access to the Amyklaion at Kommos, just as Gortyn probably used Matala. To the east, Phaistian territory extended no further than the present-day village of Pobia (ancient Boibe, which according to Stephen Byzantius [Guarducci 1935:277, no. 20] belonged to Gortyn). All told then, the territory of Hellenistic Phaistos may have consisted of roughly 260 km^2, or about 98 square miles.

During the Hellenistic period, the settlement at Matala grew far more than any other site in Phaistian territory. Archaeological evidence for Matala begins in the fourth century (Hope Simpson et al. 1995:337–338). By the early Hellenistic period, the town had expanded to cover an area of approximately 3 to 6 ha. The port was connected to Phaistos by a road that ran south from Phaistos, through the Kamilari Valley (near sites **17, 16,** and **54),** where traces of a long wall with stelae cuttings were found by our survey (Watrous et al. 1993: Plate 53b), and then southwest to Pitsidia and Matala. The harbor town's growth was probably connected to the fourth-century increase in international maritime trade, particularly with Ptolemaic Alexandria, which became one of the most powerful political and commercial centers in the Eastern Mediterranean (Buraselis 1993). It may have been through the port at Matala, therefore, that the 10,000 *medimnoi* (5,252 hectoliters or 12,305 bushels) of grain was sent to the Mesara by Cyrene in the drought-afflicted years around 330 BC (Tod 1948:273). The growth of Matala is accompanied by a lessening of settlement hierarchy (figure 11.16), as local sites in this period began to expand in size relative to Phaistos.

A dense ring of small, seasonal farm buildings sprang up around Matala (Hope Simpson et al. 1995:329–358) during the Hellenistic period (figure 11.20). Such a suburban pattern has also been recognized in Boeotia, around the town of Thespiai (Bintliff and Snodgrass 1985:140, Figures 16 and 145). Rural sites around Matala differ from farm sites around Phaistos in that they possess much smaller landholdings and are lo-

Figure 11.20. Hellenistic Farms and their hypothetical landholdings around Phaistos and Matala

cated on steep slopes and poor, thin soils. The farms around Matala show little material investment or signs of permanence: of the forty-one Hellenistic sites at Matala, twenty-eight produced only a scatter of sherds. Thirteen of these sites were associated with walls, and only two had roof tiles. Some of these sites, however, are associated with retaining or terrace walls (Shaw and Shaw 1996:304 and 357), a sign of agricultural intensification. It seems reasonable, therefore, to infer that these farms were probably worked by freemen, metics, and slaves who lived in Matala. Since the Dorian aristocracy of Crete (Aristotle *Politics* 1328b 32–1330a 32) was said to have been little concerned with agriculture and business, the commercial center of Matala must have been primarily inhabited by the lower classes. Aristotle (*Politics* 1303b 10), for instance, regarded the population of Piraeus as more "democratic" than that of Athens.

The Phaistian *chora* seems to have consisted of three rough concentric zones radiating from the polis center (figure 11.20). The first zone, the area within about a 1 km radius of Phaistos, had the best available land. This zone had few farmsteads on it, presumably because the owners lived in the adjacent *asty*. Numerous Hellenistic ground stone implements from Phaistos (stored today in the west magazines of the Minoan palace) show that grain and other agricultural products from this land were brought into the city to be processed. The second zone, comprising the land located 1 to 4 km distant from Phaistos and made up of dry marl soils (on Ieroditis and around Kamilari), possessed the largest number of farms. These farms, within an easy walk from Phaistos, had relatively large landholdings. Of course, we cannot be sure that each of the notional landholdings marked on figure 11.20 belonged to the site within its polygon, because not every field need have had a structure on it, but the overall size of the landholding seems relatively secure. As a group, farm sites in this second area possessed roof tiles, stone presses (plate 11.5), walls, inscribed tombstones, cooking ware, basins, *pithoi,* amphorae, loom weights, spindle whorls, and beehives.

The third zone, located around Matala and in the foothills of the Asterousia, was, by and large, the poorest in size of landholding, soil type, and structural remains. Farms in this area produce no inscribed tombstones or any other sign of literacy. Marginal lands in the Agio Pharango Valley were also resettled in the late Classical period, for the first time since the Late Bronze Age (Blackman and Branigan 1977:72–77). Hellenistic settlement there consisted of a hamlet and at least five farmsteads, mostly traceable through small sherd scatters. Such a regional pattern of settlement seems to show the growth of a lower class. A similar trend began in fourth-century Sparta and has been attributed in part to the increased role of coinage in the local economy (Cartledge and Spawforth 1989:42).

Land and settlement within the territory of Hellenistic Phaistos point to a three-tiered socioeconomic hierarchy. Choice land, the earliest settled, and still directly in the hands of the free citizenry, was immediately around Phaistos. Further from the *asty,* poorer land some 2 to 4 km from the center, was only settled in the seventh century and later. Finally, truly marginal land at the periphery of the Phaistian *chora* was settled intensively beginning in the late fourth century. Burials within Phaistian territory follow a similar pattern. Large, rich chamber tombs are found adjacent to Phaistos. Graves marked by inscribed stelae occur in an area 1–2 km south of Phaistos, and simple, unmarked graves are more distant from Phaistos, at Kalivia (**104)** and around Matala. Our pattern of settlement, however, is not directly indicative of landownership, because, at least on mainland Greece (Jameson, Runnels, and Van Andel 1994:108, 386), several rural properties could actually be owned by or leased from the same person. One also remembers Plato's advice in the *Laws* (745b), that, in the ideal city, each householder should own two lots, one near the city and one near the border. Nevertheless, the increased diversity of regional settlement, especially at the lower end of the economic spectrum, points to a growing lower class.

Intensified Rural Land Use

Elsewhere in Greece, the rural countryside was also densely settled during the early Hellenistic period. Surveys have documented this trend in Aetolia, Attica, Boeotia, Lakonia, Melos and Keos, the Argolid, Corinthia, and Euboeia (Alcock 1993:33–49). Rural Attica and Crete, for example, were both settled, despite the fact that their political structures differed greatly. Based on their fieldwork in Keos, Cherry, Davis, and Mantzourani (1991:463) have suggested that this type of settlement of rural land took place at times when land had become accessible to the lower and middle class. Our Cretan evidence, however, provides a contrary case. Since rural Greek settlement expanded both in democratic societies with a sizeable middle class and in aristocratic poleis with restrictive systems of land tenure, it seems unlikely that this trend can be tied to a political cause. A more probable candidate is the powerful market-oriented cash economy that emerged in fourth-century Greek society (Cohen 1992; Harris 1989:69–73).

In Crete, the transformation from a barter to a market-oriented economy can be traced back to the introduction of coinage. Both Phaistos and Gortyn began to mint their own coins in the mid-fifth century BC (Le Rider 1966:163–166). Coins were already in use in sixth-century Crete (Le Rider 1966:168, 267) and must have been widely accessible in the Mesara by the early fifth century BC, because the Gortyn Law Code routinely assesses penalties in Aeginetan staters, payable by freemen, serfs, and citizens alike. At least three coin hoards of the late fourth or early third century are known from Phaistos (Le Rider 1966:11–40; Hadzi-Vallianou 1992). Coins minted by nineteen other Cretan poleis have been recovered at Phaistos, including examples from such nearby city-states as Gortyn, Priansos, Lyttos, Sybrita in the Amari Valley, and Axos north of Mount Ida (Le Rider 1966). Similarly, foreign coins from Aegina, Argos, Boeotia, Carthage, Corinth, Cyprus, Cyrene, Rhodes, Sikyon, Siphnos, and Thera also came to Phaistos. These coins point to an economy that was to some degree cash based.

Gortyn began to issue larger amounts of new coinage after 330 BC. Many Cretan poleis minted their first coins at this time (Le Rider 1966:190). Soon after, in the third century, both Gortyn and Phaistos issued a new series of bronze coins. The minting of these bronze coins at Gortyn can be directly related to the agricultural production of the rural countryside, because the decree (Guarducci 1950:162) accompanying the issue stipulated specifically that this coinage could be accepted in place of previous types of payment, which had been in grain. By the second century, Gortyn, among other poleis, possessed a *chreophylakion* (Guarducci 195/1/2232.7), a form of state bank that kept track of debts, issued credits, and arranged business contracts for purchases, sales, lending, and borrowing money. Such an institution represents a real change in Cretan attitudes toward money, since fifth-century Gortynians could buy or sell houses and trees outside their polis, but were forbidden by law (Guarducci 1950:80) to take securities, that is, to lend money for profit. It is true that Cretan inscriptions only began to attest to a wide expansion of trade during the Roman period (Chaniotis 1988b), at a time when the economic power and extent of the state had greatly increased, but these documents should not be interpreted too literally. Cohen has shown that, beginning in fourth-century Athens, there had already grown up a strong and widespread cash-based economy that was "invisible" or underground because of traditional social attitudes (Cohen 1992:192–201). Only when we combine written and archaeological sources are we likely to avoid the specific bias of each category of evidence.

As for other parts of Greece, scholars (Heichelheim 1964:113–116; Jameson 1977/1978; Pecirka 1973:119–121) have identified the Hellenistic monetary-based economy as a stimulus for the production of agricultural and manufactured goods for profit. A cash economy has the obvious advantage over one based on barter in that it offers an opportunity for profit and savings. The possibility of profit prompted a greater exploitation and leasing of land, since surpluses and rents brought in cash (Jameson, Runnels, and Van Andel:109 and n 19). In the fourth century BC, Athenians (Osborne 1991) dealt in large sums of money involving taxes, leasing, credit and loans, banking, war costs (trierarchy), and liturgies, as a way to achieve political and social status. Cohen (1992:4–7, 87–90, and passim) has documented how the traditional nonprofit economy of Athens was transformed into one driven by market forces under the influence of increased exchange in coin, credit, banking, loans, and trade. Cash transactions made real estate speculation (Cohen 1992:31), leasing of land, investment in loans on maritime trade, and intensification of agriculture based on slave labor (Jameson 1977/1978; 1992) profitable. Following Alexander's conquests, Greek traders spread this new economy throughout the Eastern Mediterranean.

Cretans seem to have responded as eagerly as other Greeks to these new economic opportunities. At Phaistos, signs of trade begin to multiply rapidly in the years following 325 BC. Levi's excavation (1967:569–588) at Phaistos revealed a late-fourth-century building fitted with a winepress, next to which was found a stack of foreign amphorae. Large buildings on the acropolis and outskirts of Matala are similar in plan to the Kalamaki workshop (see below), and so may have been industrial facilities (Hope Simpson et al. 1995:337, 342, and 345). The bay at Matala (plate 3.7) was outfitted at some point in the Hellenistic or Roman period with rock-cut ship sheds (Blackman 1973). Foreign wines were imported to Phaistos, and stamped amphorae from Rhodes, Cnidos, and Corinth (or Kerkyra) were recycled. Attic vases came to Matala, Kommos, and to our sites **20** and **37**. Matala produced its own amphorae (Hope Simpson et al. 1995:336–337; Empereur, Marangou, and Papadakis 1992:

643), a sign that it was exporting local wine, perhaps as early as the late fourth century BC. Under the Ptolemies, Alexandria became one of the chief trade ports in the Mediterranean, and Egyptian trade with Crete increased sharply in the Hellenistic period. As a result, Matala became a stop on one of the major east-west Mediterranean trade routes between Alexandria and Italy (Frazer 1972:153–160).

Gortyn also took part in this expanded foreign trade. By the end of the fourth century BC, it was a production center for two local amphora types (Marangou 1991). An inscription (*Supplementum Epigraphicum Graecum* 1:414 dated to the early fourth century) relates that Gortyn was also an international exporter of medicinal herbs. Atticizing stelae of the Classical and Hellenistic periods found at Gortyn have been linked with trade routes between Athens, Crete, and Egypt (Bowsky 1997). Local wine amphorae from the Mesara have been found at Cyrenaica and Alexandria (Fulford 1989; Marangou 1993). Cretan Hadra ware (La Rosa 1984), produced both in the Mesara and at Knossos (Callaghan 1985), has been found at many sites in our region and was widely exported abroad, to Alexandria and probably to Cyrenaica and Italy (Cook 1966:7).

Besides being a port, Matala was also an industrial town possessing shops, mines, quarries, fisheries, and shipyards (Hope Simpson et al. 1995:398). At Kalamaki (plates 11.1 and 11.2), a large, late-fourth/–third-century industrial building (Hadzi-Vallianou 1987) contained a flat spouted stone press, querns, stone bins, and a large stone spouted basin, or *mortarium*, set next to a pillar to support its press, for the processing of oil, wine, and grain. Cretan artisans working in places such as Matala included masons, potters (Guarducci 1935:218 at Lebena), carpenters, dyers, bowmakers, shipbuilders, and blacksmiths as well as physicians (Petropoulou 1985: 57–59). At Gortyn, specialized craftsmen from abroad were employed when local workers were unavailable (Guarducci 1950:115, no. 58; 179–183, nos. 78 and 79). Cypress wood may well have been one of the products exported from Matala to construction projects overseas (Burford 1969:37, 76, 151, 178). The importance of trade in the Hellenistic Mesara, and in Crete generally, is confirmed by Cretan treaties of *isopoliteia* that routinely included the rights of citizens from one city to do business in the other, to import and export goods (including livestock) between cities without taxation, and to own and lease land in the other city-state (Petropoulou 1985:49; 63–68).

The intensified use of land within the chora of Hellenistic Phaistos was part of the economic trend described above. Artifacts from local Hellenistic farms point to increased production and storage of grains, oil, and wine as well as to beekeeping and the weaving of textiles. Many of these farmsteads (**2, 25, 26, 56,** and **79**) were equipped with massive stone presses (plate 11.5), whose size signals the commercial production of wine and/or oil. The same Mesara farms (sites **20, 32, 36, 75, 77,** and **79**) also produced transport amphorae, a sign that they were connected with wider economic networks that exported wine and oil. These exports would have infused cash into the local Mesara economy.

The Hellenistic economic system may have represented a way that Cretans could circumvent the traditional social strictures against personal wealth. Nevertheless, despite such attitudes, even the lower Cretan classes had access to cash; thus, the Hellenistic poet Dosiades (*apud Ath.* 143 a–b), speaking of Lyttos, describes the Cretan system of contributions, and mentions that in his time each slave made his contribution to the state in the form of an Aeginetan stater. In the second century, Polybios may be reacting to the trend toward a cash economy when he claims:

> The Cretans are the only people in the world in whose eyes no gain [*kerdos*, the Greek term for commercial profit] is disgraceful. Their laws go as far as possible in letting them acquire land to the extent of their power, and money is held in such high honor that its acquisition is not only regarded as necessary but as most honorable. (6.45–47)

The industrial structure at Kalamaki excavated by Hadzi-Vallianou (1987) is a particularly clear example of this local capitalist investment.

Scholarly opinions are divided on the causes of intensified land use in late Classical and Hellenistic Greece. On the Keos survey Cherry, Davis, and Mantzourani (1994) attributed the increase in rural farms on that island to population growth. In contrast, the authors of the Southern Argolid survey have connected the dispersed settlement there with the production of oil for export (Jameson, Runnels, and Van Andel 1994: 383–394). Recently, Acheson (1997) has concluded that most of the landholdings in the Late Classical and Hellenistic Argolid belonged to small "subsistence farmers," who were therefore too poor to have been involved in trade. Acheson's argument for the Argolid is not convincing, partly because she does not define the subsistence needs of a farming family in comparison to the size of their landholdings. Farm holdings in the Argolid varied in size from 5.5 to 22.5 ha, with a median of 13 ha (Acheson 1997:177). Figuring, generously, that a family of five can live on about 5 ha (chapter 6) of mediocre land, the Argolid farm households would have had the capacity to produce a surplus which they could have used to purchase imported items. Massive stone presses (for example, Runnels, Pullen, and Langdon 1995:450, Figure 115 [G 10]; Mee and Forbes 1997:259, Figure A 1.2) found on Late Classical–Hellenistic farms in the southern Argolid, Methana, and in our survey area (plate 11.5) point to the same conclusion. Such presses are absent from Archaic and earlier farms in Greece. Traditional nineteenth- to early-twentieth-century methods of processing olives (chapter 6), using sacks, wooden presses, and natural surfaces, suggest that a poor, self-supporting family (ancient or in the recent past) did not need such heavy equipment for subsistence. These stone press beds appear toward the end of the fourth century BC, and therefore it seems clear that they were introduced in order to produce a surplus for exchange.

The Keos fieldworkers cited population growth as the cause of increased rural settlement on the island. Rural resettlement, however, cannot be simply equated with or interpreted in demographic terms. Osborne's study (1985) of Classical and Hellenistic leases has shown that rural estates need not all have been permanent residences. In the Mesara, if the settlement dispersion had been the result of general population growth, one would expect an overall consistency in the regional pattern of settlement. But this is not the case. Instead, the great growth in temporary farm sites sprang up around the harbor town of Matala.

Recent settlement history in our area may throw some light on this issue. Beginning in the 1960s, land use in the Mesara has dramatically intensified. With the introduction of deep wells and hothouses, the area has begun to produce agricultural surpluses for export to the mainland and to Europe. Tourism has also brought increased money and much urban construction, especially along the coast. A visitor to the Western Mesara today cannot help but notice that the outskirts of Tymbaki, Moires, Pitsidia, Matala, and other villages have expanded with the construction of new houses (appendix F, and figure F.1). From 1950 to 1990, the censuses of 1951 and 1991 for the Western Mesara (Eparchias of Pyrgiotissa and Kainourgio) show that local population increased 9%, from 30,387 to 33,104. As the villagers' accounts in appendix F make clear, the physical expansion of the local village of Pitsidia was not caused by demographic growth, but by larger economic factors. Local population increase was an independent effect also caused by these same economic developments. Similarly, on Keos, the recent construction of rural farmsteads only became significant after 1920, at a time when censuses testify to an actual overall drop in local population.

Population growth as an explanation for increased rural settlement is problematic for other reasons. Why, for instance, did this trend take place in Greece only at the turn of the third century BC, and not earlier, over the longer course of the Geometric–Classical periods? One underlying answer to this question is that population growth in Crete, at least, was severely constrained by social practices. Methods of contraception in antiquity were numerous (Riddle 1992:1–86). Aristotle (*Politics* 1272a 14) mentions, disapprovingly, that in Crete, men have male companions and are kept separated from women in order that there should not be too many children. Infanticide was also practiced. At Gortyn, for example, a mother had the legal right to expose her children (Guarducci 1950: 130, no. 72, lines 47–48). Worldwide anthropological fieldwork (Hassan 1981:143–160) has also shown that preindustrial societies closely regulate their populations through cultural means (sexual mores, controls on marriage, abortion, and infanticide) in order to maintain their social structure and ecological balance. In the Mesara, the rise in rural settlement begins relatively suddenly at the end of the fourth century BC at a pace that precludes simple demographic growth. It appears more likely that, with the momentous changes of the Hellenistic period, citizens and noncitizens on Crete began to realize and take advantage of the opportunities offered by increased manpower for labor. Under such circumstances, traditional restraints on the fertility of the lower classes may have been relaxed. Whatever population growth took place is apt, therefore, to be a response to economic factors rather than the other way around. As Brumfiel (1992:556) remarks, population growth in complex societies does not happen "naturally," but is the result of socioeconomic changes that make having more children desirable.

Acheson's study (1997) also assumes that only farmers with large estates would have had the wherewithal to take part in the trade network, while poor farmers would have had to focus on basic subsistence needs. Blitzer's ethnographic research (chapter 6) suggests that Acheson's dichotomy between "subsistence farmers" and "market producers" is fictional. All members of traditional society in the nineteenth- and early-twentieth-century Mesara participated in exchange and trade to the extent that they were able. Beyond their crops, farmers made baskets, produced charcoal and lime, and made wooden tools (to name only a few items) for sale as well as working as day laborers to earn cash. Within their individual constraints of land, time, and labor, each farmer routinely grew extra crops for the purpose of exchange and for obtaining cash. Oil particularly was viewed as liquid cash. It is significant that this level of economic activity is rarely mentioned in official contemporary written sources (chapters 6 and 14), but it existed nonetheless and was quite important.

INTIMATIONS OF A CHANGING SOCIETY

One final observation about Hellenistic settlement around Phaistos: distinct patterns of settlement within the region, one centered around Phaistos (figure 11.15) and the other around Matala (figure 11.20), could be viewed not just as a function of social hierarchy, but also as possible evidence for the emergence of two separate and incompatible economic systems, each supported by a different sector of society. Freemen, metics, and *perioikoi* may have been motivated to move into the town at Matala to escape the traditional social and economic conditions existing in the polis center and its surroundings. This was similar, perhaps, to the movement into medieval European towns by people fleeing the feudalistic system. In his *Laws* (705a), Plato expresses the conservative city view of life in the harbor when he characterizes the latter as "a briny and bitter neighbor. It fills a city with wholesale traffic and retail huckstering, breeds shifty and distrustful habits of soul, and so makes a society distrustful and unfriendly within itself."

In his history of Classical and Hellenistic Crete, Van Effenterre (1948:161–172) suggested that Dorian cities became more democratic beginning in the third century, that is, that the freemen (*apetairoi*) may have gained more civic rights and greater access to land. It seems possible that this trend may have been fueled in part by the economic developments described above. In addition, these two economic systems may have directly contributed to the increased social tumult recorded for Hellenistic Crete. Such internal tension may be behind decrees like the Itanos decree (Guarducci 1942:82–83, no. 3) of the early third century that compelled its citizens to swear oaths that they would not betray the city's ships or property, nor would they initiate any redistribution of land, dwellings, or cancellation of debts. In the Mesara, Polybios (4.53. 3–55.6) tells us how civil strife broke out in Gortyn, and how one group, the *neoteroi*, who were driven from the city, sought refuge in and took possession of the port towns of Matala and Lebena. Commentators (Willetts 1959:189–191; Petropolou 1985:108, 200–203) have understood Polybios's use of the term *neoteroi* literally, as referring to an age group of young men, but one wonders if Polybios was not using the term more loosely to refer to a class of economic newcomers, as in the term "*nouveau riche*" (possibly the so-called *neocretans* in Spyridakis 1992).

12

Creation of a Greek City-State (Late Minoan IIIC–Orientalizing)

L. Vance Watrous and Despoina Hadzi-Vallianou

The first part of this chapter reviews recent explanations of the rise of the Greek polis, or city-state. In the second part, cultural changes in the Western Mesara, including developments at Phaistos's better-known neighbor, Gortyn, are used to reconstruct the sequence of events that led to the creation of the Phaistian and Gortynian states. Finally, the third part is a comparative analysis of the Dorian and Minoan states and how they were formed.

The Question of Polis Formation

First, a definition of terms. What do we mean by a polis? Ehrenberg (1965) and others (for example, Runciman 1982; Raaflaub 1993) have discussed the varied development of the Greek city-states, from their early aristocratic political forms (retained in Sparta and Corinth) to a homogenous body of citizens (at Athens). We can recognize four minimal features of a Classical Greek polis, or city-state: a specialization of governmental roles, centralization of enforceable authority, permanence of governmental structure, and emancipation from real or fictive kinship as the basis of relations between citizens and officials (Runciman 1982).

It is clear from the early use of the term *polis*, however, that the concept developed over time and meant different things at different times and places. In the *Iliad* and the *Odyssey*, the word *polis* is used to mean either a city or a political community (Hansen 1993:10–12). Homer's political communities were poleis, but they were not states, in that they were relatively simple political structures headed by a hereditary ruler. By the fourth century, the Greek polis had developed into a final form that can be called a state. At this time Aristotle (*Politics* 1276a) defined the polis as the relationship that citizens shared as members of a common political and religious community. More specifically, the political form of the Classical Greek city-state consisted of elected magistrates, a council, and an assembly, drawn from the citizen body (Hansen 1996). Citizens were united in social and political matters by their participation in a system of state cults headed by a patron deity (Sourvinou-Inwood 1990). It is in this last, fullest sense that we use the term *polis* here.

For Ehrenberg (1965) the development of the polis was the transformation of an early tribal society to one governed by state institutions, that is, an organization based on a common citizenship, law, and cult, as outlined by Aristotle (*Politics* 1252b 16–53a 3). Several more-recent studies (Roussel 1976; Bourriot 1976; Donlan 1985) have questioned Ehrenberg's interpretation, because the "tribal" titles and institutions in Classical society appear to have been contemporary inventions. Strictly speaking, this may be true, but it does not necessarily follow that earlier Greek society was free of "tribal" structures, if we understand this term to refer to a society whose political structure was kinship based. Morris's historical study (1987) of the Early Iron Age burials of Athens and Argos concluded that the idea of the polis and the development of a citizen class appeared in the eighth century BC. While his analysis, based largely on funerary data, may have identified the appearance of a relatively homogenous aristocratic class, it does not convincingly establish that the (final) polis organization existed in the eighth century BC.

Athenian upper-class society in the eighth century BC seems to have consisted of competitive social groups whose political and religious lives were still organized along kinship lines. Antonaccio's studies (1994:409) suggest that eighth-century Greek cults were too varied and contradictory to be equated with any lasting form of the polis. Likewise, in her study of Olympia and Delphi, Morgan (1990:203–204, 207) has concluded that eighth-century participation at sanctuaries is best understood as competition between elite families, not states. In Athens, public urban shrines, the essential sign of a citizenry bound together by a system of shared communal cults, do not begin until the mid-sixth century BC (Shapiro 1989:5). Only then is the Old Athena Temple built on the acropolis, and the Panathenaia established.

In 1988, Snodgrass applied the systemic model of culture to Early Iron Age Greece in his book *Archaic Greece*. Snodgrass began by identifying the following archaeologically attested developments of the eighth century BC as correlates of the process of polis formation:

1. Rise in urban population (increased number of burials in cemeteries) due to a shift from pastoralism to farming, and leading to land pressure, claims of land by means of cult at outlying Bronze Age tombs, colonization, and an increased need for metal.
2. Establishment of urban and rural sanctuaries as the focus for a unified community of cult.
3. Increased foreign contacts through trade.
4. Achievement of literacy and the appearance of inscribed laws.
5. Artistic depiction of epic subjects.
6. Development of hoplite armor and tactics, which broadened the political power base of the community.

By linking the above developments with the rise of the polis, Snodgrass (1988), was able to identify both a process that explained how the Greek polis developed and the historical milestones (developments 1–6 above) for reconstructing that process. Snodgrass posited a Dark Age Greece inhabited by small, pastoralist communities, which, in the eighth century, began to make more intensive agricultural use of their land and thus grew in size. The resulting population growth stimulated the economy, and this, in turn, created the basic conditions leading to the formation of the polis. Morris (1987), however, has argued persuasively that the Early Iron Age burials of Athens were an exclusively aristocratic privilege, and thus the rise in burial numbers largely represents the appearance of an elite social class, not simple population growth. Moreover, the recently excavated Dark Age sites at Nichoria, Kavousi, and Chalasmenos have produced dietary data consistent with an agricultural, not a pastoral, subsistence base (Sloan and Duncan 1976; Klippel and Snyder 1991). Snodgrass's claim that the growing population of Dark Age Greece led to increased need for metals, which in turn stimulated foreign trade and local technology (as during the Industrial Revolution), is anachronistic. The strikingly selective use of imported metals in Greece, as elite grave goods or dedicatory gifts at regional sanctuaries, indicates that this trend is a result of an increasing stratification in eighth-century Greek society, not of any general population growth or economic revolution.

For mainland Greece, Snodgrass (1988:52–55; 99–107) correlated the shift of costly metal dedications from graves to extra-urban sanctuaries in the eighth and seventh centuries with the enfranchisement of a citizen class. Similarly, Morris (1987) has argued that the appearance of a class of citizens is recognizable in the widely varied burial types of eighth-century Athens and Argos. Both of these arguments fail to address two crucial questions. First, if the polis was formed in the eighth century BC, why did the "citizen class" choose to make its dedications at regional sanctuaries rather than at the urban shrines of its own "polis"? Second, if, as most would argue, the polis is a system of shared political and religious citizenship (Runciman 1982; De Polignac 1995:124–125), why are the monumental urban shrines that are clearly communal efforts (rather than smaller shrines that were controlled by aristocratic families), such as temples at Mycenae, Corinth, and the Old Athena Temple at Athens, only built later, in the seventh and sixth century BC? The eighth-century archaeological data assembled by Snodgrass and Morris may well signal the formation of an upper class within society, but it does not reflect the forming of the polis as Aristotle understood it.

On the other hand, Snodgrass's assertion that monumental urban shrines mark the establishment of a polis-wide cult is surely correct. His explanation that the Greeks adapted the alphabetic script for commercial purposes and to write down epic poetry might be modified, however. The earliest Greek inscriptions are, in fact, unrelated to commerce (Stoddard and Whitley 1988). Instead, they consist mainly of dedications made at sanctuaries and captions on expensive vases painted with heroic scenes. Early Greek writing occurs in contexts of public display and social competition. Greeks of the eighth and seventh centuries wrote about the Homeric poems and epic scenes, not because writing made it possible to record and communicate the epics more easily—something that could be done just as well by oral means—but because the permanent inscription publicly connected the writer with the heroic tradition and thus served to manifest his elite status. Writing and the epic tradition were not only interrelated signs of an emerging social stratification, they were themselves a means whereby this social competition was waged. Inscriptions of this sort are missing from early Cretan communities (Whitley 1997) because of the distinctive Dorian social structure and ideology (see below), but the point here is that in order to understand the rise of the Greek polis, we need to view the various developments of the Early Iron Age as operating within a social and political context (see explanations in chapters 1 and 2).

We turn now to Crete, to examine how the polis evolved in our region.

Creation of the State in the Western Mesara

Phaistos and Gortyn were both fully developed polis states by the end of the seventh century BC. Politically, they were governed by an elected board of chief magistrates, a council of elders, and an assembly (Guarducci 1935:270). These magistrates or marshals, called *kosmoi*, were chosen from different kinship groups (*startoi*) to supervise military, judicial, and religious matters within the polis (Willetts 1967:11). The earliest meaning of the verb *kosmeo*—to arrange or set in order, as in marshalling an army (*Iliad* 14.379)—suggests that originally a *kosmos* was the military leader of his kinship group, or *startos* (Jeffery 1976:189–191). Socially, Phaistian and Gortynian society consisted of the land-owning citizens, freemen, serfs, and slaves, the latter two classes responsible for farming the land (Aristotle *Politics* 1272a–1272b 23). Male citizens, brought up to take part in war and governance, were fed at the public mess hall (*syssiteion* or *andreion*), organized by companies, called *hetaireiai*, which were subdivisions of the larger kinship groups. Each citizen possessed an estate, the *klaros*, maintained by the underclass, the produce of which was collected by the state for the mess halls and the gods of the polis (Guarducci 1950:132, no. 72, line 27). In cultic terms, citizens celebrated a common body of public rituals at state-organized urban and rural temples. Physically, by circa 625 BC, Phaistos and Gortyn both possessed a fortified settlement center, monumental urban temples, a place of assembly (*agora*), a central mess hall, a storage facility for agricultural surplus, rural estates, and its own surrounding territory (*chora*).

Noncitizens, including foreigners, were laborers, farmers, craftsmen, and traders, but were not allowed to bear arms or exercise in the gymnasia. The Cretan lyric poem, the Song of Hybrias, presents this distinction in the words of a Cretan male citizen:

> My spear and my sword and that fine shield, which guards my skin, are my great wealth. For I plough with this, I reap with this, I tread the sweet wine from the vine with this, I am called master of the serfs with this. But those who dare not hold the spear and sword and fine shield, to guard their skin, all fall and kiss my knee, calling me master and great lord. (translation Willetts 1965:12)

To see how the state structure described above developed, we will examine the cultural changes taking place in the Early Iron Age society of the Western Mesara.

Population Groups and Urban/Rural Reorganization

By the Protogeometric period (if not by LM IIIC), the settlement at Phaistos stretched (continuously?) from the hill of Ephendi Christos to Chalara over an area of approximately 50 ha. The population at Phaistos consisted of three groups: Dorian newcomers, Mycenaeans who had settled in the Mesara in the LM III period, and the native Minoan stock.

Our archaeological data implies that several features of the urban Phaistian state were introduced in the seventh century. During this period the urban center of Phaistos grew in size and was reorganized. Houses in the central portion of the city were abandoned and at least two monumental temples were built in the area of the palace and on the Acropoli Mediana. Large *pithoi* found on the Acropoli Mediana point to the existence of a civic structure for collection and storage of the agricultural surplus. Funding for this new building program may presuppose a recently acquired source of wealth (see below). According to Aristotle (*Politics* 1272a 16), the state surplus for the Cretan poleis came from portions of produce derived from public lands and from the rents paid by the subject class. One portion of this produce was given to a state fund for the discharge of public service and to the gods, and another portion went to the public mess hall.

The other settlement center in the Western Mesara was Gortyn, Phaistos's natural rival (Van Effenterre 1985:175–188; Kotsonas 2002). Unlike Phaistos, the site of Gortyn was apparently first settled in early LM IIIC, since no Minoan remains have as yet been found under the Classical–Roman settlement (A. Di Vita, pers. comm., 1998). Both Plato and Pausanias (8, 53, 4) mention the tradition that Gortyn was founded by Achaeans. The late Hellenistic mythographer Conon (*History*, 36) recorded that Gortyn was established by Lakonians along with natives living in the area. Archaeological investigation at Gortyn (Di Vita 1991) has shown that during the LM IIIC period there was a settlement on the ridge of Agios Ioannis to the west of the Lithaios River (figure 12.1). By the Protogeometric period, there were three settlements at Gortyn, one situated on the Agios Ioannis Ridge, another on the Armi/Profitis Ilias Ridge to the east of the river, and a third, small one at Vourvoulitis to the northeast. Incremental growth at Gortyn and the late (SubMinoan) date of the Amyklaion's foundation suggest that the settlement may have been formed by successive groups of arrivals during the LM IIIC–Protogeometric period. During the Geometric period, the Agios Ioannis settlement possessed a fortification wall. At least two of these settlements had their own separate shrines. At Vourvoulitis there was a rectangular sanctuary that contained Protogeometric through Geometric pottery, miniature conical cups, and figurines (La Torre 1988/1989:290–298).

The open-air shrine for the western community at Gortyn on the hilltop of Agios Ioannis began in the ninth century, with an altar by circa 670 BC and shortly thereafter (circa 650 BC) a small temple. In the seventh century BC, reliefs, including a representation of a triad of two goddesses and a male deity (Artemis, Lato, and Apollo?), were associated with this temple (Rizza and Santa-Maria Scrinari 1968:49, Figure 77 and Plate IV). Votives, including weapons, miniature shields, helmets, and fibulae (Levi 1955/1956; Rizza and Santa-Maria Scrinari 1968) were probably associated with ceremonies of male initiation and childbirth (Willetts 1962:112, 201–206; Watrous 1996:81–90b). The deep *bothros* in the Gortyn temple and some of the offerings within it, that is, plaques representing sphinxes as well as a scene of the death of Agamemnon, hint at a heroic and ancestral aspect to the cult. (Agamemnon may have been a related ancestor, as his mother Aerope was Cretan [Apollodoros 3. 2. 1–2; Diodoros 5. 78]). Dedications at the shrine fell off sharply toward the end of the seventh century BC, when the city sanctuary of Apollo Pythios was constructed. Since the votive assemblages at the Gortynian shrines on the acropolis of Agios Ioannis and at Kommos consist of similar types, it seems probable that these sanctuaries belonged to separate social groups within the larger community at Gortyn.

Di Vita (1991) has taken the few Geometric sherds found at several locations in the plain be-

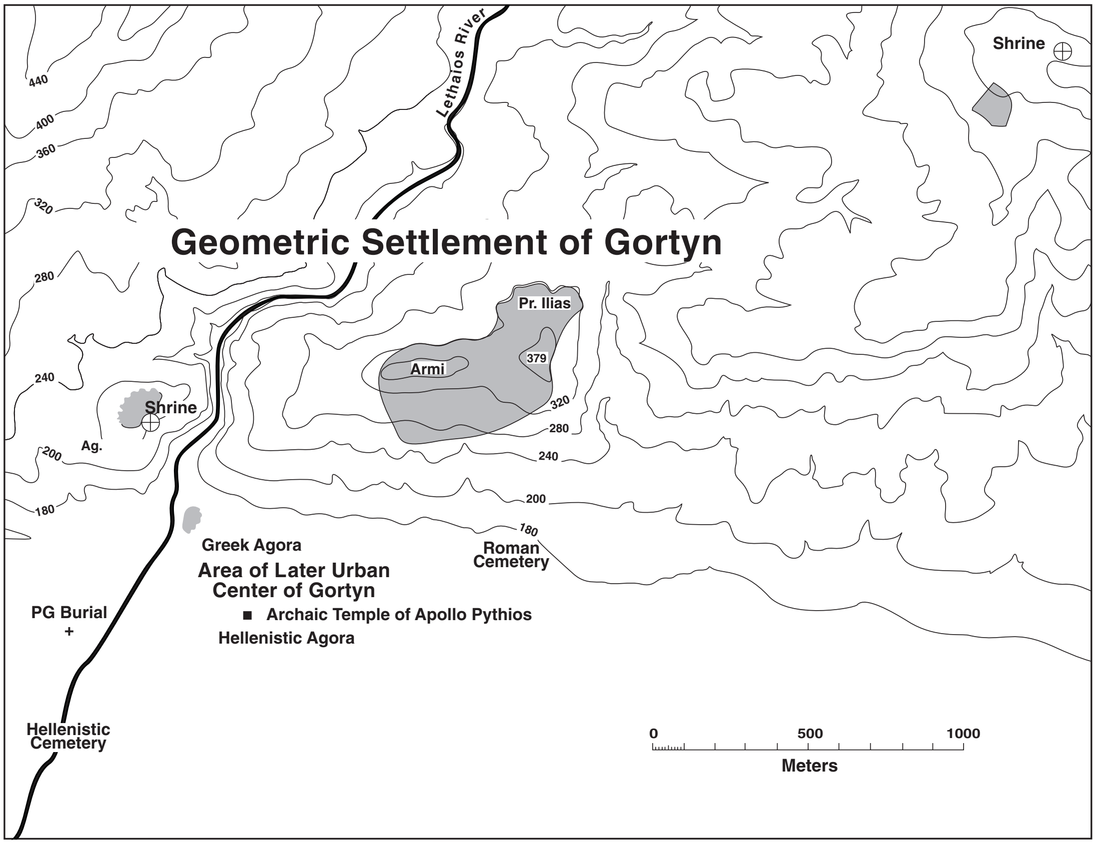


FIGURE 12.1. Map of Geometric settlement at Gortyn (after La Torre 1988/1989 and Di Vita 1991)

low Gortyn as a sign that the ridgetop settlements began to move down to the plain in the eighth century BC. By the beginning of the seventh century BC, the ridgetop was largely abandoned. In the town below, the principal temple of Gortyn, a monumental structure dedicated to Apollo Pythios, was constructed in the mid-seventh century (Ricciardi 1986/1987). According to Di Vita, Archaic Gortyn (figure 12.1) may have consisted of at least three separate population clusters, on the acropolis, around the Pytheion, and in the area of the Greek agora, where the Gortyn Law Code was displayed (Di Vita, La Rosa, and Rizzo 1984:70). Each of these clusters is likely to have been composed of separate social groups. A version of this urban spatial organization by kinship exists today in large Cretan villages, where clusters of households, each consisting of a separate patrilineal group (related though one family name), form their own neighborhood (Herzfeld 1985:56–66; Aschenbrenner 1986:49 for mainland Greece).

Rural territory also seems to have been reorganized in the late seventh century. At that time, the Phaistians established a ring of new farms (figure 11.5) at a distance of 1–2 km around their center, at the edge of the immediate agricultural catchment of the city. These farms (*klaroi*), the family estates of Cretan citizens, were founded within a relatively short period of time (circa 625–550 BC), and, hence, are not explicable solely in terms of demographic pressure. Instead, it is tempting to view these *klaroi* as part of the contemporary political rearrangement of the Phaistian polis. In this case, the new farms might have been the product of some form of land redistribution, as happened in seventh-century Sparta (Huxley 1962:40–49).

The intent of this land redistribution seems to have been the enlargement of the agricultural and political base of the newly founded Phaistian state. Prior to the mid-seventh century, each member of a Cretan phratry contributed to his own mess hall (Willetts 1955:139–140). But, by the end of the seventh century BC, this system had been modified so that common meals were centralized at a state-organized *syssiteion,* and a separate share of the produce was appropriated for state and cult purposes (Aristotle *Politics* 1272a; Dosiades *apud Ath.* 143a–b). Henceforth, serfs also had certain legal and property rights (Willetts 1955:49–51) that were outside of the traditional kinship system, but were legally recognized. In return for this status, serfs were settled on these new rural farmsteads and were expected to contribute agricultural produce to the state. The creation of a class of rural serfs was the means whereby the Phaistians were able to raise the agricultural surplus necessary for their new state institutions.

Archaeological evidence in the Mesara indicates that by the end of the seventh century BC, clusters of family groups (*startoi*) had come together in an urban community that was supported by a rural class of serfs. In the next section we examine burials, inscriptions, and cult as evidence for the social relations of our region.

Social Relations

As discussed in chapter 8, the distribution and contents of Early Iron Age graves around Phaistos suggest that the settlers consisted of different kinship groups and social classes. At Gortyn, a massive Protogeometric tholos tomb containing iron weapons and *oboloi* (Alexiou 1966) also contrasts with the simple Geometric pit burials from the same site (Di Vita 1991a:317 n. 13). Knossian burials reveal a similar pattern. Coldstream (1991:290) has pointed out distinctive "warrior burials" among the poor SubMinoan graves there. The Cretan aristocracy's exclusive right to bear arms, recorded by Aristotle (*Politics* 1264a 12) seems to have begun in the Early Iron Age.

Conflict between communities appears to have been common in the Early Iron Age Mesara. The settlements at Phaistos and Gortyn, nucleated on defensible hilltops, were both fortified. Phaistos apparently suffered two destructions by fire during the Geometric period. Weapons were a conspicuous feature in elite burials at Phaistos and Gortyn. Graves at Knossos (Whitley 1991:189, Table 12) document this trend more precisely: numbers of weapons rise in the Late Protogeometric–Early Geometric period (44%) from the SubMinoan period (29%), followed by a drop-off in the Late Geometric–Early Orientalizing period (27%). Intracommunity conflict also existed. Our best evidence for this type of social strife comes from the early Cretan laws. The oldest Gortynian laws (Guarducci 1950:1–123, nos. 1–71) often fix penalties for sources of community tension, such as theft of livestock, grazing on a neighbor's land, damage to trees, and the rules of inheritance. One long Archaic decree at Gortyn (Guarducci 1950:68–71, no. 14, lines g–p) was enacted to prevent *kosmoi,* who acted as judges between disputes, from refusing to step down at the end of their term of office. The decree also ordered that, in the event that fines were not duly collected, the *kosmos* himself should pay. It seems reasonable to infer from this inscription that the *kosmoi* were in the habit of favoring certain disputants. The fifth-century Law Code at Gortyn, a codification of earlier laws, consisted overwhelmingly of rules for resolving similar disputes over different types of property. Again, it looks as if earlier officials did not adjudicate property disputes uniformly. Of course, this social problem was not unique to Crete. One thinks of Hesiod's well-known complaint (*Works and Days* 35–36) about "gift-devouring kings" in his native Boeotia. In fact, practically all of the early Greek lawgivers—Lygurgus, Zaleucus, Solon, and Pittacus—were said to have been appointed in times of civic strife (Gagarin 1986:58–59).

Early Iron Age Cult

Early Iron Age cult in the Mesara went through three overlapping but distinct phases that are directly related to contemporary political developments.

The first phase, datable to the LM IIIC–Protogeometric period, corresponds to the establishment of rural shrines on natural boundaries, De Polignac's "sanctuaries of territorial sovereignty" (1995:32–88). Elite possessions of this period, such as bronzes, gold jewelry, and faience, were concentrated at these sanctuaries and in tombs. At Agia Triada, a shrine was established at the site immediately following its LM IIIB abandonment. Another rural shrine was founded at Kommos in the SubMinoan period.

Following the mainland Greek pattern (De Polignac 1995:32–60), these two shrines seem to have been established by their neighbors, Phaistos and Gortyn, to support their rival claims to the areas surrounding the shrines. For Gortyn, control of the Kommos area would have brought access to the coast and a good harbor. Apollo, the principal deity at the Amyklaion, was the patron of ephebes, a natural choice for a shrine on a disputed boundary. Military and male offerings at Kommos reinforce this interpretation.

The multiplicity and small size of these Geometric shrines in the Mesara suggest that their cults were under the control of certain social groups. An analogous situation is known at Athens. Members of the Eteobutadai family, who claimed to be descendants of the original royal family of Athens, held the exclusive right to serve as priestesses of Athena Polias. As Parke (1977:17–18) observes, Athenian priesthoods that remained within certain families dated back to a time when a particular cult was the prerogative of one family or clan. At Kommos, one family actually buried its dead in an abandoned Minoan house on the site in the Late Geometric period (Shaw 1981: Plate 61d).

In the *Odyssey* (3.286–290) the Lakonian hero Menelaos relates how five ships in his fleet were wrecked on a reef off the coast near Gortyn and that the crew members were left safely on shore. Since the only reef along the Mesara coastline is located at Kommos (Gifford 1995:60–61) and the founders of Gortyn were said to be from Lakonia, the *Odyssey* account sounds like a foundation myth justifying Gortynian control of the Kommos sanctuary. The incident is described as taking place "at the border of Gortynian land" (*Odyssey* 3.294), making clear the territorial claim of Gortyn. Such a practice has precedents elsewhere, as Thucydides (6.3) and Diodorus (13.108, 4) relate that the Chalcidian colonists at Naxos and the Cretans and Rhodians at Gela established an Apollo shrine marking their landing point in their new land.

The second phase of local cult practice begins in the eighth century BC, with a great increase in dedications at the cave sanctuary of Zeus on Mount Ida (Sakellarakis 1987; Boardman 1961:84; Hoffman 1997:161). Magnificent bronze shields (Kunze 1931; Canciani 1970) as well as weapons and figurines of armed warriors were left at the sanctuary during the eighth and seventh centuries. These elaborate shields and other weapons were probably items carried by young men during the famous Cretan Pyrrhic dances described by Strabo (10.465–468) and performed by pairs of contestants (Plato *Laws* 815a; *Athen.* 631c) who imitated combat moves to the music of the flute or lyre. We know from later inscriptions that Gortyn and Phaistos as well as Rhittenia, Lyttos, Axos, and Knossos took part in ceremonies at the Idaean sanctuary. At one level, the performance of these martial contests at this regional sanctuary probably served as a substitute for interregional conflict (Morgan 1990:92–105; Snodgrass 1991) and a chance for local elites to gain status among their peers by dedicating their armor.

One wonders if this trend was not also connected to the unique nature of Zeus. According to Herodotus (2.53), Homer and Hesiod were the first Greeks to describe Zeus in his role as the powerful and majestic deity responsible for all order in the world. Zeus's character in epic Greek poetry bears a close resemblance to, and may be derived from, Near Eastern gods of nature who, through their awesome strength, establish order in the world and rule over it (Walcot 1966; West 1997:14–19, 132–137, 319–324). Epic poets declared that all laws came from Zeus, and those who administer justice receive their ordinances from Zeus. In the *Theogony* (902) Hesiod gives the daughters of Zeus the names Eunomia (Well-governed), Dike (Justice), and Eirene (Peace). As Walcot (1966:45) points out, these children are meant to demonstrate that the political realm of man springs from a divine source. In Crete, Zeus held a special position as the guardian and source of laws (Plato *Laws* 624a–625a). Oaths sealing treaties between cities, for example, were sworn by Idaean Zeus and were kept in his sanctuary (Chaniotis 1988b:29–32; Polybios 28.14, 1–4). Since it was through the will of Zeus—made known by his earthly representative, Apollo—that kings were conferred the right to rule (*Iliad* 2.201–208; Hesiod *Theogony* 96), elites competed and made offerings at the shrine of Zeus in an effort to demonstrate that they enjoyed his favor, which would have created powerful political status at home.

The third phase of cult in the Mesara, dated to the seventh century, is defined by the reorganization of urban and rural sanctuaries. At Phaistos and Gortyn, large-scale temples were constructed within the city. The deliberate monumentality of these new temples was almost certainly an attempt to distinguish these buildings from earlier shrines. Dedications at these temples were similar to earlier votives, indicating that the initiation of young men had been transferred from the earlier kin-based shrines to the official city sanctuary. This step marks the foundation of true community-wide cults, what Morgan (1990:5) rightly calls the institutionalizing of cult by the state.

Cults at the old rural shrines were also rearranged. The Phaistian shrine at Agia Triada ceased, and a new sanctuary of Artemis was established at Kalamaki, in the valley immediately north of the Amyklaion at Kommos (Hope Simpson et al. 1995:369–372). The Gortynian Law Code states that "the woman should swear an oath to (the statue of) Artemis the Archer *near* the Amyklaion." If the shrine of Artemis at Kalamaki had belonged to Gortyn, there would have been no need to stipulate where the sanctuary was located, which implies that the shrine was Phaistian. The Amyklaion at Kommos was also reorganized in the seventh century BC, with the addition of new buildings and an altar. This construction of two adjacent shrines, dedicated to brother and sister deities, looks very much like deliberate cultic integration. Such an arrangement resembles the Spartan enactment of its two main cults, Apollo Hyakinthos (at Amyklai) and Artemis Orthia (in Sparta). These new cult forms marked the unification of the separate Lakonian townships into a single Spartan polis (De Polignac 1995:64–68; Antonaccio 1994:99; Cartledge 1992:54–55; Petersson 1992:110, 117–123). Gortynian use of the Phaistian sanctuary at Kalamaki also implies Phaistian access to the Amyklaion at Kommos. Such an integration of cults may therefore have been part of a larger political treaty (*synpoliteia*) worked out by the two new polis states Phaistos and Gortyn.

During the seventh century, the sanctuaries at Kommos and the Idaean Cave exhibited extensive international relations (Boardman 1961; Kopcke and Tokumaru 1992; Shaw 1998). Boardman (1970a) and Hoffman (1997) have interpreted the Assyrian iconography on the Idaean shields as a sign that Near Eastern craftsmen were resident in Crete. At Kommos, the tripartite shrine established circa 800 BC is an eastern type known in Phoenician cities (Shaw 1989). Foreign imports at Kommos also increased in the seventh century (Johnston 1993). At Gortyn, the Daedalic-style sculpture and terracotta reliefs (Rizza and Santa-Maria Scrinari 1968) from the acropolis shrine are based on eastern examples. This evidence points to an influx of foreign workers into the seventh-century Mesara. By the end of the century, the Gortynians at least had brought these activities under state control. They created the office of the *ksenios kosmos*, the magistrate who had jurisdiction over resident foreigners (Guarducci 195/1/214 g–p 2), and constructed a monumental storage facility (Building Q) at Kommos (Shaw 1986:229–231).

Seventh-century cult also served as a basis for the introduction of written laws in Crete. These early Cretan laws, known at Gortyn, derive their effective power from their placement in sacred contexts (Thomas 1995). Cretan inscriptions, for example, often begin with the word *Gods* (Pounder 1984; Gagarin 1986:133). Early laws at Gortyn come from the site of the temple of Apollo Pythios. Because writing in Crete was used to codify and reinforce the emergent social and political structure, Cretan inscriptions are predominantly legal—in contrast to the situation in Attica, where early inscriptions are religious dedications, epigrams on gravestones, signatures, and captions on vase paintings (Stoddard and Whitley 1988). The aggressive and competitive character of Early Iron Age Cretan society might explain why inscribed laws appeared so early in Cretan cities (Whitley 1997).

During the Early Iron Age, the communities at Phaistos and Gortyn show signs of conflict and social competition. In response to these conditions, in the seventh century BC the two poleis established the following institutions: a polis cult, serf-run rural estates, a public storage facility for this surplus, a central mess hall (*andreion*), governmental control over an artisan workforce and foreign trade, the public display of written laws, and official treaties between poleis. These seventh-century developments, visible in the archaeological record, mark the appearance of the polis state in the Western Mesara.

How were these institutions established? To answer this question we must turn to written sources dealing with seventh-century Phaistos and Gortyn.

Epimenides and Thaletas

Later Greek authors mention two individuals connected with the political development of the Mesara, Epimenides from Phaistos and Thaletas of Gortyn. Both men are referred to as seers, or prophets (*mantes*), and lawgivers.

Epimenides, from Phaistos (Strabo 10.4.14), was a religious and political reformer. He wrote religious treatises, including a *Theogony, Katharamoi* (Purifications), and the *Birth of the Curetes and Korybantes*. The Spartan phrase "the skin of Epimenides," referring to written oracles, suggests that he wrote on leather scrolls in the Phoenician fashion. He was also directly connected with the cave cult of Zeus on Mount Ida (FGrHist 457 F 18; Diog. Laert. 8.3), and according to a tradition recorded by Diogenes Laertius (1.110–111), he was credited with the establishment of the first temples at Phaistos. Around 600 BC, Epimenides was called to Athens to purify that city, and his reforms at Athens are said to have cleared the way for Solon's legislation (Plutarch *Solon* 12.8). As a seer, Epimenides seems to have been aware of the Near Eastern tradition of prophecy and purification (Burkert 1992:41–87). One of his techniques of purification involved the use of an onion, a method described in detail in an Akkadian document. Another of his texts was *On Sacrifices and the Cretan Constitution*. In his writings (apud Diogenes Laertius 1), Epimenides used the verb *eunoimai*—to have good laws, to be well-ordered (*eunomia*)—a concept integrally connected with the early constitution of the Cretans and the Spartans.

The second figure was the Gortynian Thaletas, who lived in the mid-seventh century (circa 665 BC). Thaletas was famous as a sage and lawgiver, who had instructed Lycurgus (Aristotle *Politics* 1274a 29). Herodotus (1.65–66) identified Crete as the source of the Lycurgan laws that brought *eunomia* to Sparta. Thaletas is said to have blamed the conflict in his own community on aristocratic families (Plutarch *Lycurgus* 4), and he composed poems that exhorted the Gortynians to be law-abiding. Thaletas was also credited with establishing the *gymnopaidia* (Plu. *de mus*. 9) in 668 BC, a ceremony consisting of dances and songs for young males and citizens. Held during the heat of the summer, these strenuous dances and songs commemorated successful battles (Petersson 1992:42–56). At the Gortynian festival of Apollo Pythios, Thaletas himself led the music on the lyre. These early festivals were meant to replace the old ritual displays carried out at family-controlled shrines and graves. As public performance, they were intended to articulate community values and establish consensus on the social custom in the polis (Conner 1987).

Thaletas's ceremonies are likely to have been introduced at mid-century or shortly thereafter, at the time of the foundation of the new temple to Apollo Pythios at Gortyn (Ricciardi 1986/1987). We know that at Gela and Thasos, the oracular cult of Apollo Pythios played an important role in the resolution of internal conflicts between rival groups within those communities (De Polignac 1995:118–127). As Morgan (1990:154, 159) has pointed out, divination was viewed as a tool to eliminate disorder and establish a common opinion on a difficult issue. At Gortyn, this connection is made explicit, since the inscribed laws and treaties were actually set up on the facade of the temple of Apollo Pythios (plate 12.1). Like Solon, Thaletas seems to have formulated specific regulations concerning the religious, economic, and political life of citizens, thereby greatly increasing the legal involvement of the state in the community.

Thaletas anchored these laws in divine authority, much like the Spartan constitution, which was established under the patronage of the newly founded cult of Athena and Zeus Syllianos (Great Rhytra, Plutarch *Lygurgus* 6) and authorized by Delphi (Tyrtaios *Eunomia* fragment 3). These divine cults provided an impartial status that protected the polis institutions from the powerful competitive groups within the city. Thaletas placed the institutions that he had helped to create—laws, official festivals, communal education, and military training—under the protection of a new oracular shrine common to the entire community, thereby binding the society into a new political union, the Classical polis.

Palace and Polis

Twice during antiquity, the community at Phaistos formed itself into a state. These two transformations afford us with an opportunity to examine these states from a comparative perspective.

Both Phaistian polities, the Minoan palace state and the Classical Dorian polis state, possessed basic institutions of similar type: a class society with a warrior elite and serfs, a literate bureaucracy, a system of economic redistribution, a surrounding territory organized into agricultural "estates," and a state religion. Many lower-class occupations, such as potters, masons, and laborers, are evident in the Minoan society of the Mesara. The Classical polis also established occupational trades strictly by class. Gortynian inscriptions suggest that there were quarters within the city designated for the noncitizen artisans and metics, and specialized craftsmen and artisans were supported by a system of rations in both periods (Willetts 1955:41–43). State cult provided a framework for initiation of the young into adult social roles (Watrous 1996:81–96; Willetts 1965:110–124).

Both polities created a state identity that distinguished them from contemporary rivals. We can see this clearly in the polis. Classical coins minted at Phaistos (Le Rider 1966:84–97 and Plates 20–24) depicted patron deities, for example, Zeus Velchanos and Talos, and bore the polis name. It is more difficult to discern the individual character of the Minoan states. Nevertheless, such differences probably existed, in distinct regional sanctuaries (for example, at the Kamares Cave versus the peak sanctuary on Mount Jouktas), in local cult practice (for example, offering of kraters and cups at Psychro versus chalices at Syme), and localized seal designs (for example, seals depicting bull leaping that E. and B. Hallager [1995] have shown are unique to Knossos).

Nevertheless, the Minoan and Dorian polities differed in crucial ways. They structured political power differently. Minoan kingship was probably both divine and hereditary. Dorian magistrates, on the other hand, were periodically elected (though from within certain clans). Thus, Classical state formation went one step further than the Minoan case in that its system effectively transcended kinship. Hence, at Minoan Phaistos architectural monumentality was reserved for the palace, whereas its Classical counterpart was the temple of the patron deity of the polis. From a modern perspective, then, we might regard the Minoan polities as protostates, although this would be somewhat anachronistic since all second-millennium BC polities in the Mediterranean and the Near East took this form. Foreign trade was carried out by the Minoan elite, but was relegated to foreigners and noncitizens in the Dorian state. The Minoan polities established colonies abroad and aggressively sought out foreign contacts for international trade. In contrast, the early Cretan poleis rarely sent colonies overseas and, in the matter of foreign trade, relied mainly on others.

How can we explain such a mixture of sociopolitical similarities and differences? Conditions preceding the formation of the Minoan palace state and the Classical polis were similar in some ways. Both states arose out of periods of urban nucleation, demographic changes, social conflict, and conditions of socioeconomic circumscription. In this respect, the political structure of both states can be viewed as solutions to internal socioeconomic conflict. These changes imply a reorganization of economic and social roles in each society (Flannery 1972). On the other hand, Minoan social stratification seems to have been formed out of a combination of earlier socioeconomic pressures, while the class structure of Early Iron Age Crete was the result of the Dorian conquest.

Both states appear to have been formed relatively quickly, perhaps within the space of two generations in each case. Epimenides and Thaletas are credited with the introduction of several of these innovations that transformed their communities into city-states. Certain innovative features—the urban temple, *andreion*, *klaroi*, and written laws—of the new polis seem so interrelated functionally that it seems reasonable to assume they were introduced as parts of a single vision, that is, of a community that was harmoniously governed (*eunomia*). Phaistian and Gortynian state creation would seem to support the current importance archaeologists (Brumfiel 1992) place on the role of agency in the process of state formation. Minoan state formation also looks like a political solution to pressing internal problems (chapter 9). Similarly, the creation of the Classical polis state was, to a great extent, an act of integration, of finding ways to transfer existing social institutions—that is, classes, *kosmoi, hetaireiai,* cult ceremonies—into a new context. The solution was a citizen-based society supported by a centralized economic structure and defined by religious ceremonies, such as the *gymnopaidia,* or the Phaistian *Ekdysia*, held at the urban temple.

A major problem in the process of state formation is creating a leadership that will not favor its own kinship group. This problem was solved differently in the Minoan and Classical cases. In Middle Minoan I Phaistos, the ruler was probably regarded as divine, and thus elevated above his social peers. The Minoan solution may have been imitative of contemporary Near Eastern practice. But, why was this not the solution in the Early Iron Age, when kingship was still the norm in the Near East? In contrast to the Minoan case, the Dorian communities rejected the concept of kingship because it was inappropriate for their own social structure. The Classical Cretan polis was, in effect, an agreement, a balance, achieved among competitive family groups of comparable social standing within the community. The uses of literacy illustrate how distinct one aspect of the two state formation processes could be. Minoan writing was, as far as we know, first used as a means to control economic systems of redistribution, whereas in the Early Iron Age, literacy was adopted to institutionalize rules (laws) governing the rights of social groups and individuals within society.

Finally, is it possible that the existence of the Minoan palace states had an effect on the later formation of the Classical polis? There is certainly abundant evidence that the Early Iron Age inhabitants of the Western Mesara knew about the Bronze Age past. Descendants of the Minoan population lived in the region, and, according to Aristotle (*Politics* 1271b), were still following their ancient laws. Physical remains of the Minoan past were visible at many local sites. In LM IIIC the Dorian newcomers knew to place their shrines precisely on top of the administrative centers at Kommos and Agia Triada. At Phaistos, Geometric houses were literally constructed upon Bronze Age walls. At Gortyn, the builders of the seventh-century temple on the acropolis of Agios Ioannis used nonlocal gypsum blocks (probably from a Minoan building) for the lower wall blocks of the temple (plate 12.2) and its interior *bothros,* as if to publicly proclaim a continuity of worship with the past. Sanctuaries at the Kamares and Idaean Caves were used continuously from the LM period into the Early Iron Age.

While the political structure of the Phaistian polis was a response to specific seventh-century realities, certain of its social institutions look as if they were grounded in the Minoan past. For example, when a monumental temple was constructed at Phaistos in the seventh century, it was placed physically on top of the Minoan palace, as if it were meant to be understood as its successor. The Classical system of storage and redistribution and the creation of rural estates managed by resident serfs have clear Minoan precedents. In addition, the system of male and female initiation closely resembles Minoan customs (Koehl 1986; Marinatos 1993:123; Watrous 1996b:106–111). Aristotle also records a belief that the Cretans' system of *syssiteia* and their separation of military and farming classes dated back to the reign of Minos (*Politics* 1329b). Likewise, Koehl (1997) has recently argued that the Cretan *andreion,* or mess hall, can be traced back to the Minoan period. Two Cretan political institutions, the *gerousia* (council of elders) and the *basileus* (political leader), are non-Indo-European words that have been identified in the Linear B tablets (*ke-ro-si-ja* and *qa-si-re-we*), suggesting to Weingarten (1997:530) that the latter term is Minoan in origin.

Finally, it may be significant that Epimenides was unique among Archaic Greek seers in that his prophetic knowledge was said to extend into the *past* (Aristotle *Rhetoric* 3.1418a 21). Diogenes Laertius (1.112) reports that he wrote a letter to Solon describing a constitution that Minos had drawn up for the Cretans. One of his treatises was titled *On Minos and Rhadamanthys* (Diels-Krantz 1934:27–37; Diog. 1.112). One cannot help suspecting, therefore, that Epimenides and Thaletas may have modeled some of their reforms on known Minoan practices and justified them to their Dorian peers—who regarded themselves as "returned Herakliadiai"—as a renewal of ancestral custom.

13

Mesara Romana (150 BC–AD 400)

L. Vance Watrous and Despoina Hadzi-Vallianou

THIS CHAPTER CONCENTRATES ON the Late Hellenistic–Early Roman settlement and "romanization" of our survey area after the destruction and abandonment of Phaistos circa 150 BC. Our treatment is relatively brief, because in the Roman period the center of power in the Western Mesara moves to Gortyn, which is not in our survey area. Hence, this chapter focuses exclusively on our own survey area, since a comprehensive history of settlement in the Western Mesara during the Roman era is both beyond the limits of our field project and would require a volume in its own right.

Late Hellenistic–Early Roman Settlement and Trade

In the mid-second century BC, Phaistos was destroyed by Gortyn (Strabo 10.479), and its lands became part of Gortynian territory (Strabo 10.14.1). Less than a hundred years later, in 66 BC, Crete itself was conquered by the Romans, and in 27 BC Gortyn became the capital of the Roman province of Crete and Cyrenaica. Thus, our survey area was transformed from an autonomous polity to a marginal area, first within the Gortynian polis (circa 150–66 BC) and then within a Roman province. Roman rule of the Mesara (66 BC–seventh century AD) brought internal peace as well as the presence of a Roman proconsul who governed the island. Historical sources (gathered by Sanders 1982:6–11) indicate that Roman Crete was relatively trouble-free and thus the duties of the Roman governor at Gortyn were mainly judicial. Local Cretans served on the Provincial Council, called the Koinon, like the earlier Hellenistic pan-Cretan council. Four officials (*kosmoi*) on the council were appointed annually. Inscriptions indicate that the duties of the Koinon included the issuing of coinage, supervising public buildings, and organizing games in honor of the emperor. Its members were wealthy Cretan men, such as Soarchus of Gortyn, who built a new aqueduct for his hometown (Guarducci 1942:IV, 330). Since the duties of the Koinon were largely honorary, the internal political affairs of the region were probably in local hands, as in the pre-Roman period. Locals paid taxes to the Roman authorities, perhaps in the form of a tithe, as had already been the case for subject Cretan communities during the Hellenistic period.

Despite the Gortynian and Roman conquests, the population of our survey area appears to have remained fairly stable. Within the survey zone (table 13.1) there were forty-two Early Roman settlements as opposed to thirty-eight Hellenistic settlements. Thirty of the thirty-eight Hellenistic settlements continued in use during the Early Roman period. The percentage of continuously occupied sites in the Hellenistic–Roman period is thus about 80%, which makes a clear contrast with the Nemea area in the Peloponnese (Alcock 1993:57, Table 4: 29%) and with Melos (25%). Moreover, six of the seven sites in our survey area were abandoned for a specific historical reason, that is, they were located in the immediate vicinity of Phaistos (figure 13.1). The seventh site (**36**) probably went out of use because of the nearby foundation of the large settlement (**35**) close to Agia Marina.

The total number of settlements, including the foundation of three large new Hellenistic settlements, near Kamilari (**75**), Phaneromenoi (**26),** and Agia Marina (**35)** as well the continuing expansion of Matala, may signal an overall increase

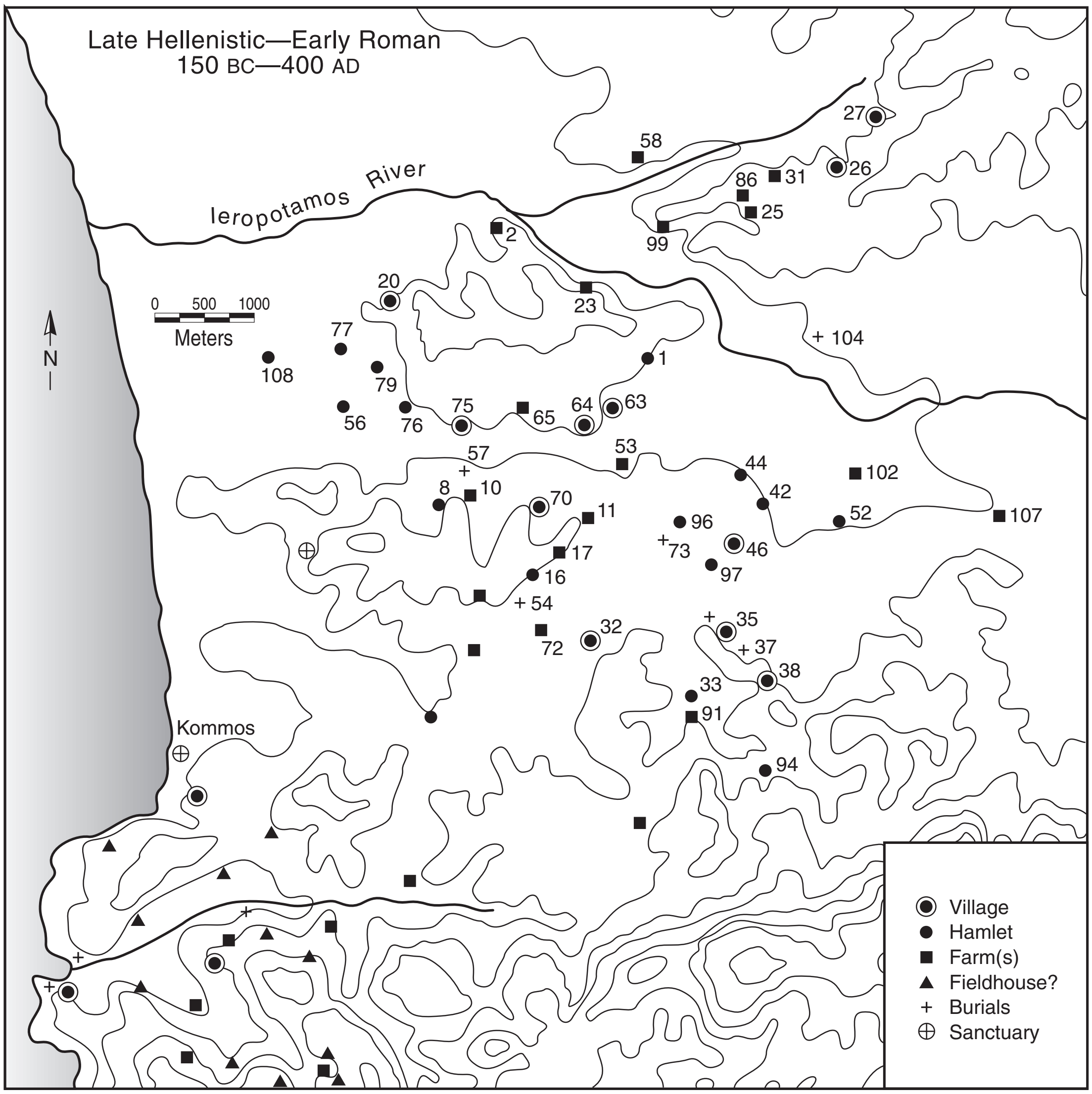


FIGURE 13.1. Late Hellenistic–Early Roman sites in the Western Mesara. Kommos survey sites unnumbered.

in local population. Six Early Roman settlements (**33, 38, 52, 63, 72,** and **102**) were new in this period. Three sites—**52, 102,** and **107**—were built on top of the present alluvium of the Levadia, and three others—**33, 38,** and **91**—were in the southern foothills near Sivas. Scattered houses were also built south of Kalivia. By the Early Roman period, Matala and its extensive suburbs were at least 1 km^2 in extent (Hope Simpson et al. 1995:399) and became the largest population center in the Mesara west of Gortyn.

Early Roman settlement in our area was also more widely dispersed. Some new settlements (**33, 52, 63, 72, 91, 102,** and **107**) were situated farther from Phaistos than their Hellenistic successors (on average 2.9 km from Phaistos as compared to 2.3 km for the Hellenistic period). As noted already in chapter 4 (table 4.2), Early Roman rural sites were concentrated on relatively poor land (Class III and III/IV) except for those on top of the present alluvium of the Mesara Plain (sites **52, 102,** and **107**). In the Agio Pharango Valley, ten farmsteads continued into the third or fourth century AD (Blackman and Branigan 1977:76). Several farmsteads within our survey area possessed large stone presses (plate 13.1), suggesting that they were production sources for the marketing of oil. Another

TABLE 13.1. Late Hellenistic–Early Roman sites in the survey area

Sites	Size	Land	Function	New
1	Small	I/II	Settlement	—
2	Small	I/II	Hamlet	—
8	Small?	II	Settlement	—
10	Small	II	Hamlet	—
11	50 x 50 m	II	Farm	—
16	70 x 175 m	II	Settlement	—
17	25 x 30 m	II	Farm	—
20	160 x 195 m	I/II	Settlement	—
23	10 x 40 m	II	Farm	—
25	85 x 30 m	II	Farm	New
26	300 x 200 m	II	Settlement	New
27	160 x 200 m	II	Settlement	?
31	80 x 80 m	II	Farm	—
32	220 x 150 m	II/III	Settlement	New
33	140 x 65 m	II	Farm/villa	New
35	600 x 800 m	II/III	Settlement	—
37	—	—	Graves	New
38	190 x 100 m	II/III	Farmstead?	New
42	130 x 110 m	I/II	Hamlet	New
44	60 x 135 m	I/II	Farm	—
46	180 x 300 m	I/II	Settlement	—
52	Small	I/II	Settlement	New
53	Small?	II	Hamlet	—
54	—	—	Tombs	—
56	50 x 130 m	II	Farm	—
57	—	—	Tombs	New
58	?	II/III	Settlement	—
63	100 x 110 m	II	Settlement	New
64	250 x 200 m	II	Hamlet	New
65	40 x 50 m	II	Farm	—
70	250 x 90 m	II/III	Hamlet	—
72	60 x 60 m	I/II	Farm	New
73	—	—	Graves	New
75	280 x 320 m	II/III	Settlement	New
76	70 x 80 m	II	Farm	—
77	40 x 110 m	I/II	Farm	—
79	100 x 100 m	II	Hamlet	—
86	50 x 20 m	II	Farm	—
91	70 x 40 m	II/III	Farm	New
94	130 x 60 m	II/III	Farm	New

Continued on next page

TABLE 13.1. Late Hellenistic–Early Roman sites in the survey area *(continued)*

Sites	Size	Land	Function	New
96	130 x 160 m	I/II	Farm	—
97	150 x 165 m	II/III	Hamlet	—
99	Small	II	Farm	—
102	Small	I/II	Farm	New
104	Large?	—	Cemetery	—
107	Small	I/II	Farm	New
108	Small?	I/II	Hamlet?	New

farm, with a massive oil press (plate 13.2), was located at the edge of our survey zone approximately 500 m south of the Sivas tholos tombs (Early Minoan site **109**).

Immediately following its destruction by Gortyn, Phaistos was largely abandoned. Following the Roman takeover of the region, parts of Phaistos were gradually reoccupied. Investigators have noted "modest houses" and early(?) Christian graves north of the palace, a farmhouse with a large *trapetum* at Agia Photia (Levi 1981:633), a third- or fourth-century farmstead with olive presses in Chalara (Levi 1967/1968:77–78; Mercado 1974/1975:123, 136), and a bathhouse at the south edge of Agios Ioannis (Sanders 1982:161). Roman levels probably exist beneath the village of Agios Ioannis, as our survey found Early Roman occupation debris scattered immediately west and south of the village. Apparently Phaistos became one of the many villages in the region during the Roman period. Strabo (10.4, 14), for example, speaks of Phaistos in the same way as Rhytion, as a *kome*, or village. As might be expected, following the demise of the settlement at Phaistos, the adjacent cemetery sites also went out of use. The local loss of political independence is clearly reflected in the new, acephalous settlement hierarchy (figure 13.2).

While most of the Hellenistic sites in the Phaistos area remained unchanged in the Early Roman period, several rural developments were related to specific historic events of this period. Six new village-sized settlements (figure 13.1), several quite large, for example, site **35** (14 ha in size) and site **75** (8.7 ha in size), were established. New hamlets, sites **94** and **52**, were also founded. The immense size of these new settlements suggests that they represent the population displaced from Phaistos. Equally significant is the fact that these new sites, and others (**33, 38,** and **91**), were situated away from the most productive land. Such changes reflect the local population's loss of political autonomy. Intensive settlement and dependence on restricted areas of poor soils also seems to have precipitated a period of soil erosion (see chapter 4).

Loss of political autonomy brought significant changes in local land use. Small rural farmsteads, the backbone of the Hellenistic Phaistian polis, began to disappear (figure 13.2). Some local land may have passed into the hands of absentee landlords, probably resident in Gortyn, since fields with off-site pottery (figure 13.3) within our survey zone also decreased generally by one-third (Hellenistic, 208; Early Roman, 134). Local use of land appears to have been heavily concentrated around large settlements, that is, **26, 27, 35,** and **46**. In areas where Hellenistic sites had continued into the Roman era, the drop in off-site pottery is particularly striking. One would expect local exploitation to have remained consistent in these areas, yet the lack of off-site pottery suggests otherwise. This land seems to have been under Gortynian control. For example, the rich fields of the Levadia, were unoccupied, repeating the pattern of the Late Minoan III period (chapter 10). Well-watered land such as this may even have been converted into grazing areas belonging to the Gortynian state.

Farms, hamlets, and villages made up most of the local settlement. Farm and hamlet sites produced Black Glaze, cooking ware, spindle whorls or loom weights, lamps, stone presses,

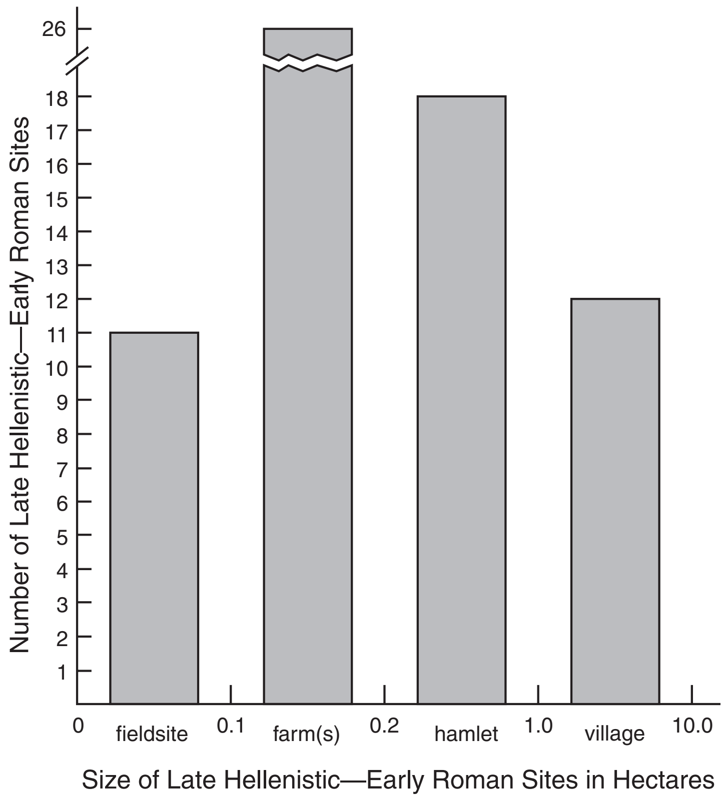


FIGURE 13.2. Late Hellenistic–Early Roman settlement hierarchy in the Western Mesara

Roman slipped (plates E.21, bottom right; E.22, middle row, left and right) and other imported wares (plate E.19, upper row, left and right), roof tiles, local amphorae, beehives, *pithoi,* and basins. While Roman period hamlets were situated near good land and a water source, farms were often located in marginal areas, typically consisting of a combination of level land and slopes, and usually were some distance from a known water source. One would expect that, given their size, local villages would have been near water and good land, but the opposite was the case. Village-sized settlements were located at least 3 km from Phaistos and on dry, Class III land. The fact that local site size no longer correlated with land quality points to the politicized nature of settlement change during this period. Villages sites, however, did produce evidence of brick-built buildings and a greater variety of Roman slipped wares than the smaller settlements.

During this period Gortyn and Matala became the principal population centers in the Western Mesara. Under its Roman rulers, Gortyn took on the monumental character of an imperial capital (Di Vita, La Rosa, and Rizzo 1984:90–110). The city possessed three theaters, an amphitheater, two nymphaea, a praetorium, baths, and a circus. Temples were constructed for the deified Augustus (Di Vita 1984) and Isis/Serapis. At Gortyn, the cemeteries of the Roman period encircling the city indicate that the settlement also reached its greatest extent at this time (Di Vita 1984a:72, Figure 36). Strabo (10.4, 11) records that the circumference of Gortyn was 50 stades, or approximately 66 ha in extent. Sanders (1982:156) has estimated that the total area of the Roman city was approximately 150 ha.

Matala continued to grow during the Early Roman period (Hope Simpson et al. 1995:399). Together with its suburbs, Roman Matala achieved its maximum size, about 15 ha. Outside of our survey area a number of Roman sites in the Western Mesara have been identified by Sanders (1982:155–162), including Pobia, Peri, Platanos, Moires, a large building with marble columns at Tymbaki, a village at Plora (ancient

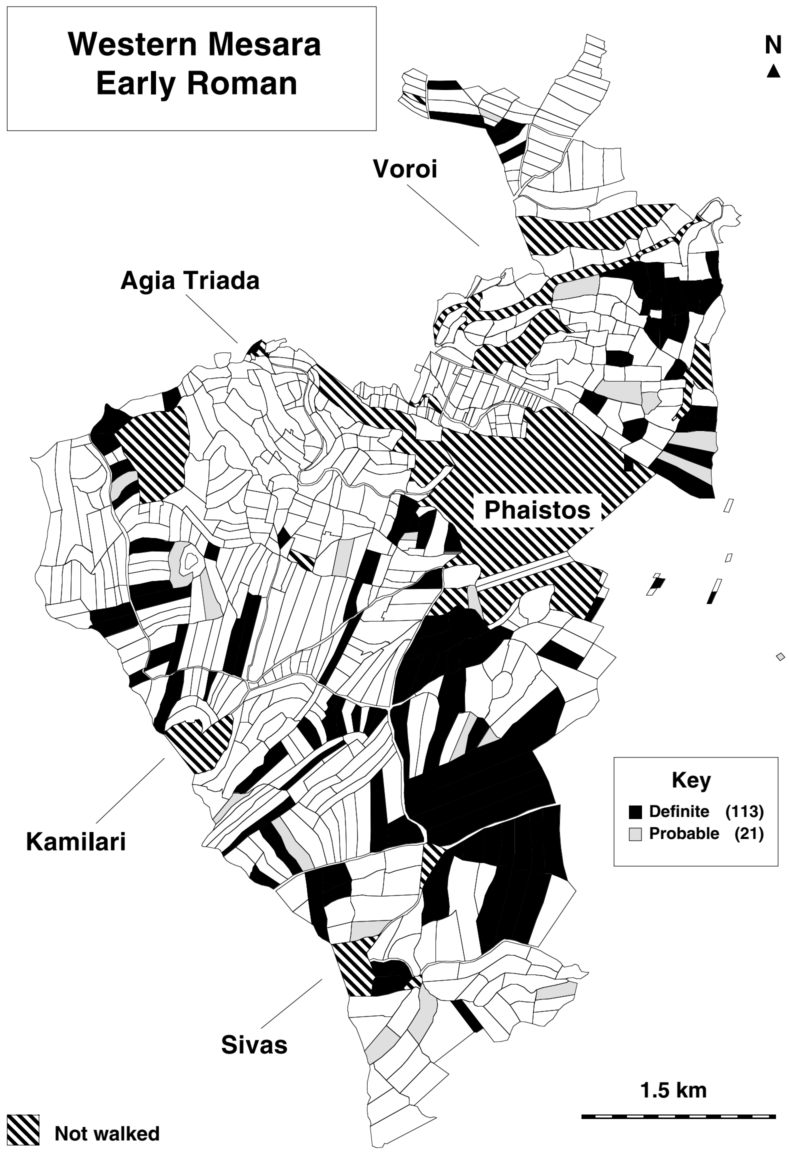


FIGURE 13.3. Off-site Early Roman pottery in the Western Mesara

Pyloros), and villas at Zaros and Nivritos (figure 11.2). In the Asterousia, sites existed at Miamou, Vassilika Anogeia, and Antiskari. Along the south coast, Roman sites are known at Trypeti, Kaloi Limenes, a village-sized settlement at Lasea, and a sanctuary of Aesclepius at Lebena.

Under the Pax Romana, the Western Mesara expanded its export economy. Our survey found imported North Africa wares at sites **20, 26, 27, 32, 35, 44, 46, 64, 75, 86,** and **102**. Imported pottery found on our sites testifies to the Western Mesara's commercial connection with Cyprus, Anatolia, Rhodes, Kos, Antioch, Italy, and perhaps Spain. Cretan wine became a major export in this period. Production sources for amphorae, first set up in the Hellenistic period, are known at Matala, Gortyn, Ierapetra, and Palaiochora. Cretan wine amphorae have been found as far away as Egypt, the Adriatic (Ancona, Cremona), Sicily, Italy (Pompeii and Herculaneum), and France (Empereur, Marangou, and Papadakis 1992; Marangou 1993:176–182; Chaniotis 1998a). Mesara wine was exported to Italy, taking advantage of the great Alexandria–Rome trade route carrying grain via Crete to the Roman port of Puteoli (T. Pena, pers. comm.).

Olive oil from the Western Mesara was exported in considerable quantity in the Roman period. Within our survey area the wide dispersion (figure 13.1) of Early Roman farms equipped with large stone oil presses (plate 13.1) point to an intensified local production of oil. Mattingly (1988b:138–140, 153–155) has noted a similar investment of labor begun by the urban elite in Libya during the first century BC. According to Strabo (10.475), Crete was a two-day sail from Cyrene, and already by the Hellenistic period Cretan amphorae filled with wine and oil were being traded to Berenice in Libya (Fulford 1989:174, Figure 5). This trade continued to increase into the third century AD (Fulford 1989: 177, Figure 8). Hadzi-Vallianou's excavations (Huber and Varalis 1995:1027) at Matala have also uncovered evidence for local ceramic production from the fourth to the sixth century AD.

While the centers at Gortyn and Matala have produced evidence of large and expensively decorated buildings (Di Vita 1984), other sites (for example, Zaros and Tymbaki) have yielded the luxurious materials that might be found at a Roman villa. Only two sites within our survey area produced expensive raw materials associated with a Roman villa (Alcock 1989a), namely, a single fragment of marble wall slabbing at site **33** and a cut block (reused?) from the small site **107**. Along with Gortyn and Matala, several of our survey sites (for example, sites **26**, **32**, **35**, and **46**) grew to village size during the Early Roman period. Demographic nucleation may have been a gradual trend extending over the course of the Early Roman period, since at least fifteen of our thirty-seven sites have produced evidence of occupation continuing into the third century AD.

ROMANIZATION OF THE MESARA

Writing about the countryside of mainland Greece during the Roman period, Alcock (1993) described some of the consequences of Roman rule—an overall drop in regional populations, demographic nucleation, the creation of large estates (often in the hands of absentee landlords), and the centralization of rural cults.

To what extent does the Western Mesara during the Roman era conform to this pattern of "romanization"? The answer seems to be: only slightly. Roman population levels in the region (see above) did not drop; if anything, they show a moderate rise. While Gortyn, as the provincial capital, clearly expanded in this period, it was not at the expense of the rural countryside, which continued to be densely settled. In fact, new sites established in formerly unoccupied areas suggest that both the local urban and rural population grew during the Roman period.

Based on circumstances documented elsewhere in the Roman empire, Sanders (1982:23) suggested that the string of Roman-period settlements (figure 11.2) between Pobia and Rhytion in the central Mesara were the centers of large estates owned by absentee landowners. Bowsky (1999) has discussed the group of elite Roman and Romanized families living at Gortyn that might have included such landowners. These families drew their wealth from commerce and contributed to the new urban construction of Gortyn and Lebena during the first and second centuries AD. Nonetheless, the archaeological data to support Sanders's identification of these sites as estates is lacking, because we know little about Roman period sites in the Central Mesara or their geographical dispersion. In our own survey area, however, the Early Roman pattern of rural settlement does not point to the creation of large estates. Distances between rural sites, indicative of the size of individual landholdings, did not increase in the Early Roman period, and the continuity of local settlement during the Early Roman period also implies little change in land tenure from late Hellenistic times. No obvious signs of land confiscation, as occurred elsewhere in Greece (Alcock 1989a:7–8) can be found in our area. Some of the land in the Western Mesara may have been owned by the urban elite at Gortyn, but this transference of ownership likely took place after circa 150 BC when Gortyn assumed control of Phaistian territory. The two local survey sites (**26** and **27**) that possessed extensive Roman structures may have been the centers of sizeable Gortynian estates, but these sites seem exceptional rather than typical of our area.

On the other hand, local cults in the Western Mesara do show signs of considerable change following assumption of Roman control. The shrines of Zeus Velchanos at Agia Triada (**2**) and

Demeter(?) at Kamilari (**6**) were already deserted soon after the destruction of Hellenistic Phaistos. In the Agio Pharango, the shrine of Aesclepius continued into the first century BC (Blackman and Branigan 1977:74). The cult of Artemis at her temple near Kalamaki ceased in the first century AD (Hope Simpson et al. 1995: 370) while the Amyklaion at Kommos went out of use by the mid-second century AD. While several of these shrines may have been closed by the Gortynians after their destruction of Phaistos, the larger sanctuaries at Kalamaki and Kommos seem to have ceased under Roman rule, probably to be replaced by the newly established metropolitan shrines at Gortyn. More closely identified with Gortyn, the sanctuary of Aesclepius at Lebena was remodeled in the second–third century AD and continued to the end of the fourth century, when a Christian basilica was constructed at the site (Di Vita 1984). As in other parts of Greece, Roman rule did result in the transformation and centralization of cult activity in our region.

For the most part, however, the Early Roman Mesara seems to have differed markedly from the contemporary mainland. Alcock (1993:33–75) lists the conditions that led to the abandonment of the countryside on the mainland: (1) population loss through wars, (2) an increasing economic polarization and stratification in society, and (3) the arrival of Roman businessmen, colonists, and veterans who are thought to have became dominant landowners, and (4) the establishment of large estates. The Mesara does not produce evidence for conditions 1, 3, and 4. One might also express a certain skepticism about Alcock's claim for large rural estates on the mainland, since their existence can only be indirectly inferred (Alcock 1999:75). On the Greek mainland it seems more likely that it was the development under the Roman empire of a new economic and social system, concentrated in the cities, that motivated rural settlers to move off of their land. This same powerful process of "ruralization" has inexorably transformed the countryside throughout Greece since the introduction of an industrialized economy in the early twentieth century.

Why was Early Roman Crete so different? In contrast to the mainland, the Cretan pattern of settlement hints that the transition to Roman control on the island was smooth. On the mainland, the Romans seemed to have superimposed a sociopolitical hierarchy on a society that had possessed a large class of landowning citizenry. The result was an economic and political disenfranchisement of this landowning class. In Crete, however, the establishment of Roman rule caused far fewer changes, since the Dorian poleis were already hierarchically structured and ruled by a relatively small social circle. The elite social structure of Crete was a perfect vehicle for Roman rule. Within our survey area, for example, by the time that the Romans assumed control, the local population had no experience with self-governance, and Roman rule may have left their lives unchanged. The same was true for the governing Gortynian elite, since under the Roman system (Bowsky 1999), they kept most of their former power.

Society in the Mesara appears to have peaceably transformed itself during the Early Roman period, accepting the superimposition of a governmental authority and official Roman customs. In the early first century AD Strabo (10.4, 22) described the traditional Dorian structure of government on Crete, and then remarked that not many of these political institutions remained in his own day, having been made obsolete by the issuing of Roman edicts. Dorian social practices, concerning male initiation, marriage, and kinship relations, seem to have survived longer in Early Roman Crete, at least into the third century AD, at the time that rural sanctuaries, where these traditional practices were celebrated, began to be abandoned (Watrous 1996b:57–96).

The end of our period comes after the third century AD, when both urban and rural settlement throughout the Western Mesara began to recede. The acropolis of Matala was fortified, probably by the end of the fourth century, and was abandoned soon thereafter. Finally, after the severe earthquake in 365, Gortyn also sharply contracted (Myers, Myers, and Cadogan 1992: 100) in size.

14

A Province under Byzantine, Venetian, and Ottoman Rule, AD 400–1898

Dimitri Tsougarakis and Helen Angelomatis-Tsougarakis

THIS CHAPTER FOCUSES ON historical and archival documents that directly describe the social, political, and economic conditions of the Western Mesara during the Byzantine, Venetian and Ottoman periods. Archaeological data from the survey is combined and discussed with information gained from settlement records. Oral traditions describing the economic and social history of the nineteenth and early twentieth centuries are discussed in chapter 6.

The chapter consists of five sections. The first is a brief overview of events in the region, which is meant to provide the reader with a historical framework. We begin this section with a discussion of the rise of Christianity because of its great cultural importance. The second is an administrative history of the region, in which we give an account of the status of the province within the general administration of Crete. The third deals with questions of population, settlement patterns, and land use. In this section the archaeological data from the survey is useful, especially for the Late Roman and Byzantine periods. The fourth section is a study, based on written documents, of the regional economy of the province. And, the fifth is a treatment of the monasteries and their economic and cultural roles within the Western Mesara.

HISTORICAL OUTLINE

The Rise of Christianity

Christianity has played an important and continuing role in Cretan history. According to local Cretan tradition, the evangelization of the island was carried out by St. Paul himself during his fourth and last mission between AD 63 and 67. St. Paul first saw Crete when he was transferred as a prisoner to Tome in AD 61. During that voyage the ship carrying him was forced by adverse winds to anchor at the southern Mesara port of Kaloi Limenes (Acts 27.7), but it is unlikely that Paul was able to preach to anyone at that time. After his fourth mission, St. Paul left his beloved disciple Titus to organize the Cretan Church. The Church of Crete is thus considered an apostolic see, as established by St. Paul, while Titus is considered the first archbishop of Crete and the patron saint of the island. The seat of the archbishop was established at the capital city of Gortyn (figure 14.1), and eventually, eight more bishoprics were founded in other cities of the island. The impressive cathedral church of St. Titus in Gortyn, the remains of which stand today, was probably built during the seventh century.

From every point of view—religious, cultural, artistic—the fifth and sixth centuries were a real turning point in the history of Crete. This was the time when Christianity finally triumphed and when the great majority of the basilica churches were built. Life would be quite different from that of the past, and the archbishop of Crete was to be a leading figure in the difficult years ahead. In the Mesara, the area of the capital Gortyn and the seat of the archbishop, this process was even more pronounced. Indeed, from the fourth century onward the Christian clergy, particularly the bishops, had started to acquire a new role in the society of the Late Roman world. Starting with the reign of Constantine, when Christianity was accepted as a legal religion, and later when it became the only official

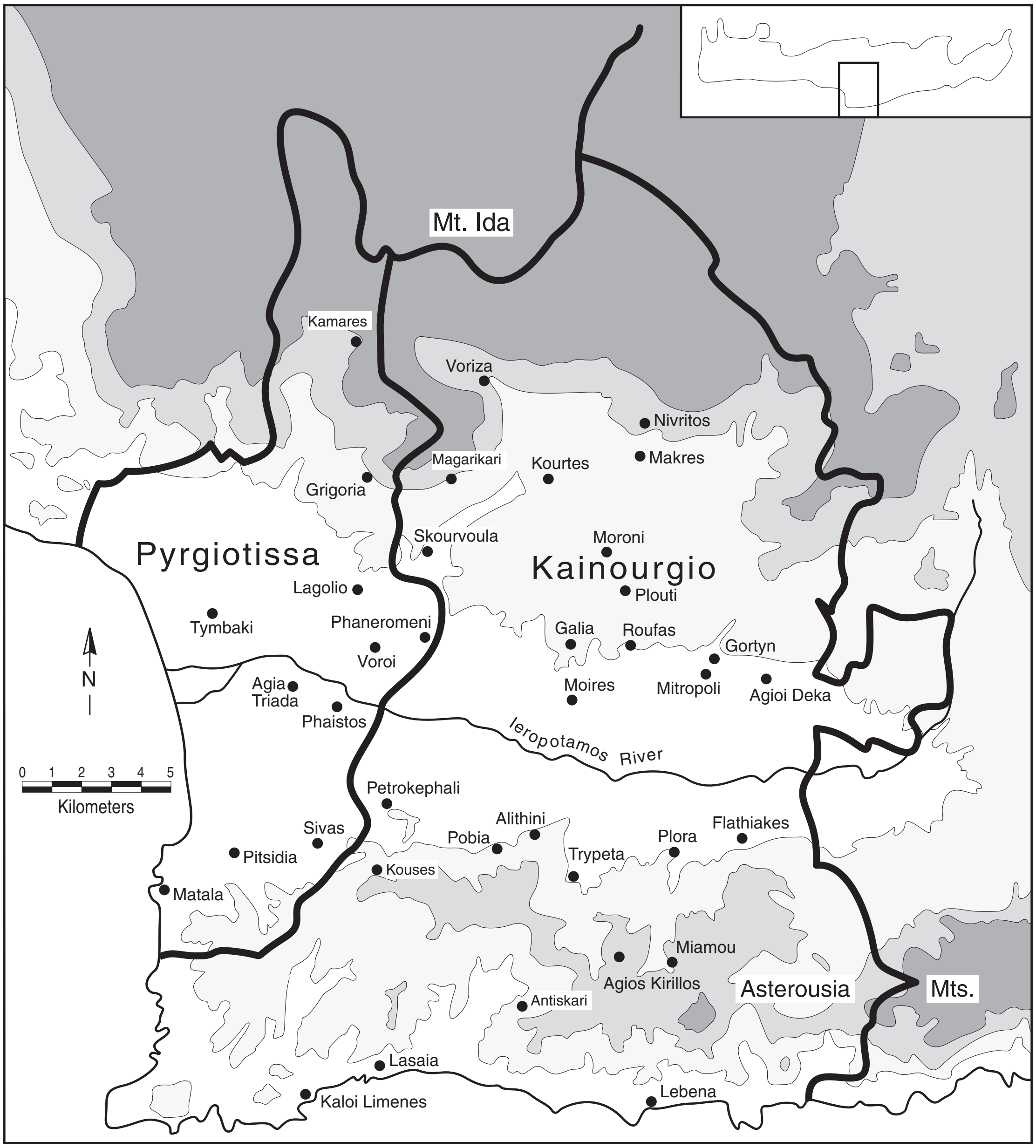


FIGURE 14.1. Map of the Western Mesara

religion, the church hierarchy in the provinces was gradually incorporated into the civil administrative structure. The bishop, already a leading person in the congregation of his polis and its region, slowly became an important figure in the civic administration as well.

This transition was facilitated by the gradual decline in importance of the traditional administrative bodies, such as the city councils and the provincial *curia*, and of the social class of the *curiales* themselves (see Chryssos 1981 and Tsougarakis 1988a:159–164). The bishops, therefore, not only became part of the imperial administrative machinery in the provinces, but also later acted as virtual representatives of their city and its inhabitants. An archbishop such as the archbishop of Crete, head of an Apostolic See, seated in the capital city of Gortyn and presiding over a local synod of ten to twelve other bishops, was naturally an even more significant person. Before long he was an equal to the provincial governor of the island and in certain cases he seems to have had precedence over him. In other words, by the sixth century, parts of the civil administration of the province seem to have passed to the archbishop, or, the civil administration was shared concurrently by the provincial governor and the archbishop.

We can see this transition through the involvement of the church prelates in affairs that have little or nothing to do with issues of the church. In Gortyn the archbishop was more than once commemorated in inscriptions recording public works, either alone or along with the provincial governor. So, in an inscription on a marble epistyle found in the ruins of a church near the temple of Pythian Apollo in the area of Gortyn we read: "At the time of Theodoros, the most holy archbishop, and Helios, the illustrious proconsul, this wall was renovated auspiciously in the consulship of the most illustrious Flavius Apion, in the second year of the indiction" (that is, AD 539 [Bandy 1970:58–61]). That the wall in question may not have been a church wall (Bandy 1970:60) makes the mention of the archbishop even more indicative of his position, and more so as his name precedes that of the provincial governor. Two more inscriptions of the sixth century, probably dedicatory, from the area of Gortyn mention a bishop in connection with works carried out during the time he held office (Bandy 1970: nos. 27–28, 29]. What we see, therefore, is that the bishop or archbishop is used together with the local governor (or gradually replaces him) in the commemoration of public works, indicating not only the degree of incorporation of church prelates into the local administration, but probably also the de facto assumption of civil authority on their part. In the eighth century the *Life of St. Andreas,* archbishop of Crete, presents the saint as the principal protector of the population of Crete against not only pestilence and drought, but against Arab attacks as well (Papadopoulos-Kerameus 1898:176–177). The natural exaggerations of the religious text may in some part reflect the actual position of the prelate in the society of the "Dark Ages."

At times, the growth of the church met with obstacles. A number of Cretans were martyred for their beliefs. One of the best known groups, the Ten Martyrs of Crete, from the reign of Decius (249–251), is identified with the Mesara. The first mention of these saints occurs in an epistle sent by eight Cretan bishops to Emperor Leo I in 458. These Ten Martyrs, six of whom were from Gortyn, were executed and buried near the capital, probably in the area of the local village of Agioi Deka (figure 14.1) by Gortyn, where the homonymous church exists today. This church, which is of the Middle Byzantine period, probably stands in the place of an Early Christian church, possibly marking the site where the Ten Saints suffered their martyrdom. Two more local martyrs were bishops of Gortyn: Cyril, executed in 304, and Peter the Younger.

After the initial establishment of Christianity, the Cretans were gradually converted and became ardent Christians. In the years to come, Christianity in its Orthodox form evolved into one of the most important characteristics of the Cretan identity. The large number of Early Christian basilica sites on Crete known to us today (more than ninety) attests to the expansion of the new faith all over the island. In the Mesara, remains of the Early Christian period, that is, until the seventh or eighth century, include impressive monuments in the area of the capital Gortyn. There, the progress and final triumph of Christianity can be seen in the conversion of the old temples into churches as well as in the construction of new churches. The temple of Pythian Apollo, for example, was converted into a three-aisled basilica and seems to have served as the cathedral church prior to the construction of the church of St. Titus (Sanders 1982:108), while an earlier temple also existed at the site of the Mavropapas basilica. New churches included two superimposed basilicas with impressive granite columns and mosaic floors discovered on the Mitropoli road at Gortyn. Early Christian sites in the Mesara are also known elsewhere: the basilicas and monastery on the Acropolis of Gortyn, the *triconchon* (a building whose plan includes three niches) and *martyrion* at Mitropoli, the basilica at Matala, the basilicas at Lasaia and at the sanctuary of Asklepios in Lebena on the south coast, and the possible basilicas at Agioi

Deka and at Gergeri near the village of Nivritos (figure 14.1).

The church of St. Titus at Gortyn, one of the largest early Christian monuments on Crete, illustrates the newly gained importance of the sect in the Mesara. Its date has been contested, but it is probably late rather than early in the period, that is, the seventh century. An impressive (31 x 19 m) and complex structure, the church was built of limestone blocks in the Hellenistic, rather than the Roman manner. The ground plan is of a three-aisled basilica with a cross dome design. The central area was covered by a dome, the arms of the cross end in an apse on the north and south walls, and the nave and the arms were barrel-vaulted. On the east side, the chancel is shaped as a triconch with the *pastophoria* (rooms to the north and south of the central apse) having one anteroom each. The church incorporates repairs and alterations made after the expulsion of the Arabs in 961, but it is fairly certain today that the building was not destroyed during the Arab occupation of Crete. It continued to serve as a cathedral church for some time after the Byzantine reconquest of the island in 961 and before the final establishment of the new capital at Chandax on the north coast, where the seat of the archbishop was also moved.

The fifth and sixth centuries were a turning point in the religious, artistic, and cultural life of Crete. Christianity became the dominant religion and the great majority of the basilica churches were built at this time. From this period onward the archbishop of Crete became a leading figure. This process was especially pronounced in the Mesara, because the early seat of the archbishop was located at Gortyn.

The Byzantine Period (AD 400–1210/1211)

The history of Byzantine Crete can be divided into the First (circa 400–828) and Second (961–1210) periods. Between these periods (828–961) Crete was in the hands of Andalusian Arabs.

During the First Byzantine period, the Christian faith was firmly established on the island, while the remains of the local self-governing urban political systems that characterized the ancient world steadily declined for various reasons: natural disasters such as numerous catastrophic earthquakes, the plague, and changing economic conditions in the Eastern Mediterranean following the Arab expansion and Arab raids. In the Mesara and immediate surroundings this development can be observed mainly, but not exclusively, through archaeological finds. The important cities of Lebena and Lasaia on the south coast were abandoned early in the period; Gortyn, being the capital, had a slower decline. Recent archaeological finds show that the city, hit by a variety of disasters, gradually broke up into separate neighborhoods, and after the 670s, the main occupation site must have been within the walls of the acropolis. On the other hand, an administrative and military presence was prominent until the the island fell to the Arabs in the 820s.

The Arab conquest of Crete transformed the island into a state in the front line of continuous warfare. Beginning with the Arab period the center of power was transferred to Chandax (modern Herakleion) on the north coast, adding to the decline of the Gortyn area. It is significant in this regard that the Mesara region has yielded no traces of Arab occupation, apart from the village of Sivas, whose name may be of Arab origin. After repeated unsuccessful attempts, the Byzantine army finally expelled the Arabs from Crete in 961.

During the Second Byzantine period three main trends are notable in Crete: gradual economic growth with an expansion of villages, a development of large landed properties, and relatively close contacts with Constantinople. All three trends are present in the Mesara area. Due to its intensive cultivation, the Mesara seems to have been densely populated and most of the villages known through later Venetian sources were probably already present during this period. Within the fertile Mesara Plain there appear to have existed imperial lands as well as imperial monasteries holding extensive possessions. Despite the fact that the capital had been moved to the north coast, the Mesara continued to be important.

The Venetian Period (1210–1669)

The Venetian domination of Crete was a direct result of the Fourth Crusade (1204) that ended with the fall of Constantinople and the partition of the Byzantine Empire. The Venetians expelled their rivals, the Genoese, from Crete and they established their own firm rule on the island. They organized a new administrative system and sent the first settlers from Venice to Crete. Local land was redistributed among the settlers, the Latin church, and the state. These changes caused repeated rebellions instigated by the old landed Cretan families during the thirteenth through sixteenth centuries. Eventually, a compromise was reached and a number of powerful families managed to keep some or all of their land. During this period, Venetian colonists continued to be settled on Crete.

These frequent uprisings, combined with earthquakes and the plague, which decimated the population of Crete in the middle of the fourteenth century, created great insecurity among the populace. Conditions were worsened by the exorbitant financial exactions that Venice imposed on settlers and native Cretans alike in order to finance wars with Genoa and to defend Crete from the Turks. Chronic mismanagement and corruption of the local administration, and extreme severity toward the native Cretans, worsened the situation. Thus, the population was driven to rebellion or to exile. Existing evidence shows that the urban population of the island fared comparatively better than the inhabitants of the villages.

The period of the Venetian domination of Crete is remarkable for two additional trends. The first is the gradual "Hellenization" and cultural assimilation of the Venetian settlers. The second is the impressive "Veneto-Cretan" artistic and literary production, particularly in the sixteenth and the seventeenth centuries. The constant Ottoman threat to Venetian rule of the island, successfully faced for nearly two centuries, eventually became overwhelming. In 1645 the Turks began their conquest of Crete. Only the capital Candia (Chandax), was able to resist for more than twenty years. Finally, in 1669, the city was ceded to the Turks by treaty, and its defenders were allowed to depart, followed into exile by a great number of Greeks who fled Ottoman rule.

The Ottoman Period (1669–1898)

Crete emerged from the long Venetian-Turkish war in a state of destruction and depopulation. Candia, the most important urban center, lost all of its population. Candians who had survived the siege preferred to follow the departing Venetians. Only six persons remained within the city when the Ottomans took possession. Candia never fully recovered its former population; most of the Venetian buildings were destroyed and the city lost its western character. Another town, Siteia, was obliterated, and was only resettled in the second half of the nineteenth century.

Despite various measures adopted by the sultans to help Crete recover and maintain a reasonable state of prosperity, the local Turks, who formed the island's army, exercised their power arbitrarily. Successive pashas sent to Crete were unable to put the affairs of the island in order or to control the Turks, who often managed to expel them. The Cretan *reaya*, the local Christian subjects, were among the most oppressed in the Ottoman Empire. Some Cretans chose to convert to Islam to escape oppression, although quite a few of the converts secretly remained Christian.

Conditions remained more or less unchanged for about a century. However, in 1770, when the Greeks of the Morea (the Peloponnese) revolted against the Turks, the Cretans of Sphakia took up arms. This uprising received no support elsewhere and was eventually put down. As a result, the greatly diminished population of Sphakia was obliged, for the first time, to pay taxes to the Turks. After the 1770 uprising, the pashas and the Porte were unable to control the local Turks' increasing violence and extortion aimed at the *reaya* population of Crete.

Finally, the War of Greek Independence broke out in 1821, and the Cretans soon followed suit. The following year, the sultan asked for the help of Mehmet Ali of Egypt, who managed to suppress the revolution in Crete within two years. Greece became a free and independent state in January 1830 when the Great Powers signed a protocol in London, but Crete was ceded to Mehmet Ali and remained under Egyptian rule until 1841, when it was returned to the sultan. The rest of the nineteenth century was marked by successive Cretan uprisings (in 1841, 1858, 1866–1869, 1878, 1896, 1897), the aim of which was union with Greece. These uprisings were usually suppressed with great bloodshed, but after each one the Turks were obliged to make concessions. In 1897, during one of these rebellions, England, France, Italy, and Russia jointly intervened and declared Crete to be autonomous under the sovereignty of the sultan, a solution initially rejected by the Cretans. In 1898, the Turks resisted the attempts of the Powers to enforce a new constitution, but the Europeans landed troops and the Turkish army was obliged to leave Crete permanently. For the next decade the island was governed by Prince George of Greece as a Commissioner of the Powers. In 1907 Crete declared its union with Greece, and Cretan deputies were accepted into the Greek Parliament in 1912.

ADMINISTRATION

The Late Roman and Byzantine Period

After the Roman conquest of Crete, the city of Gortyn became the capital of the island. Gortyn was the dominant settlement in probably the most vital area of Crete (D. Tsougarakis 1988:15–20, 155–164). Under Augustus, a proconsul of praetorian rank governed the combined province of Crete and Cyrenaica, an arrangement that lasted until the reign of Diocletian. At the end of the third century, Crete was separated from Cyrenaica and transferred to the Praefectura Praetorio per Illyricum where it became a province of the Diocese of Moesia. Under Constantine, Crete was governed by a *consularis* as part of the Diocese of Macedonia. At the time of Justinian, the governor seems to have taken the title of proconsul (Guarducci 1950:460; cf. Bandy 1970: no. 31). This system lasted until the reorganization of the empire in the seventh century.

During the Late Roman period, Gortyn continued to be the seat of the Cretan provincial governor, the administrative center of the island, and the market center for the Mesara. Gortyn was also the seat of the Cretan Koinon, that is, the pre-Roman confederation of the Cretan cities, which was permitted to function under the Romans, albeit with reduced authority (Chryssos 1981:537–549). Besides hosting the provincial assembly, Gortyn also had its own *curia*, or local assembly, in which its citizens participated. It has not been established exactly when, during the First Byzantine period, the municipal system ceased to exist. Quite probably, this happened at a different time in each city. Since Gortyn was the capital of the island, it is reasonable to assume that the municipal system was still functioning there, perhaps until the seventh century.

Unfortunately, little is known about the administrative organization of Crete below the level of the Koinon during the First Byzantine period. In the beginning of the sixth century, apart from Gortyn, not one of the twenty-two Cretan cities mentioned by the Synecdemos of Hierocles is to be found in the Mesara. Other geographical works of this period, such as the Peutinger Table, the Anonymous of Ravenna and the Stadiasmos of the Great Sea, which contain lists of Cretan cities, do not mention any settlements in this region (Tsougarakis 1988:91–109). It is fairly certain, therefore, that during the First Byzantine period—and probably for some time earlier—Gortyn was the only city in the Mesara. Because the written sources do not mention any other settlements in this region, one cannot say what their administrative status may have been, but settlements such as Phaistos and perhaps Matala may have had the status of a *kome*, or village. There can be no doubt that these smaller settlements were under the direct administrative jurisdiction of the city of Gortyn.

Later in the First Byzantine period, despite other administrative changes, Gortyn remained the capital of Crete until the Arab conquest. After the mid-seventh century, the physical city of Gortyn declined (Di Vita 1991, 1996). During the seventh century, the military-administrative provinces *(themes)* of the Byzantine Empire were governed by a general (Tsougarakis 1988:164–178). At this time Crete may have been part of the large *theme* (a province of the Byzantine Empire in which army units were locally recruited) of Hellas or the Peloponnesus. Some scholars have suggested, on slight evidence, that Crete became an individual *theme* in the eighth century. More probably, Crete was an *archontia* (a lower Byzantine administrative unit) at this time, and Gortyn was the seat of a new governor (*archon*). It seems likely that Crete was nominally promoted to a Byzantine *theme* for military reasons in the year (827/828) that the Arabs made an unsuccessful attack on the island. As a result of the Arab occupation, Chandax (Herakleion) on the north coast became the Arab capital. After the Arabs were driven out in 961, Crete did become a *theme* with its distinctive governor, or *strategos*. The subdivisions of a Byzantine *theme* were called *turmae*, but the number of *turmae* in Crete is not known. However, there is an indirect indication that the Mesara Plain constituted a separate *turma*, since another "*turma* of the north of the Mesara" is mentioned in a late twelfth-century document (Miklosich and Muller 1860–1890:VI, 125).

The Venetian Period

Although the *theme* system had declined long before the Venetian occupation of Crete, the new rulers introduced a different administrative system, but they retained the use of the word *turma* as an administrative and geographical subdivision (Xanthoudides 1939; Thiriet 1959; Maltezou 1988:110–115). Crete was divided into six *sexteria* named after the six-part administrative organization of Venice. Each *sexterium* was composed of a number of *castellaniae,* that, in their turn, consisted of a number of *turmae*. Later, the *sexteria* were replaced by three, and subsequently, by four *territoria*, corresponding approximately to the present division of Crete into four *nomes*, or provinces. The Duke of Candia (*Duca di Candia*), helped by two *Consiliarii* (councilors), was the governor of Crete, and the *Capitan General* was head of the army. There were also two senatorial boards, the *Consilium dei Rogati* and the *Consilium Feudatorum*, as well as a hierarchy of civil servants. The central government had its seat in Chandax, called Candia by the Venetians, while each of the three other territorial centers was the seat of a *Rector*. The official name of Crete became *Regno di Candia*.

The present-day Mesara provinces of Kainourgio, Pyrgiotissa (figure 14.1) and Monofatsi to the east were initially the third *sexterio* of San Croce (Tafel and Thomas 185/1/2II, 144; Xanthoudides 1939:10, 11; Spanakis 1958:321). Modern Kainourgio and Pyrgiotissa correspond almost exactly to the adjoining Venetian *castellaniae* of Castro Novo, or Castel Nuovo, and Priotissa (Pyrgiotissa). Later these administrative units belonged to the *territorium* of Candia. Existing evidence is more abundant for Castro Novo than for Priotissa. The seat of the *castellania* of Castel Nuovo was the castle of the same name, the ruins of which are still to be seen on a hill a little to the east of the town of Moires. The Castro Novo castle was built, perhaps in 1206, by the Genoese Pescatore, along with fourteen or fifteen other castles, constructed between 1204 and 1210, when Crete fell briefly into the hands of the Genoese (Xanthoudides 1939:5–6, 39; Spanakis 1958:204; Gerola 1902a). Its first mention occurs in the *carta concessionis* (treaty map) in 1212 (Gerola 1906–1932:I/1, 212). The name Castel Nuovo may derive from the fact that it was built at a new location away from the old (ancient and Byzantine) castle on the acropolis of Gortyn.

Castel Nuovo was a rather small castle, not intended to house a population within its walls. In 1230, during the uprising of the Skordilis and Melissinoi families, it was attacked by the rebels and was surrendered to them by Corrado Demilena. Despite this, the Venetians considered Castro Novo a strong and easily defensible place. In 30 January 1295, a suggestion was made in the Venetian Maggior Consilio that the seat of the Rectors of Rethymnon be transferred to Castro Novo for reasons of better defense, although no decision was ever taken (Theotokis 1933a:28–29, 32). In 1443 repairs were undertaken on the castle, but a century later, in 1559, it was almost uninhabited, and in 1631 it was entirely deserted (Gerola 1906–1932:I/1, 212).

The *castellans* (table 14.32), the military heads of *castellania*e appointed for two years, were initially Venetians who had also become members of the local nobility. It appears that much later, Cretan Greeks could also hold the office of *castellan*. The following *castellans* have come down to us through surviving official documents:

- Giovanni Zancaruolo (1311–1313) (Thiriet 1966–1971: nos. 237, 239, 1311).
- Damiano Capello (1313–1315) (Thiriet 1966–1971: nos. 276, 279,1313).
- Giovanni Mocenigo (1315–1319) (Thiriet 1966–1971: no. 328, 1315). Mocenigo was probably the one who was ably attacked by villagers during an attempted arrest in 1319 (Ratti-Vidulich 1965: no. 231, 1319).

- Paolo Contarini (1374) (Thiriet 1958: no.534). He was rewarded for his loyalty during the Cretan rebellion and the war of Padova.
- Andrea da Medio. In 1399 he was *castellan* of Castel Nuovo, but at the same time he held the *castellania* of Pediada (Thiriet 1958: no. 963).
- Nicholas Palaiologos (1545), a Cretan Greek. In that year he was ordered by Capitan General Andrea Gritti to publicize the sentence imposed on those fief-holders of his region who had evaded participation in the *varnitio*, their military obligation (Xirouchakis 1934:50 n. 2; Panagiotakis 1986:227). It seems that he died in 1547.
- The last *castellan* known to us is Nicolo Pagan, in 1548. He was of Italian origin, a local noble (*nobilis cretensis*), and a member of the Council in Candia (Manousakas 1949:49), and he was involved in a case discussed below (Kolyva-Karaleka and Moatsos 1983:402–403).

In 1583 the salary of the *castellan* of Castro Novo was 86 *hyperpera* a year, while his chaplain received 27, his scribe 19, and his servants a total of 125 *hyperpera* (Castrofilaca 1583: c. 7). We also know of some notaries or scribes of this *castellania* in the fourteenth century. In 1304 Francesco d' Arimini was appointed notary of Castro Novo (Thiriet 1966–1971: no. 98); in 1324 Dominicus Traversario was "*olim scriba Castri Novi,*" while in 1328 Petrus Chursario was described as "ex-notary" (Ratti-Vidulich 1965: no. 441), and in 1381 Constantinus Calomati from Castro Novo was appointed "*notarius in scriptura greca*" or Greek-writing notary (Santschi 1976:84, no. 326).

Our knowledge of Pyrgiotissa during the Venetian period is quite limited. There was also a castle there, exactly at the mouth of the Ieropotamos River, of which not a trace survives. The *castellania* of Priotissa must have received its name from the castle, but in this case, the Greek name indicates that a Byzantine *pyrgos*, or tower, was once there. It was for this tower that the now extinct nearby church of Panagia was called Pyrgiotissa, and thus, the whole province was named. The Venetians adopted the name, identifying Priotissa as the region to the west of Castro Novo, which was also included in the *sexterio* of San Croce. The castle may have been rebuilt or reinforced at a later period. In 1558 its surrounding walls were burnt down during a raid by pirates (Basilicata 1630:119; Spanakis 1991:665). Not very long afterward, in 1601, the castle lay ruined and half buried, and thirty years later, only its foundations remained visible (Gerola 1906–1932:I/1, 261). However, the castle is visible on two seventeenth-century maps, by Basilicata (1630) and Boschini (1651).

Only two of the *castellans* of Pyrgiotissa are known to us: one Iohannes Bono, who was an *ex-castellan* in 1402/1403, to whom a fine was imposed for illegally appropriating an amount of money during his term of office (Thiriet 1978: nos. 88, 105, 137, 146); and in 1548, one Nicolo Rizardo, who was of Italian origin and whose family were members of the Council of Candia (Manoussakas 1949:49; Kolyva-Karaleka and Moatsos 1983:401). In 1583 the salary of the *castellan* was 88 *hyperpera*, his scribe received 21, and his servants received a total of 86 *hyperpera* (Castrofilaca 1583: c. 7). Apart from the *castellans*, very few other officials of these two *castellaniae* are known. Among them are the judicial officers, *advocatores communis* (of Pyrgiotissa?), of 1390, Carolus Quirino and Nicolaus Geno (Santschi 1976: no. 1306), and the *Captains contra fures* (police officers concerned with robbery) for the year 1393: they were Michael de Medio for Castro Novo and Iohannis Cavalario for Pyrgiotissa (Santschi 1976:323, no. 1453 and 321, no. 1436 respectively).

The Venetians realized that there were only two places in southern Crete where an enemy (either an army or pirates) could possibly make a successful landing. One of these was the coast and port at Kaloi Limenes in Pyrgiotissa (figure 14.1). Thus, the commoners of this *castellania* along with those who lived in other *castellaniae* along the sea coast (Selino, Kissamos, Apokoronas, Mylopotamos, Ierapetra, and Merabelo) were called to serve in the army. They were exempted from serving in the galleys and from other imposed labors, but they were obliged by Foscarini to defend the castles. These men were in the lists of the national guard and were trained like the Italian officers who were sometimes appointed. Nevertheless, the Venetian authorities had no great expectations concerning their work (Pasqualigo 1953:30).

It is not exactly clear what was was required of the inhabitants of the *castellania* of Castro Novo. There is evidence that they were also called to serve in the army and the galleys, particularly those who did not live near the coast. Castro Novo and Pyrgiotissa were among the *castellaniae* that had to man one of the two galleys kept during peacetime. In time of war, the *territorio* of Candia maintained thirteen galleys with a crew of 2,360, of whom 365 men were from Castro Novo, while Pyrgiotissa provided 111 (Castrofilaca 1583: c. 114 with a list of *galioti* per village; Xirouchakis 1934:74). The villagers tried, at all costs, to avoid service in the galleys or the army. Some years before 1594, the inhabitants of certain villages fled to the mountains when they were called up. Seven inhabitants of the village of Voriza were condemned to the galleys for this reason. Men from the villages of Monochoro (Castel Nuovo) and Pitsidia (Pyrgiotissa) fled by boat to Paximadi, a barren islet some fourteen kilometers west of Matala, and remained there for years rather than serve in the army (Xirouchakis 1934:36).

Initially, the Turks maintained the Venetian administrative division of Crete. The four divisions were *hukumet sancaks,* or self-governing provinces. These *sancaks* were relatively small compared with others in the Ottoman Empire and had some degree of independence that warranted different treatment. Their obligations, besides loyalty and the payment of tribute, were to admit *kadis* (Ottoman judges who were also priests) in the major cities, and garrisons to the fortifications (Sugar 1977:41–42). Soon the eastern province of Siteia was united with that of Candia, which became the most extensive and populous province of Crete. The *sancaks* were governed by pashas, with capitals in Candia, Rethymno, and Chania, respectively. Each pasha had his own council, which dealt with local affairs.

The Venetian division of each province into smaller provinces was also maintained unaltered. Thus, Castel Nuovo and Pyrgiotissa existed as they had under the Venetians, except that Castel Nuovo was now called Nefs Castelli. Although all three pashas held the same rank, the pasha of Candia was their superior since he led the army and as such was authorized to appoint the commanders of the garrisons of smaller fortresses. The Turks also continued the Venetian practice of imposing military duties on the villagers. Thus, the inhabitants of the nearby villages were obliged to man a number of the small fortresses or the smaller watch-towers. In the later periods, some houses in the villages were built as towers (figure 14.11). In Kainourgio there were eight such watch-towers and seven in Pyrgiotissa, each of which was guarded by the inhabitants of specific villages (see tables 14.1 and 14.2).

This administrative division of Crete lasted until 1867, when the eastern regions of Crete

TABLE 14.1. Watch-towers in Kainourgio, Ottoman period

Name of Tower	Villages Responsible for Its Guard
Trochala	Flathiakes, Agioi Deka, Miamou, Plora, Agios Kirillos, Anogeia
Agios Onoufrios	Antiskari, Koukiana, Trypita, Mitropoli, Ampelouzos
Peramata	Plouti, Kyrmousi, Makres, Drosos
Fterisos(?)	Alithini, Rouphas, Paliama, Moroni
Agios Nikolaos and Agios Markos	Gialomonochoro, Kastelli (Nefs Kastelli), Nivrytos
Kefala	Moires, Vreli, Apolychnos, Monochoro, Kousses
Kokkinopoulou	Petrokefali, Voriza, Skourvoula, Kourtes, Galia, Vetou(?)
Vigla	Pobia

Source: Stavrinides 1975–1985: II.343, no. 990.

TABLE 14.2. Watch-towers in Pyrgiotissa, Ottoman period

Name of Tower	Villages Responsible for Its Guard
Volaka	No garrison
Matala	Sivas
Manoussou	Pitsidia
Koukloti	Kamprari(?), Agios Ioannis
Sporgias	Agia Triada, Voroi, Voucomat(?)
Pyrgiotissa	Sympallousa, Faneromeni, Lagolio, Megali Marka (=Makres?), Tympaki
Gourgouri	Grigoria, Magarikari, Kamares

Source: Stavrinides 1975–1985: II.343, no. 991.

formed, once again, a separate nome (Lasithi). Under this same reorganization, the two provinces of Kainourgio and Pyrgiotissa were united under an *eparch*, or provincial governor, residing at Moires. In 1879, the "municipal bill" created new municipalities, three in the province of Kainourgio and two in Pyrgiotissa (Stavrakes 1890:165, 166–167).

SETTLEMENTS, POPULATION, AND LAND USE

Late Roman/Early Byzantine Period (Fifth to Ninth Century)

The Late Roman Period saw the first difficulties of the cities of the empire, particularly those in areas frequently disturbed by barbarian invasions and attacks. But even those cities located at a distance from these dangers experienced financial difficulties that became progressively more severe and eventually contributed to their decline. Crete was not among those Roman provinces facing serious danger from external attacks; moreover, the provinces of Kainourgio and Pyrgiotissa were near the capital city Gortyn, which meant that economic recession and its consequences may have affected them less—or later than other, more remote areas of the island. It is assumed therefore that urban life in Gortyn must have lasted longer than in other Roman cities of Crete, while settlements peripheral to Gortyn may have benefited by their proximity to the capital.

By Roman standards Gortyn was quite a large city; its remains today cover an area of approximately 1.6 km north-south by 1.8 km east-west. These remains include an aqueduct, two theaters, a circus, a number of temples, the Praetorium complex, two Nymphaea, baths, various fountains, and other buildings. The Christian remains include the impressive metropolitan church of St. Titus, probably of the sixth century; two Early Christian martyria; six other Early Christian basilicas, including two superimposed ones of considerable dimensions; probably a monastery; and three cemeteries, not counting the fortified acropolis with its two basilicas and a monastery (Sanders 1982:108–113, 156–159; Di Vita 1984, 1985, 1990, 1991). The Late Roman city has also yielded an impressive array of coins, sculpture, and inscriptions. Recent excavations have brought to light paved roads, workshops, and, most interesting, private houses of the sixth/seventh century (Di Vita 1991, 1996). The city seems to have suffered from a number of earthquakes, one of which, around 670, must have dealt a final blow. After that, city life declined dramatically and the Gortyn population dwindled. The main habitation site, of small proportions, became the fortified acropolis (Di Vita 1979, 1985, 1991).

Natural catastrophes, however, were only one of many factors that contributed to the decline of the Late Roman/Early Byzantine capital. Environmental disasters are seldom the only cause of permanent decline. Conditions in Gortyn, in the third quarter of the seventh century, may have been aggravated by other factors, such as economic recession and/or invasion. Gortyn seems to have benefited from the attention of a number of emperors (for example, Heraclius, Bandy 1970: no. 23) and can be considered a prosperous city up to circa 650 (Di Vita 1985:143). Nevertheless, most of the cities of the empire were in considerable financial trouble by the sixth century, while the Arab attacks of the mid-seventh century created more serious problems. All three factors added to an apparently intrinsic trend toward ruralization of Byzantine urban life (Haldon 1985:86–89). After the seventh century, urban life in Gortyn and the surrounding area was in serious decline, both in terms of population and quality of life. A vivid picture of this decline in the first half of the eighth century is provided by the *Life of St. Andreas*, archbishop of Crete (Papadopoulos-Kerameus 1898:169–179), as well as by the excavations in Gortyn proper and on its acropolis (Di Vita 1996; Rizza and Santa-Maria Scrinari 1968:85, 91).

Our knowledge of the other urban centers in the Mesara is less detailed. These were settlements along the south coast, mainly Lebena (Lentas), Lasaia (Halai), and Matala (figure 14.1). Lebena was the most important of the three in Roman times, because of its famous shrine of Asklepios, which attracted worshipers from as far as North Africa, and because of its role in trade, as one of the harbors of Gortyn (the other being Matala). After the decline of the cult and sanctuary of Asklepios, the late fifth/early sixth century basilica church built on the site was less popular (Sanders 1982:113–114), and Lebena continued solely as a harbor town. The site may have ceased to be inhabited after the seventh century.

Lasaia was a small harbor town that, apart from trade, had additional resources in the form of stone quarries and deposits of minerals, mainly copper. The main part of the town covered an area of about 100 m east-west by 150 m north-south, which is quite small, even by provincial standards, but other inhabited areas included the acropolis and the shoreline. Lasaia reached its peak in the fifth and sixth centuries. It then began a decline and was eventually abandoned sometime in the seventh century (Blackman and Branigan 1975:28–32). Its early decline suggests that neither direct Arabs raids nor the economic conditions caused by Arab conquests in the East were the main cause.

About Matala we know even less. It was the main port of Gortyn and it owed its existence and prosperity entirely to this status. Apart from the Early Roman tombs cut into the soft rock (marl) on the north side of the harbor and some columns (of a basilica church?), very few remains of the Roman/Late Roman settlement have come to light. The decline of Gortyn meant the abandonment of this settlement as well. Habitation at this site in later periods was occasional or temporary until the beginning of the twentieth century. There is no literary evidence for any other settlement with an urban character in the Western Mesara during this period.

Our archaeological survey of the Phaistos region (figure 14.2) found pottery of the First Byzantine period, suggesting the existence of a number of smaller occupation sites. One of these sites (**33**) produced Roman, Byzantine, Venetian, and Ottoman pottery, indicating a settlement with continuous habitation. Continuity of habitation has also been suggested by the finds in two other sites, **63** and **32**. Sites **10**, **91**, and **96** of the First Byzantine period seem not to have been occupied after the sixth or seventh century. In all, there are seven First Byzantine occupation sites. Of these seven sites, one (and perhaps as many as three) seem to have survived into the Middle Byzantine and the Venetian periods, while the rest did not continue beyond the seventh century. If this evidence is representative of a wider pattern, one may assume that the area was quite densely populated as long as Gortyn flourished, but that the decline of the capital brought about the abandonment of most rural sites. Our off-site data is similar: Late Roman pottery recognized by the archaeological survey in off-site fields (figure 14.3) dropped off by 76% (134 Late Roman: 30 Byzantine). Such a development is not unreasonable, but it presupposes a crucial fact, namely, that the general decline by the seventh century was followed by a severe demographic crisis. Otherwise, one cannot explain why the breaking up of Gortyn and the decrease of its population did not result in an increase in rural habitation sites.

The port of Kaloi Limenes, about 1.5 km west of Lasaia, does not appear to have been a substantial settlement during this period. Nevertheless habitation on the hill to the west of the harbor is attested by a considerable amount of Roman and Late Roman pottery, and after these periods the site was deserted (Blackman and Branigan 1975:

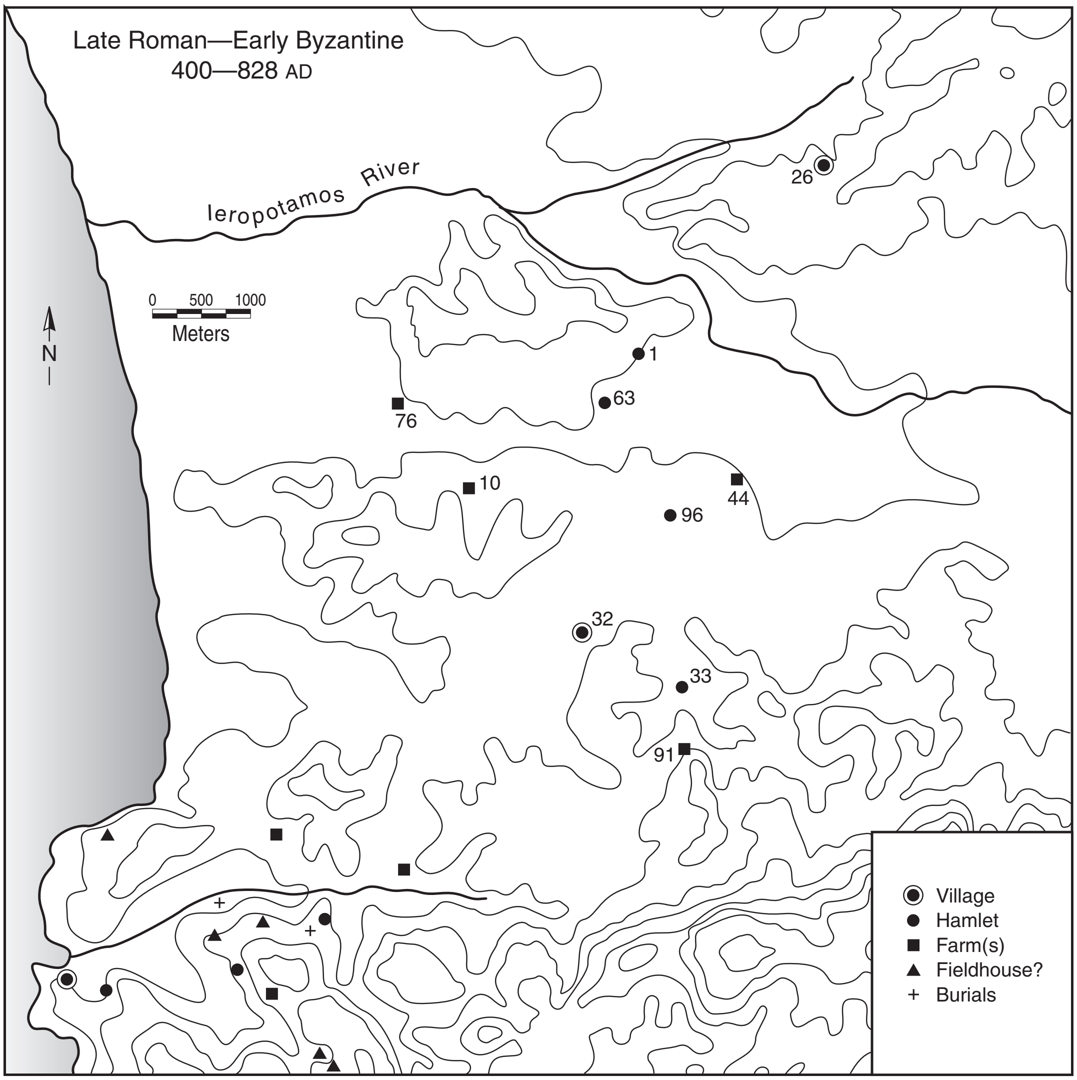


FIGURE 14.2. Map of Late Roman–Early Byzantine sites in the survey area of the Western Mesara. Kommos survey sites unnumbered. Site numbers correspond to those in Appendix D.

23–25). The Agio Pharango survey has identified a relatively large number (11) of farmsteads of the Roman period, apart from a settlement at Gavaliana. Bintliff (Blackman and Branigan 1977:26–30) estimated that the land may have sustained a population of seventy-five to eighty-five persons. These sites declined, until they were more or less abandoned in the third/fourth century. Only three sites, probably farmsteads, produced pottery of the sixth/seventh century, but it could not be determined whether they continued from the earlier period or were new establishments. In any event, by the end of the seventh century, permanent occupation of the valley seems to have come to an end (Blackman and Branigan 1977:75).

We know little about the rest of Pyrgiotissa and Kainourgio, due to the fact that archaeological evidence consists mostly of chance finds, whose assessment and interpretation are uncertain. Apart from the sites known from literary sources and those already discussed above, there are approximately twenty more sites, which have yielded finds (see figures 14.2 and 14.4). About eleven of these may have been habitation sites at some point during this period, but there is not enough evidence to draw any con-

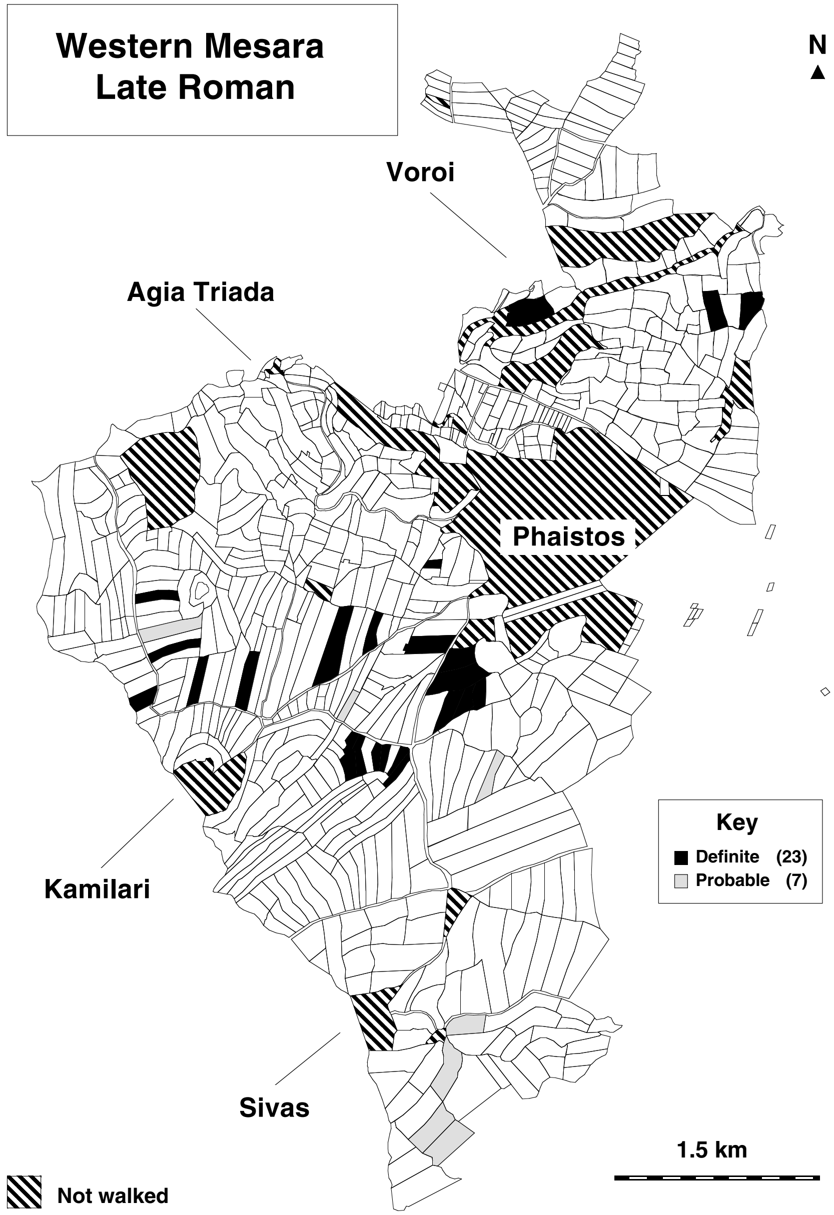


Figure 14.3. Off-site Late Roman pottery in the Western Mesara

clusions about their size and life span. From pottery finds it is clear that most of these sites, if not all of them, ceased to be used after the seventh century. The impression of local abandonment, as it emerges from the archaeological finds, should not mislead us: the overall decline does not equal a complete abandonment of the Western Mesara. On the contrary, the closer we come to the Arab conquest (circa 827), the more administrative and/or military activity is observable in Crete (Tsougarakis 1988:164–178), most of which is centered in the region of Gortyn. The real situation for the period from about 670 to 827 seems to be one of reduced population, a reduced number of habitation sites, abandonment of coastal settlements, withdrawal to defensible sites (for example, Gortyn), and an intensive local military presence.

TABLE 14.3. Archaeological evidence for Roman sites not mentioned in literary sources

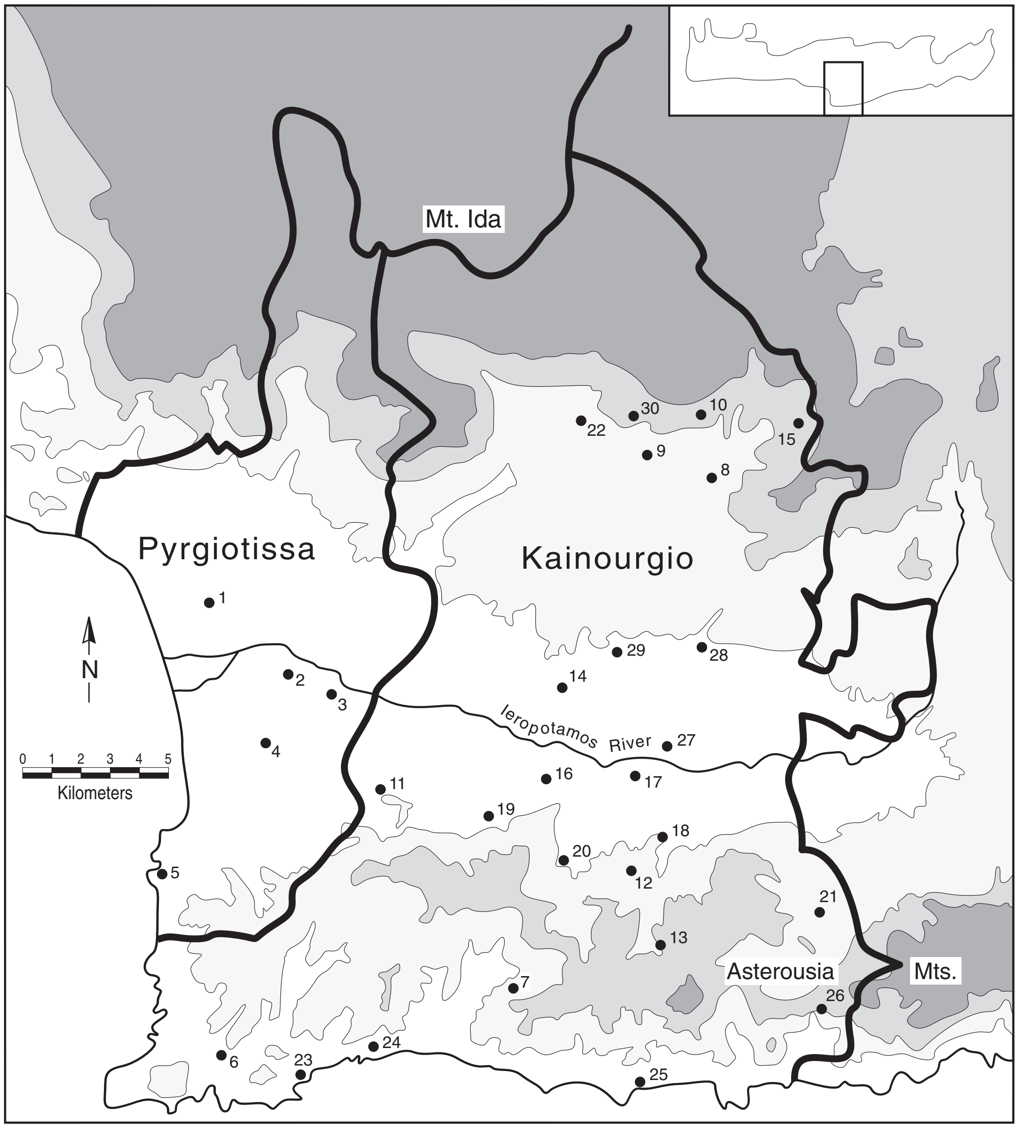
Kainourgio		Pyrgiotissa	
Name	Habitation Site	Name	Habitation Site
Agio Pharango Gorge	+	Tymbaki-Kokkinos Pyrgos	+(?)
Antiskari		Agia Triada	+
Apomarmas		Agios Ioannis-Phaistos	+
Drosoi		Kamilari-Sivas	+
Gergeri	+		
Kouses (?)			
Logarotopos	+		
Makry Livadi (Miamou)	+		
Moires			
Panasos			
Peri	+		
Platanos	+		
Plora	+		
Pobia-Alithini	+		
Trypiti	+		
Vasiliki	+		
Zaros			

Source: Sanders 1982:155–162.

The Arab and Second Byzantine Periods (circa 827–1210/1211)

The effect of the Arab conquest on the local Cretan Greeks is something of a mystery. Our region was certainly affected by the Arabs' choice of Chandax as their capital. Gortyn's alleged destruction (or what was left of it) seems to be more of a later fiction than a historical fact, since long before the time of the Arab arrival, the main settlement site at Gortyn had shifted to its acropolis. The metropolitan church of St. Titus does not show any signs of major destruction at that time; on the contrary, it seems to have been repaired in the ninth/tenth century and to have been standing during most of the period (Orlandos 1926:319). Mitropolis, about one kilometer south of Gortyn, continued as a village, indicating that for some time after the Byzantine reconquest of 961, the seat of the Metropolitan was located there, and that St. Titus was possibly in use as the metropolitan church of Crete. There is, however, no evidence for the Arab presence in the area during nearly 133 years of Arab occupation. Siva, first mentioned ca. 970, (see Xanthoudides 1964:18 for its generally accepted Arab origin) may, however, be a sign of an Arab occupation.

Contemporary written sources provide virtually no direct evidence for settlement of the Mesara during this period. Venetian sources refer generally to Mesara settlements from the "*tempore Grecorum*," that is, before the Venetian conquest of 1210/1211. As a result, we know of settlements that certainly existed in the second half of the twelfth century, but we have no way of knowing how much older they may have been. *The Life and Testament of St. John Xenos* (Tomadakis 1983–1984) refers to Siva, the saint's birthplace, during the period from 970 to 1030, and mentions a number of settlements in other areas of Crete which are known to have survived into later periods. If this was a general

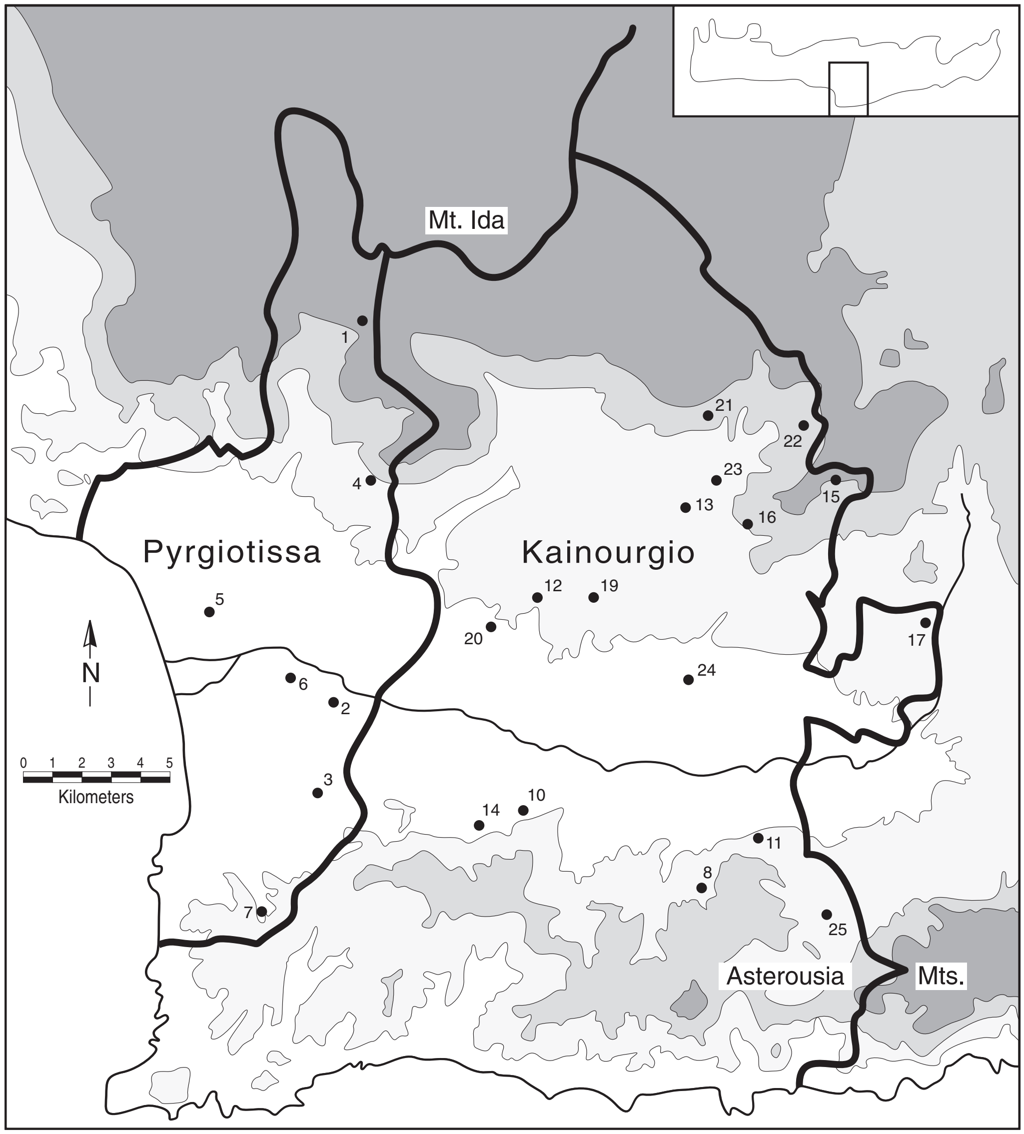


1. Timbaki-Kokkinos Pyrgos
2. Agia Triada
3. Agios Ioannis-Phaistos
4. Kamilari-Sivas
5. Matala
6. Agio Pharango
7. Antiskari
8. Apomarma
9. Drosoi
10. Gergeri
11. Kouses (?)
12. Logarotopos
13. Makry Livadi (Miamou)
14. Moires
15. Panasos
16. Peri
17. Platanos
18. Plora
19. Pobia-Alithini
20. Trypeta
21. Vasiliki
22. Zaros
23. Kaloi Limenes
24. Lasaia
25. Lebena
26. Agios Savvas
27. Choustouliana
28. Gortyn
29. Kastelli
30. Nivritos

Figure 14.4. Archaeologically attested Late Roman–Early Byzantine Sites in the Western Mesara

pattern, then many of the twelfth-century settlements may also have existed at least a century earlier.

There are twenty-four settlements (seventeen in Kainourgio and seven in Pyrgiotissa) known to exist in the twelfth century or earlier, but for eight of these (six in Kainourgio and two in Pyrgiotissa) the evidence for the twelfth century is uncertain (figures 14.4 and 14.5). The written sources obviously do not provide a complete list of villages. Moreover, since fourteen of these twenty-four settlements belonged to either the church or a monastery and secular settlements far outnumbered church-owned examples,



1. Kamares
2. Melica (Agios Ioannis)
3. Sivas
4. Temeneli
5. Timbaki
6. Agia Triada (?)
7. Ethia (?)
8. Agia Marina
9. Agios Kostantinos
10. Alithini
11. Anogeia
12. Apolichno
13. Kyrmousi
14. Limne (Pobia?)
15. Mulia
16. Nassi
17. Vayli
18. Cametachi
19. Rouphas (?)
20. Monochorio (?)
21. Gergeri
22. Panasos (?)
23. Apomarmas
24. Mitropoli (?)
25. Vasiliki (?)

Figure 14.5. Twelfth century and possibly earlier settlements in the Western Mesara

the actual number of tenth- to twelfth-century settlements must have been considerably greater. Seven Byzantine-period sites (figure 14.6) identified by our survey coroborrate this conclusion. Since the survey area alone produced habitation sites amounting to almost one third of the total number of settlements known from written records for the two provinces, we may conclude that both provinces were relatively well populated in the twelfth century. Venetian documents also indicate that the Mesara area was densely settled in the thirteenth century. Our evidence, however, does not permit an estimate either for the total number of settlements or possible population numbers. Only three villages (Agios Konstantinos, Cametachi, and Nassi) of the twenty-four twelfth-century settlements ceased habitation during the Vene-

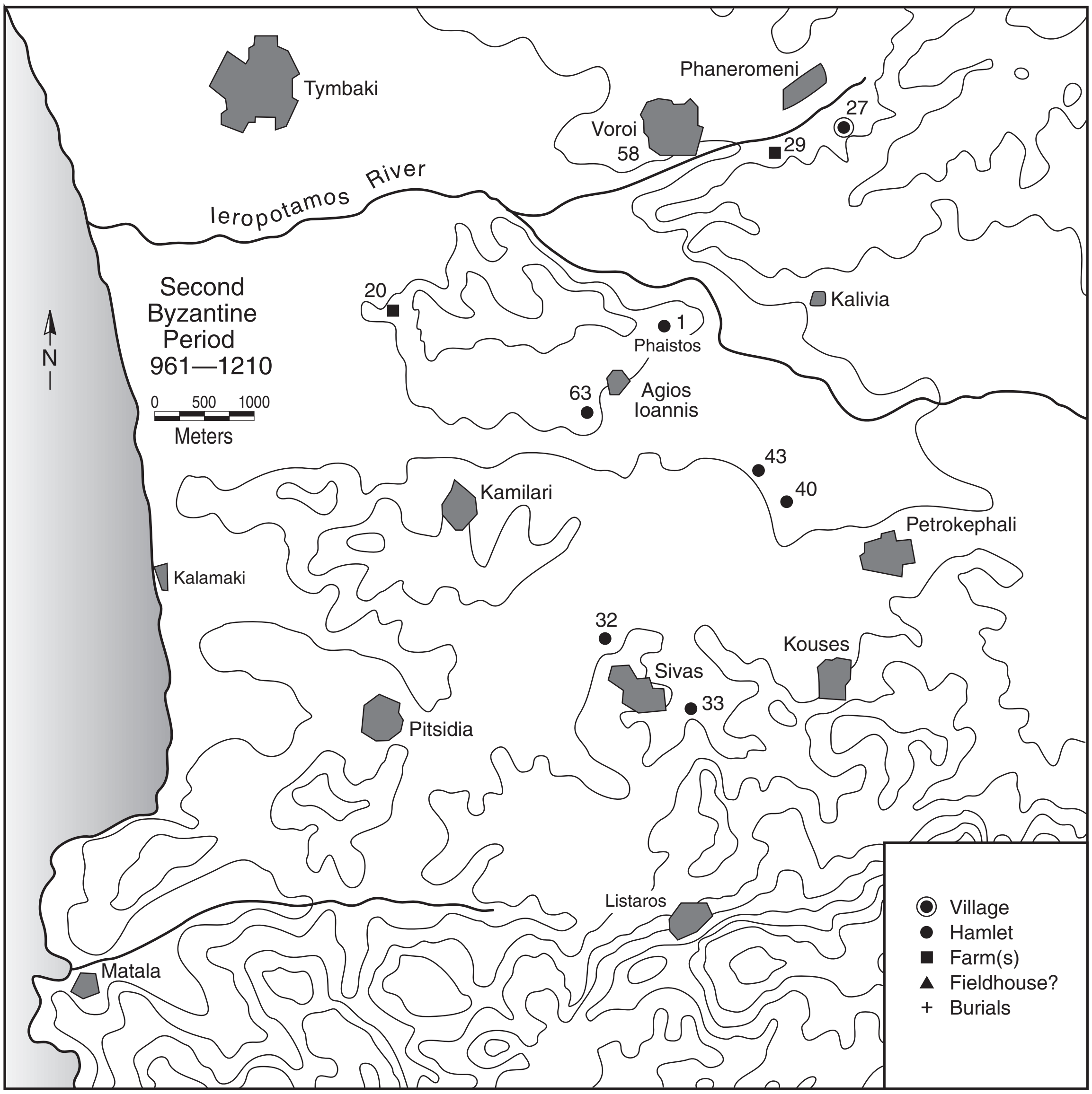


FIGURE 14.6. Map of Second Byzantine period sites and present-day villages in the survey area of the Western Mesara. Site numbers correspond to those in Appendix D.

tian period, while most of the remaining settlements survived without intermediate abandonment into the nineteenth century (appendix H). Two of our survey sites (**58** and **33**) show continuous habitation until modern times, and two more settlements (**20** and **40**) existed from Byzantine through to Ottoman times.

No contemporary evidence exists concerning cultivation, produce, and land use in the area, but there is a strong possibility that what little is known for the thirteenth and fourteenth centuries also applies to the twelfth century. One cannot tell, however, which of these sites was the central market settlement for the two provinces in Byzantine times, before the Venetian conquest and the creation of the seats of the *castellaniae*, that is, Castel Novo and Castel Priotissa. With no information concerning numbers of inhabitants, we cannot determine which of these sites may have been relatively more important or more populous. Even the later creation of the seats of the *castellaniae* does not mean that these sites immediately became the market centers in their respective provinces, despite the fact that they were the administrative centers.

TABLE 14.4. Settlements of the twelfth century known from thirteenth-century sources

Kainourgio		Pyrgiotissa	
Name of Site	Byzantine Owner	Name of Site	Byzantine Owner
Agia Marina	Archbishop	Kamares	Sfaca Monastery
Agios Konstantinos	Archbishopric	Melica (A. Ioannis)	Pala Monastery
Alithini	Pala Monastery	Siva	Pala Monastery
Anogeia		Temeneli	Pala Monastery
Apolichno	Archbishopric	Tympaki	Pala Monastery
Kyrmousi	Monastery of Kyrmousi	Agia Triada(?)	
Limne (Pobia?)	Archbishopric	Ethia (?)	
Mulia	Archbishopric		
Nassi	Archbishopric		
Vayli	Monastery of Pala		
Cametachi	Monastery of Kyrmousi		
Rouphas(?)	Monastery of Kyrmousi(?)		
Monochoro(?)			
Gergeri(?)			
Panassos(?)			
Apomarmas(?)			
Mitropoli			

Some settlements may be of pre-twelfth-century date. Uncertain twelth-century sites = (?).

TABLE 14.5. Chronological distribution of finds in sites from survey area

Site No.	Late Roman	Byzantine	Venetian	Ottoman
26 (A 38, 39, 40)	+			
10 (A 19)	+			
91 (B 36)	+			
63 (B 5)	+	+		
96 (B 41)	+		+	+
32 (A 49/B 13)	+	?	+	+
33 (A 50)	+	+	+	+
43 (A 61)		+ (11th–12th)		
27 (A 41/42)		?	+ (13th–14th/15th)	
29 (A 46)		+	+	
20 (A 30)		+	+	?
40 (A 58)		+	+	+
58 (Voroi)		+	+	+
97 (B 42)			+ (13th–14th/15th)	

continued on next page

Table 14.5. Chronological distribution of finds in sites from survey area *(continued)*

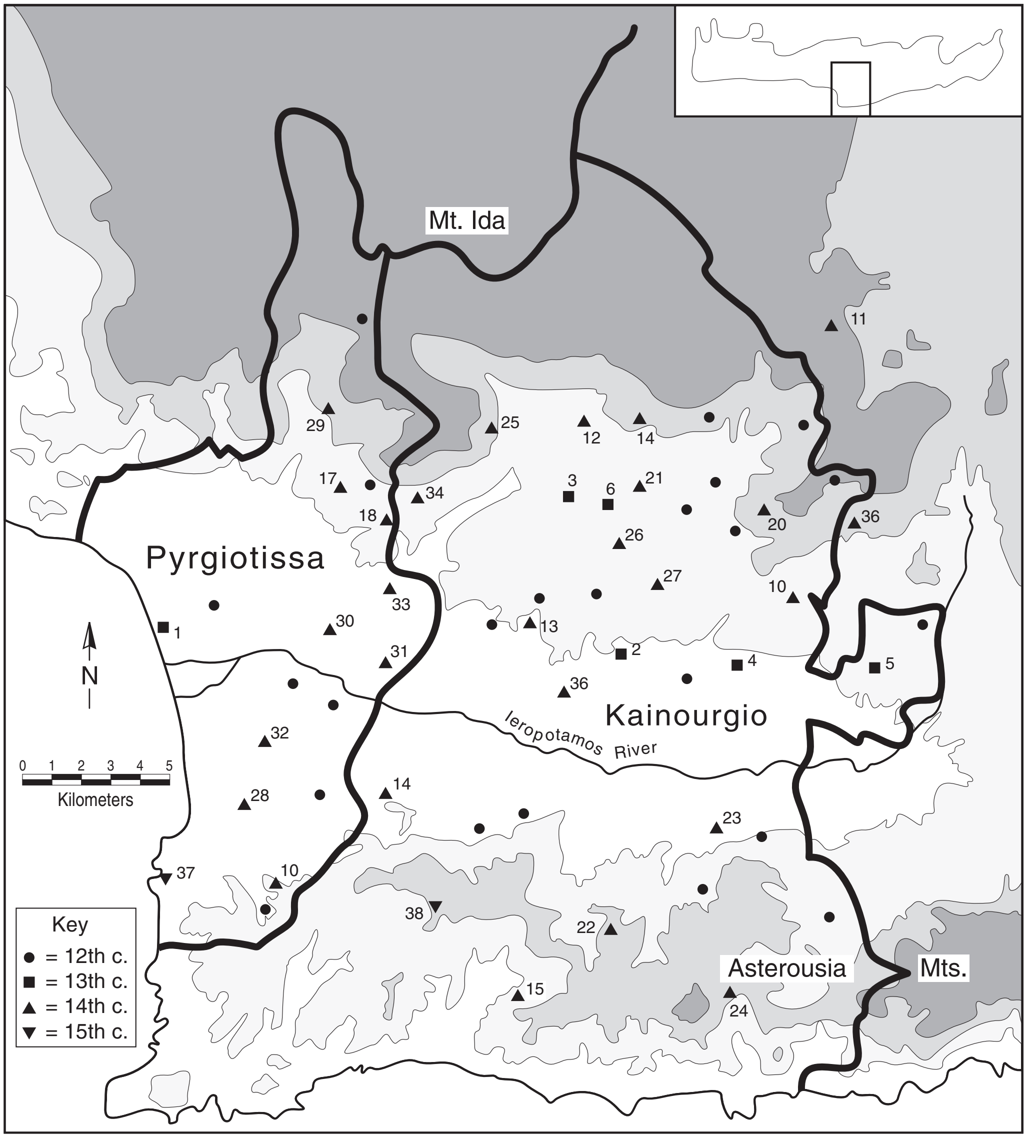
Site No.	Late Roman	Byzantine	Venetian	Ottoman
8 (A 16)			+	+
19 (A 29)			+	+
42 (A 60)				?
10 (A 19)				+
22 (A 32)				+
52 (Ap 4)				+
102 (B 47)				+

The Venetian Period (1210/1211–1669)

Settlements

All but three of the settlements of the Second Byzantine period are mentioned in thirteenth century sources, but there are very few (six or seven) settlements appearing for the first time in the thirteenth century. Two of these are the actual seats of the *castellaniae*, namely Castel Nuovo and Castel Priotissa (Pyrgiotissa), while the rest are mentioned in fourteenth-century sources and their existence in the thirteenth century can be postulated (see table 14.6). After the twelfth century, there are two periods in the *Venetokratia*, namely in the fourteenth and the sixteenth centuries when great numbers of villages appear for the first time (see tables 14.6, 14.9, and figure 14.7). Data from our archaeological survey shows the same increase in sites (figure 14.8). We do not know whether these villages simply appear for the first time in the sources, or they were new foundations. Given the historical circumstances of the fourteenth century, however, it is hard to envisage the extensive foundation of new villages at that time. Most of the twenty-nine or thirty new settlements that first appeared in the fourteenth-century sources must have been older villages. Conversely, it is not very clear why the thirteenth- and fifteenth-century sources mention so few (new) settlements. If this is understandable for the thirteenth century, the first period of Venetian rule, it is less so for the fifteenth century, when political circumstances were much more favorable. In any case, the more or less complete lists of villages provided by the first Venetian descriptions and/or censuses of Crete during the sixteenth century show that the information from other available sources (mainly notarial acts) of the previous centuries is incomplete.

The two main sixteenth-century lists of settlements are the works of Barozzi (1577) and Castrofilaca (1583). Barozzi gives a total of 83 settlements for the two provinces (58 for Kainourgio and 25 for Pyrgiotissa), while Castrofilaca gives 84 (61 for Kainourgio and 23 for Pyrgiotissa) (figure 14.9). The difference lies in the fact that, in the case of Kainourgio, Barozzi omits four villages (Gorgorimo, Novo Proprio, Petrokefali, and Vico) included by Castrofilaca, while Castrofilaca omits one village (Paliokefala) added by Barozzi. For Pyrgiotissa, Castrofilaca omits three settlements (Matala, Agios Antonios Andilaras, and Tymbaki) existing in Barozzi's list, while Barozzi omits one (Agios Andreas) given by Castrofilaca. Twenty-nine of the settlements mentioned in these lists, that is, a considerable 35%, appear for the first time. Some of these can be new foundations made between the fourteenth and the sixteenth centuries, while the rest were probably older settlements that were not mentioned in previous sources. Fifty years after the census of Castrofilaca (1583), Basilicata's list of villages in 1630 is identical to that of Castrofilaca, containing all the settlements mentioned by the latter. This, in our opinion, means that the frequent appearance of "new" settlements before 1583 is due primarily to the fact that no source prior to the sixteenth century offers a compehensive list of settlements. If such a list did exist for the fourteenth century, we assume that the settlements first appearing in the



1. Pyrgiotissa
2. Castel Nuovo
3. Kourtes
4. Agioi Deka
5. Gangeles
6. Panagia
7. Vico (not located)
8. Thau (not located)
9. Anemuni (not located)
10. Agios Andreas
11. Prinias
12. Zaros
13. Vreli
14. Nivritos
15. Antiskari
16. Vourvoulitis
17. Kalochorafitis
18. Kissoi
19. Kouses
20. Raftis
21. Paliama
22. Agios Kirillos
23. Apesokari
24. Krotos
25. Messiskli
26. Moroni
27. Plouti
28. Pitsidia
29. Grigoria
30. Voroi
31. Kalivia
32. Kamilari
33. Potamitis
34. Skourvoula
35. Kato Moulia
36. Moires
37. Matala
38. Pigaidakia

FIGURE 14.7. First appearance of twelfth–fifteenth century settlements in literary sources. Names for some twelfth century sites are unknown.

sixteenth-century censuses would have been fewer in number.

One notable characteristic of Cretan settlements is their continuity during the period of Venetian rule and onward into the nineteenth century. A total of 14 settlement sites is known from literary sources in the two provinces (107 in Kainourgio and 33 in Pyrgiotissa: see appendix G). Five of these sites (Gortyn, Kaloi Limenes, Lasaia, Lebena, and Matala) are Late

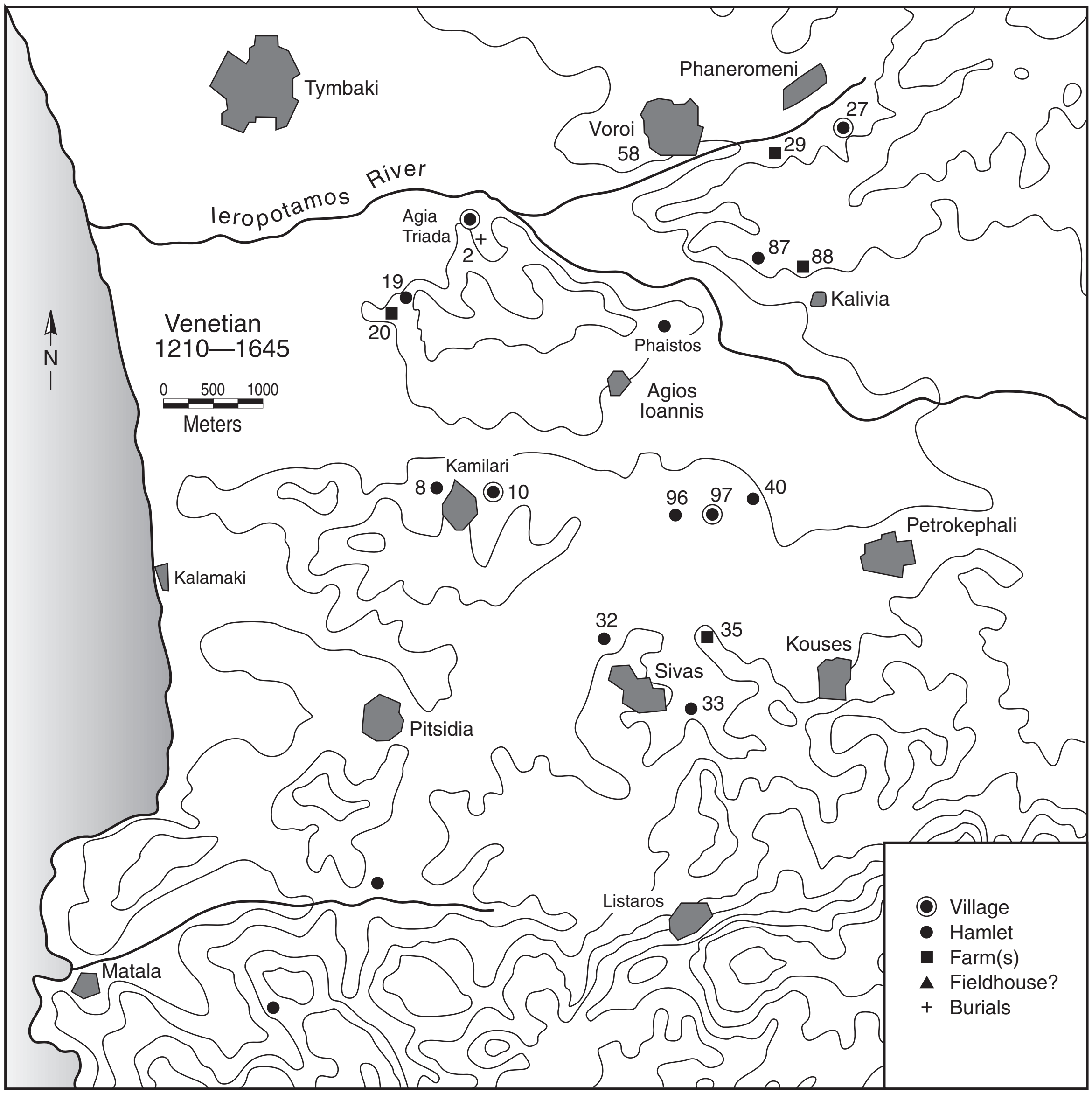
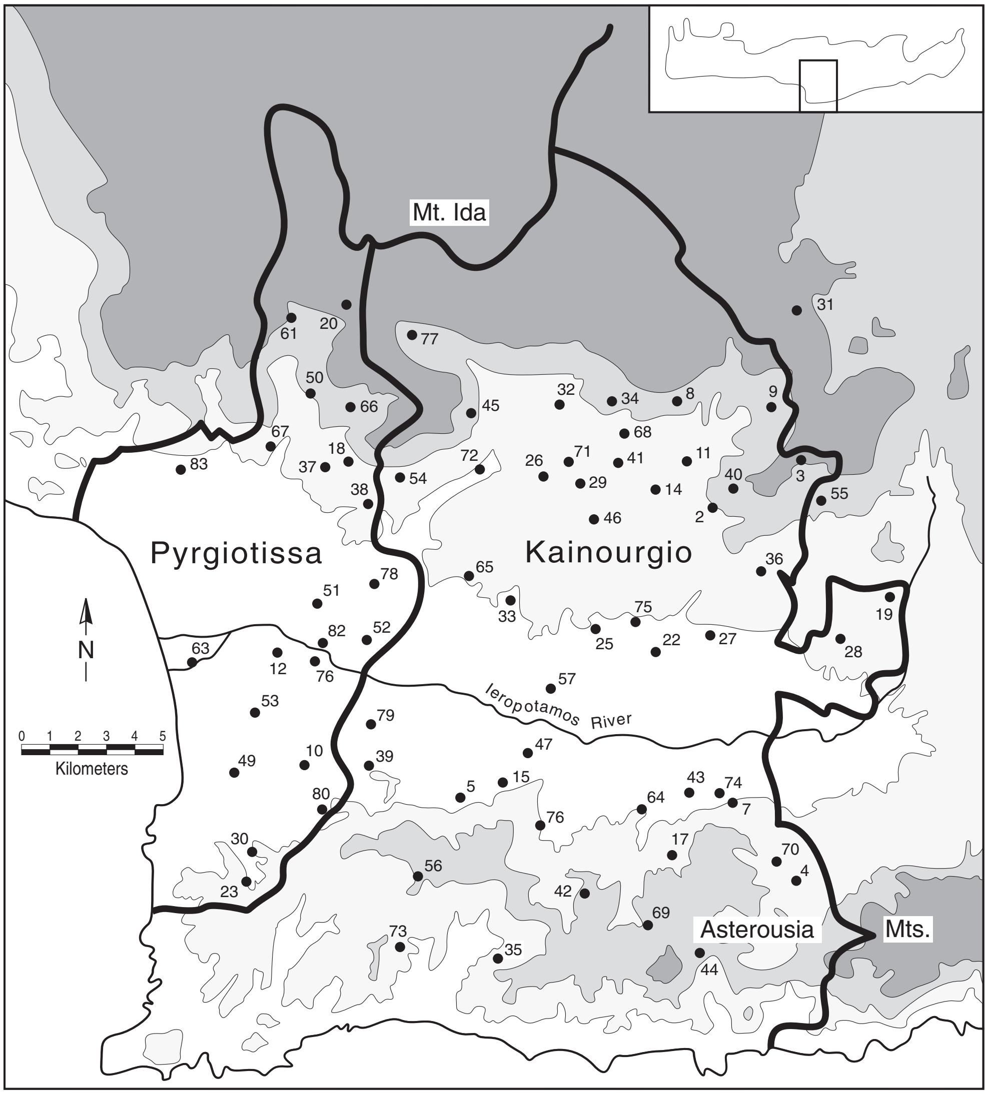


Figure 14.8. Map of Venetian period sites in the survey area of the Western Mesara. Site numbers correspond to those in Appendix D.

Roman/Early Byzantine sites, which ceased to exist after the seventh-century. Gortyn was replaced quite early on by Mitropoli (Di Vita 199:262), while Kaloi Limenes and Matala survived only as place-names. Of the remaining 135 settlements, 33 are mentioned only in the Ottoman period and are discussed below. This leaves us with 102 settlements, a number of which, between 17 and 24, were Byzantine in origin. The remainder are Venetian, in the sense that they appear for the first time in Venetian sources. Of these 102 settlements, 17 (17%) disappeared by the end of the Venetian period or the first years of Ottoman rule, as they are mentioned for the last time either in the final Venetian description of 1630 or in the first Ottoman census of 1671. The rest, an impressive 84%, survived through the nineteenth century, most of them to its end (see tables 14.3–14.5).



1. Agios Konstantinos (not located)
2. Nassi
3. Apano Moulia
4. Vassiliki
5. Pobia
6. Monochoro
7. Anogeia
8. Gergeri
9. Panassos
10. Siva
11. Apomarma
12. Agia Triada
13. Apolychnos
14. Kyrmousi
15. Alithini
16. Agioa Ioannis
17. Agia Marina
18. Temeneli
19. Vali
20. Kamares
21. Rouphas
22. Mitropoli
23. Ethia
24. Viko (not located)
25. Castel Novo
26. Kourtes
27. Agioi Deka
28. Gangales
29. Panagia
30. Agios Andreas
31. Prinias
32. Zaros
22. Vreli (Paleo Chorio)
34. Nivritos
35. Antiskari
36. Vourvoulitis
37. Kalochorafitis
38. Kissoi
39. Kouses
40. Raftis
41. Paliama
42. Agios Kirillos
43. Apesokari
44. Krotos
45. Mesiskli
46. Moroni
47. Peri
48. Plouti
49. Pitsidia
50. Grigoria
51. Voroi
52. Kalivia
53. Kamilari
54. Skourvoula
55. Kato Moulia
56. Pigaidakia
57. Azogyreas
58. Flabanochori (not located)
59. Ampadochori (not located)
60. Koutsounari (not located)
61. Chilia Vrysi
62. Gorgorimo (not located)
63. Sympallousa
64. Plora
65. Galia
66. Magarikari
67. Mournidi
68. Drousi
69. Miamou
70. Kandila
71. Keramos
72. Laloumas
73. Gialomonochoro
74. Flathiakes
75. Ampelouzous
76. Trypita
77. Voriza
78. Phaneromeni
79. Petrokephali
80. Listaros
81. Psallida (not located)
82. Falandra
83. Klima
84. Kamaria (not located)

FIGURE 14.9. Map of villages mentioned by Castrofilaca in 1583

Population

For population numbers, our information before the late Venetian period is extremely rare, and it is only in the description of Castrofilaca in 1583 that we have for the first time a systematic and detailed census of all the villages in the Mesara. Castrofilaca (figure 14.9) provides a solid picture for that time, but the lack of previous or later information makes it impossible to determine the evolution of the population or its development after the Ottoman conquest. The data provided by Castrofilaca, nevertheless, is quite detailed: Not only do we have the total number of inhabitants for each settlement, but the population of each village is broken down into four categories, namely *homini da fatti*, *putti*, *vecchi*, and *donne* (men 14 to 60 years of age, male children, old men, and women of all ages), giving us insight into the composition of the population. The number of inhabitants in the settlements (see table 14.6) varies from only 5 (Ampadochori) to a maximum of 644 (Castel Novo, the capital of Kainourgio).

In Pyrgiotissa the settlements are not only fewer, but also smaller in size. The largest settlement (Agia Triada) has 312 inhabitants and all the rest are under 200, while in Kainourgio there are sixteen settlements with over 200 inhabitants besides Castel Novo. If we exclude the largest and the smallest settlement in each province, we have an average of 151.1 inhabitants per village for Kainourgio and 106.7 for Pyrgiotissa. The average for Kainourgio drops to 146.5 if we add the six villages considered outside of the province in Castrofilaca, given at the end of the list in table 14.6, but the difference is still considerable. The list of Castrofilaca for the two provinces gives a combined average of 144.8 inhabitants per village (11,729 inhabitants in 81 settlements). For the sake of comparison, in 1881, after a considerable increase in population in the second half of the nineteenth century, the two provinces had a total of 12,900 inhabitants in 70 settlements, with an average of 184.2 inhabitants per village, an increase in population from 1583 of just under 10%. It is noteworthy that in thirty-two out of fifty-nine cases (54.2%) where we have comparable data, the population of the same settlement was higher in 1583 than in 1881.

In 1689 the census of Corner in the Peloponnese (provinces of Modon, Coron, Arkadia, Fanari, and Patras) gave a total of 16,179 inhabitants in 282 settlements (Panagiotopoulos 1985:225–230), that is, an average of 57.3 inhabitants per settlement, almost one third of the corresponding average in Kainourgio and Pyrgiotissa. A greater percentage of the settlements in Kaingourio and Pyrgiotissa (35 out of 81, that is, 43.2%) had a population of less than 100 inhabitants, while twenty-eight (34.5%) had 100–199 inhabitants, eight (9.8%) had 200–299, and finally, ten settlements had over 300 inhabitants (12.3%). About half of the population lived in settlements with less than 200 inhabitants, while the ten settlements with over 300 inhabitants, including the capital of Kainourgio, contained 31% of the population. The remaining 20% of the inhabitants lived in villages with a population between 200 and 299 people.

The four categories of population given by Castrofilaca can in some cases be compared with similar data of other regions and/or periods. It is immediately obvious that the total male population was unusually higher than that of the female: 54.8% males to 45.2% of females, or 121.5 men to 100 women. In 1602 in the outskirts of the city of Corfu the ratio was 115.4 men to 100 women, while in the Peloponnese in 1689 the ratio was 117.6 men to 100 women (Panagiotopoulos 1985). The corresponding ratio in 1881 for Kainourgio and Pyrgiotissa was 104 men to 100 women, or 51%–49%, with only 2% more males instead of over 9.5% in 1583. Thus, by any standard, that is, there seemed to be a considerable shortage of women in these two provinces in 1583.

The second characteristic is that the number of boys under fourteen years in the male population is high, at 45.4% of the total number of men. In 1689 in the Peloponnese it was only 34.3% (Panagiotopoulos 1985), but in 1602 in Corfu it was even higher than in Crete, at 46.7%. On the other hand, the number of men over sixty years was low, only 3.3% of the total number of males, while in 1700 in the province of Napoli di Romania in the Peloponnese it was almost double at 6.06% (Panagiotopoulos 1985:234). But in 1602 in the outskirts of Corfu it was half of that of Crete, at just 1.5%. This points to a much shorter life expectancy in Corfu, with Crete somewhere in the middle between Corfu and the Peloponnese.

TABLE 14.6. Villages of the Western Mesara and their population in 1583

Kainourgio			Pyrgiotissa		
Agia Marina	25		Agia Triada	150	(48)
Agioi Deka	308	(254)	Agios Andreas	69	
Agios Kirillos	156	(95)			
Agios Konstantinos	34		Agios Ioannis	89	(151)
Alithini	161	(126)	Ampadochori	5	
Ampelouzos	158	(234)			
Anogeia Apano	50				
Anogeia Kato	271	(243)			
Antiskari	214	(162)			
Apesokari	104	(117)			
Apolychnos	100	(31)			
Apomarmas	73	(43)			
Azogyreas	87				
Castel Novo	644	(74)	Chlia Vrysi	31	
Drosoi	32	(39)	Ethia	66	
			Falandra	41	
			Phaneromeni	141	(203)
Flabanochori	30				
Flathiakes	82	(108)			
Galia	120	(65)			
Gergeri	500	(625)			
Gialomonochoro	207	(52)	Grigoria	186	(184)
Gorgorimo	54		Kalochorafitis	108	(71)
			Kalivia	151	(100)
			Kamares	113	(210)
Kamaria	196	(121)	Kamilari	77	(312)
Kandila see Kamaria					
Keramos	44		Kissoi	157	(124)
Kitia	57				
Kourtes	172	(150)			

TABLE 14.6. Villages of the Western Mesara and their population in 1583 *(continued)*

Kainourgio			Pyrgiotissa		
Kouses	76	(236)			
			Koutsounari	75	
Kyrmousi	31	(50)			
Laloumas	39	(18)			
Listaros	72	(76)			
			Magarikari	140	(205)
Mesiskli	88				
Miamou	204	(281)			
Mitropoli	147	(168)			
Monochoro	86	(31)			
Moroni Kato	120	(287)			
Moroni Apano	49				
Moulia Ap- Kato (Ap)	119	(175)			
			Mournidi	65	
Nassi	76				
Nivritos	210	(157)			
Paleo Chorio see Vreli					
Paliama	66	(36)			
Panagia	56	(62)			
Panassos	319	(207)			
Peri	145	(98)			
Petrokefali	139	(377)			
Pigaidakia	319	(133)			
			Pitsidia	189	(417)
Plora	167	(230)			
Plouti	146	(74)			
Pobia	399	(838)			
Psallida	60				
Raftis	224	(121)			
Rouphas	424	(118)			
			Siva	156	(357)
Skourvoula	104	(132)			
			Sympallousa	25	
			Temeneli	99	(35)
Trypita	147	(18)			
Vassiliki	406	(175)			
Viko	87				
Voriza	281	(547)			
			Voroi	312	(381)

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TABLE 14.6. Villages of the Western Mesara and their population in 1583 *(continued)*

Kainourgio			Pyrgiotissa	
Vourvoulitis	108	(52)		
Vreli [Paleo Chorio]	303	(112)		
Zaros	266	(711)		
*Gangales	253	(160)		
*Klima (Amari)	52	(166)		
*Krotos (Monof)	117	(115)		
*Prinias Apano (Monof)	59	(65)		
*Prinias Kato (Monof)	48			
*Vali (Monof)	85	(92)		
Settlements:	59	(+ *6=65)	22	
Inhabitants:	9,362 (+ *614 = 9,976)			2,445

From Castrofilaca 1583. Numbers in brackets parentheses ( ) = inhabitants in 1881 (see figure 14.9).

* Settlements belonging to the province of Kainourgio at various periods, but outside this province at the time of Castrofilaca.

TABLE 14.7. Composition of the population of Kainourgio and Pyrgiotissa in 1583

Settlement	Homini da Fatti	Putti	Vecchi	Donne	Total	
Agia Marina	6	8	—	11	25	
Agia Triada	53	27	2	68	150	(48)
Agioi Deka	88	69	3	148	308	(254)
Agios Andreas	24	15	1	29	69	
Agios Kirillos	41	45	3	67	156	(95)
Agios Konstantinos	7	7	1	19	34	
Agios Ioannis	23	24	2	40	89	(151)
Alithini	42	45	1	73	161	(126)
Ampadochori	3	2	—	—	5	
Ampelouzos	40	40	6	72	158	(234)
Anogeia Apano	14	18	—	18	50	
Anogeia Kato	78	86	3	104	271	(243)
Antiskari	61	60	6	87	214	(162)
Apesokari	26	22	3	53	104	(117)
Apolychnos	30	20	—	50	100	(31)
Apomarmas	24	16	1	32	73	(43)
Azogyreas	24	19	2	42	87	
Castel Novo	159	164	11	310	644	(74)
Chlia Vrysi	11	6	1	13	31	
Drosoi	12	5	—	15	32	(39)
Ethia	23	14	—	29	66	

Table 14.7. Composition of the population of Kainourgio and Pyrgiotissa in 1583 *(continued)*

Settlement	Homini da Fatti	Putti	Vecchi	Donne	Total	
Falandra	11	11	—	19	41	
Phaneromeni	44	41	2	54	141	(203)
Flabanochori	10	9	—	11	30	
Flathiakes	20	23	1	38	82	(108)
Galia	41	25	—	54	120	(65)
Gergeri	151	119	15	215	500	(625)
Gialomonochoro	55	55	2	95	207	(52)
Gligoria	46	56	—	84	186	(184)
Gorgorimo	15	14	1	24	54	
Kalochorafitis	37	29	1	41	108	(71)
Kalivia	41	36	1	73	151	(100)
Kamares	26	36	—	51	113	(210)
Kamaria and Kandila	48	51	6	91	196	(121)
Kamilari	29	25	1	22	77	(312)
Kandila see Kamaria						
Keramos	11	7	1	25	44	
Kissoi	63	28	6	60	157	(124)
Kitia	21	10	1	25	57	
Kourtes	33	47	2	90	172	(150)
Kouses	20	21	3	32	76	(236)
Koutsounari	21	11	4	39	75	
Kyrmousi	9	8	1	13	31	(50)
Laloumas	10	8	—	21	39	(18)
Listaros	20	20	1	31	72	(76)
Magarikari	40	36	—	64	140	(205)
Mesiskli	24	20	4	40	88	
Miamou	59	60	2	83	204	(281)
Mitropoli	38	30	2	77	147	(168)
Monochoro	24	27	—	35	86	(31)
Moroni Kato	32	24	4	60	120	(287)
Moroni Apano	15	9	—	25	49	
Moulia Apano	33	36	4	46	119	(175)
Mournidi	17	14	—	34	65	
Nassi	23	14	2	37	76	
Nivritos	61	45	4	100	210	(157)
Paleo Chorio see Vreli						
Paliama	20	11	5	30	66	(36)
Panagia	17	13	1	25	56	(62)
Panassos	94	66	16	143	319	(207)

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TABLE 14.7. Composition of the population of Kainourgio and Pyrgiotissa in 1583 *(continued)*

Settlement	Homini da Fatti	Putti	Vecchi	Donne	Total	
Peri	37	43	2	63	145	(98)
Petrokefali	46	40	2	51	139	(377)
Pigaidakia	99	92	12	116	319	(133)
Pitsidia	54	47	2	86	189	(417)
Plora	45	41	1	80	177	(230)
Plouti	40	39	4	63	146	(74)
Pobia	118	96	4	181	399	(838)
Psallida	24	15	—	21	60	
Raftis	68	43	4	109	224	(121)
Rouphas	102	116	5	201	424	(118)
Siva	52	30	2	72	156	(357)
Skourvoula	30	24	2	48	104	(132)
Sympallousa	6	7	—	12	25	
Temeneli	25	21	—	53	99	(35)
Trypita	48	31	4	64	147	(18)
Vassiliki	111	91	8	196	406	(175)
Viko	24	19	2	42	87	
Voriza	65	87	3	126	281	(547)
Voroi	67	90	4	151	312	(381)
Vourvoulitis	30	31	2	45	108	(52)
Vreli [Paleo Chorio]	86	56	6	155	303	(112)
Zaros	78	73	7	108	266	(711)
Totals	3,323	2,939	215	5,330	11,807	(12,900)

From Castrofilica 1583. Numbers in parentheses ( ) = inhabitants in 1881

TABLE 14.8. Villages of Kainourgio and Pyrgiotissa according to size in 1583

Kainourgio		Pyrgiotissa	
Name	Inhabitants	Name	Inhabitants
Castel Novo	644		
Gergeri	500		
Rouphas	424		
Vassiliki	406		
Pobia	399		
Panassos	319		
Pigaidakia	319	Voroi	312
Agioi Deka	308		

Table 14.8. Villages of Kainourgio and Pyrgiotissa according to size in 1583 *(continued)*

Name	Inhabitants	Name	Inhabitants
Vreli [Paleo Chorio]	303		
Voriza	281		
Anogeia Kato	271		
Zaros	266		
*Gangales	253		
Raftis	224		
Antiskari	214		
Nivritos	210		
Gialomonochoro	207		
Miamou	204		
Kamaria and Kandila	196	Pitsidia	189
Kourtes	172	Gligoria	186
Plora	167	Kissoi	157
Alithini	161	Siva	156
Ampelouzos	158	Kalivia	151
Agios Kirillos	156	Agia Triada	150
Trypita	147	Faneromeni	141
Mitropoli	147	Magarikari	140
Plouti	146	Kamares	113
Peri	145	Kalochorafitis	108
Petrokefali	139		
Moroni Kato	120		
Galia	120		
Moulia Ap- Kato (Ap)	119		
*Krotos (Monof)	117		
Vourvoulitis	108		
Skourvoula	104		
Apesokari	104		
Apolychnos	100		
Mesiskli	88	Temeneli	99
Azogyreas	87	Agios Ioanniis	89
Viko	87	Kamilari	77
Monochoro	86	Kousounari	75
*Vali (Monof)	85	Agios Andreas	69
Flathiakes	82	Ethia	66
Nassi	76	Mournidi	65
Kouses	76	Falandra	41
Apomarmas	73	Chilia Vrysi	31
Listaros	72		

Continued on next page

TABLE 14.8. Villages of Kainourgio and Pyrgiotissa according to size in 1583 *(continued)*

Name	Inhabitants	Name	Inhabitants
Paliama	66		
Psallida	60		
*Prinias Apano (Monof)	59		
Kitia	57		
Panagia	56		
Gorgorimo	54		
*Klima (Amari)	52		
Anogeia Apano	50		
Moroni Apano	49		
*Prinias Kato (Monof)	48		
Keramos	44		
Laloumas	39		
Agios Konstantinos	34		
Drosoi	32		
Kyrmousi	31		
Flabanochori	30		
Agia Marina	25	Ampodochori	5
Settlements	59 (+ *6=65)	22	
Inhabitants	9.362 (+ *614=9,976)		2,445

* Settlements belonging to the province of Kainourgio at various periods, but outside this province at the time of Castrofilaca.
Source: Castrofilaca 1583.

TABLE 14.9. First and last mention of settlements that had disappeared by 1630/1670

Kainourgio			Pyrgiotissa		
Name	First Mention	Last Mention	Name	First Mention	Last Mention
Ag. Konstantinos	12th/13th c.	1630	Agios Antonios Andilaras	1577	1580/1590
Anemouni	1373		Ampadochori	1577	1630
Azogyreas	1577	1630	Chlia Vrysi	1577	1671
Camethachi	12th/13th c.	1271	Koutsounari	1577	1583
Kitia	1577	1671			
Flabanochori	1537	1630			
Kamaria	1577	1583			
Nassi	12th/13th c.	1630			
Paliokefala	1577				
Thau	1340				
Vidho	1583				
Viko	1301	1630			

The smaller number of women also probably points to a higher mortality rate, perhaps resulting from high birth hazards. In 1602, the girls under fourteen or sixteen years of age were 47.9% of the female population, but in the Peloponnese in 1689 they were only 29.9%, and in 1700 35.9% (Panagiotopoulos 1985:225–230 and 234, respectively). If girls under fourteen comprised circa 45% of the female population, then the ratio of the females could be about 3,132 adult females to about 2,398 girls under fourteen years. In this case the composition of the adult population could have been 3,538 adult males to about 3,132 adult females (112.9 men to 100 women, 53 to 47%), while the difference between boys and girls under fourteen years could be 2,939 boys to about 2,398 girls (122.5 boys to 100 girls, 55 to 45%). This shows that, as the population grew older, females fared better than men as far as mortality rates were concerned.

LANDOWNERSHIP AND LAND USE

The Venetian conquest of Crete meant that the land, almost in its entirety, came under Venetian ownership. Theoretically the land was divided into three parts, one of which was given to the new settlers, that is, Venetian fief-holders. A second part was kept by the state, and a third part was held by the church. Nevertheless, a few powerful Greeks, after bitter struggles, managed to force Venice to accept their right to previous landholdings, with the result that quite a few Greeks later on became owners of fiefs. Some relatively important Greek families were established in villages of the Mesara: the Phocas family was established in Vassiliki Anogeia, Monochoro was the seat of the Mousouros family, in Kissoi lived the Gavalas family, while Kouses (Watrous et al. 1993: Plates 55 a–b) was the seat of the Kourmoulis family. Most of these families claimed to be able to, or could, trace their names back to the Byzantine period. More often than not, the villages were part of several fiefs, in the sense that different parts of the lands of a settlement and of its inhabitants were owned by different fief-holders. Although the Venetians kept detailed registers of the fiefs, of their divisions, and of the succession of their owners, some of which survive today, most of the extant registers remain unpublished. Consequently we have a fragmentary idea of the succession of owners, and we know only who the owner or the exploiter of a fief was at a particular time.

We know, for instance, that Vassiliki Anogeia in 1300 belonged to Georgius Litino (Pizolo 1975–1985: nos. 97, 98), while Apomarmas in 1271 and 1302 was owned by Giacomo Mudacio (Scardon 1942: no. 117; Brixano 1950: no. 524). Kourtes in 1367 and 1415 belonged to the family of Petrus Ialina (Gasparis 1997:320f, 387). Until the mid-fourteenth century, Krotos belonged to Petrus Stadi and Marcus Fontanela, and later it came into the possession of Franciscus Grimaldo (Theotokis 1933a:193–194). In the same period Martsalos belonged to Ancollus Tedaldo, who sublet its revenue to a Greek (de Fredo 1968: no. 30). In 1265 half a *serventaria* (one-sixth of a fief) of Monochoro belonging to a Greek, Leo Metaxari, was given to another Greek, Orfaniakis (Gerland 1899:80), while in 1320 one and a half *serventarie* in the village were in the possession of the Gradonico family. The important Corner family owned land in Pitsidia in 1328 (Gasparis 1997:101, 305) and in Nassi in 1365 (Santschi 1976:10 no. 37). Before 1369 the *serventarie* of Pala and Picidia, probably comprising land different from that owned by the Corner family, belonged to Iohannes and Ludovicus Habramo. These two sold the land to Benedictus Zane, but Zane failed to pay the price and the *serventarie* were resold (Santschi 1976:31–32, nos. 136–137). In the fourteenth century, the family of Pasqualigo owned land both in Prinias and Agios Andreas (Gasparis 1997:312–315). In the seventeenth century, members of the well-known families such as the Barbarigo, Calergi, Dandolo, Dolfin, Fradello, Lombardo, de Mezo, Pasqualigo, Querini, Trivisan, Venier, and Zen owned no less than eighty-seven churches and presumably lands in the province of Castel Novo and sixteen churches in Pyrgiotissa (see tables 14.28–14.31). Apart from private individuals, extensive lands were owned or exploited by the church and in particular by the monasteries. The latter grew sharply in numbers and landholdings during the fifteenth and sixteenth centuries in Crete. Some of the most important of these monasteries existed in the Mesara, and the land they held made them economic powers within the region, although the monasteries themselves could be part of a fief-holder's estate (see "The Monasteries," below).

The land owned by the fief-holders, either individuals or institutions, such as the state, church, or charitable institutions, was cultivated by the villagers, who were divided in two main categories, the *villani* and the *franchi*. The main difference between the two was that the *villani* had to pay a personal tax to the fief-holder, while the *franchi* did not. On the other hand, the *villani* of the state were better off than the serfs owned by private individuals. Slaves working in the fields did exist but their number was small. Cultivators held the land under various forms of concession, their main obligation being to give the landlord one-third of the produce, plus the corvees and the other usual and unusual donations. In some cases, we have more information about the size, the total produce, or the landlord's revenue of a fief or part of it. In 1369 the two *serventarie* of Pala and Picidia mentioned above were sold for 2,150 *hyperpyra* (a Byzantine gold coin), but in 1248 part of the land of Agia Marina given to fief holders had a revenue of only three *hyperpyra* annually (Tsirpanlis 1985: 189, No. 105 III). In 1415 the *serventaria* of Kourtes, divided among the heirs of Petrus Ialina, comprised twenty-one households of "*franchi*" and "*villani*"; land of twenty-one "oxen" (a land measure), producing 537 $^1/2$ *mensure* (one *mensura* is approximately 15 *okades* or 19. 2 kilograms) of wheat and 107 $^1/2$ of barley; pasture land whose rent was worth twenty-three *hyperpyra* and four *grossi* (a silver coin, a division of the ducat); various orchards that were rented for thirty *hyperpyra* and 3 *grossi*. In all the *serventaria* was worth 228 *hyperpyra* and ten *grossi* (Gasparis 1997:320–323). In 1497 the income of the villages Pobia and Pigaidakia was auctioned and was finally bought by Alexandro Dradua for 4,250 *hyperpyra* for 4 $^1/2$ years (Ploumidis 1974b:287), while at some time before 1572 the village of Sivas was auctioned and bought by Nicolo Paleologo for the sum of 5,515 *hyperpyra* (Mertzios 1964:175). On the other hand, one fourth of a *serventaria* of Agios Andreas in 1389 had an income of seventy-four *hyperpyra* annually (Gasparis 1997:314).

The most detailed description of the possessions (or part of them: it is not clear whether or not the part divided between the two fief-holders coincides with the entire village) and the inhabitants of a village in Mesara is provided by the division of the village of Raftis in 1414 between Nicolaus Dandolo and Andreas Calica. There were fifty-six households of *villani* and *franchi* in the village and the land of its territory comprised 42 $^1/4$ oxen of cultivated fields (apparently producing grain), thirty-two vineyards, ten "*xerizampela*" (old vineyards), five orchards, and two mills (Gasparis 1997:59, 60, 220–223, and Tables 37–39, pp. 289–292). In terms of the composition of the population of Raftis, more than $^3/4$ of its inhabitants were *franchi* (78%, 44 of the 56 households) and less than $^1/4$ were *villani*. Of these forty-four "free" peasants, a very high percentage (41%, eighteen households, of which eight are headed by women) possessed no land at all, while only one of the 12 *villani* was mentioned as having no land. As a result, a number of *villani* were in a much better financial position than some "free" peasants. Some of the land of the village, however, was possessed or cultivated by people living outside it. More than half of the inhabitants of Raftis, both free and *villani*, possessed both grain-producing fields and vineyards, grain and wine being the two main products of the region. Of the fifty-six households, thirty-three (plus three "outsiders") possessed land, sharing in this way an average of 1.17 oxen of land per household. On the other hand, twenty-four inhabitants (plus eight outsiders) possessed vineyards, sharing one vineyard per farmer. In other words, the average farmer in Raftis possessed about one "ox" of grain-producing land and one vineyard. As far as quantity of production was concerned, one "ox" of land produced between 90–120 *mensure* of grain (between 1,755 and 2,340 liters; the *mensura* or *muzuri* is computed at about 19.5 kg in Stavrinides 1975–1985:II, 253 (1685); III, 70–71 [1720]), depending on the quality of the land, while a vineyard of an average 8 "workers" in size produced approximately sixty-eight *mistata* of must (about 612–850 liters at between 9 and 12.5 liter a *mistato*: Schilbach 1970:142–143). The maximum production of both these products, however, could not provide the household with the income necessary for their survival, without additional sources of revenue (Gasparis 1997:224–225).

The commune, that is, the state, was a considerable owner of land in various areas of the

Mesara. In the sixteenth century state-owned lands existed in the areas of Vreli, Messiskli, Kandila, and Matala, as inferred from the revenues received from their leaseholders mentioned in the census of 1583. Pierro de Veggia held a lease at Vreli worth 16 *hyperpyra* and 9 *grossi*. In Kandila, the lease of Andrian Tron was worth 72 *hyperpyra*. At Matala Giacomin Notara and Antonio da Grado possessed leases worth 270 and 125 *hyperpyra*. In Messiskli, Francesco, Lorenzo, and Antonio da Vegga held a lease of 178 *hyperpyra*, 3 *grossi*; Antonio da Grado and Marco Venier held leases, each worth 127 *hyperpyra*, five *grossi* (see table 14.6). In 1308 the village of Agia Triada was leased by the commune to one Iohanninus Fradello (Tsirpanlis 1985: No. 224), while in 1357–1358 the Duca di Candia Philippus Aurio settled a number of "*franchi*" to cultivate state lands in the area of Castro Novo (Theotokis 1933a:96). These state-owned lands in the area between Castro Novo and Pyrgiotissa were called *frangotopoi*, apparently because they were free from feudal obligations and/or were cultivated by *franchi*. In 1541, after the concession of Nauplion and Monemvasia by Venice to the Turks in 1540, a number of *stradioti* (mercenaries) from Nauplion had been given land in these *frangotopoi*, but in 1548 refugees from Nauplion and Monemvasia were settled there. We have a detailed description of the division of land among the eight refugee families established in this area, which permits us to understand the type of land owned by the state, the type of holdings that the *stradioti* previously owned, and the land that the actual cultivators possessed (Kolyva-Karaleka and Moatsos 1983).

There were twenty-one *stradioti* with their captain, plus the widow of the previous captain, who shared 1,496 *mensure* of land in Kainourgio (one *mensura* or *mouzouri* of land was equal to approximately 400 m^2 (Gasparis 1997:52), although in the Mesara it seems to have equaled 1,000 m^2 or even more (Platakis 1975a:81; Psilakis 1992/1993:328). Apart from the Captain and the widow, who had a greater share than the rest, it is immediately obvious that the share of the *stradioti* varied according to their rank, from a maximum of seventy to a minimum of sixteen *mensure* of land (see table 14.11). The eight refugee families from Nauplion and Monemvasia were given 1,563 *mensure* of land in Kainourgio, and 181 *mensure* in Pyrgiotissa, plus a total annual revenue from orchards and other holdings of 334 *hyperpyra*. Their share in the *frangotopoi* of Kainourgio, according to the amount of compensation that each one of the refugees was entitled to receive, ranged from a maximum of 406.5 to a minimum of 104 *mensure* of land (see table 14.10). Obviously the eight refugee families were of a significantly higher social status than the simple *stradioti*, although the *Protopapas* of Nauplion and the Captain of the *stradioti* seem to have been equals. At the other end of the scale, the farmers themselves leased much smaller portions, which ranged from a maximum of 16 to a minimum of 10 *mensure* of land, thus starting at the other end of the social scale of the *stradioti* (see table 14.12).

Significantly, there were only grain fields and orchards divided among the settlers, but no vineyards. This may indicate that the land in a particular area was not suitable for vine cultivation or, more probably, that the state favored the growth of grain in lands owned by the commune. The existence of a mill within divided lands shows that local grain was milled on the spot. The grain fields were divided physically, that is, as an extent of land, while the orchards and fruit trees were divided as amounts of annual revenue. In both cases, the new owners received the revenue due to them without, apparently, any change in those who actually cultivated the land. Thirty-five years later, in 1583, Castrofilaca (1583: c. 15r) noted that the state received from the *frangotopoi* of Kainourgio and Pyrgiotissa 1,800 *ducats* in revenue. This division of land (*moirasia*) seems to have produced the place-name Moires (allotments) by which the locality and its later settlement became known.

Despite a change in the masters of Crete, changes in cultivation and the use of land were gradual and long-term. These included a growing emphasis on viticulture, and later an increase in the production of olive oil. Specialized cultivation existed in various areas, such as the planting of flax along the banks of the Ieropotamos or cotton near Vassiliki Anogeia, as well as the complementary cultivation of orchards and fruit trees. Generally, however, the Mesara Plain remained a grain and wine-producing region.

TABLE 14.10. Size of the landholdings, in *mensure*, of the Nauplion and Monemvasia refugees in Kainourgio (1548)

Name of Landholder	Location		Total
	Kampos	Kefala	
Nikolas Malaxos (Protopapas)	199	207.5	406.5
George Tryphon	106	110.5	216.5
Bella Dalegge	106	110.5	216.5
Agnes Denassin	84.5	88	172.5
Markos Denassin	84.5	88	172.5
John Denassin	84.5	57	141.5
Maroula Zygomala	62.5	65.5	128
Marina Moro	50.5	53.5	104
Mensure	782.5	780.5	1,563

TABLE 1 4.11. Size of the landholdings of the Strateia of Nauplion in Kainourgio in *livellum* (1541–1548)

Name of Landholder	Location		Total
	Kampos	Kefala	
Captain J. Mormori	94 38 95	28 160 150	245 405
Widow of Captain Fr. Denassin	50	50	100
Ludovico Denassin	35	35	70
Nikolaos Psaras	35	35	70
Dimitris Psaras	30	35	65
Dimitrios Katelos	32	32	64
Iohannis Spiliotis	32	32	64
Michael Spiliotis	32	32	64
Stamatis Skouras	32	32	64
Nikolas Palaiologos	32	32	64
Nikolo Fontana	30	30	60
Nikolaos Podaros	29	29	58
Nikiphoros Lionis (Leon)	24	24	48
Alexander Fontana	20	20	40
Theotokis Charkotouvis	18	18	36
Dimas Poliouras	16	16	32
Gionis Bartzis	16	16	32
Martis Bartzis	16	16	32
George Spiliotis	16	16	32
George Kladouris	16	16	32
Manolis Kladouris	16	16	32
Ginis Bartzis	—	16	16
George Mourmouris (Mormori)	—	16	16
Mensure	716	780	1,496

Livellum is rent paid for a piece of land.

Source: Kolyva-Karaleka and Moatsos 1983:418–419.

Table 14.12. Size of the landholdings of Pyrgiotissa farmers given to refugees in 1548

Name	Land of First Quality	Land of Second Quality	Total
George Skarlatos	16		16
Michael Zervopoulos	16 (+ 1 mill)		16
Vidalis Namatas	16		16
John Pavias	15		15
Michael Serepetzis	14		14
Michael Namatas	12		12
Manolis Namatas	10		10
George Kynegos		14 + 4	18
Nikolas Agiostefanitis		16	16
Frangias Chlamouris		12	12
Maris Pavlopoulos		12	12
"Tou livadiou"		12	12
"Tou papa"		0	10
Mensure	99	80	179

Source: Kolyva-Karaleka and Moatsos 1983: 405–408.

The Ottoman Period (1669–1898)

Settlements and Population

The first Ottoman census in 1671 mentions sixty-one villages in Kainourgio and twenty-four in Pyrgiotissa (Stavrinides 1975–1985:II, 122–126). Nine settlements are encountered for the first and only time in this census, and one other appears for the first time in 1671 and is then mentioned again in 1731. In all, we have references to only thirty-three new settlements in the Ottoman period. Two more (Fradio and Xeri Kara) are also listed for the first time. However, it is stated that they were given as fiefs to the leader of the Ottoman army in 1650, and thus they were in fact Venetian sites. There is a strong possibility that at least some of the other settlements were late Venetian sites as well. The remaining eighteen settlements appear at various instances in the Ottoman period. Within our survey area, there is also an increase from sixteen to nineteen archaeological sites (figure 14.10). Survey area sites include churches (plate 14.1) and two Early Venetian habitation sites (**27** and **97**) that did not continue beyond the fourteenth/fifteenth centuries, while site **27** may have had a Byzantine origin. Sites **8**, **19**, **32**, and **96** show continuous existence from Venetian through to Ottoman times, while sites **20, 32, 33** and **40** are Byzantine sites (or earlier, in the case of site **33**) that continue into the Venetian and Ottoman periods. The church of Agios Pavlos (plate 14.1) at the southwest edge of Agios Ioannis was built in this period, in the thirteenth or fourteenth century. Most of these settlements were small, *metochia*, hamlets or single farmsteads, rather than actual villages. Some of them have been later united or incorporated into the expanding neighboring villages, as it has happened with Kapariana, which is now part of Moires, or Kardamiana, Mastrachiana, and Tzaniana, now part of Gergeri. The location of several smaller settlements remains unknown.

Ottoman censuses were carried out so that the Porte could fix the capitation tax (*cizye*) paid exclusively by male non-Muslim subjects over twelve years of age (Sugar 1977:103; Gibb and Bowen 196/1/2I part ii, 252–253). Most of the relevant Ottoman documents are still unpublished, and thus an estimate of the population based on the poll-tax receipts is only an approximation. This evidence is therefore best used only for relative comparisons.

In 1671 there were 1,782 males liable to pay the poll tax in Kainourgio and 475 in Pyrgiotissa (Stavrinides 1975–1985:II, 122–126). If we

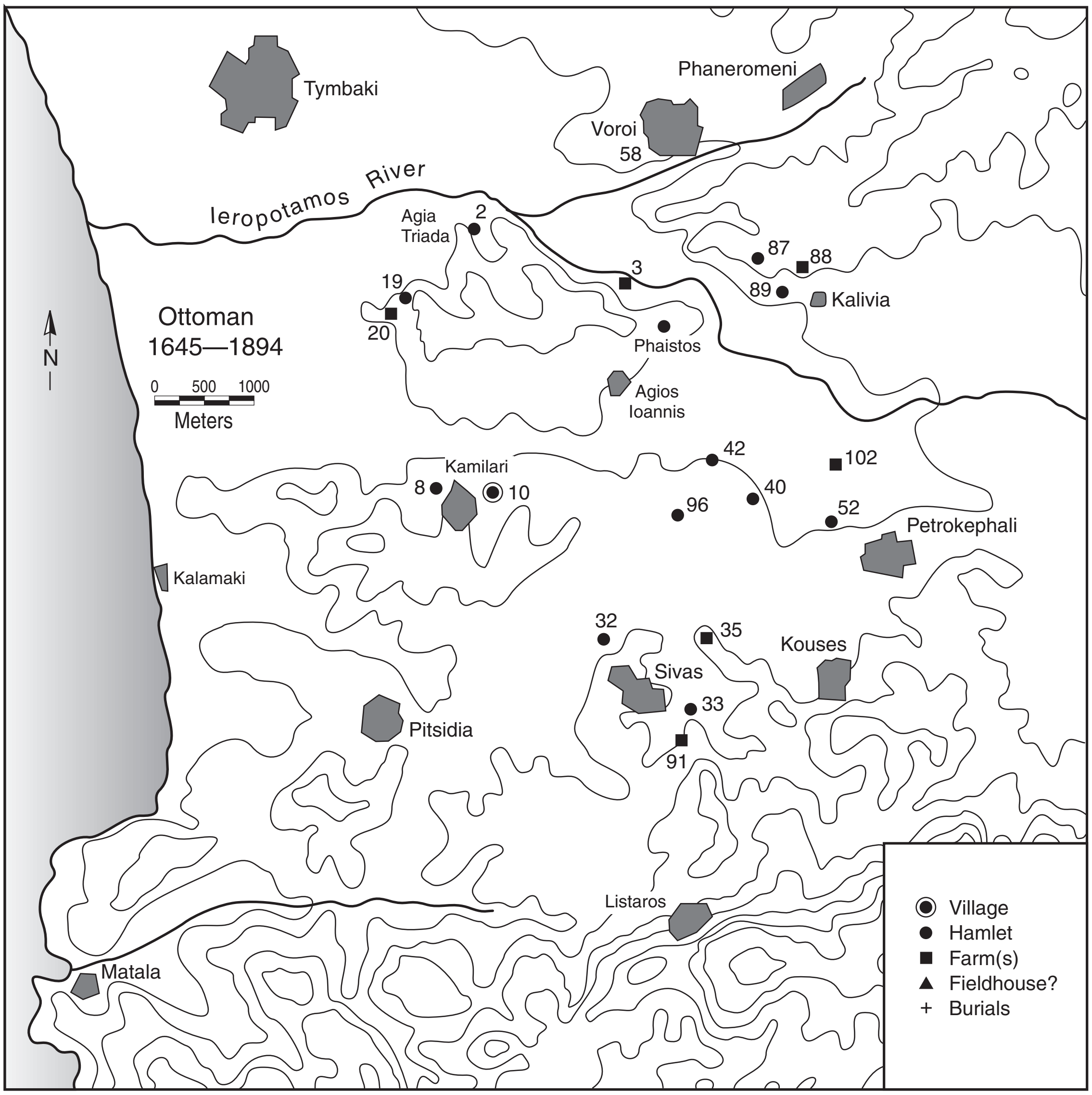


Figure 14.10. Map of Ottoman period sites and present-day villages in the survey area of the Western Mesara. Site numbers correspond to those in Appendix D.

estimate four persons per Christian family, then we will have a Christian population of 7,128 for Kainourgio and 1,900 for Pyrgiotissa. Assuming that the ratio of Christian population to Muslim was 2:1, as some travelers stated, then the total population could have been 10,692 for Kainourgio and 2,850 for Pyrgiotissa. If the ratio was 3:1, as other travelers claimed, then the population would have been 9,501 and 2,533, respectively. Thus, the population of both provinces would be either around 13,542 or 12,034. These figures are not accurate, of course, but they indicate that, despite the long war, the population remained more or less stable, or had even increased since 1583. It is a matter of conjecture whether a probable increase had developed gradually and represented a phenomenon of the Venetian period, or was, at least partly, the result of new settlers in the area. New settlers might have been either refugees from the towns, who fled the Turkish army but did not leave the island with the Venetians, or even soldiers of the Ottoman army, who were given lands in the area, or both. The second hypothesis seems less likely, because soldiers and officials were usually granted the revenue of the lands and, in any case, if we judge from what is known for the rest of Greece, the Turks were seldom agricultural laborers themselves. The strong Muslim element of the regional population attested later must have been mainly converted Cretans. The lack of any considerable number of Turkish place-names in the area also points to the same conclusion. No decline in the rural population seems likely.

Some years later a significant drop of the population occurred, a result of serious outbreaks of plague, one in 1678 and the other from 1689 to 1691 (Greene 1983:132–133). In 1691 and 1693 there were only 999 *reaya* who were obligated to pay the capitation tax in Kainourgio and 296 in Pyrgiotissa. Using the above computations, the Christian population would have been only 3,960 in Kainourgio and 1,184 in Pyrgiotissa. If we include the Muslims in a ratio of 2:1, then the population in Kainourgio would rise to 5,940 and in Pyrgiotissa to 1,176. If, however, the ratio was 3:1, then the total in Kainourgio would be 5,280 and in Pyrgiotissa 1,578. That is, both provinces would have just 7,116 or 6,858 inhabitants, which represents a considerable drop in population.

In regard to the population of each settlement, it is much more difficult to reach even these tentative figures. We can hardly make assumptions about the total Muslim population of an individual village, as the concentration of Muslims varied in each case. We know, for example, that in later times some villages were predominantly Muslim (see Chourmouzis 1842: 87–88, 96–102; Pashley 1837:II, 316), and the number of Christians given by the census provides no further evidence. An indication of the comparative size of a village can, however, be discerned. This suggests that a few of the villlages which in 1583 had a substantial population preserved at least a considerable number of Christian residents and they were still relatively more populous than Muslim-dominated villages. Gergeri, the village with the largest known Christian population in the two provinces, had 162 male Christians over twelve years of age. The second largest was Pobia with 131 Christians, and then Plora with a *metochi* called Flaskiana or Vlaskiana, which together had 114. Agioi Deka had 77 and Castro Novo, now called Nefs Kastelli, had 72. In Pyrgiotissa, Voroi had the largest Christian population, 55 men, and Agia Triada and Pitsidia followed with 53 and 52. It seems, therefore, that some of the largest villages did not lose their importance, although there is a clear tendency of the population to disperse in smaller settlements. These must have been fairly close to other villages, as they have now been incorporated into larger villages (Stavrinides 1975–1985:II, 122–126; Tsatsaronaki 1954:21, 22, 25; Nomos Irakleiou, passim).

We have no lists of settlements for the eighteenth century, and it is only in 1832, after the War of Greek Independence, that a census (taken by a Greek) provides us with information collected about the villages and the population of Crete. Unfortunately, Pyrgiotissa was not included, but Kainourgio appears in the census. Kainourgio was recorded as having fifty-five settlements, although certain villages, for example, Voriza and Skourvoula, are omitted (Chourmouzis 1842:87–88, 96–103). It is interesting that Chourmouzis gives both the name of each village with the number of Christian and Muslim families at that time (with some reference also to churches and olive presses) and for the prewar years. Even if his numbers are not completely accurate, they do give us a fairly good idea of the distribution of Christians and Muslims in the villages as well as of the local depopulation that followed the War of Independence.

Thirty-five of the settlements in Kainourgio were predominantly Christian, fifteen predominantly Muslim, and five had about the same number of Christian and Muslim families. In several cases after the war, Christian-Muslim villages became either completely Christian or Muslim, the other families having been killed or forced to leave. The most impressive example comes from the large village of Pobia, which in prewar years had 290 Christian and three Muslim families, but after the war is listed as having only 60 Christian families. Before 1821, Gergeri had 200 Christian and three Muslim families; in 1832, there were 55 Christian and only one Muslim family. Before the War of Independence, the villages of Prinias, Vreli, and Pigaidakia were entirely Christian. After the war, Kastelli (Castro Novo), Mastrogergiana, Kandila, Agia Marina, Miamou, Krotos, Antiskari, Gianoulgiana, Monochoro Gavaliana, Peri, Kouses, and Listaros had only Christian populations. Three villages with exclusively Christian populations before 1821—Agios Kirillos with 10 families, Trypita with 20, and Aistratigos with 3—had been deserted by 1832. Plate 14.2 shows a similarly abandoned Mesara village, Lakathiana (Chermousi). Moroni had 92 Muslim families before 1821 and 26 thereafter. Prior to 1821, Raftis had 90 Muslim families (and 1 Christian family); in 1832 the number was reduced to only 40 Muslim families. Kourtes had 63 Muslim families and 1 Christian family before the war; afterward, in 1832, there were only 12 Muslims. Finally, Seferiana, Kapariana, Rouphas, Plouti, Kyrmousi, Makres, Keramos, Vourvoulitis were inhabited only by Muslims.

According to Chourmouzis, before the War of Independence there were 2,108 families in Kainourgio, of which 1,327 were Christian and 781 were Muslim, that is, 62% Christian and 38% Muslim. Only 437 Christian and 300 Muslim families remained in 1832, a loss of 67% of the Christian population and 61% of Muslim. Over eleven years the total loss of population in the region was an appalling 65%! An estimate (at five persons per family) of the total number of local inhabitants based on the figures above would give us 10,540 persons for the prewar years in Kainourgio. If Chourmouzis's figures are correct, only 3,685 persons were living there in 1832.

In 1834 the English traveler Pashley compiled a list (excluding a few *metochia*) of forty-eight settlements in Kainourgio (Pashley 183/1/2II, 316). No new village names appear on Pashley's list. Pashley cites a total of 406 Christian and 278 Muslim families, 684 families in all, for the population of Kainourgio. His numbers for those families in some cases agree with those of Chourmouzis for the post-war years, in other cases they do not, but the total is not substantially different.

The thirty years following 1821 saw a considerable demographic recovery. Once again, however, the available evidence is fragmentary and not based on official censuses. A detailed report on destructions and violent attacks on the Christian population of various Cretan villages, for example, Kalathiana (figure 14.11), during the insurrection of 1866 provides information about the number of houses in specific villages in Kainourgio and Pyrgiotissa (Tsatsaronaki 1954:19–28). It is clear, therefore, that already many of the villages had not only recovered their population after 1832/1834, but, in some cases, had exceeded it. Thus, Pobia, with only 60 families in 1832, had recovered by 1866 to 250 houses (of the 293, which existed prior to 1821).

LAND USE

Lands conquered by the Ottomans became state property (*miri*), if the already existing property rights were not confirmed by the sultan. While withholding property rights, the sultan offered to individuals the usufruct of land as a *timar* in reward for their services and on condition of future military obligation. The holders of the *timars* could also act as policemen and tax collectors. Occasionally the sultan gave lands as a gift to individuals whose descendants could inherit them, or he confirmed existing property rights. The sultan and rich landowners could establish a trust (*vakif*) by bestowing religious foundations with land for their support in perpetuity (Sugar 1977:42, 93–100, 197).

The particulars of the arrangement of landholding in the newly occupied Crete are only partially known, as many of the relevant documents remain unpublished (Greene 1993:74 and passim). Nevertheless, some general facts are clear. Issued law codes (*kanunnames*) were ambiguous about landownership in Crete. Arable land seems not to have been *miri* land, which means that it could be sold. In Crete the 482 *timars* were distributed to 1960 persons, the produce of these villages amounting to tax revenues for the *timar*-holders. Each recipient's share could consist of a percentage of the revenue from several villages, which varied in each case (Greene 1993:77–80, 91–92, 119). For example, the revenue of an unnamed village in Pyrgiotissa (Greene 1993:92) amounted to 117,171 *akce* (a small silver coin, one-third of a *para*, forty of which equaled a *piastre*). Twenty thousand *akce* were given to the Aga of the Azaban forces, 96,000 were divided into twenty-four shares of 4,000 each and given to soldiers, and the remaining 1,170 *akce* were added to revenue from two other villages and given to another soldier. This

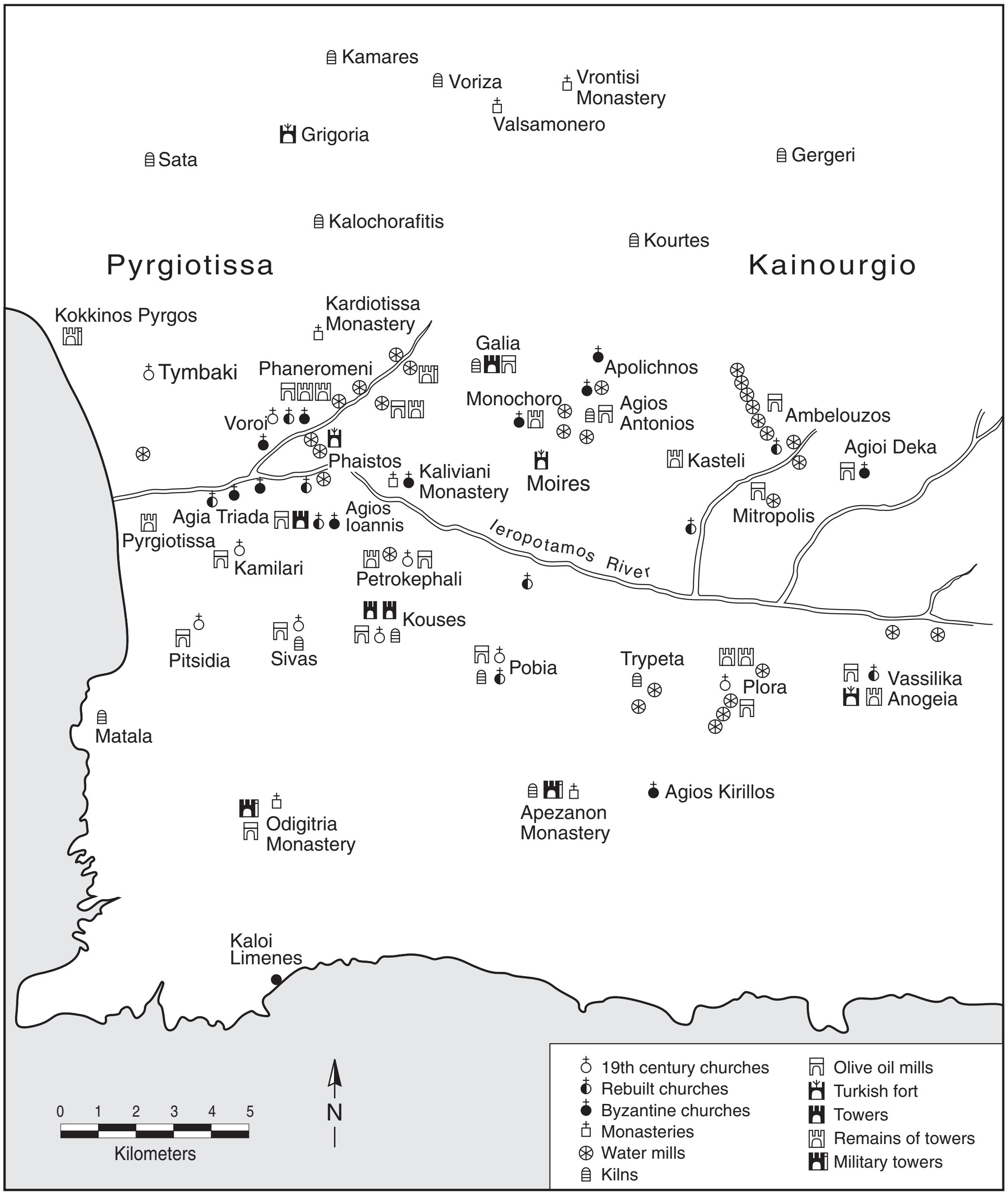


Figure 14.11. Map of the major monuments of the Byzantine–Ottoman period in the Western Mesara (after Vallianos and Kokkoris 1987:29)

tax system actually resembles that of the Venetian period.

Whole villages could be given as *timars* to important persons. Such was the case of Gazi Housein Pasha to whom the sultan gave several villages as *timars* in 1650. Some of these settlements were in Kainourgio: Alithini, Platanos, Choustouliana, Listaros, Monochoro, Plora, Trypita, Petrokephali, Pobia, and Kouses. Others were in Pyrgiotissa: Tymbaki and two *metochia*, Xeri Kara and Sympallousa. Houssein Pasha did not give them as *vakif* to Mecca and Medina, as he did with Sfakia and other villages in Rethymno, but kept them himself (Stavrinides 1955: 315). Twenty years later his son and heir Ahmet Bey residing in the village of Pyrgiotissa proper (Nefs Percofca) bought from a *spahi* (an irregular Ottoman light cavalryman) two gardens and a

TABLE 14.13. Settlements first appearing and disappearing in the Ottoman period

Kainourgio		Pyrgiotissa	
Aistratigos	1821–1832	Charka	1671
Armoutidon Metochi	1867	Moulia Pizaniana	1682–1695
Baga Metochi	1671		
Chourdiano Metochi	1671		
Filidiana	1821–1832		
Fitzana	1821–1832		
Gianoulgiana Metochi	1821–1832		
Izounida	1671		
Kalogeriana	1821–1832		
Kanatiana	1671		
Kavalato	1671		
Kirolako	1671		
Koukiana	1671		
Manousana	Eighteenth century/ mid-nineteenth century		
Mastrogergiana	1832		
Mertori Metochi	1866		
Neoniana	1821–1832		
Rixo	1671		
Salisima	1821–1832		
Sklaviana	1671–1731		
Tzagaraki Metochi	1731		

Settlements first appearing in the Ottoman census of 1671 must have been in existence in the last part of theVenetian period.

TABLE 14.14. Population of Kainourgio and Pyrgiotissa in the nineteenth century

	Pre-1821			1832			1834			1866
Village	CF	MF	Tot.	CF	MF	Tot.	CF	MF	Tot.	Houses
Agia Marina	6		6	2		2				
Agioi Deka	45	18	63	10	9	19	10	10	20	All 30 destroyed
Agios Antonios										All 9 destroyed
Agios Kyrillos	10		10							
Aistratigos	3		3							
Alithini	20	16	36	9	2	11	3	12	15	15 of 20 destroyed
Ampelouzos	14	10	24	8	5	13	5	6	11	15 Christian destroyed
Anogeia	30	20	50	8	15	23	5	10	15	
Antiskari	15		15	15		15	12		12	

Table 14.14. Population of Kainourgio and Pyrgiotissa in the nineteenth century *(continued)*

	Pre-1821			1832			1834			1866
Village	CF	MF	Tot.	CF	MF	Tot.	CF	MF	Tot.	Houses
Apesokari	21	3	24	6	2	8				
Apolychnos								8	8	10 all destroyed
Apomarmas	10	8	18	2	3	5				
Choustouliana							12		12	32 all destroyed
Drosoi	4	2	6	2	1	3				5 destroyed 2
Fari	8	8	1	1						15 all destroyed
Filidiana	16	4	20							
Neoniana										
Flathiakes	5	7	12	6	4	10	2	1	3	10 all destroyed
Galia								15	15	
Gavaliana	7		7	4		4	3		3	
Gergeri	200	3	203	55	1	56	41	4	45	105 destroyed 102 remain- ing
Gianoulgiana			4		4					
Kalathiana									8	all destroyed
Kandila	12		12	7		7	5		5	
Kapariana		35	35		15	15		7	7	40 destroyed 20 remaining
Kastelli	8		8	4		4				10 all destroyed
Keramos		12	12		3	3				
Keratokefali										20 all destroyed
Kourtes	1	63	64	1	12	13		20	20	
Kouses	42		42	6		6	4		4	
Krotos	18		18	7		7	8		8	
Kyrmousi		25	25		10	10		10	10	
Listaros	11		11	3		3	6		6	
Makres		10	10		10	10				10 all destroyed
Makriana							3		3	7 all destroyed
Manousana	12		12	3		3	2		2	
Mastrogergiana	12		12							
Miamou	50		50	24		24	15		15	
Mitropolis	12	14	26	5	5	10	5	5	10	

Continued on next page

TABLE 14.14. Population of Kainourgio and Pyrgiotissa in the nineteenth century *(continued)*

	Pre-1821			1832			1834			1866
Village	CF	MF	Tot.	CF	MF	Tot.	CF	MF	Tot.	Houses
Moires	26	25	51	6	7	13	6	6	12	15 Christian destroyed
Monochoro	7		7	3		3	3		3	5 all destroyed
Moroni		92	92		26	26		30	30	
Moulia Apano	25	25	50	8	15	23	5	10	15	20 destroyed 10 remaining
Nivritos	8	7	15	4	4	8				15 all destroyed
Paliama								6	6	
Panagia	1	30	31	2	1	3	5		5	
Panasos	20	31	6	11	20	31	6	12	18	25 all destroyed
Peri	40		40	4		4	4		4	25 all destroyed
Petrokefali	40	18	58	16	10	26	12	5	17	
Pigaidakia	15	2	17				6	1	7	
Platanos	20	2	22				15		15	25 all destroyed
Plora	56	3	59	12	2	14	18	3	21	30 all destroyed
Plouti		42	42		16	16		12	12	
Pobia	290	3	293	60		60	50		50	250 destroyed 130 remaining
Prinias	60	3	63	30		30	15	2	17	20 destroyed 10 remaining
Psallida										10 all destroyed
Raftis	1	90	91		40	40		18	18	
Rouphas		40	40		16	16		10	10	
Seferiana		42	42		16	16		10	10	
Skourvoula							3		3	40 destroyed 25 remaining
Trypita	20		20							
Vasiliki	20	18	38	12	4	16	5	10	5	
Voriza							35		35	100 destroyed 70 remaining
Vourvoulitis		22	22		15	15		12	12	
Vreli	12	3	15	5		5	1	5	6	
Zaros	35	30	65	30	10	40	50	6	56	130 destroyed 80 remaining

CF = Christian families. MF = Muslim families. Sources: Pre-1821, 1832: Chourmouzis 1842; 1834: Pashley 1837; 1866: Tsatsaronaki 1954.

Table 14.15. Villages of Kainourgio and Pyrgiotissa according to population in 1583 and 1881

	Kainourgio		Pyrgiotissa	
Population	1583	1881	1583	1881
1–19	—	4	1	—
20–99	24	18	10	4
100–199	18	18	10	4
200–299	8	9	—	3
300–399	5	1	1	3
400–499	2	—	—	1
500–599	1	1	—	—
600–699	1	1	—	—
700–799	—	1	—	—
800–899	—	1	—	—
800–899	—	1	—	—
over 1000	—	—	—	1

Sources: Castrofilaca 1583; Stavrakes 1890.

house for 130 *piastres* and the holding rights for twenty fields for fifty *piastres*, which means that his family was extending its lands in the area (Stavrinides 1975–1985:I, 176–177).

A register of Crete for 1705 mentioned that the provinces of Kainourgio and Pyrgiotissa had sixty-three villages and 2,712 landowners, and twenty-eight villages and 1,170 owners respectively (Stavrakes 1890:189). Judging from what is known in the late nineteenth century, many of the villages in these areas had a large Muslim population. Relying on Muslim landholding patterns known from other parts of Greece, we can infer that the Muslim population possessed the choicest landholdings in the plains as well as irrigated gardens and orchards. They may not have cultivated the land themselves since many landholders only used their properties as sources of revenue (figure 14.15).

Evidence for landownership is fragmentary. In 1685, the *metochi* of Mourinos Theotokopoulos in Moires consisted of ten rooms (on two floors), a garden of two and a half *donums* (each roughly equivalent to a *stremma*), fields of one hundred *ergatai* (the extent of land in a vineyard that can be worked in a single day) and fifty *donums* of land (Stavrinides 1975–1985:II, 220). In 1695, another *metochi* called Fradio in the village of Rouphas had a field of 300 *mouzouria*, a house with four rooms (on two floors), an orchard of two *stremmata* with seventy olive trees, and other fruit trees, two cisterns, a vineyard of two *stremmata* (1,000 m^2), three big and two small *pithoi* and a pair of oxen (Stavrinides 1975–1985:III, 156). In 1682, the consul of Venice in Candia possessed a *metochi* in Moulia Pizaniana in Pyrgiotissa. After the flight of the consul in 1687, when the treaty between Venice and Turkey was discontinued, the ownership of the *metochi* was eventually contested between the consul of France and one Ibrahim Aga. The litigation ended in favor of the Turk. This *metochi* had fields of 650 *mouzouria*, vineyards, fruit trees, a large house, stables, and outhouses, valued all together at 400 *piastres* (Stavrinides 1975–1985:III, 98–99).

We know of two *metochia* belonging to monasteries. One *metochi* called Papa Leivadioti, in the area of the village Petrokefali, belonged to the monastery of Odigitria (figure 14.11) and was sold in 1707 to a Turkish official in repayment of a debt. This *metochi* had a house with ten rooms on the ground floor and an upper storey, a yard and outhouses, a field of 500 *mouzouria*, ten olive trees, three oxen and two donkeys (Stavrinides 1975–1985:III, 347). Much later, in 1855 and 1856, the monastery of Preveli in the province of Agios Vasileios in Rethymnon, bought a *metochi* called Alithini in the village of the same name in Kainourgio. This metochi had a house with a yard, a well, stable, and barn. It had 250 olive trees that produced annually an average of 1,000 *okades* of olive oil. Its land also produced 3,000 *okades* of grain and pulses (Papadakis 1978:190). There are few references regarding the buying and selling of land, mostly concerning small properties such as a few *stremmata*, or fields producing two or three *mouzouria* of grain. There are also some cases of houses, or mills changing hands, but it is mostly land that is sold. The parties involved are both Christian and Muslim, the latter often residing in Candia (Stavrinides 1975–1985:I, 155, 267–268; II, 92, 107, 315; III, 195, 224)

Property belonging to Christians was often sold to pay back debts to Muslims (this was also common elsewhere in Greece). Moneylending was a very profitable business in the Ottoman Empire and for individuals of all religions and nationalities. One suspects that these transactions were coerced by the ruling Muslims, because in one documented case there was a formal complaint, and in a second case, the arrangement was unusual. The selling of the *metochi* of Papa Leivadioti has already been mentioned. Another considerable property owned by an inhabitant of the *metochi* of Pitsidia in Pyrgiotissa was sold in 1674 as repayment for a debt of 287 *piastres* to the *vakf* of the leader of the imperial Janissaries in Candia. The property sold for that price was an olive grove of about 800 trees in the village of Sympallousa, an orchard of about two *donums* (an Ottoman unit of land measurement, roughly equal to a *stremma*, 1,000 m^2) with its neighboring vineyard of ten *donums* in the village of Pitsidia. After selling his property the vendor, one Nikolaos Pizanis, then rented the entire property from the buyer for an annual rent of forty-seven *piastres* (Stavrinides 1975–1985:II, 181). In 1685, a case was brought to the *kadi* (an Ottoman judge who was also a priest) by a Christian resident of the village Voroi against a Muslim who had allegedly taken over some of his property. The Muslim claimed that the property was sold to him as repayment of a debt of 22.5 *piastres* and produced witnesses to that effect; thus, the plaintiff lost the case (Stavrinides 1975–1985:II, 239–240).

ECONOMY

The economy of medieval Crete, like all medieval economies, was agricultural, and trade was also important. Hence, pottery and coins from the capital Gortyn can provide some information about the economy during the fifth through eighth centuries. The most common imported wares were African Sigillata Chiara D (300–600) and Late Roman C (or Phocean Red Slip ware, 450–600), the latter in time outnumbering the former. During the sixth century most imported amphoras came from Italy, but by the seventh and eighth centuries, Palestinian amphoras were more numerous (Di Vita and Martin 1997:134, 156). The existence of Palestinian amphoras at Gortyn probably reflects the rising importance of the Eastern empire. On the other hand, the numismatic evidence shows a steadily decreasing use of coins during the fourth through ninth centuries (table 14.16), indicating a transition to a less monetized economy. Coins fall sharply in number in the sixth century, and again after the seventh century, with the exception of the reigns of Heraclius (610–641) and Constans II (641–668). After the third quarter of the seventh century and until the Arab conquest, coins are rare, reflecting the general state of the island's economy (Tsougarakis 1988:250–265). Of the 48 coins of known mints found at Gortyn, 46 come from the East (28 from Constantinople) and two from the West. Already in the fourth century, Crete had stronger contacts with the Eastern than the Western Empire.

As the most extensive and fertile plain in Crete, the Mesara was of crucial importance to the island's economy. It was intensely cultivated, producing mainly cereals. Evidence for cereal production in the Byzantine era is only circumstantial, but it is well documented for the Venetian and Ottoman periods (Ploumidis 1974:102; Baladi 1988:169–185). There is little doubt that cereal production was also the main economic activity of the Mesara in Byzantine times. Part of the grain was, of course, the staple food of the inhabitants, but quantities of grain were also exported from Crete. That means that there was usually a surplus. In the Second Byzantine period, part of the grain produced in the crown lands was donated to various institutions, one of which was the monastery of Saint John of Patmos. Some of these crown lands, given for cultivation to the local inhabitants in the 1170s, were probably in the Mesara.

This situation did not change during the early years of Venetian rule. There was, at least, an apparent self-sufficiency in Crete when bad crops, wars, or major natural catastrophes did not result in a shortage. In the case of a shortage, grain was imported usually from Asia Minor or the Aegean islands. In good years, Crete was permitted to export grain, but the Venetian government exercised control over the export trade: while prices were freely established, usually on the threshing grounds (*super arreis*), exports were prohibited if the prices exceeded a certain limit imposed by the state. This policy aimed to secure enough grain for local needs and for the needs of Venice itself at all times (Tsougarakis 1990). The state also had its own grain supply from state lands exploited directly or rented to cultivators (Kolyva-Karaleka and Moatsos 1983:383–384; Spanakis 1957:19–20). In 1589 the commune earned only 100 *ducats* (Venetian gold coins) annually from the lands that it exploited in the Mesara, while the total income from the rent of state lands in the Mesara and in Lasithi amounted to 2,900 *ducats* (Mocenigo 1940:105–106). In 1602 the state lands of the Mesara were rented for approximately 227 *ducats* (Moro 1958:172). Those who had land of their own and produced cereals were also required to bring a certain part of their grain production to the capital of the *territorio,* to be sold at a fixed price for the public granary (*Fontego*) (Spanakis 1969b:412–413). Grain was also kept in the public granary for the crews serving in the galleys and for emergencies.

Gradually, however, the local production of grain declined in favor of viticulture, which was officially encouraged by Venice. As a result, during the later centuries of the Venetian domination the grain production of Crete became insufficient to sustain the local population, and imports of grain became a necessity, particularly after the sixteenth century. Providing Crete with grain was one of the primary concerns of the Venetian governors of the island. Such problems were even worse in the seventeenth century. An official report for the year 1639 stated that even in a good year the grain crop of all the plains in Crete was sufficient for only two-thirds of the year, and thus it was neccessary to import grain from the islands. It was at that time that the Venetians, in their attempt to make Crete self-sufficient once

Table 14.16. Numismatic evidence of the fourth–ninth centuries AD

Century	Fourth	Fourth-Fifth	Fifth	Fifth–Sixth	Sixth	Seventh	Seventh–Eighth	Eighth	Ninth	LR	Unknown	Total
Constantinople	5		1		5	16	1					28
Alexandria	1											1
Cyzicus	3				1							4
Antioch	4		1									5
Salonica	2											2
Nicomedia	1											1
Heracleia	2											2
Sirmium	1											1
Rome			1									1
Eastern	1		1									2
Vandalic				1								1
Unspecified	52	19	8	—	1	9	1	4	3	1	11	109
Totals	72	19	11	2	6	26	2	4	3	1	11	157

Sources: Di Vita 1981:153–163; Di Vita and Martin 1997:77–103; Allegero and Ricciardi 1999:271.

again, introduced the cultivation of rye, a grain unknown in Crete until that time (Spanakis 1969b:417–418). The *territorio* of Candia often supplied other *territoria* with grain (Spanakis 1969b:412–413, 414–420). Shortages and the state-controlled prices often led to local illegal trafficking of grain and other foodstuffs, sold to corsairs who usually came into the remote and unpoliced port of Kaloi Limenes (Moro 1958:69–70; Basilicata 1630:17).

For a relatively short time following the Ottoman conquest in 1669 there was an increase in local grain production. For the first time after a long period, Crete resumed exports of grain, mainly to North Africa and to the Aegean Islands. The earliest known official Ottoman permission for export of grain was in 1678, when 20,000 *koila* of Constantinople (563.2 tons, at 22 *okades* [1.28 kg] a *koilo*) were exported to France (Stavrinides 1975–1985:II, 276; Greene 1993:194–195). In 1696, a good agricultural year, permission was given for 2,000 *mouzouria* of grain to be purchased from the area of Castro Novo and exported from the port of Matala (Stavrinides 1975–1985:III, 170 no. 1405). That same year the price of grain was specified as twenty *paras* per *mouzouri* of fifteen *okades*, that is about 19.2 kg (Stavrinides 1975–1985:168–169, no. 1401). In 1699, perhaps the most productive year of this period, a total of 30,000 *mouzouria* of grain was exported from Crete (Triantafyllidou-Baladie 1988:170). In 1715, however, a new shortage occurred and soon became the norm. Even in the years of shortages, however, the Mesara was an important producer, as can be inferred from the fact that the inhabitants of Sphakia came to the region to purchase grain. In 1732 and 1735, after an official complaint by the Sfakiotes, the Ottoman government ordered that they should not be prevented from purchasing grain in Castro Novo and Pyrgiotissa.

In 1741, however, another document accused the Sphakiotes of misusing their permission to buy grain from these areas, because they created local famine by amassing huge quantities of cereals (40,000 to 50,000 *mouzouria* are mentioned), which they subsequently sold illegally to corsairs (Stavrinides 1955:264–270). Later, in the late eighteenth and early nineteenth centuries, grain produced in the area of Kainourgio (Castro Novo) was considered of excellent quality and was bought by wealthy Greeks and Turks at double the normal price (Kritovoulides 1859:566). The French traveler Olivier, writing at the end of the eighteenth century (1794), remarked that the province of Mesara was the granary (breadbasket) of Crete. He also said that, although the cereals of the Mesara were "*un des meilleurs de la Turquie,*" yielding great quantities of flour and excellent bread, they were never consumed by the indigent producers, who ate a coarse barley bread. Instead, the fine quality bread was consumed by the *agas* (Ottoman officials) and the rich inhabitants of the towns (Olivier 1800/1801–1807:341–342). Other travelers (Savary 1788:203; Tournefort 1717:69) made similar remarks. But in the course of the nineteenth century, particularly after the War of Greek Independence, cultivation of cereals was very much reducedm as large parts of the land remained uncultivated for a variety of reasons. According to the British traveler Robert Pashley in the early 1830s, seven-eighths of the land near the Mesara remained uncultivated from the beginning of the war in 1821 (Pashley 183/1/2I, xxxiii).

Wheat was not the only grain produced; barley was also extensively cultivated. There are fewer mentions of barley in the documents, not only because it was produced in smaller quantities, but perhaps also because it was mainly for consumption by the poor and was rarely traded. There is, for example, an indication of extensive production of barley in the area (and in the lands) of the monastery of Apezanes, as indicated by a number of Ottoman documents of 1692, 1693, and 1700 (Stavrinides 1975–1985:II, 411, no. 1087, p. 429, no. 1113 and III, p. 244 no. 1545).

Grain production was tied to the existence of local mills. Although windmills were also used, the majority were water mills driven by the plentiful water of the area. Mills existed in the Byzantine period, although we lack written documentation about them. In the Venetian period, mills, as well as the rights on the places suitable for mills, were part of the landlord's fief and were let in various ways to their tenants or other persons, as shown in existing contracts (Gasparis 1997:97–104). Large numbers of mills

TABLE 14.17. Water mills in Kainourgio and Pyrgiotissa

Village	Mills	Village	Mills
Agioi Deka	1	Mitropoli	2
Ampelouzos	3	Odigitria/Gialomonochoro	1
Anogeia	1	Petrokephali	1
Anonymos river	1	Phaneromeni	4
Apolychnos	4	Plora	4
Apomarmas	2	Plouti	3
Gergeri	3	Psalida	6
Grigoria	4	Skourvoula	5
Kalochorafitis	1	Trypita	2
Kardamiana	2	Tympaki	2
Klima	3	Tzaniana	1
Lagolio	1	Voroi	3
Laloumas	1	Vreli (Ag. Antonios)	4
Mastrachian	2	Zaros	9

(plate 14.3) in certain areas were, naturally, an indication of substantial local grain production. In the Mesara area the published Venetian documents mention very few mills (one in Apomarmas in 1302 [Brixano 1950:189, no. 524] and two in Raftis in 1414 [Gasparis 1997:365, 367]), but there is no doubt that many more must have existed. In the decade around 1410, Buondelmonti mentioned that he saw mills all along the banks of the Ieropotamos river (Buondelmonti 1415: 174–175). In the Ottoman period as well, the documents mention very few mills—one in Apomarmas in 1671 (Stavrinides 1975–1985:I, 155); one in Ampelouzos in 1685 (Stavrinides 1975–1985:II, 236, no. 835); three in Zaros in 1801 and four burned down in the same village during the War of 1866 (Fanourakis 1952:340–341; Tsatsaronaki 1954:20); one in Agios Antonios destroyed in 1866 (Tsatsaronaki 1954:25); and seven burned down again during the same war in Tsachiana, Kardamiana, Mastrachiana, and Apomarmas (Tsatsaronaki 1954:22)—a fraction of the actual number. Today, in the two provinces of Kainourgio and Pyrgiotissa, seventy-six old water mills (plate 14.3 and figure 14.11) exist in various degrees of preservation (Vallianos 1985:26–28). Vallianos (1985:11) dates most of these mills to the Venetian period and a smaller number to the first years of the Ottoman period. The high number of local mills points to the extensive production of cereals in the Mesara Plain (Table 14.17).

Extant Byzantine sources, except for the twelfth century "Ptochoprodromos" poems (Eideneier 1991:IV.l.332) do not mention wine. While the Mesara Plain was primarily a grain-producing region, settlements at the edge of the plain or on somewhat higher ground did practice viticulture. The case of Raftis, a village in the Mesara Plain, may be indicative. In 1414 there were forty-eight landed inhabitants in the village, thirty-two of whom (66.6%) possessed a vineyard in addition to whatever other land they cultivated (Gasparis 1997:221–223, and Tables 38 and 39 in p. 292). Of course, local conditions certainly varied. In areas north of the Mesara, the cultivation of the vine was more prominent. In 1327, the village of Pala rendered to its feudal owner 100 measures of grain, thirty measures of barley, and 390 *mistata* (a liquid measure of varying size) of wine, while in 1414 it rendered sixty measures of grain, ten of barley and 500 to 600 *mistata* of wine. At the same time Pitsidia, in the Mesara proper, seemed to have only grain and no wine production (Gasparis 1997:305). As the case of Pala shows, vine cultivation was particularly favored by the Venetians for obvious economic reasons, since they were interested in exporting Cretan wine (Topping 1981:509–520; Papadakis 1977:5–25). Logothetis (1982) discusses the vine varieties that were cultivated and the type of wine produced. During the Venetian period Cretan wine was exported across the Mediterranean region, as far as Tana in the Black Sea and Flanders and England in Western Europe. Cretan wine was also exported to England (Lowder 1952). One of the earliest references to Cretan wine, made by the Irish monk and traveler Symon Semeonis in 1322 (Iliadou-Hammerdinger 196/1/2551; Esposito 1917: 335–336) mentions its fame and wide distribution (*"vinum illud famosum cretense, quod per universum mondum portatur"*). In 1359 the Venetians regulated the wine exports to Flanders by giving permission to Flemish ships to carry Cretan wine, and in 1372 by defining the export duty (Theotokis 1937:70–71, 159; Verlinden 1935: 448). In the beginning of the sixteenth century, Crete produced about 100,000 tons of wine, half of which was exported. More than two-thirds of the exports were made through the port of Chandax (Triantafyllidou-Baladie 1988:185).

During the Venetian-Turkish War and after the Turkish occupation, vine cultivation declined significantly, due to the destruction of vineyards during the war, heavy taxation, and the Ottoman indifference to wine. Wine production did pick up later in the period, although it never reached Venetian levels. Currant production and export, however, were substantial, which suggests that Cretan viticulture was diversified rather than abandoned. In the first years of the Turkish period, toward the end of the eighteenth century, vineyards and/or wine presses are mentioned in the Mesara villages of Plouti, Rouphas, Grigoria, Moulia Pizaniana, and Sympallousa (Stavrinides 1975–1985:I, 362–363; II, 181, 246–247, 412; III, 98–99, 156, 157, 220–221). A further destruction of vineyards occurred during the War of Independence in the 1820s, but after this period the vine plantations were renewed (Raulin 1869:II, 240).

Cultivation of olive trees and production of oil in the Mesara seem to have been quite small in the Byzantine period, even though written sources are contradictory on this point. Some writers insist that the olive tree was entirely unknown on the island and that olives and oil were imported from Libya and Spain (for example, the twelfth-century Arab author Al-Zuhri [Hajj-Sadoq 1968:54, 81, 83], also using ninth-century sources). Others (Tafel and Thomas 1856:II, 148 dated to 1212) mention the export of oil from Cretan possessions of Sinai. Olive trees are occasionally mentioned in early Venetian documents. The earliest mention in the Venetian period is a transaction concerning oil worth 800 *hyperpera* recorded in 1300 by the notary Pietro (Pizolo 1975–1985: no. 156). In the decade beginning in 1410, Buondelmonti quotes a Venetian friend in Candia as stating that in Crete there is an abundance of every kind of "fruit" except for olives, which the island lacks due to the "laziness of the rustics" (Buondelmonti 1981:153). Buondelmonti (1981: 112) also mentions that the area between Matala and the castle of Pyrgiotissa was full of all kinds of trees including an abundance of "oleaster."

In the seventeenth century Cretan olive cultivation comes into its own, partly due to an increased demand of olive oil, particularly in Western Europe. Up to that time Venice was importing oil mainly from Puglia and Corfu, where production was very high. In the seventeenth century Venice made olive tree cultivation obligatory in Crete to boost production of oil (Politis 1967). During the entire Ottoman period olive oil became the staple produce of Crete with gradual but notable increase in production during the eighteenth century. Oil production was encouraged by the profitability of exports of olive oil to France, where it was used in the manufacture of textiles in Languedoc and in the soap factories of Marseilles. It was further boosted by the fact that in Crete itself there was impressive growth in the soap industry, with a spectacular increase in the number and production of local soap factories. These eventually absorbed such a large part of the Cretan olive oil output that France had trouble in securing enough oil for her own industries.

One of the early mentions of the production of olive oil in the Western Mesara may be in 1635–1637, when olive trees and olive oil are included among the property and agricultural production of the monasteries of Apezanes and Vrontisi as well as of other church properties (Census 1635: f. 11v–12r (Vrondissi), f. 18r–v

(Apezanes and passim). The first mention of a large number of local olive trees is in 1674 when an olive tree plantation of 800 trees was sold in the village of Sympallousa, near the castle of Pyrgiotissa (Stavrinides 1975–1985:II, 181, no. 756). Later mentions are smaller: seventy olive trees in an "orchard" near Rouphas in 1695 (Stavrinides 1975–1985:156, no. 1381), seventy-three olive trees in the area of Grigoria in 1699 (Stavrinides 1975–1985:220–221, no. 1498), nine olive trees in a field in the area of Voroi in 1696 (Stavrinides 1975–1985:195, no. 1448). In 1707, a field with twenty-two olive trees in the village of Monochoro was donated to the monastery of Valsamonero (Stavrinides 1975–1985:352, no. 1766) and in the same year the monastery of Odigitria sold its *metochi* of Leivadiotis that contained 30 olive trees (Stavrinides 1975–1985:347, no. 1755). One of the earliest mentions of an olive-press is in 1750, near Zaros, in the possession of the monastery of Vrontisi (Stavrinides 1975–1985:IV, 351–352, no. 2439).

Monasteries seem to have owned considerable numbers of olive trees. Apart from the cases mentioned above, our information becomes more frequent in the nineteenth century. In 1801 Vrontisi let to the Turks a *metochi* containing "olive tree plantations" (Fanourakis 1952:340), while the monastery of Valsamonero also let "olive tree plantations" that were in its possession (Fanourakis 1952:341). A concrete piece of information concerning the possessions of a monastery comes between 1855 and 1856: a *metochi* of the monastery of Preveli at the village of Alithini in Kainourgio, containing 250 olive trees yielding 1,000 *okades* (1.28 tons) of oil a year (Papadakis 1978:190) was sold. Finally, a report recording destruction during the rebellion of 1866 mentions that the Turks burned 4,540 olive trees in Kainourgio. In Pyrgiotissa, they burned 4,000 olive trees belonging to the monastery of Apezanes, 150 from the monastery of Odigitria, and 2,000 in Tymbaki (Tsatsaronaki 1954:19–27).

Chourmouzis's documentation (1842:86–103) of the destruction following 1821 also gives us an idea of olive oil production in Kainourgio at the beginning of the nineteenth century. Before 1821 there were 111 oil presses in the fifty-nine villages of Kainourgio. Ten years later, in 1832, there were 41 presses in the remaining fifty-three villages, 70 presses having been destroyed. The greatest number (10) of presses was in Zaros, of which 6 were destroyed. In 1832, 3 of Moroni's 9 presses survived. In Gergeri there were 2 (of 7); in Kourtes 1 (of 8); in Mitropoli 2 (of 4); in Platanos 2 (of 4); in Pobia 2 (of 5). A report (Tsatsaronaki 1954:19–26) mentions 24 presses destroyed in Kainourgio during the war of 1866, including all presses in Agioi Deka and Mitropolis.

Orchards and the production of flax, cotton, honey, and cheese complemented the major cultivation of grain and wine. By "orchards" or "gardens" both in the Byzantine and the Venetian periods one means plots of land of varying sizes in which either vegetables and pulses (*chardini de herbis*) or trees (*chardini de arboribus*) were cultivated. Both kinds of produce were for local consumption and exchange. Sources of all periods often mention orchards. In the Venetian period "orchards" are mentioned in all divisions or allocations of properties as well as in notarial acts. A very early one is a notarial act of 1281 (Marcello 1960: no. 396), in which an orchard is being let for seven years in the village of Vassiliki Anogeia (Kainourgio); others mention an orchard in Raftis in 1414 and in Kourtes in 1415 (Gasparis 1997:365, 368 [Raftis]; 320, 387 [Kourtes]). The settlement at the Pyrgiotissa castle must have had an abundance of "orchards" producing fruit of every kind, according to Buondelmonti who describes it as being "*tantum diversarum arborum fructifantum plena*" (Buondelmonti 1981:112). In 1548, when refugees from Nauplion and Monemvasia were given land and settled in Pyrgiotissa and Kainourgio, "orchards" are mentioned in the *frangotopoi* near the castles of Pyrgiotissa and Castel Novo (Kolyva-Karaleka and Moatsos 1983:387–388, 408–412, 439–441 and passim). There are later mentions of "orchards" in Sympallousa, Grigoria, and Rouphas (Stavrinides 1975–1985:II, 181, no. 756 [1674]; III, 220–221, no. 1498 [1699]; III, 156, no. 1381 [1695]; respectively), while Gergeri in the nineteenth century is described as "full of fruit-bearing trees" (Chourmouzis 1842:87).

The cultivation of flax is first attested in 1271 in an act of the notary Scardon (Scardon 1942: no. 255). Buondelmonti also mentions that flax was cultivated near Gortyn along the banks of the Ieropotamos (Buondelmonti 1981:178). He blamed the bad health of the inhabitants of Castel Novo on the soaking and rotting of flax in the river. In 1630, Basilicata repeated this observation and added that this practice, apart from making the water of the river unusable, created the bad climate of the area (Basilicata 1630:39, 195). In 1644, among the produce stored in the storerooms of the monastery of Valsamonero was a quantity of 67.5 lbs. of flax (Mavromatis 1990:484). Flax was clearly cultivated in the area until the nineteenth century (Kritovoulides 1859:565–566; Chourmouzis 1842:86; chapter 6, this volume). Cotton must also have been cultivated in the general area of Castel Novo, as is shown by an act of the notary P. Pizolo of 1304: an inhabitant of Anogeia receives a cow, in return for which he is to pay 200 lbs. of "good and pure" Cretan cotton (Pizolo 1975–1985:109, no. 927). Two other acts by Pizolo (1975–1985: nos. 603 and 609 [1300]), involve an inhabitant of Castro Novo trading in cotton. The price at that time was seven *hyperpera* per 100 lbs of cotton. The earliest mention of cotton cultivated in Crete is from 1118 (Miklosich and Muller 1860–1890:VI, 96). Cotton cultivation in this area is mentioned again in the nineteenth century (Kritovoulides 1859:565–566; Chourmouzis 1842:86).

Local beekeeping and the production of honey is mentioned in 1644 when it is recorded that the monastery of Valsamonero owned thirty beehives in addition to nineteen hives in a *metochi* (Mavromatis 1990:485, 488). Cretan honey was renowned since Roman times and is mentioned in Byzantine and Venetian sources (Tsougarakis 1988:287). In 1801 beehives were among the possessions of the monastery of Vrontisi that were being leased (Fanourakis 1952:340–341). In 1818, Pyrgiotissa is mentioned as producing "excellent honey" (Praktikides 1983:53). Indicative of the substantial production of honey in the area is the fact that in the war of 1866–1867 the Turks destroyed 1,400 hives in the region of Kainourgio and 500 hives belonging to the monastery of Apezanes alone (Tsatsaronaki 1954:19–26).

Despite the fact that written sources rarely refer to animal husbandry, it must have been important, since Crete was widely known as a producer of excellent cheese. Cretan cheese is mentioned by Arab travelers and geographers as well as by Byzantine writers of the twelfth century (Tsougarakis 1988:278 for Arab sources; Legrand 1880:I, 56 and Edeneier 1991:IV, 109, 210 for Ptochoprodromos). The earliest indirect reference to stock-raising in the Mesara region comes from the early years of the Venetian period in record of pasture lands belonging to various villages (Tsirpanlis 1985:44–46). A more direct mention is in a contract of 1367, in which pasture lands and grazing animals are mentioned at the village of Kourtes (Gasparis 1997:387). In 1415, Buondelmonti observed that on Sanctum Montem, that is, the Asterousia Mountains, there were pasture lands where goats and cattle were grazing, often attended by shepherds (Buondelmonti 1981:115). In 1450, a claim for compensation was filed in the Castro Novo area because Dimitri Cacota's goats entered someone else's property and destroyed his olive trees. To pay the compensation, Cacota had to sell some of his goats. The incident was considered harmful to the renowned local industry of cheese-making (Thiriet 1966–1971:II, no. 1440). Monasteries apparently owned considerable numbers of animals both in the Byzantine and the Venetian periods. An early thirteenth-century document presented to the Venetian government in Crete complained about the destruction caused by certain officials in the province of Sivritos (in the Amari Valley), mentioning thousands of grazing animals belonging to monasteries (Cervellini 1906:14). Only in the seventeenth century do we have specific references: in 1635 the monastery of Vrontisi employed four shepherds full-time and needed the considerable sum of 800 *mouzouria* of fodder and 720(?) *hyperpyra* annually for its animals. In the same year the monastery of Apezanes owned 1,000 animals producing 3,000 lbs. of cheese (Census 1635: f. 12r and 19r). In 1644 an inventory records that one of the *metochia* of the monastery of Valsamonero owned 467 sheep and goats and produced 150 lbs. of cheese out of a total of 300 lbs. (Mavromatis 1990:485, 487–488). In 1801 the monastery still owned an unspecified number of sheep, which were hired with the rest of its property (Fanourakis 1952:341). Cretan stock-raising produced wool and hides, both of which are present in notarial acts (Tsougarakis 1988:280–281). In 1699, Turkish officials counted sheep, goats, and kids on behalf of the tax-farmer: they found 11,347 in the province of Kainourgio and 6,329 in Pyrgiotissa (Stavrinides 1975–1985:III, 212, no. 1480; Stavrinides 1955:258). Only Sitia had a much higher number, 18,247, while Monofatsi (10,932), Rizo (11,511), Pediada (10,057), Mirabello (10,924), and Sfakia (11,000) were comparable to Kainourgio. Pyrgiotissa, on the other hand, had numbers comparable to Malevizi (6,155) and Lasithi (5,897).

Only one reference to manufacturing in the Mesara appears in documents: a Venetian period document mentions that the village of Gergeri specialized in making chairs and stools (Mavromatis 1990:475, 476, 481, 482).

Aside from direct descriptions of economic activities, the most important source of economic information is tax records of various kinds. Unfortunately, the only specific information we possess comes from 1583, and is provided by the well-known detailed description/census of Crete by Castrofilaca (Xirouchakis 1934). Castrofilaca's references, however, are sporadic and do not help in establishing a clear economic picture of the provinces.

Concerning the revenues from various taxes that inhabitants owed the government, it is characteristic that there existed considerable unpaid sums of money, which accumulated over time. Castrofilaca distinguished these arrears in two categories: those that had been owed for so many years that they were practically impossible to collect, and those that could be collected. Concerning the former, the various tax-farmers and other officials of Castro Novo owed the *Camera fiscal* a grand total exceeding 8,994 *hyperpera* (see table 14.18). The greatest sum (more than 7,299 *hyperpyra*) was owed by an individual also indebted for the *"datio della Porta,"* which was a toll-tax. Pyrgiotissa, on the other hand, owed a noncollectible sum of only 84 *hyperpyra*. The collectible debts exceeded 573 *hyperpyra* for Pyrgiotissa and 434 *hyperpyra* for Castro Novo (see table 14.19).

The revenues of the state from farming taxes, especially the tax on the wine (or must), is also specified by Castrofilaca; the relevant information for Castro Novo and Pyrgiotissa, apart from anything else, is also interesting for the differences it reveals concerning the value of the tax (and the corresponding quantities produced) between the two provinces (see table 14.20 below).

Apart from regular taxes, the main imposition during the Venetian period was an *angareia* (corvee labor), owed the state by male inhabitants of the villages between fourteen and sixty years of age. Its duration varied from one region to another: in the *territorio* of Candia it was six days a year, but in Rethymnon it was twelve, and in Chania eighteen days a year. This forced labor, which also applied to the animals (mules and donkeys) of the villagers, could be bought out in cash. In 1583 the fifty-nine villages of Castro Novo owed a total of 1,918 personal and 543 animal *angareiai,* while the corresponding numbers for the twenty-three villages of Pyrgiotissa were 530 and 110 respectively. Because the villagers were apparently unable or unwilling to meet their obligations, there were huge arrears from previous years. Up to the year 1583 there were 9,856 personal and 1,472 animal *angareiai* owed by Castro Novo, and 2,607 and 385 *angareiai* respectively owed by Pyrgiotissa (Castrofilaca 1583: c. 70).

Numerical data for Crete in general and for the Mesara in particular remain scarce during the period of Ottoman domination. Prevailing adverse conditions did not allow any real economic growth among the Christian population, which suffered greatly from the arbitrary exactions, extortions, and extraordinary impositions to which they were subjected by the Turks and, sometimes, by the Christian notables. In official Turkish documents one finds a long series of cases indicative of a general practice of economic abuse and its various forms, including disproportionate assignment of the poll tax, irregularities in its collection, violations of legal taxation by tax-farmers, and extortions of all kinds. Several of these cases concern Kainourgio and Pyrgiotissa. Despite the occasional attempts of the Porte, instigated by repeated petitions, denouncements, and desperate pleas by the Cretans to impose some order, to regulate the taxation in a reasonable way, and to alleviate the burdens of the *reaya* population, the situation did not improve (Stavrinides 1975–1985:passim, and

TABLE 14.18. Noncollectible tax revenues for Castro Novo and Pyrgiotissa in 1583

Name of Debtor and Description of Debt/Year	Amount
Cocoli Vido per il Castelnovo del 1505	6 h. 6 gr. 16 p.
Zorzi Doxara per il datio della Porta et Castel Novo	7,299 h. 3 gr. 24 p.
Zanachi Giaritti per Castelnovo 1522	3 h. 12 p.
Alexi Doxara per Castel Novo 28 (1528?)	967 h. 10 gr. 16 p.
Giorgi Venessa per Castelnovo 1531	691 h. 10 gr. 16 p.
Manoli Abramo per il Castelnuovo 1535	8 h. 4 gr. 16 p.
Manoli Cornero per il datio del Castel Priotissa 1510	84 h. 6 gr. 8 p.

h.= *hyperpera*, gr.= *grossi*, p.=*piccoli*.

TABLE 14.19. Collectible tax revenues for Castel Novo and Pyrgiotissa in 1583

Name of Debtor and Description of Debt/Year	Amount
Nicolo Cognano per Novo l'anno 1578	39 h.
Nichita Cazzuri per Castel Novo 1580	245 h. 9 gr.
Nicolo Cognano per Castel Novo l'anno 1581	150 h. 7 gr. 16 p.
Nicolo Mavromati per Castel Priotissa l'anno 1574	48 h. 4 gr. 16 p.
Thomaso Varda per Priotissa l'anno 1575	48 h. 4 gr. 16 p.
Zuan Castrophilaca per Priotissa l'anno 1576	99 h. 4 gr. 16 p.
Zuan Gisi per Priotissa l'anno 1577	358 h. 4 gr. 16 p.
Gianna Patrologo per Castel Priotissa l'anno 1580	20 h. 9 gr.

Source: Castrofilaca 1583: c. 54–56. h.= *hyperpera*, gr.= *grossi*, p.=*piccoli*.

TABLE 14.20. Tax levied on wine in *hyperpera*, 1570–1683

Year	Spina del Novo	Priotissa Castello
1570	3,200	40
1571	3,200	40
1572	3,200	40
1573	6,210	40
1574	3,073	40
1575	4,510	40
1576	4,520	340
1577	12,510	350
1578	9,231	380
1579	5,000	380
1580	6,010	300
1581	4,000	300
1582	3,050	140

Source: Castrofilaca 1583: c. 86.

particularly II, 230–231, 375, 404–406, 415–416 no. 1096, 447–449 no. 1149; III, 35, 36, 56–57, 70–71, 72–73, 79, 250, 271, 274, 280, 281, 307; IV, 44; V, 54–55).

The inability of the inhabitants to pay their taxes, noticeable under the Venetians, continued under Ottoman rule. In the very first years of the Turkish occupation, in 1671, there is a report that the villages of Kainourgio and Pyrgiotissa still owed considerable sums of tax money for the year 1669 (Stavrinides 1975–1985:II, 10). In 1671, there was a census in Eastern Crete in order to establish the population of the *reaya* liable to capital taxation (*cizye*) (Stavrinides 1975–1985:II, 113–138, no. 699). Allocation of the poll tax was calculated according to a person's wealth. Thus, three categories were distinguished: the rich, the middle class, and the poor. We do not know exactly what they paid in 1671, but a year later a document of 1672 specified that the poll tax was between 4 and 4.5 *piastres* per head, and twenty years later, in 1691, the three categories paid by the *reaya* were eight, four, and two *piastres* respectively (Stavrinides 1975–1985:II, 365 no. 1020, 403 no. 1076B), or nine, four and a half, and two and a quarter *piastres*, according to another official document, (Stavrinides 1975–1985:III, 166, no. 1398). In 1672 there were 475 persons liable for poll tax in Pyrgiotissa and 1,782 persons in Kainourgio and the total tax that was imposed on the two provinces, including the amount received by the tax collector, was between 7,273 and 8,100 *piastres* for Kainourgio and between 1,938 and 2,159 *piastres* for Pyrgiotissa (Stavrinides 1975–1985:II, 67).

It was of interest to the Porte to have more *reaya* included in the first category, that of the rich. As a result, more people were arbitrarily included in it, as one can see in the census of 1671 in particular, and, to a lesser extent, in subsequent ones (Stavrinides 1975–1985:III, 103 no. 1314, 106 no. 1316, 116 no. 1332A). Thus, the numbers in each category mentioned in the documents for the villages of the two provinces do not accurately identify the economic affluence of the local population. In the last decade of the seventeenth century, the population of Crete had dropped considerably, due to the plague, which hit the island and lasted for two years (1689–1691) (Stavrinides 1975–1985:II, 357 no. 1007, 389 no. 1057, 404–406 no. 1077; Detorakis 1970:118–136 who misses this outbreak). A decade earlier, in 1678, there had been another outbreak of the plague with over 78,000 victims throughout the island (Detorakis 1970:132–133). Hence, there was a dramatic decrease of the population within a short time. The *reaya* had great difficulty in meeting their obligations, as they had to pay according to population numbers included in the censuses before the plagues, which was far above the actual surviving or resident population. Thus, in 1691 there were only 999 persons in Kainourgio and 296 persons in Pyrgiotissa liable to poll tax. The situation was so extreme that the sultan ordered the poll tax of the year 1692 to be collected according to the second and third category only. The same number of persons who had to pay the capitation tax was given for the two provinces in 1693, when they paid a total of 4,943 and 1,464 *piastres* respectively, and for the year 1694, with only a small reallocation in the numbers of the three categories (Stavrinides 1975–1985:III, 116, no. 1332A). (For the population figures see the section above, "Settlements, Population, and Land Use.") A little later, a new law introduced fixed payment for the poll tax, abolishing the division of the *reaya* into three categories (Stavrinides 1975–1985:III, 158 no. 1385), but in 1714 it was changed back to the old system (Stavrinides 1975–1985:III, 384 no. 1823).

Apart from poll-tax records, the only other principal source of information on the economy during this period comes from the farming out of revenue-producing imperial possessions to agents of the sultan (this revenue was known as *mukataa*). The *mukataa* constituted a very heavy financial burden upon the inhabitants. The tax-farmers by definition exacted much more than they had paid to the state, and the corrupt state of the local authorities made matters worse. The *mukataa* varied from one year to the next, and the specific information that we possess concerning two years is typical. In 1691 the *mukataa* of Kainourgio and Pyrgiotissa amounted to 4,930 *piastres* and was received in full. Other provinces, however, were unable to pay it, because the harvest had been bad and, at the same time, a large part of the land, particularly near the sea, had remained uncultivated. This was a result of the war with the Venetians and the raids of the *hain*, the Christian rebels and outlaws, who had fled to the mountains (Stavrinides 1975–1985:III, 107–108, no. 1317). It seems that, despite the prevailing bad conditions and depopulation, Kainourgio and Pyrgiotissa had been less affected than other provinces. In 1696 the tax-farmers of the imperial villages of these two provinces were to pay to the state approximately 4,260 *piastres*. Of this sum, 3,000 *piastres* would be paid in grain (about 115.2 tons), and the rest in cash (Stavrinides 1975–1985:III, 168–169, no. 1401).

Apart from regular taxations, the Cretan economy was affected by historical misfortunes, which included the massacres and destructions (described above) that followed Christian uprisings. The raids of the *hain* also caused considerable damage both to the Turks and to Christians who had to pay for this destruction and suffered retribution by the authorities (Stavrinides 1975–1985). Further destruction was caused by raids and by war. The Sphakiotes, for example, raided the Mesara region to loot its produce, an action that had serious economic repercussions (Stavrinides 1955:328; Giannopoulos 1978:64; Pashley 183/1/2I, xxxiii). In the fourteenth century raids and robberies were so numerous that the Venetian Senate decided in 1350 to send four captains to Crete to deal with the situation (*Capitanei super latronibus*), one of whom was for Castro Novo. However, there was little in the way of results (Thiriet 1966–1971:I, 242, no. 645; cf., 240 no. 640 [1358] and 243 no. 651 [1359]).

MONASTERIES

The last group of great institutions to be considered is the monasteries of the Mesara. They are not only religious establishments, but also landowning settlements, and as such, they are often included in censuses. Like most Greek monasteries, those in the Mesara were founded in remote places or generally at some distance from other settlements. Several of these old monasteries are still functioning today, while all that remains of others are churches. In other cases, nothing survives and their exact location remains unknown.

During the Byzantine period there existed monasteries described as imperial, that is, depending on and/or founded by the crown, while others were established by individuals and were administered by their families. The same practice of monasteries founded by private families existed in the Venetian period. When the Latin Patriarchate was established in Constantinople after the Fourth Crusade (1204), it claimed the possessions of the Orthodox Patriarchate in Crete. The subsequent fight between the Latin Church and the Venetians over the extended fortune and lands of the Greek Church on the island ended with the division of the Orthodox Patriarchate's possessions into three parts, one for the Latin Church, one for the state, and one for the Venetian fiefholders. Since the Venetians did not recognize the authority of the Orthodox Patriarchate in Crete, each Orthodox monastery fell under the jurisdiction of one of the three parties that received its revenue, regulated its fortunes, and rented out its lands. For those monasteries under the jurisdiction of the Venetian *Commune*, or state, the Venetians regulated their affairs and appointed the abbots and *epitropoi* (wardens) for some of them (Papadakis 1986:115). Since the establishment of additional monasteries was not prohibited by the Venetians, new monasteries were controlled by the Orthodox population.

Besides these categories, Orthodox monasteries in the Ottoman period were either *stavropigiaka*, that is, directly under the jurisdiction of the Patriarchate, or *enoriaka*, dependent on the local bishop, but their status could occasionally change from one to the other. We have little information about the jurisdiction of Mesara monasteries until late in the nineteenth century, when the monastery of Apezanes was *enoriako*, while Odighitria was a *stavropigio* (Stavrakes 1890:203). During this period many Cretan monasteries became *stavropigiaka*, because the Patriarchate, making use of its privileges, could better protect these monasteries from Turkish interference (Detorakis 1988:446). This more-or-less administrative distinction could be of vital importance for the monastery, because, among other things, it could affect its revenues. For example, a Patriarch could, and often did, give part or even the whole of the revenue of a monastery to one of the officials of the Patriarchate. Of course this does not necessarily mean that it had always been so. In 1870, a convocation of local bishops, abbots, lay representatives, and a bishop representing the Patriarch of Constantinople drew up a regulation, later approved by the Patriarch and his Synod, according to which all the monasteries were under the jurisdiction of the Municipality of the Nome to which each belonged (Stavrakes 1890:203–204).

The monasteries might be autonomous, or they could be, or eventually could become, dependencies of other monasteries. A dependent monastery, regardless of its size, was commonly called a *metochi*. The various possessions of a monastery, whether a single church, lands, or houses, or a combination of these, were called *metochia*. A typical *metochi* has a church, usually a small one, habitation cells, and other outbuildings in the area where the main monastery has lands. A *metochi* is usually in the region of its monastery, but it is not uncommon for a monastery to also possess *metochia* in distant places. It is not clear under what circumstances an autonomous monastery might become a dependency of another. It is reasonable to suppose, however, that this might happen when a monastery was failing and needed the protection and help of a larger one. The opposite could occasionally also occur, and a *metochi* might rise to the status of an autonomous monastery.

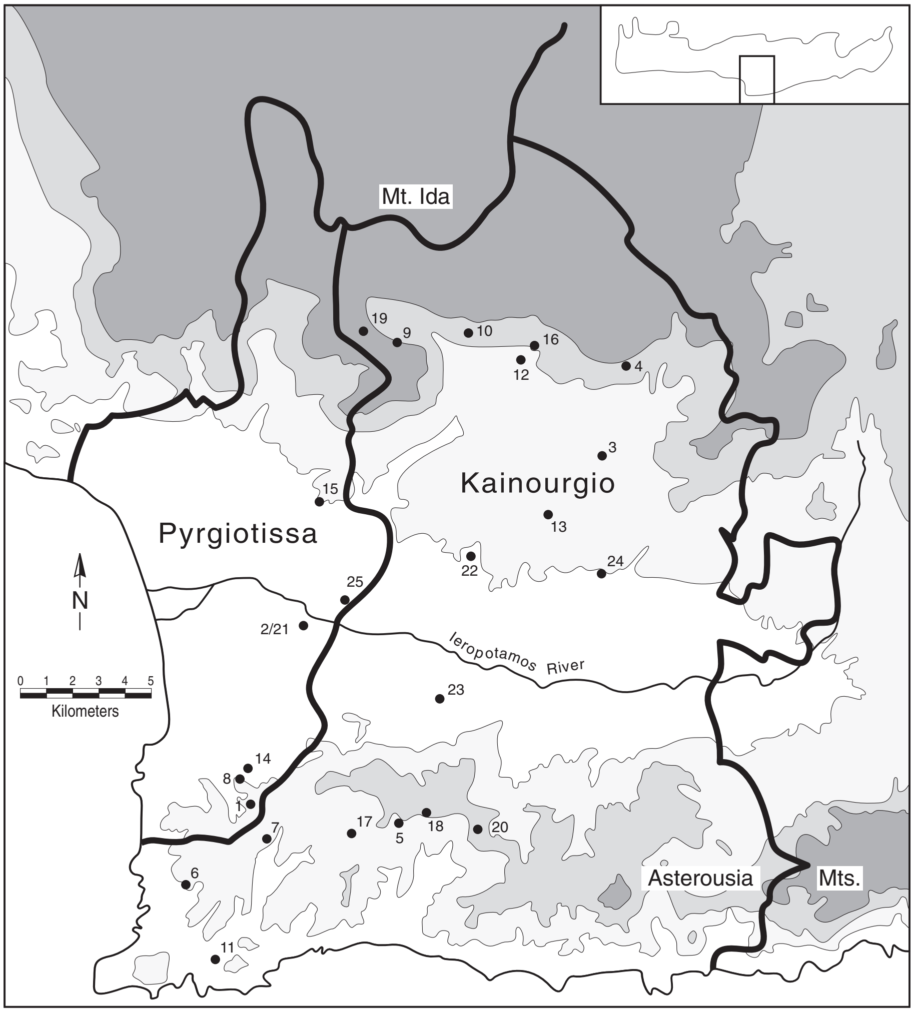
During the late Venetian period (seventeenth century) a large number of small monastic establishments were founded in Crete. However, there is as yet no evidence that this happened in the Western Mesara. On the contrary, our evidence suggests that only a very small number of local monasteries or *metochia* existed in the seventeenth century (see table 14.21). This may not be conclusive, since chronological data for most of the small *metochia* are not available. In the Ottoman period no autonomous monasteries were founded, as the building of churches, or even their repair, was strictly prohibited and permission was only given after the payment of considerable sums of money to the Ottoman authorities. This phenomenon also applies in the Western Mesara, where no new monasteries were established during this period.

The information available for each monastery varies greatly. For some, there are only a few references in the written sources, whereas for others considerable documentation exists, usually covering only specific periods of time. More often than not, however, the available written evidence is limited and fragmentary for three reasons. First, the archives of the monasteries did not survive the numerous rebellions against the Ottomans and the destructions that followed. Second, no notarial archives from the Venetian period exist today from the Western Mesara. Third, the numerous documents in the Ottoman archives are only partially published. A date for the foundation of a monastery is often based on archeological or stylistic evidence provided by its church and wall paintings. It is also not unusual for a grafitto to offer a *terminus ante quem* for the date of a monasteric establishment. Only rarely do we have a document that dates a monastery's foundation accurately.

The distribution of monasteries (figure 14.12) and their known *metochia* in the provinces of Kainourgio and Pyrgiotissa is uneven. Even taking into account the small size of Pyrgiotissa, the monasteries there are only about one fifth of those in Kainourgio.

The Earliest Monasteries

Evidence exists for several Byzantine period monasteries in the Western Mesara, but it is scarce. The oldest is the monastery of Sts. Eutychios and Eutychianos founded by St. John Xenos toward the end of the tenth century, and first mentioned in a document dated to about 1030 (Tomadakis 1983–1984:5, 8). The monastery was located in the Asterousia near the village of Etia south of Pyrgos. Another monastery of the tenth century, also founded by St. John Xenos, was that of St. George Douvrikas. Psilakis (1992/1993:324) has suggested that the monastery of St. George Falandras was next to the ruins of Phaistos. An unpublished document (Census 1635, f. 31r) in the State Archives of Venice refers to "*S. Jorzi di Ubrica . . . posto nel loco ditto Falandra*" corroborating Psilakis's suggestion. Another monastery, belonging to Panagia of Kyrmousi (Kainourgio), is referred to as "*monasterium imperiale*" in 1248 and therefore must be dated to the Second Byzantine period (Tsirpanlis 1985:48–49, 195 no. 105), although the church as it now stands was built between 1293 and 1391 (Xanthoudides 1903:145), or 1302 and 1397 (Gerola



I. Sts. Eutychios-Eutychianos
2/21. St. George Douvrikas/ St. George Falandra
3. Kyrmousi
4. Gergeri
5. Panagia Gorgooepikoos
6. Panagia of Martsalos
7. Odigitria
8. St. Andreas at Langos
9. Valsamonero
10. Vrontisi
11. St. Anthony at Agio Pharango
12. St. Nicholas at Zaros
13. Santa Maria degli Angeli
14. St. John at Langos
15. Kardiotissa
16. St. Euthymios at Zaros
17. St. John Prodromos at Pigaidakia
18. Aistratigos at Pigaidakia
19. Stavromenos near Vorizia
20. Apezanes
21. St. George Douvrikas/ St. George Falandra
22. St. Antonios at Vreli
23. Livadiotis
24. St. Paraskevi at Ampelouzos
25. Kalyviani (not certainly a monastery)

FIGURE 14.12. Monasteries of the Western Mesara

1906–1932:546). It is possible that the monastery of Gergeri, first mentioned in 1268 (Tsirpanlis 1985:143), was also of Byzantine date. The church of the monastery of Panagia Gorgoekipos near the village of Pigaidakia can also be dated to the twelfth century on stylistic grounds, but the church frescoes are later, circa 1300 to 1350 (Borboudakis 1971a:521) and the oldest of its many grafitti date to the year 1400 or 1406 (Tsougarakis 2000:699, no. 141).

We do not have any evidence for new monasteries in the Western Mesara in the thirteenth century, perhaps a result of a temporary Venetian prohibition against the foundation of new Orthodox monasteries. In the following two centuries this situation changed radically, as a considerable

Table 14.21. Chronological evolution of monasteries in the Western Mesara

Name	Dedication	Foundation	Evidence/ First Mention	Dependence
Eutychios-Eutychianos	Eutychios-Eutychianos	10th c.	1030 (Tomadakis 1983:5, 8)	Village Etea (15th-17th c); Odigitria 1648
St. George Douvrikas (the same as Falandra)	St. George	10th c.	1030 (Tomadakis 1983:5, 8)	
Kyrmousi	Panagia	12th c. or earlier	1248 (Tsirpanlis 1985:195)	
Gergeri	?	12th c.(?)	1268 (Tsirpanlis 1985:143)	
Panagia Gorgooepikoos	Panagia	12th c.(?)	Wall-paintings (?); but oldest graffito 1427	Apezanes
Panagia of Martsalos	Panagia	14th c.	1352 (Lombardo 1968:26–27)	
Odigitria	Panagia	14th c.	1393 (Santschi 1976:322, no. 1443)	
St. Andreas at Langos	St. Andreas	14th c.	Wall-paintings (Borboudakis 1970:493)	Odigitria
Valsamonero	St. John, St. Fanourios	14th c.	Inscription 1400; wall- paintings (Chatzidakis 1952:75); grafitto of 1404 (Xanthoudides 1903:142)	
Vrontisi	St. Anthony, St. Thomas	14th c.	Wall-paintings (Chatzidakis 1952:72); mention 1437	
St. Anthony at Agiofarango	St. Anthony	14th/15th c.	Gerola 1906–1932:II, 229, 242–243	Odigitria (1870)
St. Anthony at Platea Peramata	St. Anthony	1378	McKee 1998:757	Same as previous?
St. Nicholas at Zaros	St. Nicholas	14th/15th c.	Wall-paintings (Papadaki 1966:434); grafitto 1481	Valsamonero (1644)
Santa Maria degli Angeli	Panagia	14th/15th c.	Gerola 1906–1932:II, 150–152	
St. John at Langos	St. John	14th/15th c.	Wall-paintings (Borboudakis 1970:493)	Odigitria
Agioi Deka	Holy Ten Martyrs	?	1415–1417 (Buondelmonti 1981:175–176)	
Kardiotissa	Panagia	15th c.	Grafitto 1423	

Continued on next page

TABLE 14.21. Chronological evolution of monasteries in the Western Mesara *(continued)*

Name	Dedication	Foundation	Evidence/ First Mention	Dependence
St. Euthymios at Zaros	St. Euthymios	15th c.	Grafitto 1438	?
St. John Prodromos at Pigaidakia	St. John	15th c.	Grafitto 1507	Apezanes
Aistratigos at Pigaidakia	St. Michael	15th c.	Grafitto 1521	Apezanes
Stavromenos nr. Vorizia	Christ	15th c.	Wall-paintings (Chatzidakis 1952:75; Borboudakis 1970: 601); grafitto of 1517	Vrondisi, Valsamonero (1644)
Apezanes	St. Anthony	15th c.or 16th c.	1459 or 1549 (Psilakis 1992:240)	
Falandra (the same as St. George Douvrikas)	St. George	10th cent.	1597: Cruso 1612–1639: f. 120r	1723: Arkadi
St. Antonios at Vreli	St. Antonios	16th/17th c.	1671 (Doulgerakis 1958:120)	Vrondisi
Livadiotis	Sts. Anargyroi	17th c.	Inscription 1608 (Xanthoudides 1903:146)	Odigitria
St. Paraskevi at Ampelouzos	St. Paraskevi	?	1635: Census 1635: f. 11r-v	Vrondisi
Panagia Monastirachi	Panagia	Panagia of Martsalos?	1635: Census 1635: f. 83r	
Kalyviani (not certainly a monastery)	Panagia	14th c.	Wall-paintings (Bissinger 1995)	

number of monasteries were established. These new monasteries are in most cases dated on the basis of their wall paintings and grafitti.

The earliest reference to a previously unknown local monastery in the fourteenth century is that of Panagia of Martsalos, first mentioned in 1352 (de Fredo 1968:26–27) and again in 1362/1363 (McKee 1998:II, 784–785). Today a cave church dedicated to the Virgin exists at Martsalos. The great monastery of Panagia Odigitria is first mentioned in 1393 (Santschi 1976: No. 1443, 322); the surviving wall-paintings are also of the fourteenth century (Borboudakis, Gallas, and Wessel 1983:91) and there are two grafitti of the years 1468 and 1560. St. Andreas at Langos, a *metochi* of Odigitria, also has frescoes of the first half of the fourteenth century (Borboudakis 1970:493). The church of the monastery of St. Nicholas at Zaros, a *metochi* of Valsamonero, has frescoes that can be dated as early as the beginning of the fourteenth century (Papadaki-Okland 1966:434), with the earliest grafitto dated to 1481 (Tsougarakis 2000:697, no. 116). Valsamonero, a monastery dedicated first to Panagia Odigitria and later to St. John Prodromos and St. Fanourios, is dated to the fourteenth century via the style of its paintings and its dedicatory inscriptions of 1400–1431 (Chatzidakis 1952:75). A grafitto of 1404 (Xanthoudides 1903:142) provides a *terminus ante quem* for the monastery's foundation. Likewise, the monastery of Vrontisi, dedicated to St. Antony and St. Thomas, is dated by its wall-paintings to the fourteenth century (Chatzidakis 1952: 76, 80, 86–89; Borboudakis 1985:408). Vrontisi is first mentioned in written sources in 1437; at that

Table 14.22. Monasteries in Castel Novo and Pyrgiotissa in the Census of 1635

Village	Monastery	Owner (*jus patronatum)*	Priests/monks	Income	Comment
	St. Antonios Apezanes	Gabriel Bonaseri	Abbot & 70 monks & 36 laymen	See table 14.25	
	St. Antonios Vrondissi	?	Silvestro Dhesso (80 monks & 4 shepherds)	See table 14.24	
	St. George Falandra	Mercurios Codomnis		See table 14.26	Given by the Duca .. Gradoni-co
?	Panagia Monastirachi	Abbot Macarios Caronita	Macario Varugha	See table 14.27	
	Madonna Mattala	S. Benetto & sons Notara	Arsenio Gugielmo plus 1 monk & 2 servants	30 *ducats* (uncertain)	
Moires	St. George	Archbishop	Makarios Somagnichi	Not mentioned	
Panassos	St. John Bap-tist	Nicolo & Franc. De Mezo	Daniel Cherodynamos	Not mentioned	
Raptis	St. Nicolas	Marieta wid. Zorzi Barbarigo	Giorgis Trullianos	Not mentioned	
Raptis	2 more in ruins	Marieta wid. Zorzi Barbarigo			
Sivas	I santi	"Giorgis Notaras"	Grigorios Papadopoulos	Not mentioned	
[Vorizia]	Panagia Valsamonero	Matthio Querini	Abbot Gabriel Papadopoulos	See table 14.23	
Zaros	St. Nicolas	Nicolo Lombardo	Convent	Not mentioned	

time the monastery belonged to the Latin Patriarchate of Constantinople and was let by the Latin Patriarch Ioannis Contareno to Gerasimos Skordilis, who is supposed to have been its first abbot.

As far as we know, there was only one Latin monastery in the Mesara, that of Santa Maria degli Angeli at Fradio near Castro Novo (figure 14.22), dated to the fourteenth/fifteenth century (Gerola 1906–1932:II, 150–152: wall-paintings of the fifteenth century). Restored in 1996, the monastery is now used as an Orthodox church dedicated to the Annunciation of the Virgin. The church of St. Antonios in Agio Pharango, which at first might have been the center of Christian worship for local hermits, is thought to be from the fourteenth or fifteenth century (Gerola 1906–1932:II, 229, 242–243). The church of St. John at Langos, another *metochi* of Odigitria, is also dated by its frescoes to the second half of the fourteenth century or the beginning of the fifteenth century (Borboudakis 1970:493). An inscription dates the church of Panagia at Monochoro of Galia to the fourteenth/fifteenth centuries (either 1345 or 1445) (Xanthoudides 1903:135–138; Kalokyris 1957:43); a probable fourteenth-century grafitto favors the the former date (Tsougarakis 2000:698, no. 129). This church was a *metochi* of Valsamonero and later of Vrontisi (Doulgerakis 1958:120).

In the early fifteenth century Buondelmonti (1981:109; 175–176) mentioned the existence of several Orthodox monasteries, both of monks and nuns, in the Asterousia Mountains. Near the church and village of Agioi Deka, he stated that he saw about a hundred cells of monks; this can only refer to a monastery. Most of the fifteenth-century monasteries that are known to us can be dated on the basis of grafitti inscribed on their walls. Thus, the church of Panagia Kardiotissa near Voroi is dated to the first half of the fifteenth century by a grafitto of 1423 (Borboudakis 1968a:423–424; Nikolidakis 1986:213). A graffito of 1438 (Gerola and Lassithiotkis 1961:88) dates the small church of St. Euthymios near Zaros, probably a *metochi* of Valsamonero. The church of St. John near Pigaidakia, a *metochi* of the monastery of Apezanes, is dated by a graffito of 1507 (Gerola and Lassithiotakis 1961:91). Although the earliest graffito from the church of Estavromenos at Voriza near Valsamonero dates to 1517 (Chatzidakis 1952:75), its fifteenth-century wall paintings indicate that the building was constructed earlier.

The dating of Apezanes, one of the most important monasteries in Crete, is not known. Its oldest reference is to be found in unpublished Venetian documents of 1549, since a mention "of 1458" comes from a forged will of the nineteenth century (Psilakis 1992:240). Two grafitti, one of 1507 and one of 1521, provide a *terminus ante quem* for the churches of St. John and Taxiarches (Aistratigos), both *metochia* of Apezanes, located at Pigaidakia. The earliest reference to St. George Falandras at Phaistos after the Byzantine period is in 1597 (Cruso 1612–1639:2, f. 120r). Cornelius (Cornaro 1971:I, 222) incorrectly identifies it as a monastery dedicated to the Virgin Mary.

An inscription gives us the exact date, 1608, of the foundation of St. Anargyroi of Livadiotis near Petrokefali, a *metochi* of Odigitria (Xanthoudides 1903:146). A document of 1671 refers to the church of St. Antonios at Vreli as belonging to Vrontisi "from the oldest years" (Doulgerakis 1958:120, 161–162; Stavrinides 1975–1985:I, 426, II, 33–34). This may mean that St. Antonios was a foundation of the previous century. Finally, St. Paraskevi at Ampelouzos is first mentioned in 1635 (Census 1635: f. 1 r–v) as a *metochi* of Vrontisi. At some unknown date, possibly in the nineteenth century, the extensive lands of the *metochi* were acquired by the state, to establish the Agricultural School of Mesara, situated next to Gortyn. Finally, several other local *metochia* that appear in Ottoman period documents can be dated to the Venetian period by their wall paintings.

Monasteries During the Venetian and Ottoman Periods

Most of the Byzantine monasteries in the Mesara did not survive very long in the Venetian period. Those few that did were not as important as the newly established monasteries. Thus, Kyrmousi was last mentioned in 1320 (Tsirpanlis 1985: no. 113 I–III) and Gergeri, if it were of Byzantine origin, in 1345 (Gasparis 1997:31 n. 18). St. George Douvrikas, established in the tenth or eleventh century, also disappeared from our written sources, because it is identified by a different name, St. George Falandras, that begins to appear in sixteenth-century documents. Only Sts. Eutychios and Eutychianos, an establishment of the tenth/eleventh century, survived for an equally long time. This monastery was on the top of a hill that in Byzantine times was called Lithinon or Raxos and is now Charkokefala, between Kaloi Limenes and the monastery of Odigitria (figure 14.1). The monastery was still in operation as an Orthodox establishment during the fourteenth and fifteenth centuries, although it belonged to the Latin Patriarchate of Constantinople. In 1423 the Patriarchate rented it out to "*papati calogero Nillo Ligidi . . . cum omnibus suis juribus et rationibus, quod est de jure dicti casali Ethea*" (the priest-monk Nilos Ligidi . . . with all its rights and possessions, which is in the rights of the said village of Ethea). In 1445 the monastery was restored to the jurisdiction of the village of Ethia (Tsirpanlis 1967:203–204) until 1630. At some time afterward, it became a *metochi* of the monastery of Odigitria, to which it belongs today.

Odigitria, dedicated to the Virgin, is probably the oldest known monastery (plate 14.4) of the Venetian period and one of the four most important monasteries in the Western Mesara, the other three being Valsamonero, Vrontisi, and Apezanes. Almost all of the others that existed or still exist in the Western Mesara became *metochia* of these monasteries. Odigitria was in existence from at least 1393 (when it was first mentioned), and it suffered various destructions during the Ottoman occupation of Crete. Apart from substantial buildings at the seat of the monastery, Odigitria eventually gathered a considerable number of *metochia* and had extensive possessions. Besides St. Andreas and St. John Prodromos at Langos, already mentioned, the monastery of St. Antonios at Agio Pharango eventually became a *metochi* of Odigitria. Similarly, in 1606 the monastery of Sts. Eutychios and Eutychianos became a *metoch*i of Valsamonero, the monastery of St. John Farangitis. In 1608 Odigitria built the church of Sts Anargyroi on its *metochi* at Leivadiotis near Petrokefali. This *metochi* was sold to the Turks almost a century later, to pay the debts of the monastery. Odigitria also possessed *metochia* at Matala and at Foteinopoulo, near Tymbaki.

In the sixteenth century (1571) the revenues of the monastery of Odigitria were 1,000 *ducats*; in 1578 its revenues had been given to the important family of Kallergis, who received an annual income of 1,500 *ducats* (Spanakis 1969a:149). In 1596 the British traveler Fynes Moryson was treated with great hospitality by the monastery. It was probably during this century that a wall was built round the monastery, giving it its present fortified appearance. The monks of Odigitria participated (1645) in the Veneto-Turkish war for Crete. Joseph, its abbot, was one of the leaders of the local resistance group against the Ottomans in 1660–1661 (Karathanassis 1973:111). During the War for Greek Independence (1821–1828) the monastery became a refuge and a base for rebels. In 1828 the rebel monk Joseph Xopateras was besieged and eventually killed by Turkish troops in the monastery tower, ina battle that resulted in great destruction of the monastery. In 1841, Odigitria became *enoriakon* and in 1844 it became *stavropigiakon*. In 1866 the abbot Gerasimos Manidakis took an active part in the great rebellion of 1866–1869 and turned the monastery into a depot for gunpowder. After the war, in 1870, the monastery, which lay in ruins, was rebuilt and in 1880 it was manned by nine monks. Around 1900 Odigitria was financially ruined and its monks were entirely destitute (Psilakis 1992:229).

Valsamonero was built at the end of the fourteenth century, as indicated by inscriptions of 1400–1407. It is first mentioned by Buondelmonti in 1415 (1981:178, 283–284) as dedicated to St. John (before the construction of the aisle dedicated to St. Phanourios). It is also mentioned as dedicated to the Virgin (1562), to St. Phanourios (1582), and to both saints (1643). Inscriptions and grafitti indicate that it was repeatedly repaired and reconstructed. It is possible that it became a cultural center, since it had a considerable number of books in its library, and a school may have functioned there in the Venetian period. In 1535 its fief-holder was Mattio Querini, its abbot Gabriel Papadoulos, and it housed about 30 monks and layman (Census 1635, f. 64v). In 1644, the monastery was given as a fief to the Venetian noble Ranier Dandolo. Ottoman-period references to the monastery began in 1694. In 1730 it was visited by Baume, the French vice-consul in Candia (Konstantinidis 1956:392). In 1801, the monastery lands were leased to a layman for two years, suggesting that it was deserted (Fanourakis 1952: 341). It was still functioning in 1832 (Chourmouzis 1842:17), but ten years later it is possible that no monks resided there. By 1870 Valsamonero was certainly deserted (Psilakis 1992:312).

Despite its desertion, Valsamonero still owned extensive *metochia*. In 1606 the monastery of St. John Farangitis, formerly a *metochi* of Odigitria, became a *metochi* of Valsamonero. In 1635 and 1644 the monastery owned St. Nicholas at Zaros and possibly the church of St. Euthymios, St. Paraskevi of Meritis in Castro Novo, the *metochi* of Kera Velouliani, the church of St. George at Panassos, and various other *metochia* (Census 1635, f. 64v). In 1870 St. John at Veloudi of Galia (Mavromatis 1990; Psilakis 1992:314, 316; see table 14.23) was added to its possessions. It is not known whether Estavromenos at Voriza was also a *metochi* of Valsamonero. In 1842 there was an attempt by the Metropolitan of Crete to auction off the lands of several monasteries, including Valsamonero; this failed for various reasons. In 1919 the land-register of Vrontisi included Valsamonero among its *metochia*.

The monastery of Vrontisi, dedicated to St. Antony and St. Thomas, is dated to the fourteenth century through its frescoes, although it was first mentioned in 1437 as a possession of the Latin Patriarchate of Constantinople and was rented by Gerasimos Skordilis, who is its first known abbot. In 1467 it is mentioned as a

TABLE 14.23. Possessions of Valsamonero in 1635

Churches/*Metochia*	Location/Village	Land, etc.	Income	Payments
St. Paraskevi sto Meriti			50 mz. corn*	
200 mist. wine*				
"Sti Murnea"				
Stavros				
St. Nicolas				
Ve…?	St. John Farangitis			
St. George	Panassos			
			From *livello*:	
60 *hyperpera*				
50 mist. olive oil				

* Income from the first four *metochia*.

Patriarchal village, which Cardinal Bessarion let to the Venetian noble L. Quirini. In the sixteenth and the seventeenth centuries it was among the monasteries whose abbot and wardens were appointed by the Venetian government of Crete (Papadaki 1986:115). It is one of the few monasteries whose abbots are relatively well known. Vrontisi was a flourishing monastery with a scriptorium, a school, and probably an icon workshop (Doulgerakis 1958:153–154, 158–159; Panagiotakis 1972:652–655). A little before the Ottoman conquest it was the third largest in Crete, with eighty monks and four full-time shepherds; it was also the fifth largest in agricultural revenue (Vlachaki 1986:315–316). During the Veneto-Turkish war, in 1645, the monks of the destroyed Arkadi monastery fled to Vrontisi. A few years after the conquest, in 1671 and 1672, we are informed that the monastery had obtained a *berat*, or warrant, from the Turkish commander-in-chief Ahmet Pasha, protecting it from any outside intervention (Doulgerakis 1958:163–165). In the same year, 1672, the monastery was transferred to the jurisdiction of the Metropolitan of Crete, but in 1729 it once again came under the Patriarchate of Constantinople (Gedeon 1939: 380). In the nineteenth century, Vrontisi was periodically deserted because of the continuous wars and rebellions, and in 1801 it was most likely deserted, because its property was leased for two years (Fanourakis 1952:340–341). In 1818 it was abandoned because of the Turkish actions (Praktikides 1983:52–53); from 1821 to 1828 it became a base of the fighters for Independence and it suffered great destruction during the rebellion of 1866, when it was again used as headquarters for the local fighters. Although a small number of nuns is recorded in Vrontisi in 1863, the monastery was again abandoned; between 1864 and 1877 it was rented by private individuals, Greeks or Turks, inhabitants of neighbouring villages (Doulgerakis 1958:170; Psilakis 1992: 312–313). It was finally re-established circa 1895.

Vrontisi owned a number of *metochia* (table 14.24), among which were the church of Panagia at Monochoro, formerly a *metochi* of Valsamonero; St. Antonios at Vreli; Panagia Kardiotissa; St. Paraskevi at Ampelouzos, with its extensive lands (Psilakis 1992:120); and possibly St. Euthymios at Zaros (Census 1635, ff. 11r–12r).

Apezanes, also dedicated to St. Antony, is the last of the four main monasteries of the Western Mesara. It is probably the latest of the four: the earliest mention of it is in 1549 (Detorakis 1986:96), but the date of its foundation is unknown. In the sixteenth and seventeenth centuries it was one of the important monasteries with wardens who were appointed by the Venetian government of Crete (Papadaki 1986:115). In the last quarter of the sixteenth century its income amounted to 2,000 *ducats*. Meletios Pigas, later Patriarch of Alexandria (1590–1596), was a monk in Apezanes, and the important scholar Meletios Syrigos was

TABLE 14.24. Possessions of Vrontisi in 1635

Churches/ *Metochia*	Location/ Village	Land, etc.	Income	Payments
				To Nicolo Lombardo: 45 mz. grain; 2 mist. honey; 28 *hyperpera*. To the fisc: 14 *ducats* of Candia. To the fontego: 8 mz. grain
St. Veneranda (=St. Paraskevi)	Ampelouzos	7 fields "*francati*"	50 mouz. grain	To the Archbishop: 265 mz. grain; 30 mz. barley; 30 lb. cotton; 28 *hyperpera*.
Timios Stavros	Avgeniki (?) / Assani	Vineyards; vineyards (rented); field	100 mist. wine; 100 mist. wine; 15 mz. grain	36 *hyperpera*
St. John Theologian "*stineligi*"	Agia Varvara	24 fields; vineyards	121 mz. grain; 20 mz. barley; 500 mist. wine*	For the vineyards: 20 mz. grain; 8 *hyperpera*
Timios Stavros	Avgeniki (?) / Assani	Vineyards; vineyards (rented); field	100 mist. wine; 100 mist. wine; 15 mz. grain	36 *hyperpera*
Panagia Faneromeni	Avgeniki (?) / Assani	4 fields	12 mz. grain; 2 mz. barley; 6 mist. olive oil	35 *hyperpera*
Panagia "sto Catochori"	Messiskli	Various fields; "from rent" of fields	84 mouz. grain; 14 mz. barley; 10 mz. grain; 6 mist. olive oil	
St. Anne	Skourvula	Fields	6 mist. grain; 6 mist. olive oil	
	"Stovrondissaki"	2 fields; 100 olive trees; 1 orchard		
	Zaros; Zaros & elsewhere	1 field of 2 *mouzouria*; 3 watermills; olive trees	48 mz. grain; 100 mist. olive oil	
	Peza (?)	8 vineyards	150 mist. wine	
	"Sti livada"	1 vineyard	200 mist. wine	
	?	160 olive trees	200 mist. olives	
	Nivritos	Various fields	24 mz. grain	
	? (Nivritos?)	1 vineyard	6 mist. wine	
	?	4 houses	Rent not specified	
	?	Field; 6 olive trees	12 mz. grain; 3 mist. olive oil	

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TABLE 14.24. Possessions of Vrontisi in 1635 *(continued)*

Churches/ *Metochia*	Location/ Village	Land, etc.	Income	Payments
	Mulia	Vineyards; "from rent" of fields**	500 mist. wine;* 47 mz. grain; 70 *hyperpera*	
	?	Vineyards	1500 mist. wine	
				Annual salary of 4 shepherds: 1500 *hyp*. For vestments and clothes: 5,000 *hyp*. For wax and oil for the church "lire" 1,000 annually. Various expenses: 500 *hyp*.
				For the sustenance of 80 monks and "others": 800 mz. grain, 1,000 mz. barley
				For the animals: 800 mz. fodder & 720(?) *hyp*.

*1,000 *mistata* of wine from the vineyards in St. Anne and Mulia. ** Together with rent from Agia Varvara.

abbot in 1626. Toward the end of the Venetian period, in 1635, it was the fourth largest monastery in Crete, with sixty monks and thirty-six laymen, and was the second largest in agricultural revenue (Census 1635, f. 18v–19r). It does not seem to have suffered any destruction during the Veneto-Turkish war and there is a mention that it had managed to obtain an *ahtname*, or pact from the sultan, guaranteeing its security, but no actual document is preserved (Psilakis 1992:250). It was called Toplou during the Ottoman period because it was fortified and had cannons, but it is not certain when it acquired these fortifications (described by Gerola 1906–1932:III, 187). In 1745 it was visited by the Russian monk Barskij, who sketched the monastery. During the War of Independence it became a base for resistance fighters. In 1827 the Turks burned down a large part of the monastery, including the church, the monks' cells, and many storerooms, but the surrounding wall and some of the books and manuscripts seem to have survived. Later, in 1834, the monks travelled around Crete gathering alms to rebuild the monastery (Pashley 183/1/2I, 222, 274). In the war of 1866 its possessions suffered greatly, as the Turks burned down 4,000 of its olive trees and two of its *metochia* (Tsatsaronaki 1954:24), but in 1881 it had twenty monks and ten laymen, being again one of the largest monasteries in Crete (Stavrakes 1890: 154, 203). In 1900 Apezanes was dissolved and was re-established in 1935 (Psilakis 1992:254).

Apezanes owned a large number of *metochia*, but because of a lack of published archival material, we do not have a clear picture of how these *metochia* were acquired. Nearly all appear as possessions of Apezanes in the census of 1635, and the register of 1919 demonstrates the persistence of monastic properties (see table 14.25). These include St. Pelagia at Agia Varvara of Monofatsi (Xanthoudides 1903:149); St. Dimitrios, Panagia, and St. Paraskevi, all at Antiskari; Profitis Ilias and Metamorfosi at Trypita; Aistratigos at Pigaidakia; St. John Prodromos at Farkatines (Pigaidakia); and St. Markos and the large *metochi* of the old, probably Byzantine, church of Panagia Gorgoepikoos at Gialomonochoro. At least since the beginning of the nineteenth century, Apezanes also owned a *metochi* in Smyrna (first mentioned by Pashley 183/1/2I, 274), consisting of a church and a house, to which the abbot fled after the destruction of 1827. This *metochi* belonged to the monastery at least until 1907, or perhaps until 1922. Various other possessions, the locations of which cannot always be determined, appear in documents of the second half of the nineteenth century (table 14.25).

Three more monasteries should be mentioned here briefly, namely St. George Falandras, Santa Maria degli Angeli, and Panagia Monastirachi. The first stands on the site of the tenth/eleventh-century St. George Douvrikas, but it is first mentioned in the sixteenth/seventeenth century, when its abbot Merkourios Koudomnis had in 1629 a legal suit with a member of the village of Sivas over an orchard (*perivoli*) bequeathed to the monastery in 1597 (Cruso 1612–1639: prot. 2, f. 120a, June 8, 1629) (table 14.26). During the late Venetian period, its abbot was appointed by the Venetian authorities. During the Ottoman period it functioned normally until 1821. In 1723, it was "united" by Patriarchal decision with the monastery of Arkadi (Gedeon 1885–1890:624) and in 1817 it was mentioned by the traveler Sieber. In the War of Independence, in 1821, it was destroyed and burned down, while its lands were taken by wealthy Turks of the area. The monastery has not functioned since since.

The second, Santa Maria degli Angeli, was the only Catholic monastery in the Western Mesara. Its foundation goes back perhaps to the fourteenth century, although traces of its surviving frescoes were dated to the fifteenth century by Gerola (1906–1932:II, 150). The monastery belonged to the Franciscan order, and was apparently in operation until the Turkish conquest. The last mention we have is in the will of Andrea Cornaro in 1611, who bequeathed to the monastery an annual donation of four *mouzouria* of grain from the produce of his fields in the village of Thrapsano in the Pediada.

Finally, Panagia Monastirachi appears for the first and only time in the Census of 1635 (f. 83r) among the monasteries of the province of Pyrgiotissa. Its abbot was Macarios Caronita and the monastery is described as being in a mountainous, arid, and infertile area, a fact that accounts for its poor income (table 14.27). The identification of this monastery is uncertain. As Panagia Odigitria is absent from the 1635 list, one would tend to identify it with Monastirachi, and all the more so as the location of Odigitria fits the description. Nevertheless, Panagia Monastirachi is cited as a small and poor establishment, which Odigitria certainly was not. Of the other two candidates dedicated to the Virgin, namely Panagia Kalyviani and Panagia Kardiotissa, neither matches the description of the location, and for Kalyviani we are not certain if it

Table 14.25. Possessions of Apezanes in 1635

Churches/ *Metochia*	Location/Village	Land, etc.	Income	Payments
	Near & around the monastery	Fields; vines; olive trees	400 mz. corn; 200 mz. barley; 250 mz. "*biava* & *legumi*"; 500 mist. wine; 150 mist. olive oil	
	Pigaidakia	Fields	80 mz. corn	
St. John Chryssostom	Pigaidakia	Fields	300 mz. barley	
Metochi with 2 churches: Panagia Gorgoepikoos, & St. Markos	Pigaidakia	Fields; olive trees	50 mz. corn; 40 mz. barley; 70 mz. "*biava* & *legumi*"; 25 mist. olive oil*	

Continued on next page

TABLE 14.25. Possessions of Apezanes in 1635 *(continued)*

Churches/ *Metochia*	Location/Village	Land, etc.	Income	Payments
Christ Kalamitsi	Pigaidakia	Fields	30 mz. corn**	
St. John Farkatines	Pigaidakia	Olive trees	30 mz. corn**; 25 mist. olive oil*	
	Trypita		400 mz. corn; 25 mz. barley	
St. Michael Archangel	Trypita	Fields	200 mz. corn; 80 mz. barley; 60 mz. "*biava* & *legumi*"	
St. Paraskevi	Trypita		30 mz. corn	
	Peri		80 mz. corn	
St. Paraskevi	Peri	Fields	15 mz. corn	
Panagia "di Gaghinaca"	Near the sea	Fields	8 mz. corn	
St. Dimitrios	Near the sea	Fields	10 mz. corn	
St. Pelagia	Agia Varvara	Vineyards; fields	4000 mist. wine; 20 mz. corn	
St. George Gorgolainis	Assites	2 fields; 1 orchard	Not specified, for the sustenance of the monks	
Panagia Armiri	[Nr. Agioi Deka]	1 field	No income	
Church "de Farangi"	?	1 field	No income	
	Candia	Houses & shops	250 *hyperpera*	
		1000 animals	3000 lb. cheese	
				12,000 *hyp*. a year for the cultivation of the fields
				For the sustenance of the monks etc: 1,800 mz. corn; 1,000 mz. barley; 300 mz. olives; 400 mz. "*legumi*"; 3,000 mist. wine; 100 mist. oil; 2,000 lb. cheese
				Other expenses: 15,000 *hyperpera*

* 50 *mistata* olive oil from both Gorgoepikoos and St. John Farkatines

** 60 mz. from both Christ Kalamitsi and St. John given to the tenant farmers

ever was a monastery. The last candidate, Panagia at Martsalos, mentioned twice in the fourteenth century, fits the description of the location but it seems to belong to the province of Castel Novo rather than to Pyrgiotissa. However, given that at Martsalos we have the border of the two provinces, we provisionally identify Panagia Monastirachi with Panagia at Martsalos.

TABLE 14.26. Possessions of St. George Falandra in 1635

Churches/ *Metochia*	Location / Village	Land Etc	Payments	Income
	?	Fields; fields; fields (free)	"*Terzaria*" to various fief-holders:134 mz. corn & 11 mz. barley; "*Livello*" to Matthio Dandolo: 88(?) *hyp*.	(Net) From all the fields: 100 mz. corn; 200 mz. "*biava* & *legumi*"
	?	Fields	"Livello" to Matthio Querini & Nicolo Saga: 3 2/4 mz. corn, mz. barley, 18 *hyp*. 2 *angareia*	(Net) 25 mz. corn
	?	Orchards	"*Livello*" to Piero Bon: 175 *hyp*.	(Net) 60 *hyp*.
	?	2 water mills	"*Terzaria*" to Matthio Dandolo & Marco Barbarigo: 36 mz. corn	(Net) 50 mz. corn
	?	Olive trees	"*Terzo*" to Lunardo Notara	(Net) 6 mist. oil
Panagia di Stroviglia and "Stustamata"	Territ. di Castel Bonifacio	Vineyards		100 mist. wine; 40 *ducats* (uncertain)
2 simple churches near the monastery				The income serves the upkeep of the monastery, 3 priests, 16 monks, & 6 servants

TABLE 14.27. Possessions of Panagia Monastirachi in 1635

Churches/*Metochia*	Land, etc.	Income
	Fields	35–50 mz. corn
	Olive trees	20 mist. olive oil
	3 *donegali* & 18 animals; 100 swine	

The Finances of the Monasteries

The monasteries in the Mesara normally owned extensive landholdings which were mainly rural. According to wriiten sources, urban property, houses or shops, was rare. Property was mostly donated or bequeathed and was much less frequently acquired by purchase. Donors usually were private individuals, but they could also be high-ranking officials or even members of the imperial family and the emperor himself, if the monastery was important enough. After the Byzantine period the donors were private individuals, although it was by no means uncommon for Venetians to make donations to Orthodox monasteries as well. Sometimes the donations were quite important. In 1569 two vineyards and a house were donated to Vrontisi by a notary (Mertzios 1961–62:249–250); in 1648 a stone sculptor left a quarter of his belongings to the same monastery (Bees 1906:59); before 1689 a field of 200 *mouzouria* was donated to Apezanes (Stavrinides 1975–1985:II, 332); in 1603 Markos Papadopoulos bequeathed his villages of Kamariotis and Fourni to several monasteries, one of which was Apezanes (Xanthoudides 1912:283); and in 1707 five fields, twelve olive trees, and one house were donated by a woman to Valsamonero (Stavrinides 1975–1985:III, 352).

Despite the fact that the monasteries owned considerable land, they seem at times to have been in need of cash; at other times they appear to have large amounts of money. In 1617, for example, the abbots of St. Catherine of Sinai (in Herakleion) and of Vrontisi accumulated the greater part of 5,000 *ducats*, which the Venetians used to fight off the attacks of the Uscoques (Serbs) (Doulgerakis 1958:154). It was not uncommon for individuals to borrow and/or to owe money to the monasteries, for the monasteries did not force repayment. We can see, for example, that in 1644 the scholar Thomas Flagginis in Venice had owed Vrontisi 300 *ducats* for quite some time (Mertzios 1939:32), and in 1866, Apezanes lent to an individual 2,200 *piastres* without interest (Psilakis 1992:252). There are many more instances of loans of smaller sums that the monasteries gave to various individuals (for example, Stavrinides 1975–1985:III, 113).

The Venetians did not specifically oppress the monasteries, but they could ask them to contribute economically in cases of emergency. On the other hand, during the Ottoman period, urban monasteries were destroyed and only a small number of rural monasteries, for example, Vrontisi, were able to acquire the official order that protected them sufficiently for their survival. Monasteries suffered severely not only from high taxation (they had to give one-seventh of all their produce to the tax farmers) and extraordinary impositions, but also from quarterly obligatory presents to the Ottoman officials. They were obligated to house and feed the passing janissaries and other Turkish soldiers, who often used every opportunity to plunder them. According to Muslim sacred law, the building and even the repair of a church or a monastery was prohibited. Thus, the monasteries were obliged to pay huge amounts of money in bribes in order to secure permission for even the most basic repairs.

Monasteries also paid for the services of an influential Turk (*monastir agasi*), who intervened on their behalf with the authorities in order to help them avoid the continuous vexations and to assist them with their petitions. Because of the arbitrary economic impositions of the Ottomans, many monasteries were obliged to borrow money, which resulted in greater financial difficulties. As a rule, monasteries only sold property in cases of extreme need. In Ottoman times, however, we have various examples of monasteries selling landed property in order to repay their debts. One of the most notable cases was the selling, in 1707, of the *metochi* of Leivadiotis by the monastery of Odigitria. The monastery had acquired this large *metochi* by purchase and was obliged to sell it for 770 *piastres* to its Ottoman lender in order to pay the debt (Stavrinides 1975–1985:III, 347). In 1685, Vrontisi also sold to a Turk a field and a mill in Ampelouzos for twenty-five *piastres* (Stavrinides 1975–1985:II, 236) and while the reason for the sale is not mentioned, the price was low for such transactions. In 1674 a monk of Apezanes sold a number of buildings in various villages of the Mesara (Stavrinides 1975–1985:II, 165–166). It is probable that the monk was in fact the abbot, and that the property sold belonged to the monastery. In 1705 the same monastery owed 100 *piastres* to a Turk (Stavrinides 1975–1985:III, 330).

Monastic property decreased in extent in Ottoman times, although new donations from the pious could eventually allow for the addition of new acquisitions if the monastery managed to remain in operation. The situation became worse in the nineteenth century because of the frequent wars. After the upheavals of the late nineteenth century the monks of Odigitria were so destitute that they had to borrow money and 2,000 *okades* of barley from Apezanes in order to survive (Stavrinides 1975–1985:229). After the destructions that Apezanes suffered during the Greek Revolution and the rebellions of 1860–1875, those who rented its lands in Trypita, Farkatines, Pigadiana, and Peri were obliged to plant olive trees on them to replace those destroyed (Psilakis 1992:250–252). In the same period (1870–1871) the monks of this monastery were entirely penniless, as witnessed by their petitions to the authorities, and owed their fifteen servants and workers back pay of 4,620 *piastres* (Psilakis 1992:253).

The rural property of the monasteries could be of any kind, that is, vineyards, cultivated fields often with water mills, orchards, trees, or simply pasture land, cattle, sheep and goats, and bees. All of these, in times of peace, usually made the monastery economically self-sufficient and often resulted in a surplus, either in cash or in produce. It was quite common during the Venetian period for part of the revenue of the monasteries to be given to noble fief-holders. In Ottoman times, when the Patriarchate of Constantinople could again interfere officially in the ecclesiastical affairs of Crete, part of a monastery's revenue could be given to one of the Patriarchal officials. Vrontisi, for instance, gave part of its revenue to the Megas Skevophylax of the Patriarchate in the first half of the eighteenth century (Gedeon 1939:380).

Various monastic properties were managed directly or indirectly, depending on the circumstances. Lands could be rented out on a long-term basis to private individuals, who, during the Venetian period, often were wealthy landowners. Alternatively, they were cultivated by the monks themselves, lay brothers, hired labor, or laymen on short-term contracts under the direct supervision of the monastery. In the latter case, the possessions of the monastery were often organised into a rural *metochi* that might have a church and cells for the monk or monks who resided there, but in every other respect it was an agricultural estate. Monasteries and/or their *metochia* usually had their own olive and wine presses as well as mills for their grain.

Only rarely do we have a general picture of a monastery's landed property before the late nineteenth century, and we have no way of knowing whether this picture reflects previous periods. Exceptionally, we have an early account of the possessions of the monastery of Kyrmousi (1248 and 1320), which could possibly go back to Byzantine times. At that time Kyrmousi owned nearby cultivated fields, the village of Cametachi (of unknown location), a vineyard, a mill, a church, and fifty-three houses in Chandax (Herakleion), twenty-five of which were let for an annual rent of 16.5 *hyperpyra* and 183 *grossi* (Tsirpanlis 1985:195). Usually, however, our information is fragmentary, both in chronological continuity and in regard to the extent of the monasteries' estates. Sometimes, we may know the total of a monastery's revenues, but we do not know the details of the property by which which these revenues were acquired.

A case in point is the monastery of Apezanes. In 1571, it had an income of 1,500 *ducats* (Theotokis 1933a:317), while in 1577 Foscarini mentioned that it belonged to the Kallergis family and its income was 2,000 *ducats* (Spanakis 1969a:149), an income that was still the same in 1586 (Spanakis 1977:59). In 1583 the monastery was paying annually a rent of 24 *hyperpyra* for property leased from the commune "*in borgo et altro*" (Castrofilaca 1583: c. 20), showing that the monastery was not exploiting only lands of a strictly rural nature. In 1635, it is reported that it had an income of 250 *hyperpyra* and that its lands produced 2,000 *mouzouria* of wheat, 4,500 *mistata* of wine, 200 *mistata* of olive oil, 380 *mouzouria* of pulses, and 3,000 lbs. of cheese annually; it also had 1,000 cattle (Vlachaki 1986:315). At the same time it had annual expenses of 27,000 *hyperpera,* and the better part of its agricultural produce was used for the sustenance of the monks and laymen of the monastery.

Barley was cultivated in its fields in the nearby plain in 1692, 1693, and 1700 (Stavrinides 1975–1985:II, 411 no. 1087, 429 no. 1113; and III, 244 no. 1545). In 1866, the Turks destroyed 500 of its beehives, pointing to considerable production of honey and wax. They also burnt 4,000 olive trees belonging to the monastery (Tsatsaronaki 1954:24), apparently only part of the total owned by the monastery. In 1871, the monasteries of the province of Herakleion were divided into four categories according to their income, and Apezanes was in the first category—monasteries with the highest income (Tsatsaronaki 1954:254). In 1872, the tithe of the property of Apezanes amounted to 541 *piastres,* from which it may be inferred that the actual income of the monastery was in excess of 5,000 *piastres* (Tsatsaronaki 1954:253–254). These figures show that even after severe destruction a monastery could still retain properties of considerable size and productivity.

Our scattered written information only gives us a partial view of the monastery's development and of its properties. For instance, it is obvious from earlier data that in the first half of the sixteenth century the production of olive oil was relatively small in comparison to the production of wine, while the reverse is true for the Ottoman period, when the monastery owned large numbers of olive trees. This information, however, we already have from other sources. Also, there was a larger production of wheat in the Venetian period, contrary to Ottoman times, when grain of lesser quality, that is, barley, was produced for private consumption. However, it is interesting to see that the annual production of 2,000 *mouzouria* (approximately 38,500 kg at fifteen *okades* [1.28 kg] a *mouzouri*) of wheat in 1637 could satisfy the needs of almost 154 people (at around 250 kg a year per person (Dembinska 1985:431f, 452). Given that in 1635 there were sixty monks and thirty-six laymen in Apezanes (Vlachaki 1986:316), and assuming that all the laymen were fed by the monastery, there still remained a surplus of wheat to cover the needs of about fifty-eight additional individuals. Of course agricultural production varied from one year to the next, but the evidence indicates that the monastery normally expected a surplus in production that could be put to various uses. Furthermore, we can estimate that 2,000 *mouzouria* of wheat could be produced on roughly eighty hectares of land, implying a property of considerable size. Additionally, the monastery owned vineyards that yielded 4,500 *mistata* of wine, olive groves, and various orchards and pasture lands.

Of course, not all monasteries owned land of this extent. Vrontisi, for instance, in 1635 produced only 467 *mouzouria* of grain and 121 *mistata* of olive oil, although it was one of the largest monasteries in the region, with eighty monks who needed 1,600 *mouzouria* of grain annually for their sustenance (Census 1635, f. 11r–12r). However, at the same time it produced over 3,000 *mistata* of wine, which may mean that its landed property happened to be of a somewhat different nature. The same could be said for Agios Nikolaos at Zaros, a *metochi* of Valsamonero, which in 1644 was in possession of a large number (over 400) of sheep and goats (Mavromatis 1990:485).

For the nineteenth century, we find evidence for monastic property of equal or, in some cases, of even greater size. For instance, in 1801 "all the fields, olive trees, the income of the sheep and bees and all the things movable and immovable" of Vrontisi were leased for two years for 3,000 or 4,000 *piastres* (Fanourakis 1952:340–341), while in 1869 the property of this monastery was leased for 8,600 *piastres* (Psilakis 1992:312). In 1919 only three of the numerous *metochia* of Apezanes, those of Agios Dimitrios at Antiskari, Agios Ioannis at Farkatines, and Panagia at Tzigounas, possessed arable land of 2,200 *mouzouria*, besides pasture lands and other property (Psilakis 1992:242–243). Likewise, St. Paraskevi at Ampelouzos in 1867 owned arable land of 796 *mouzouria*, besides olive trees and property of other kinds, all of which were auctioned and let for six years for 37,100 *piastres* (Psilakis 1954: 318). In the mid-nineteenth century Kardiotissa owned arable land of 154 *mouzouria* with 166 olive trees and 300 *mouzouria* of pasture land, all of which were auctioned and let for 8,315 *piastres* (Psilakis 1954:337). In 1870 various fields of Valsamonero, comprising 200 olive trees and 160 *mouzouria* of land, sixty of which were pasture land, were auctioned for 17,650 *piastres* (Psilakis 1954:312). In 1870 the *metochi* of Valsamonero at Veloudi of Galia had a field of 40 *mouzouria*, but in 1919 the same *metochi* comprised fields of 140 *mouzouria* and a large vineyard (Psilakis 1954: 312, 316).

These examples show that the existing evidence in published sources does not permit an in-depth analysis of the development of monastic properties. On the other hand, it does allow us to conclude that a large part of the cultivated and pasture land of the Western Mesara was controlled by the monasteries, which, despite the difficulties, mismanagement, and destruction suffered during Ottoman rule, made them influential factors in the economic life of the region and often gave them the power of large landowners. It should be noted that the monasteries very often used parts of their income to help the poor and the needy. A considerable number of the properties bequeathed to the monasteries were given with the specific request that their revenue be used as relief for the poor. It is also characteristic that the donors were not always among the nobility and the rich, but were also ordinary and less well-off individuals.

In 1689 a field of 200 *mouzouria* was given to Apezanes "for the poor Christians" (Stavrinides 1975–1985:II, 332); in 1704 various articles were left by a man from Vreli for the poor of Valsamonero (Stavrinides 1975–1985:III,177–178); and in 1707 a woman from Monochoro left five fields with twelve olive trees and a house to Valsamonero "for the poor of the monastery" (Stavrinides 1975–1985:III, 352). Finally, we have some evidence that the monasteries were used, at least occasionally, as banks for the safekeeping of money or goods belonging to minors (Stavrinides 1975–1985:II, 331–332).

The Monasteries in Society

From the above discussion, it is obvious that monasteries played more than an economic role within the region, and it would be misleading to regard them simply as big landowners. Their cultural role—their contribution to the development of arts and letters—is known and established from Byzantine times. This role continued during the occupation of Crete by the Venetians, but the Ottoman conquest resulted in a severe setback in these matters. However, under the pressures of foreign rule, the monasteries began to play an increasingly important religious and ideological role in society.

As far as schools, education, and literacy are concerned, we know that some of the largest monasteries had scriptoria where manuscripts were produced, and libraries of considerable size. There was certainly a scriptorium at Apezanes in the sixteenth and seventeenth centuries. In 1566 Ioannis-Ioasaph Dorianos, the well-known scribe, became a monk there (Patrinelis 1958–1959:80), where he received a letter from his famous pupil Maximos Margounios in 1601 (Tomadakis 1991:636–637, 641). Another scribe connected with the monastery was Nikodimos Spatharos. A manuscript chronicle (found on the island of Skopelos) of the plague of 1592 in Candia originated from Apezanes (Lampros 1932:14; Lampros 1907:487). There was also a school in Apezanes in the Venetian period (Detorakis 1996:225) and very probably an elementary school in Vrontisi in the seventeenth century (Mavromatis 1990: 473–474). Vrontisi also had an important library in the seventeenth century (Mavromatis 1990); the scribe Merkourios Venetzas worked there from 1614 to 1616 (Doulgerakis 1958:153–154). An interesting manuscript of 1648–1650 (cod. 6 of the monastery of Sts. Theodoroi in Aroaneia) originated from Vrontisi (Bees 1906:55–59) and in 1818 there were twelve chests full of books and old manuscripts in this monastery (Praktikides 1983:52–53). In 1870, the surplus of the monastic property revenues in Crete was used to partly fund the public schools of the island (Stavrakes 1890:204). Thus, income from various *metochia* of Vrontisi, Valsamonero, Kardiotissa, and Stavromenos of Avgeniki funded the Greek School in Herakleion (Psilakis 1992:312), and in 1871 the salary of the teacher in Agios Myron was paid by Apezanes.

Some of the monasteries in the area were important focuses of artistic activity. The monasteries at Valsamonero and Panagia Kardiotissa possess two of the most impotant examples of Byzantine wall paintings in fourteenth and fifteenth century Crete (Papadaki 1966:433; Borboudakis 1968a:423–424; 1994:29; 1973:601; 1975; 357; Chatzidakis 1952:72–75). The monastery at Vrontisi also has wall-paintings of the fourteenth/fifteenth century (Chatzidakis 1952:76, 80, 86–89; Borboudakis 1983:408). One of the greatest painters of the Cretan Renaissance, Michael Damaskenos, seems to have had connections with Vrontisi, as six of his icons existed there until 1800. Odigitria also had wall paintings (Borboudakis 1993:91) as well as icons of the famous Cretan painters Angelos and Rizos. Wall paintings of the fourteenth and fifteenth centuries also exist in Panagia Gorgoepikoos, Panagia at Monochoro, St. Nicholas at Zaros, Stavromenos near Valsamonero, and St. Andreas and St. John at Langos near Odigitria. The monasteries of the Western Mesara not only continued the local Byzantine artistic tradition, but also featured the new developments in painting of the Cretan Renaissance.

The most important role of the monasteries, however, was probably religious and ideological, particularly during the centuries of foreign rule. During the Venetian period the monasteries and clergy led the resistance against the attempts of the Venetian government to convert the population to Catholicism. The strength of the Orthodox faith among the population was such, that at the end of 450 years of Venetian rule, less than 2% of the Cretans had accepted Catholicism. In addition, a large portion of the Venetians, particularly those living in the countryside, were either converted to Orthodoxy, or were in the practice of using Orthodox churches and services because of the virtual lack of Catholic clergy. During the period of Ottoman occupation the monasteries played an important role in nearly every uprising against the Turks. Even before the occupation of the entire island, during the Veneto-Turkish war for Crete, the monks fought against the Turks. Joseph, abbot of Odigitria, was one of the leaders of the people in the Mesara who still fought against the Ottomans in 1660 and 1661. Later, the monks of Odigitria and other monasteries were among the leaders of continuous rebellions or offered their monasteries as headquarters and ammunition depots. This resulted in repeated destruction of the Mesara monasteries in the eighteenth and particularly the nineteenth century, which explains why practically no monastic archives older than the last quarter of the nineteenth century survive today in the Mesara and in Crete in general, contrary to other parts of Greece.

It is therefore obvious that the monasteries had a complex role to play in their Mesara environment, and we must take all of these factors into account in order to evaluate their role correctly. The modern monastery of Panagia Kaliviani is a good example of the roles a monastery can play in society. Panagia Kaliviani (Psilakis 1992:326–335), near the village of Kalivia in Pyrgiotissa, originally was a church dedicated to the Mother of God, believed to be of the fourteenth century, judging by surviving wall-painting (Bissinger 1995:270; Gerola and Lassithiotakis 1961: no. 582). After 1821 it was partly ruined and some attempts to repair it met with difficulties, as the nearby village of Kalivia was inhabited entirely by Ottomans who also owned all of the the neighboring land. In the 1860s the church acquired great fame because of "miracles" that occurred there. Its reknown grew well beyond the local villages, and in the 1870s Kaliviani had become an important pilgrimage site for all Cretans, despite the bitter reaction of the local Ottomans. People from all over Crete began to make different kinds of donations to the church, particularly landed property.

In a few years Kaliviani was extremely rich. A committee was established to manage its finances, buildings were built to house the faithful, and monks came to stay, even though it was not formally a monastery. This growth continued into the twentieth century. In the 1920s it functioned as a monastery and received its official status in 1960. Today it is a monastic complex run by nuns who manage a primary school, a house for orphaned girls, an old-age home, a boarding school for girls, an organization for child protection, a school for sewing, weaving, knitting, and for fashioning sacerdotal vestments, a printing-house, and a museum (Timotheos Papoutsakis, Metropolitan of Gortyn, Panagia Kaliviani, 1975). In many respects an exceptional case, Kaliviani nevertheless illustrates that monasteries of the past had a complex and important role in their society.

TABLE 14.28. Churches in Castel Nuovo mentioned in the Census of 1635

Village	Church	Owner (*jus patronatum*)	Priest	Remarks
Agia Marina	Agia Marina			
Agioi Deka	Agioi Deka	Rhenier Dandolo	Giannis Frangos & Manolis Marangos	
	Panagia	Rhenier Dandolo	Giannis Frangos & Manolis Marangos	
Agios Eleftherios	Agios Eleftherios			
Agios Kyrillos	Agios Kyrillos Agios Theodoros	Rhenier Dandolo Rhenier Dandolo	Michielin Pardo Michielin Pardo	In ruins
Alithini	Panagia	Francesco Querini	Michali Arcauli	
	Agios Georgios (chapel of Panagia)	Francesco Querini	Frangias Arcauli	
Anogia	Panagia Odigitria Agia Paraskevi Christos Panagia (2nd) Panagia (3rd) Panagia (4th) Agios Georgios	Nicolo de Mezo (rented by Antonios Vergo) Giannis Scarlatos Church of St. Mark (Candia)	Antonios Vergo	
Antiskari	Agios Georgios Agios Nikolaos Panagia Christos	Thomaso Querini		
Apesokari	Panagia (& 2 chapels: Agia Paraskevi & Agios Georgios)	Zanachi Pasqualigo		
Apolychnos	Agios Panteleimon	Archbishopric (Church of St. Titos, Candia)		
Apomarma	Panagia Agia Georgios	Marco Mudazo	Giannis Litinos	
Castel Nuovo	Stavros Agios Marina	Priest Michielin Paris(?) Priest Nicolo Rucchielli		
Galia	Agios Georgios Agios Nikolaos	Juane Calergi & Nicolo Querini	Alessandro Draganigo	
Gangales	Panagia	Giacomo Zanne	Michelis Mono-krousos, Stefanis Monokrousos & Georgios Ferretto	
Gergeri	Profitis Elias Agios Ioannis Baptist Agios Georgios	Abott Trivisan Constantinos Troulinos		
Kandila	Panagia Agios Georgios Agios Nikolaos Profitis Elias	Heirs of Andrea Dandolo Francesco de Mezo		In ruins

Continued on next page

TABLE 14.28. Churches in Castel Nuovo mentioned in the Census of 1635 *(continued)*

Village	Church	Owner *(jus patronatum)*	Priest	Remarks
Kouses	Agios Georgios Agia Pelagia	Heirs of Francesco Grioni Zuane Dandolo	Stamatis Varuchas	
Krotos	Agios Georgios Panagia Crucifixion			
Kyrmousi	Panagia Agios Ioannis Agia Eirini Agioi Apostoloi	Marco Barbarigo	Michelis Leda	
Miamou	Agios Georgios Agia Paraskevi Agios Ioannis Prodromos Agios Ioannis Theologos			
Mitropoli	Agios Nikolaos	Nicolo Marmoran	Agostin Frangos	
Moroni	Panagia (& 2 chapels: Agios Georgios and Agia Pelagia)	Thomaso Querini & Ber- nardo Venieri	Giacomo Sorian	
Moulia, Apano	Panagia Agios Dimitrios	Michiel de Ca' Fradello Gabriel Fradello	Nicolos Matzafouris	
Moulia, Kato	Agios Georgios	Francesco Zen	Ieronymos Cherodynamos	
Nassus	Agios Ioannis Theologos Agios Antonios	Zorzi de Mezo Marietta wid. Zorzi Barbarigo	Giorgis Troulianos	
Nivritos	Agia Marina	Nicolo Lombardo	Georgios Simopoulos & Const. Troulinos	
Paliama	Agioi Apostoloi	Archbishopric (Church of St. Titos, Candia)	Georgios Troulinos	
Panasos	Panagia Odigitria Panagia	Priest Giorgi Balestrà	Giorgis Diminitis	
Peri	Agios Nikolaos	Stefanos Arcauli	Frangias Arcauli	
Petrokephali	Agio Pneuma	Vettor Mesori	Manolis Scimesto (sic: Chymefto?)	
Pigadakia	Agios Georgios	Nicolacchi de Mezo		
Plora	Sotir (Metamorphosi) Agios Antonios Agios Georgios Kalamiotis	Nicolo Venier Monastery of Panagia Simiani (metochi of St. Catherine of Sinai, Chandax)	Filippo Zagaropulo Ionas Magussis	
Plouti	Agios Georgios Archangel Michael	Giacomo Querini	Manios Monomachos	Near the village
Pobia	Agia Paraskevi Panagia Agios Ioannis Christos St. Michael Agios Georgios	Michael & Nicolo Sachellaris Juane, Franc. & Ben. Querini	Manoli Bulgari Nicolo Sarandopio	

Table 14.28. Churches in Castel Nuovo mentioned in the Census of 1635 *(continued)*

Village	Church	Owner *(jus patronatum)*	Priest	Remarks
Prinias	Agios Georgios	Zorzi Dolfin & S. Lombardo	Giorgis Serepeci	
Raptis	Agios Georgios Agios Konstantinos	Marietta wid. Zorzi Barbarigo Deacon Michelis Koutagiotis	Giorgis Troulianos	
Roufas	Panagia di Gratia Christ Agios Georgios	Francesco & Domenico Venier & the Franciscan monastery of Candia	Damiano Avonale	This must be the Franciscan monastery Santa Maria degli Angeli, registered here as a church
Trypita	Profitis Elias Christos	Francesco de Mezo Priest Marco Vonale	Marco Vonale	
Vali	Christos (Sotir)	Polo Grimani	Michelin Venier	
Vassiliki	Panagia Agios Ioannis Panagia (old) Agios Georgios Agios Savas Profitis Elias (old) Agios Georgios Platanos	Nicolo Zen Francesco de Mezo	Const. Cavallaro Const. Cavallaro	
Vreli (Paliochorio)	Agios Antonios Agios Nikolaos Stavros Agia Paraskevi Panagia	Marco Bra..li		
Zaros	Agios Georgios & Agia Kyriaki Agia Pelagia Agia Eleni	Nicolo Lombardo	Michelis Thimopulo Monk Gedeon Babacchio Const. Troulinos	

Table 14.29. Owners of churches in Castel Nuovo in 1635

Owner	Village	Church
Archbishopric (Church of St. Titos, Candia)	Apolychnos Paliama	Agios Panteleimon Agioi Apostoloi
Church of St. Mark (Candia)	Anogia	Agios Georgios
Franciscan monastery of Candia	Roufas	Panagia di Gratia Christ Agios Georgios
Stefanos Arcauli	Peri	Agios Nikolaos
Priest Giorgi Balestrà	Panasos	Panagia

Continued on next page

TABLE 14.29. Owners of churches in Castel Nuovo in 1635 *(continued)*

Owner	Village	Church
Marco Barbarigo	Kyrmousi	Panagia Agios Ioannis Agia Eirini Agioi Apostoloi
Marietta wid. Zorzi Barbarigo	Nassus Raptis	Ag. Antonios Ag. Georgios
Marco Bra..li	Vreli (Paliochorio)	Agios Antonios
Juane Calergi	Galia	Ag. Georgios(1/2) Ag. Nikolaos(1/2)
Heirs of Andrea Dandolo	Kandila	Panagia
Zuane Dandolo	Kouses	Agia Pelagia
Rhenier Dandolo	Agioi Deka Agios Kyrillos	Agioi Deka Panagia Agios Kyrillos Ag. Theodoros
Zorzi Dolfin	Prinias	Agios Georgios (1/2)
Gabriel Fradello	Moulia, Apano	Agios Dimitrios
Michiel de Ca' Fradello	Moulia, Apano	Panagia
Polo Grimani	Vali	Christos (Sotir)
Heirs of Francesco Grioni	Kouses	Agios Georgios
Deacon Michelis Koutagiotis	Raptis	Agios Konstantinos
Nicolo Lombardo	Zaros Nivritos	Agios Georgios & Agia Kyriaki Agia Pelagia Agia Eleni Agia Marina
S. Lombardo	Prinias	Agios Georgios (1/2)
Nicolo Marmoran	Mitropoli	Agios Nikolaos
Vettor Mesori	Petrokefali	Agio Pneuma
Francesco de Mezo	Kandila Trypita Vassiliki	Agios Georgios Agios Nikolaos Profitis Elias Agios Ioannis Panagia (old) Agios Georgios Agios Savas Profitis Elias (old) Agios Georgios Platanos
Zorzi de Mezo	Nassus	Agios Ioannis Theologos
Nicolo de Mezo	Anogia	Panagia Odigitria
Nicolacchi de Mezo	Pigadakia	Agios Georgios
Marco Mudazo	Apomarma	Panagia Ag. Georgios
Priest Michielin Paris(?)	Castel Nuovo	Stavros
Zanachi Pasqualigo	Apesokari	Panagia (& 2 chapels: Agia Paraskevi & Ag. Georgios)
Juane, Franc. & Ben. Querini	Pobia	Agios Georgios

TABLE 14.29. Owners of churches in Castel Nuovo in 1635 *(continued)*

Owner	Village	Church
Francesco Querini	Alithini	Panagia Agios Georgios (chapel of Panagia)
Giacomo Querini	Plouti	Agios Georgios Archangel Michael
Nicolo Querini	Galia	Ag. Georgios (1/2) Ag. Nikolaos (1/2)
Thomaso Querini	Antiskari Moroni	Ag. Georgios Ag. Nikolaos Panagia Christos Panagia (& 2 chapels: Agios Georgios and Agia Pelagia)
Priest Nicolo Rucchielli	Castel Nuovo	Agia Marina
Michael & Nicolo Sachellaris	Pobia	Agia Paraskevi Panagia Agios Ioannis Christos St. Michael
Giannis Scarlatos	Anogia	Agia Paraskevi
Abott Trivisan	Gergeri	Profitis Elias Agios Ioannis
Constantinos Troulinos	Gergeri	Agios Georgios
Francesco & Domenico Venier	Roufas	Panagia di Gratia Christ Agios Antonios
Nicolo Venier	Plora	Sotir (Metamorphosi) Agios Antonios
Bernardo Venieri	Moroni	Panagia (& 2 chapels: Agios Georgios and Agia Pelagia)
Priest Marco Vonale	Trypita	Christos
Giacomo Zanne	Gangales	Panagia
Francesco Zen	Moulia, Kato	Agios Georgios

TABLE 14.30. Churches in Pyrgiotissa mentioned in the Census of 1635

Village	Church	Owner (jus patronatum)	Priest	Remarks
Agia Triada	Agia Triada Agios Nikolaos	Priest Georgios Chymeftos (or Abott Trivisan who conceded it to priest Manea Vacà) Abott Trivisan (who conceded it to priest Giorgis Trivisan)		Church registered by both priests
Castel Priotissa	Panagia		Emmanuel Chymeftos	
Etia	Agios Georgios	Marinos Notaras	Frangias Kalogeras	

Continued on next page

TABLE 14.30. Churches in Pyrgiotissa mentioned in the Census of 1635 *(continued)*

Village	Church	Owner (jus patronatum)	Priest	Remarks
Grigoria	Agios Georgios	Antonio Condomini		
Kamares	Panagia	Antonio Condomini		
Magarikari	Panagia Kardiotissa	Antonio Condomini		
Pitsidia	Agios Georgios Agia Paraskevi	Zampiero Manolacchi	Stamatis Papadopoulos	
Sivas	Agios Ioannis Agia Paraskevi (at Charakas)	Orlandos Notaras	Frangias Kalogeras	
Voroi	Agia Pelagia Agios Ioannis Agios Georgios Kontaratos Panagia Agia Marina Agia Paraskevi	Nicolo Lombardo	Nicolo Scordili D. Nigri (?)	

TABLE 14.31. Owners of churches in Pyrgiotissa in 1635

Owner	Village	Church
Priest Georgios Chymeftos (or Abott Trivisan who conceded it to priest Manea Vacà)	Agia Triada	Agia Triada
Antonio Condomini	Grigoria Kamares Magarikari	Agios Georgios Panagia Panagia Kardiotissa
Nicolo Lombardo	Voroi	Agia Pelagia Agios Ioannis Ag. Georgios Kontaratos Panagia Agia Marina Agia Paraskevi
Zampiero Manolacchi	Pitsidia	Ag. Georgios Ag. Paraskevi
Marinos Notaras	Etia	Agios Georgios
Orlandos Notaras	Sivas	Agios Ioannis Agia Paraskevi (at Charakas)
Abott Trivisan (who conceded it to priest Giorgis Trivisan)	Agia Triada	Agios Nikolaos

TABLE 14.32. Lists of officials

	Dates	Reference	Remarks
Castellans of Castro Novo			
Giovanni Zancaruolo	1311–1313	Thiriet 1966–1971: nos. 237, 239	
Damiano Capello	1313–1315	*Ibid.*, nos. 276, 279	
Giovanni Mocenigo	1315–1319	*Ibid.*, no. 328	
Paolo Contarini	1374	Thiriet 1958: no. 534	
Andrea da Medio	1399	*Ibid.*, 963	Also of Pediada
Nicholas Palaiologos	1545	Panagiotakis 1986:227	
N.c. Nicolo Pagan	1548	Kolyva-Karaleka and Moatsos 1983:403	
Francesco Zen d Nicolo	1574	Karapidakis 1983: B 98	
Sr. Bernardin Barbarigo	1575–1576	*Ibid*, B 208	
Zuan Dartona d. Hemanuel (b)	1576–1578	*Ibid*.	
Jacomo Dartona	1578	*Ibid.*, B 303	
Nicolo Barigo d. Francesco	1578	*Ibid.*, B 312	
Jacomo Dartona	1578	*Ibid.*	
Franc. Querini d Vicenzo (b)	1578	*Ibid.*	
Sr. Bernardin Barbarigo	1581–1582	*Ibid.*, C 140	
Zuane Pagana	1582	*Ibid*.	
Stefano Samothraci	1582	*Ibid*.	
N.c. Zuan-Piero Colonna d. Prospero (b)		*Ibid*.	
Anzolo Demezo d. Marco	1586	*Ibid.*, C 408	
Giacomo Spiera (b)	1586	*Ibid*.	
Castellans of Pyrgiotissa			
Iohannes Bono	Before 1403/1404	Thiriet 1978: no. 105	
V.n. Mat. Venerio qd Franci	1539	Karapidakis 1983: A 83	
N.c. Ioannes Vezamario Marci (b)	1539	*Ibid*.	
Sr Marco Dacanal qd sr Marini	1540	*Ibid.*, A 237	
N.c. Marco Pagan (b)	1541	*Ibid*.	
Nicolao Rizardo	1548	Kolyva-Karaleka and Moatsos 1983:400	
Michel Grego d Nicolo	1574	Karapidakis 1983: B 98	
Nicolo Gradonico	1576	*Ibid.*, B 108	
Polli Trivisan d Alvise (b)	1576	*Ibid*.	
Nicolo Querini d Giacomo	1578	*Ibid.*, B 312	
Thomado Franco d Zuane (b)	1578	*Ibid*.	
N.h. Lorenzo Zen d Mathio	1581–1582	*Ibid.*, C 136	
Thomado Franco (b)	1582	*Ibid*.	
Zuanne Notara			
Nicolo Notara (vice-castellan)	1582	*Ibid.*, C 210	Election annulled
N.h. Lorenzo Zen d Mathio	1582	*Ibid.*, C 211	

Continued on next page

TABLE 14.32. Lists of officials *(continued)*

	Dates	Reference	Remarks
Zuan Querini d Marci	1586	*Ibid*., C 408	
Nicolo Nathanail d Antonio (b)	1586	*Ibid*.	
Scribes of Castro Novo			
Dominicus Traversario	Before 1324	Ratti-Vidulich 1965: no. 441	
Hieronymo Tarquillino	? –1537	Karapidakis 1993: A 28	
Mat. Desalodio (vice-scribano)	1537	*Ibid*.	
Zorzi Figeto	1576	*Ibid*., A 190	
Franc. Marmara (b)	1576	*Ibid*.	
Zuane Xerno	1578	*Ibid*., A 1313	
Draco Cochili qd sr Alessandro	1578	*Ibid*.	
Zuan Pizoni d Alvise	1581	*Ibid*., C 137	
Zuan-Battista Spigi d magistro Benetto (b)	1581	*Ibid*.	
Marco Bonasseri	1586	*Ibid*., C 408	
Manoli Calamara	1586	*Ibid*., C 480	
Zorzi Andronico d Marco	1587	*Ibid*.	
Notaries of Castro Novo			
Francesco d'Arimini	1304	Theotokis 1933a:40; Thiriet 1966–1971:I, no. 98	
Petrus Chursario	Before 1328	Ratti-Vidulich 1965: no. 441	Not certainly of Castro Novo
Constantinus Calomati (notarius in scriptura greca)	1381	Santschi 1976:84, no. 326	Not certainly of Castro Novo
Sr. Andrea Curmulussi	1537	Karapidakis 1993: D 28	
Scribes of Pyrgiotissa			
Iohannes Quirino	1399	Santschi 1976:386, no. 1797	
Sr. Georgius Mussa dictus Barbeta	1538	Karapidakis 1993: A 83	
Sr. Ioannes Graco qd sr Jurga (b)	1538	*Ibid.*	
Sr. Mathio Dasallo	1540	*Ibid.* A 238	
Sr. Nicolo Spisura (b)	1540	*Ibid.*	
Georgius Massa (b)	1540	*Ibid.*	
Zannis Jurgas	1548	Kolyva-Karaleka and Moatsos 1983:404	
Michel Barbarigo	1576	*Ibid.* B 190	
Giorgi Fotinopoulo (b)	1576	*Ibid.*	
Nani Ciriacopoulo d Constantin	1578	*Ibid.* B 313	
Zorzi Fretto (b)	1578	*Ibid.*	
Sr. Andrea Chiriacopoullo	1582	*Ibid.* C 221	
Zorzi Franco d Francesco	1586	*Ibid.* C 408	

Table 14.32. Lists of officials *(continued)*

	Dates	Reference	Remarks
Antonio Lotto d Avrami (b)	1586	*Ibid.*	
"Capetanei Contra Fures" of Castro Novo and Pyrgiotissa			
Iohannis Cavalario	1393	Santschi 1976:321 no. 1436	
V.n. Marcus Venerio qd Nicolo	1536	Karapidakis 1993: A 83	
N.c. Sr Georgius Damulla(b)	1539	*Ibid.*	
N.v. Sr Francesco Venerio d Jacobo	1540	*Ibid.* A 238	
Sr. Juan Lima (b)	1540	*Ibid.*	
Sr. Anzolo Pasqualigo d Nicolo	1541	*Ibid.*	
Alessandro Zen d Marin	1578	*Ibid.* B 312	
Zuan Quirini qd Vicemzo(b)	1578	*Ibid.*	
N.c. Marco Lezardo d Andrea (Scribe: Sr Juane Servo)	1581	*Ibid.* C 116	
N.h. Marco Dandolo d Zuane	1581	*Ibid.* C 136	
N.c. Hieronymo Zorzi d Piero (b)	1581	*Ibid.*	
Marco Lizzardo	1582	*Ibid.* C 210	Election annulled
N.h. Marco Dandolo d Zuane (Scribe: Sr Zaco Cochili)	1582	*Ibid.* C 238	
Zorzi Quirini qd Remullo	1584	*Ibid.* C 331	Does Not Accept
N.h. Nicolo Bon d Francesco (Scribe: Ms Zuan Stactea)	1584	*Ibid.*	
N.c. Vasetto Zorzi d Piero	1587	*Ibid.* C 478	
Leading Cantors of Castro Novo			
Sr. Marco Zancharopoulo d papa Giorgi from Faneromeni	1574	Karapidakis 1993: B 83	

Abbreviations: b = "*secunda muta*"; d = de/di, ms = *misser*, N.c. = *nobilis cretensis*, N.h = *nobilis homo*, N.v. (or: V.n.) = *nobilis venetus*, qd = *quondam*, Sr. = *ser.*

Part V:
FINAL PERSPECTIVES

15

Conclusions

L. Vance Watrous and Despoina Hadzi-Vallianou

THIS CHAPTER CONSISTS OF two main sections. In the first, we present the diachronic cycles of social complexity that our study has documented in the Western Mesara and our conclusions about social evolution in the region. In the second, we return to the starting point of our project—the Plain of Phaistos and the Phaistian polity—and examine how land and polity were interrelated during the prehistoric and the historic periods.

CYCLES OF SOCIAL COMPLEXITY

In this study we have traced the fluctuating social complexity of society in the Western Mesara from the fourth millennium BC to the twentieth century AD. Now it is time to step back and look for overall patterns. As a basis for this analysis, we summarize our systemic findings in figure 15.1. Given its broad coverage, this diagram is imprecise—categories such as technology, conflict/competition, and ideology not readily susceptible to quantification are especially so—nevertheless, certain patterns in the evidence clearly stand out. The changing designations within each column of figure 15.1 are based on the data discussed in the relevant chapters.

Twice during their long periods (Neolithic–Late Minoan I; Late Minoan III–Late Hellenistic) of political autonomy, the inhabitants of the Western Mesara region formed themselves into a state polity whose center was at Phaistos, once at the end of the late Prepalatial period, and again in the Early Iron Age. Our study has helped to define the cultural changes that these two transformations entailed. We begin by summarizing these transformations in the following two sections.

Cultural Changes before and during the Period of the First Palaces (Early Minoan II–Middle Minoan II)

Profound internal cultural changes accompanied Minoan state formation. Population grew radically. The local population of the core Phaistian area (as represented on our chronological site maps) seems to have increased fourfold between Early Minoan II (population of approximately one thousand) and Middle Minoan IA, and ninefold between Early Minoan II and Middle Minoan II (population of approximately nine thousand). In Early Minoan II, Phaistos was a village among other villages, hamlets, and farms, whereas by the Protopalatial period, it had become an urban center among smaller settlements. In other words, the bulk of the population growth was focused at the top of the settlement hierarchy, nucleated at Phaistos. The complexity of MM IB–II society therefore was not an outgrowth of simple population increase, but was formed in the context of a nucleated population.

Changes in land use affected the environment. Subsistence practices and land clearing during the Neolithic and Early Minoan period brought about a phase of erosion, that, in turn, deposited expanses of arable soils in the valleys. This erosional deposition seems to have had beneficial, rather than negative, effects on Early Minoan agriculture. With the later establishment of the palace state at Phaistos, the agricultural use of the surrounding land intensified sharply: this development is manifest in the new farms

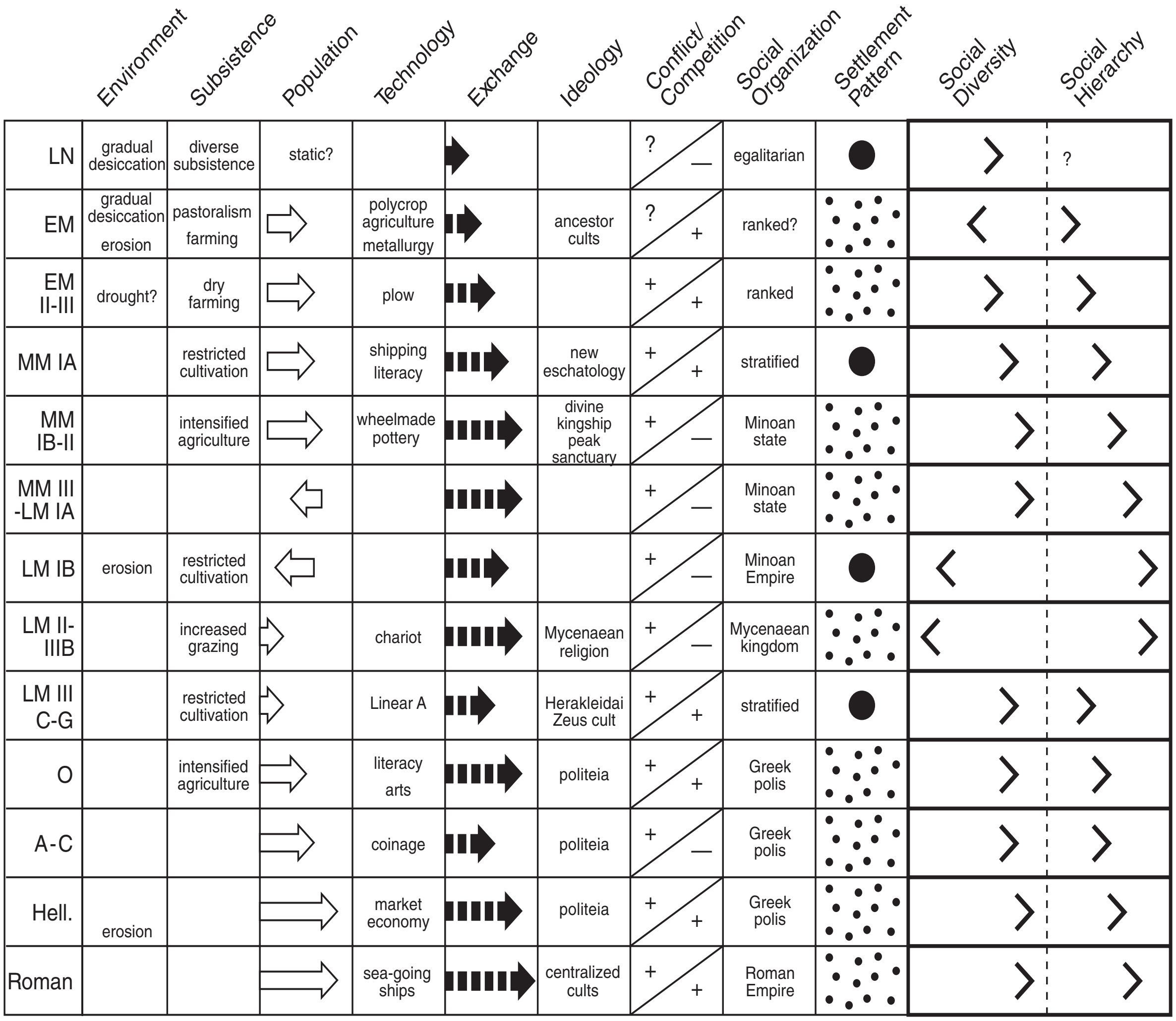

FIGURE 15.1. Diachronic diagram of social evolution in the Western Mesara

founded along the Class III marl ridge of Kamilari and the construction of massive check dams below this ridge.

Social hierarchy increased during this period. In Early Minoan II, societies in the Mesara were ranked: certain social groups had preferred access to metals, gold, probably obsidian, and other imported objects. Nevertheless, burials remained communal and broadly similar in content. Unequal wealth and status do not seem to have translated into great individual political power. On the other hand, by the late Prepalatial period, communities had become stratified into large social classes. Prestige goods and ostentatious tombs multiplied in the Middle Minoan IA period. Elites and commoners can be distinguished by burial contents and tomb types. In the Protopalatial period, social stratification took another jump: three or probably four levels of society are visible in the material record. Styles of architectural masonry, for instance, broadly signify royalty (ashlar orthostate), elite (coursed ashlar), sub-elite (in cyclopean), and commoner (rubble).

Craft specialization and exchange followed the same trajectory. In the Early Minoan I–II period, Mesara bronze workers and potters produced specialized goods for elite patrons and for export. By Middle Minoan IA the numbers and types of specialized items, such as daggers, ivory seals, and stone vases increased dramatically. With the appearance of palatial royalty and an expanded elite in Middle Minoan IB–II, specialized craftsmen produced goods for these classes, such as the extraordinary swords and leopard ax from Malia (for royalty), Kamares ware (for the elite), metal, stone, and painted clay vases made in peripheral centers (for the sub-elite), and utilitarian artifacts (for the peasantry). Foreign relations became stronger. Early Minoan II foreign trade focused primarily on the Aegean; frequent connections with the Levant and Egypt began in Middle Minoan IA and became closer still during the Protopalatial period. Using ideas learned from foreign cultures, the Minoans fashioned their own writing systems.

Social diversity grew as the complexity of Minoan society developed. New types of burials, in *larnakes, pithoi,* cists, and chamber tombs, appeared in Middle Minoan I. Seal types and designs became more varied and sophisticated in Middle Minoan IA. Protopalatial seal designs began to portray or refer to individual professions, such as priests, scribes, potters, textile workers, farmers, and mariners. A new social ("sub-elite") group, neither the uppermost elite found at the core of palatial centers nor peasantry, was created in Middle Minoan I. At Malia the architectural complex called the Agora (Van Effenterre 1980:189–195), constructed north of the palace in Middle Minoan IB, like the open spaces Ek and El north of the LM I palace at Gournia, may have served the economic activities of this group.

Signs of conflict also increased during this period. Rural and coastal sites were destroyed and began to be abandoned in Early Minoan IIB. Portions of the population moved into more defensible sites or remote areas. Fortification walls, which have been dated to the late Prepalatial period, are known at Vasiliki, Agia Photia, Chamaizi, and perhaps at Knossos, Malia, and Gournia.

Ideological change, as seen in iconography, is especially interesting because it took place principally at the end of this period, that is, at the time of state formation in Middle Minoan IA. Early Minoan art is abstract and limited in range. Only in Middle Minoan IA did seals and pottery begin to depict natural and figural motifs. By Middle Minoan IB–II, Minoan iconography included a wide variety of pictorial motifs (Walberg 1986; Watrous 1996:81–92). An official cult, centered at regional sanctuaries, was created in Middle Minoan IB, and figurines from these sanctuaries for the first time depict recognizable social types, such as ephebes, would-be mothers, and the sick.

Cultural Changes before and during the Early Greek Polis (Late Minoan IIIC–Orientalizing Period)

Early Iron Age communities such as Phaistos were initially formed of disparate ethnic groups brought together by the invading Dorian Greeks. A period (tenth–ninth century BC) of social integration was followed by rising social competition (mid-eighth–seventh century BC) that led to major social changes during the later seventh century BC.

Early Iron Age population size seems to have remained relatively stable until the later eighth and seventh centuries, at which time settlement began to expand. Regional conflict was common. During the Geometric period Phaistos was fortified, and tombs of this period contained weapons. Colonists from the Mesara may have left for Gela in the seventh century, probably as a result of social friction. Settlement remained nucleated, and land use does not appear to have been intensive, which may have contributed to a phase of regional erosion and the marshy condition of the Levadia (chapter 4). The advent of literacy in the eighth century preceded state formation by a century. Specialized craftsmen manufactured prestige goods, such as bronze shields and vases and ivory objects, in the eighth–seventh centuries for competitive Dorian elites. At Phaistos and Gortyn internal social conflict was resolved during the second half of the seventh century by a political reorganization of the community, attributed to reforms introduced by Epimenides and Thaletas. At this time, the urban center of Phaistos was rearranged, and a class of rural serfs was settled on permanent estates in the countryside.

Major ideological changes seem to have appeared in the later eighth and seventh centuries. Aristocratic participation in militaristic ceremonies at the sanctuary of Zeus on Mount Ida probably signaled increased elite competition for political power. Urban temples at Phaistos and Gortyn constructed during the late seventh century marked the creation of a polis cult. Increased overseas trade, and perhaps an influx of foreigners, can be dated to the seventh century, and by the end of that century, foreign craftsmen had been officially incorporated into the Gortynian state. Finally, new institutions, manifested in monumental urban temples, centralized storage facilities, mess halls, and a publicly displayed written law code testify to the establishment of the Greek polis in the Mesara. The transition from kinship rule to government by community institutions was complete.

What Have We Learned about the Formation of the State in Crete?

We begin by pointing out two specific contributions this study has made to our understanding of early state formation in Crete before listing some more general observations.The first contribution concerns the Prepalatial period. Our data suggests that the later Prepalatial period on Crete consists of three chronological phases, Early Minoan IIB, Early Minoan III, and Middle Minoan IA, each with its own distinctive social and economic trajectory. The process of social evolution that led to the Minoan palace states was more complicated than envisioned a generation ago. Ranked Early Minoan II "chiefdoms" need to be decoupled from the development of the first Minoan states at the end of the Middle Minoan IA period. Our collected data suggest that the late Prepalatial period (Middle Minoan IA) is particularly crucial to understanding Minoan state formation, since it was the events of the Middle Minoan IA period that motivated certain elites to reorganize their society into a state.

The second contribution is the observation that social complexity and the path to social complexity within our region varied considerably over time. An obvious example is that Minoan states, headed by a dynastic ruler, differed considerably from later Cretan states whose government consisted of elected officials. Social and political power took different forms at different periods in the Western Mesara (see chapters 8, 9 and 12; see also Earle 1997 on this issue). During the Early Bronze Age, the control of local land was an effective source of power that could be converted into social status. On the other hand, once society had become stratified in Middle Minoan IA, economic strategies based on agricultural wealth or exchange alone were not sufficient to effect a state. The currency of power in the MM period was different from that in the less hierarchically structured EM period. Henceforth, the growth of elite power mainly took other paths defined in new social and ideological terms.

This observation suggests that Hawkes's Ladder (Hawkes 1954)—the idea that there exists a hierarchy of difficulty in interpreting archaeological data in terms of cultural activities (technology, economic activities, social organization, and the most difficult, ideology)—is a useful construct for approaching the context of developing social complexity. By this I mean that as societies grow more complex, the changes propelling them toward still greater complexity are more likely to come from further up the hierarchy of Hawkes's Ladder. Therefore, the arguments of C. Renfrew (1972), Halstead (1981), and Manning (1996) for Minoan state formation, based as they are on ethnographic parallels with relatively simple societies (namely Early Minoan chiefdoms, Greek peasant farmers, and Hawaiian chiefs), only apply to the ranked society of the Early Minoan I–II period, and not to the more highly stratified society of the Middle Minoan period.

Once society in the Western Mesara consisted of stratified classes, two paths toward state formation were possible. The Phaistian state could have been formed through force (for example, Flannery 1999). Such a state would, at least in its initial stages, have resembled an expanded chiefdom. Political power would have differed from earlier stages primarily in extent rather than in kind. This did not happen in the Mesara. Instead, a certain member or members of the local elite created an extensive new social and ideological structure. The result was a "corporate" Minoan state, where power was shared between the elite and a ritual ruler.

Returning to the patterns discernable in figure 15.1, we list below some more general conclusions about the process of social evolution within our region:

- Prime movers, either empirical or theoretical, are notable by their absence.

- Social complexity took myriad forms, since individual systemic elements as well as social diversity and social hierarchy changed independently of one another.
- Traditional neoevolutionary social trajectories are missing.
- Considerable growth in both social diversity and hierarchy correlated with increased foreign contacts, technology, competition, and conflict.
- Population growth accompanied, and was a product of, greater social complexity. In all cases, this population growth seems to have been a byproduct of increasing social complexity, rather than a cause of it.
- Physical modifications in the environment provoked changes in social structure, and vice versa.
- Advances in technology were not, except during the earliest phases of prehistory, conditions that enabled greater social complexity. Instead, they were manifestations of an already increased complexity.
- Intensified agriculture correlated with increased social hierarchy.
- Periods of settlement nucleation were associated with rising social hierarchy.
- Social diversity was one of the first casualties of foreign conquest. Like natural biodiversity, social diversity seems to have been a sign of a society's long-term health.
- Successful evolution of social complexity included increased diversity and hierarchy.
- As social hierarchy increased, so did state territory.
- Both literacy and urban nucleation preceded state formation, but were not in themselves immediate causes of it.

LAND AND POLITY

From the beginning of our study we have focused our investigations on the rural area surrounding Phaistos as a way of understanding how the regional society centered at Phaistos developed over time. It seems appropriate, therefore, to conclude this volume by returning to this relationship between rural land use and the structure of Phaistian society. We offer below a final overview of how this relationship evolved during prehistory and the Iron Age.

Prehistoric Land and Society

The first Neolithic inhabitants in our region lived in nucleated communities, using seasonal camps for grazing, hunting, and gathering. Such a far-flung and diverse subsistence strategy required the exchange of different types of food among families (Hayden 1995), and hence, both a nucleated pattern of settlement and an egalitarian (though not necessarily a simple) social structure. In our earliest phase of settlement, then, land-based subsistence seems to have directly affected social structure.

By the end of the Neolithic era, the local inhabitants had begun to modify their environment by their alterations of the local vegetation cover, changes discernible today in an erosional episode datable to the Early Minoan period. In the Early Bronze Age, the introduction of polycrop agriculture brought different crops and subsistence practices. These innovations encouraged the dispersion of settlement. Families moved out from Phaistos into rural areas to form small, permanent, and self-sufficient agricultural communities based on dry (plow) farming and grazing. These rural Early Minoan settlements appear to have consisted of one, or sometimes two, social groups.

By the Early Minoan II period, the dispersion of settlement in the Western Mesara had created an opportunity for greater social complexity. The single village-sized settlement at Phaistos was surrounded by hamlets and farms. In terms of agricultural capability, peripheral sites possessed poorer landholdings. Certain groups at the larger settlements appear to have controlled long-distance trade and had a monopoly on the possession of metal weapons. Craftsmen making Early Minoan II pottery and daggers may have in some way been “attached” to these groups. Initial growth of social complexity in Early Minoan II can be explained largely in terms of people using the productivity of their land for their economic and social advantage. Landholdings and land use therefore played an important role in the emergence of Early Minoan social complexity.

During the following Early Minoan III period (circa 2200–2050 BC), drought, famine, and social collapse in the Near East produced migrations and abandonment of drier rural areas for well-watered centers. Indirect evidence exists for the same conditions (Moody and Watrous, in press) in the Aegean. Within the Early Minoan III–early Middle Minoan IA Western Mesara, rural areas were abandoned and much of the local population seems to have been nucleated at Phaistos, and probably also at Platanos. Uprooted from its land, the rural population became a dependent class.

By later Middle Minoan IA (circa 2050–1900 BC), the communities at Phaistos, Archanes, and Knossos consisted of an elite class of wealthy family groups and a large lower class. Despite ameliorated climatic conditions and demographic growth, local population remained nucleated at Phaistos. Such an unnatural pattern of settlement marks a fundamental shift in land/polity relations. Henceforth, political structure would determine how land was owned and used.

By the Middle Minoan IB period, Phaistos had become the center of a state with a surrounding territory. One of the initial steps taken during the process of state formation was settling the lower class in outlying farms to provide an agricultural surplus for the elite. Our survey revealed this process of deliberate settlement dispersion (figure 10.1). The effect of this move was to institutionalize land as a source of power. Land became state territory. As such, territory was afforded divine protection by the patron deity worshipped at the regional sanctuary. Territory was a source of state power, and hence, worth accumulating. Unmistakable signs of territorial expansion began by Middle Minoan II and reached an acme in Late Minoan IA, when Knossos apparently assumed control of the Mesara. During the Late Minoan III period the Mycenaean rulers at Knossos exploited local land and its inhabitants.

Chora and Polis

In Late Minoan IIIC the arriving Dorian Greeks nucleated a segment of the local population at Phaistos. Rural land remained sparsely settled during the Early Iron Age, a manifestation, in part, of elite land tenure. In the seventh century BC, this pattern was sharply reversed when the land around Phaistos was densely resettled. Rural resettlement was a political decision, linked to other contemporary events accompanying the formation of the polis state, including the construction of a monumental city temple, the centralization of public meals at the *andreion*, and the introduction of written laws. The establishment of serf-run rural estates was, therefore, an economic prerequisite for the institutions of the new Cretan state. Rural settlements took a standardized form, that is, the family estate (*klaros*), manifesting their political origin.

Classical written sources articulate the close interdependence of the state and its land. In fifth-century Crete, the *klaros* defined the political status of a Dorian citizen within his polis. In order to be a citizen, a man had to own an estate and contribute its produce to the polis and his *hetaireia*. In Classical Crete an individual's greatest good was his freedom, and his land was emblematic of that freedom. Conversely, any citizen who lost his property through debt or self-mortgage was seized, and lost his freedom and citizenship (Guarducci 1950:128, no. 72, column I, line 56–column II, line 1). The Gortyn Law Code (Guarducci 1950:132, no. 72, column IV, lines 31–37) describes the family *klaros* as consisting of an urban house and rural property that included a farmhouse. Members of the citizen family resided in the city, while serfs and slaves lived in and worked on the rural farm. In terms of its inhabitants, the relation between *asty* (city) and *chora* (rural land) expressed the political relationship between free citizen and unfree serf or slave. Major changes observable in the settlement and use of the *chora*, therefore, reflected transformations in this social and political relationship.

Such a transformation took place in the early Hellenistic period, when rural settlement surrounding Phaistos expanded outward dramatically from its earlier configuration. Concentric growth of settlement from the polis center testified to intensified land use by a growing lower class. Our evidence suggests that this expansion was largely a response to new market opportunities of the Hellenistic era. Unlike Classical economic practices, Hellenistic commerce was increasingly cash-based and fluid. Such a powerful economy undermined traditional social structure. Less subject to elite control, it created a shift in the balance of local social power. This imbalance may, in part, lie behind the civil war that erupted at Gortyn circa 220 BC and subsequently engulfed the Western Mesara. For the first time in two millennia, local land and land use seem to have become a driving force for social change.

Land was not only a powerful sociopolitical factor but also an integral part of polis ideology. In his ideal state, modeled on Dorian examples, Plato (*Laws* 741c–d) says that the land is sacred to the gods, and that when a citizen accepts an allotment of land, it must be accompanied by threefold sacrifices and prayers. Citizens (*Laws* 740a) should regard their land as a portion of the common whole, and should care for their land more closely than a son cares for his mother. At Gortyn, Classical inscriptions refer to land in exalted terms, as ἀθάνατα χρήματα (Guarducci 1950:176, no. 76B). To Aristotle (*Politics* 1331a 24–b 19) the *chora* was as sacred as the *asty*: the city, he says, should have temples to the gods on prominent spots at its center, while the countryside should be scattered with shrines in honor of the gods and heroes.

In the Western Mesara, when the local Phaistian prophet Epimenides established shrines for the polis, it is recorded that he purified both the city dwellings and the surrounding fields:

> "Λέγεται δὲ καὶ πρῶτος ὀικίας καὶ ἀγρόυς καθαράι καὶ ἱερά ἱδρύσασθαι."
>
> (Diogenes Laertius I 118)
>
> (It is said that he was the first to purify houses and the fields, and to establish temples.)

* * *

In the course of this study we have learned that rural-urban interactions in our region were directly linked to social evolution. Land played many important roles. In some periods, land use shaped social structure, whereas at other times, the prevailing social and political institutions determined the form of rural land use and settlement.

Land was sustenance, dwelling place, source of raw materials for exchange, guarantee of political rights and status, basis of elite power, community territory, cause for war, and sacred space. Land was therefore connected with all aspects of ancient society. It is on the basis of these cultural interconnections that we have been able to relate our rural data to the cycles of social complexity of the Phaistian polity.

Appendix A

Land Classification and Botanical Studies Methods

C. Thomas Shay and Jennifer M. Shay

Land Classification

LAND POTENTIAL IN THE AREA of the archaeological survey was estimated in detail. It was based on the soil suitability factors of Verheye (1973) who developed a land evaluation scheme for Mediterranean areas. Some of these factors were mapped in a detailed soil survey of the Mesara Plain by Yassoglou (1960). The variables mapped included soil texture and depth, drainage of the soil profile, slope, erosion (the weathering of parent material as estimated from soil development), calcium carbonate status, upper soil (epipedon) development (crudely estimated from the nitrogen concentration), and the presence of organic layers and gravels in the profile (figure A.1).

To calculate soil suitability values for each of the mapping units, each factor is assigned an index or class number.

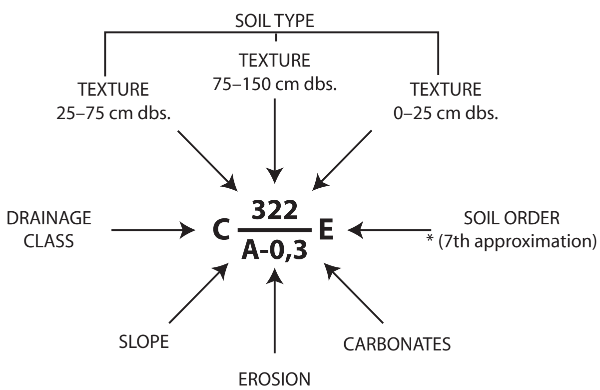

FIGURE A.1. Soil map symbols

Soil Texture and Depth

The soil profile is divided, for the purpose of textural classification, into three sections. Table A.1 illustrates the possible textural configurations for Entisols and Alfisols. Class numbers are assigned as an index of land potential. For both these soil orders, medium-textured soils with gravel (indicated by an asterisk *), in the 0–25 cm depth below surface and/or in the 25–75 cm layers are placed in Class 3. Coarse-textured soils with gravel are classified in Class 6.

In addition to texture, assignment to one of 5 classes (1–4, 6) were made on the basis of soil depth (table A.2).

Slope

The phases of slope used in the present land classification system are those used in Michigan, U.S.A. The classes are based on the percent slope and apply to both the Entisol and Alfisol soil orders.

Carbonate Content

The carbonate content of the soils was measured as shown in table A.5.

Erosion

Soil erosion was measured as shown in table A.6.

Calculating the Soil Suitability Value

Each of the factors listed in table A.6—texture, depth, drainage, slope, erosion, and carbonate content—make up the soil mapping symbol introduced in figure A.1. The task of calculating a soil suitability value from this symbol requires

TABLE A.1. Possible textural configurations for Entisols.

Class	Possible Textural Configuration of Entisol				
1	—	212	213	214	—
	—	222	223	224	—
	—	232	233	234	—
	—	312	313	314	—
	—	322	323	324	—
	—	332	333	334	—
	—	412	413	—	—
	—	422	423	—	—
2	—	—	—	114	—
	—	—	—	124	—
	—	—	133	134	—
	211	—	—	—	215
	221	—	—	—	225
	231	—	—	—	235
	311	—	—	—	315
	321	—	—	—	325
	331	—	—	—	335
	411	—	—	414	415
	421	—	—	424	425
	431*	432*	433*	434*	435*
3	111	112	113	—	115
	121	122	123	—	125
	131	132	—	—	135
	431*	432*	433*	434*	435*

* With A, B, drainage; + With C, D drainage

Class	Possible Textural Configuration of Alfisol				
1	—	—	—	—	—
2	20	30	40	50	60
3	10	—	—	—	—

The numbers refer to : (a) Texture 25–75 cm dbs.
(b) Texture 75–50 cm dbs.
(c) Texture 0–25 cm dbs.

that the class number assigned to each element of the symbol be taken as an index value expressing the importance of that factor to evaluation of land use potential. The average for the sum of values attached to each of these factors provides a soil suitability value for any given mapping unit.

BOTANICAL STUDIES METHODS

Field

Botanical field work took place in three seasons: May 17–June 9, 1984; July 2–22, 1986, and April 25–June 9, 1987, a total of three months of work

TABLE A.2. Soil classes

Class	Non-cemented gravel > 60% (symbol "0" on soils map)	Residual soils on marls	Soils on other substrates
1	—	—	All soils with depth 4
2	—	34	All soils with depth 3
3	25–75 cm dbs	33	92, 892, 982, 772
4	—	—	12, 22, 42, 52, 62, 72, 82 if less than C slope (< 6%)
6	0–25 cm dbs	32, 31	All others including class if more than C slope (> 6%)
No change in class	75–150 cm dbs	—	—

Source: Numbers are taken fromYassoglou (1960).

TABLE A.3. Drainage classes

Soil Order	Class 1	Class 2	Class 3	Class 4
Entisols	A, B	C	D	E, F
Alfisols	—	A	B	C (D)

TABLE A.4. Slope classes

Class	Slope Phase	Percent Slope
1	A	0–2%
2	B	2–6%
3	C	6–12%
4	D	12–18%
6	E	Over 18%

TABLE A.5. Carbonate content

Symbol	Description
0	No reaction to HCl.
1	No reaction to HCl in section A of the profile, while there is reaction in section B and/or C.
2	The reaction to HCl in section A is weak and not always visible. The reaction in the lower section is not considered.
3	The reaction to HCl in section A is vigorous. The reaction in the other two sections is not considered.

TABLE A.6. Erosion

Symbol	Description
0	No erosion. No subsurface horizon layer is present on the surface of the soil.
1	Slight erosion. Subsurface horizon or layer is present in less than 30% of the surface.
2	Moderate erosion. Subsurface horizon is present in more than 30% of the surface.
3	Strong erosion. Deep-lying subsurface horizons or layers are present on the surface.
4	Very strong erosion. A considerable part of the profile has been washed out and gullies are present in the area.

in the field. We focused our attention on archaeological sites in and around the survey area, but we also chose locations along a transect from the south coast to the foothills of Mount Ida in order to encompass the range of environments found in the Western Mesara (figures 5.1 and 5.2). These environments were: (1) a valley immediately east of Kaloi Limenes on the south coast; (2) in the Asterousia near the monastery of Odigitria and adjacent to an EM tholos tomb; (3) on the southern edge of the Mesara Plain close to the village of Sivas near an EM tholos tomb; (4) the Kamilari–Phaistos environs typical of the central portion of the Mesara; (5) the Ieropotamos floodplain; (6) the Voroi-Phaneromeni area; (7) the northern foothills between Voroi and Magarikari; (8) the Galia-Kourtes area north of Moires and (9) the area between Zaros and Kamares. We had previously surveyed around the archaeological site of Kommos, including the area of Pitsidia, Kamilari, and Matala (Shay and Shay 1995).

We chose a few locations for specific reasons. The effects of grazing were noted by comparing the vegetation inside and outside an enclosure several hectares in size located between Listaros and Odigitria. On June 6, 1987 we surveyed the effects of fire in a shrub area near Listaros that had been burned in September 1985. Plant colonization after cultivation was noted by comparing three abandoned fields near Matala with their surrounding vegetation.

At each location we made a list of plant species. In most locations, we estimated the abundance of shrub species (dominant, abundant, frequent, occasional, rare) by the amount of ground they covered in an area of several hundred square meters. Cover of each stratum (tree, shrub, herb) was independently estimated in terms of continuous (greater than 75%), discontinuous (25–75%) and scattered (less than 25%). Trees were generally taller than two meters or had a circumference at breast height > 10 cm. Height of some shrubs was measured, in others shrub height was estimated as tall (2 m), medium (0.6–2 m), low (less than 0.6 m, erect and grows in clumps with multiple stems), and dwarf (less than 0.6 m, straggling, and grows as single or a few stems). Vines were recognized as a separate category.

In some sites, quantitative data were collected where the percentage of bare ground and the amount of ground covered by each species of tree or shrub was estimated in ten randomly located 2 x 2 m sample plots using a slightly modified Braun-Blanquet (1932) scale of cover classes (i.e., class 1 = less than 5% ground cover, class 2 = 6–25%, class 3 = 26–50%, class 4 = 51–75%, class 5 = 76–100%). A 0.25 x 0.25 m quadrant was nested in the northwest corner of the larger plot, and the cover of herbs, mosses, and bare ground was estimated using the same scale. Specimens were collected in cases of uncertain identity. At all locations notes were made on slope direction (aspect), slope position, slope angle (using a Suunto inclinometer), microrelief, percent bare rock, stoniness, coarse fraction composition, depth of fill (meters), plant heights, plant cover, and evidence of grazing. At some locations, one to three soil samples of about 200 grams each were collected. Black and white and/or color photographs were taken at some locations.

Laboratory

Plants were assigned preliminary identifications using *Flora Europaea* (Tutin et al. 1966–1975) and prepared in two sets. One set was sent to Dr. W. Greuter, Director of the Berlin Botanic Gardens to be verified; the other was retained at the University of Manitoba.

Some soil textures were measured using standard soil sieves and the pipette method of Smith and Atkinson (1975) while others were hand textured by the Manitoba Soil Testing Laboratory, Winnipeg. Alkalinity (pH), salinity (conductivity), and the concentration of calcium, available nitrogen, and available phosphorus were analyzed at the Manitoba Soil Testing Laboratory, Winnipeg, using the procedures of McKeague (1978).

To explore the ethnobotany of the Western Mesara, we first determined which plants in the vicinity were currently used by local people or could have been used in the past (see table B.8). During fieldwork we observed some local plant gathering and interviewed several people regarding plant uses. However, our visits covered the April–July period, which is only part of the gathering cycle. We have thus supplemented our few observations and interviews with written sources (e.g., Niebuhr 1970; Huxley and Taylor 1977; Sfikas 1979).

Preliminary Data Analysis

Using the 202 survey sites within the study area, we recorded site number, south and east grid coordinates, elevation (meters above sea level), estimated rainfall (mm), slope aspect, slope position, slope angle, percent slope, microrelief, percent bare rock, stoniness, coarse fraction composition, depth of fill, plant height, and plant cover. This data was entered into a Microsoft Excel database.

Ordination of Shrub Communities and Species

The assignments of dominant, abundant, frequent, occasional, and rare for shrubs were converted to a five-part scale (5 = dominant). For sites quantitatively sampled, the percentage of shrub cover was converted to a five-part scale, where 5 is 81–100%, 4 is 61–80%, 3 is 41–60%, 2 is 21–40% and 1 is 0–20%. Altogether, we surveyed 202 sites and sampled 155 dominated by shrubs.

Data from 152 shrub locations (note that three were inadvertently omitted from the total of 155) were analyzed with several ordination (classification) procedures in order to detect similarities among sites and among species. The ordination techniques included Principal Components Analysis, Correspondence Analysis, and Detrended Correspondence Analysis (Jongman, Braak, and Van Tongeren 1987). These multivariate procedures were used to analyze the soils data.

Another means of revealing the similarity in the distribution of the various shrub species was through chi-square analysis. We constructed contingency tables for the presence of eight of the most widespread shrub species and tested their association using chi-square. The associations tested were among *Thymus, Calicotome, Ebenus, Pistacia, Phagnalon, Phlomis, Salivia,* and *Helichrysum.* The same multivariate procedures were used to analyze the soil data.

Shrubs in Relation to Environmental Factors

We also examined the distribution of shrub communities and species with respect to environmental factors using indices of soil moisture, soil fertility, and the recent history of disturbance.

MOISTURE INDEX (RANGE 1 TO 10)

The components of the moisture index include (1) estimated rainfall; (2) slope position; (3) slope angle in degrees; and (4) solar irradiation index. For each variable, the value at each of the 202 sites was converted into a statistic that reflected the relative importance or weight of each variable as a factor influencing moisture availability. The weightings were: rainfall (1–6), slope position (0.25–1), slope angle (0.25–1) and solar radiation (0.5–2) for a minimum of 2 and a maximum of 10.

Rainfall. A regression using ten years of rainfall values for eight stations in the Mesara from 10 to 525 m in elevation (Vallianos et al. 1985) was used to relate rainfall to elevation. The elevation of each sampling location was then used to estimate rainfall at that place. Estimated rainfall ranged from below 400 mm and 782 mm. Higher moisture index subvalues reflect greater estimated rainfall. The sites were grouped into six categories with equal intervals as shown in table A.7.

Slope Position. Generally, higher moisture index subvalues reflect land that is level (prohibiting runoff), has a lower elevation (increasing the amount of runoff received from other areas), or is located close to water sources such as rivers or streams. The sites were grouped into four categories as shown in table A.8.

Slope Angle. It is reasonable to assume that flat or level land will not release much runoff, shallow slopes will release some runoff, and steep slopes will release almost all excess moisture. None of the slope angles measured exceeded 57 degrees. The sites were grouped into four categories of equal intervals as shown in table A.9.

Calculation and Use of the Solar Irradiation Index. The calculation of the solar irradiation index for a specific location requires the latitude of the survey area (about 35 degrees N) (Frank and Lee 1966:1–47), the slope aspect, and the percent slope. Frank and Lee (1966) list both the

TABLE A.7. Rainfall categories

Moisture Index Subvalue	Estimated Rainfall (mm)
1	396 to 460
2	461 to 524
3	525 to 589
4	590 to 653
5	654 to 717
6	718 to 782

TABLE A.8. Slope position

Moisture Index Subvalue	Position of Slope
1	Flat plain; valley floor (stream margin)
0.75	Lower slope; foot of slope
0.50	Midslope; flat on or near slope-top; roadside
0.25	Top or near top of slope

TABLE A.9. Slope angle

Moisture Index Subvalue	Angle of Slope (degrees)
1	0 to 14
0.75	15 to 28
0.50	29 to 42
0.25	43 to 57

TABLE A.10. Moisture index and solar radiation

Moisture Index Subvalue	Solar Irradiation Index
2	0.24 to 0.33
1.5	0.33 to 0.24
1	0.42 to 0.51
0.5	0.51 to 0.60

solar irradiation index for each percent slope increment of 10% (from 0% to 100%). Data for latitudes 34 degrees and 36 degrees N in the tables were averaged as there were no data for 35 degrees N.

The amount of sunlight received by a specific location influences the availability of moisture. Moisture availability influences plant composition. There is an inverse relationship between the degree of solar irradiation and the availability of moisture. Higher moisture index subvalues therefore reflect lower solar irradiation (less evaporation) while lower values reflect higher irradiation (greater evaporation). The means by which solar irradiation index was obtained is described elsewhere. The sites were grouped into four discrete categories of equal intervals as shown in table A.10.

Finally, the moisture index for each site was arrived at by adding the moisture index subvalues for each environmental variable.

SOIL FERTILITY INDEX (RANGE 1 TO 10)

The soil fertility index was calculated using the following soil characteristics: texture, carbonate content, pH value, conductivity, available nitrogen, available phosphorus, available potassium, and organic matter. These soil characteristics were analyzed using principal Components Analysis (CANOCO Run 5A). The results showed that 95% of the variability in these soil characteristics was accounted for on the first Component axis. Thus, the score for each sample on the first axis is a good summary measure of fertility. These scores were then scaled to provide a soil fertility index, as represented in table A.11.

The locations were plotted along each of the three axes: soil moisture, soil fertility, and disturbance. For each of a dozen or more widespread shrubs, histograms were prepared showing their average abundance at locations with each particular combinations of soil moisture, soil fertility, and disturbance. Plots of five shrubs (*Thymus*, *Ebenus*, *Ceratonia*, *Cistus*, and *Satureja*) illustrated five somewhat different types of geographical distributions.

Geographical Distribution of Shrubs

We selected 18 shrubs (*Thymus*, *Calicotome*, *Sarcopoterium*, *Ebenus*, *Pistacia*, *Phagnalon*, *Heli-*

TABLE A.11. Disturbance index (range 1 to 10)

Disturbance Definitions	
A. Surrounding area—scores 0–3	
0	Surrounded by extensive area of shrubland with no roads intersecting area
0.5	Surrounded by large area of shrubland
1	Large "island" surrounded by cultivated or cleared land
2	Small "island" as above or adjacent or near a road
3	Very small "island" surrounded by cultivated or cleared land, as Location 87
B. Site history and abandonment—scores 0–4	
0	Probably never cultivated for over 100 years
0.5	Not disturbed for more than 40 years such as sites next to Location 107
1	Abandoned many years (< 40) ago, e.g. terraces abandoned in the early 1940s at Locations 103–106
2	Abandoned several decades ago, e.g., Kermes oak dominated Location 119
3	Abandoned less than a decade ago, e.g., sites with signs of cereal crops as Location 24 and 25
4	Cultivated within the past several years, e.g., some 1986 sites
C. Site erosion—scores 0–1	
0	On level or low slope (<15 degrees)
0.5	On medium slope (15–30 degrees)
1	On steep slope (>30 degrees)
D. Grazing—scores 0–1	
0	No evidence of recent grazing
0.5	Some evidence or likely moderate grazing
1	Probable heavy grazing (e.g., close to settlement)
E. Fire	
0	No evidence of recent fire
1	Evidence of recent fire (e.g., charcoal or charred shrubs)

chrysum, Phlomis, Salvia, Teucrium, Thymelaea, Wild *Olea, Prasium, Cistus, Rhamnus, Satureja* and *Ceratonia*) for analysis.

The first step involved the creation of a database consisting of site designations, grid coordinates for each site, and abundance of each taxon for every site (using a five-part scale). The data base was recorded in a statistical analysis program called Systat. The grid coordinate locations of the occurrence of a taxon could then be graphically displayed using a scatterplot in which the x-axis represents grid coordinates east and the y-axis represents grid coordinates south. The next step required the use of a graphics program called UltraPaint. This provided an accurate illustration of the relative location of sites at which a specific taxon occurred. Finally, the scatterplots were imported from Systat into UltraPaint and overlaid on top of the base maps. Care was taken to insure that grid locations on the scatterplots corresponded precisely with grid locations on the base maps. The location of the scatterplot data points on the topographic tables B.3–B.8 in appendix B can then be observed in order to determine not only the spatial occurrence of taxa but the correspondence of their distribution with topography. This form of analysis can be valuable since elevation may be an important explanatory environmental variable.

A printout of the resulting graphics was then examined visually, as presented in figures B.3–B.8 in appendix B. The topography of the map was divided into four elevation regions. The lowest elevation (light gray) represents the survey zones referred to as the southern plains (including Kommos), central plains (near the Ieropotamos River), northern plains and southern coast; the region of next highest elevation (light to medium gray) represents the survey zones referred to as the southern and northern upland; the region of second highest elevation (medium to dark gray) represents the northern foothills; and lastly, the region of highest elevation (dark gray) represents a mountainous region that was not included in the survey area and was therefore not sampled. This latter region is shown on the map for illustrative purposes only.

Appendix B

Botanical Studies, Environment, and Land Use

Jennifer M. Shay and C. Thomas Shay

Table B.1. Monthly, seasonal, and annual *(a)* rainfall (mm) and *(b)* coefficient of variation (%) for stations on Crete, 1952–1971

a. Rainfall

Station	Month												Annual Total	Season			
	J	F	M	A	M	J	J	A	S	O	N	D		Winter	Spring	Summer	Fall
Agia Kiriakos	99.7	67.6	48.5	19.9	10.1	1.8	0.0	0.3	10.4	55.2	57.6	139.6	510.7	310.9	78.5	2.0	123.2
Anogeia	238.3	136.8	149.7	57.0	30.2	12.8	1.0	1.9	33.4	162.3	122.0	203.8	1149.4	591.6	236.9	15.7	317.8
Gortyn	116.6	82.9	54.1	24.5	18.6	1.8	0.0	1.2	14.7	68.5	60.6	131.1	574.6	329.9	97.2	7.3	143.7
Herakleion	103.4	68.7	55.0	29.2	12.7	23	0.6	0.6	23.7	78.4	45.1	78.9	498.6	256.2	97.0	3.4	147.2
Pobia	98.1	68.5	46.0	17.7	7.4	0.8	0.0	0.5	15.4	66.8	62.8	121.5	505.6	291.8	71.2	1.3	145.0
Tymbakion	94.9	61.5	52.8	16.9	9.6	2.2	0.0	1.4	133	67.3	59.6	99.9	479.5	258.7	79.4	3.6	140.2
Zaros	180.2	115.1	83.5	32.4	20.8	2.5	0.0	3.3	15.0	84.9	83.5	190.4	811.6	491.9	136.8	5.8	183.3

b. Coefficient of variation

Station	Month												Annual Total	Season			
	J	F	M	A	M	J	J	A	S	O	N	D		Winter	Spring	Summer	Fall
Agia Kiriakos	42.5	74.1	42.1	123.6	98.0	177.8	—	300.0	175.0	95.1	58.2	47.5	24.9	38.1	38.5	160.0	51.9
Anogeia	47.1	86.5	49.4	72.3	93.7	164.1	190.0	215.8	126.6	67.3	86.4	40.2	22.0	37.3	38.4	140.1	55.2
Gortyn	48.7	74.7	39.6	126.9	108.6	227.8	—	—	211.6	97.2	65.0	41.0	26.3	37.6	45.3	294.5	55.8
Herakleion	41.8	83.3	54.9	103.4	78.0	156.5	250.0	250.0	164.1	98.6	86.5	38.3	29.5	39.4	60.5	123.5	27.5
Pobia	54.3	75.6	45.2	128.2	128.4	312.5	—	440.0	172.7	107.9	61.8	45.5	27.6	40.0	44.2	276.9	55.4
Tymbakion	47.9	81.6	46.8	133.7	97.9	240.9	—	400.0	236.1	99.9	63.4	50.1	27.8	39.2	48.5	252.8	58.1

Source: Didaktoria (1979)

TABLE B.2. Pearson product-moment (a) correlations and (b) probabilities for soil texture and chemical composition of 89 soil samples from the Western Mesara

a. Correlations	Texture	Carbonate	pH	Salinity	Nitrogen	Phosphorus	Potassium	Organics
Texture	1.000							
Carbonate	0.485	1.000						
pH	–0.217	–0.109	1.000					
Salinity	0.150	–.037	-0.055	1.000				
Nitrogen	0.029	-0.434	-0.036	0.345	1.000			
Phosphorus	0.062	-0.204	0.005	0.243	0.234	1.000		
Potassium	0.209	-0.235	-0.130	0308	0377	0.528	1.000	
Organic matter	0.239	-0.157	-0.128	0.436	0.438	0.280	0.503	1.000

Bartlett chi-square statistic: 167.099 DF = 28 Prob = 0.00

b. Probabilities	Texture	Carbonate	pH	Salinity	Nitrogen	Phosphorus	Potassium	Organics
Texture	0.000							
Carbonate	0.000	0.000						
pH	0.040	0.305	0.000					
Salinity	0.158	0.731	0.608	0.000				
Nitrogen	0.787	0.000	0.733	0.001	0.000			
Phosphorus	0.560	0.054	0.964	0.021	0.027	0.000		
Potassium	0.490	0.026	0.223	0.003	0.000	0.000	0.000	
Organic matter	0.230	0.141	0.229	0.000	0.000	0.007	0.000	0.000

Number of Observations: 89

TABLE B.3. Spearman rank correlation of soil texture and chemical composition of 89 soil samples from the Western Mesara

	Texture	Carbonate	pH	Salinity	Nitrogen	Phosphorus	Potassium	Organics
Texture	1.000							
Carbonate	0.545	1.000						
pH	–0.065	–0.011	1.000					
Salinity	0.418	0.123	–0.322	1.000				
Nitrogen	0.098	–0.085	–0.276	0.390	1.000			
Phosphorus	0.115	–0.120	–0.205	0.256	0.366	1.000		
Potassium	0.342	0.018	–0.240	0.377	0.344	0.352	1.000	
Organics	0.285	0.093	–0.564	0.448	0.357	0.475	0.570	1.000

Number of Observations: 89

TABLE B.4. Crops in the Mesara, 1924 and 1929

	1924 - Area (hectares)		1929 - Area (hectares)		1929 - Production (kg/ha)	
Crop	Pyrgiotissa	Kainourgio	Pyrgiotissa	Kainourgio	Pyrgiotissa	Kainourgio
Cereals:						
Wheat, winter	127.9	507.1	314.7	660.3	704	788
Wheat, spring	127.9	507.1	0.5	—	400	—
Oats	379.1	1311.6	382.7	833.0	492	688
Barley	277.6	1016.5	389.0	731.1	720	827
Rye	—	1.1	0.7	—	286	—
Maslin	202.6	656.2	331.8	600.9	708	938
Pulses:						
Broad beans	24.2	256.4	124.2	130.6	279	736
Garden peas	0.3	10.0	0.3	2.1	333	286
Lentils	2.9	15.2	15.6	7.7	436	519
Kidney beans	1.S	1.6	8.5	1.4	529	429
Chick peas	14.8	61.7	34.2	24.6	190	427
Dry peas	16.9	76.0	12.4	23.8	468	348
Leguminous herbs	—	81.0	—	0.4	—	500
Bitter vetch	36.3	278.2	69.9	171	914	834
Common vetch/ tare	2.7	6.5	0.8	2.5	750	520
Vines:						
For wine	58.6	122.5	157.3	292.7	1690	2516
Table grapes	2.7	7.3	8.1	7.4	1481	2784
Dry raisins	0.6	2.4	27.2	72.6	914	2222
Olives:						
Oil olives	?	?	487.4	973.3	518	330
Eating olives	?	?	1.3	20.2	9538	1361

Source: National Statistical Service of Greece. Agricultural Statistics 1924, 1929.

TABLE B.5. Selected characteristics of important cereal crops

Crop characteristic	Wheat *(Triticum)*	Barley *(Hordeum)*
Yields in Western Mesara (kg/ha)	700–800	700–800
Labor inputs (days per hectare per year)	30	30
Crop requirements		
Soil moisture	Water demanding	Less water demanding
Chemistry	Intolerant of saline soils	Can tolerate saline soils
Yield increase with fertilizer	1.5 times	1.3 times
Pests		Variety of weed competitors Nematodes, slugs, insects
Diseases		
Fungi Virus	Rust	Rust, mildew, smut Several

Sources: National Statistical Service, Agricultural Census 1929; Gibbon (1981), López-Bellido (1992), Verheye (1973), Briggs (1978)

TABLE B.6. Selected characteristics of important pulse crops

Crop characteristic	All pulses	Pea *(Pisum savitum)*	Chick pea *(Cicer arietinum)*	Lentil *(Lens culinaris)*	Fava bean *(Vicia faba)*
Yields in Western Mesara (kg/ha)		350 to 500	200 to 400	400 to 500	300 to 700
Labor inputs (days per hectare)	60				
Crop requirements					
Temperature Soil moisture		Sensitive to heat, excess moisture or drought	Sensitive to heat, excess moisture	Adaptable Can tolerate heat and low soil moisture	Water demanding but sensitive to heat and excess moisture
Chemistry		Sensitive to soil salinity	Sensitive to soil salinity	Sensitive to soil salinity	
Yield increase with fertilizer	1.4 times				
Nitrogen fixation		Need for nitrogen reduced when fallowed	Nitrogen fixation variable	Not all strains fix nitrogen. Average crop could deplete nitrogen	Fix most of own nitrogen needs
Competition		Compete poorly with weeds	Compete poorly with weeds	Compete poorly with weeds	
Pests			Few insect problems	Insects a problem during storage	
Diseases			Many diseases		Rotating crops
Fungal		2 diseases that may sometimes cause loss	1 disease that may often cause major loss	3 diseases that may often cause major loss	1 disease that may often cause major loss
Bacterial		Rare			
Protoplasm					Usually not important
Virus		Rotating crops reduces diseases			Usually not important Reduces diseases

Sources: National Statistical Service, Agricultural Census (1929); López-Bellido (1992); Pepelasis and Yotopoulos (1962); Summerfeld and Roberts (1985); Smithson et al. (1985) Webb and Hawtin (1981); Anonymous (1997); T. Warkentin (pers. comm. April, 1999)

TABLE B.7. Selected characteristics of olives and grapes

Crop characteristic	Olives (*Olea europaea*)	Grapes (*Vitis vinifera*)
Yields in Western Mesara (kg/ha) (per Rockerfeller Archive)	For oil: 300 to 500 For eating:1400	For wine: 1700 to 2500 For table grapes: 1500 to 2800 For dry raisins: 900 to 2200
Labor inputs (days per hectare per year)	70–90 by dry farming 80–88 by irrigation	125 by dry farming 200–250 by irrigation
Crop requirements		
Rainfall	> 400 mm per year	Can tolerate cooler and more humid conditions than olive
Soil Texture	Light, sandy for water holding	Light
Soil Depth	Deep	Deep
Soil Chemistry	Can tolerate some salinity	
Yield increase with fertilizer	1.2	1.2 to 1.8
Pests	Dacus fly	
Diseases		Mildew

Sources: National Statistical Service Agricultural Census (1929); Anonymous (1966); Aschenbrenner (1972); Pansiot and Rebour (1961); Rockefeller Archive Center, Tab1es 259, 268; Zohary and Hopf (1993)

TABLE B.8. Agricultural areas for selected communes in the Western Mesara Plain

Region and Commune	Total Agricultural Land: Area (stremma)	Percent	Tree groves: Area (stremma)	Percent	Vine yards: Area (stremma)	Percent	Annual Crops: Area (stremma)	Percent	Fallow: Area (stremma)	Percent	Uncultivated Land: Area (stremma)	Percent	Pasture: Area (stremma)	Percent	Total Land Area (stremma)
SOUTHERN UPLANDS:															
Pigaidakia	4628	31.11	1204	8.09	158	1.06	1626	1 0.93	1638	11.01	2	0.01	10248	68.89	14876
SOUTHERN MESARA:															
Kouses	4168	81.76	1442	28.29	219	4.30	1512	29.66	994	19.50	1	0.02	930	18.24	5098
Sivas	8282	95.51	3770	43.48	274	3.16	2513	28.98	1710	19.72	15	0.17	389	4.49	8671
CENTRAL MESARA:															
Kamilari	763S	96.95	2799	36.84	302	3.98	4180	55.02	84	1.11	0	0.00	232	3.05	7597
Voroi	10100	96.73	5227	50.06	909	8.71	2736	26.20	1106	10.59	122	1.17	341	3.27	10441
Phaneromeni	8189	99.15	3727	45.13	550	6.66	2709	32.80	1203	14.57	0	0.00	70	0.85	8259
NORTHERN UPLANDS:															
Zaros	25732	93.57	11905	43.29	2829	10.2 9	7723	28.08	3274	11.91	1	0.00	1767	6.43	27499
Kamares	2708	97.66	999	36.03	189	6.82	1032	37.22	488	17.60	0	0.00	65	2.34	2773

Continued on next page

TABLE B.8. Agricultural areas for selected communes in the Western Mesara Plain *(continued)*

Summary of Agricultural Areas:

Region	Tree Groves (%)	Vineyards (%)	Annual Crops (%)	Fallow Land (%)	Not Cultivated (%)	Pasture Land (%)
Southern Uplands	8.09	1.06	1 0.93	11.01	0.01	68.89
Southern Mesara	37.85	3.58	29.23	19.64	0.12	9.58
Central Mesara	47.88	6.70	36.60	9.10	0.46	2.45
Northern Uplands	42.63	9.97	28.92	12.43	0.00	6.05

Source: Data from National Statistical Service, 1961 Census.

Table B.9. Vascular plants: Their collection areas, distribution, plant communities, and potential uses in the Western Mesara

Nomenclature:
Notes:

1. Nomenclature follows Turland et al. (1993), Chilton and Turland (1997, 2002).
2. When (1) occurs after a plant name it indicates that this taxon is not found in Turland et al. (1993), Chilton and Turland (1997, 2002) or Flora Europaea.
3. Plant names in brackets refer to introduced species.
4. Alternative family names are noted in parentheses.

Collection Area:

AD=	Agioi Deka	Kl=	Klima	Mo=	Moroni
AG=	Agios Galini	Km=	Kamilari	Mv=	Moni Vrontisiou
AI=	Aghia Ioannis	Kn=	Knossos	NC=	North Coast
AV=	Ano. Vianos	Ko=	Kommos	Od=	Odigitria
AT=	Agia Triada	Ku=	Kourtes	Pe=	Petrokephali
CF=	Central Fourforas	La=	Lagoli	Ph=	Phaistos
Ga=	Galia	Le=	Lebena	Pi=	Pitsidia
Gr=	Grigoria	Li=	Listaros	Pl=	Platanos
Ka=	Kamares	Ls=	Lasithi Limnarkaros	Pm=	Phaneromeni
Kc=	Kalochorafitis	Ma=	Matala	Po=	Pombia
Ki=	Kaloi Limenes	Mg=	Magarikari	Si=	Sivas
Kk=	Kalamaki	Mi=	Moires	Vo=	Voroi
Mm=	Miamou	Za=	Zaros		

Western Mesara regional designations:

S=	Southern Mesara	C=	Central Mesara bottomland	N=	Northern Mesara
Out=	outside the Western Mesara region				

Plant Communities:

1=	shrub	4=	grassland, meadow	6=	coastal
2=	wayside, cultivated	5=	woodland	?=	habitat unknown
3=	damp				

Note: Numbers in the columns indicate the number of collections (x= not collected).

Potential Plant Use:

be=	beverage	fl=	flavoring	me=	medicine
cr=	craft	fo=	food	po=	poison
de=	decoration	fu=	fuel	ri=	ritual
fd=	fodder				

Sources: Neibuhr 1970; Huxley and Taylor 1977; Sfikas 1979.

Note: Potential plant uses in parentheses indicate the use for the genus and may not pertain to the particular species.

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
ACANTHACEAE													
Acanthus spinosus L.	KI			2			2						mo
ACERACEAE													
Acer sempervirens L.	Ka				1	1							cr
ADIANTACEAE													
Adiantum capillus veneris L.	Kk, Fa			2				2					be, me
AIZOACEAE													
Mesembryanthemum nodiflorum L.	Ko			2							2		
AMARANTHACEAE													
Amaranthus lividus L.	AI, AD			2			2						fo, me
Amaranthus retroflexus L.	Pl			1			1						fo, me
AMARYLLIDACEAE													
Pancratium maritimum L.	Kk			x							x		
ANACARDIACEAE													
Pistacia lentiscus L.	Ko, Pl, Vo, Od, NC, Ma	1	2	4		3	1	1		1			fo, be, ri, fu, cr, me, fd
Pistacia terebinthus L.	AV	1											fo, de, cr. me
APOCYNACEAE													
Nerium oleander L.	Pl			1			1						cr, me, po
ARACEAE													
Arisanum vulgare Targ.-Tozz.	Ma, Ph, Mg			2	1	1	1			1			fo, me
Arum italicum Miller spp. *byzantinum* (Blume) Nyman	Pl, Fh			2				2					fo
Dracunculus vulgaris Schott in Schott & Endl.	Pl, Kk, Ma			4			1	2	1				me, de
ASCLEPIADACEAE													
Cynanchum acutum L.	Ph			1				1					
BERBERIDACEAE													
Berberis cretica L.	Ls	1											fo
BORAGINACEAE													
Anchusa aegyptiaca (L.) DC.	Ko			4			4						
Anchusa azurea Miller	Km, AI, Ph			3			3						de
Anchusa undulata L. spp. *hybrida* (Ten.) Coutinho	AI			1			1						

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
BORAGINACEAE (*continued*)													
Anchusa undulata L. spp. *undulata*	Ko												
Cerinthe major L.	Ko			1				1					me
Cynoglossum columnae Ten.	Ko			1			1						
Echium angustifolium Miller	Ko			1			1						
Echium plantagineum L.	Ko			2			2						
Heliotropium hirsutissimum Grauer	AI, O		1	1			2						
Lithodora hispidula (Sibth. & Sm.) Griseb.	Kl, Ko		1	3		2	1		1				
Neatostema apulum (L.) I. M. Johnston	Ko			1			1						
CAMPANULACEAE													
Campanula drabifolia Sibth. & Sm.	Kl		1				1						
Campanula erinus L.	Mo, Ko			5	1	1	4		1				
Campanula tubulosa Lam.	Mv				1		1						
Laurentia gasparrinii (Tineo) Strobl	Za				2	1		1					
Legousia pentagonia (L.) Druco	Gr, Ka, Mg				4	1	2	1					
Petromarula pinnata (L.) A. DC.	La, Ka				2			2					
Solanopsis minuta (L.) C. Prasl. spp. *minuta*	Mv												
CAPPARIDACEAE													
Capparis spinosa L.	Ph												fo, fl
Capparis spinosa L spp. *sicula* (Veillard) Holmboe	Li, Ko			3		1	2						fo, fl,me, ri
CAPRIFOLIACEAE													
Sambucus ebulus L.	Mo				1		1						be, me, cr
CARYOPHYLLACEAE													
Arenaia leptociados (Reichenb.) Guss.	Ko			1					1				
Herniaria hirsuta L.	AT			1				1					me
Minuartia hybrida (Vill.) Schischkin	Ko			2					2				
Minuartia mediterranea (Link) K. Maly	Ko			1		1							
Petrorhagia velutina (Guss.) P. W. Ball & Heywood	Kl, Ko			2	1		2		1				

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
CARYOPHYLLACEAE (*continued*)													
Sagina apetala Ard.	Ko			1					1				
Silene apetala Willd.	Ko												
Silene behen L.	Ko			1			1						fo, cr, me, fd
Silene colorata Poiret	Ko			1			1						
Silene cretica L.	Kl				1		1						
Silene gallica L.	Kl, Ko			1	1		2						
Silene pinetorum Boiss. & Heldr.	Mv				1		1						
Silene sedoides Poiret	Ko			3			2						
Silene vulgaris (Moench) Garcke	Ko			2			2						fo
Spergularia bocconii (Scheele) Ascherson & Graebner	Kl, Ko		1	2		1	1		1				
Spergularia diandra (Guss.) Boiss.	Ko			1		1							
Velezia ridgida L.	Ko			1		1							
CHENOPODIACEAE													
Atriplex halimus L.	Pi, Ko			4		1	1	2					fo, cr, me, fd
Chenopodium murale L.	Ko			1			1						fo
Chenopodium opulifolium Schrader ex Koch & Ziz	Ko			1			1						fo
Suaeda vera J. F. Gmelin	Ko			1							1		
CISTACEAE													
Cistus incanus L. spp. *creticus* (L.) Heywood	Vo, Ki, Od, Ka, Fa, Ph, Ma, Ko		5	7	1	6	2		4	1			be, de, cr, me
Cistus parviflorus Lam.	Od, Ko, Ma		1	3		1			2	1			
Fumana arabica (L.) Spach	Kl , Mv, Vo, Ko		1	4	3	6			2				
Fumana thymifolia (L.) Spach ex Webb.	Kl , Vo, Ko		4	3	1	5			3				
Helianthemum lippii (L.) Pers.	Ko			1			1						
Helianthemum salicifolium (L.) Miller	Ko			3		1			1				
Tuberaria guttata (L.) Fourr.	Mg, Ko			1	1	1				1			

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
COMPOSITAE													
Achillea cretica L.	Ko			2							2		
Aetheorhiza bulbosa (L.) Cass. spp. *microcephala* Rich. f.	Ko			1					1				
Anthemis arvensis L.	Li, Ko		1	3			1		1				me
Anthemis chia L.	Ko			1			1						me
Anthemis altissima L.	La				1			1					
Anthemis cotula L.	Ko												me
Anthemis rigida (Sibth. & Sm.) Boiss. & Heldr.	Ko			1					4				
Artemisia arborescens L.	Gr				1		1						
Asteriscus aquaticus (L.) Less.	Od, Ph, Ko			1	3	2	2						
Atractylis cancellata L.	Vo, Ph, Ko			5		5							
Atractylis humilis L.	Ko			1					1				
Calendula arvensis L.	Ko			1			1						me (fo, de)
Carduncellus caeruleus (L.) C. Presl	Od		1				1						
Carlina corymbosa L. spp. *graeca* (Boiss.) Nyman	Si, Vo			1	1	2							
Carlina macrocephala Moris	Ko			1		1							
Carthamus lanatus L.	Ko			1			1						cr
Centaurea aegialophila Wagenitz	Ko			1							1		
Centaurea idaea Boiss. & Heldr.	Po		1				1						fo
Centauroa raphanina Sibth. & Sm. spp. *raphanina*	Ko			2		1			1				
Chamomilla recutita (L.) Rauschert	Ko			1				1					
Chondrilla juncea L.	Ko			1			1						fo, me
Chrysanthemum coronarium L.	Ko			2			2						fo, ri, fd, de
Chrysanthemum segetum L.	Ko			1			1						fo
Cichorium endiva L. spp. *divaricatum* (Schousboe) P. D. Sell	Ko			1			1						fo
Cichorium spinosum L.	Le			2		1	1						
Cirsium creticum (Lam.) D'Urv.	Ph			1				1					

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
COMPOSITAE (*continued*)													
Crepis cretica Boiss.	Ph			3		3							
Crepis foetida L.	Ko			10		1	4		5				
Cropis foetida L. spp. *commutata* (Sprengel) Babcock	Km, Ph			6		2	4						
Crepis multiflora Sibth. & Sm.	Ko			3		2						1	
Crepis neglecta L. spp. *cretica* (Boiss.) Vierh.	Od, Mv, Ko		1	7	1	1	3	1	4				
Crepis cf. *rubra* L.	Ko												
Crepis sancta (L.) Babcock	Ko			5			4		1				
Crepis vesicaria L.	Ko			2			2						
Crupina crupinastrum (Moris) Vis.	Ph, Ko			4		1	3						
Dittrichia viscosa (L.) W. Greuter	Ko		1		2	1	1	1					
Filago aegaea Wagenitz spp. *aristata* Wagenitz	Ko			1		1							
Filago pyramidata L.	Ko			4		2	2						
Galactites tomentosa Moench	Si, Kl			1	1		1	1					fd
Globularia alypum L.	Kl		1			1							me, po
Hedypnois cretica	Ko												
Hedypnois cretica (L.) Dum.-Courset spp. *cretica*	Ko			7		1	2		2		2		
Hedypnois cretica (L.) Dum. Courset spp. *monspeliensis* (Murb.)	Ko			6		3	2		1				
Helichrysum italicum (Roth.) G.Don f. in Loudon spp. *microphyllum* (Willd.) Nyman	Ls	1											
Helichrysum orientale (L.) Gaertner	Ko			1			1						de
Helichrysum stoechas (L.) Moench spp. *barrelieri* (Ten.) Nyman	Ko			1					1				me
Hypochoeris achyrophorus L.	Ko, Ph, Si			14		9	1		3		1		
Lactuca serriola L.	Ko			1			1						fo, me
Lamyropsis cynaroides (Lam.) Dittrich	Kl, Ko		1	1			2						be, cr, ma

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
COMPOSITAE (*continued*)													
Leontodon tuberosus L.	Si, Ko			5		2	2		2				fo
Notobasis syriaca (L.) Cass.	Po, Ko		1	3			2		2				fo
Onopordum illyricum L. spp. *cardunculus* (Boiss.) Franco	Ko			3			1		1		1		
Onopordum tauricum Willd.	Ko			2		1					1		
Pallenis spinosa (L.) Cass spp. *microcephala* (Halacsy) Rech. f.	Ko			2		1	1						
Phagnalon graecum Boiss. & Heldr.	Ko			3			2		1				
Picris altissima (Delile)	Ph, Vo			1	1	2							
Picris echioides L.	Za			1	1		1	1					
Reichardia intermedia (Schultz Bip.) Coutinho	Ko			1		1							
Reichardia picroides (L.) Roth	Ph, Ko			10		1	1		5		1	1	fo
Rhagadiolus stellatus (L.) Gaertner	Mo, Ko			2	1	1	2						
Scolymus hispanicus L.	Ko			2			1		1				fo, me
Scorzonera cretica Willd.	Ko			3			2		1				fo
Senecio vulgaris L.	Ko			2									me, po
Sonchus asper (L.) Hill	Ko			1		1							(fo)
Sonchus oleraceus L.	Ko			4			1		1		1	1	fo, me, po
Steptorhamphus tuberosus (Jacq.) Grossh.	Za, Km, Ko			4	1	3	2						
Tolpis virgata Bonol.	Li, Ko			2		1	1						
Tragopogon hybridus L.	Ph, Ko			2		1	1						
Tragopogon porrifolius L. spp. *australis* (Jordan) Nyman	Si, Ko			2		1	1						fo
Urospermum picroides (L.) Scop. ex F.W. Schmidt	Ko, Ph			7		3	2		2				
CONVOLVULACEAE													
Convolvulus althaeoides L. spp. *tenuissimus* (Sibth. & Sm.) Stace	Ko, Mv			2	1		2		1				me
Convolvulus dorycnium L.	Ko, Km			2		1							
Cuscuta palaestina Boiss.	Ko, Kl, Si, Ph		1	4		4		1					fo, me

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
CRASSULACEAE													
Crassula tillaea Lester-Garland	Ko			1								1	
Sedum litoreum Guss.	Ko			2		2							
Sedum rubens L.	Po, Mg, Ko	1	1	1	1	1			1				
Sedum sediforme (Jacq.) Pau, non Hamet	Ma, Ko			3		3							
Umbilicus horizontalis (Guss .) DC.	Ko, Gr			1	1		2						
CRUCIFERAE													
Biscutella didyma L.	Kc, Ko			1	1		1			1			
Brassica tournefortii Gouan	Ko			3			1				1		fo, cr
Cakile maritima Scop.	Ko			5		1	1				3		fo, fl, me
Capsella bursa-pastoris (L.) Medicus	Ko			1				1					me
Didesmus aegyptius (L.) Desr.	Ko			1		1							
Erucaria hispanica (L.) Druce	Km, Ph, Ko			7		1	4	1			1		
Hirschfeldia incana (L.) Lagreze-Fossat	Ko, Vo, AI			6		3	2	1					fo
Malcolmia flexuosa (Sibth. & Sm.) Sibth. & Sm. subsp. *naxensis* (Rech. fil.) Stork	Ko			1					1				
Nasturtium officinale R. Br.	AT, Ko			2				2					fo, me
Raphanus raphanistrum L.	Ko			2			1		1				fo, po
Rapistrum rugosum (L.) All.	Ph			1		1							
Sinapis alba L.	AI, Ko			3			2		1				fo, fl
Sisymbrium irio L.	Ko			1					1				fo, me
Sisymbrium officinale (L.) Scop.	Ko			1				1					fo
CUCURBITACEAE													
Bryonia cretica L.	Ko			2				2					me
CUPRESSACEAE													
Cupressus sempervirens L.	Ko, Mo, Kk, Mv			1	2	1	1	1					ri, de, fu, cr, me, po, fd
Juniperus oxycedrus L. spp. *macrocarpa* (Sibth. & Sm.) Ball	Ko			1		1							fu, cr, me
Juniperus phoenicea L.	My	1											fu, cr, me
CYPERACEAE													
Carex distans L.	Ko			3				3					
Carex divisa Hudson	Ph			1				1					

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TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
CYPERACEAE (*continued*)													
Carex flacca Schreber	Si												
Carox flacca Schreber spp. *semulata* (Biv.) W. Greuter	Ko			3		1		2					
Carex hispida Willd.	Kk, Ph			2				2					
Carex otrubae Podp.	Ph			1				1					
Cyperus capitatus Vandelli	Ko			2					2				
Cyperus longus L spp. *badius* (Desf.) Murb.	Kk, Ph, Ko, Po			4				4					be, cr, me
Eleocharis palustris (L.) Roemor & Schultes	Ph			1				1					
Scirpus cernuus Vahl	Mv				1				1				
Scirpus holoschoenus L.	La, Si, Ko			3	1		1	2	1				
Scirpus maritimus L.	Ph, Ls	1			1	1							fo
DIOSCOREACEAE													
Tamus communis L.	La				1			1					fo, me, po
DIPSACACEAE													
Pterocephalus papposus (L.) Coulter	Mv				1	1							
Scabiosa atropurpurea L. spp. *maritima* (L.) Arcangeli	Ko			3			3						
Scabiosa sicula L.	Ko			1		1							
Tremastelma palaestinum (L.) Janchen	Li, Ko		1	2			2		1				
EQUISETACEAE													
Equisetum ramosissimum Desf.	La												
Equisetum telmateia Ehrh.	La, Pe												po
ERICACEAE													
Arbutus unedo L.	NC	11											fo , be, cr, fu, ma, fd, de
Erica arborea L.	NC	1											cr, fu
Erica manipuliflora Salisb.	Ko, Ki, Od, Ls, Ma	1	2	4		4	1		1				
EUPHORBIACEAE													
Chrozophora tinctoria (L.) A.Juss.	Ph			1		1		1		1			fo, be, me, cr
Euphorbia characias L	Ku, Mg, Ko			1	2			1					me

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
EUPHORBIACEAE (*continued*)													
Euphorbia dimorphocaulon P. H. Davis	Si			1		1							
Euphorbia falcata L.	Ph			1		1							me
Euphorbia helioscopia L.	Ph, Ko			3			1		2				me, po
Euphorbia paralias L.	Ko, Km, Kk			4			4		4		2		me, po
Euphorbia peplis L.	Ko			4		1	1		2				me, po
Euphorbia pubescens Vahl	Ph			1				1					
Mercurialis annua L.	Ko			1					1				me, po
Ricinus communis L.	Ko			1			1						me, po
FAGACEAE													
Quercus brachyphylla Kotschy	Mo												fu, cr, fd
Quercus coccifera L.	Mo, Za, Gr, Mv, CF, Ls, Kc, Mg	7			9	3	2	1		3			de, fu, cr, fd, me
Quercus ithaburensis Decne spp. *macrolepis* (Kotschy) Hadge & Yalk	NC												
Quercus pubescens Willd.	Ku, Mo, Ls, NC	2			3	1	2						
FRANKENIACEAE													
Frankenia hirsuta L.	Ko			4			1				3		
GENTIANACEAE													
Blackstonia perfoliata (L.) Hudson	Ko			1		1							
Centaurium pulchellum (Swartz) Druce	Ko			1			1						
Centaurium spicatum (L.) Fdtsch	Ko			1					1				me
Centaurium tenuiflorum (Hoffmanns. & Link) Fritsch	Ph, Ko			2		1			1				
Centaurium tenuiflorum (Hoffmanns. & Link) Fritsch spp. *tenuiflorum*	Pl			2		1			1				
GERANIACEAE													
Erodium laciniatum (Car.) Willd.	Ko			6		1	4						
Erodium malacoides (L.) L'Her.	Ko												fo

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses *(cont.)*

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
GENTIANACEAE (*continued*)													
Erodium moschatum (L.) L'Her.	Ko			1				1					fo
Geranium dissectum L.	Ko			1				1					me
Geranium molle L.	Mo, Ko				1	1							
Geranium purpureum Vill.	Kc			1	1			1		1			
Geranium robertianum L. subsp. *purpureum* (Vill.) Hyman	Ko			2			1	1					me
Geranium rotundifolium L.	La, Ko			4	1	1	2	1	1				me
Geranium tuberosum L.	Ko			2			2						fo
GLOBULARIACEAE													
Globularia alypum L.	Vo, AG	1			1	1							me
GRAMINEAE													
Aegilops dichasians (Zhok.) Humphries	Ki, Si, Ko		1	2		1			2				
Aegilops lorentii Hochst.	Ko			4		1		1	1		1		
Aegilops ovata L. *pro parte*	Ko												
Agrostis stolonifera L.	Ph			1				1					
Aira elegantissima Schur	Si, Ko			3		1			2				
Alopecurus myosuroides Hudson	Ph			1				1					fd
Andropogon distachyos L.	Si, Ko			2		1			1				fd
Anundo donax L.	Mi, Ph			2			1	1					cr, me
Avena barbata Pott ex Link	AI, Ko			7		1	3		2			2	fd
Avenula cycladum (Rech. f. & J.S. Scheffer) W. Greuter	Mv												
Brachypodium distachyon (L.) Beauv.	Ph, Ko		1	2		2			1				
Brachypodium retusum (Pers.) Beauv.	Od, Ka, Km, Si, Ko		1	2	1	2	1		1				
Briza maxima L.	Ko			1					1				de
Briza minor L.	Ko			2				1	1				
Bromus alopecurus Poiret	Ph, Ko			2		1		1					
Bromus diandrus Roth	Ph, Ko			3				1			2		
Bromus fasciculatus C. Presl	Ph, Ko			8		8							
Bromus hordeaceus L.	Ph			1				1					cr, me, fd
Bromus intermedius Guss.	Ph, Si, Ko			6		2	1		3				
Bromus madritensis L.	La, Ko			7	1	5	1	1	1				

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
GRAMINEAE (*continued*)													
Bromus rigidus Roth	Ko			6		2					2	1	fd
Bromus rubens L.	Ko			2		2							fd
Bromus sterilis L.	Km			1			1						fd
Bromus tectorum L.	Ko			2			1		1				po, fd
Corynephorus divaricatus (Pourret) Breistr.	Ko, Kk			5		1						4	
Cutandia maritima (L.) W. Barbey	Ko			1								1	
Cynodon dactylon (L.) Pers.	Ko			3			1		1			1	to, me, fd
Cynosurus echinatus L.	Gr, Mo				2	1		1					
Dactylis glomerata L.	Mv			7	1	7	1						fo, fd
Dactylis glomerata L. spp. *hispanica* (Roth) Nyman	Kl, Li, Ko		1	1		1	1						
Dasypyrum villosum (L) P. Candargy	Ph, Ma, Ko			5		2	1		1	1			
Desmazeria marina (L.) Druce	Ko			2					1		1		
Desmazeria rigida (L.) Tutin	Gr, Si, Ma, Ko			6	1	2		1	3	1			
Dittrichia viscosa (L.) W. Greuter	Mv												
Echinaria capitata (L.) Desf.	Si, Ko			5		2			3				
Elymus farctus (Viv.) Runemark ex Melderis	Ko			2					1		1		
Elymus farctus (Viv.) Runemark ex Melderis spp. *rechingeri* (Runemark) Melderis	Ko			2		1					1		
Festuca arundinacea Schreber	Ph			2				2					fd
Festuca arundinacea Schreber spp. *fenas* (Lag.) Arcangeli	Kk			3			1	2					fd
Festuca arundinacea Schreber var. *glaucescens* Boiss.	Ko												fd
Gastridium ventricosum (Gouan) Schinz & Theil.	Od, Mv, Si, Vo, Kc, Ko, Li		1	4	3								
Hordeum bulbosum L.	Si, Ko			2		2							fo, fd

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
GRAMINEAE *(continued)*													
Hordeum hystrix Roth	Ph			2			1	1					
Hordeum murinum L.	Kc												
Hordeum murinum L. spp. *leporinum* (Link) Arcangeli	Ko			4	1	2	3						
Hyparrhenia hirta (L.) Stapf.	Ko			5		1	3		1				fd
Imperata cylindrica (L.) Raeuschel	Ko			1			1						cr, me
Lagurus ovatus L.	Ko			3		1	1		1				de
Lolium rigidum Gaudin	Ph, Si, Ko			6		2	1		2		1		fd
Lophochloa cristata (L.) Hyl.	Ph, Ma, Ko			7		4	1		1	1			
Lygeum spartum L.	Ko			2		1							
Melica cillata L.	Mg				1		1						
Melica minuta L.	Ko			5		5							
Melica rectiflora Boiss. & Heidr.	Kl		1			1							
Parapholis incurva (L.) C.E. Hubbard	Ko			2		1							
Paspalum paspalodes (Michx) Scribner	Ph			1				1					
Phalaris aquatica L.	Si, Ph			2		1		1					fd
Phalaris coerulescens Desf.	Kl, Si		1	1		1			1				fd
Phalaris minor Retz.	Ko			2		2							fd
Phalaris paradoxa L.	Si			1			1						
Phleum subulatum (Savi) Ascherson & Graebner	Kl, Ka, Ph, Li		1	2	1	2	1		1				
Phragmites australis (Cav.) Trin. ex Steudel	Kk			1				1					me, cr
Piptatherum coerulescens (Desf.) Beauv.	Mv, Ko			2	1	3							
Piptatherum miliaceum (L.) Cosson	AT, Ko, Pe			11		7		2	2				
Piptatherum thomasii (Duby) Kunth	Ph			1		1							
Poa bulbosa L	Ph, Ko			1			1						fd
Poa bulbosa L. spp. *vivipara* (Koeler) Arcangali	Ko			6		1	4		1				fd
Polypogon monspeliensis (L.) Desf.	Kk, Ph, Ko			3			1	2					

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
GRAMINEAE (*continued*)													
Polypogon viridis (Gouan) Breistr.	La, Ph			2	1			3					
Psilurus incurvus (Gouan) Schinz & Theil.	Si, Vo, Ko			2	1	2			1				
Setaria ambigua (Guss.) Guss., non Schrader	AI			1			1						
Setaria verticillata (L.) Samp.	Al,AD			2			2						fo
Sorghum halepanse (L.) Pers.	Kk, AD			1			1						fo, po, fd
Stipa bromoides (L.) Dorfler	Ki		1				1						
Stipa capensis Thunb.	Ph, Ko			8		5	1		1			1	fd
Trachynia distachya (L.) Link	Ph			5		4			1				
Triplachne nitens (Guss.) Link	Ko, Kk			3			1				2		
Triticum lorentii Hochst.	Ph												
Vulpia ciliata Dumort.	Kc, Ko, Si			3	2	2			2	1			
Vulpia fasciculata (Forskal) Samp.	Vo, Ko			4			1				3		
GUTTIFERAE													
Hypericum empetrifolium Willd.	Ko, Vo			4	1	3	1		1				
Hypericum perfoliatum L.	Gr, Si			1	1	1		1					me
Hypericum triquetrifolium Turra	Ko, Km, AD			5		1	3		1				
IRIDACEAE													
Gladiolus italicus Miller	Ko			5					5				fo, me, de
Gynandrisis monophylla Boiss. & Heldr. ex Klatt	Ko			1					1				
Gynandrisis sisyrinchium (L.) Parl.	Ko			7		1	3		2			1	fo
Hermodactylus tuberosus (L.) Miller	Ko			2		1						1	
Iris albicans Lange	Ko			1					1				de
Iris cretensis Janka	Ko			2		1							
Romulea ramiflora Ten.	Ko			1		1							
JUGLANDACEAE													
Juglans regia L.	Za, Ka				2			1		1			fo, cr, me

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

			Distribution in Mesara			Plant Community(ies)							Potential Plant Use
Plant Tax	Collection Area	Out	S	C	N	1	2	3	4	5	6	?	
JUNCACEAE													
Juncus heldreichianus Marsson ex Parl.	Ki, Ph, Si			6		1		5					cr
Juncus hybridus Brot.	Ko			1				1					cr
Juncus maritimus Lam.	Ki			1				1					
LABIATAE													
Clinopodium vulgare L.	Ko			1					1				
Genista acanthociada DC.	Ls												
Lamium amplexicaule L.	Ko			3			3						me
Lavandula stoechas L.	NC	1											me, cr
Marrubium vulgare L.	Ko			1			1						me
Micromeria nervosa (Desf.) Bentham	Ko			6		1	2		2			1	
Mentha microphylla C. Koch	Ph			1				1					cr
Mentha pulegium L.	Ph			1				1					fl, me, cr
Origanum microphyllum (Bentham) Boiss.	Ls	2											cr
Phlomis cretica C.Presl	AT			1			1						
Phlomis x cytherea Rech. f.	Ko												
Phlomis floccosa D.Don	Ko												
Phlomis fruticosa L.	Mv, Ko				2	1	1						
Phlomis lanata Willd.	Po, Mv, AT, Ls, Ko	1	2	4	2	4	3		1				
Phlomis x sieberi Vierh.	Ko			1		1							
Prasium majus L	Kk, Ko			4		2	1					1	
Rosmarinus officinalis L.	Ko			1				1					fo, be, fl, me, ri, cr
Salvia triloba L. f.	Od, Ko		1				1						fo, fl, be, cr, me
Salvia verbenaca L.	AT, Ko			3		1	2						me
Salvia viridis L.	Ph, Ko			2		2							
Salvia viridis L. var. *commata* Heldr.	Ko			1			1						
Salvia viridis L. var. *viridis*	Ko			6		1	4		1				
Satureja thymbra L.	Od, Mv, Fa, Ls, Ko	1	1	9	1	2	4	1	3			1	cr, me
Scutellaria sieberi Bentham	La , Kc				2			1		1			
Sideritis curvidens Stapf.	Ph, Ko			1, 2		1	2						
Stachys cretica L.	Ph			1			1						

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
LABIATAE (*continued*)													
Stachys cretica L. spp. *cretica*	Ko	1		2					2				
Stachys spinosa L.	Km, Ko, Ma			7		4	1		1	1			
Teucrium alpestre Sibth. & Sm.	Kl, Od, Ko, Vo		2	5	1	6	1	1					
Teucrium divaricatum Sieber ex Boiss.	Kl , Ph, AI		1	3		4							me
Teucrium flavum L.	Fa			1		1							
Teucrium microphyllum Desf.	Pl, Od, Km, Ko, Li		1	9		6	2		1			1	
Teucrium polium L.	Ko			1		1							cr, me
Teucrium scordium L. spp. *scordioides* (Schreber) Maire & Petitmengin	Ph			1				1					me, cr
Thymus capitatus (L) Hoffmanns. & Link	Ko			6		3	1					2	fl, fu, cr, me
LEGUMINOSAE													
Acacia saligna (Labill.) Wendl. f.	Ko			1							1		fu, cr, fd
Anagyris foetida L.	Ko			3		2		1					me, po
Anthyllis hermanniae L.	Ko	2		6		4	2						
Anthyllis tetraphylla L.	Ko												
Astragalus hamosus L.	Ko			2			1		1				me, fo
Calicotome villosa (Poiret) Link	Ku, Ko		3	4	2	3		1	1			1	me
Ceratonia siliqua L.	AT, Po, Od, Ko, Vo			4			4	1	1	1			fo, fl,be, cr, me, fd
Cicer arietinum L.	Ko			1			1						fo, fd
Coronilla scorpioides (L.) Koch	Ko, Ph			4		2			2				fd
Dorycnium rectum (L.) Ser.	Kk, Ph, AI			4			1	3					
Ebenus cretica L.	Ku, Ko			5	1	1							
Genista acanthociada DC.	Ga, Kl	1	1		1		2						
Hedysarum spinosissimum L.	Vo, Ph, Ko			4		2	1		1				fd
Hippocrepis unisiliquosa L.	Ko			3			1		1			1	
Hymenocarpus circinnatus (L.) Savi	Si, Ko			5		1			4				fd
Lathyrus cf. annuus L.	Ko			1					1				

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
LEGUMINOSAE (*continued*)													
Lathyrus cicera L.	Ko			2			1		1				fo
Lathyrus clymenum L.	Ko			1				1					
Lathyrus hierosolymitanus Boiss.	Ko			2			1		1				
Lathyrus sativus L.	Li		1				1						fo
Lathyrus saxatilis (Vent.) Vis.	Ko			1		1							
Lotus cytisoides L.	Ko			7		1	2		2		2		fo
Lotus edulis L.	Ko			7		1	3		3				fo
Lotus halophilus Boiss. & Spruner	Ko			10		1	3		1		4	1	
Lotus ornithopodioides L.	Ko			3		2			1				
Lotus peregrinus L.	Ko			7		1	1		4		1		
Lotus tenuis Waldst. & Kit. ex Wilid.	Ph			2				2					
Lupinus varius L.	Ko				1		1						fo
Medicago ciliaris (L.) All.	Ph			1				1					fo
Medicago coronata (L.) Bartal.	Ph, Ko			6		4			2				
Medicago disciformis DC.	Ko			5		3			1		1		
Medicago globosa C.Presl	Ko			4		1			3				
Medicago littoralis Rohde ex Loisel.	Ko			4			1		2		1		fd
Medicago marina L.	Ko			1					1				
Medicago minima (L.) Bartal.	Ko, Ph			5		2			2		1		fd
Medicago minima (L.) Bartal. var. *longiseta* Ser.	Ko												
Medicago minima (L.) Bartal. var. *minima*	Ko			2		1			1				
Medicago orbicularls (L.) Bartal.	Ko			2		1	1						cr, fd
Medicago polymorpha L.	Ph, Ko			13		6	3		4				
Medicago scutellata (L.) Miller	Mg, Ph, Vo			1	2	1	2						fd
Medicago truncatula Gaertner	Ph, Ko			7		7							fd
Medicago turbinata (L.) All.	Ko, Vo			2	1	2			1				
Melilotus indica (L.) All.	Pl, AI, Ph			3			2	1					me, fd
Medicago messanensis (L.) All.	Ph			1				1					fd

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
LEGUMINOSAE (*continued*)													
Melilotus sulcata Desf.	Ko			2					2				
Onobrychis aequidentata (Sibth. & Sm.) D'Urv.	Ph, Ko			3		1	1		1				
Onobrychis caput-galli (L.) Lam.	Vo, Ko			3		1			1		1		
Ononis breviflora DC.	Ph			1		1							
Ononis mitissima L.	Km			1			1						
Ononis natrix L. spp. *hispanica* (L. f.) Coutinho	Ko			4		1	1		2				
Ononis pubescens L.	Ph, Ko			4		1	2		1				
Ononis reclinata L.	Vo, Ko			3	2	4			1				
Ononis spinosa L	Pe			2		1	1						fo, me
Ononis spinosa L. spp. *antiquorum* (L.) Arcangeli	Ko												
Ononis spinosa L. spp. *diacantha*	Od		1				1						
Psoralea bituminosa L.	Ko												me
Scorpiurus muricatus L.	Ko			5		1	1		2				
Securigera securidaca (L.) Degen & Dorfler	Ph, Ko			7		3	3	1					
Spartium junceum L.	Ku, Ko	1			1	1							cr, me, po
Tetragonolobus purpureus Moench	Ko			4		1			4				fo
Trifolium angustifolium L.	Ph, Vo, Ko			2	1	1	1		1				
Trifolium arvense L.	Ko			1			1						po, fd
Trifolium campestre Schreber	Pl, Ko			5		1	3		1				fd
Trifolium infamia-ponterii Greuter	Pl, Ko			2			1		1				
Trifolium lagrangei Boiss.	Ko												
Trifolium lappaceum L.	Si, Vo			1	1	1	1						
Trifolium squamosum L.	Ph			1				1					fd
Trifolium scabrum L.	Vo, Ko, Ph			6	2	5			1		1		fd
Trifolium squamosum L.	Ph			1				1					fd
Trifolium stellatum L.	Pl, Ph, Ko			3			2		1				fd
Trifolium tomentosum L.	Ko			2					1		1		fd
Trifolium uniflorum L.	Ls,AG	1		2			1		1				
Vicia bithynica (L.) L.	Za				1	1							
Vicia cretica Boiss. & Heldr.	Ko			1		1							

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
LEGUMINOSAE (*continued*)													
Vicia hybrida L.	La, Ko			4	1	2	1	2					fd
Vicia lutea L.	Ph			1				1					fo, fd
Vicia peregrina L.	Vo, Mo, Ko			3	2	2	2		1				fo
Vicia sativa L.	Ph, Ko			6			3	1	2				fo, fd
Vicia sativa L. spp. *nigra* (L.) Ehrh.	Ko			1		1							fo, fd
Vicia tenuissima	Si, Ph			2		1		1					
Vicia tenuissima (Bieb.) Schinz & Theil.													
LILIACEAE													
Allium ampeloprasum L.	Ko, Km			2					1		1		fo
Allium rubrovittatum Boiss. & Heldr.	Od, Ko, Vo		1	2	2	2	1		1	1			
Allium subhirsutum L.	Si, Mg, Ka			3	1	2	1		1				
Allium trifoliatum Cyr.	Ko			4			4						
Asparagus aphyllus L.	Ls, Kc, Ko	1		1	1	1				1			(fo)
Asphodeline lutea (L.) Reichenb.	Za				1	1							de
Asphodelus aestivus Brot.	Ko			1			1						fo, cr, me
Gagea fibrosa(Desf.) Schultes & Schultes, f.	Ko			1					1				
Gagea graeca (L.) A. Terracc.	Mm, Ko			4		1	2		1				
Muscari comosum (L.) Miller	Ko			4			3					1	fo, me
Muscari spreitzenhoferi (Heldr.) Vierh.	Ko			7		4	2					1	
Ornithogalum creticum Zahar.	Kl		2			1	1						
Ornithogalum narbonense L.	Ph, Ko			4		3			1				fo
Ruscus aculeatus L.	Ls, Ko	1		1		1							fo, cr
Smilax aspera L.	La				1			1					fo, be, me, cr
Urginia maritima (L.) Baker	Ko			1		1							ri, cr, me
LINACEAE													
Linum bienne Miller	Si, Ko			3		1	2						cr
Linum strictum L.	Ph			1		1							me, cr
Linum strictum L. spp. *corymbulosum* (Reichenb.) Rouy	Mv, Si, Li			2	1	2							me

Table B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
LILIACEAE (*continued*)													
Linum strictum L. spp. *spicatum* (Pers.) Nyman	Ko			5		4	1						
LYTHRACEAE													
Lythrum junceum Banks & Solander	La, Kk, Ph, Ko			3	1		1	3					
MALVACEAE													
Lavatera bryoniifolia Miller	Ki, Km, Ko		1	2			1	2					
Lavatera cretica L.	Ph			3			1	1	1				
Malva aegyptia L.	Ko			4		2	2						
Malva cretica Cav.	Ko			2					2				
Malva sylvestris L.	Ko			1			1						fo, be, me
Malva sylvestris (L.) var. *incanescens* Griesb.	Ko			1			1						fo, be, me
Malva cretica Cav.	Ko			2					2				
Malva sylvestris L.	Ko			1			1						fo, be, me
Malva sylvestris (L.) var. *incanescens* Griesb.	Ko			1			1						fo, be, me
MORACEAE													
Ficus carica L.	Pl			2			2						fo, cr, me, fd, po
MYRTACEAE													
Myrtus communis L.	La				1			1					fo, be, fl, me, fu, cr, ri, de
OLEACEAE													
Olea europaea L.	Ko, Pl, AT, Vo, Po, Od, Kl, La, Mv, AI, Mg		5	10	3	4	12	1		1			fo, de, fu, cr, me, fd
Phillyrea latifolia L.	NC	1											(fo)
ORCHIDACEAE													
Aceras anthropophorum (L.) Aiton f.	Ko			1					1				
Anacamptis pyramidalis (L.) L.C.M.Richard	Ko			9			3		5			1	fo, me
Barlia robertiana (Loisel.) W. Greuter	Ko			1		1							
Ophrys apifera Hudson	Ko			1		1							

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
ORCHIDACEAE (*continued*)													
Ophrys bombyliflora Link	Ko			3			1		2				
Ophrys doerfleri Fleischm.	Ko			2					1				
Ophrys fuciflora (F.W. Schmidt) Moench spp. *maxima* (Fleischm.) Greuter	Ko			1					1				
Ophrys fuciflora (F.W. .Schmidt) Moench spp. *candica* E. Nelson ex Soo	Ko			3		1	1		1				
Ophrys fusca Link spp. *iri-color* (Desf.) O. Schwarz	Ko			1			1						
Ophrys lutea (Gouan) Cav.	Ko			4			3		1				
Ophrys mammosa Desf.	Ko			2					1				
Ophrys scolopax Cav. spp. *heldreichii* (Schlechter) E. Nelson	Ko			1					1				
Ophrys sphegodes Miller	Ph			1		1							
Ophrys sphegodes Miller spp. *cretensis* H. Baumann & Kunkele	Ph			1		1							
Ophrys sphegodes Miller spp. *tommasinii* Vis.	Ko			4		2	1		1				
Ophrys spruneri Nyman	Ko			2			2						
Orchis coriophora L.	Km, Ko			3		1			2				fo
Orchis coriophora L. spp. *fragrans* (Pollini) Sudre	Pl, Ph, Si			3		2	1						(fo)
Orchis italica Poiret	Ko			6			1		4			1	
Orchis laxiflora Lam.	Ls, Ph	1		1				1					
Orchis papilionacea L.	Ko			3			1		1			1	
Orchis saccata Ten.	Ko			5			2		2			1	
Serapias lingua L.	Si, Ko			4		2			2				fo
Serapias parviflora Parl.	Ko			1			1						fo
Sarapias vomeracea (Burm.) Briq. spp. *laxiflora* (Soo) Golz & Reinhard	Ph, Si, Ko			6		2			4				fo
Serapias vomeracea (Bumm.) Briq. spp. *orientalis* W. Greuter	Ph, Si, Ko			9		4	2		3				fo
OROBANCHACEAE													
Orobanche crenata Forskal	Ko			3			1		2				
Orobanche pubescens D'Urv.	Ko			5		1	4						

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
OROBANCHACEAE (*continued*)													
Orobanche ramosa L. spp. *mutelli* (F.W. Schultz) Coutinho	Ph, Ko			7		1	2		3		1		
OXALIDACEAE													
Oxalis pes-caprae L.	Ko			1			1						fd
PALMAE													
Phoenix theophrasti W. Greuter	Ph			1		1							
PAPAVERACEAE													
Fumaria parviflora Lam.	Ko			1			1						me
Glaucium corniculatum (L.) J.H. Rudolph	Ko			1			1						
Glaucium flavum Crantz	Ko			1			1						fo, cr
Hypecoum cf. glaucescens Guss	Ko			1							1		
Hypecoum procumbens L.	Ko			3					1		1	1	me, po
Papaver rhoeas L.	Ko			4			4						fo, cr, me, fd
Roemeria hybrida (L.) DC.	Ko			1			1						po
PINACEAE													
Pinus brutia Ten.	AT, Mv	1		1	1		2						
Pinus halopensis Miller	Ko												fu, cr
PLANTAGINACEAE													
Plantago afra L.	Ph, Ko			3		2	1						me
Plantago albicans L.	Ph, Ko			3		1	1		1				
Plantago arenaria Waldst. & Kit.	Ko												me
Plantago bellardii All. ssp. *deflexa* (Pilger) Rech. f.	Vo, Ko			2	1	1	1		1				
Plantago cretica L.	Od		1				1						me
Plantago lagopus L.	Si, Ko	1		2					2				
PLATANACEAE													
Platanus orientalis L.	Ka, Od		1		1			2					cr
PLUMBAGINACEAE													
Limonium bellidifolium (Gouan) Dumort.	Ko			1							1		
Limonium graecum (Poiret) Rech. f. spp. *graecum*	Ko												
Limonium oleifolium Miller	Ko			1							1		

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
PLUMBAGINACEAE (*continued*)													
Limonium sieberi (Boiss.) O. Kuntze	Ko			2			2						cr
POLYGALACEAE													
Polygala monspeliaca L.	Ko			1		1							
POLYGONACEAE													
Emex spinosa (L.) Campd.	Ko												
Polygonum aviculare L.	AD			1			1						fo, be, me, po
Polygonum equisetiforme Sibth. & Sm.	Ko, Km, AT			3			1	2					
Polygonum lapathifolium L. spp. *lapathifolium*	AT			1				1					fo
Polygonum salicifolium Brouss. ex Willd.	Km, Ph			2				2					fo, fl
Rumex bucephalophorus L. spp. *aegaeus* Rich. fil.	Ko			2					1			1	fl
Rumex conglomeratus Murray	La				1			1					fo, fl
Rumex pulcher L.	AT			1				1					fo, fl
PRIMULACEAE													
Anagallis arvensis L.	Gr, Ko			3	1		1	1	2				cr, me, po
Asterolinon linum-stellatum (L.) Duby	Ko			2		1			1				
Samolus valerandi L.	Mv, Fa			1	1			2					fo, me
PUNICACEAE													
Punica granatum L.	NC	1											fo, be, me, de, ri, cr
RANUNCULACEAE													
Adonis microcarpa DC. spp. *cretica* (Huth) Vierh.	Ko			2			1					1	me
Anemone coronaria L.	Ko			1					1				de, po
Anemone hortensis L. spp. *heldreichii* (Boiss.) Rech. fil.	Ko			2					2				po
Clematis cirrhosa L.	Kc, Ko			1	1	1				1			de
Garidella nigellastrum L.	Ph, Vo, Ko			3	1	4							
Nigella arvensis L. spp. *aristata* (Sibth. & Sm.) Nyman	Ko			1			1						po
Nigella damascena L.	Si, Ko			3		3							fl, po
Ranunculus asiaticus L.	Ko			9		1	5		3				

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
RANUNCULACEAE (*continued*)													
Ranunculus marginatus D'Urv.	Ph			1					1				
Ranunculus paludosus Poiret	Ko			2			1	1					
RESEDACEAE													
Reseda lutea L.	Km, Ko			2			2						fo, cr
RHAMNACEAE													
Rhamnus lycioides L spp. *graecus* (Boiss. & Reuter) Tutin	Ls	1											
Rhamnus lycioides L. spp. *oleoidos* (L.) Jahandiez & Maire	Mv, AG, Ls, Km	1		3	1	2	1		1				
Rhamnus oleoides L.	Ko			2		1			1				cr
ROSACEAE													
Crataegus azarolus L.	Mo				2		2						fo, me
Eriobotrya japonica (Thunb.) Lindley	Mo			1			1						fo
Potentilla reptans L.	Ph												fo, me, ri
Prunus dulcis (Miller) D.A.Webb	Ph, Ko			6		2	1					3	fo, de, cr
Prunus webbii (Spach) Vierh.	Gr, Mg, Ko			1	2		1			1		1	
Pyrus amygdaliformis Vill.	Za, Si, Li, Ko			3	2	2	1	1				1	fo
Pyrus pyraster Burgsd.	Ko												fo
Rubus ulmifolius Schott	Ko			1				1					fo
Sanguisorba officinalis L.	Ko			2		1	1						fl, cr, me, fo
Sarcopoterium spinosum (L.) Spach	Po, Ko		1	3		1	1		2				fu, me
RUBIACEAE													
Asperula incana Sibth. & Sm.	Mv, Mo, Ga				3	1	2						
Asperula rigida Sibth. & Sm.	Vo, Ko			2	1	3							
Crucianella latifolia L.	Kl, Km, Ko		1	1		1		1					
Galium aparine L.	La, Ko			1	1		1	1					me
Galium debile Desv.	Ph			2				2					
Galium divaricatum Pourret ex Lam.	Ka				1				1				
Galium heldreichii Helacsy	Ka				1	1							
Galium murale (L.) All.	AI, Ko			5		2	2		1				
Galium setaceum Lam.	Ph, Li, Ko, AI		1	7		6	1		1				
Rubia tenuifolia D'Urv.	1				1					1			

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
RUBIACEAE (*continued*)													
Rubia tinctorum L.	Ph			1			1						me, fd, cr
Sherardia arvensis L.	Ph, Ko			4			4						
Valantia hispida L.	Kl, Ko		1	1			1		1				
RUTACEAE													
Ruta chalepensis L.	Ko			2		2							cr, me
SALICACEAE													
Populus nigra L.	Mo			1	2		1	2					
SANTALACEAE													
Osyris alba L.	AT, Fa, Si, Ph, Ko			6		3	1	1	1				de, me
Thesium alpinum L.				3			2		1				
Thesium humile Vahl.	Ko												
SCROPHULARIACEAE													
Bellardia trixago (L.) All.	Mg, Si, Ko			3	1		1	1	1			1	
Kickxia commutata (Bernh. ex Reichenb.) Fritsch	Vo			1				1					
Linaria chalepensis (L.) Miller	Ko			1			1						
Linaria pelisseriana (L.) Miller	Kc				1					1			
Misopates orontium (L) Rafin.	Ph, Ko			4		1	2		1				
Parentucellia latifolia (L.) Caruel	Ko			2			2						
Parentucellia viscosa (L.) Caruel	Za, NC, Ph	1		1	1		1	1					
Scrophularia canina L.	Ko			1			1						
Scrophularia lucida L. spp. *filicifolia* (Mill.) Rech. fil.	Ko			4			3		1				
Verbascum macrurum Ten.	Ko												cr, po
Verbascum sinuatum L.	Ko			2			1		1				me
Veronica anagallis-aquatica L.	AT, Ph, Ka			2	1			3					
SELAGINELLACEAE													
Selaginella denticulata (L.) Link	Ko			1			1						
SINOPTERIDACEAE													
Cheilanthes fragrans (L. f.) Swartz	Vo				1	1							
SOLANACEAE													
Hyoscyamus albus L.	Ko			1			1						me, po

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distributio n in Mesara			Plant Community(ies)							Potential Plant Use
			S	C	N	1	2	3	4	5	6	?	
SOLANACEAE (*continued*)													
Lycium intricatum Boiss.	Ko			1			1						me, po
Lycium schweinfurthii Dammer	Ko			2		1						1	ri, me
Mandragora autumnalis Bertol.	Kc, Km, Ko			2	1		1		1	1			fo, me, po
Solanum luteum Miller spp. *alatum* (Moench) Dostal	Ph, Ko			1					1				fo, me, po
Solanum nigrum L.	Ph			1			1						
STYRACACEAE													
Styrax officinalis L.	Ph, Vo, La, Za			2	2		1	3					me, ri, cr
TAMARIACEAE													
Tamarix parviflora DC.	Ko			1			1						fu, cr, me
THYMELAEACEAE													
Daphne sericea Vahl	Ls	1											cr
Thymelaea hirsuta (L.) Endl.	Km, Od, Ko, Ma		1	5		3	2		1	1			
TYPHACEAE													
Typha domingensis (Pars.) Steudal	Pe			1				1					fo
UMBELLIFERAE													
Ammi majus L.	Ga, Ko, Km			2	1		2		1				me
Apium nodiflorum (L.) Lag.	Kk, Ph			1				1					
Bunium ferulaceum Sibth. & Sm.	Si, Ko			4		3			1				
Bupleurum gracile D'Urv.	Od, Km, Vo, Ko	1		3	1	3	1					1	fo, de, cr, me
Crithmum maritimum L.	Ko			1							1		fo, me, po
Daucus carota L.	Mv, Vo				2	2							
Daucus carota L. spp. *maximus* (Desf.) Pall.	Ko			2			1	1					
Daucus guttatus Sibth. & Sm.	Ko			1							1		
Daucus involucratus Sibth. & Sm.	Vo, Ko			5	1	6							me
Eryngium campestre L.	Ko			1			1						fu, cr
Ferula communis L.	Pl			1	1		1	1					
Ferulago nodosa (L.) Boiss.	Mo				1	1							fo, fl, cr, me
Foeniculum vulgare Miller spp. *piperitum* (Ucria) Coutinho	Ko			1				1					

Continued on next page

TABLE B.9. Vascular plants: Collection area, distribution, plant communities, and potential uses (*cont.*)

Plant Tax	Collection Area	Out	Distribution in Mesara S	C	N	Plant Community(ies) 1	2	3	4	5	6	?	Potential Plant Use
UMBELLIFERAE (*continued*)													
Lagoecia cuminoides L.	Pl, Ph, Mo, Ko			5	1	2	2		2				(fo)
Oenanthe pimpinelloides L.	Ph			1				1					
Orlaya kochii Heywood	Ko												
Pimpinella peregrina L.	Si, Kc			1	1			1		1			
Pseudorlaya pumila (L.) Grande	Ko			4		2			1		1		
Scaligeria cretica (Miller) Boiss.	Kc				1					1			
Scaligeria cretica (Miller) Boiss. spp. *halophila* (Rech.) fil.	Ko			1					1				
Scaligeria napiformis (Sprengel) Grande	Po, Mv		1	1	1	2	1						me
Scandix pecten~veneris L.	Ph, Ko			5		2	2		1				
Smyrnium olusatrum L.	Lo			1				1					fo, me
Tordylium apulum L.	Ko			1			1						
Torilis arvensis (Hudson) Link	Ph			1				1					
Torilis leptophylla (L.) Reichenb. f.	Ph, Kc, Ko			4	1		2		2	1			
Torilis nodosa (L.) Gaertner	Ko			4		3	1						
URTICACEAE													
Urtica pilulifera L.	Ko			1		1							ri, me
VALERIANACEAE													
Centranthus calcitrapae (L.) Dufresne spp. *calcitrapae*	Mo, Ko			1	1	1			1				
Fedia cornucopiae (L.) Gaertner	Kn	1											fo
Valerianella discoidea (L.) Loisel.	Ph, Si, Ko			3		2			1				
Valarianella hirsutissima Link	Ko			2		1			1				
Valarianella vesicaria (L.) Moench	Ko			3		1	2						
VERBENACEAE													
Vitex agnus castus L.	Od, Ko			1	1		1	1					fl, ri, de, cr, m
V1TACEAE													
Vitis vinifera L.	Ko			1			1						fo, be, me, fd, cr
ZYGOPHYLLACEAE													
Tribulus terrestris L.	AD			1		1							fo, me, po

TABLE B.10. Terminology used for Mediterranean-type shrublands

Shrub height	Term	Country or Area	General Term
Tall	Maquis	Greece, France, Israel	High mattoral
	Macchia	Italy	(height > 2 m)
	Matorral	Spain, Chile	
	Chaparral	California	
	Renosterveld	South Africa	
	Mallee	Australia	
Medium	Garrigue	France (calcareous soils)	Middle mattoral
	Gariga	Italy	(height 0.6-2 m)
	Jaral	Spain (siliceous soils)	
Low	Phrygana	Greece	Low mattoral
	Garrigue	France (siliceous soils)	(height < 0.6 m)
	Batha	Eastem Mediterranean	
		Israel	
	Garriga	Italy	
	Tomillares	Spain	
	Jaral	Chile	
	Coastal sage	California	

Sources: di Castri 1981:3; Tomaselli 1981:5.

TABLE B.11. Presence (%) and geographical distribution of major shrubs in relation to soil moisture, soil chemistry, and human disturbance at 155 sites in the Western Mesara

						Relative Measures of Environmental Conditions								
	Presence (n = 155)		Distribution within the Mesara			Moisture Content			Disturbance			Soil Nutrients		
Plant Taxa	n	%	South	Central	North	Dry	Inter.	Moist	Low	Med.	High	Low	Med.	High
Thymus capitatus	122	78.7	X	X	X	X	X		X	X	X	X	X	X
Calicotome villosa	103	66.5	X	X	X	X	X		X	X	X	X	X	X
Phagnalon graecum	92	59.4	X	X	X	X			X	X	X	X	X	X
Sarcopoterium spinosum	90	58.1	X	X	X	X	X		X	X	X	X	X	X
Phlomis spp.	81	523	X	X	X	X	X		X	X	X	X	X	X
Helichrysum spp.	77	49.7	X	X	X	X			X	X	X	X	X	X
Thymelaea hirsuta	76	49.0		X		X			X	X	X	X	X	X
Salvia triloba	63	40.6	X	X	X	X	X			X		X	X	X
Teucrium sp.	51	32.9	X	X	X	X			X	X	X	X	X	
Pistacia lentiscus	47	303	X	X			X		X	X	X	X	X	X
Ebenus cretica	43	27.7		X	X	X	X			X			X	
Olea europaea (wild)	41	26.5	X	X	X	X	X		X	X	X	X	X	X
Asparagus aphyllus	39	25.2	X	X	X	X	X		X	X	X	X	X	X
Prasium majus	30	19.4	X	X	X	X	X		X	X	X	X	X	X
Satureja thymbra	29	18.7		X	X	X			X			X	X	X
Anthyllis/Genista	28	18.1		X	X	X	X		X	X		X	X	
Cistus spp.	23	14.8	X	X	X		X		X	X		X	X	X
Rhamnus spp.	23	14.8		X		X	X			X		X	X	
Osyris alba	22	14.2	X	X	X	X			X	X	X	X		X
Fumana spp.	19	12.3	X	X	X	X			X	X		X	X	
Ceratonia siliqua	14	9.0		X	X	X					X		X	
Micromeria nervosa	12	7.7		X		X			X	X			X	

TABLE B.12. Chi-square values *(a)* and probability matrix *(b)* for 14 major plant taxa identified at 89 sites within the Mesara study area

a.

	Calicotome	*Thymelaea*	*Ebenus*	*Pistacia*	*Wild Olea*	*Thymus*	*Sarcopot.*	*Phlomis*	*Salvia*	*Phagnalon*	*Helichry.*	*Teucrium*	*Asparagus*
Thymelaea	8.758												
Ebenus	8.079	2.465											
Pistacia	10.688	0.131	5.206										
Wild Olea	0.31 B	7.391	8.856	0.661									
Thymus	14.205	14.402	7.194	10.736	0.783								
Sarcopoterium	0.069	3.403	0.051	5.745	0.814	9.428							
Phlomis	2.760	0.019	4.088	3.425	1.859	9.428	3.216						
Salvia	0.960	0.915	0.166	0.017	2.036	0.853	4.930	7.074					
Phagnalon	11.748	14.939	2.465	1.124	0.004	18.464	2.011	3.403	3.382				
Helichrysum	13.408	10.982	0.946	2.949	0.090	13.587	0.099	1.353	7.682	34.471			
Teucrium	7.406	1.902	0.012	11.895	1.174	6.654	0.200	5.098	0.013	7.525	9.084		
Asparagus	0.022	0.655	0.149	3.476	6.998	0.059	8.139	0.291	5.026	0.655	0.093	3.280	
Prasium	9.273	0.104	1.325	12.412	4.489	1.916	0.291	8.139	1.536	4.457	3.089	19.309	0.341

Note: All plant taxa shown occur in a minimum of 25% of the 89 sites involved in this analysis.
Note: For all values listed, fewer than one-fifth of fitted cells are sparse (frequency < 5).
Therefore significance tests should be valid.

b.

	Calicotome	*Thymelaea*	*Ebenus*	*Pistacia*	*Wild Olea*	*Thymus*	*Sarcopot.*	*Phlomis*	*Salvia*	*Phagnalon*	*Helichry.*	*Teucrium*	*Asparagus*
Thymelaea	0.003												
Ebenus	0.004	0.116											
Pistacia	0.001	0.717	0.023										
Wi1d Olea	0.573	0.007	0.003	0.416									
Thymus	0.000	0.000	0.007	0.001	0.376								
Sarcopoterium	0.793	0.065	0.821	0.017	0.367	0.002							
Phlomis	0.097	0.889	0.043	0.064	0.173	0.002	0.073						
Salvia	0.757	0.339	0.684	0.895	0.154	0.356	0.026	0.008					
Phagnalon	0.001	0.000	0.116	0.289	0.950	0.000	0.156	0.065	0.066				
Helichrysum	0.000	0.001	0.331	0.086	0.764	0.000	0.753	0.245	0.006	0.000			
Teucrium	0.007	0.168	0.914	0.001	0.279	0.010	0.655	0.024	0.908	0.006	0.003		
Asparagus	0.881	0.418	0.700	0.062	0.008	0.808	0.004	0.590	0.025	0.418	0.761	0.070	
Prasium	0.002	0.747	0.250	0.000	0.034	0.166	0.590	0.004	0.215	0.035	0.079	0.000	0.559

Note: Probability values within the 0.000 to 0.005 range are highly significant.

TABLE B.13. Major landscape types related to degree of human influence

		Examples in the Western Mesara			
Landscape Type	Flora and Fauna	Degree of Human Influence	Community Type	Distribution	Typical Species
Natural	Spontaneous	Not influenced by humans	Probably no examples now exist		
Sub-natural	Largely spontaneous	Influenced by humans to some extent where there is foot traffic and some plant collecting	Perhaps some sand dune communities and sea cliffs	Along west and south coasts	Ononis natrix, grasses, liliaceous bulbs
Semi-natural	Somewhat spontaneous	Strongly influenced by humans through frequent fires, continual grazing, and woodcutting	1. Communities of shrubs on steep slopes and uplands	Throughout	Dominated by spiny and unpalatable species, e.g. Kermes oak, thyme, spiny broom
			2. Marshes, streamsides, and damp places	Localized, mainly in central and northern area	Oleander, chaste tree, bramble, giant reed, plane
			3. Scattered tree groves	In northem part of area	Oak, maple, myrtle, pine
Agricultural	Predominantly controlled by humans	Drastically altered by humans	Agricultural fields, roadsides, meadows, and planted tree groves		Exotic field crops, weeds and omamentals; cypress

Source: After Westhoff in Naveh and Lieberman (1984:19).

TABLE B.14. Tree distribution, land use, and population in relation to elevation and topography in the Western Mesara

TOPOGRAPHY				TREE DISTRIBUTION					LAND USE					POPULATION	
				Conifers		Oaks									
Elevation (m)	Interval (m)	Area (sq. km)	Area (%)	*Pinus brutia*	*Cupressus sempervirens*	*Quercus pubescens*	*Quercus coddifera*	Maquis shrub	Pasture	Vineyards	Tree crops	Annual crops	Olive treeDistribution	1881	1961
	1600–2400	38.3	4.9												
1600															
	1400-1600	23.2	2.8												
1400					|										
	1200-1400	63.6	7.6		|										
1200					|										
				|	|										
1000	800-1200	83.0	9.8	|	|										
				|	|	|	|	|							
800				|	|	|	|	|							
700	600-800	238.4	28.3	|	|	|	|	|					|	3	3
600				|	|	|	|	|	39%	25%	22#	14%	|	7	9
700	600-800	238.4	28.3	|	|	|	|	|					|	3	3
600				|	|	|	|	|	39%	25%	22#	14%	|	7	9
500	400-600	134.9	16.1	|	|	|	|	|					|	16	24
400				|	|	|	|	|	22%	22%	21%	22%	|	13	21
300	200-400	115.8	13.9	|	|	|	|	|					|	12	22
200				|	|	|		|	12%	14%	29%	22%	|	10	18
100	100-200	69.9	8.3	|	|	|		|					|	6	12
0	0-100	72.3	8.6	|	|	|		|					|	7	21

Sources: Area figures derived from Mesara map.

Proportion figures from Kolodny (1974) Atlas D-20.

Tree distribution data from Zohary and Orshan (1965).

Olive distribution data from Allbaugh (1953: 51).

Land use categories from 1961 Agricultural census for Heraklion nome, National Statistical Services (1966).

Approximate elevation ranges: Lowlands 0–350, Hills 350–450, Mountains 450–800 m a.s.l.

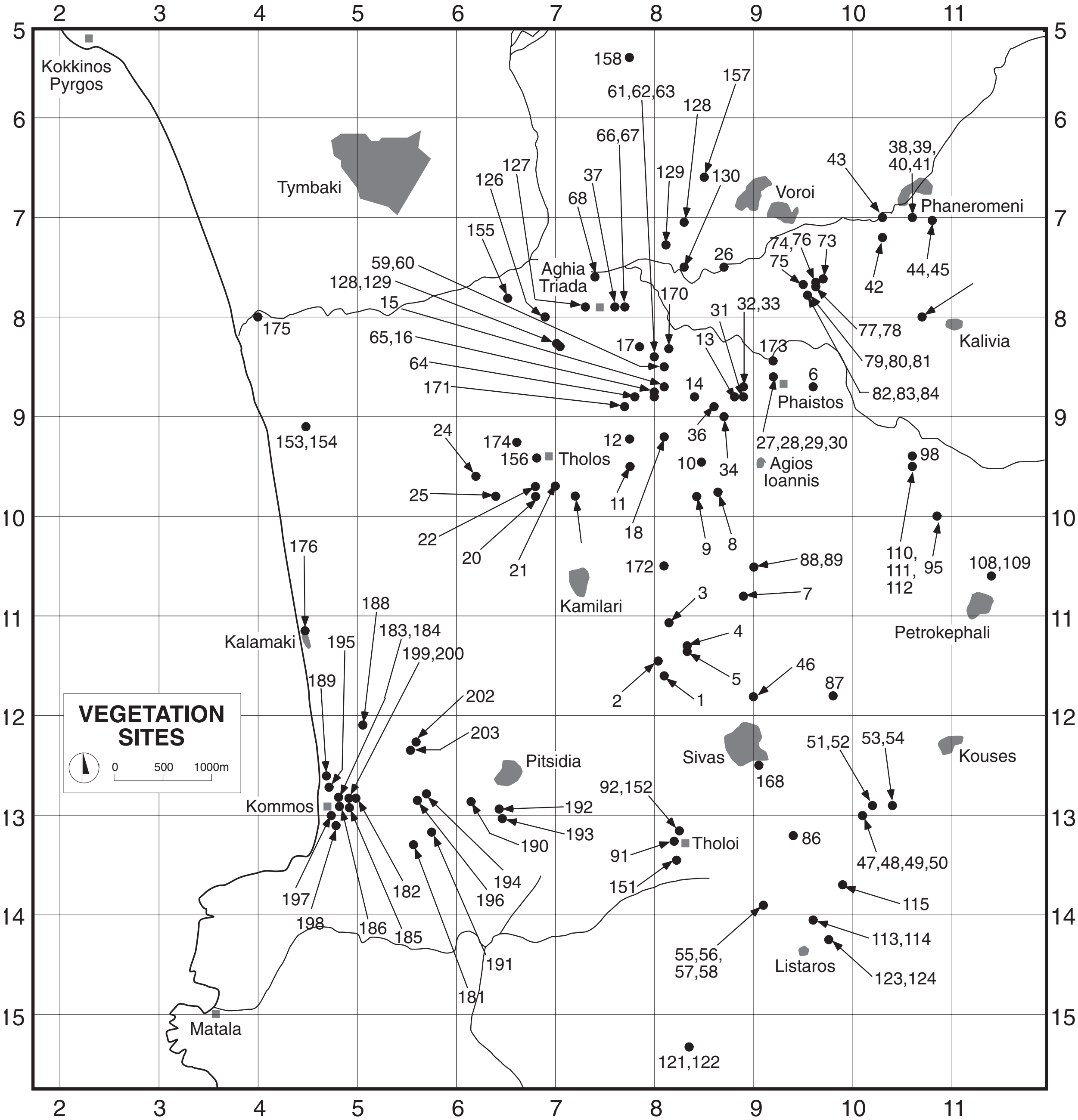


FIGURE B.1. Distribution of vegetation sampling locations within the study area

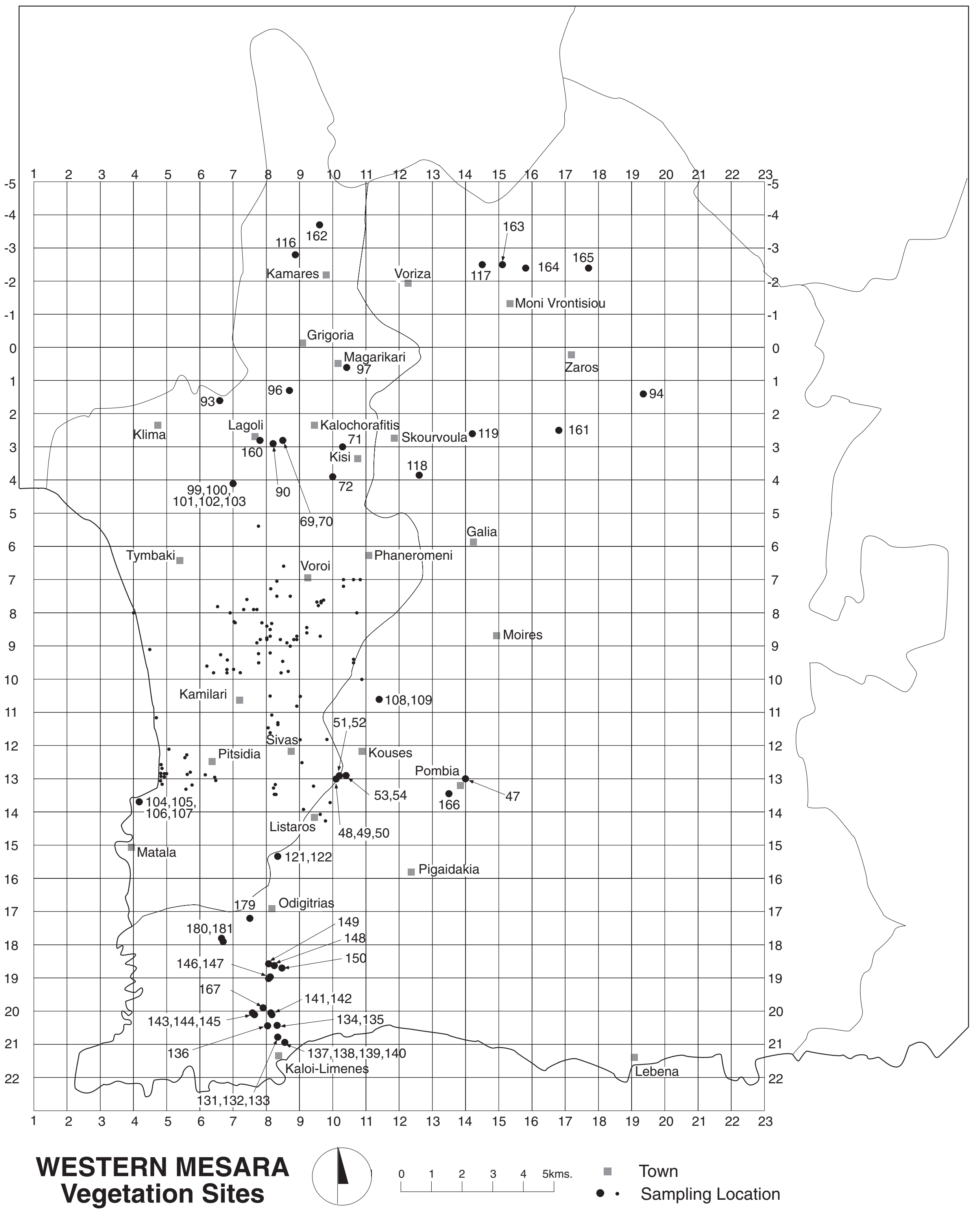
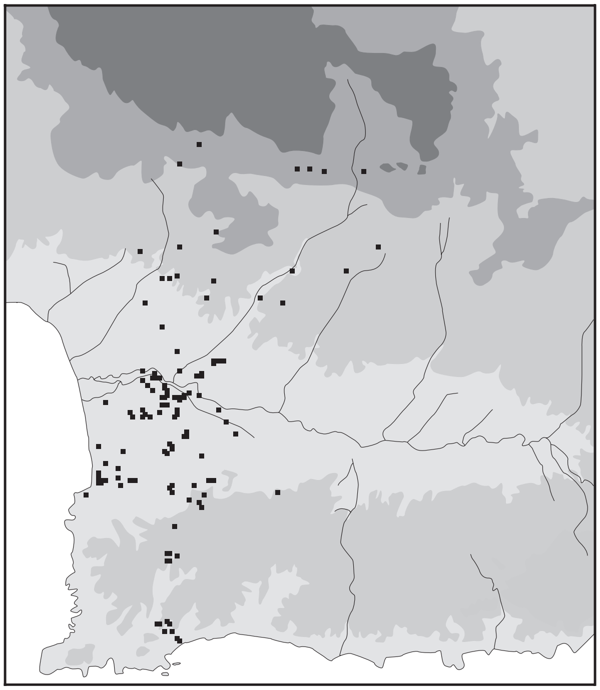
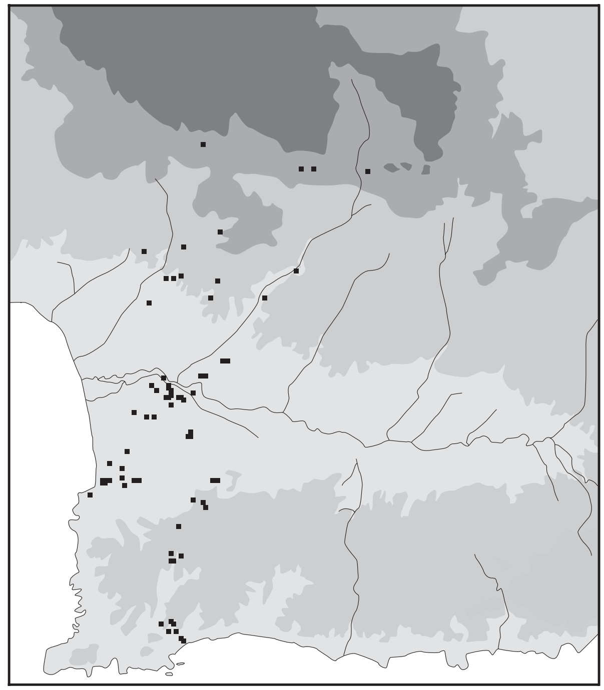


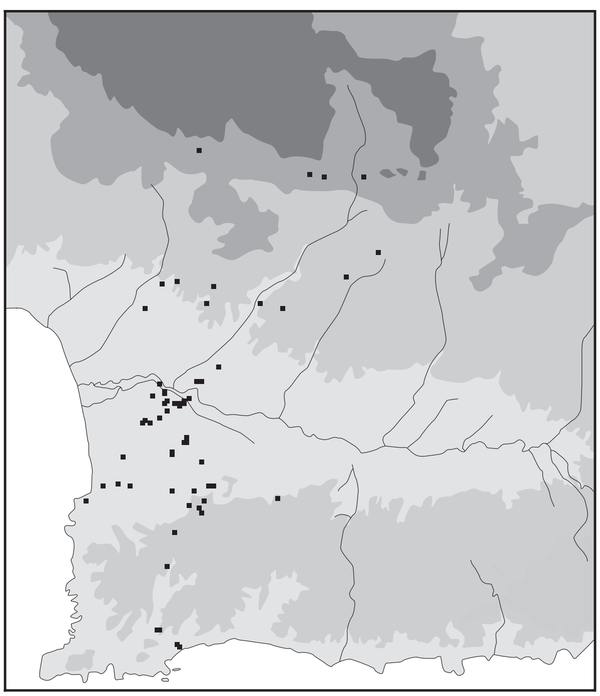
FIGURE B.2. Distribution of vegetation sampling locations along a north-south transect from northern foothills to the south coast



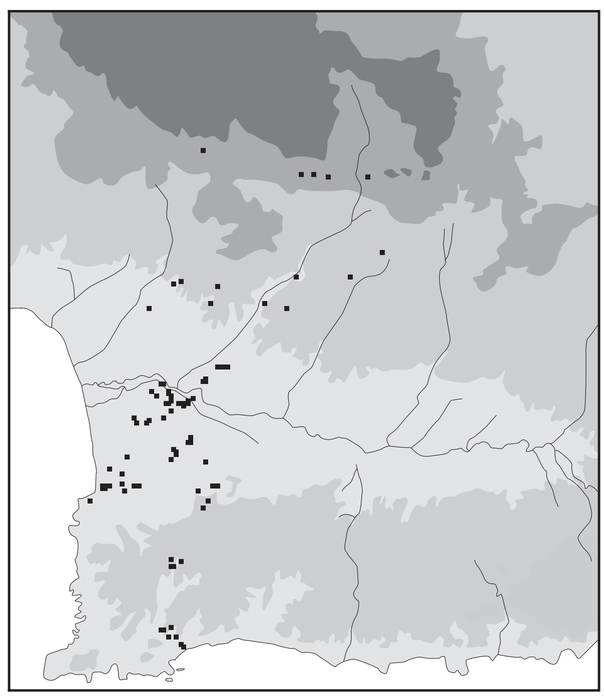
Locations of 152 vegetation survey sites in the Western Mesara.



Occurrence of *Calicotome villosa* at sites in the Western Mesara.

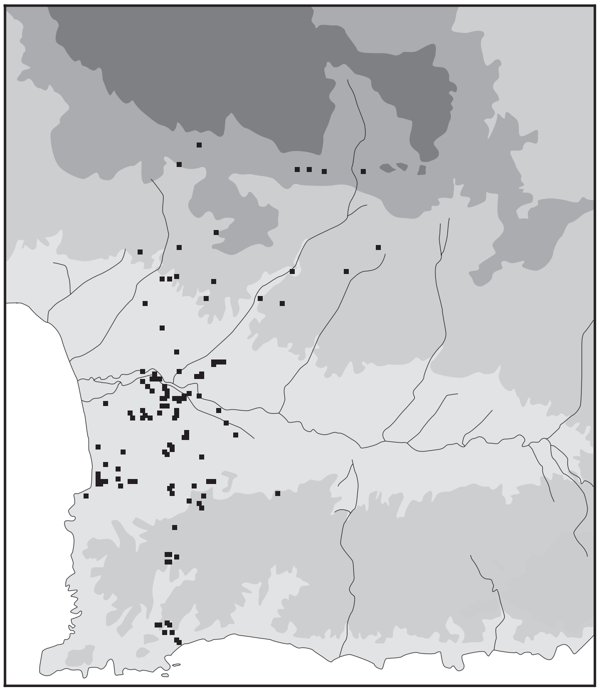


Occurrence of *Sarcopoterium spinosum* at sites in the Western Mesara.

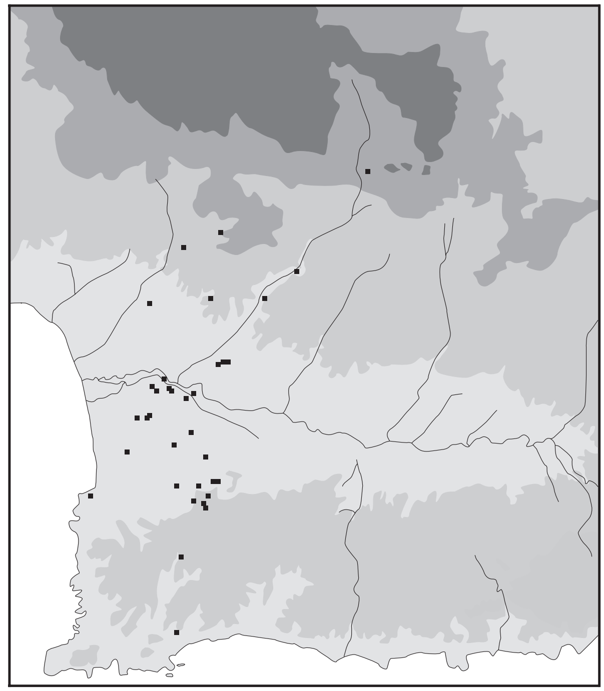


Occurrence of *Coridothymus capitatus* at sites in the Western Mesara.

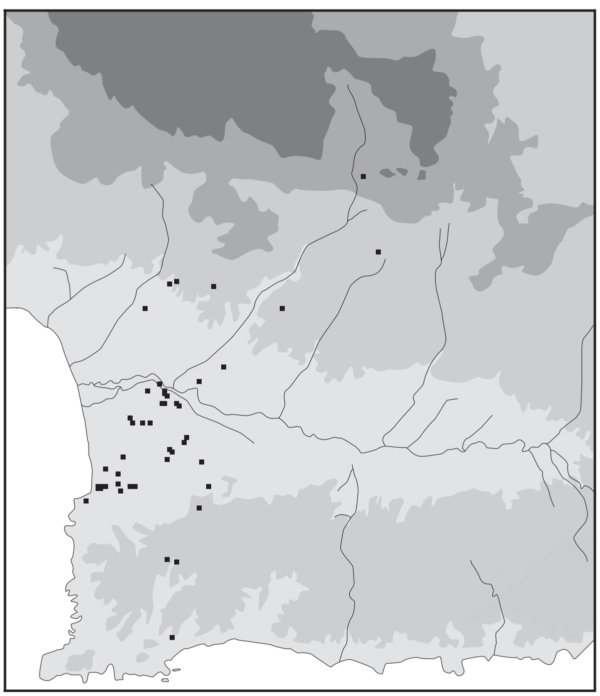
FIGURE B.3. Occurrence of spiny broom *(Calicotome)*, thorny burnet *(Sarcopoterium)*, and thyme *(Thyme)* in the Western Mesara



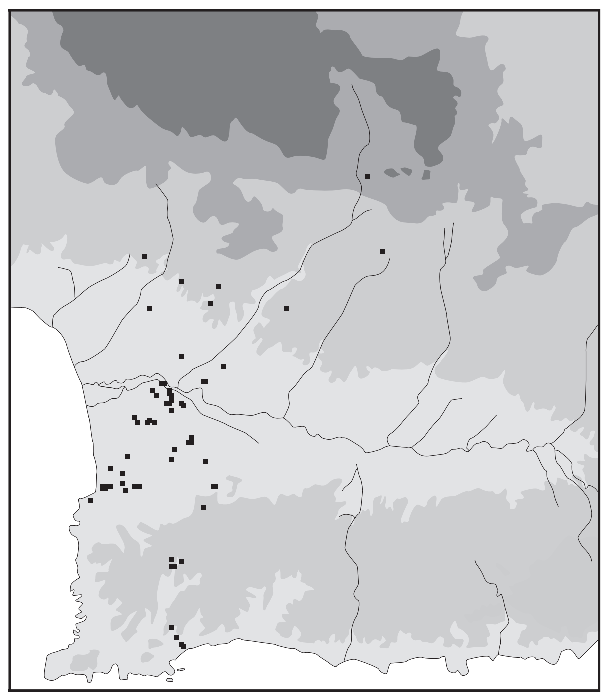
Locations of 152 vegetation survey sites in the Western Mesara.



Occurrence of *Asparagus aphyllus* at sites in the Western Mesara.

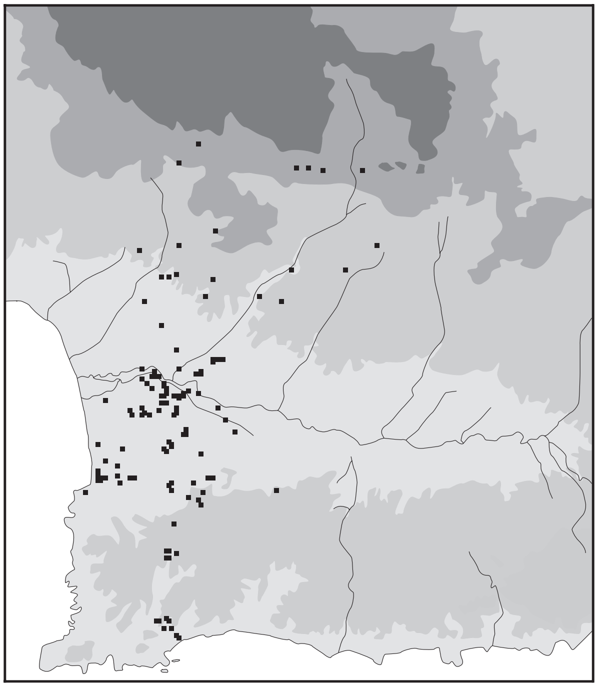


Occurrence of *Helichrysum* spp. at sites in the Western Mesara.

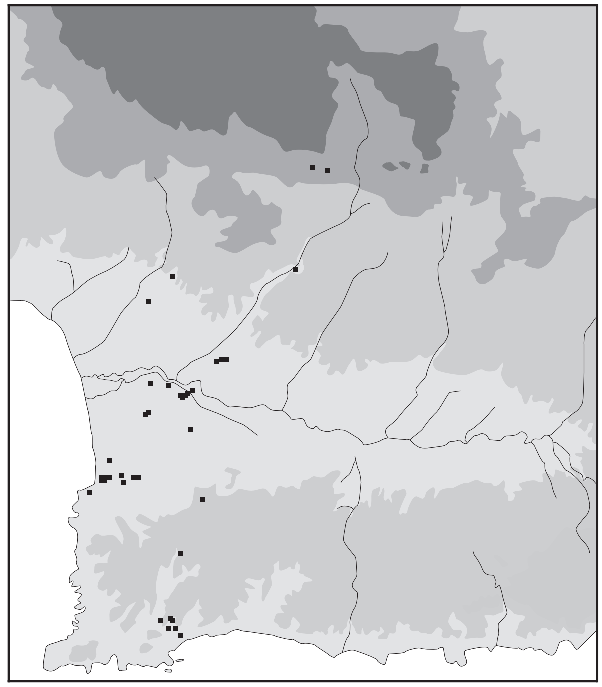


Occurrence of *Phagnalon graecum* at sites in the Western Mesara.

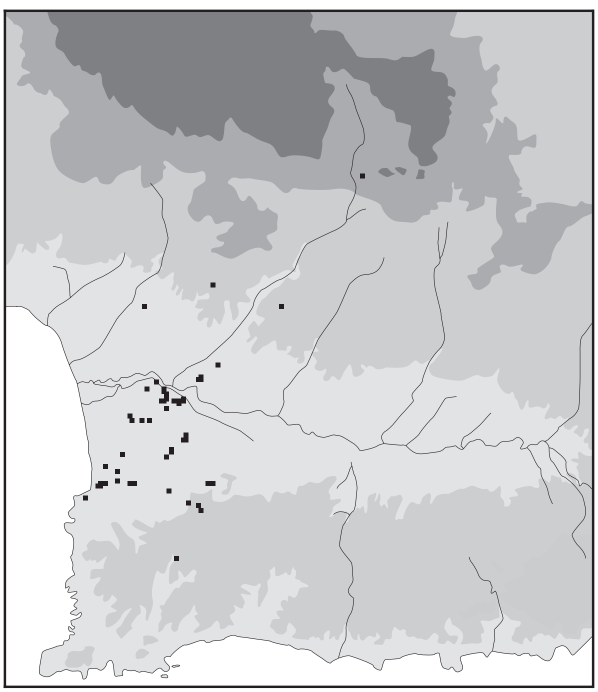
Figure B.4. Occurrence of asparagus *(Asparagus)*, helichrysum *(Helichrysum)*, and phagnalon *(Phagnalon)* in the Western Mesara



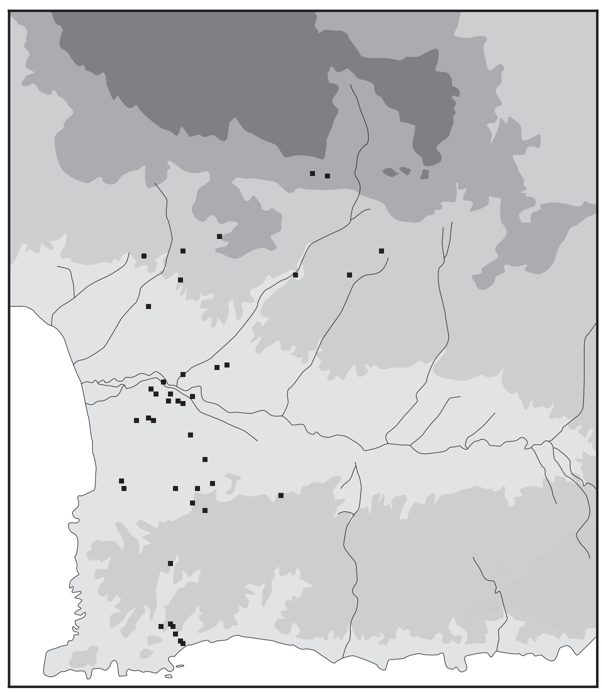
Locations of 152 vegetation survey sites in the Western Mesara.



Occurrence of *Teucrium* spp. at sites in the Western Mesara.

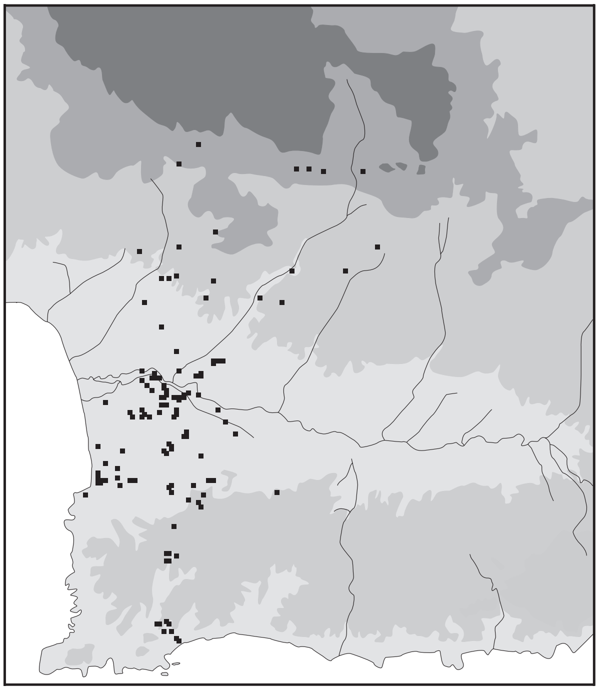


Occurrence of *Thymelaea hirsuta* at sites in the Western Mesara.

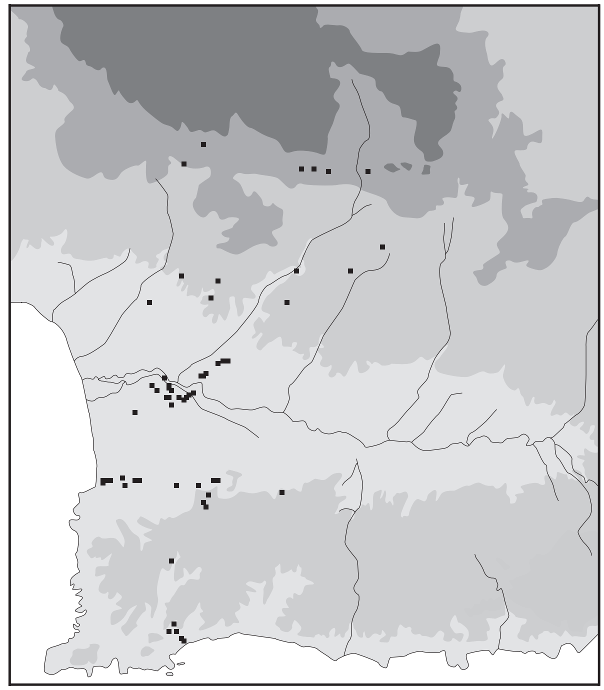


Occurrence of wild *Olea europaea* subsp. *oleaster* at sites in the Western Mesara.

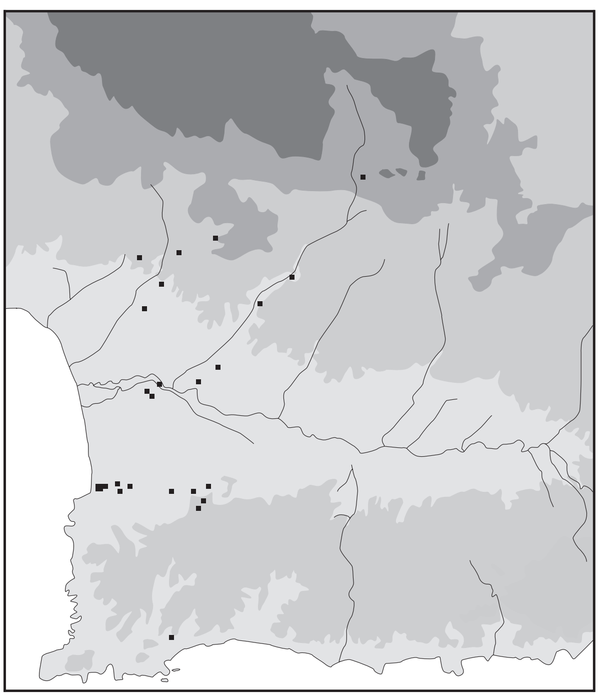
FIGURE B.5. Occurrence of germander *(Teucrium)*, thymela *(Thymelaea)*, and olive *(Olea)* in the Western Mesara



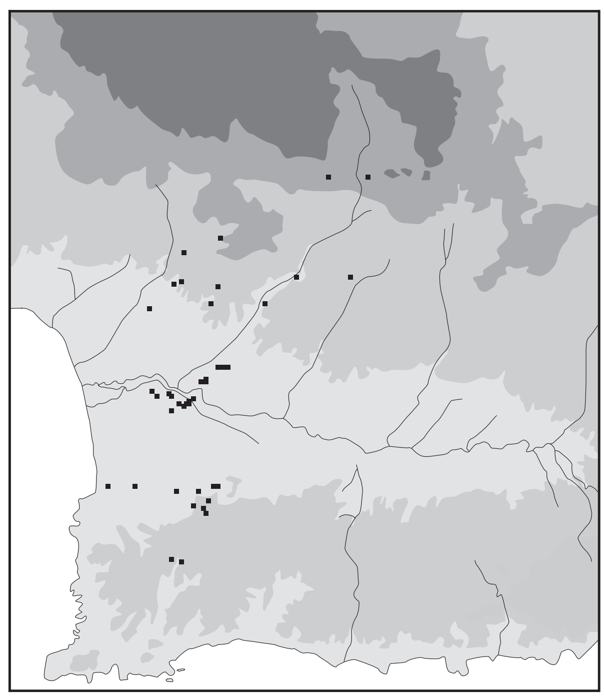
Locations of 152 vegetation survey sites in the Western Mesara.



Occurrence of *Phlomis* spp. at sites in the Western Mesara.

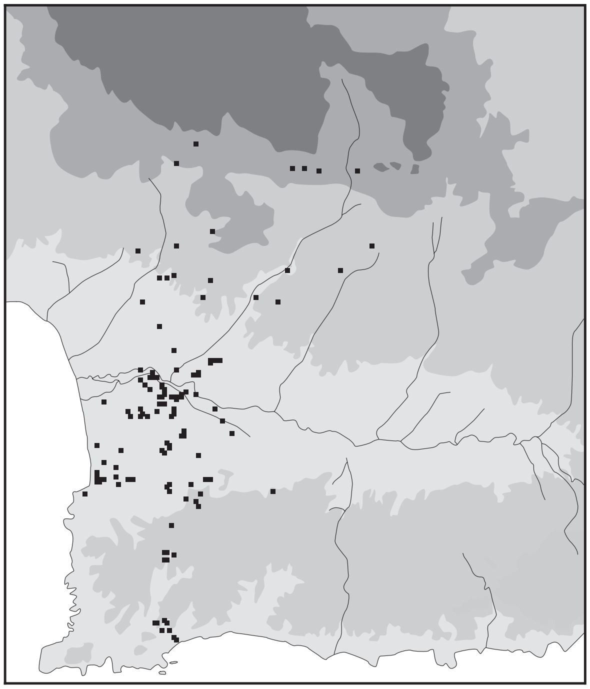


Occurrence of *Prasium majus* at sites in the Western Mesara.

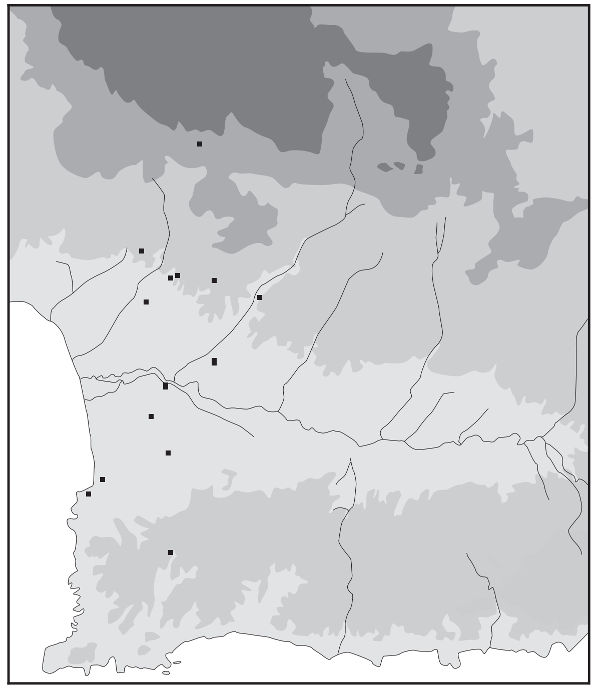


Occurrence of *Salvia* spp. at sites in the Western Mesara.

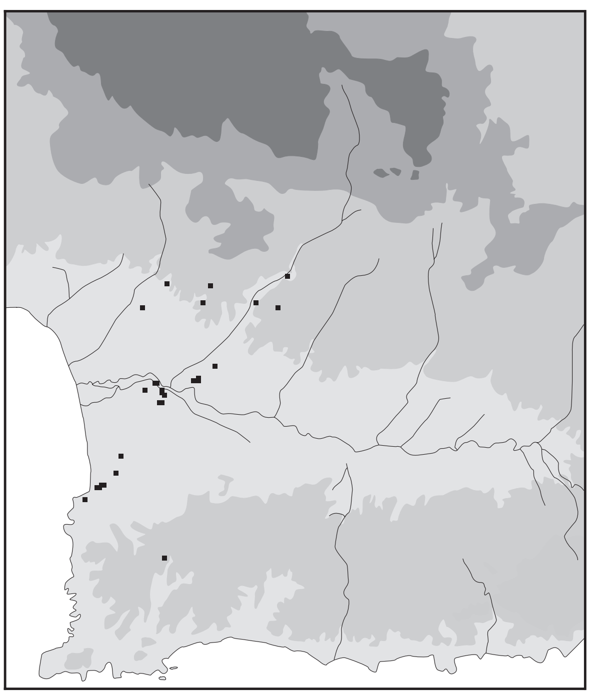
FIGURE B.6. Occurrence of Jerusalem sage *(Phlomis)*, prasium *(Prasium)*, and sage *(Salvia)* in the Western Mesara



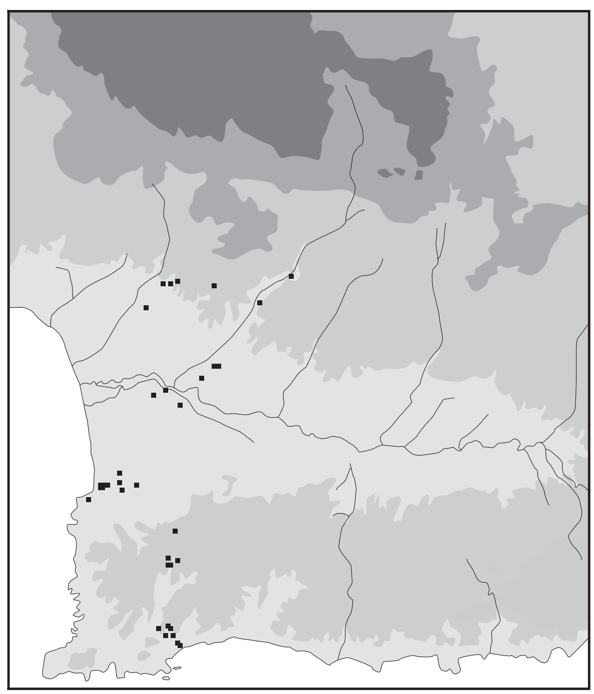
Location of 152 vegetation survey sites in the Western Mesara.



Occurrence of *Ceratonia siliqua* at sites in the Western Mesara.

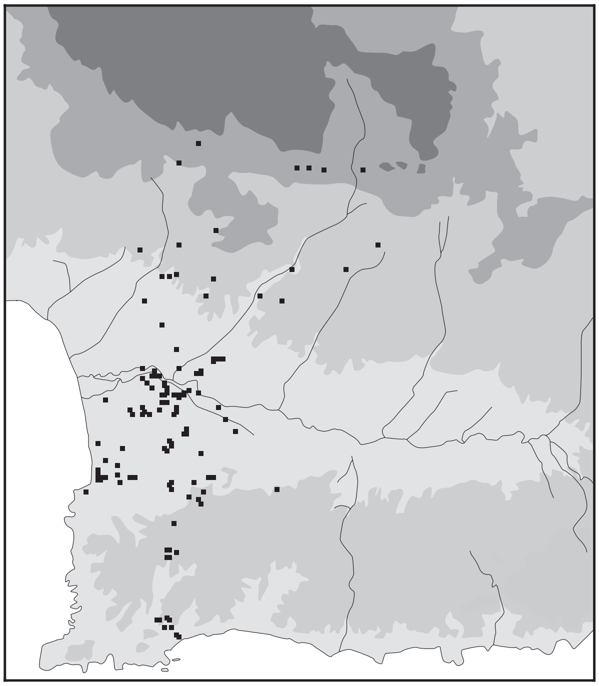


Occurrence of *Ebenus cretica* at sites in the Western Mesara.

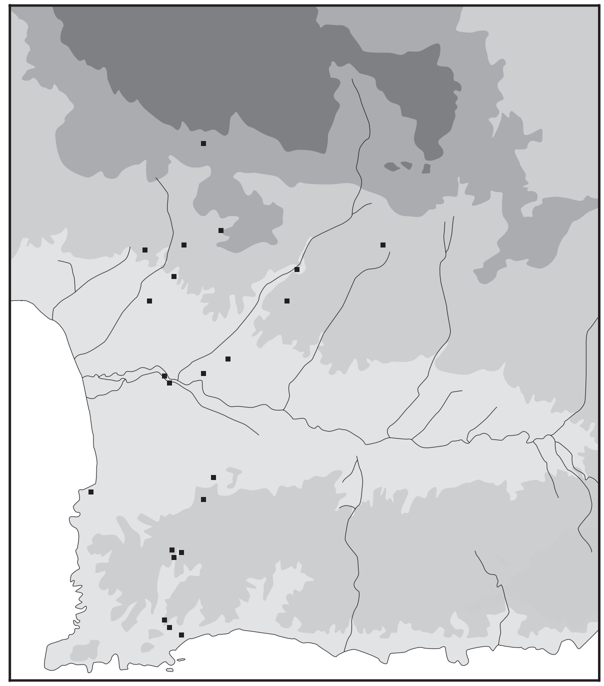


Occurrence of *Pistacia lentiscus* at sites in the Western Mesara.

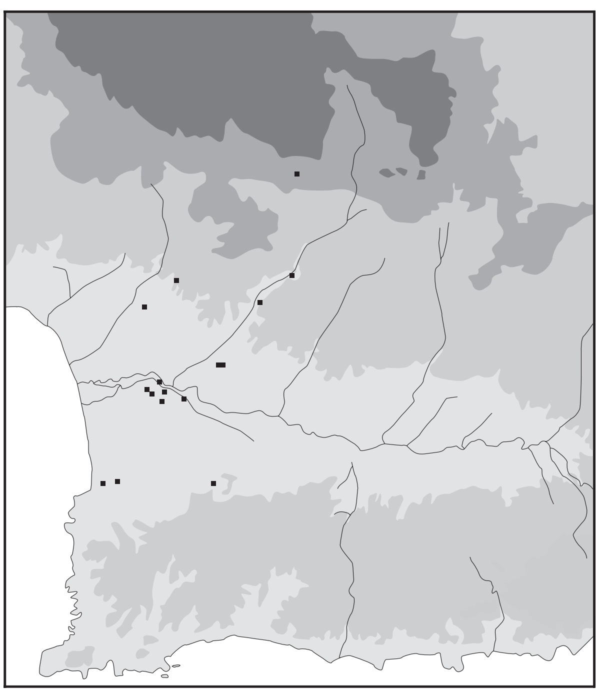
FIGURE B.7. Occurrence of carob *(Ceratonia)*, Cretan ebenus *(Ebenus)*, and lentisc *(Pistacia)* in the Western Mesara



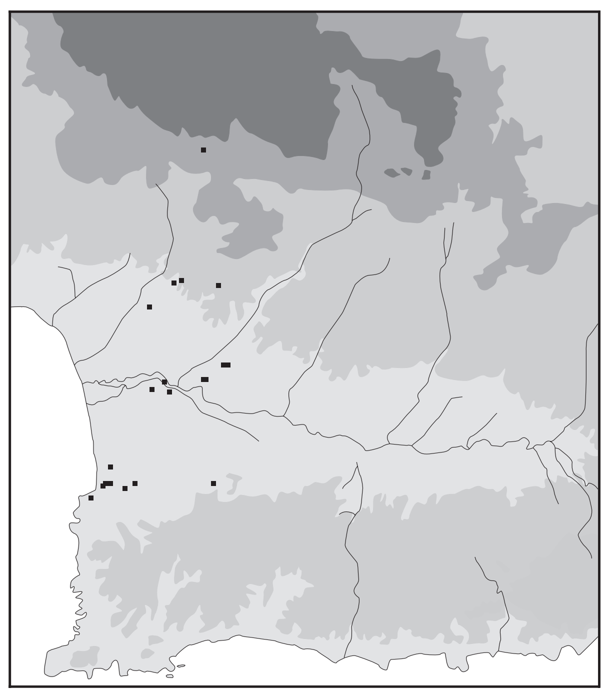
Location of 152 vegetation survey sites in the Western Mesara.



Occurrence of *Cistus* spp. at sites in the Western Mesara.



Occurrence of *Rhamnus lycoides* at sites in the Western Mesara.



Occurrence of *Satureja* spp. at sites in the Western Mesara.

FIGURE B.8. Occurrence of rock rose *(Cistus)*, buckthorn *(Rhamnus)*, and savory *(Satureja)* in the Western Mesara

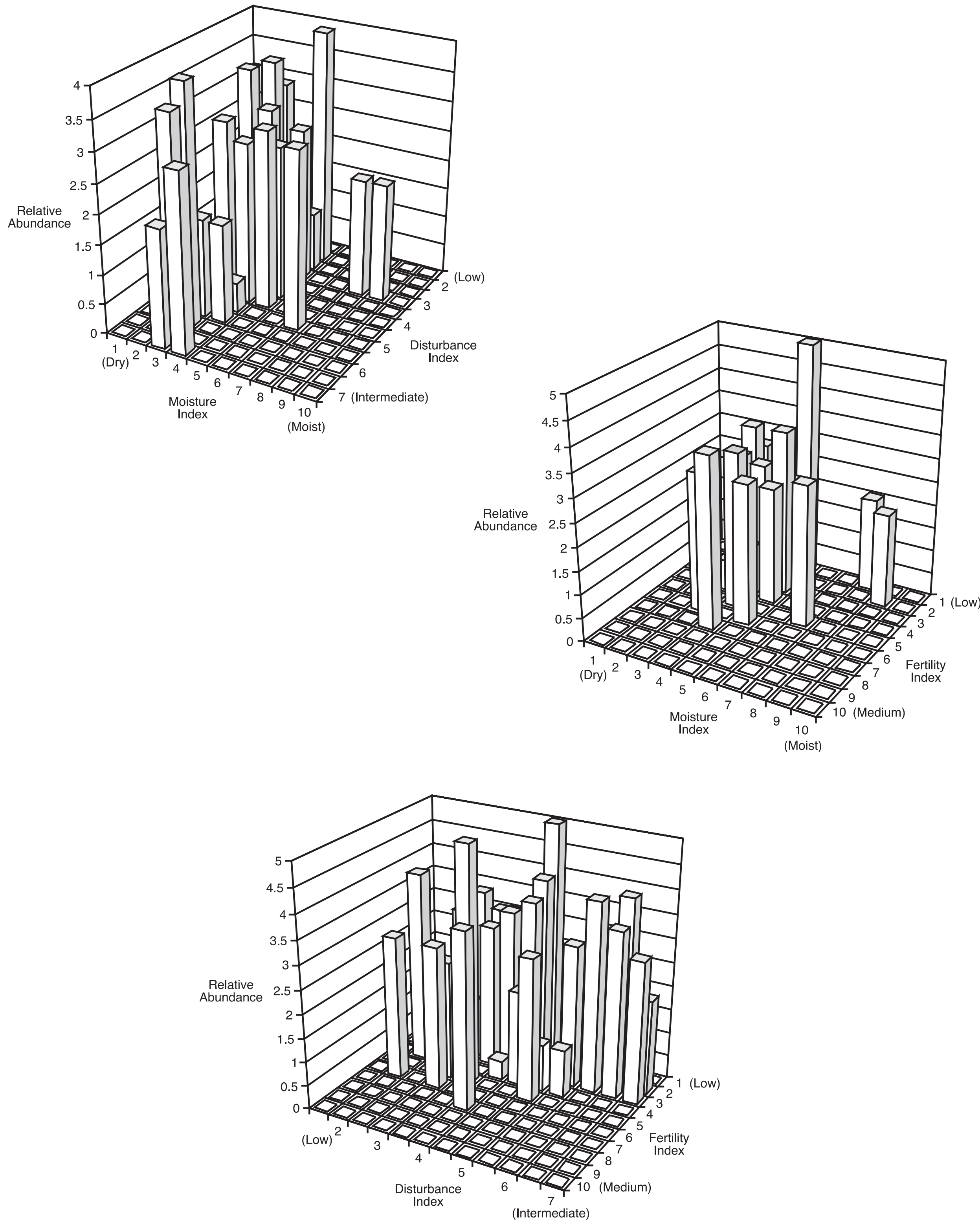


FIGURE B.9. The distribution of thyme *(Thymus)* with respect to soil moisture, soil fertility, and disturbance

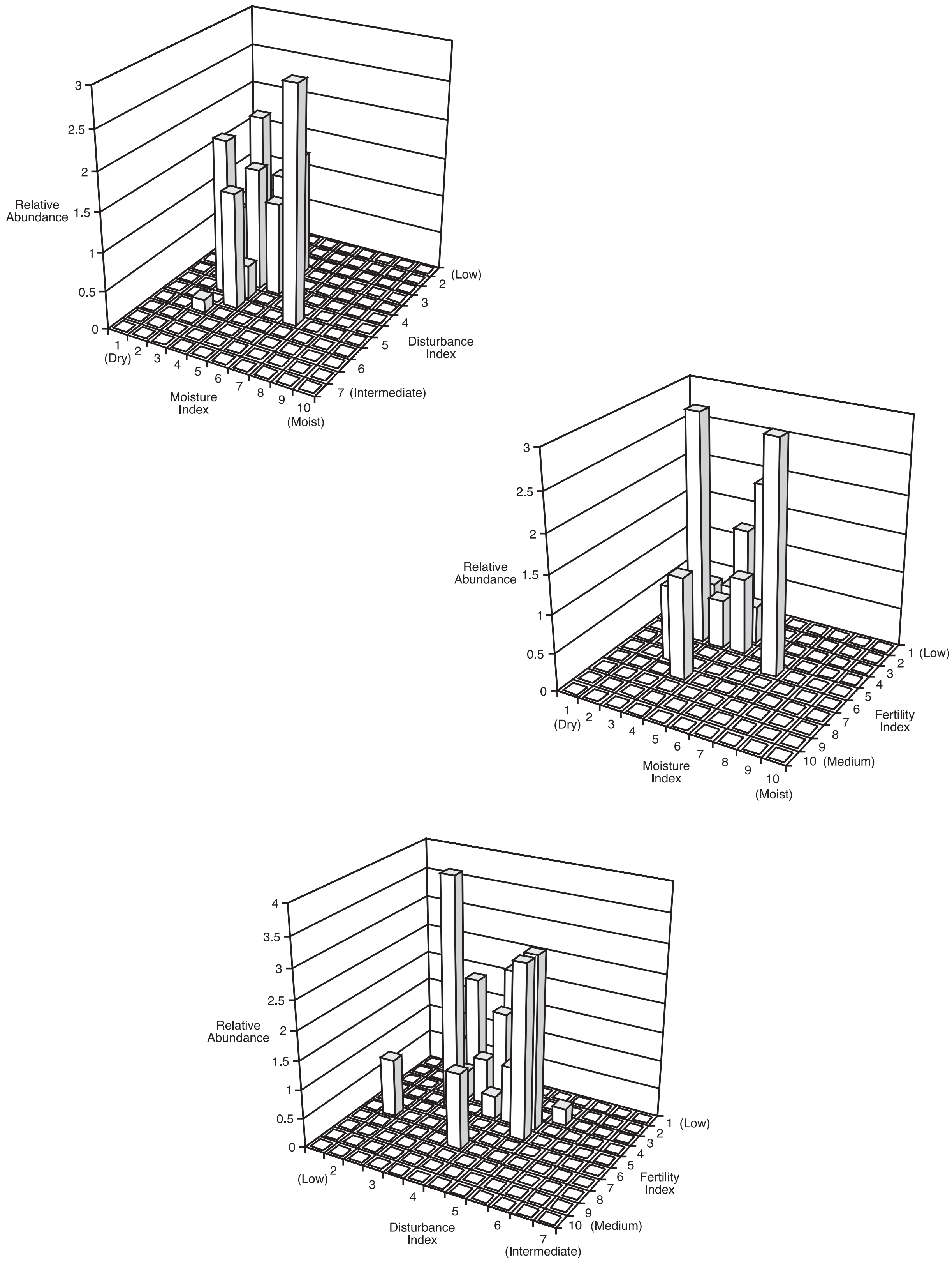


FIGURE B.10. The distribution of Cretan ebenus *(Ebenus)* with respect to soil moisture, soil fertility, and disturbance

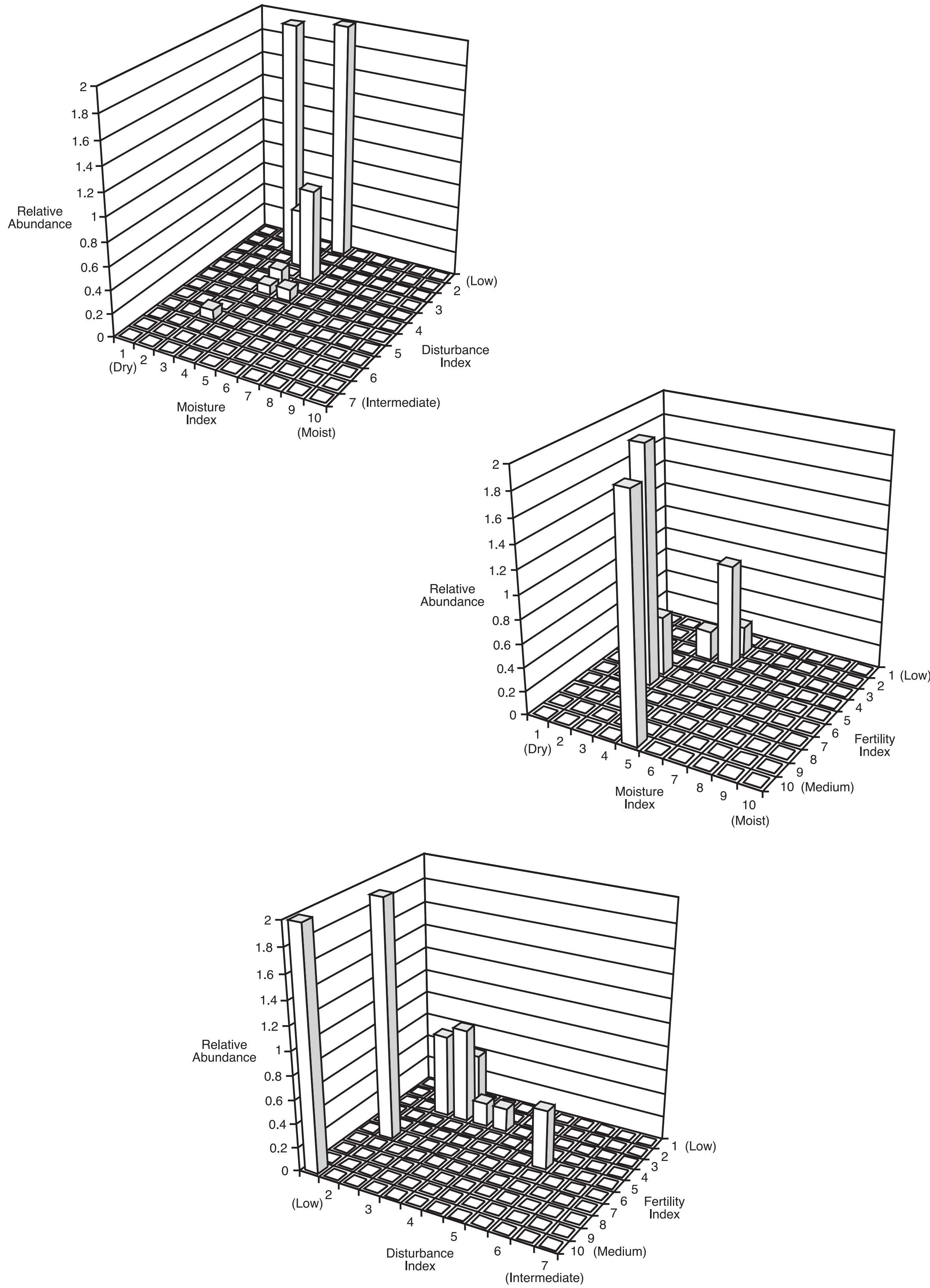


FIGURE B.11. The distribution of carob *(Ceratonia)* with respect to soil moisture, soil fertility, and disturbance

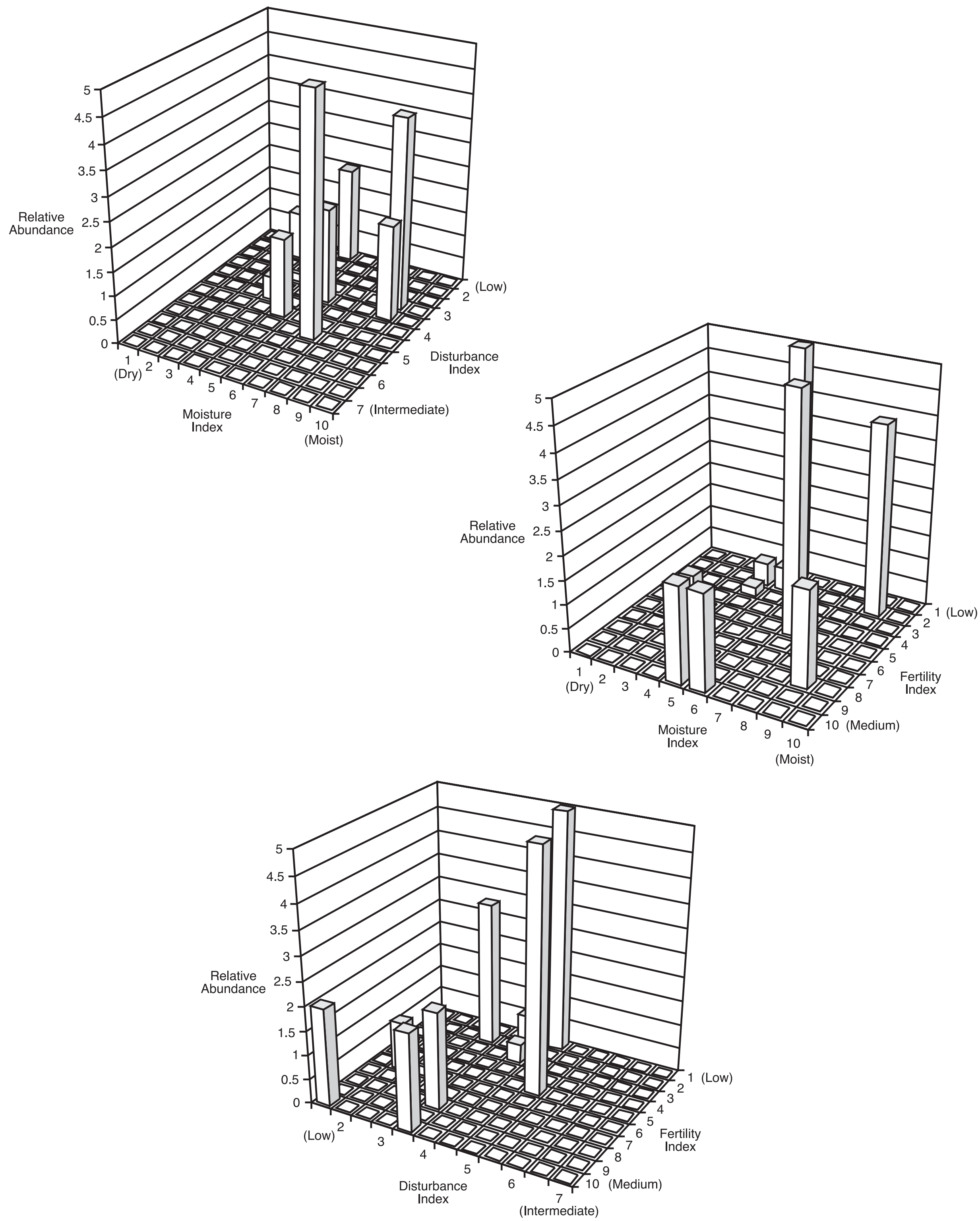


FIGURE B.12. The distribution of rock rose *(Cistus)* in respect to soil moisture, soil fertility, and disturbance

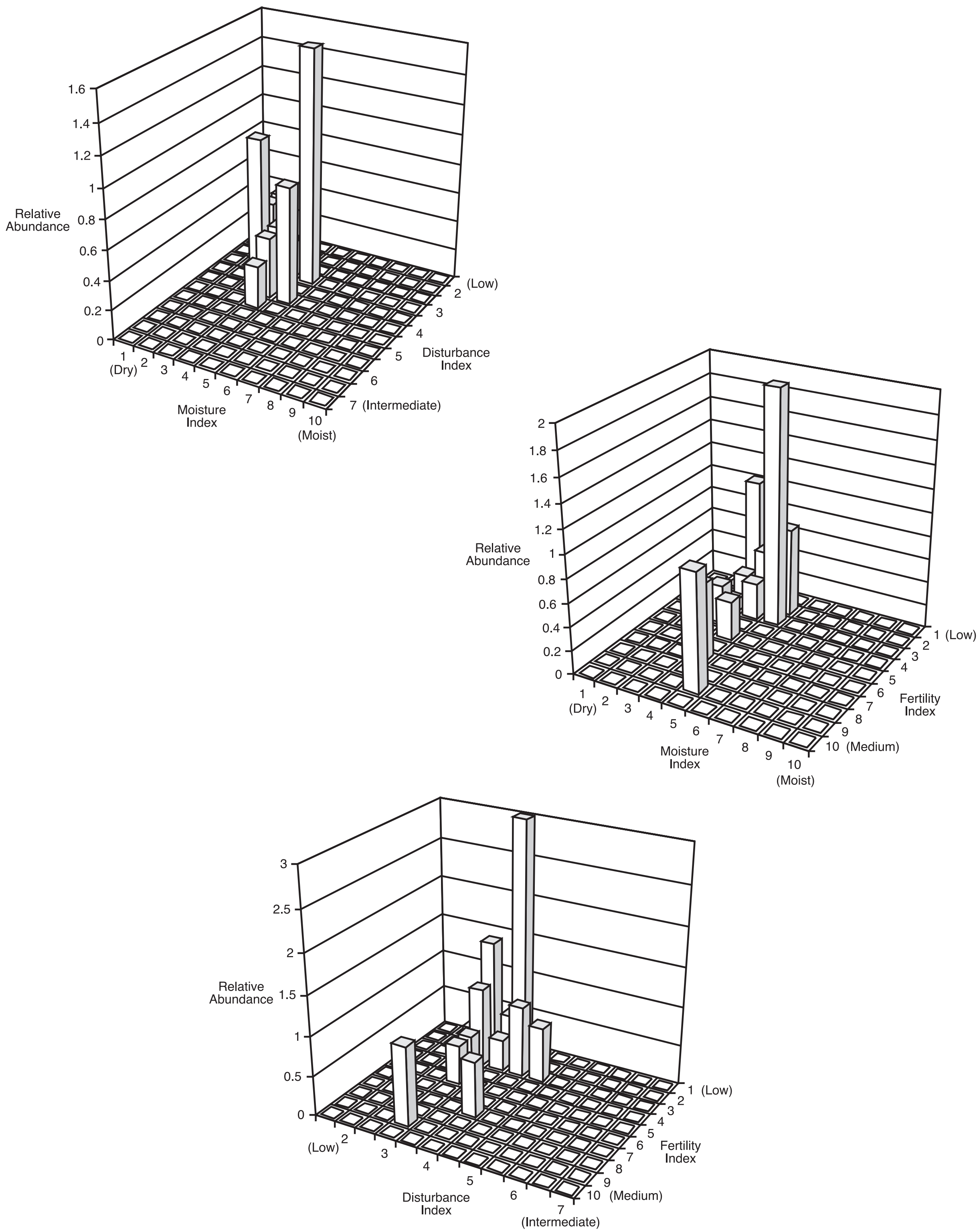


FIGURE B.13. The distribution of savory *(Satureja)* with respect to soil moisture, soil fertility, and disturbance

Appendix C

The Chipped Stone and Ground Stone: Raw Material Sources, Production Sites, and Finds

Harriet Blitzer

Until the late twentieth century, published cultural assemblages from prehistoric Crete were characterized by a relative paucity of chipped and ground stone tools. This is a curious situation in the Aegean, given the extensive record of such finds over the past century in the Greek mainland (see the syntheses in Runnels 1995b, and Rutter 1993; Blitzer 1998) and the Cyclades (Davis 1992). More recently, finds from systematic excavations and surveys throughout Crete have increased our lithic database (Watrous 1995). And yet, even in these carefully assembled collections, chipped stone artifacts of local chert and siliceous limestone—as well as imported obsidian—are a minor quantitative presence (see Knossos, below) and are evidence of a technology still poorly understood. As a result, local and regional lithic traditions in Crete are currently difficult to identify in both the Neolithic and Bronze Age periods. Ground stone is gradually becoming better known (for example, Evely 1993–2001; Blitzer 1995), with some persistent Bronze Age ground stone traditions evident as early as the Late Neolithic period at excavated Cretan sites.

Chipped Stone

In the Early Neolithic period, during which not only Knossos, but a series of cave sites (Lera, Gerani, and others) on the north coast have evidence for the earliest known occupation of the island (Watrous 1995), chipped stone finds consist primarily of imported obsidian. The Knossian lithic assemblages (studied by this writer from 1994 to 1997) demonstrate that in the earliest encampment of Stratum X at Neolithic Knossos (Evans 1964:140–142) the newly arrived settlers had begun to open any remotely siliceous rock in the vicinity in an attempt to locate knappable materials. Among the earliest lithic finds from the Knossos encampment were 27 pieces of obsidian, 5 pieces of chert (Evans 1964:142), and objects of quartzite, not the ideal raw material for percussion flaking, including a single percussion-flaked quartzite cleaver and percussion-struck flakes. In addition, siliceous limonite and siliceous limestone were evident among the cherty rocks preserved in the Stratigraphical Museum at Knossos. In the very next Early Neolithic level of settled occupation at Knossos (Stratum IX), obsidian was the most abundantly used material (115 pieces) with barely any chert finds (7 pieces) preserved from the excavation (Evans 1964:146). A dependence on obsidian can be read into this ratio and given the excellent reportage of this excavation at Knossos it is clear that no chert finds, however undiagnostic, appear to have been missed. Evans noted dark red, green, brown, and gray cherts in the deposits, as well as percussion made chips of rock crystal in the later strata (Evans 1964:233). This seeming early dependence on imported obsidian in the manufacture of chipped stone implements appears to extend to the later levels of habitation at Neolithic Knossos. Nonetheless, the total quantity of chipped stone (both obsidian and chert) from the excavation, as already noted by Evans (1964:233) was extremely small.

Years of local field observation on Crete indicate that overall, in contrast with the Greek mainland (see Blitzer 1998), Crete is not a chert-rich environment. Deposits of nodular, laminar, and bedded chert are rarely visible on the island and those that do exist are frequently located in heavily eroded secondary or tertiary contexts and are not extensive. The chert raw material is often faulted, brittle, and small-scale in terms of usable piece size and is thus limited in workability as well as spatial distribution island-wide. The coarse physical qualities of this local chert in Crete (worked pieces are frequently hard to identify) and the lack of diagnostic features known from the contemporary technology of mainland Greece may in fact have influenced the recognition and successful collection of chipped stone at excavations and surveys throughout the island. Secondary deposits of siliceous stone such as the opaque black chert fragments now ringing the disturbed margins of Lake Kournas in west Crete, clearly representative of locally available raw materials in that region (for example, Moody 1987) do not help us to define Cretan lithic traditions through time or place.

Thus, the chipped stone collected during the Western Mesara Survey (roughly 1,120 pieces, of which 26 were obsidian) dating from the Late Neolithic/Early Minoan I period through the twentieth century A.D (plates C.1–C.8; figures C.1–C.20) provides an unusual opportunity to establish the identity of some regional chipped stone forms as early as the Late Neolithic period (figure C.1). An unexpected benefit of the Mesara survey was the discovery of two sites, site **34**, near the village of Sivas (plate C.6; figures C.10–C.15) and site **65**, near the village of Kamilari (plates C.1–C.5; figures C.3–C.9), which had been used extensively in antiquity as siliceous stone sources and knapping sites for the production of chipped stone implements and, in the case of site **65**, as a Late Neolithic/EM I habitation site as well. These two sites, along with an intermittent deposit of laminar chert lenses found in sedimentary layers on coastal hillslopes near the excavated site of Kommos (see Blitzer 1995), appear to have supplied all of the raw materials for the ancient chert implements recovered during the survey. In contrast, twentieth-century threshing-sledge elements, the uniformly identifiable chert and functional morphology of which differed substantially from any ancient Mesara raw material types, were imported from outside of Crete (see "Sources of Nineteenth- and Twentieth-Century Threshing-Sledge Elements," below) and were only occasionally supplemented during the last century by the use of local chert raw materials as replacement flakes.

As a source for siliceous stone, the bottomland of the Mesara is nothing more than a vast repository for unworked rock raw materials that have eroded from slopes and hills along the margins of the plain and in many cases have been transported by watercourses feeding into and through the plain to the pebble/cobble deposits of the Libyan Gulf coastline (see chapter 4). Likewise, stray finds of worked chert and obsidian were found in fields throughout the entire survey area as a natural component of colluviation, alluviation, and human redistribution of soils through time. Ground stone implements of various types, most commonly in fragmentary form, were also found at sites (e.g., site **65**) of all dates and as stray finds throughout fields (plate C.8; figure C.20). With the exception of imported obsidian (figure C.16), which occurred infrequently among the survey finds, and several other raw materials (e.g. chlorite) used in the manufacture of stone bowls (of which only fragments were found) the rock types used in the manufacture of ancient chipped and ground stone objects recovered during the survey are entirely from the Western Mesara region and the sources of most of them have been identified (see Blitzer 1995 for a full description of rock sources and useful rock types in the Western Mesara).

THE CHERT RAW MATERIALS

Various types of chert and a homogenous variety of siliceous limestone were employed in the manufacture of chipped stone implements in the ancient Mesara. The three primary sources for chert and siliceous limestone are identified here with the caveat that useful stray cobbles and chunks of chert could in antiquity, as now, be recovered from erosional deposits throughout the plain.

Source 1: The Miocene/Pliocene Marls Identified at Site 65

The marls of the Western Mesara region are rich in chert pebbles and cobbles (see chapter 2) many of which continue to erode from these bedrock deposits as the landscape is more severely disturbed via deep plowing with five- to six-foot-high plow blades, bulldozing, and resulting erosion. As an example, at site **65**, a Late Neolithic/Early Minoan I knapping and habitation site located directly on a chert source (plates C.1–C.5; figures C.1, C.3–C.9) the chert pebbles and cobbles of irregular sizes and shapes are imbedded in and eroding out of the marl. The chert itself is characterized by two broadly defined color types, which, in some samples, blend into one another: a dark red-brown ranging from Munsell 2.5 YR 3/6 red to 10R 3/4 dusky red, and a gray-blue-green ranging from 5G 5/1 to 5G 6/1with dark grayish brown to dark grayish green examples representing the blending of these two color groups (plate C.1).

All of the chert from these marls is opaque, dull to slightly glimmering in luster, and marked by extensive joint planes, substantial healed fractures with lime or quartz infilling, and crazing, a fine network of fractures both healed and unhealed. Some of the chert cobbles have a cortex that includes limey material similar to the marl matrix, but many of them are simply composed of a coarser, heavily fractured and battered crypto-crystalline material on their exteriors. These cherts are not nodular in origin, and, based on the sizes and morphology of the cobbles and pebbles, appear to have occurred initially as chunks and fragments eroded from a heavily indurated and fractured bedded source. Examples of an extremely homogenous off-white siliceous limestone also occur more rarely in these deposits, and this material alone among the Mesara rock types is characterized by the workability and fluid response to force of fine-grained cherts found elsewhere in the Aegean. All of these marl cherts are extremely tough and resistant to force, and the artifacts recovered from sites such as **65** reflect the difficulties encountered by Mesara knappers in consistently deriving percussion flakes of uniform sizes from multidirectional cores. Percussion flake manufacture was consistently stymied by the resistant character of these cherts, and in only a few less-faulted examples is it possible to identify successful production of flakes which are uniformly thick and fairly wide in dimension.

As worked chert pieces resembling the examples from site **65** were found at sites and in fields throughout the survey area, it is clear that this particular exposure of cobble-filled marls, as well as others throughout the Western Mesara, supplied the raw materials for chipped stone implements in various periods of antiquity. Threshing sledges recorded as part of the ethnographic study during the survey (see chapter 6) occasionally bear replacement blades that were made by the farmers themselves of similar marl cherts.

Source 2: The Eroded Bedded Chert at Site 34

South of the village of Sivas, in a heavily disturbed area of bedded chert eroding out of slope faces, the survey identified an ancient chert source/knapping site with no associated ceramics or other artifacts to provide any guidelines for dating (plate C.6; figures C.10–C.15). Given that the lithic history of prehistoric Cretan culture is poorly known at this point, with primarily the stratified finds at Neolithic Knossos (and these are primarily obsidian) as a guide, the chipped stone from this site was examined in comparison with site **65** Late Neolithic/Early Minoan I, and in a later study session, with comparable chipped stone from the recent Gournia Survey (see Watrous and Blitzer 1999). At site **34** are objects comparable in technology to those at site **65**, as well as an array of less diagnostic finds that could be Bronze Age or later in date. The opaque dark red-brown chert of this disturbed bedded deposit is characterized by thick rectilinear chunks and blocks of cobble- and pebble-size rock that reflect the joint planes, faulting, and eroded surfaces of the original bedded structure (for example, figure C.10). The chert itself is dull to glimmering in luster, resistant to force, and ranges from brittle to fairly workable. Larger workable pieces of chert seem to have been available more frequently at this site than at site **65**. As with the faulted material at site **65**, the difficulty of removing flakes from these pieces required that the knapper use these obstructions to advantage, thus resulting in production adaptations that repeat the tool morphology visible at site **65**.

The dark-red chert of this source occurs among finds throughout the survey area, both as worked and unworked examples. It is clear that this raw material was utilized throughout antiquity in a variety of periods. In addition, this type of chert was employed for replacement blades on the bases of twentieth-century threshing sledges, in crudely manufactured pieces that are not uniform in size or shape.

Source 3: The Chert Lenses of the Libyan Gulf Coastline near Kommos.

As described in Blitzer 1995, a tough, translucent to opaque form of off-white to yellow chert was interbedded with sandy to pebbly limestone layers in the Vigles slopes near the Bronze Age coastal site of Kommos. Worked examples of this material were found both at sites and as stray finds during the survey. This is an infrequently occurring material among the cultural finds of the survey and was clearly employed only rarely as individual chert lenses eroded out of (or were dug out of) the coastal slopes.

Sources of Nineteenth- and Twentieth-Century Threshing-Sledge Elements

Imported chert used for threshing sledges in the period before World War II consisted primarily of an opaque white granular to crystalline chert type (figure C.1) that was most commonly shipped, already struck into long, thick blades, in burlap sacks (containing roughly one kilo of chert blades per sack) to tool shops and woodworkers (threshing-sledge makers) in Herakleion and secondarily to craftsmen and vendors in the market town of Moires. A number of elderly farmers recall the source of these threshing-sledge elements as Anatolia, and indeed the major producers of threshing-sledge blades in the late nineteenth and the first half of the twentieth century were located in villages on the Anatolian west coast (Bordaz 1965, 1969). Other varieties of chert threshing-sledge elements, including a golden yellow to brown translucent to opaque type, were also imported to the island of Crete from off-island sources identified only generally as the northern Aegean or the Thessaloniki area. All elderly farmers agreed that the sacks of blades were worked into their final shapes (blades and finished flakes visible in figure C.1) by local threshing-sledge makers and were driven into the sledges with a wooden mallet. This same application technique was employed when missing elements were replaced with crudely fashioned local chert fragments by the farmers themselves.

The Importation of Obsidian

Twenty-six bits and pieces of obsidian (17 blade segments and 9 percussion-struck flakes) were recovered during the survey, most of these in very poor shape as a result of soil disturbance and displacement, and all of them extremely small in scale (18 examples are visible in figure C.16). It is clear (Blitzer 1995:488–496) that the obsidian (Melian and otherwise) reaching the Mesara from suppliers in the Aegean was minimal beginning in the Late Neolithic period and continued to be limited, in contrast with the scale of obsidian use evident elsewhere in the eastern Mediterranean (Blitzer 1998:271–283) throughout the Bronze Age. The obsidian itself is gray to black, semitranslucent to almost opaque, and in some cases has flow-lines. It is brittle, in extremely poor condition, and bears signs of a limelike cortex on some flakes. As at site **65** (LN/EM I) where 171 worked chert pieces (plates C.1–C.4; figures C.3–C.9) were found and only one piece of obsidian, the ratio of recovered chert to obsidian throughout the Mesara survey area is equally extreme. This ratio exists in significant contrast with the lithic evidence from soundings at Late Neolithic Phaistos (Vagnetti 1975:15–38, 92), where obsidian was the most common siliceous raw material recovered (described by Vagnetti as "numerous" in both blade and flake form) and a "blue-green chert" of the type originating at the site **65** chert source was more rarely encountered (described as "used in small amounts") in the form of flakes. The chert-to-obsidian ratio at Phaistos

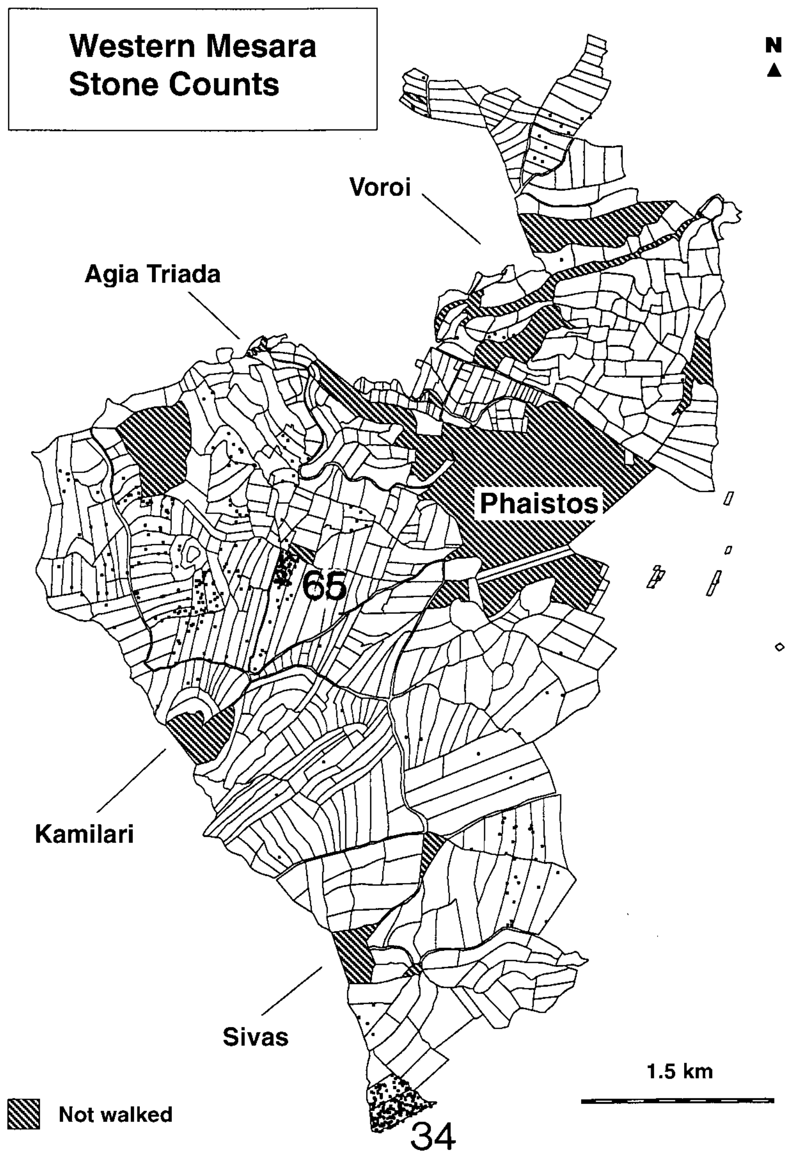


FIGURE C.1. Western Mesara stone counts

suggests that beginning in the Late Neolithic period, obsidian was coming into the Mesara via the center at Phaistos and from there was distributed in restricted amounts to other smaller sites (e.g., site **65**) in the locale.

CHIPPED STONE TOOL TYPES FROM THE MESARA SURVEY

Implements and debris of chert (1 through 4 below) and obsidian (5) recovered during the Mesara Survey include:

1. Multidirectional flake cores (plate C.2; figures C.3, C.4, C.10). These occur on a wide array of chert chunks from pebble to cobble size. In some cases the percussion made flakes removed from these cores are long and thin, but these are serendipitous morphological results having more to do with the internal faults of the raw material than with an intent to produce blades. The term blade is used in this text only for parallel-sided obsidian blades produced by pressure or indirect percussion. Most commonly, the chert flake

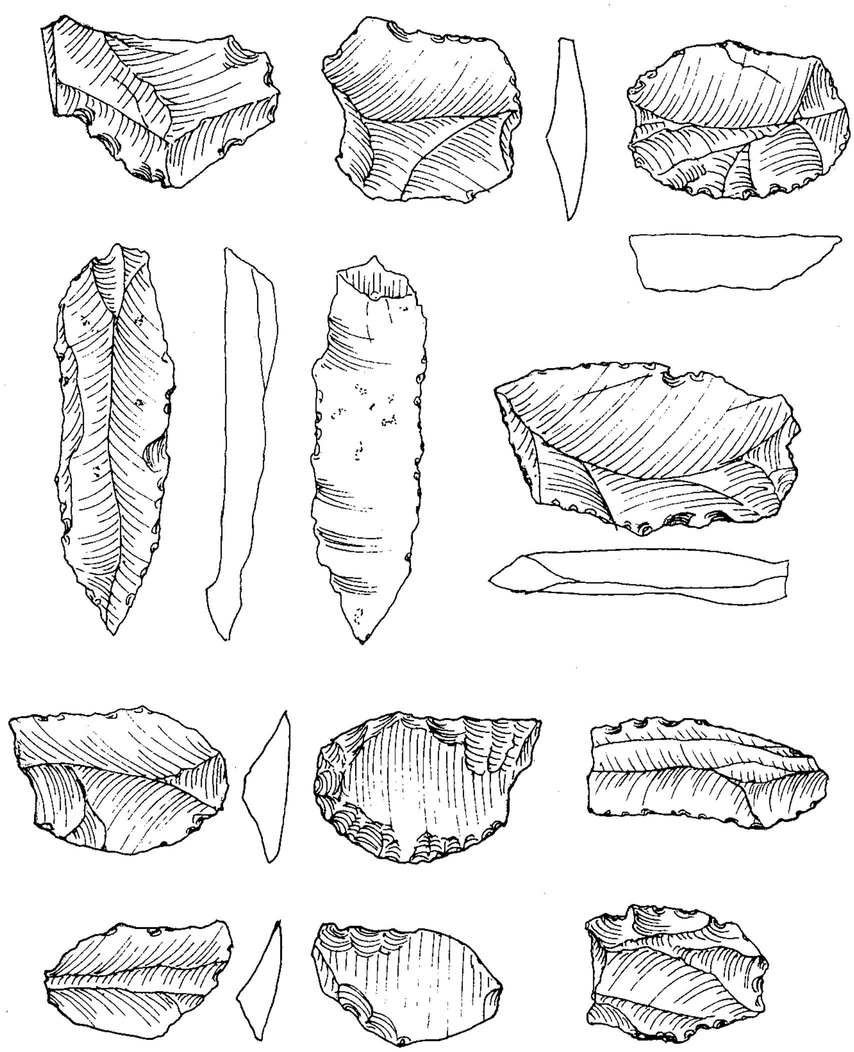


FIGURE C.2. Nineteenth- and twentieth-century threshing sledge elements. Scale 2:3.

scars are thick and broad with little evidence for regularity of dimension. Multidirectional flake cores are found as early as Late Neolithic/Early Minoan I (e.g., at site **65**) and occur at Bronze Age sites as well.

2. Thick to thin percussion struck flakes with truncated ends (some in burin form) and with or without marginal retouch (plate C.3; figures C.5, C.9, C.14, C.15, C.18). These multipurpose cutting, scraping, and gouging tools were found as early as LN/EM I (site **65**) and were well distributed throughout Bronze Age sites and associated fields. One enormous retouched flake of siliceous limestone from site **98** (with occupation beginning in the Late Neolithic period) was also recovered (plate C.7; figure C.19).

3. Small to large thick flakes with notched and nosed ends or notched sides, and percussion retouched margins (plate C.5; figures C.6, C.11, C.17). These are sturdy very thick flakes with deliberate retouch at the notched margins and additional peremptory retouch plus wear throughout on their use edges. Such heavy-duty scraping and gouging implements were found as early as LN/EM I (site **65**) and occurred at and near Bronze Age sites.

4. Small to large percussion struck pointed flakes with sharp angular use ends (for use as piercing implements, gravers, burins) (plate C.4; figures C.7–C.8; C.12–C.13, C.17 second row, left). These objects were found as early as LN/EM I (site **65**) and occurred in Bronze Age contexts.

5. Obsidian blade segments from prismatic blade cores of very small scale (figure C.16) and small percussion made obsidian flakes (figure C.16). Some of these obsidian fragments have a lime cortex (a total of 26 pieces). Most obsidian pieces were found in extremely poor condition throughout the survey area. The blade segments and flakes would have been useful as cutting implements. Any further functional interpretation is delimited by their present condition.

As already noted by Blitzer (1998:271–283) in comparing lithic evidence from the island of Crete in the Bronze Age with that of the mainland and the Cyclades, no points (arrowheads) or denticulated sickle elements, nor any chert pieces with sickle gloss of any kind were recovered in the Mesara survey. Nor was there any evidence for the production of prismatic blades in chert as occurs in the Greek mainland in the Early Bronze Age. These are fundamental differences between Crete and the mainland during the Bronze Age that have implications for agricultural practices as well as for the procurement of food from the wild. These distinctions are valid however, only when evaluated in relation to the availability of copper and bronze tools in each of these regions. The chert implements in the Mesara are all sturdy, for intensive use in scraping, gouging, incising, and cutting. The obsidian is small-scale and useful for cutting. The rural (agricultural) contexts of most of the chipped stone from the Mesara—habitation and field contexts in which we assume there to have been substantial production of grain crops within a subsistence system—require us to ask why agriculturalists in Crete are not using chert sickle elements to harvest their grain as is common on the Greek mainland during the Bronze Age. While it is possible that the harvesting of grain (and/or pulses) in Crete was carried out with the use of obsidian elements in sickles, the other possibilities include the plucking of grain by hand (e.g., Harlan 1967), or, harvest with the use of metal sickles, a hypothesis that cannot at present be supported by evidence from the archaeological record.

Equally, the limited array of tool types in the Mesara (and in Crete) during the Early, Middle, and Late Bronze Ages suggests a more perfunctory attention to chipped stone manufacture as an element of everyday culture than is obvious in the Greek mainland. It is unclear whether the tool types evident at locations such as site **65** continue to be produced with the same vigor after the Middle Minoan I period. Evidence from excavated sites in the Mesara suggests a reduction in chipped stone manufacture after the beginning of the Middle Minoan period (see Blitzer 1995 on limited chipped stone production, primarily obsidian, at Middle through Late Bronze Age Kommos).

In addition to sites **34** (chert source) and **65** (chert source plus LN/EM I habitation), only the following sites produced up to twenty pieces of chipped stone: Site **6** (MM IB–LM); site **7** (LN/EM I–LM III A2); site **9** (MM IB–III); site **16** (EM II–LM III); site **39** (EM I–II); site **66** (MM–LM); site **69** (MM I–II); site **74** (MM I–LM III). For the most part, however, chipped stone finds were recovered as stray finds throughout the survey area. The intensity of chipped stone use evident in the Neolithic and Bronze Age Greek mainland is particularly absent in the Mesara and elsewhere in Crete.

Ground Stone Finds

The ground stone objects recovered in the Mesara Survey (plate C.8; figure C.20) are completely in keeping with the array of implements known from excavated prehistoric sites such as Phaistos and Kommos (Blitzer 1995: passim). The hand tools, including the most common forms also identified at Kommos, and stationary implements such as mortars, fit neatly into the typology of food-processing implements established by Blitzer and are primarily prehistoric in date. Local sandstone, limestone, and quartzite were used in the production of these everyday-use tools found at sites and as stray finds in fields.

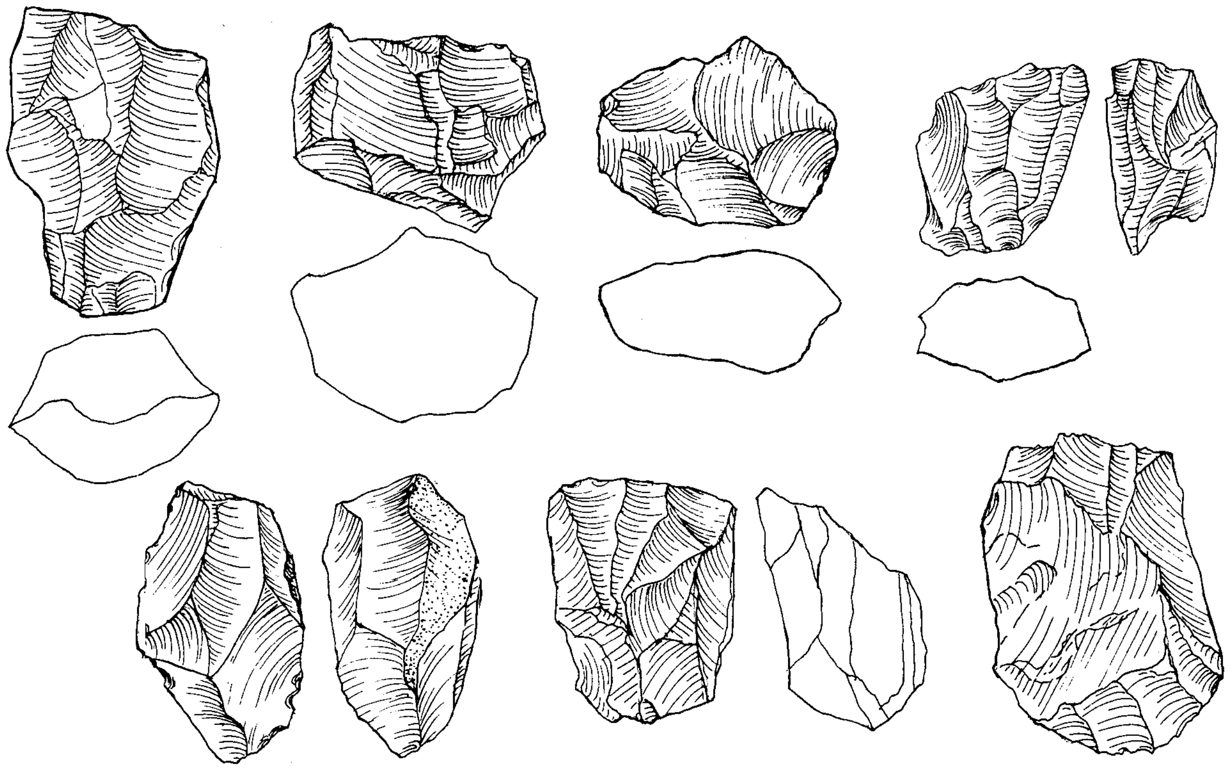


FIGURE C.3. Site 65. Multidirectional chert cores. Scale 2:3.

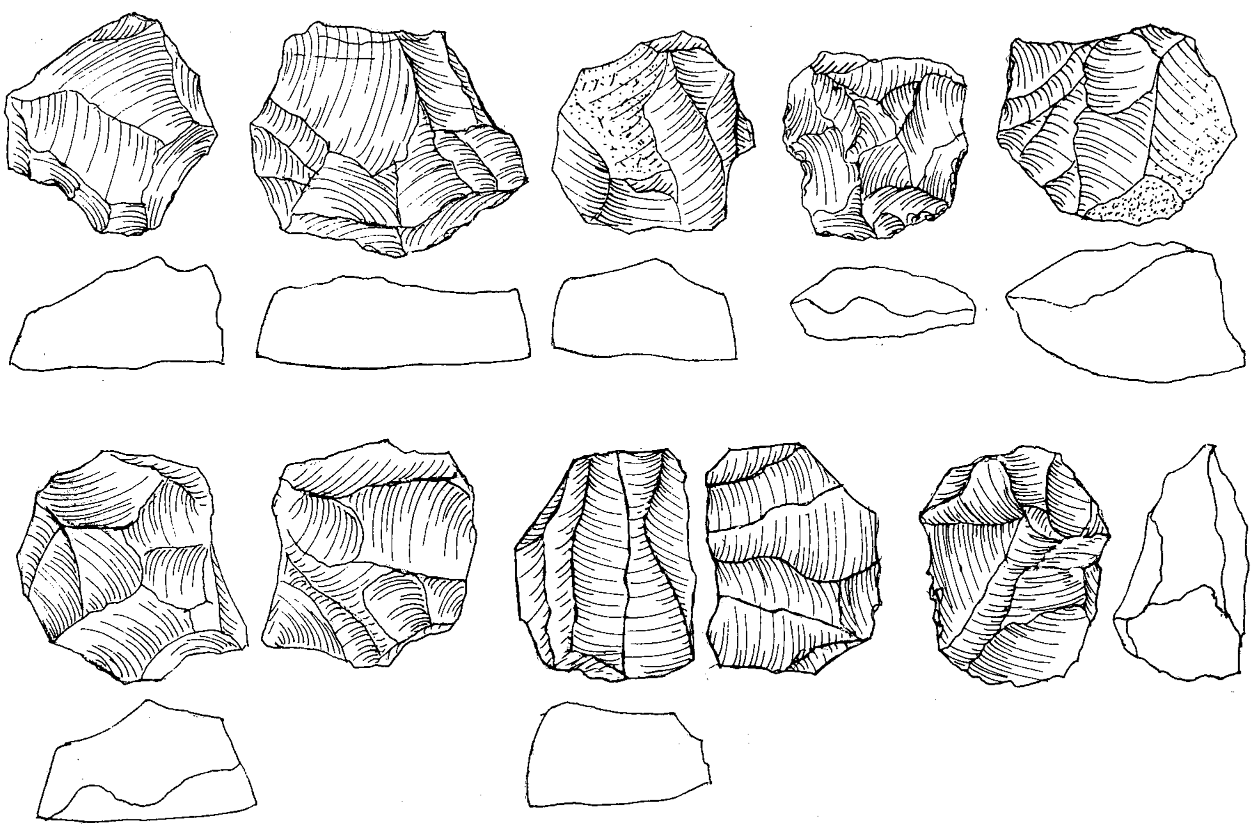


FIGURE C.4. Site 65. Multidirectional chert cores. Scale 2:3.

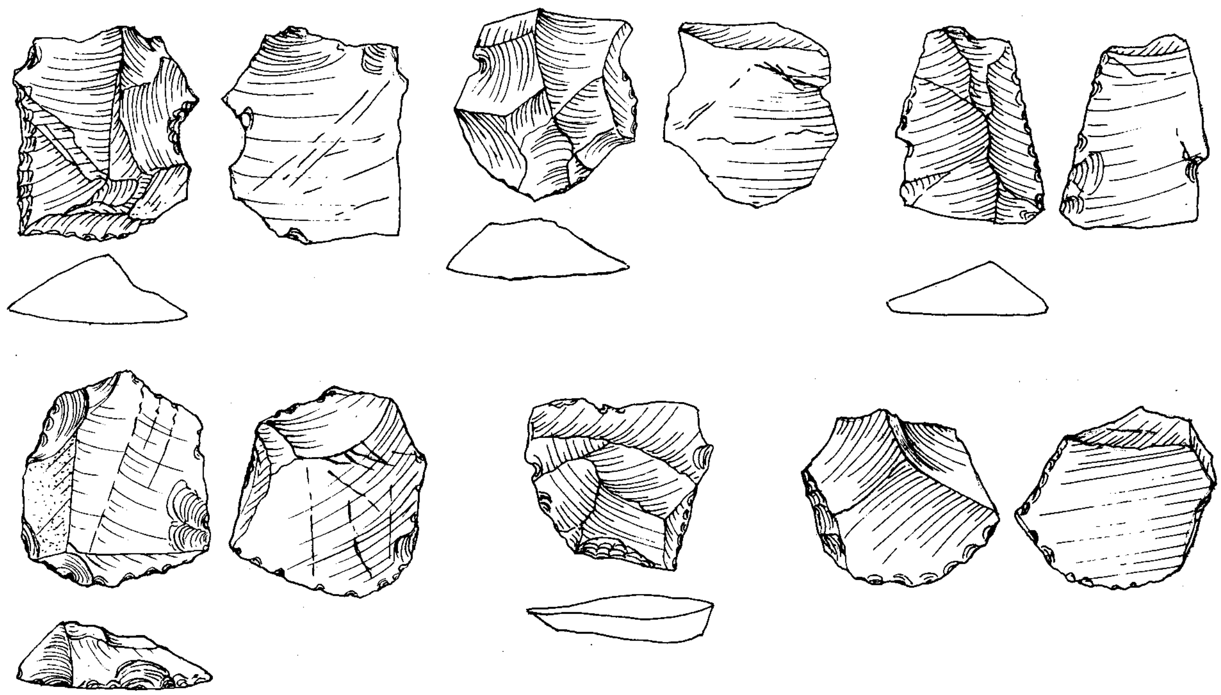


FIGURE C.5. Site 65. Thick to thin chert percussion struck flakes with and without retouch. Scale 2:3.

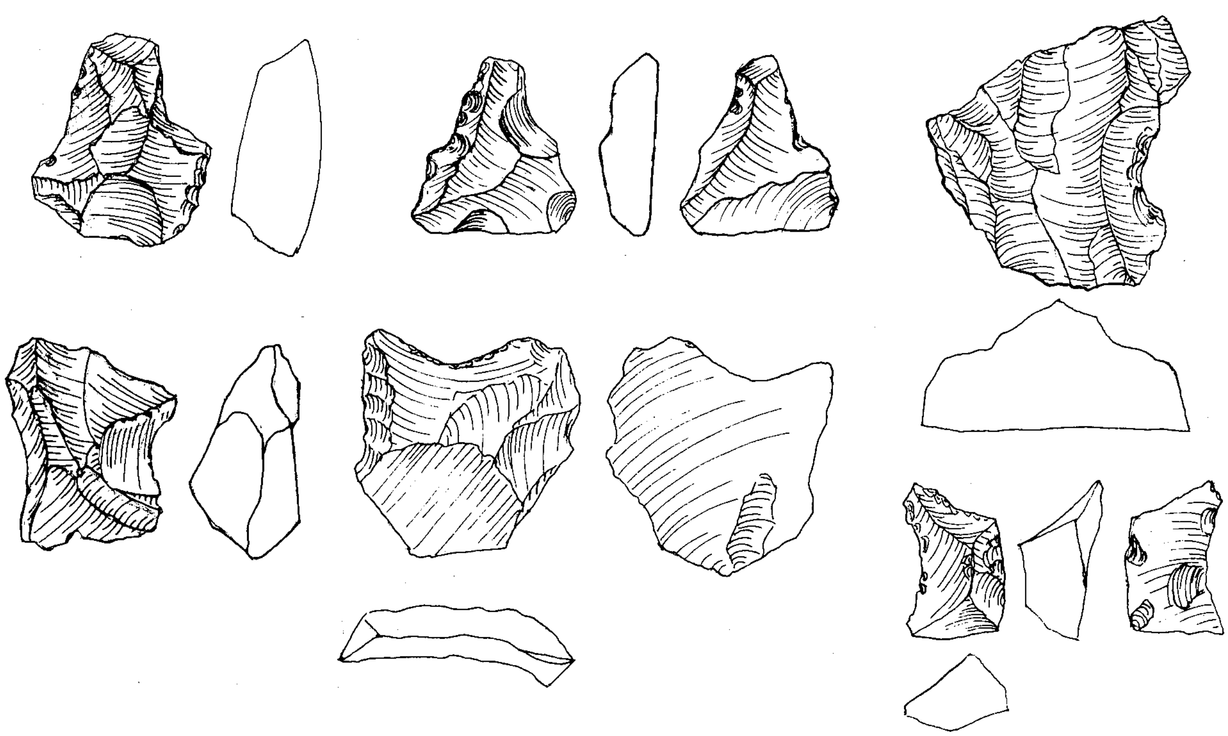


FIGURE C.6. Site 65. Notched and nosed chert flakes. Scale 2:3.

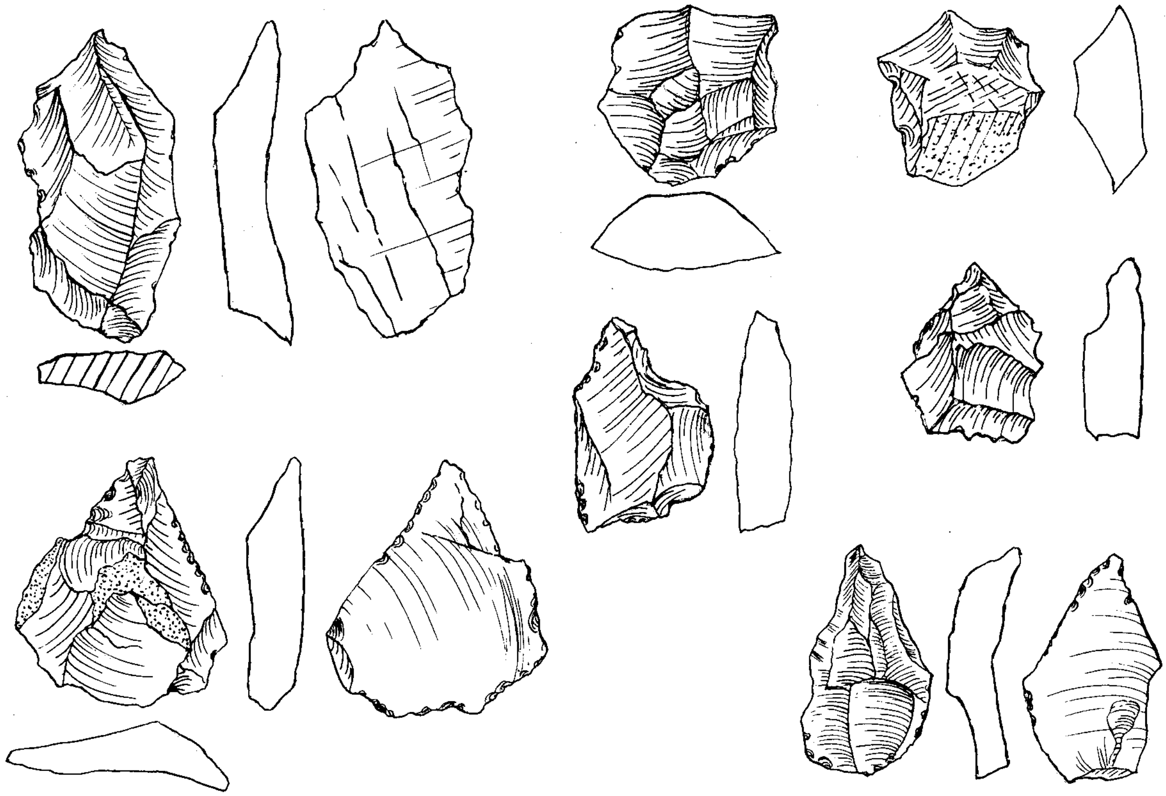


FIGURE C.7. Site 65. Notched and pointed chert flakes. Scale 2:3.

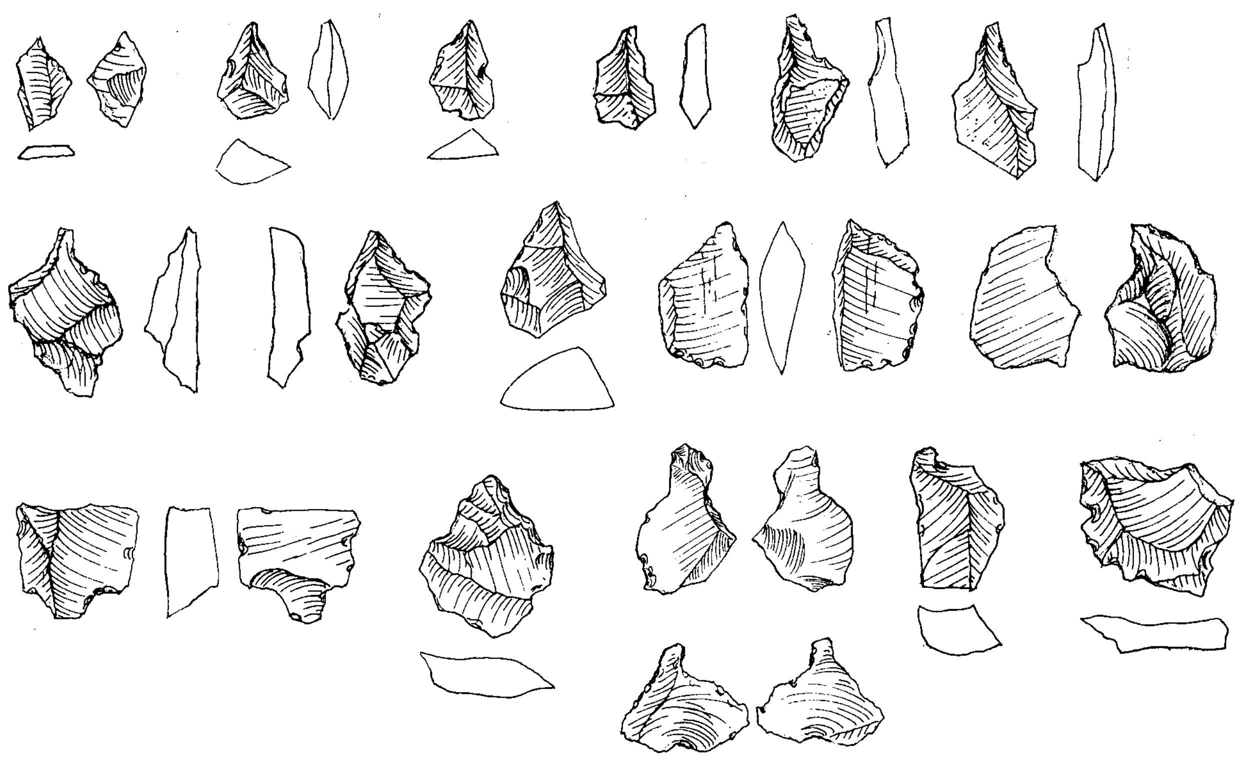


FIGURE C.8. Site 65. Notched and pointed chert flakes. Scale 2:3.

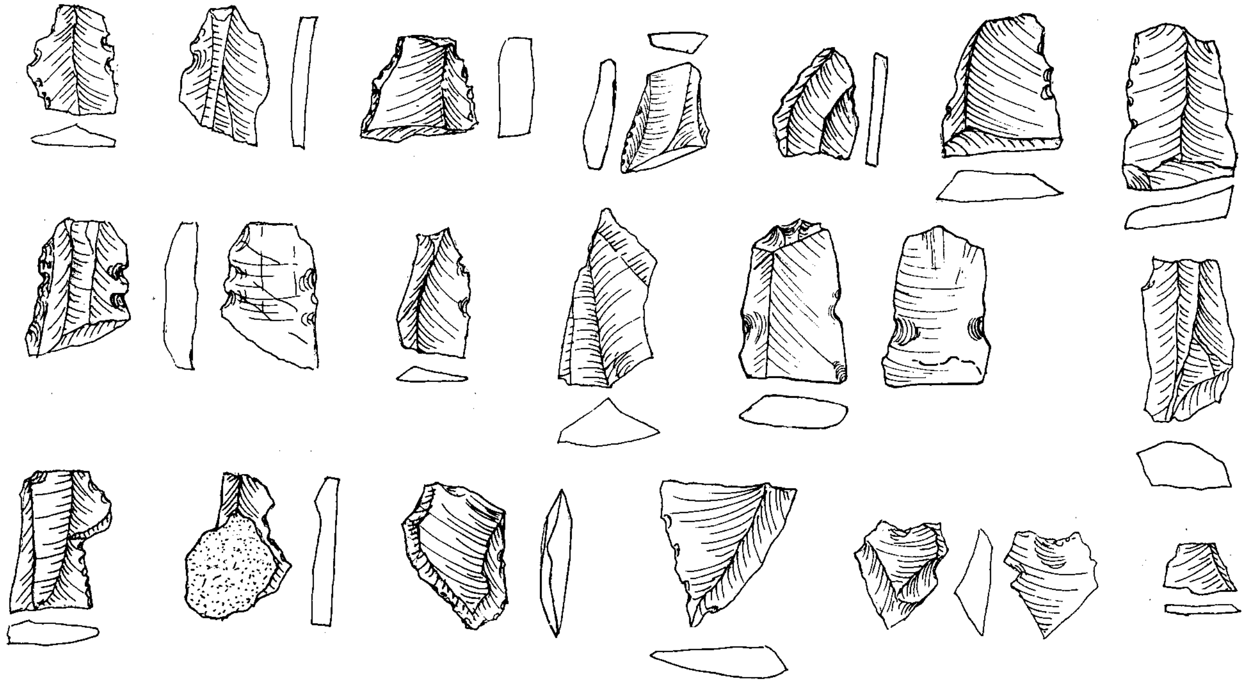


Figure C.9. Site 65. Thick to thin chert percussion struck flakes with and without retouch. Scale 2:3.

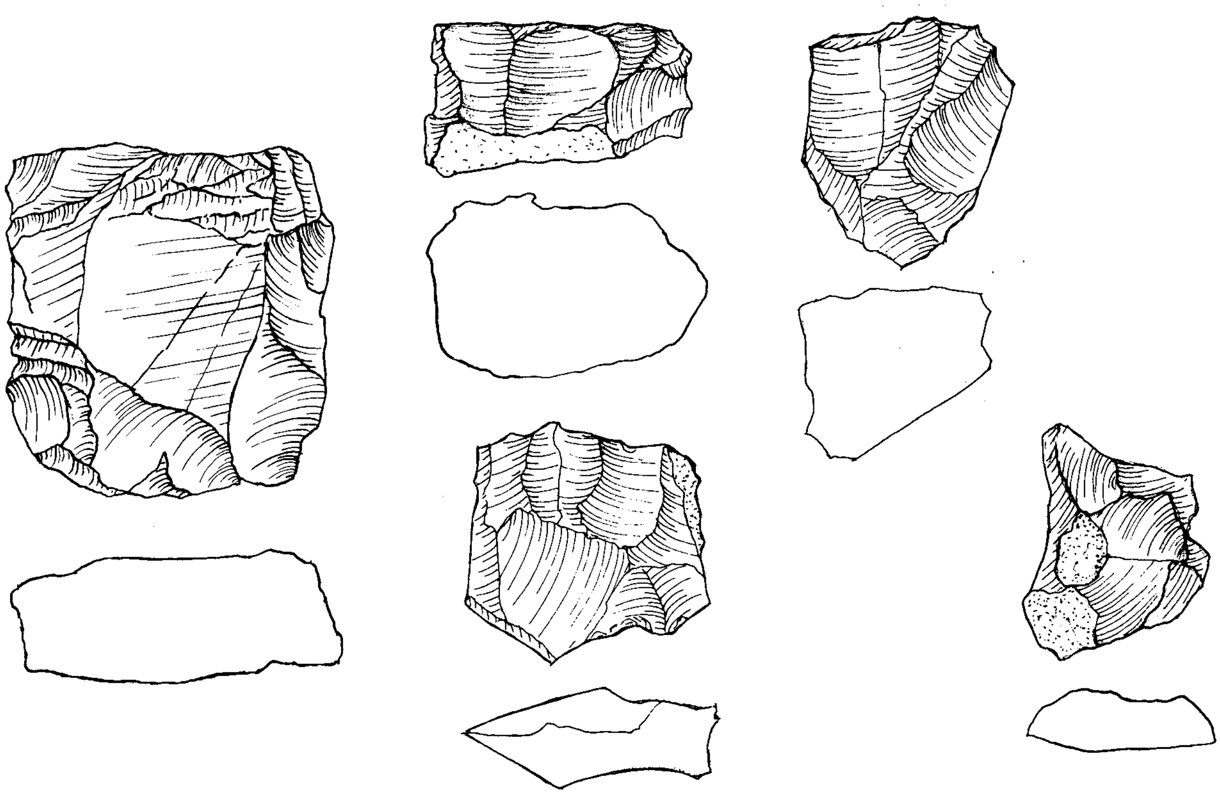


Figure C.10. Multidirectional chert cores. Scale 2:3.

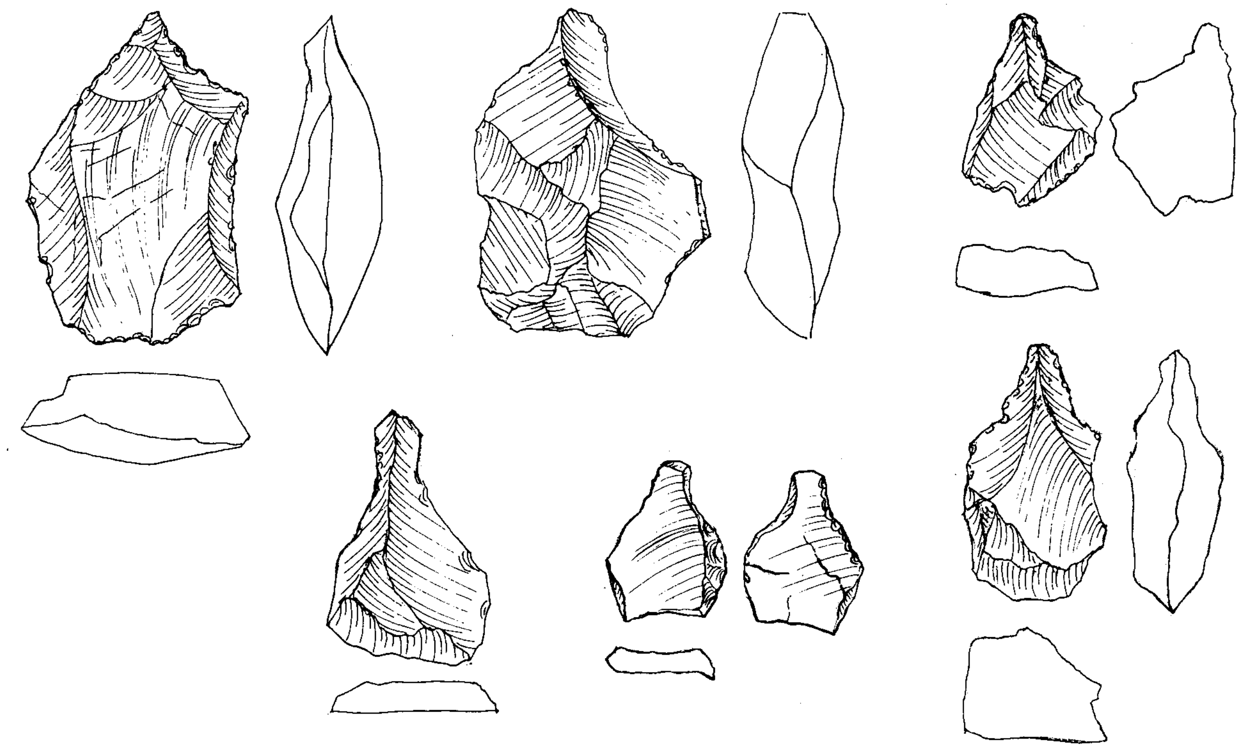


FIGURE C.11. Site 34. Notched and nosed percussion struck chert flakes. Scale 2:3.

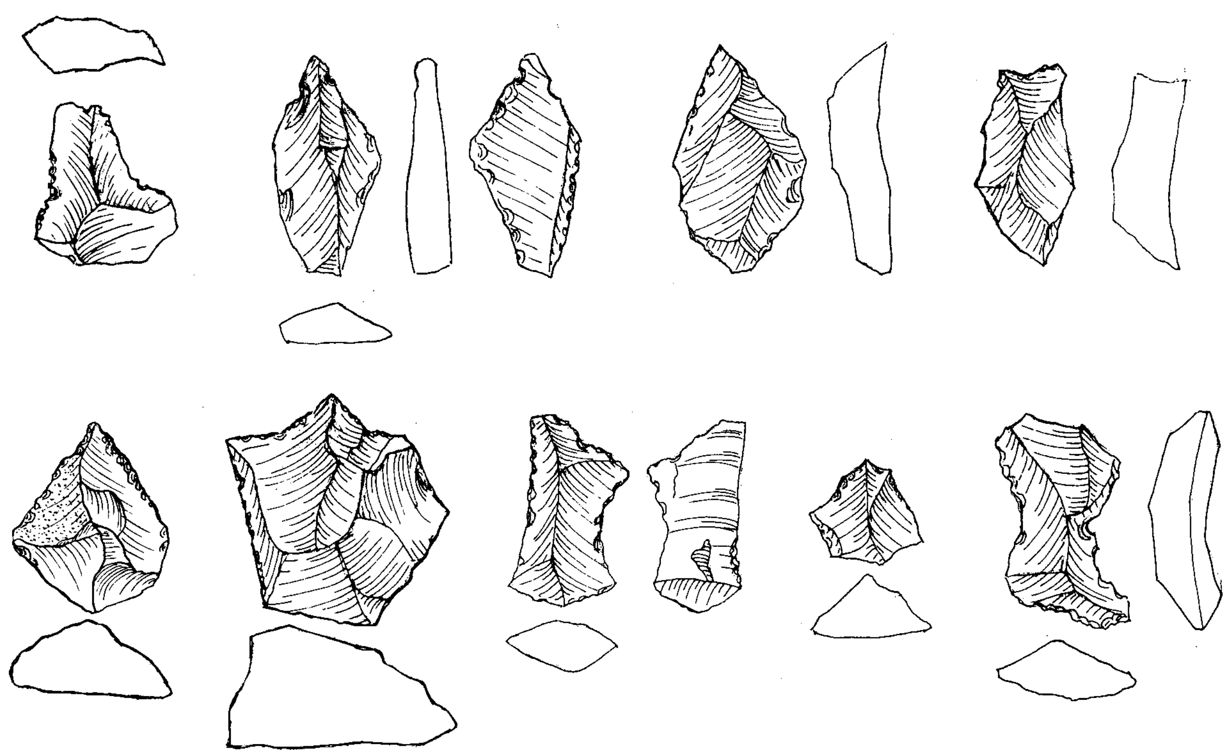


FIGURE C.12. Site 34. Notched and nosed percussion struck chert flakes. Scale 2:3.

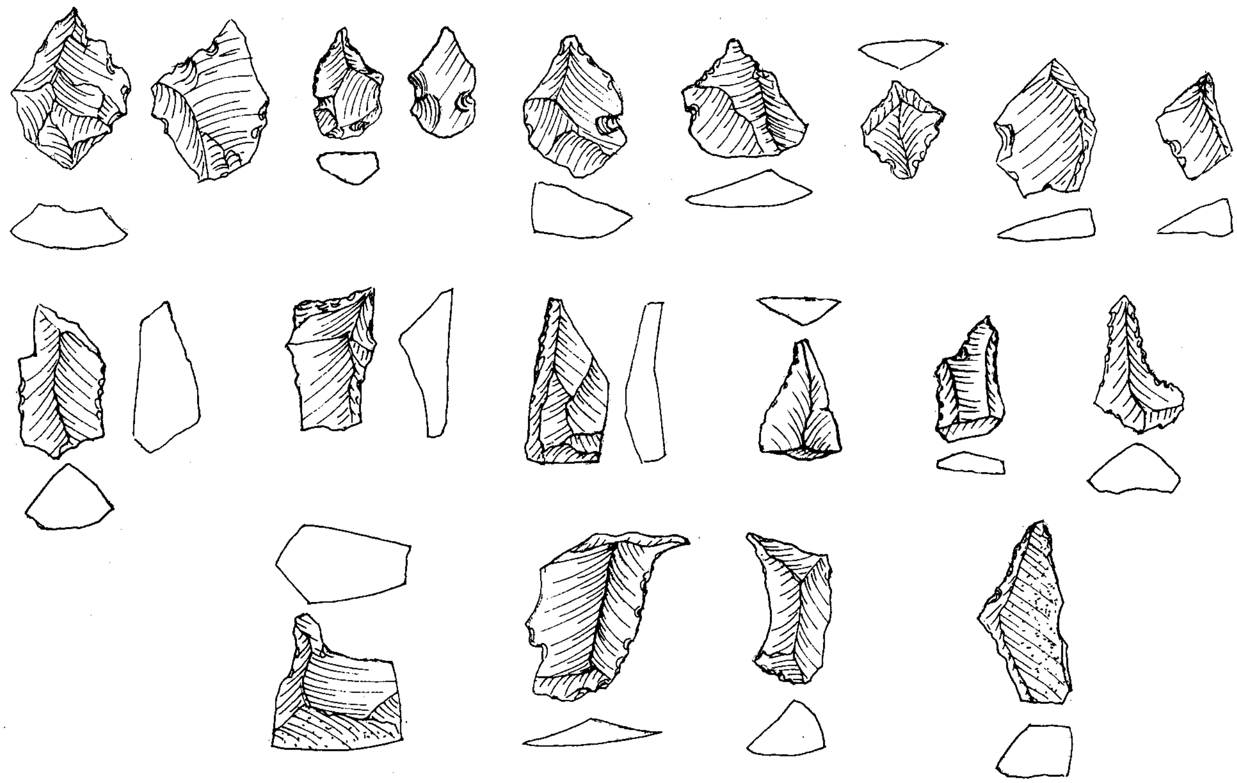


FIGURE C.13. Site 34. Chert flakes with sharp angular use ends. Scale 2:3.

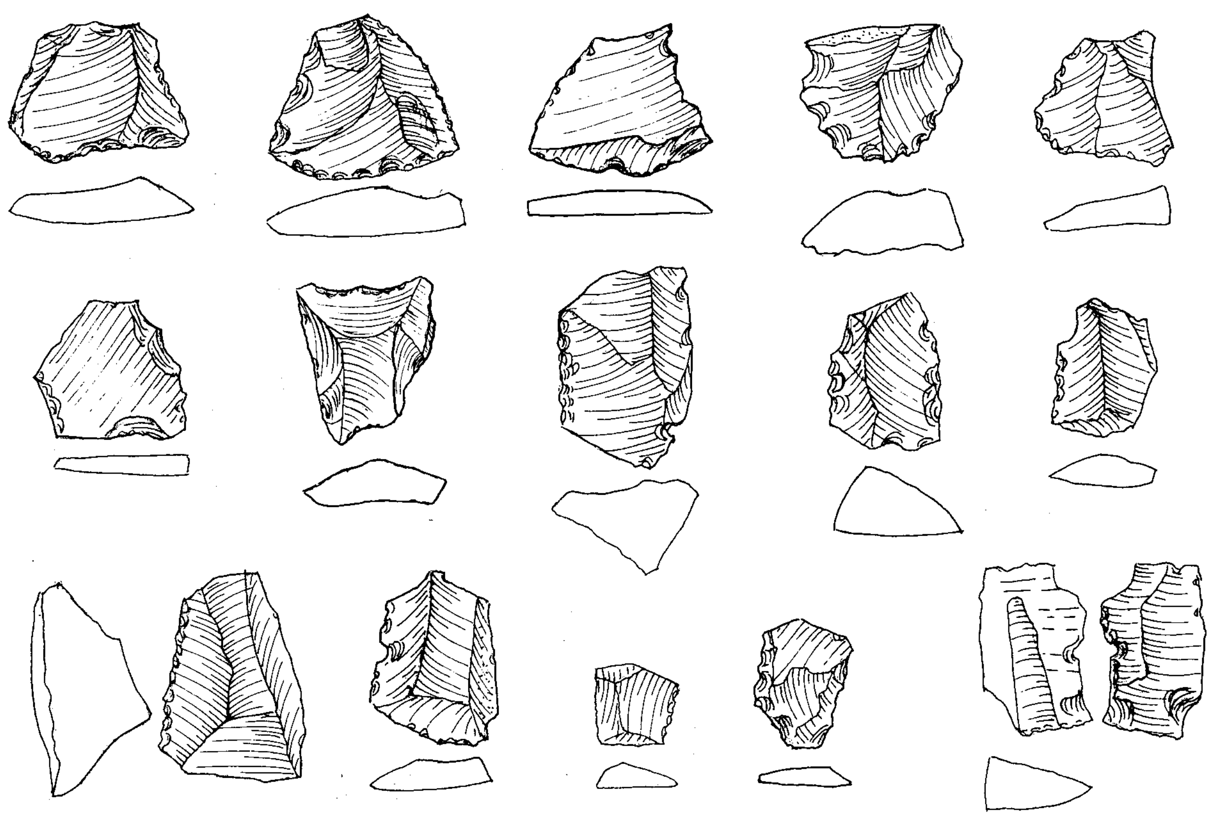


FIGURE C.14. Site 34. Percussion struck chert flakes with retouch. Scale 2:3.

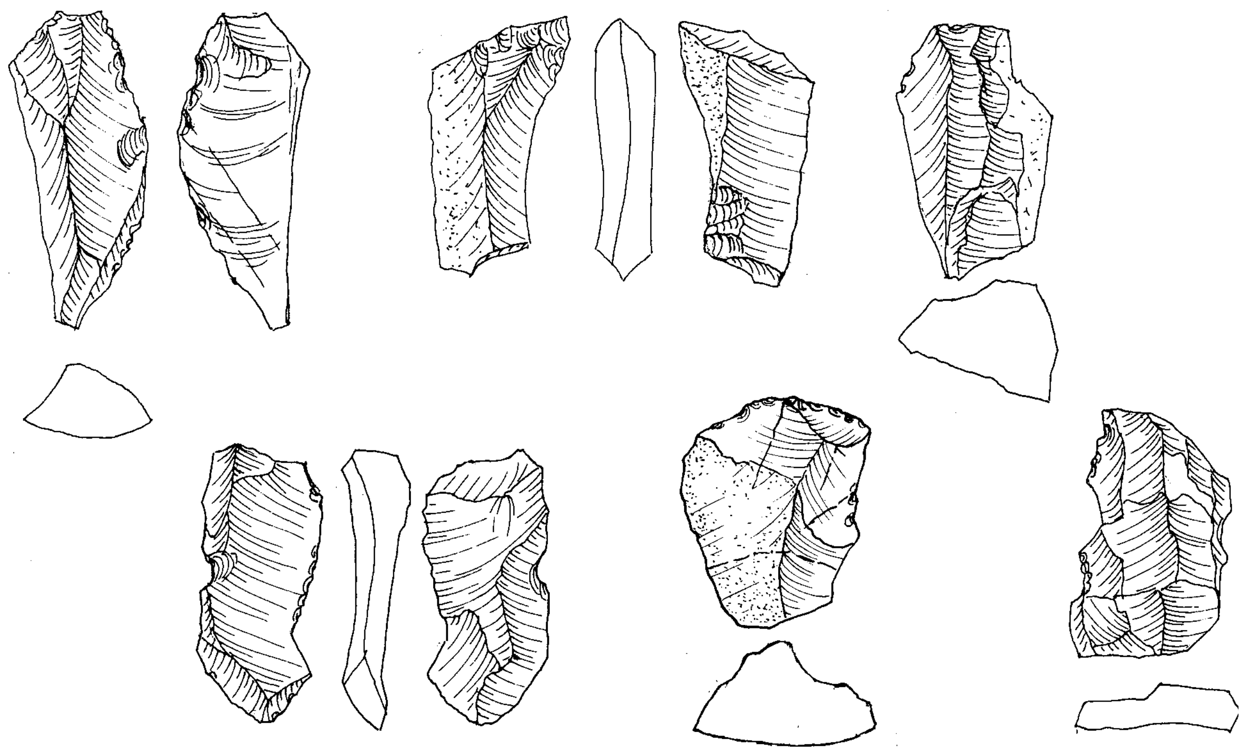


FIGURE C.15. Site 34. Percussion struck chert flakes. Scale 2:3.

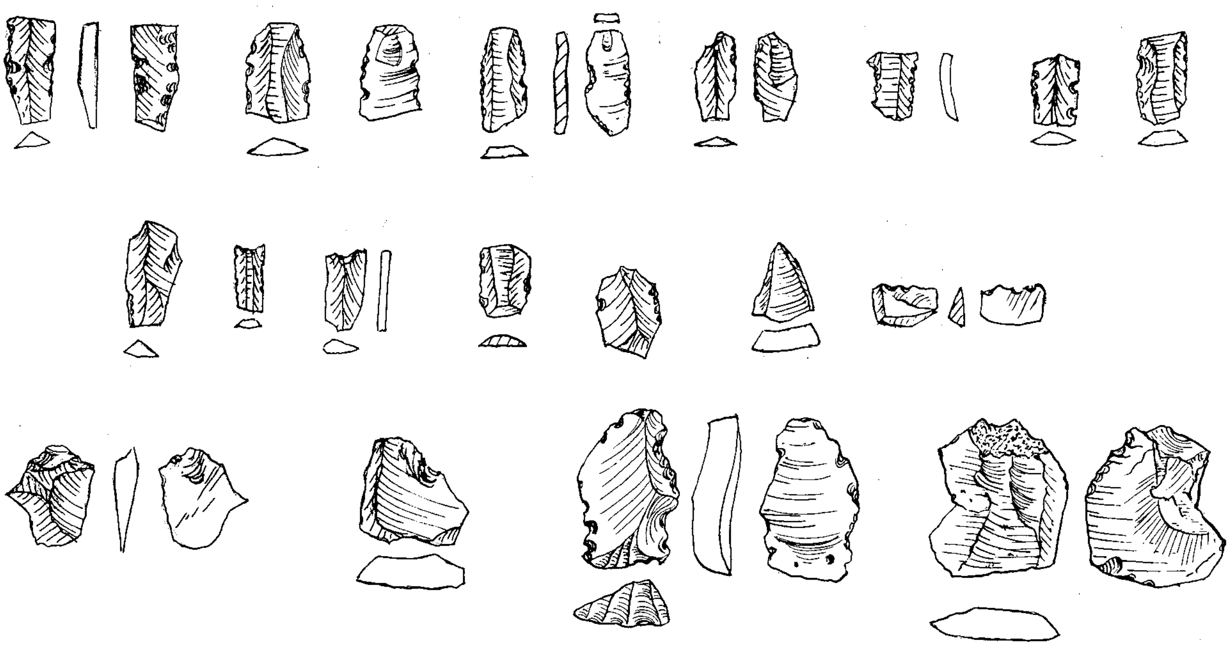


FIGURE C.16. Obsidian blade segments and flakes from locations throughout survey area. Scale 2:3.

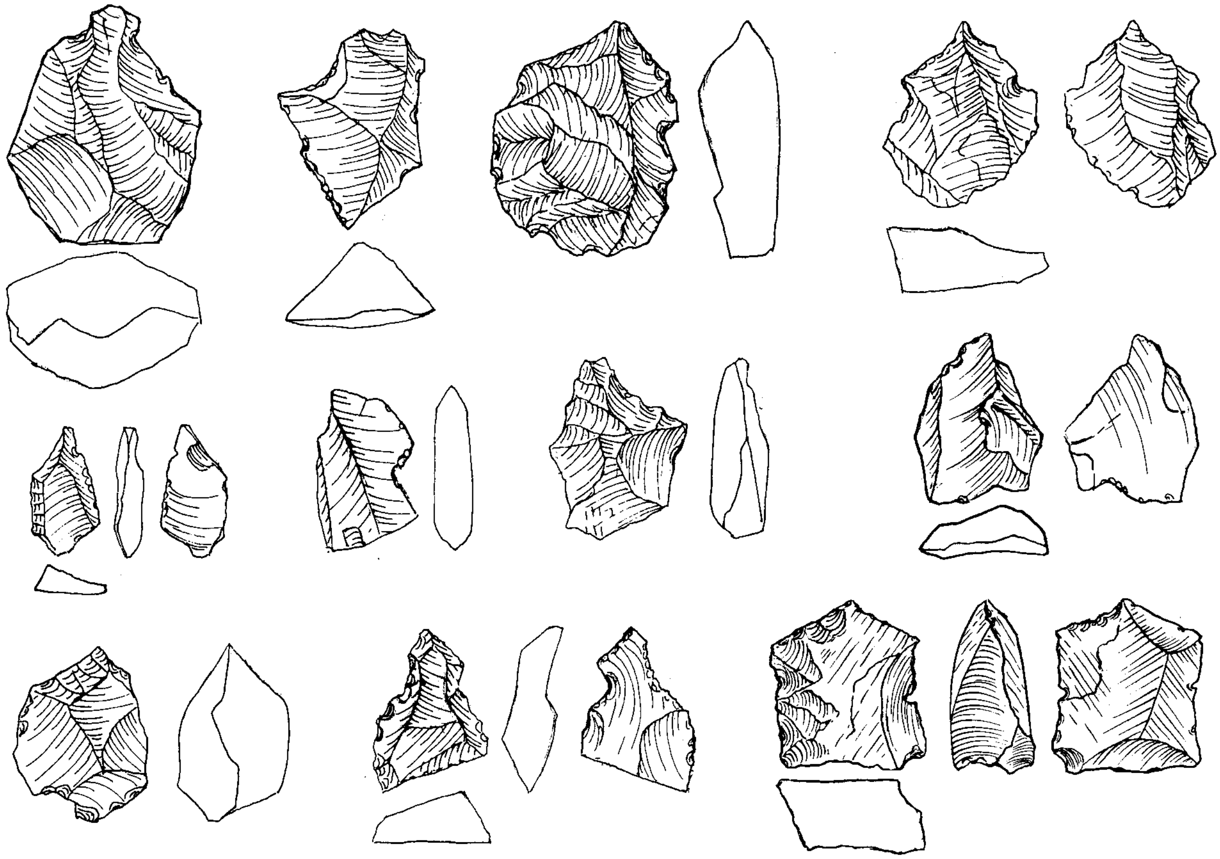


FIGURE C.17. Notched and nosed implements from locations throughout survey area. Scale 2:3.

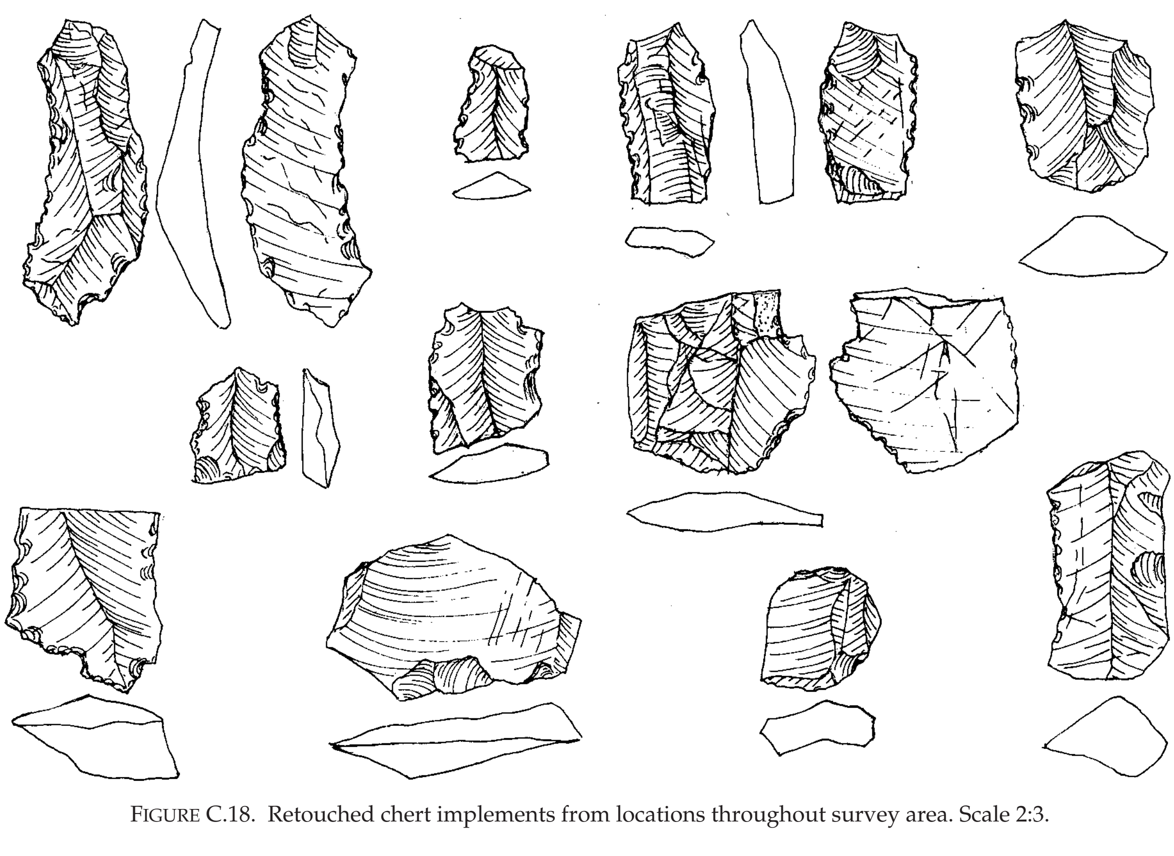


FIGURE C.18. Retouched chert implements from locations throughout survey area. Scale 2:3.

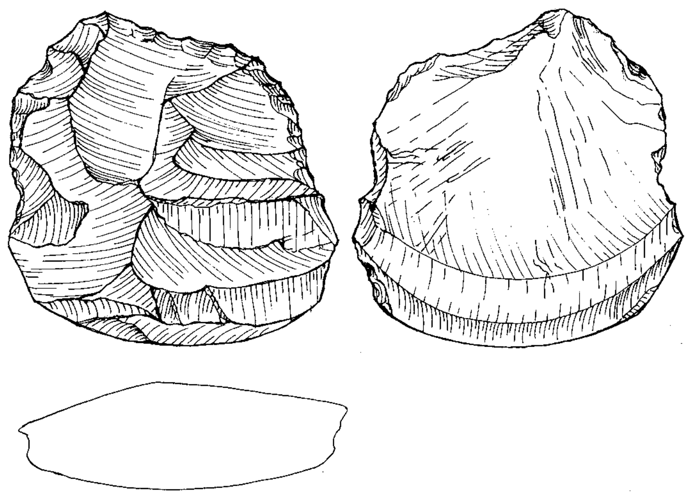


FIGURE C.19. Site 98. Siliceous limestone percussion struck chert flake with retouch. Scale 1:2.

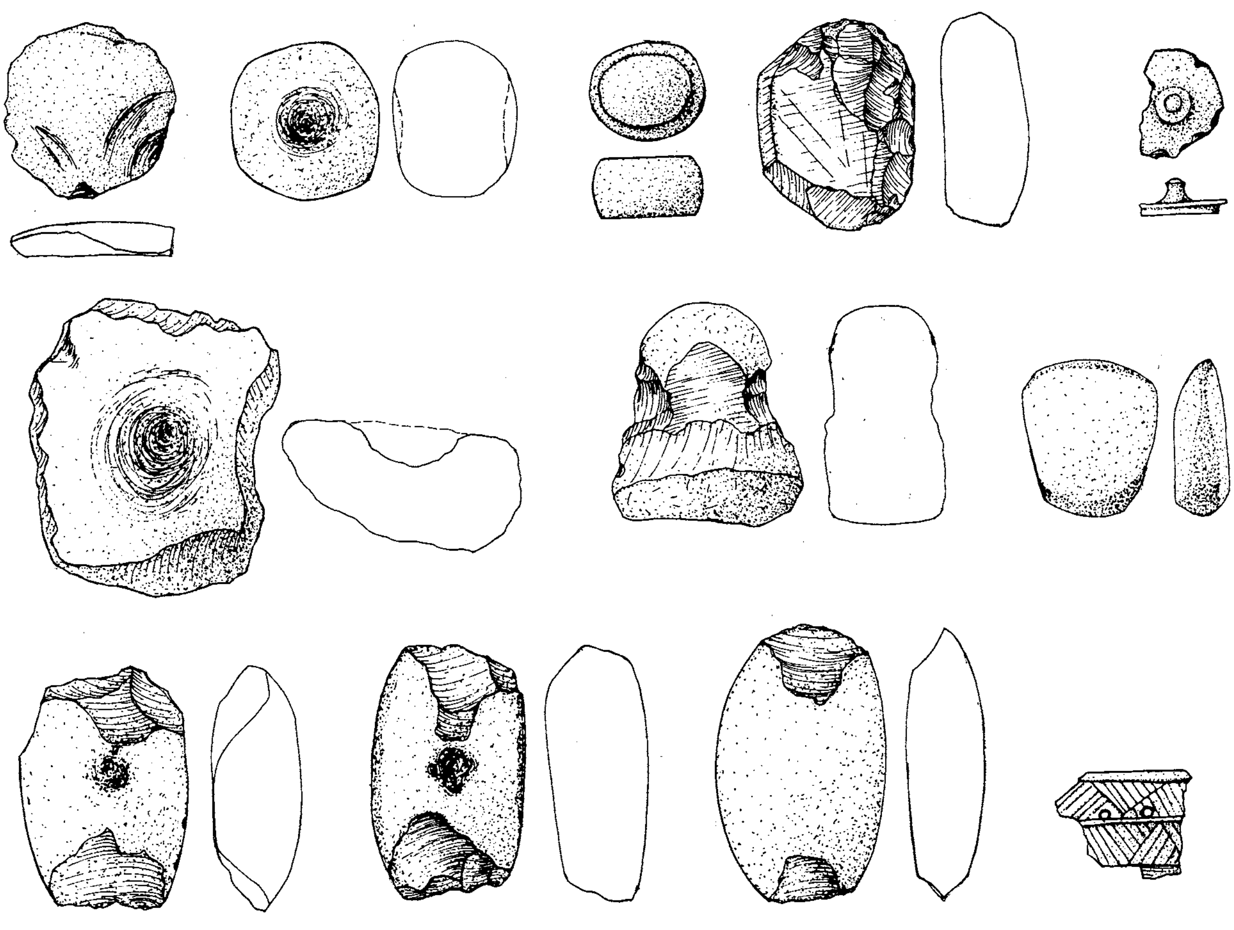


FIGURE C.20. Ground stone objects from throughout survey area. Scale 1:3.

Appendix D

Register of Archaeological Sites

L. Vance Watrous and Despoina Hadzi-Vallianou

Each catalogue entry presents the following information on the site: site number in bold and site name or, in parentheses, site field number; description (location and topography, water source [if known], architectural remains, bibliography and site size); artifacts by date; and finally, site type (settlement, cemetery, or sanctuary) by date. The sites of Phaistos (**1**) and Agia Triada (**2**), because of their long excavation history, are described in a more narrative form. Site field numbers refer to the numbers originally given to the sites during the survey by teams A and B (See chapter 1, "Field Methods"). Sites marked (Ap) are located outside the survey. Initial site size is for the entire (often multiperiod) site; when possible, site measurements (N–S length given first) by chronological period are given; information on site size by period also appears on the relevant chronological maps in chapters 7 to 14. Chronological designation of artifacts within a period (e.g., MM I–LM I) does not necessarily imply continuous use throughout that period. In order to avoid needless repetition and length, artifact descriptions list recognized ceramic shapes distinctive of a specific chronological period (see appendix E).

Special abbreviations and terms used primarily in this section are:

BSJ = bridge-spouted jar
DG = dark ground
BG = black glaze
RS = Roman red slipped ware
B = burnished
TS = Terra Sigillata
TSR = Tortoise Shell Ripple (MM III–LM IA) decoration
Frag. = fragment
N = north
S = south
E = east
W = west

Intensive Survey Area

1. Φαιστος. This settlement was founded on a high ridgetop, adjacent to the Ieropotamos River, in the center of the Western Mesara during the Late Neolithic period. The Italian excavators report finding LN pottery and walls in their trenches across the area of ridgetop now occupied by the palace, on the south slope (Levi 1976:604–605; Vagnetti 1972/1973), in the west court area (ibid., 526, below room XCIV), south of the storerooms and in pockets of the bedrock (Vagnetti, pers. comm., 1994), and on the east slope of the hill at Chalara. House walls and EM II pottery are reported at Phaistos in the area of the palace, in the west court, underneath and south of the Acropoli Mediana, where the Italian School storerooms are presently located (Pernier 1935; Levi 1967/1968:66 n. 2; 1976; 160–163, 170–186, 288–294, 478–479). A sounding in the West Court area of the palace revealed Prepalatial houses and MM IA pottery (Pernier 1935:130, 136–137; Levi 1957/1958:170–177; 1967/1968:66; 1976:288–294, Figs. 453–454, 552).

The west slope of Efendi Christos produced a little EM II, MM IA, LM III A/B, and masses of MM IB–LM I and PG–H, and a handmade bull rhyton (MM I?) near the peak and an animal figurine (MM IB–LM I). The main cemetery of Minoan Phaistos was located about 500 m to the north, on the south slope of the Ieroditis ridge, between the church of Agios Onouphrios and the monastery of Kaliviani. Digging for the foundations of the church of Agios Onouphrios is said to have uncovered burials. The Early Minoan material from "Agios Onouphrios" published by Evans (1895) may have come from the slope above and northeast of the church where a large pit is visible today.

Protopalatial and Neopalatial Phaistos is relatively well known because it was the focus of Pernier's (Pernier and Banti 1935, 1951) and Levi's (1976, 1981) work. At this time Phaistos possessed a palace, public squares (upper and lower west courts), streets, well-built houses, and artisanal areas (La Rosa 1992). Prehistoric Phaistos reached its greatest size during the MM I–III period, at least 55 ha in area.

Late Minoan III occupation (references compiled in Kanta 1980:96–98) has been reported in the palace area, in a large house west of the palace (Rocchetti 1974/1975:234, 238, and 241), on the ridgetop under the Italian storerooms (Levi 1976:2, 595–596) north of the palace (Pernier 1902: Figs. 45, 46 and Pl. 8:4; Borda 1946: Pls. 33–47; Levi 1952/1954:450, Fig. 83.), in the west court (Levi 1976:302; Rocchetti 1974/1975:234, Fig. 89:13; Fig. 99:35–40 and Fig. 165:90) and at Chalara. Late Mycenaean sherds are said to be particularly common in the area of the west court, under PG–Geometric levels (Rocchetti 1974/1975:173). Our survey found the face of a Karphi-like statuette (plate E.13), probably from a shrine of the LM IIIC or PG period on top of Ephendi Christos. Mycenaean-type figurines are also known from the area of the palace (Pernier 1902:118–119). Larnax burials have also been found south of Phaistos, at Ambela, near the church of Agios Pavlos (Pernier 1907:298) and at Alexandraki near Agios Ioannis (Hadzi-Vallianou 1989:431).

A Geometric house is reported north of the palace, at Agia Photini (Levi 1961/1962a:78 and Fig. 155). Geometric levels were found under the Italian School storerooms (Levi 1985:595–596), covering the area of the palace (Pernier 1902:21), in the west court (Rocchetti 1974/1975), and at Chalara (Levi 1981:653–699). PG tombs have been found at the base of the hill near the watermill. One km south east of Agios Ioannis a PG tomb with vases, a pin, and fibula was found at Ambeli (Levi 1961/1962b:467; Rocchetti 1972: 54–58). PG vases found next to a wall at Ambeli (Levi 1961/1962b:467) may have been a tomb. Vasilakis (1994/1996) reports a Geometric tholos tomb, with weapons, a metal figurine, jewelry, and pottery (including Knossian and Cypriote imports). Vasilakis (1993) recently excavated a Geometric tholos tomb (with two Hellenistic tombs built over it) near Agios Ioannis. In the late seventh century BC, a temple was built at the SW corner of the palace. Two (Archaic?) *boustrophodon* inscriptions from the site are reported by Pariente (1994:825). In the sixth century BC, a votive column was dedicated on the Acropoli Mediana (La Rosa 1974). Pernier also found an architectural antefix there, best dated to the sixth century, which he suggested belonged to a sacred building (Pernier 1902; La Rosa 1978). La Rosa (1997:82–85, Figs. 28 and 29) has published one of a number of late Archaic figurines of a seated goddess (Demeter?) found near the palace.

During the Classical–early Hellenistic period Phaistos was the large urban center (at least 60 ha) of a city-state. Hellenistic houses (Pernier 1902; Levi 1961/1962b:465–467) are still visible on the site. Hellenistic or Early Roman walls have been found in the Levadia (Gria Saita) at 1.70 m below the present surface (Hadzi-Vallianou 1988). A Hellenistic house built along a stone-paved road was recently revealed immediately north of Agios Ioannis (Hadzi-Vallianou 1989:429). Vasilakis (1994/1996) reports a Hellenistic *peribolos* with two cist tombs (one of which contained a Panathenaic amphora) found next to the Matala road at Agios Ioannis. Poor Hellenistic burials are reported at Kaliviani (Savignoni 1904:654). Part of the Hellenistic city wall ascends the east slope of Ephendis Christos (figure 11.16). Hellenistic house walls are reported at Ambela near Agios Pavlos. Hellenistic and Roman graves and pottery (plate E.18) have been found to the east and south of the village of Agios Ioannis (Hadzi-Vallianou 1989:435–436). A fragmentary inscription of the second century BC was found west of the site below the Herakleion-Phaistos road (Lebessi 1976:353 and Pl. 276c). Hellenistic chamber tombs (plate 11.4) have also been found at Phalangari, about 750 m north of Phaistos cut into the south slope of the Ieroditis ridge (Hadzi-Vallianou 1987, 1989, 1995).

In the Roman period a small settlement existed at Agios Ioannis (Sanders 1982:161) that continues to the present day (Curuni and Donati 1988:371). Christian graves of the Byzantine period (?) are along the north edge of the Minoan palace (Tsougarakis 1988:320). A small post-Roman settlement, including a bath, probably continued at Agios Ioannis, as evidenced by the Byzantine church of Agios Pavlos.

LN–Modern settlement.

2. Αγια Τριαδα. Located on the west end of the Phaistos ridge, the settlement overlooked the Ieropotamos River to the north. Halbherr noted LN sherds in the settlement. La Rosa has found an EM I deposit at the southern edge of the settlement (Di Vita 1986/1987:465). Agia Triada may have been two hamlets, each with its own tholos in EM II. The main remains of the Protopalatial settlement are walls under the later town (Laviosa 1972–1973). MM IA vases were found outside the tholoi and west of the site near the church of Agia Triada. A jug (La Rosa 1979:66, Fig. 17e) from the town could be MM IA. The Neopalatial settlement included an upper town with villas around a court, a lower town with a civic court, portico, storage magazine, and houses surrounded by a circuit wall. Figurines of women and men on the hilltop immediately east of the site (and others washed down from the hill) indicate the existence of a small shrine there (Laviosa 1972:413). The LM III settlement had a large "megaron" (probably a residence), stoas, and houses. The cemetery to the north continued in use and chamber tombs south of the site are said to have had LM III larnakes (La Rosa 1987:548).

Geometric structures have recently been found east of the LM III stoa (La Rosa, pers. comm., 2001). During the LM IIIC–Orientalizing period a shrine set on the upper court attracted many votives (D'Agata 1997). A dedicatory inscription belongs to the Classical period. In the Hellenistic period there was a small settlement, and an altar on the Piazziale dei Sacelli (D'Agata 1993) and a tile-roofed shrine to Zeus Velchanos over the LM III stoa. A first century BC farm building, with a stone oil and/or wine press, stood on the site in the later period. In the Roman period a farmstead (?) was located east the of the large tholoi (Laviosa 1972:47).

The church of Agios Georgios Galatas at the SW corner of the site was dedicated in the early fourteenth century (Tsougarakis 1988:221). A small cemetery adjacent to the church was used until the early seventeenth century (Di Vita 1986/1987:458–463).

LN–LM IIIB settlement, LM IIIC–O sanctuary. H–ER shrine/farmstead, V church and cemetery.

3. Ιεροντομυλος. (A 1) Located at the N base of the Phaistos hill, at the junction of the asphalt road and the Ieropotamos River, the watermill is fed by a water conduit from the Gria Saita to the east (Vallianos et al. 1985:34 and 50; Hadzi-Vallianou 1989:204–248).

A Venetian–Modern period (seventeenth century–1965 AD) watermill and house.

4. (A 7) Located 1500 m W of Phaistos on the S slope of the Phaistos ridge, partly cut by asphalt road. A small concentration of sherds. Size: 6 x 28 m. Artifacts: EM I–IIA: one Gray ware sherd; MM IB–II/III: Barbotine, DG, polychrome, bowls, pithoi, cookpots, coarse jar, red B lamp, cut-out stand, conical cups (handmade and wheelmade).

MM IB–II/III settlement and/or grave(s).

5. Γρυγορυ Κορυφη. (A 13) Located 1,200 m NNW of Kamilari on the W side of a hilltop in the valley between Phaistos and Kamilari. Large tholos tomb, filled with skeletons, annex rooms, and exterior altar excavated by Levi (1961/1962a). Artifacts: sealstones, bronze daggers and razors, jewelry, clay and stone vases, lamps and braziers, a larnax and three clay models depicting a group of dancers, an offering scene and a woman grinding cereal (?). Another possible tholos, with MM III material, was located about 200 m to the NE at the site of Mulona Lakko.

MM IB–LM IIIA 2 tholos tomb.

6. (A 14) Located at the S base of the hill, on which the Kamilari tholos (site **5**) sits. A small tholos tomb excavated by Alexiou and described by Branigan (1976). Adjacent to the tomb is a stone base with a rectangular depression cut to hold a statute base (plate 11.3). Artifacts: our survey found EM (?), MM IB–IIIA sherds (jars, straight-sided cup, DG, conical cup, bowls), three chipped stone frags.; H votives: BG cups and a krater, plain jugs, and a sieve-like censer (?), about 40 figurine frags.—pedestal bases, female drapery, bodies and head, lamps, male nude, horns of consecration (Watrous et al. 1993: Pl. 54b), Arretine pottery, and Roman glass. Englezou (1988/1989) has published a collection of Classical-Hellenistic votives including figurines of a Demeter type, children, female *kistophorai*, and young men.

MM IB–III; LM I?; LM III tholos tomb; C–H rural shrine.

7. (A 15/69) Located 1,200 m NW of Kamilari village on the valley floor immediately below and W of the Kamilari tholos tomb excavated by Levi (1961/1962a). At NW edge of site red soil, revealed by deep plowing, produced MM IA?–LM I, LM III (?), and G–A (?) pottery. Main part of site is at base of hill, only revealed in 1987, also by deep plowing: LN–EM I, MM IB–LM III pottery, heavy walling, including a rectangular ashlar block with a single, carefully cut dowel hole set onto its upper surface. Site size: about 150 x 300 m?

Artifacts: LN–EM I: one B rim; MM IA: imported N coast dark-painted eggcup (plate E.6, middle row, left), incised (crosshatched) jar; MM IB–LM I: cooking ware, DG, conical cups, BSJ, carinated and straight-sided cups, pithoid jar, pithoi, jugs, amphora and teapot; LM III: goblet; Geometric-Archaic? Seven chipped stone, one handstone, one stone bowl (?); many stone querns, handstone rubbers, hammers (Blitzer 1995: type 1), five chipped stone; one *gourna*.

MM IA (?), MM IB–LM III settlement.

8. Ζοοδοκος Πιγι. (A 16) Located 350 m NW of Kamilari at the site of the church of the Virgin of the Life-giving Spring, on a gentle N-facing slope, near the valley floor, above a perennial spring. In road cutting the top of the red soil horizon (buried 1.00 m below light brown soil): LN–EM I sherds and a retouched white chert flake. Size: 170 x 100 m in MM period. Artifacts: LN–EM I: Wiped ware, coarse dark B sherds; MM IB–LM I: Barbotine, DG, cooking ware, pithoi, BSJ, straight-sided, conical, and carinated cups, jug, bowls, steatite bowl; Archaic: jugs; H–ER: tiles, BG, amphoras, basins, corrugated ware, lamp; ER: red painted wares; V–Modern: church, tiles, sgraffito, and glazed wares.

LN–EM I, MM IB–LM I, A, H–ER, V–Ottoman settlement.

9. (A 18) Located 200 m NW of Kamilari village, walls and sherds exposed in road cutting on W facing slope below Kamilari. Spring to the north. One N–S wall stretches 7.60 m in length. Sherds and wall remains along 37 m. Signs of burning (ash) along base of wall? Size: 37 x ? m. Artifacts: MM I B–III: Barbotine, DG, amphora.

MM IB–III farmhouse?

10. Μετοχοι Καμηλαριου. (A 19) Located 150 m below (N) of Kamilari at the N base of the hill on which the village of Kamilari sits. Size: 325 x 350 m in the Turkish period. Many scattered house walls of the Turkish (?) period, mid-nineteenth century houses, a spring (fountain constructed in its present form in 1929), wells, Church of the Panagia Marmargianas, and recent threshing floors. Artifacts: H–LR (to later sixth century): BG, Rhodian amphora, lamps, Phocaean RS; Venetian: a few glazed sherds; Turkish: many tiles, beehives (?), glazed bowls; combed and brown-painted wares (plate E.23).

H–R and T settlement.

11. (A 20) Located 900 m ENE of Kamilari village at the mouth of the small valley E of Kamilari, which runs between the area of Phaistos and Matala. Size: 50 x 50 m concentration of sherds. Artifacts: tiles and BG, Phocaean RS, amphoras, cooking ware.

C–ER farmstead.

12. Μακρυ Αρμις. (A 21) Located 600 m E of Kamilari, rectangular cist graves, constructed of small upended limestone fieldstones, dug into a natural terrace near the top of the Makri Armis ridge on the E side of a valley 200 m to the E of site **19**. Site recently destroyed by terracing for olives. Artifacts: MM III–LM I sherds and a stone cup frag.; C–H sherds.

*Minoan (?) and C–H graves, probably belonging to site **70**.*

13. (A 22) Located 950 m E of Kamilari in the small valley E of the village and 15 m S of site **19**. Size: 75 x 75 m concentration of sherds. Artifacts: MM IB–LM I: DG, pithoi, cups, bowls, amphoras, and cooking ware with round and thick oval legs; green stone tool, one chert flake.

MM IB–LM I settlement or cemetery.

14. (A 23) Located 700 m ESE of Kamilari. A patch of sherds. Size: 40 x 35 m. Artifacts: DG, Barbotine, pithos, cookpots, jars, cup, larnax frag.; one chert flake.

*MM IB–II graves, perhaps related to site **13**.*

15. (A 25) Located 950 m E of Kamilari on ridgetop 50 m S of site **21**. Walls (?) and tombs. Size: at least 17 x 31 m. Artifacts: a few Archaic sherds (plate E.16, upper, left); stone vase (?) and sherds from conical, straight-sided cups; BSJ, DG.

MM IB–III tombs.

16. (A 26/B 16) Located 850 m SE of Kamilari on top and S slope of ridge. Concentration of sherds; tiles in NE corner of site. Size: EM II: 5 x 5 m?; MM I–LM I: large; C–ER: 70 x 175 m. Artifacts: EM II: Gray ware, Agios Onouphrios ware; MM IB–LM I: Barbotine, Eggshell ware; polychrome, DG sherds; straight-sided and conical cups, jugs, pithoi, cookpots; chert flakes, three blades, and one flake of obsidian; LM III A1: cup; LM III A2: goblet, kylix (?), amphora; A (or LG ?): jug, bowl; C–ER: BG, RS wares, including dishes, cups, kantharos, lamp, bowls (plate E.19), basins, amphoras, cooking ware.

EM II, MM I–LM III, Archaic and C–ER settlement.

17. (A 27) Located 1,150 m E of Kamilari, sherds on top of S-facing slope of Μακρψ Αρμις ridge. C–ER sherds on N half of site. Size: MM IB–LM I: 50 x 60 m. Artifacts: MM IB–LM I: cooking ware, pithoi, DG, Barbotine; obsidian frag., chert flake; C–ER: tiles, BG, jug, basin, cooking ware.

MM–LM I and H–ER settlement.

18. (A 28) Located 700 m W of Agia Triada, gypsum quarry used in MM IB–LM I, and again in recent years for architectural renovation of Agia Triada and Phaistos (Di Vita, La Rosa, and Rizzo 1984:158).

19. (A 29) Located 1,100 m WSW of Agia Triada on top and S side of small hill immediately S of Ieropotamos River. Sherd scatter; site destroyed by road cutting and NATO tower. Size: 15 x 40 m? Artifacts: LN–EM I: black, brown, and red B wares (plate E.1) and wiped wares; MM IB–LM I: DG, TSR, cookpot, basin; one chert frag.; Archaic: pithos; V–T: tiles, brick, green, and brown glazed ware.

EM I; MM IB–LM I and V–T settlement.

20. (A 30) Located 1,200 m WSW of Agia Triada just W of and below site **19** at the edge of the Ieropotamos alluvial plain and at the mouth of the valley running S towards Kamilari. Concentration of sherds and tiles. Size: 160 x 195 m. Artifacts: Minoan (?): one chert flake; C–ER: BG, Megarian bowl, beehives, pithoi, Hadra ware, lamps (first and early second century AD), Phocaean RS, Koan amphoras, Chandarli ware (second century AD), RS plates (third century AD), African RS (late fourth century AD), Spanish ? jar, cooking ware (H/ER), amphoras, basins, loomweights; Byz: sgraffito ware (twelfth century); V–T: white, green, and brown glazed wares.

C (fourth century)–ER; Byz; V–T farmstead.

21. (A 31) Located 1,350 m WNW of Agios Ioannis, a patch of sherds on the lower S slope of the Phaistos ridge, 200 m S of site **4**. Size: 130 x 95 m. Artifacts: one Agios Onouphrios sherd; MM IB–LM I (much MM III): Barbotine, TSR, spirals, many pithoi, BSJ, bowls, conical and straight-sided cups, DG, and cooking ware with thin oval, round tripod legs; stone pyxis frag., small stone lid, chipped stone (chert), quern.

MM IB–LM I settlement.

22. (A 32) Located 200 m W of Agia Triada (**2**), this settlement possessed the church of Agia Triada. Size: 150 x 125 m. Artifacts: Minoan: a large red-painted and burnished MM clay lamp with an impressed ivy chain on its lip; Turkish: pithoi, lekanai, glazed wares.

Turkish (eighteenth–nineteenth century) settlement.

23. (A 34) Located 1 im WNW of Phaistos, a concentration of tiles and sherds on top of the Phaistos ridge. Size: 10 x 40 m. Artifacts: H–ER tiles and sherds (amphora, basin, pithos); three chert flakes.

H–ER farmhouse?

24. Αγιος Ονουφριος. (A 36) Located 1 km NNW of Phaistos on the upper portion of the steep S slope of Ieroditis ridge 150 m NE of the church of Agios Onouphrios, a dense concentration of sherds and (probably human) bones. A large pit just N and above the church may be the source for Evans's "Agios Onouphrios" deposit (Evans 1895). Size: 80 x 100 m. Artifacts: EM II: much EM I–II/III: wiped ware, Pattern-burnished ware, much Agios Onouphrios (closed and open shapes) ware, Gray, Lebena ware (cup, closed shape), red-painted ware (jug) as well as bowls, pyxis, pithoi (one with impressed decoration); neck fragment of a marble figurine, two pieces of chipped stone; MM IA: light-on-dark, DG (?), banded sherds; MM IB–II: DG, red B, cups, cookpots, bowl, fruit stand (?), BSJ, conical cup, jars.

EM I–MM II cemetery for Phaistos.

25. Βρισιδια. (A 37) Located 1,600 m NNE of Phaistos on the flat top of Ieroditis, a scatter of tiles, sherds, and beehives about 100 m N of a spring of that name. Size: 85 x 30 m. Artifacts: fragment of a hollow crude clay male (?) face or head (pres. H. 10 cm; Th. 1.6); eyes, nose, mouth in relief; H–ER: BG, RS, cooking ware, amphoras, pithos, basins, cups; olive press, *goudi*, and a kernos-like oval limestone boulder (H, 18; L, 66; W 45 cm) with two rows of five cut oval-shaped depressions on its upper face.

Late H–ER farm (and shrine?).

26. (A 38/39/40) Located 950 m SW of Phaneromeni, a concentration of tiles, sherds, beehives on the flat top of Ieroditis near the N edge of the ridge. Circular structure with a diameter of about 4 m (cistern?) made of stones and cement bonded to two parallel walls. At N end of site a large olive press (Watrous et al. 1993: Pl. 53d). On top of the hill a large stone olive press with circular depression and square cutting in center. Size: at least 300 x 200 m. Artifacts: one PG and LM IIIA1 sherd; H: BG sherds: ER: cooking ware, tiles, beehives, Phocaean RS plate, lamp (second AD), loomweight and spindlewhorls, amphoras, massive basins, cookpots, local RS plate, African RS, Cypriote RS (?), Chandarli dish (second century AD).

H–LR (to late sixth/early seventh century AD) farmsteads.

27. Παλαια Βρισι. (A 41/42) Located S of Phaneromeni, 350 m S of the Church of Agios Ioannis at N base of Ieroditis. Venetian stone arched fountain and cistern (and six large *gournes*) fed by nearby spring to the S on Ieroditis slope. At SE edge of site cut stone water channel (ER?). Size: 160 x 200 m.

Artifacts: H–ER: tiles, beehives, BG, brick, pithoi, basins, amphoras, lamps, bowls, cooking ware, strainer, loomweight (H); Pompeian Red, African and Phocaean RS, Arrentine wares; Byz (?): cookpot, brown polished amphora and jug, combed and polished basin, plain wares; V: much sgrafitto, green- and brown-striped, brown-, green-, and plain-glazed wares.

H–ER (to third century AD), Byz(?) and Venetian (thirteenth–fourteenth/fifteenth-century) settlement.

28. Μεζαρια. (A 44) Located 300 m S of Phaneromeni immediately W of site **27**, a patch of Minoan sherds sits in a small valley at the base of the ridge near the spring at Palaia Vrisi. Limekiln at center of site. Size: 65 x 75 m. Artifacts: TSR, cooking ware.

MM III–LM I farm?

29. Γουρνια Πιγι. (A 46) Located 800 m SW of Phaneromeni at the N base of the Ieroditis ridge immediately outside of the cave that contains the church of Agia Phaneromeni. Tiles and sherds and fountain (and a line of *gournes*) outside, constructed in 1899. Size: 30 x 25 m. Artifacts: Byz: B wares, brown-striped, brown-glazed, combed ware, Islamic (?) ochre-stained bowl, green-splashed dish, yellow-glazed, sepia-glazed dish; amphora, jars, basin, dishes, bowls.

Byzantine (to Early Venetian?) farmstead

30. Κουστουλιτις. (A 47) 200 m SSW of Voroi. Immediately N of Phaneromeni (Koutsoulitis) river and bridge leading to Voroi, a concentration of sherds reported by Hadzi-Vallianou. Size: ca. 40 x 40 m? Artifacts: MM IB–LM I: Barbotine, large squat straight-sided cup, cooking ware, BSJ, red

B ware, Trickle-decorated pithos; LM III B: bowl/cups; Late Geo–O: jug with cross-hatched triangles, band of quirks, DG skyphos, pithos with zigzags on taenia band; C–H: one BG basin; T: white/green sgraffito ware, pithos, brick-like object with rows of tiny depressions.

MM IB–LM III, LG–O settlement?

31. (A 48) Located 800 m SE of Voroi on top of Ieroditis Ridge in a natural bowl at the N edge of the cliff, 75 m above the Phaneromeni River. Size: 80 x 80 m. Artifacts: MM IA (?): handmade base; MM IB–LM I: cooking ware (oval and round legs), many coarse pithoi (mostly MM, one LM I) and cups; one stand, DG, jug, MM red-slipped sherds, BSJ, "vat slabs" (Watrous 1992:115), and a stone chopper; LM IIIC/PG (?): vertically slashed tripod legs, DG, krater, bowl; C–ER: tiles, BG, cup, trefoil jug, handle of Near Eastern fabric, lekanis, and pithoi.

MM I–LM I, LM IIIC/PG? and C–ER settlement

32. (A 49/B 13) Located 600 m NW of Sivas, a concentration of sherds and tiles in the middle of the valley that runs from Phaistos and Matala. Size: 220 x 150 m. H–LR (mainly third to fifth centuries AD): BG, Phocaean, Cypriote, African RS, Italian TS, amphoras, beehives, plates, cups, pithoi (one stamped with egg and dart), ribbed ware, one N. African amphora, spindlewhorl, basins; Byz (?): lightly burnished ware, brown-striped, and ribbed wares; V–T: sgraffito wares, Maiolica, and wares with white, green, and yellow glaze.

H–LR, Byz?, V–T settlement

33. (A 50) Located 400 m E of Sivas, walls, tiles, marble wall slabs and bricks in the spring-fed valley below the village. Size: 140 x 65 m. Artifacts: ER–LR (second–late sixth centuries AD): amphoras, cooking ware, basins, Phocaean, Arrentine, and Chandarli wares, lamps (first–third centuries AD), beehives; Byz: green-painted, coarse and brown-polished wares; V–T: sgraffito, white, green, red, yellow, black, and brown glazed wares.

ER–LR, Byz, V–T settlement

34. (A 51) Located 1 km SSE of Sivas, an area of worked stone (chert) and debris on a N facing slope covered with naturally eroded chunks of red chert. Local source and knapping area of red chert. Size: 155 x 125 m. Artifacts (309 pieces collected): cores, flakes and debris (See Appendix C).

35. Αγια Μαρινα. (A 52/56) Located 1 km NE of Sivas, a large concentration of tiles and sherds on the gentle red-soil slope just N of the church of Agia Marina. About 20 m N of the roadside fountain of Agia Marina tile-graves (ER?) are exposed in an E–W drainage ditch (at a level of 1–2 m below the land surface). In the NW corner of site, about 200 m NE of fountain, along the S side of the asphalt road to Petrokephali a small (60 x 50 m), distinct concentration of Minoan sherds, partly excavated in 1979 by the Archaeological Service. Total site size: 600 x 800 m.

Artifacts from NW corner: MM IB–LM I, IIIB sherds (MM I–II cups, DG; MM III–LM I pithoi, cups, amphora, cookpot, DG; LM III pithoi and cookpots). Artifacts sitewide: MM IB–LM I pithoi, cookpots, Barbotine; 10 pieces of chipped stone; LM III: a few sherds; Archaic: several sherds; C–ER: BG, many ER tiles, RS wares, ribbed and cooking ware and beehives; one North African amphora; V–T: sgraffito, white Maiolica and glazed wares.

MM I–LM IIIB farm? Large ER settlement.

36. (A 53) Located 900 m NE of Sivas, an area of tiles and sherds on the spur of a ridge 500 m S of the valley floor. Size: 35 x 40 m. Artifacts: Minoan: one LM I sherd with spirals; H: amphoras, pithoi, BG plate, jugs, lids, and Cypriote RS.

H farmstead.

37. Κουσες. (A 54) Located 1,300 m SW of Petrokephali, a Minoan farmhouse was excavated by Marinatos (1924–1925) on the gentle red-soil slope around 400 m S of the valley floor. Marinatos reported later burials in the house: two child burials in larnakes, one with an LM IIIB stirrup jar, and Late Roman or early Christian graves. Size: 11 x 11 m. Artifacts from Marinatos's excavation: MM II: Barbotine sherds found under the floor of one room; MM III–LM I: pithoi, amphoras, fine ware, spindlewhorls, and a bronze dagger; stone querns, rubbers, a *gourna*, a stone press and eleven chert pieces, including two cores and three flakes. Artifacts from survey: LM I: sherds; LM

III A2–B: pithoi; C: a fourth-century Attic skyphos, probably from a burial.

MM I–LM I farmhouse. LM III, C (?), LR burials

38. (A 55) Located 750 m NW of Kouses, a site first noticed by Pendlebury (Pendlebury, Eccles, and Money-Coutts 1932/1933:90) sits at the top of a gentle slope leading down (N) to the valley 600 m below. Size: 190 x 100 m. Artifacts: Minoan (?): two chert flakes; ER: tiles, RS plate (third century AD), basin, pithos lid, cooking ware, one Megarian bowl (decorated with a net pattern), and beehives.

ER village.

39. Αγιος Βασιλεος. (A57) Located 1,100 m WNW of Petrokephali and 150 m WSW of the church of Agios Basileos, a patch of sherds lies on the S slope of a low ridge immediately N of the valley floor. Many stone slabs 30 m E of site may mark a cemetery. Size: 40 x 55 m. Artifacts: EM I–II: Wiped ware, Agios Onouphrios, dark B, red-painted sherds; chipped stone (one chert flake) and whetstone.

EM I–II settlement.

40. (A 58) Located 900 NW of Petrokephali, a concentration of tiles on the valley floor 100 m N of the church of Agios Vasileos. Size: 140 x 110 m. Artifacts: Byz (twelfth to thirteenth centuries)–V: tiles, beehives, brown-painted, ribbed, glazed, and sgraffito wares; T: Margarites and glazed wares. One chert flake.

Byz–T settlement.

41. (A 59) Located 1,100 m SE of Agios Ioannis, three closely spaced concentrations of stones (decayed rubble walls) and sherds mark the location of three small houses (A, B, C) situated on the red-soil slope at the edge of the alluvial valley floor. Total site size: 80 x 115 m. Artifacts: MM IB–II: DG, Barbotine, lamp, conical cups, cookpots; MM III–LM I: pithoi, cups (including LM I spirals), cooking ware, DG, BSJ; LM III: *pithoi*, cooking ware, and a LM III A1 kylix. One Minoan clay figurine of a male with outstretched arms. Six chert pieces (five flakes, one blade) and one obsidian blade. One Archaic sherd.

House A: MM III–LM I; House B, MM IB I–II; House C, MM IB–LM I.
MM IB–LM III hamlet.

42. (A 60) Located 1 km SE of Agios Ioannis, an area of tiles and sherds sitting immediately N of site **41**. Size: 130 x 110 m. Artifacts: H–ER: spindlewhorls, RS wares, BG, amphora handle (stamped?); T: tiles and sgraffito ware. One chert blade and one flake.

H–ER, T settlement.

43. Μυλοι. (A 61) Located 850 m SE of Agios Ioannis, stone walls and sherds sit on the alluvium, 100 m NNW of site **87**. Artifacts: Byz: plain glazed, white glazed, and green striped (one stamped with circles with interior crosses), greenish-brown glazed, and sgraffito wares; sherds decorated with gouges, green and black paint; amphoras, B coarse ware, cooking ware, basin, dishes.

Byz (eleventh–twelfth century) settlement.

44. (A 62) Located 650 m SSE of Agios Ioannis, a patch of tiles and sherds on a low rise 200 m SW of the Levadia. Total site size: 60 x 135 m. Artifacts: MM: pithos, two handstone rubbers; Geo–A: pithos, DG; C–ER: beehives, BG, basins, Italian TS, Phocaean RS, spindlewhorls, amphoras, skyphos, cookpot (second to third century AD), Campanian and African vases (amphoras?); LR (fifth to sixth century AD): a few sherds.

MM, Geo–LR settlement.

45. (A 63/64) Located 500 m SSE of Agios Ioannis, an area of sherds on the gentle N slope of a rise immediately S of the Levadia. Size: 75 x 200 m. Artifacts: EM II (?): six handmade sherds; MM IB (mostly MM IB)–LM I: Barbotine, DG, red B lamp and bowl, polychrome, carinated (MM I–II), spiral (LM I) and conical cups, teapots, pithoi (MM–LM I), jugs, amphoras, pitharaki, cooking ware (thin and thick oval legs); chipped stone and stone rubbers. One LM III A2–B kylix and PG skyphos.

MM IB–LM I settlement.

46. (A 66) Located 450 m SE of Agios Ioannis, a concentration of tiles and sherds on the center of a large rise about 400 m SW from the edge of the Levadia. Size: 180 x 300 m. C–ER: African and

Phocaean RS, BG, Italian TS, Chandarli ware, amphoras, basins, beehives, and a spindlewhorl; one piece of chert.

C–ER settlement.

47. Φαλαγγαρι. (A 68) Located 900 m N of Phaistos on the S side of the Ieroditis ridge, six chamber tombs dug into the steep E slope of the Phalangari canyon, were excavated by Hadzi-Vallianou in 1987–1988 (Hadzi-Vallianou 1995, 1987, 1989; see also Savignoni 1904:654). The tombs (plate 11. 4) were cut in a row about 6 m above the canyon floor. One tomb measures about 15 feet deep x 10 feet wide x 6 feet high with benches around the sides. The final burials in these tombs can be dated by the pottery and 600 silver tetradrachmas of the successors of Alexander the Great to the third century BC.

H cemetery belonging to Phaistos.

48. (A 70) Located 600 m NW of Kamilari, pottery is exposed in a road cutting 200 m W of the church of Zoodochos Pigi. A spring exists just to the NE of the site. Size: 120 x 30 (as exposed) m. Artifacts: Neolithic: black, gray, brown, and red B wares; several different types of bowls (one lugged); one red, worked chunk of chert, one white chert flake, one stone cobble (worn at one end and pecked in center to form thumbhold).

LN settlement.

49. Λουρες. (A71) Located 1,150 m WSW of Agios Ioannis, the site, revealed by deep plowing in 1986, is situated on the floor of the valley between Kamilari and Phaistos. Sporadic stone scatters (decayed house walls) separated by spaces of 5–10 m occur across the site. In the SE corner of the site were a concentration (6 x 6 m) of stone (decayed rubble walls) and MM–LM I sherds, one chert flake, and two groundstone tools. A recently cut trench across the W side of site produced masses of sherds. Unusually large amounts of chipped stone and cores on site indicate the site was used for knapping locally available chert. At the S end of the site (just NW of a cement fieldhouse) are graves with H pottery, including a Hadra ware hydria. Total site size: 200 x 130 m.

Artifacts: EM I–II: two Agios Onouphrios sherds; MM IB–LM I: cooking ware (thin oval–round legs), BSJ (MM III), Barbotine, DG, conical and carinated cups, lamp stand, and a LM I cup; 18 mainly red but also white, and green chert flakes, two obsidian chips (see appendix C), one stone hammer, and one handstone rubber.

EM I–II knapping site, MM IB–LM I settlement, H graves.

50. (A 72) Located 1 km SE of Agios Ioannis, a patch of sherds is visible immediately E of site **42** on the rise of red soil at the edge of the Levadia. Size: 7 x 7 m. Artifacts: EM I–II: Wiped and Gray B wares and Agios Onouphrios sherds.

EM I–II field site.

51. (Ap 2) Located 50 m N of Petrokephali. A Protogeometric tomb (Levi 1957/1958:359–361) and pottery deposit (Rocchetti 1967/1968) was excavated 1.80 m below the present surface of the plain, 5 m N of the house of Z. Spiridakis. This tomb points to the presence of a contemporary settlement under the village of Petrokephali.

PG–O tomb.

52. Αγιος Σπυριδον. (Ap 4) Located in the Levadia 650 m NW of Petrokephali, a drainage ditch dug to a depth of 1.5 m has revealed sherds at a spot immediately E of the church of Agios Spyridon. An adjacent Roman building to the W was partly excavated in 1989 by Hadzi-Vallianou (1995b:432). Size: about 150 x ? Artifacts: EM I–II (much): Wiped ware, Gray Ware chalice, Agios Onouphrios teapot, large jars; MM IB–LM I: conical and straight-sided cup, DG; LM III A–B: cups, kylikes (one import from Chania), cookpot; Geo–A (?): three sherds; ER: ribbed ware, RS plates; T: tiles, green/white sgraffito, *tsoukali.*

Large, partly revealed EM I–II, MM IB–II, MM III–LM I (?), LM IIIA1, LM IIIA2–B, ER and T settlement.

53. Αγιος Δημητριος. (Ap 6) Located 850 m SSW of Agios Ioannis on a large patch of red soil in the valley floor between Phaistos and Kamilari just N of the roadside shrine of Agios Dimitrios, the site has several cut Minoan blocks, two concentrations of stones, and Minoan sherds (houses?); also two clusters of Archaic sherds (houses?). Size: in MM IB–II: 160–200 m, and in A–C: 110 x 50 m?

Artifacts: EM: two sherds; MM IB–LM I: Barbotine, carinated, straight-sided, and conical cups, teapot, miniature jug, bowl (MM), pithoi (MM III–LM I), BSJ, cookpots (thin and thick oval legs), stone pounders; LM IIIA1: one kylix; G–A (much seventh century): DG, pithos, monochrome cups, bowls, dinos; C–ER: many BG sherds, dated ca. 550–450 BC (e.g., stamped bowl, jug, and plemochoe) near center of site; a few tiles, RS plates, basin, and a spindlewhorl.

MM IB–LM I, G–ER settlement.

54. (Ap 7) Located 800 m SE of Kamilari on S-facing slope, just E of the Kamilari asphalt road, H tombs (and 79 vases) were excavated by the Herakleion Museum in 1986. Size: ca. 150 x 150 m. Our survey collected two (human?) bones, two Archaic kraters, and ER sherds.

A?, H, ER? tombs.

55. Καλλεριμι. (Ap 16) Located 500 m S of Sivas, pottery is visible in a cutting on the road to Listaros. Size: 150 x ? Artifacts: MM IB–LM III: Barbotine, cookpot, LM I painted and conical cup, BSJ; LM III (much): cooking ware and kylikes.

MM IB–LM III B settlement.

56. (Ap 22) Located 1600 m NW of Kamilari, tiles and sherds situated on a low hill 1.5 km E of the coast. Size: 50 x 130 m. Artifacts: H–ER: massive pithoi; BG, amphoras, RS plate, basins, beehives; a beautifully cut and spouted olive press, measuring 78 cm wide, 100 cm long, 18 high (Hadzi-Vallianou 1992:548 and Pl. 320a).

H–ER farm.

57. Located 400 m below (N) Kamilari. At the base of the Kamilari hill, two ER chamber tombs (Watrous et al. 1993: Pl. 54c) cut into marl bedrock, excavated by the Archaeological Service.

ER chamber tombs.

58. Βοροι. Within the village of Voroi, soundings have produced Minoan sherds at two locations: (a) below the Vallianos house, and (b) below the house immediately to the west of the Vallianos house. Artifacts: (a) Byzantine (twelfth century) sherds and (b) MM IB–LM IIIB sherds (Hadzi-Vallianou 1990:427–428). Sporadic finds from the village include Archaic, H, ER, and Byz–Modern.

MM IB–LM III, Archaic, H–Modern settlement.

59. Πλακουρες-Νερομυλος. Located on the valley floor N of Phaistos, between the watermill (site **3**) and the Tymbaki-Voroi crossroads, a cemetery was discovered during road construction. At Plakoures, a grave (?) with a bronze cauldron, two spearheads, and some daggers (probably PG–Geo). At Neromilos, a PG cemetery (Levi 1957/1958:355–359).

Protogeometric–Geometric cemetery belonging to Phaistos.

60. (B 2) Located 1 km WSW of Phaistos on lower S slope of Phaistos ridge, a rectangular plot outlined by fieldwalls of upright slabs marks a farmstead. Sherd scatter at upper (N) end of plot. Stone press or *gourna* found nearby. About 200 m S of this plot, a sandy limestone ashlar tombstone (H 0.40, L 0.76, W 0.50 m), smoothed front, sides, and top with funerary inscription to a woman (letters 0.05 m high) reported by Manganaro (1965:295) and Watrous et al. (1993:232). Margin above letters may indicate there were more inscribed lines above on another block. Size (plot): 150 x 25 m. Artifacts: H: Black glaze cups and plates.

H farmstead.

61. (B 3) Located about 1,150 m WSW of Phaistos, a sherd scatter on the S slope of Phaistos ridge. Size: 40 x 30 m. Artifacts: beehives, basin, amphora, BG bowl/dish, and cup.

H farmstead.

62. (B 4) Located 400 m SSW of Agia Triada, a chamber tomb cut into W face of slope. Dromos destroyed, perhaps by illicit digging? One of the chamber tombs from a cemetery belonging to the settlement at Agia Triada (Hadzi-Vallianou 1987).

Late Minoan III chamber tomb.

63. (B 5) Located 450 m SW of Agios Ioannis, a concentration of walls, tiles, sherds, and a cistern on top, N, and E sides of hillock. Size: 100 x 110 m. Artifacts: beehives, amphora, Canakkale II style, and spirally grooved ware. One obsidian flake.

ER–Byz. settlement.

64. (A11/ B 6) Located 800 m SW of Agios Ioannis, a concentration of sherds and stone on valley bottom. Site consists of: (a) lithics and Minoan sherds S of Kamilari road, (b) two patches of Archaic sherds, one N and one S of Kamilari road, and (c) H–ER tiles and sherds. Size: (a) 50 x 100 m, (b) each scatter is 50 x 50 m, and (c) 250 x 200 m. Artifacts: (a) eleven flint flakes (one red chert) and two obsidian pieces (flake and blade) and an EM marble figurine (Watrous et al. 1993: Pl. 53a); MM I–II: pithoi, Barbotine, teapot, cooking ware (oval and round legs); (b) sixth century cups, BG, pithos; and (c) H–ER tiles, sherds (cooking ware, amphoras, African and Phocaean RS ware, BG bowl), three spherical spindlewhorls, lamp.

EM–MM IB–II cemetery and/or settlement, A–ER settlement.

65. (B 7) Located 1,200 m NNE of Kamilari on N valley slope (immediately NW of site **49**), a small natural source of chert used as a habitation and knapping site (a), and a patch of H tiles and sherds (b). Size (a): 70 x 40 m; (b): 40 x 50 m. Artifacts: (a): LN–EM II sherds Wiped ware, dark burnished sherds, Agios Onouphrios and Vasiliki ware; much stone (total collected: 171 chert pieces, including chipped stone cores, flakes, chunks of blue, green, and red chert; one white chert flake, obsidian flake, and *gourna*, handstone rubbers. stone ax/hammer cut to be hafted); (b): H–ER: tiles, BG cup (?), plain bowl, basin, and coarse amphoras.

LN–EM IIB knapping and habitation site, H–ER farm.

66. (B 8) Located 700 m N of Kamilari, walls and sherds partly exposed in cutting for E–W dirt road at the base of the S slope of hill. Two walls 70 m apart visible in road scarp. Size: 70 x ? Artifacts: MM III, LM IIIA2–B sherds; eight (recent?) chert flakes.

MM III–LM III settlement.

67. (B 9) Located 200 m NNW of site **66**, a concentration of chipped stone. Size: 5 x 4 m. Artifacts: MM: a few sherds; pieces of white and pale brown flint.

*Knapping site (?), perhaps connected with site **66**.*

68. (B10) Located 800 m NNW of Kamilari and 150 m SSW of the small tholos tomb dug by Alexiou at Kamilari (site **6**), two short stretches of wall (preserved height: one course of fieldstones) running along edge of top terrace at the N side of ridge. Size: 80 x 35 m. Artifacts: EM II: Agios Onouphrios ware and two chert pieces; MM I–II: Barbotine, pithoi, loomweight, cooking ware.

EM II, MM I–II settlement.

69. (B 11) Located on S slope of Phaistos ridge, a concentration of sherds 1,600 m WNW of Agios Ioannis. Adjacent to streambed. Size: 25 x 10 (?). Artifacts: MM I–II sherds, pithos, two chert frags.

MM IB–II farmstead.

70. (B 12/A 24) Located 700 m E of Kamilari, an area of sherds, tiles, and a wall. On the terraced E slope of ridge overlooking small N–S valley that connects the areas of Phaistos and Pitsidia. Size: Minoan: 225 x 90 m and H: 250 x 90 m. Artifacts: MM I–II: conical cups, jars, pithoi, tripod legs (oval), DG; MM III–LM I: cups, handle with chevron inscribed on it at the top; A–C: many BG cups, relief pithoi (plates E.5 and E.6, upper, left); H–ER: rooftiles, stamped Rhodian amphora, plates, basins, Cream ware, Arrentine ware. One obsidian flake.

MM I–LM I, A–ER settlement.

71. (B 14) Located 1,100 m SE of Kamilari, sherd concentration on top of small hill. Size: 90 x 20 m. Artifacts: MM IB–II (MM III?): Barbotine, pithoi, dark ground, cooking ware; one chert flake and a groundstone hand tool.

MM IB–II (MM III?) farmstead.

72. (B 15) Located 1,000 m SSE of Kamilari, just NW of site **71**, an area of tiles and sherds on the valley floor. Size: 60 x 60 m. Artifacts: A (?): few A sherds; ER: many tiles and amphoras; BG and Arrentine plates (plate E.22, lower, right), pithoi, basins, spindlewhorls, and loomweight.

ER (mostly first–third century AD) farmstead.

73. (B 18) Located 1,300 m SSW of Agios Ioannis, a patch of sherds, on N slope of ridge. Artifacts: MM I–III: sherds, Minoan flake, two scrapers and a core of chert; G?: a cup; H–ER: Cream ware, BG cups, lekanis, and plaque (?).

*MM I–III settlement, H–ER graves (?) for site **96**.*

74. (B 17/19) Located 1,100 m SE of Kamilari, an area of sherds and stone along the top and S slope of ridge. Size: 140 x 80 m. Artifacts (on slope) MM I–LM III (mostly MM III–LM I): Minoan cooking ware, (round and oval) tripod legs, pithoi, Barbotine and dark ground; (on ridgetop) MM III–LM I: much painted fine ware, DG, pithoi, many conical cups, painted LM I cups (some LM IB), large jars, cookpots, amphoras, jugs; 61 chipped stone pieces—cores, flakes, blades, scrapers (one obsidian blade), groundstone rubber and chopper, complete murex shell.

MM I–LM IB, LM III settlement.
MM III–LM I graves on ridgetop?

75. (B 20/A 14) Located 900 m NW of Kamilari and immediately SW of Kamilari tholos tomb (site **5**) hill, a settlement occupies the valley between three hills. Cutting for a stone column visible on top of western hill inside the site. Size: 280 x 320 m. Artifacts: H–ER: tiles, glass frags., BG and African RS sherds, beehives, Combed ware, basins, pithoi, and amphoras. Thirty-seven pieces of chipped stone, including flakes and one obsidian blade (from adjacent site **7**?).

Late Hellenistic–ER settlement.

76. (B 21) Located 1,150 m WNW of Kamilari, walls and sherds on the S slope and end of a ridge, overlooking valley leading to the coast. Sections of late walling used to form a terrace. Size: 70 x 80 m. Artifacts: MM IA/B–II: red-painted teapot, lumpy conical cups, without stringmarks on their bases (some handmade), lamp, large basin. jars, carinated cup, burnished (MM IB) bowl, pithos, cooking ware (thick oval and round tripod legs); two red chert flakes, and chunk; LM III A2–B: goblet, kylix, coarse painted stirrup jar; C–ER: tiles (?), BG cups, Eastern Sigillata A, Cypriote RS; four *gournes*, a *goudi*, and *triptiras*; LR: one fifth–sixth century AD sherd.

MM IA/B–II; MM III–LM I ?; LM III A–B;
C–ER, LR? settlement

77. (B 22) Located 1,800 m WSW of Agia Triada, a concentration of sherds on the N slope of a hill about 1,800 m from the coast and directly overlooking the Ieropotamos delta. Size: 40 x 110 m. EM I–II: B and Agios Onouphrios wares; MM IB–II: pithos, dark ground sherds, one flake; LM III (much): III A2–B amphoroid krater, kylix, pithos; Archaic: pithos with a griffin (?) in relief (plate E.14); another pithos with concentric circles (plate E.16, upper, right); cups, basin; C: BG bowl, lamp; H (much): Rhodian (?) amphora; ER: Arrentine sherd.

EM I–II, MM I–II; MM III–LM I (?); LM III A–B, A–H, ER (?) settlement.

78. (B 23) Located 250 m NW of site **76**, a small patch of sherds revealed by deep plowing on the top of the S slope of a marl ridgetop. Size: 2 x 1 m. Artifacts: dark B sherds; one C spindlewhorl.

Final Neolithic campsite (?)

79. (B 24/A 33) Located 1,250 m SW of Agia Triada, tiles, sherds and stone situated on the flat ridgetop circa 300 m S of the Ieropotamos delta. Size: 100 x 100 m. A: cups, pithoi; C–ER: tiles, BG cups, amphoras, heavy basins, basins, beehive, spindlewhorl, Arrentine; and a flat, circular, stone olive press. Five pieces of MM chipped stone.

A–ER settlement.

80. Πατρικιες. (B 25) Located 750 m SE of Agia Triada, walls and sherds from site excavated by Levi (Bonacasa 1967/1968) on ridgetop above Agia Triada. Walls and sherds are in two separate concentrations: one on ridgetop and a second on W slope. Excavations revealed a pottery workshop set next to a road. Site size: 50 x 50 m. Artifacts: EM I–IIB: B bowl, Agios Onouphrios sherd, four Vasiliki teapots; MM I–II: mostly handmade MM IA/B teapots (plate E.5), conical cups, bowls; pithos (?); LM III sherds (Kanta 1980:100–101).

EM I–II; MM IA–II, LM IIIB settlement.

81. (B 26) Located 500 m W of Efendi Christos (Phaistos), two patches of sherds on top of the Phaistos ridge. Size (north patch): 10 x 35 m; smaller scatter to the south. Artifacts: MM I–II: cooking ware (oval leg), DG, bowl, conical cup; much MM III–LM I: straight-sided and conical cups, painted rounded cup, cooking ware.

MM I–LM I settlement, perhaps also graves.

82. (B 27) Located circa 400 m NW of Efendi Christos (Phaistos) along the north cliff-edge of the ridge overlooking the Ieropotamos River 100 m below. Retaining wall (Minoan?) with large blocks at S edge of site; on N, upper part of site, tiles, wall remains, cut blocks, and a small rock-cut cistern. Site size: 90 x 50 m; LN–EM I sherds in smaller area concentrated on hilltop. Artifacts: LN–EM I: B wares, Agios Onouphrios; MM I–III: cooking ware, Barbotine, DG, conical cup, eggshell ware, polychrome; A–H: loomweight, BG, amphora. One LM III kylix and a G (?) sherd.

LN–EM I, MM I–III, Archaic and H settlement;

83. (B 28) Located on the flat top spur of Ieroditis ridge 100 m NE of the church of Agios Onouphrios and 900 m N of Phaistos. This concentration of sherds marks the western portion of the main Phaistian cemetery that stretches 1,100 m eastward as far as Kalivia. Immediately below (S) this site is a large pit that may have produced the "Agios Onouphrios deposit" published by Evans (See site **24** and Evans 1895; Taramelli 1901). Size: 40 x 35 m. Artifacts: EM I–II; many handmade sherds, some from large vessels, Wiped ware, Agios Onouphrios, Lebena ware; MM I: DG, handmade conical cup, pithos, cooking ware.

EM I–MM IB portion of the main Phaistos cemetery.

84. (B 29) Located about 100 m. N of site **83**, a separate concentration of sherds sitting on the flat NW edge of Ieroditis ridge. Size (Minoan): 20 x 20 m; (C–H): 70 x 70 m. Minoan sherds focused in NW quadrant of site. Artifacts: EM I–III: Wiped ware, Agios Onouphrios, red-painted and B ware, thin oval tripod leg; chert flake, obsidian; MM I A–B: pithoi, cups; C–H: tiles, BG cups, pithoi, two spindlewhorls.

EM I–MM I B graves. C–H farmstead.

85. (B 30) Located 800 m N of the palace at Phaistos, a concentration of sherds at the S edge of Ieroditis ridge, facing directly E on the canyon of Phalangari; 300 m NE of site **99**. Size (Minoan): 130 x 40 m; (A–H): 40 x 30 m. Artifacts: EM I–II: Agios Onouphrios, red B, and red painted oatmeal wares, pithoi, chipped stone; MM I–II: Barbotine, DG, incised vase; LM III: kylix; A: cup; C: three tiles, BG cups, skyphos, basin.

EM I–MM II graves. A–H (sixth BC–third century AD) farmstead (?)

86. (B 31) Located 600 m SE of the village of Voroi, walls and sherds on the N central part of Ieroditis ridge near the N cliff. Two walls, 50 m and 20 m long, forming a right angle, enclosing an area (25 x 20 m) of rooftiles. Site size: 50 x 25 m. H–ER: tiles, large pithoi, BG, stamped Arrentine plate, amphoras, heavy disc (lid?), overfired handle, imported North African jar, beehive, jugs, cooking ware.

H–ER (to the second century AD) farmstead.

87. Παλαεα Καλυβια. (B 32) Located 1 km NE of Phaistos, walls, tiles, and sherds sit on the highest point (elev. 145 m) on the ridge of Ieroditis. Size: 60 x 60 m. Double set of walls form a partly closed rectangle with a small square room (tower?) at SE corner; apothekes (?) along S side; large central room; open court on the W. Artifacts: V–T: (twentieth century ?) sherds and tiles.

Venetian–Turkish (?) period settlement?

88. (B 33) Located 300 m W of Kalivia village, a patch of sherds and chipped stone at the top of the S slope of Ieroditis. Size: 20 x 50 m. Artifacts: Gray and Wiped ware, much Agios Onouphrios, red-washed ware, handmade (?) cup, and pithos; obsidian and chert. At the foot of the site a small concentration of tiles and Venetian-Turkish pottery.

EM I–II settlement.

89. (B 34) Located 700 m WSW of the Kalivia monastery, the cemetery site called Logiadhi by Savignoni (1904:653) sits on the steep low S slope of Ieroditis 850 m ENE of Phaistos. Heavy terrace wall (date?) at N edge; quarrying (?) in SE quadrant of site. Size: at least 100 x 150 m. Artifacts: MM I–LM III sherds (pithoi, jar, cookpots) over the two southern quadrants: probably graves; LM III: larnax frag. found a little to S of site; G: a Geometric burial, plus many Geometric sherds and cremations in nearby fields (Gerola (1902b:332); T (N end of site): tiles and Ottoman-period pottery.

Eastern portion of the main Phaistian cemetery.

90. (B 35) Located 100 m SW of site **87** on outcropping of steep S slope of Ieroditis, a dense concentration of sherds 750 m N of Phaistos. Size: 3 x 3 m. Artifacts: MM IB–LM I: sherds, cookpot frags.; Barbotine, red burnished, DG, conical and carinated cups, LM I painted (floral spray, spirals) cups.

MM IB–LM I grave(s).

91. (B 36) Located 600 m SE of Sivas village an area of tiles, bricks, and sherds on a terraced N-facing slope 100 m E of the streambed. Size: (Roman): 70 x 40; (Ottoman): 120 x 40 m. Artifacts: beehives, brick, five pieces of Phocaean RS, Chandarli ware, cooking ware, Arrentine, ribbed amphoras, basin; T (nineteenth-twentieth century): sherds and tiles.

Roman (second–seventh century AD) and nineteenth–twentieth century farmstead.

92. Μοναστιριακο Πιγαδι (B 37) Located 700 m SSE of Sivas, a cemetery (Alexiou 1968:403) situated on low slope 200 m below (NW) site **93**. Site consists of a concentration of bones, pithoi, clay lumps (mudbrick or wall or ceiling packing?). Size: 70 x 70 m. Artifacts: LM III A1–B: pithoi, cookpots, larnax frags., tripod offering table, snaketube (?), kylikes, goblets, coarse SJ; LM IIIC–PG: kraters, monochrome bowls, sherds, jar, kalathos, burnt sherds over 70 x 70 m. Recent (?) *goudi.*

LM IIIA–C/PG cemetery.

93. (B 38) Located 1 km SSE of Sivas, an area of sherds on the hidden backside (S) and top of steep ridge and rock outcropping at the S edge of the Sivas valley. Creek bed and spring at S base of site. WW II trench on top (W) of ridge produced PG sherds. Size: 80 x 110 m. Artifacts: MM IA: many handmade DG, conical cups; MM IB–II: Barbotine, cooking ware, DG, bowls, polychrome; MM III–LM I: pithoi, DG; LM III: kylix, cookpots (IIIC?); PG: footed skyphos, Monochrome pithos, Geometric jug. Handmade jug handle with mark: Y placed on its side. Stone chopper, red chert flake. Two recent limekilns, unfinished millstone, and stone doorpivot.

MM IA–Geometric settlement.

94. (B 39) Located 1,200 m SE of Sivas in the Asterousia foothills, a scatter of tiles and sherds 150 m N of a streambed. Size: 130 x 60 m. H (?)–ER: tiles, many beehives, pithos, basins, amphoras, cookware, BG, Phocaean RS, Italian TS and N. Italian (second century AD).

H?–ER farmstead.

95. (B 40) Located 400 m N of Agia Marina fountain and 400 m E of the Phaistos asphalt road, a patch of sherds and stones (decayed walls?) sitting on an area of Pleistocene red soil on the valley floor. Size: 25 x 45 m. Artifacts: LM III A–B goblets, kylikes cookpots and cook dishes, pithoi, basin, ladle, and clay firedog.

LM IIIA 1–IIIB farmhouse?

96. (B 41) Located 1,100 m S of Agios Ioannis and 100 m E of Phaistos asphalt road, a concentration of sherds on the E slope of a hill. Size: at least 130 x 160 m. Artifacts: MM IB–II: bowls, cups; MM III–LM I: pithoi, cookpots, cups, conical cups; LM III: goblet; Archaic: cups; C–H: BG, amphora, basin; ER–LR: Phocaean RS, Arrentine, ribbed amphoras; V (sixteenth–seventeenth/eighteenth centuries): many sgraffito dishes and jars.

MM IB–LM III B, A–LR, Venetian–Turkish settlement.

97. (B 42) Located 1,200 m SSE of Agios Ioannis, tiles and sherds situated on SE slope of hill facing plain 100 m to E. Size: 150 x 165 m. Artifacts: H–ER: tiles, BG, beehives, basin, Phocaean RS, Pompeian red, Arrentine, concentrated in central portion of site; V: much early Venetian pottery, tiles, jars, amphoras, pithoi, casserole, jug, cooking ware, painted sgrafitto; lightly B, polished brown (combed at times) ware; green-striped sherds, bowls glazed brown, green, and yellow. Two red chert flakes.

H–ER and early Venetian (thirteenth–fourteenth/fifteenth century) settlement.

98. (B 43) Located 1,250 m SE of Agios Ioannis and 170 m NW of church of Agios Basileios, a concentration of sherds lying on Pleistocene red soil on the E edge of a low flat hill next to the plain. Size (LN–EM I): 150 x 60 m; (Archaic):

small area in center of site. Artifacts: LN–EM I: dark burnished, Wiped ware; EM II: Agios Onouphrios, Vasiliki ware, red wash ware; MM IA/B: handmade Barbotine; MM IB–II: conical cups, cooking ware, teapots, wheel-made Barbotine, DG, straight-sided cup, coarse bowls, bridge-spouted jars.

LN–EM II, MM IA/B–MM II, A settlement.

99. (B 44) Located on ridgetop and S face of Ieroditis ridge 700 m N of Phaistos, an area of Minoan sherds and stone tools. In the NW quadrant of site, tiles and H–ER sherds may be connected with a wall circa 50 m to the N. Size (Minoan): 90 x 165 m. Artifacts: EM I–II: Wiped and Gray ware (bowls, one with high handle), dark painted jar, bowl and jug, Agios Onouphrios pyxis; many flakes, of red, green chert, obsidian flake and blade, stone chopper; H–ER: tiles, BG, ER red ware, pithos, amphoras.

EM I–IIB, MM I (?) graves or settlement. H–ER farmhouse.

100. (B 45) Located 400 m NE of Voroi, a concentration of sherds and stones (decayed walls) on Pleistocene soil. Size: at least 10 x 20 m. Artifacts: MM III–LM I; cookpot (oval leg), DG, amphora, cup, flowerpot; stone rubber.

MM III–LM I farm or fieldhouse.

101. (B 46) Located 850 m NNW of Voroi about 120 m W of asphalt road to Kalochorafitis and 150 m E of streambed, a patch of sherds on bright red Pleistocene soil. Size: at least 15 x 15 m. Artifacts: Wiped ware, handmade sherds, red chert core, green flake.

EM I campsite?

102. Gria Saita. (B 47) Located 1 km NW of Petrokephali, tiles, stone piles (walls?), and sherds sitting on the plain, immediately S of a small E–W canal. Size: at least 130 x 120 m. Artifacts: ER: North African amphora, ER plate BG; T: tiles, a brick, green-glazed sherds, *tsoukalia*, Margarites ware, white chert threshing flakes.

ER and Turkish farmstead.

103. Λιλιανα. (B 48) Located 900 m ENE of Phaistos on a small ridge at the S base of Ieroditis, 750 m W of the Kaliviani monastery, chamber tombs cut into the S side of slope. A pair of LM III chamber tombs on the W side of slope and a second pair circa 450 m N cut into the E face of the rock cliff are visible today. Traces of the other four tombs excavated by Italian archaeologists (Gerola 1902b:324–333; Savignoni 1904: col. 627–666, esp. 629–630, Fig. 99; Kanta 1980:100; Di Vita, La Rosa, and Rizzo 1984:136–137) remain between these two pairs of tombs. Some of the larnakes were apparently reused for later burials in the Geometric period. Total site size: circa 50 x ? m; (LN): 30 x 30 m. Artifacts (excavation) LM III: 18+ larnakes, beads, two rings, a needle, a clay figurine of a horse, and approximately 45 clay vases; (survey): LN: dark B sherds, worked red chert core; LM III: sherds; G: urn burials; C–H: much pottery, including two BG skyphoi (one Attic), probably from Classical burials.

LN site and LM IIIB–G, C–H cemetery belonging to Phaistos.

104. Καλυβια. (B 49) Located 450 m W of the Kaliviani monastery, 14 LM III A1–2 chamber tombs cut into the E face of a small hill midway between the village of Kalivia and the Phaistos-Moires asphalt road. Site size: 90 x 250 m. Labeled the "Tombei dei Nobili" by the Italian excavators (Gerola 1902b:324–332; Savignoni 1904: 501–654; Kanta 1980:99). Later burials stretch as far as the Kaliviani Monastery to the east. A PG grave with much pottery and weapons is reported by Hadzi-Vallianou (1979:384). Artifacts (Tombei dei Nobili): LM IIIA: painted wooden coffin, eight gold and two silver rings, gold necklaces, 12 carved sealstones, gold-inlaid sword, bronze armor (?), knives, razors, arrowheads, jugs, mirrrors, basin; imported Syrian or Egyptian alabastra, necklaces of beads, stone and clay vases; LM IIIC: burials; PG–H (around the Monastery of Kaliviana) graves.

LM IIIA–H cemetery belonging to Phaistos.

105. Αγια Παρασκευη. (B 50) Located on the S slope of Ieroditis 650 NNE of Phaistos, two main concentrations of sherds separated by about 120 m are situated immediately above and E of the church and spring of Agia Paraskevi. About 80 m W another small patch of pithos, cookpot sherds. Artifacts: (east), two groundstones, MM III–LM I jars, pithoi, cookpot; two groundstone tools; (west) MM IB–III: sherds, cookpot, jar; Archaic: skyphos and pithoi; (small patch) LM III: sherds.

MM IB–LM III, Archaic fieldsites or graves.

Sites Found Immediately Outside of the Intensive Survey Area

106. Κουρνενι. (Ap 1) Located 850 m ESE of Petrokephali, a patch of sherds and stone tools situated 300 m S of the valley floor at the edge of a small plateau 50 m above the plain. Size: 80 x 80 m. Artifacts: LN–EM I: dark burnished bowl with two sets of parallel incised lines running diagonally right and left from the rim; dark B, Wiped ware, red-painted sherds; stone chopper, saddle quern and whetstone (?).

LN–EM I settlement.

107. (Ap 3) Located 300 m NE of Petrokephali, cut blocks, tiles, and sherds on plain just E of dirt road from Petrokephali traversing the plain N–S. Size: small.

ER farmstead.

108. Αγιος Νικολαος. Located 3 km NW of Kamilari and 900 m E of the coast, a concentration of sherds on the hillock of Agios Nikolaos. Artifacts: (in road cutting on E side of hill) LN–EM I; MM I–II sherds; ER (hilltop next to church of Agios Nikolaos): sherds.

LN–EM I; MM I–II, ER settlement.

109. Σιβας. (Ap 23) Located 1.6 km SW of the village of Sivas, two tholos tombs (small bone enclosure outside) were excavated by Paribeni (1913). The settlement belonging to the tombs is circa 100 m NW of tholoi next to a seep. Artifacts (from excavation): EM I–MM II: dark B ware, a Pyrgos chalice, incised ware, Agios Onouphrios, white-on-red ware, Barbotine, a clay lamp, a spouted basin (oil separator?), and a larnax; two bronze daggers, a short sword (0.14 m in length), tweezers, razor, ten stone vases, a whetsone, stone (including one stamp seal), and ivory seals. Artifacts (survey): much EM I–II: Agios Onouphrios, red B ware; MM I B–II: cup, DG in S tomb.

EM I–II; MM IB tombs and settlement.

110. Αφρατιας. Located on a small hill 600 m SW of the church of Agios Nikolaos (see site **108**) and 200 m E of coast. D. Vallianou's excavation (Hadzi-Vallianou 1989:436) has revealed an MM IB–II structure with a cyclopean base built over an EM IIA–B (?) settlement. Artifacts: EM IIA sherds; MM IB–LM I sherds.

EM II settlement and MM I–LM I cyclopean structure.

111. Τραπεζα. Located about 700 m N of the large Kamilari tholos, a "large" concentration of sherds on fenced-in NATO enclosure near the new cistern at the turn of the NATO road. Size: "large." Artifacts: EM I: dark B sherds and Pyrgos ware chalice.

EM I settlement.

112. Σοπατα Κουσε. About 2 km E of Kouses on a ridge in the foothills of the Asterousia, Hadzi-Vallianou (1979:385, 1989:432–433) excavated a tholos tomb complex. The tomb and settlement to the N sit above a small spring-fed valley immediately below it and to the east. Artifacts (excavation): EM II (?): cups and basins; obsidian blades and bone points; a small triangular dagger and tweezer; a necklace of steatite (?) beads; MM I–II: dark-ground conical cups; several bone/ivory seals; shells and two stone blossom bowls (one high example being no earlier than MM IB) and a seal.

EM II–MM II tholos and settlement.

113. Ποβια. About 3 km W of Pobia, on a shoulder at the base of the Asterousia, circa 300 m E of the stone quarry, a large cyclopean house (and outlying buildings?) has been noted (Pendlebury, Eccles, and Money-Coutts 1932/1933:90). The walls are set on a retaining wall next to a spring. Partly destroyed by the owner of the house across (S) the road. Size: 50 x 80 m? Artifacts: MM III–LM I: sherds.

MM III–LM I cyclopean farmhouse.

Appendix E

Chronological Framework for the Survey

L. Vance Watrous and Despoina Hadzi-Vallianou

This appendix spells out the chief criteria used by the survey to date the ceramic assemblages found on archaeological sites. We have limited our description and illustration of the pottery collected by the survey to characteristic chronological assemblages (plates E.1–E.24). Our reasons for this decision are as follows. The survey area includes or is adjacent to Phaistos, Agia Triada, Kommos, and Gortyn, stratified sites that are a better source for the publication of securely dated pottery than a surface survey. Archaeologically, our area is relatively well known and so does not require the (re)publication of ceramic typologies. We did, however, collect large amounts of pottery (often several hundred sherds) from most sites. The pottery was identified by the two codirectors, who had a combined total of twenty years of firsthand archaeological experience with the local pottery of the Western Mesara.

Aside from recognizing specific ceramic shapes and decorations (presented in appendix D), we also recognized a chronological period on a site by identifying a set of features belonging to chronologically distinct ceramic assemblages. These features are outlined below.

Neolithic

Pottery (plate E.1) of this period is usually dark burnished, thick-walled (1 cm or more), and resembles the Late Neolithic material published by Vagnetti (1972–1973) from Phaistos. Surface color may also be various shades of brown or red; the fabrics are dark, coarse, and sometimes have an incompletely reoxydized core. Shapes are mostly open; the interiors of vases are sometimes wiped (a feature that continues into the EM I period). Different types of lug handles are common. Neolithic ceramic assemblages can be distinguished from EM I collections by the exclusive presence of well-burnished black-surface wares (without wiped examples). So far as we can tell, all of the Neolithic pottery from the survey is Late Neolithic, like the LN levels at Phaistos and contemporary with Strata I and II at Knossos (Evans 1994).

Early Minoan I

Burnished brown, tan, and mottled EM I wares carry on the heavy-walled Neolithic tradition. Wiped interiors are common. Shapes are generally smaller, thinner walled, and less well burnished. Incision and patterned or scribbled burnishing (plate E.2, middle row, left; lower row) occur on fine gray ware vases but are rare. Vagnetti (1972–1973) illustrates examples. Agios Onouphrios wares, often jugs and bowls, appear. Decorated in red and brown linear patterns, these vases are made in a range of buff fabrics, at times with a darker core. They may have a cream colored slip and be burnished. White on red vases (Lebena ware) are present.

Early Minoan II

Published Early Minoan II pottery from the Mesara comes from Phaistos (Levi 1976), Lebena (Alexiou 1958, 1960), Agia Kyriaki (Blackman and Branigan 1982), and Knossos (Wilson and Day 1994). Fine Gray and Agios Onouphrios wares (plates E.2, middle row, right; E.3 and E.4) continue in this period. Agios Onouphrios fabrics (Wilson and Day 1994:23–24, 57–69) are fairly easy to distinguish. EM II jugs, bowls, and cups in these fabrics tend to be larger and thicker walled than in EM I. Linear designs are heavier (e.g. Warren 1972: Pl. 30) Sharply articulated spouts (e.g. Wilson and Day 1994: Fig. 5), heavy vertical roll handles, neck pellets (Xanthoudides 1924: Pl. 26b), and large pithoid jars become common. Vasiliki and imitation Vasiliki examples are rare. Identifying an EM II phase (as opposed to EM I) on a site can be difficult: it is largely done either by the absence of EM I features or by a high proportion of Agios Onouphrios wares within the assemblage.

Early Minoan III–Middle Minoan IA

Early Minoan III is a relatively short period (Coleman 1992), circa 2400/2300–2200 BC. No Early Minoan III ceramic deposit has yet been identified in south-central Crete (Warren and Hankey 1989:20). At Knossos, the EM IIB ceramic tradition of dark on light and red or black slipped wares continues into EM III, the latter becoming more prominent (Wilson 1994:33). In EM III some EM II shapes, such as the goblet (now straight-sided), beaked jug, and shallow bowl with everted rim are still made. New shapes include the flat-bottomed goblet or tumbler, the one-handled rounded cup, and the bridge-spouted jar. We did not recognize any of the above EM III shapes during the survey.

On the other hand, Middle Minoan IA is relatively well documented in the Mesara. Stratigraphic groups exist at Lebena (Alexiou 1960: Fig. 19) and at Patrikies (Bonacasa 1967/1968). Other deposits with substantial amounts of MM IA come from Vorou (Marinatos 1930–1931), Phaistos (Levi 1976, 1981), Agia Triada (Banti 1933:171–181), Porti (Xanthoudides 1924: Pls. 34–36), and Platanos (Xanthoudides 1924: Pls. 50–51). Walberg (1983:93–104) has identified certain Mesara vases stylistically as MM IA. Principal shapes, still handmade, are the squat teapot (plate E.5, upper row, all but far left), small amphora, eggcup, plain handmade conical cup, as well as the white-on-dark-tumbler and shallow flaring bowl. Decoration consists of incision and Barbotine (plate E.5, middle row), and white-on-dark patterns or a washy, dark ground that is often lustrous and crackled. Handmade conical cups (plate E.6, upper row, all but second from right) may be MM IA (or MM IB). Bases of closed vases (plate E.5, lower row, right and lower row, right) are not clearly articulated at the bottom of the wall (as they are in MM IB). Dark paint is applied every which way on the surface of the handmade vase. Some dark painted handmade sherds, however, could only be dated generally to the EM IIB–MM I period. Conical cups are handmade and lumpy (plate E.6, upper row, second from left).

We collected extensively at the site of Patrikies (**80**) to have a body of MM IA comparanda (plate E.5). On the basis of close parallels in shape and surface decoration, we were able to date a number of sherds from the survey to the MM IA period.

Fieldworkers in the Agio Pharango Valley have interpreted their ceramic findings differently. Using the white-on-dark style and Barbotine decoration on handmade sherds as indicators of the EM III–MM IA period, Vasilakis (1989/1990) identified numerous EM III–MM IA sites in his survey of the Agio Pharango valley. Branigan and Blackman (1977:68) acknowledged that they identified almost no EM III material in their survey, but nevertheless they claimed that settlement in the Agio Pharango Valley continued unabated from EM II to MM IB. This assumption seems highly unwarranted.

Our reasons for disagreeing with our colleagues' conclusions follow. Vasilakis's dating cannot be accepted uncritically because his stylistic identifications depend on white on dark, dark ground, and Barbotine being solely EM III–MM IA. Handmade sherds of white on dark and dark ground, however, can date to EM II as well as to MM IB. More important, Barbotine is rare in the Mesara until MM IB (Betancourt 1990:28, 65). Barbotine decoration also comes in several forms that change over time. The early form of Barbotine, datable to MM IA, takes three forms: (1) large knobs frequently in pairs or rows (Xanthoudides 1924: Pl. 41), (2) torsional ridging (Xanthoudides 1924: Pl. 41:4953), and (3) barnacle-work (Xanthoudides 1924: Pl. 5:4105; Pls. E 8, upper row, middle and E 10, lower row, left). All three forms, however, continue well into the Protopalatial period. As a result of his work at Archanes, Maggidis (pers. com., 2000) now prefers a MM IB date for the first form of Barbotine. Barnacle-work is extremely popular in MM IB–II contexts and therefore cannot be assigned exclusively to the MM IA period. Other forms of Barbotine, particularly pellets (Xanthoudides 1924: Pl. 5:4971 and plate E.10, upper and lower rows, middle), and framing designs or filled areas are also mainly Protopalatial (Walberg 1983:63). Foster's (1982) and Walberg's studies, corroborated by the publication of the Protopalatial levels at Phaistos, concluded that Barbotine is most popular during MM IB–II. Thus it seems reasonable to conclude that most of the Barbotine found by the Mesara surveys dates to the Protopalatial period, and cannot, by itself, be used as a criterion for MM IA.

In addition, Levi's excavations (Levi 1976, 1981) in and around the palace at Phaistos have revealed that the pottery from the earliest levels *after* the construction of the palace were almost entirely handmade. Betancourt (1985:92–93; 1990:29–30) was able to compare ceramic deposits at Kommos with the stratified sequence at Phaistos. His study has shown that deposits of handmade Mesara pottery (including Barbotine and dark ground) outside of Phaistos, that might be identified stylistically as "MM IA," actually have their closest parallels with the earliest Protopalatial levels at Phaistos and therefore date to the MM IB period. Warren and Hankey (1989:51) come to the same conclusions: the Patrikies and other deposits, formerly dated to MM IA, actually are MM IB in date.

Blackman and Branigan's conclusions can be tested against their own data, namely, the ceramic sequence from the tholos tomb at Agia Kyriaki (Blackman and Branigan 1982). The Agia Kyriaki pottery consists largely of robbers' debris, and has been identified stylistically, but nevertheless should represent a fairly complete EM II–MM II ceramic sequence for the use of the tomb. For chronological purposes, examples of wares and shapes are each counted equally in table E.1. In the table the totals of EM II sherds to MM IB sherds is not valid because most EM II shapes were not counted (including EM II shapes would have raised the EM II total). Nevertheless, table E.1 does show a drop after EM II/III and a rise at or just before MM IB. Conspicuous by its absence at Agia Kyriaki is the MM IA Patrikies type teapot. We can check the results of table E.1 by putting Branigan's vase shapes (Blackman and Branigan 1982:39 and 40, Table 3) in chronological sequence (table E.2). Table E.2 is based on Branigan's Form C cup, which is the only ceramic shape at Agia Kyriaki that exhibits an easily definable EM II–MM IB sequence.

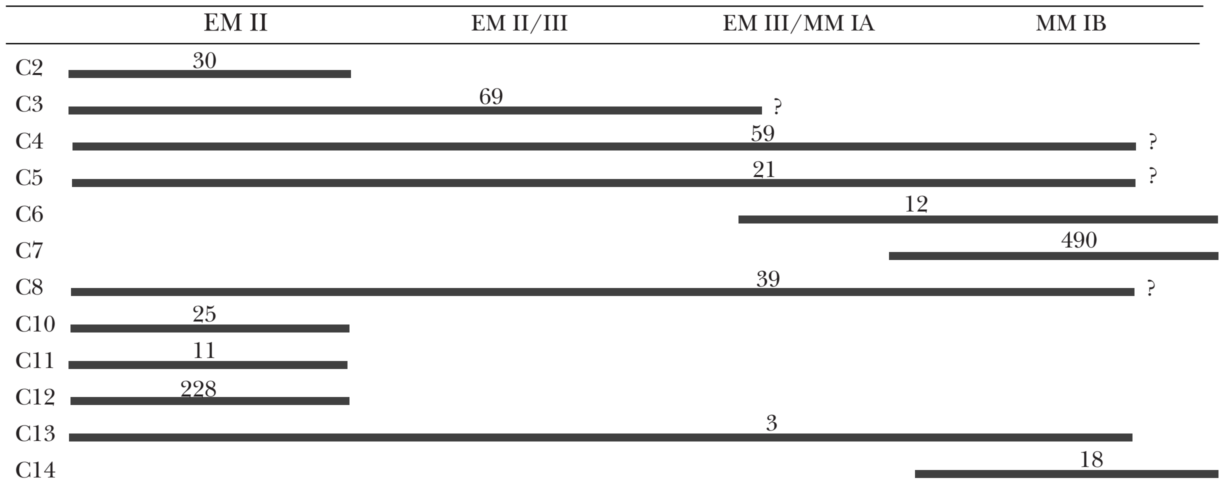
In table E.2 the chronological sequence of type C cups precludes specific totals for each individual period (EM II, EM III/MM IA, and MM IB), but a drop in numbers after EM II/III followed by a rise during or just before MM IB is

TABLE E.1. Chronology of EM II–MM IB pottery types

	EM IIA/B	MM IA	MM IB
Agios Onouphrios ware	1895		
Vasiliki ware	103		
Red/Brown Slipped ware	79	?	
Red-Wash ware		30	?
Dark-Wash ware		114	?
Urfirnis		61	?
Gournia ware		9	
Conical cups		36	500
Polychrome/Barbotine		2	6
Pedestaled/large bowls	11		
	2257	252	506

Source: Based on Blackman and Branigan 1982: Fig. 1.

TABLE E.2. Development of Type C cup



Source: Based on Blackman and Branigan 1982:39–40.

apparent. Thus tables E.1 and E.2 show a single overall pattern that matches our survey data.

In this respect, the EM III–MM IA survey results are similar to those of the Late Minoan II/III A1 period, that is, little archaeological evidence has been found, combined with the fact that identification of contemporary data is hampered by lack of stratigraphic evidence. The situation thus resembles our state of knowledge in the mid-1970s concerning the stylistic and chronological character of LM II. At that time, some scholars argued that in most parts of Crete outside Knossos the ceramic period LM IB was followed by LM IIIA1. Others (Popham 1975) believed that LM II as a ceramic and chronological period existed throughout Crete. Subsequent excavations throughout Crete have shown that Popham was correct, and that our problem was not one of ceramic identification, but that LM II pottery had been missed because it occurred in such small quantities. It is now generally acknowledged that the lack of LM II at many sites is due to the fact that LM II was period of severe depopulation. The periods LM II/IIIA1 and EM III/MM IA follow a widespread destruction of settlements and are periods of upheaval, and demographic nucleation. Thus, it appears likely that EM III/MM IA settlement data is scarce in our region and that our inferences from this data (chapter 9) are correct.

MIDDLE MINOAN IB–II

Local Protopalatial pottery is well documented (Levi 1976; Betancourt 1990). Wheel-made and relatively standardized, MM IB–II pottery (plates E.7–E.10) is easy to distinguish from earlier phases. Common shapes include conical cups (with parallel stringmarks on their base), straight-sided cups, carinated cups (plate E.10, upper row, right), bridge-spouted jars, basins, amphoras, jugs, pithoi, and lamps. Barbotine (Watrous et al. 1993: Pl. 54a and plate E.10 here), dark ground, white-on-dark, and polychrome (plate E.9, upper row, left) decoration are common. A number of the heavier shapes, lamps, fruitstands, and bowls, are burnished. Metalicizing and eggshell wares occur. Conical cups may still be handmade in MM IB (Betancourt 1986). The Protopalatial forms of the conical cup (plate E.6, lower row, all but far right) are defined by Fiandra (1973) and Betancourt (1986).

MIDDLE MINOAN III–LATE MINOAN I

Neopalatial pottery (plate E.11, upper row, all but far left) in our region is also well known (Levi 1976; Banti 1977; La Rosa 1979; Watrous 1992; Warren and Hankey 1989:47–51). The Neopalatial form of conical cups, Vapheio-type cups (with spatulate handles), rounded cups (with everted rims), pitharakia, bridge-spouted jars (burnished) cups and jugs, amphoras, and pithoi are distinctive. Hallmark designs are some light-on-dark, as well as dark-on-light spirals (plate E.11, upper row), tortoise shell ripple, wavy lines, floral motifs and festoons.

Late Minoan II–IIIA1

Excavated pottery of this period has been published from Phaistos (Levi 1967/1968: Savignoni 1904), Kommos (Watrous 1992), Agia Triada (La Rosa 1997) and Goudies (Laviosa 1970). Survey identifications are dependent on the ledge rim cup, the small kylix rim and stem, eggshell-thin and burnished body sherds. The soft, greenish underfired fabric of LM II and the hard, pure, pinkish buff of LM IIIA1 are easily recognizable. Several designs, the sponge pattern, arcs, and quirks, were identified.

Late Minoan IIIA2–B

Published LM III Mesara pottery comes mainly from Agia Triada (La Rosa 1977), Kommos (Watrous 1992), and Phaistos (Levi 1967/1968; Rocchetti 1974/1975). Fine ware body sherds can be recognized by their fine buff or reddish fabric, thick walls, and burnished surface. Distinctive shapes (plate E.20, lower row) consist of the cup, goblet, kylix, squat and globular stirrup jar, ladles, coarse basins, and tripod cooking pots. LM III motifs identified by the survey were spirals, lozenges, concentric semicircles, and the zigzag line.

Late Minoan IIIC

Late Minoan IIIC pottery has been published from Phaistos (Pernier 1902; Borda 1946; Borgna 1997) and Gortyn (Rizza and Santa-Maria Scrinari 1968). LM IIIC shapes recognized by us include kraters, bowls, krateriskoi, and kalathoi.

Protogeometric–Geometric

Published Early Iron Age pottery comes from Phaistos (Rocchetti 1967/1968, 1972, 1974/1975), Kommos (Shaw 1981, 1984), Kourtes (Rocchetti 1988/1989) and Gortyn (Rizza and Santa-Maria Scrinari 1968). Distinctive shapes and decoration include skyphoi, kraters, and cups as well as monochrome and hatched fragments (E.12, upper and lower left).

Orientalizing–Archaic

Phaistos (Rocchetti 1974/1975), Kommos (Shaw 1982; Johnson 1993) and Gortyn (Rizza and Santa-Maria Scrinari 1968) have produced helpful deposits. Diagnostic O-A shapes and decoration include monochrome cups, skyphoi and bowls, relief pithoi (plates E.15 and E.16) bands of concentric circles (plate E.12, upper and lower right), and gray matte monochrome body sherds in a fine buff fabric. Based on his experience at Tocra, Hayes was able to date some of the survey finds to the period 625–550 BC.

Classical

Classical pottery is known mainly from Kommos (Shaw 1981) and Knossos (Callaghan 1978; Coldstream 1973). The survey recognized Tulip cups, high-necked cups, kantharoi, skyphoi, rooftiles, bowls, basins, lamps, jugs, rouletted plates, stamped pithoi, and black glaze body sherds (plate E.18, lower row, right) .

Hellenistic

Hellenistic pottery has been published from Phaistos (Levi 1967; La Rosa 1990) and Gortyn (Di Vita 1988). Recognizably Hellenistic were lamps, beehives (plate E.17, right), basins, amphoras, cups, plates (plate E.18, lower row, center), cooking pots, loomweights (plate E.17, lower), and a kantharos, as well as Megarian bowls (plate E.18, lower row, left), Rhodian amphoras, black glaze fragments (plate E.19, lower row, left and second from left), Hadra ware, Cream ware (plate E.18, upper row, left; 19, lower row, right), and fine ware vases made in a pinkish-orange fabric. While as a general rule, Hellenistic is less distinctive (and less studied) than Roman ceramics (which have well-known centers of production and vessel types), the former was present at sites in large quantities.

Early Roman

Roman pottery has been published from Gortyn (Di Vita 1988) and Lasaea (Blackman and Branigan 1975). The following diagnostic types were noted: Phocaean Red Slipped, Italian Terra Sigillata, Chandarli ware, Arrentine (plate E.19, upper row, far left and right), African Red Slipped, cooking ware, grooved wares (plate E.21, upper row), Campanian and North African amphoras, Eastern Sigillata A, as well as lamps, plates (plates E.21, lower row, far right; E.22, lower right), amphoras, basins, pithoi, rooftiles, and beehives.

Late Roman–Early Byzantine

John Hayes recognized local red slipped wares (Hayes 1972) as well as dishes (plate E.22, center), ribbed amphoras, and basins from this period.

Second Byzantine Period

Publications of pottery of this and later periods in Crete were quite scarce in the 1980s. It was mainly through the unrivaled personal experience of John Hayes that we were able to distinguish pottery from these periods.

For the Second Byzantine period, Hayes was able to identify the following wares and shapes: burnished ware, brown-stripped ware, combed ware, brown glazed ware, Canakkale II and spirally grooved wares as well as glazed basins, yellow-glazed dishes, amphoras, bowls, and cooking vessels (plate E.24, lower row, second from right).

Venetian

Venetian period sgrafitto dishes and jars, stripped-, brown-, green- and plain-glazed wares (plate E.20, middle row), combed ware, polished brown ware (plate E.23, lower row), as well as amphoras and jars were dated by Hayes to the thirteenth through the early seventeenth centuries.

Ottoman

The chief ceramic markers for the Ottoman period were white and green sgrafitto wares (plate E.20, middle row), Maiolica, white glazed wares, Margarites ware, cooking pots (plate E.24, upper row, right), as well as individual examples of dishes, bowls, water jars (plates E.23, upper row, left and third from left; E.24, upper row, left), and painted amphoras (plate E.24, middle row, second and third from left).

Appendix F

The Physical and Economic Development of Pitsidia, 1961–2001: A Cautionary Tale for Survey Archaeology

L. Vance Watrous

Survey archaeologists routinely assume that settlement size is directly related to population and that the growth in the size of a settlement is due to a rise in population. As part of the Western Mesara project, this study of Pitsidia was carried out to test this assumption. I talked with many villagers about the dates of construction of their houses, the causes for the recent growth of their village, and also drew a new plan of the village (figure F.1). I would like to thank my sources in Pitsidia, especially Michaelis Fasoulakis, the schoolteacher; Maria Kadianakis, secretary of the *koinotis*; and the office of the Ministry of Statistics in Heraklion for supplying me with local population data for the years 1961–1991. Data for the latest census in 2001 came from statistics published by the Greek Ministry of Statistics (*www.statistics.gr*). This appendix presents a brief economic history of the village, by ten-year periods, for the years 1961–2001, followed by a discussion of the relationship between settlement growth, demography, and the economy.

The village of Pitsidia is located between Phaistos and Matala in the Western Mesara. This village sits on the natural route between the Mesara Plain and the nearby (about 3 km) coast to the west. One of the first things a visitor to the Pitsidia notices today is the extensive recent construction, especially around the edges of the village. New structures—houses, a school, stores, hotels, restaurants, and other structures—are everywhere. According to the villagers, these changes in the village are due to several developments, described below, that have taken place over the last generation.

Pitsidia between 1956 and 2001

The First Decade: 1961–1971

During this period Pitsidia was considered one of the poorest villages in the region. The census of 1961 listed 641 residents in the village. Villagers who could left Pitsidia to find work elsewhere—on ships, or in Germany. Many local fields and threshing floors had been abandoned, and the villagers no longer grew their own grain. On May 14, 1959, the fortunes of the village hit rock bottom when an earthquake severely damaged most of the structures in Pitsidia.

After the earthquake, the Greek government gave modest sums of money to help rebuild the damaged houses. During the 1960s, electricity arrived at the village. By 1965 the first deep wells were drilled in the local area, making it possible to grow irrigated crops that could be sold commercially. Tourism also arrived in the late 1960s. In 1967, the new rightist government began to make money available for agricultural machinery and for the development of tourist facilities. As they rebuilt their homes, some villagers added rooms on to their houses to let. By the end of the decade (1971), as emigration continued, the population of the village had dropped to 550.

The Second Decade: 1971–1981

The events of the 1960s had set important long-term developments in motion. Tourism grew rapidly. In 1971, the new asphalt road connecting Pitsidia to the outside world was finally finished.

During the 1970s, many villagers modernized and expanded their houses. In the mid-1970s, several families also began to build new structures that combined rental rooms and restaurants along the new road at the western edge of the village (figure F.1). In respect to figure F.1, it should be mentioned that the older structures at the core of the village often represent more than one household and so cannot be directly compared with the later (post-1960) architectural constructions by individual families.

In 1981 the census recorded the local population as 695. This rise was partly due to the fact that the census was conducted differently than in the past. In 1981 the census counted all individuals present in the village at the day of the census, regardless of their origin. Everyone—including tourists, visitors from other villages, and workers from elsewhere—was counted. The true population, comparable to the previous censuses, was probably still less than 600.

The Third Decade: 1981–1991

In 1980, Greece joined the European Union. With the aid of irrigation and new farm machinery, some families found it economically worthwhile to return to their dormant fields. Because of warm winters and early summers, Cretan fruit and vegetables found buyers in the northern markets of the European community. A new type of dwarf olive tree, the Italian *mourellia*, was introduced. Irrigation-fed and small enough to avoid the back-breaking harvesting required by the stately (thirty to forty feet high) older trees, groves of *morelia* were planted across Western Mesara. With the opening of European

FIGURE F.1. Plan of the village of Pitsidia markets, the area began to export large quantities of fruits, vegetables, and especially olive oil, a pattern that continues to this day. Landholdings, often small and widely spread, were reorganized and amalgamated by the government for greater agricultural efficiency.

Meanwhile, tourism continued in full swing, bringing cash into the local economy. New restaurants, mini-markets, and a car rental office opened up. Pitsidia acquired its own bakery, a sign of its raised economic status. Pitsidiani who had left the village in the years 1955–1965 began to return. Construction continued, both in Pitsidia and at Matala where local families built large hotels and rental villas.

In 1991, the census reverted to the earlier practice of counting resident locals: the population of Pitsidia was 663.

The Fourth Decade: 1991–2001

Building of tourist facilities and shops continued as local tourism showed slight increases. A new high school was built. Some of the younger generation chose to move to nearby towns, Moires and Tymbaki, and to Herakleion where they could find new kinds of work. At the same time, individuals from poorer villages began to live and work at tourist jobs in Pitsidia. A second source of newcomers to the village was outsiders from other parts of Crete and Greece who built summer and retirement homes. This move was facilitated by the socialist government's generous retirement and pension program. A couple from Canada constructed a house at the eastern edge of the village.

The census of 2001 recorded 657 individuals in the village. Villagers cited two reasons for the static local population. Today the younger generation of Pitsidiani are not attracted to village life and many move away if possible. Also, in this time of greater prosperity, families have chosen to have fewer children—usually two—for economic reasons. Fifty years ago families routinely had four to eight children to provide a workforce to help the family survive. Today these pressures are gone and the high costs (clothes, education, medical care, entertainment, etc.) of bringing up a child are restrictive.

VILLAGE EXPANSION, DEMOGRAPHY, AND THE ECONOMY

We are now in a position to assess how the physical growth of the village of Pitsidia over the last forty years relates to its resident population. Figure F.2 compares the expansion of construction in the village and the local population curve between 1961 and 2001, broken down by decades. What emerges is that the population of Pitsidia has only grown by about 2% over the last forty years, at the same time that the physical size of village almost doubled. More important, figure F.2 shows that the physical expansion of the village and population growth do not correlate. If we did not have the census figures, we, as survey archaeologists, would assume that the population of Pitsidia had grown considerably during the last thirty years and that this growth was a causative factor in the village's physical expansion. Both assumptions would be wrong. In reality, population numbers have scarcely changed, and the villagers' testimony has identified the growth of foreign tourism and the market economy as the major causes of local construction and the increased size of Pitsidia.

In our discussions, older villagers also pointed out how dramatically life had changed during their lifetimes. One woman in her eight-

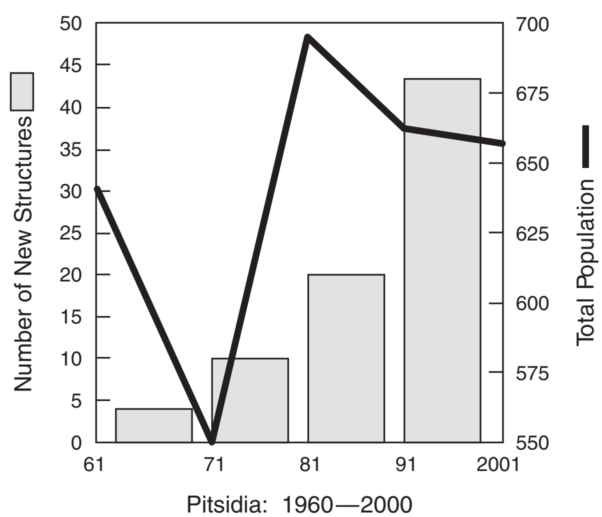


FIGURE F.2. Number of new structures in Pitsidia compared to local population, 1960–2000 ies recalled that her brother had gathered snails and sold them in town and she had sewn clothes to be able to pay for their books in high school. In those days, families had worked together and stayed together, seeing that each child, in turn, was provided with the necessary property to be able to marry. In contrast, with children's expectations today, they complained that it costs as much to bring up two children now as it did for eight children two generations ago. Children, they said, expect "everything," and once they can, they move away and seldom see their families. As our conversations drew to an end, I was struck by a contrast. While Pitsidia was expanding, modernizing, and growing more prosperous, the people in the village were lamenting the disappearance of family life due to the small size and breakup of their households.

Appendix G
Catalogue of Sites of the Byzantine–Ottoman Period

Dimitri Tsougarakis and Helen Angelomatis-Tsougarakis

What follows is a historical catalogue of settlements in the Western Mesara known from Byzantine and later written sources. The catalogue entries include historical information about the chronology, size, population, and monuments found in the settlement as reported by literary documents. As such, the catalogue is meant to complement the gazetteer of archaeological sites in appendix D.

I. Province of Kainourgio

Agavaliana (Agkabaliana). See **Gavaliana.**

Agia Marina. First mentioned in 1248 (Tsirpanlis 1985:189, no. 105III), but it was certainly a settlement of the Byzantine period. Before the Venetian occupation it belonged to the archbishop of Crete, but after the Venetian conquest it was given as a fief to Venetian fief-holders. In 1248 it was claimed by the Latin Church of Crete. It had twenty-five *mensure* of cultivated land and paid three *hyperpyra* annually. Other references: Scaffini 1907: no. XXXIX; Borsari 1963:17–18, 110. It was mentioned in the Venetian descriptions of 1577 (Barozzi), 1583 (Castrofilaca: 25 inhabitants), and by Basilicata in 1630, but it is absent from the Ottoman census of 1671. In 1821 it had six Christian families but in 1832 only two (Chourmouzis 1842:100).

Church: Agia Marina.

Agioi Deka. This is a First Byzantine period site that apparently evolved around the church/martyrion of the Holy Ten Martyrs of Crete. Whether the habitation continued uninterrupted through the Arab and Second Byzantine periods into the Venetian era is not known, but the survival of the name is a strong indication that it did. However, the first mention of Agioi Deka as a settlement is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and in two acts of the notary P. Pizolo, dated 1304 (nos. 915 and 1006). Other mentions: Vegla (1348 f.12v); de Fredo 1968: no. 67 (1352); Gasparis 1997:357 (dated to 1367); Van Gemert 1980:96 (dated to 1369: part of a *serventaria* belonging to Andreas and Angelus de Vogoncia); Santschi 1976: nos. 678 (1374), 866 (1378), 939 (1379), 1284 (1390). It appears in all the Venetian descriptions: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 308 inhabitants), and 1630 (Basilicata). In the Ottoman period it was mentioned in 1671 with seventy-seven inhabitants paying the poll tax. In 1673 there is mention of a place-name in the vicinity of the village called Ellinika (Stavrinides 1975–1985:II, 107, no. 691), usually an indication for the existence of ancient ruins. In 1821 it had forty-five Christian and eighteen Muslim families and five churches, but in 1832 there were only ten Christian and nine Muslim families and one church left (Chourmouzis 1842:88). In 1834 it had ten Christian and ten Muslim families (Pashley 1837:II, 316). In 1866 the Turks destroyed the thirty houses, all the olive presses, and the church (Tsatsaronaki 1954: 23). In 1881 it had 247 Christian and seven Ottoman inhabitants (Stavrakes 1890:129).

Churches:

Agioi Deka (a monastery in 1415–1417, according to Buondelmonti 1981:175–176).

Agia Marina (Gerola and Lassithiotakis 1961:90, no. 618).

Panagia (Gerola and Lassithiotakis 1961:90, no. 619).

Michael Archangelos.

Agios Antonios. The settlement is first mentioned in 1866, when the Turks destroyed and burned nine houses, one church of St. Antonios, three olive presses, one water mill, and 200 beehives (Tsatsaronaki 1954:25). It is not mentioned in the census of 1881, but in 1900 it had sixty-one inhabitants.

Churches: Agios Antonios.

Agios Eleftherios. This was a village a little to the E of Miamou, first mentioned in 1577 (Barozzi: San Liberale) in the territory of Castel Bonifacio. Castrofilaca (1583: S. Lefteri, 108 inhabitants) and Basilicata (1630) also mentioned it in the same eparchy. The census of churches of 1637 (f. 30r) mentions it in Castel Nuovo, as does the first Ottoman census of 1671 (ten individuals paying the poll tax). This is probably its last mention. Stavrinides (1975–1985:II, 123 n. 15) mentions that the monks of the Apezanes monastery believed it to have been deserted by the plague.

Church: Agios Eleftherios.

Agios Konstantinos. It was first mentioned in 1248 but was certainly a Byzantine site, as it belonged to the archbishopric of Crete and under the Venetians passed to the Venetian Church. It had arable land of four pairs of oxen; it also had vines owned by the Church (Tsirpanlis 1985:189, no. 105I). It is mentioned again in 1327 as a *metochi* of the village Paraschi (Gasparis 1997:305) and in 1572 as part of the possessions of Nicolo Paleologo (Mertzios 1964:175–176). It is also mentioned in the Venetian descriptions: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 34 inhabitants), and 1630 (Basilicata), but it is absent from the Ottoman lists. Its exact location is not known.

Agios Kyrillos. First mentioned in 1378 (Santschi 1976:207, no. 872: Agio Chirlo). Subsequent mentions in 1580/1590 (Anonymous), 1583 (Castrofilaca: 156 inhabitants), and by Basilicata in 1630. It is included in the Ottoman census of 1671 (fourteen individuals paying the poll tax). In 1821 it had ten Christian families and one church, but it was subsequently deserted (Chourmouzis 1842:100–101). In 1881 it had ninety-five Christian inhabitants (Stavrakes 1890: 131).

Churches:
Agios Kyrillos.
Agios Theodoros (Gerola and Lassithiotakis 1961:91, no. 624).
Panagia.

Aistratigos. A small settlement near Trypita mentioned only in the nineteenth century. Before 1821 it had three Christian families and one church, but in 1832 it was deserted (Chourmouzis 1842:101).

Alithini. In 1248 it was a *vinea* with "terris et jardinis et molendino uno" (a vineyard with fields and a mill) in the jurisdiction of the village Apollona; both the village and the *vinea* belonged to the monastery of Pala (Paliani) (Tsirpanlis 1985: 194, no. 105Xb). This author does not believe that this *vinea* should be identified with the later village of the same name (1985:45, n.1). The settlement with this name is met in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) and in all the Venetian descriptions: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 161 inhabitants), and 1630 (Basilicata). In 1671 twenty-nine individuals paid the poll tax (Stavrinides 1975–1985:II, 123). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In 1821 it had twenty Christian families and sixteen Muslim ones, three churches and one olive-press, but in 1832 only nine Christian and two Muslim families remained (Chourmouzis 1842:102). In 1834 Pashley mentions three Christian and twelve Muslim families (Pashley 1837:II, 316). In 1881 it had 108 Christian and 18 Ottoman inhabitants (Stavrakes 1890:131). In the nineteenth century it had become a *vakif* (Stavrakes 1890:148).

Churches:
Panagia (belfry with the date: MDCXXV=1625: Xanthoudides 1948:526).
Agios Georgios.

Ampelouzos. The earliest mention of the settlement is in the Venetian description of 1577 (Barozzi), and then in 1580/1590 (Anonymous), 1583 (Castrofilaca: 158 inhabitants), and 1630 (Basilicata). In 1671 it had twenty-seven inhabitants paying the poll tax (Stavrinides 1975–

1985:II, 122). In 1821 it had fourteen Christian and ten Muslim families, three churches, and three olive presses, but in 1832 only eight Christian and five Muslim families remained (Chourmouzis 1842:88). In 1834 Pashley mentions five Christian and six Muslim families (Pashley 1837:II, 316). In 1881 it had 166 Christian and 68 Muslim inhabitants (Stavrakes 1890:129). A mutilated statue of the Minotaur, now in England, was found in a field near the village in the nineteenth century (Spanakis 1960:286).

Church: Agia Paraskevi.

Anogia. This settlement was called Vasilika Anogia, that is, near the village of Vasiliki, as distinct from Toxika Anogia which was near Axos in the province of Mylopotamos. It is first mentioned in one of the forged or suspect thirteenth-century documents (pretending to be of 1182) that concern the so-called Twelve Archontopoula of Crete, as belonging to the Phocas family (Gerland 1905–1908:21–29). Remains of Byzantine sculpture in the village (Gerola 1906–1932:II, 262). Its first securely dated mention is in the acts of the notary P. Pizolo in 1300 (1975–1985: acts no. 97, 98) and 1304 (acts no. 927, 929, 954). It was owned by the Litino family whose *villani* cultivated vine in 1300, while in 1304 cotton was produced in the area of the village. It was still owned by the same family in 1372. It is mentioned again in 1312 (Verlinden 1982:47); 1320 and 1336 (McKee 1998:486, 300); in 1338, 1339 (Cruce 1999: nos. 1, 269, 339, 437); and in 1383 (McKee 1998:486, 946). In 1371 there is mention of Cato Anogia as a distinct settlement (Gasparis 1982:124, Table I), and in the Venetian era there was always a distinction between Apano and Cato Anogia: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 50 and 331 inhabitants for Apano and Cato, respectively), and 1630 (Basilicata). Other mentions in the Venetian era in Santschi (1976:28, no. 120 (1368); 157, no. 487 (1370); 71, no. 277 (1372); 345, no. 1601 (1394); 385, no. 1786 and 392, no. 1836 (1399); 392, no. 1838 (1400). In 1671, however, it is mentioned simply as Anogia with eighty inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Mention of inhabitant as representative of the village in 1755 (Stavrinides 1975–1985:V, 65, no. 2586). In 1821 it had thirty Christian and twenty Muslim families, four churches, and one olive press, but in 1832 only eight Christian and fifteen Muslim families, two churches, and one olive press remained (Chourmouzis 1842:99). In 1834 Pashley mentions five Christian and fifteen Muslim families (Pashley 1837:II, 316). In 1866 twenty Christian houses were burned down as well as the church of Theotokos (Tsatsaronaki 1954:24). In 1881 it had 167 Christian and 76 Ottoman inhabitants (Stavrakes 1890:131).

Churches:

Agia Paraskevi (demolished; photographs of sculptured marble fragments by Gerola in Curuni and Donati 1988:374 nos. 858, 1388, 1389, 1390).

Panagia Odigitria.

Christos.

Agios Georgios.

Panagia, with dedicatory inscription of 1820 above the entrance (Tsougarakis 2004: no. 528).

Antiskari. A Roman bronze coin and some sherds come from here (Sanders 1982:159), but the settlement is first mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and in an act of 1350 (Santschi 1976:112, no. 88: "lo logo de Landisicari che aspeta ala dita serventaria et quarto" [de Calessia]) and again in 1366 and 1369 (Santschi 1976:150, no. 416) and 1403 (Manoussakas 1964: 86, 94: Antisikari). The name is said to derive from the *antiskaroi*, who were persons paid to serve in the Venetian galleys replacing those who had to fulfill this obligation (Spanakis 1940–1976:I, 158; II, 67; III, 42). It appears in all the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 214 inhabitants), and 1630 (Basilicata). In 1671 it had thirty-two inhabitants paying the poll tax (Stavrinides 1975–1985:II, p. 123). It does not seem to have suffered any destructions during the 1821 Revolution, and in 1832 it still had, as before 1821, fifteen Christian families, three churches, and one olive press (Chourmouzis 1842:100). In 1834 Pashley mentions twelve Christian families (Pashley 1837:II, 316). In 1866 the Turks burned down one thousand olive trees belonging to the village (Tsatsaronaki 1954:25). In 1881 it had 162 Christian inhabitants (Stavrakes 1890:131).

Churches:
Panagia (Gerola and Lassithiotakis 1961:91, no. 633).
Agios Georgios (Gerola and Lassithiotakis 1961:92, no. 634).
Agios Dimitrios (Gerola and Lassithiotakis 1961:91, no. 635).
Agios Nikolaos.
Christos.

Apesokari. It is only mentioned once before the sixteenth century, in 1369 (Santschi 1976:151, no. 431). After that it is present in all the Venetian descriptions: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 104 inhabitants), and 1630 (Basilicata). Notarial acts involving inhabitants, in 1598 (Castano ff. 35r, 52r). In 1671 it had twenty-five inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Before 1821 it had twenty-one Christian and three Muslim families, three churches, and three olive presses, but in 1832 only six Christian and two Muslim families remained, with one church and two olive presses (Chourmouzis 1842:99). In 1866 the Turks destroyed fifteen of the twenty Christian houses as well as the church of the Dormition (Tsatsaronaki 1954:24). In 1881 it had 115 Christian and two Ottoman inhabitants (Stavrakes 1890:131).
Churches:
Panagia (Dormition) with a vaulted tomb and coat of arms of the Corner (?) family (Gerola 1906–1932:II, 361, no. 403 and IV, 269, no. 413).
Agios Georgios.
Agia Paraskevi.

Apolychnos. Though mentioned in 1248 for the first time, this is a Byzantine settlement that belonged to the archbishopric of Crete before the Venetian conquest and passed to the Latin church after it (Tsirpanlis 1985: no. 105I). It had three pairs of oxen of arable land. It is mentioned in an act of 1367 (Gasparis 1997:387) and again in 1369 and 1370 (Santschi 1976:37, no 165 and 51, no. 218, respectively). It is mentioned in all the Venetian descriptions: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 100 inhabitants), and 1630 (Basilicata). In 1671 it had nine inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). In 1834 Pashley saw only eight Muslim families (Pashley 1837:II, 316). In 1866 the Turks destroyed completely its ten houses, one olive press, and the church of St. Panteleimon, while they burned down 2,000 trees (Tsatsaronaki 1954:20). In 1881 it had nine Christian and twenty-two Ottoman inhabitants (Stavrakes 1890:129).
Church: Agios Panteleimon with wall paintings and Byzantine sculpture (Gerola 1906–1932:II, 263) and graffito monogram (Tsougarakis 2000: no. 91).

Apomarmas. An inscription was found here recording the construction or repair of an aqueduct (Guarducci 1935:I, XXXI.9). First mentioned in 1271 (Scardon 1942: no. 117), it must certainly be considered a Byzantine settlement. It is mentioned again in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001: 199) and in 1302 (Brixano 1950: no. 524). Both in 1271 and 1302 it belonged to the family of Giacomo Mudacio. It is mentioned in all the Venetian descriptions: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 73 inhabitants), and 1630 (Basilicata). In 1671 it had fifteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Before 1821 it had ten Christian and eight Muslim families, two churches, and one olive press; in 1832 it had two Christian and three Muslim families, while its church and olive press survived. In 1881 it had thirty-one Christians and twelve Ottoman inhabitants (Stavrakes 1890:130).
Churches:
Panagia (with remains of wall paintings; marble cornice with Byzantine decorative sculpture: Gerola 1906–1932:II, 259, Figs. 320, 262).
Agios Georgios.

Armoutidon Metochi. It is only mentioned in 1867, comprising ten houses and one olive press, all of which were destroyed by the Turks (Tsatsaronaki 1954:19). It must have been near the village of Skourvoula.

Azogyreas. It is only mentioned in the Venetian descriptions of the sixteenth and seventeenth centuries: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 87 inhabitants), and 1630 (Basilicata), but it is unknown in previous or later centuries. According to Faure and Van Spitael (1977:58), it should be located near Kapariana.

Baga Metochi. In 1671 this was a place near Nefs Kenuryo (Castelli): Stavrinides 1975–1985:I, 267–68.

Bobia. See **Pobia.**

Camethachi. The location of this settlement is unknown, as is its Greek name. It occurs only twice, both times in the thirteenth century: in 1248 it is described as a former possession of the monastery of Kyrmousi, held at that time by fief-holders (Tsirpanlis 1985:195, no. 105Xc). Given that the Venetians divided between themselves the land of the Greek owners immediately after the conquest of Crete, this makes it very probable that Camethachi was actually a settlement of the Byzantine period. It comprised, apparently among others, a mill and a vineyard. In 1271 it was in the possession of one Marinus Bernardo de Lassiti, who let its mill and a neighboring orchard to an inhabitant of the (nearby?) village of Vassiliki (Scardon 1942: no. 445, appearing as Camatathi).

Castel Nuovo. Its name appears also as Castro Novo, Nefs Castelli, Nefs Kenuryo, and Kainourgio Kastelli or simply Kainourgio.

1. The castle and the settlement. The castle was one of the fourteen to fifteen castles built between 1204 and 1210 by the Genoese Enrico Pescatore, the so-called Count of Malta, to defend the island against the Venetians. This was probably built in 1206 (Gerola 1902a; Xanthoudides 1939:5–6, 39; Spanakis 1964:204) and is first mentioned in 1212. The name N(u)ovo reflects the fact that it was built in a new location, other, that is, from the old (Ancient and Byzantine) castle on the Acropolis of Gortyn. A description of the castle in 1631 exists in a topographical *relazione* of the Regno di Candia by Rafaello Monanni (Monanni 1631:172). In 1230, during the rebellion of the Skordillis and Melissinoi families against the Venetians, it was attacked by the rebels and was surrendered to them by Corrado Demilena. In 1295 it was suggested in the Venetian Maggior Consilio that the seat of the Rectors of Rethymnon be transferred to Castel Nuovo for reasons of better defense, but no decision was taken (Theotokis 1933a:28–29, 32). In 1358, because of the unruly conduct of the inhabitants of the area (in 1319 the *castellan* was attacked by the villagers during an attempted arrest: Ratti-Vidulich 1965: no. 231), a captain with soldiers was sent to reinforce the garrison. Other measures were taken to reinforce law and order (Thiriet 1966–1971:I, nos. 639, 645). In 1443 the *castellan*'s quarters were repaired and the tower refortified (Gerola 1906–1932:I/1, 212); in 1589 no one was living inside the castle, and in 1631 it was almost completely deserted. The settlement was around the castle (which was small and could only house the *castellan*'s quarters, one small church, and two cisterns) and halfway down the hill; on the west side of the settlement there was the Jewish quarter. The following Venetian *castellans* are known: (1) Giovanni Zancaruolo, 1311–1313 (Thiriet 1966–1971:I, nos. 237, 239). (2) Damiano Capello, 1313–1315 (Thiriet 1966–1971:I, nos. 276, 279). (3) Giovanni Mocenigo, 1315–1319 (Thiriet 1966–1971:I, no. 328); probably the one who suffered the attack (see above). (4) Marco Mothonio (1352) (Thiriet 1966–1971: nos. 1452–2). (5) Paolo Contarini, 1374 (Thiriet 1958:I, no. 534). He was rewarded for his loyalty during the Creta rebellion (1361) and the war of Padova. (6) Andrea da Medio, 1399, who also held the *castellania* of Pediada (Thiriet 1958:I., no. 963). (7) Nicholas Palaiologos, 1545 (Xirouchakis 1934:50, n. 2; Panagiotakis 1986:227). He is apparently to be identified with Nicolo Palaiologo, one of the twenty-five *stradioti* of the Nauplion army who had been settled in Castel Nuovo in 1541 (Kolyva-Karaleka and Moatsos 1983:385–386). (8) Nicolo Pagan, 1548 (Kolyva-Karaleka and Moatsos 1983:403). The following notaries and scribes of Castel Nuovo are known: (1) Francesco dí Arimini, appointed in 1304 notary of Castel Nuovo (Theotokis 1933a:40; Thiriet 1966–1971:I, no. 98). (2) Dominicus Traversario in 1324 was a former scribe (*olim scriba CN*) (Ratti-Vidulich 1965: no. 441). (3) Petrus Chursario of Castel Nuovo was described in 1328 as ex-notary (but not explicitly of Castel Nuovo: Ratti-Vidulich 1965). (4) Constantinus Calomati from Castel Nuovo is appointed in 1381 a notary in the Greek language (*notarius in scriptura greca*) (though not explicitly in Castel Nuovo: Santschi 1976:84, no. 326). Notarial acts (sales, purchases, etc.) involving inhabitants of Castel Nuovo: 1281 (Marcello 1960: nos. 374, 375, 131?); 1300 (Pizolo 1975–1985: nos. 519, 602, 609); 1301 (Brixano 1950: nos. 38, 434); 1304 (Pizolo 1975–1985: nos. 755, 928); 1346 (Gasparis 1982:23, Table I); 1357 (de Fredo 1968: no. 129); 1388 (Manoussakas 1964:90); 1382–1394 (Gasparis 1997:163). Court decisions involving inhabitants of Castel Nuovo: 1314 (Ratti-Vidulich 1965: no. 15); 1319 (Ratti-Vidulich 1965: no. 231); 1324 (Ratti-Vidulich 1965: nos. 369, 373); 1328 (Ratti-Vidulich 1965: nos. 441–442); 1329 (Ratti-Vidulich 1965: no. 486); in 1403/1404 one Iohannis Argiro from Castro Novo, formerly *advocatus comunis,* was already two years in prison, being unable to pay a fine of 150 *hyperpera* imposed by the government (Ducali no. 109); other mentions in Santschi 1976: passim from 1368 to 1399. In 1583 Castrofilaca recorded 644 inhabitants. In 1671 Nefs Kenuryo had seventy-two inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123), and before 1821 Castelli had eight Christian families, one church, and one olive press. In 1832 it had only four families. In 1866 its ten Christian houses and the church of S. Antonios were burned down together with 200 olive trees (Tsatsaronaki 1954:23). In 1881 it had seventy-four Christian inhabitants (Stavrakes 1890:129). Jews of Castel Nuovo: earliest mention in 1281 (Marcello 1960: no. 375), others in notarial acts above; see also: Gerola 1906–1932:I, 212; II, 381 (inscription); Santschi 1976:51, no. 217 (1370), 236, no. 1091 (1382). The Jews of Castel Nuovo and Castel Bonifacio were expelled from there, but in 1463–1465 Venice ordered that they be allowed to resettle because of their good services: Manoussakas 1960:81, 131, 133, 134, 142–143. Description: Monanni 1631:172.

Churches:

Agios Antonios (coat of arms, possibly of Pantaleo: Gerola 1906–1932: IV, 269; Curuni and Donati 1988:377, nos. 824, 825, 1398).

Stavros.

Agia Marina.

2. The province. The new castle gave its name to the whole province. There are no statistics for it before the sixteenth century. In 1541, 1543, and 1547 refugees from Nauplion and Monemvasia were settled between Castel Nuovo and Pyrgiotissa, in a region called Francotopoi: Kolyva-Karaleka and Moatsos 1983: passim. In 1554/1555 there were thirty-eight priests in the province (Gerola 1906–1932:II, 174 n. 377). In 1570 the province of Castel Nuovo had sixty-three villages (Ntourou-Iliopoulou 1982: 140, no. 9). In 1583 Castrofilaca (1583: c. 103–104) recorded fifty-eight villages with 9,368 inhabitants (2,163 men, 2,333 children, 186 old persons [men?], and 4,236 women) and fifty-four priests (Xirouchakis 1934:52). Under the Turks in 1671 Castel Nuovo had sixty-one villages with 1,782 *reaya,* and in 1672 there were 1,782 persons paying the poll tax (Stavrinides 1975–1985:II, 67, 122–123). In 1691 the Turks received 999 poll tax receipts, of which 260 were from rich people, 553 middle class, and 186 poor (Stavrinides 1955: 251). The same number of tax receipts were received in 1693 (this time divided into 199 rich, 601 middle class, and 199 poor), worth a total of 4,943 *aspra* (Stavrinides 1975–1985:III, 116, no. 1332A) and in 1694 (200 rich, 599 middle class, and 200 poor) (Stavrinides 1975–1985:III, 105–106, nos. 1314, 1316). In 1705 according to the land-register Castel Nuovo had sixty-three villages and 2,712 owners (Stavrakes 1890:188–189). After the destructions of the War for Independence, the Egyptian census of 1834 registered forty-eight villages with 406 Christian and 278 Muslim families in Castel Nuovo (Spanakis 1991:327). In 1881 Castel Nuovo had fifty-four villages with 8,917 inhabitants, 7,113 Christians, and 1,804 Muslims (Stavrakes 1890:129–131).

Chourdiano Metochi. It is mentioned only in 1671 as being near Gorgorimo (Stavrinides 1975–1985:II, 123). Stavrinides suggests that it may be identical with Gianoulgiana Metochi (q.v.), near Pigaidakia.

Choustouliana. It is mentioned once in the seventeenth century, when in 1650, along with many other possessions, it was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315: Christouliana). It appears again only in the nineteenth century: In 1834 Pashley recorded twelve Christian families (Pashley 1837:II, 316); in 1866 its thirty-two houses and the church of the Dormition were burned down, together with more than twenty olive trees (Tsatsaronaki 1954:23); in 1881 it had 216 Christian inhabitants (Stavrakes 1890:54). In the nineteenth century it had become a *vakif* (Stavrakes 1890:148). Early Christian inscriptions were found here (Bandy 1970: no. 49, 50, 51).

Church: (?) Byzantine sculpture (cross) in the cemetery church: Gerola 1906–1932:IV, 548.

Chryssostomos. There is a reference to a "terra de Grisostomo" in 1248 belonging to the bishopric of Chersonisos (Tsirpanlis 1985:191, no. 105V], and in two instances there is mention of a *casale Chrussostomo* in the acts of Cruce (1999: nos. 443 and 465 [1339]). In 1635 there is mention of a metochi St. Juanne Grisostomo in the area of the village of Pigaidakia, belonging to the monastery of Apezanes (Census 1635: f. 18v): there is a place-name Chryssostomos and a ruined church of St. John Chrysostom today very near ancient Lasaia, at the coast S of Pigaidakia, which certainly marks the site of the 1635 metochi, but it is not certain that this was the site of the settlement as well. However, there is no other mention of a village named Chryssostomos in any other area, as far as we are aware.

Dixo. See **Rixo.**

Drosoi. A Roman building was found here, which may have been either a bath house or a shrine to Hercules (Platon and Davaras 1961:289). The settlement is first mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and then from the sixteenth century onward: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: thirty-two inhabitants), 1630 (Basilicata). In 1671 Drosoi and Makres together paid nine poll tax receipts (Stavrinides 1975–1985:II, 124). Before 1821 it had four Christian and two Muslim families, one church, and one olive press; in 1832 only two Christian and one Muslim families remained (Chourmouzis 1842:97). In 1866 two of its five houses were burned down (Tsatsaronaki 1954:21). In 1881 it had twenty-eight Christian and eleven Ottoman inhabitants (Stavrakes 1890:130).

Fari. Situated 2.5 km from Moroni, it is mentioned in the Ottoman period only. In 1671 it paid three poll tax receipts (Stavrinides 1975–1985:II, 123). Before the 1821 War of Independence it had eight Christian families, one church, and five olive presses, but in 1832 only one Christian family remained (Chourmouzis 1842:97). In 1866 its fifteen houses were burned down as were the two churches of St. John and Christ; one olive press and fifty beehives were also destroyed (Tsatsaronaki 1954:21). In 1881 it had forty-seven Christian inhabitants (Stavrakes 1890:55) but was later deserted.

Filidiana. Together with Neoniana and Kalogeriana it is mentioned only once: before the 1821 War of Independence, all three settlements, being a little to the north of Kandila, had sixteen Christian and four Muslim families, four churches, and one olive press, but in 1832 they were deserted (Chourmouzis 1842:99).

Fitzana. Together with Salisima it is mentioned only once as being in the neighborhood of Paliama: before the 1821 War of Independence all three had twenty-five Christian and four Muslim families and four churches, but in 1832 they had eleven Christian families and one church (Chourmouzis 1842:97).

Flabanochori. It is only mentioned in the later Venetian period: in 1537 the charitable institution of St. Lazaros possessed land in the village (Papadia-Lala 1996:144), and in 1572 it formed part of the possessions of Nicolo Paleologo (Mertzios 1964:175). It is present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 30 inhabitants), 1630 (Basilicata). It was subsequently deserted and its location is unknown today.

Flathiakes. It is first mentioned in 1325 (Nigro lib. 2, f. 3r: Flactrachies [*sic*]) and then again from the sixteenth century onward. It is mentioned in 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 82 inhabitants), and

1630 (Basilicata). In 1671 it had twelve inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Before 1821 it had five Christian and seven Muslim families, two churches, and one olive press, but in 1832 it had four Christian and six Muslim families (Chourmouzis 1842:99). In 1834 only two Christian and one Muslim families remained (Pashley 1837:II, 316), but in 1881 it had 108 Christian inhabitants (Stavrakes 1890:131).

Church: Agios Georgios.

Fradio. In the Ottoman period this was a *metochi* on the site of the Franciscan monastery of Santa Maria degli Angeli. It was situated in the area of Roufas, 1 km SW of Moroni, and one of its sides was bordered by a river (probably the one mentioned in Roufas, q.v.). In 1695 this *metochi*, comprising, among other thing, a house, a field of 300 *mouzouria*, an orchard of two *stremmata* with 70 olive trees as well as other trees, a vineyard of three *stremmata* and two water cisterns, was sold at the price of 120 *piastres* (Stavrinides 1975–1985:III, 156, no. 1381). It appeared in the end of the nineteenth century and had 330 inhabitants in 1900 (Nouchakis 1903:126).

Galia. It is first mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198), then in 1348 (Vegla f. 12r) and then again in the sixteenth century. It is mentioned in 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 120 inhabitants), and 1630 (Basilicata). In 1671 it had thirty-one inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122–123). In 1672 the area of Velouli (in the neighboring province of Monofatsi) belonged to Galia (Stavrinides 1975–1985:II, 92). In 1834 Pashley mentions only fifteen Muslim families. In 1866 the Turks destroyed the forty houses of the *metochi* of Galia and burned the church of St. George (Tsatsaronaki 1954:20). In 1878–1884 it was a *vakif*, and in 1881 it had eleven Christian and fifty-four Ottoman inhabitants (Stavrakes 1890:148 n. 2, 129). An Early Christian inscription was found here (Bandy 1970: no. 53).

Churches:
Agios Georgios.
Agios Nikolaos.

Gangales. Although today this is in the province of Monofatsi, it was previously in that of Kainourgio. It is first mentioned in a notarial act of 1300 (Pizolo 1975–1985: no. 671), and again in 1379 (Santschi 1976:210, no 902 and 211, no. 904). After that it is mentioned from the sixteenth century onward: in 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 253 inhabitants), and 1630 (Basilicata). Notarial acts involving inhabitants, in 1598 and 1599 (Castano ff. 79v–80r, 159r). In 1671 it had thirty-nine inhabitants paying the poll tax. (Stavrinides 1975–1985:II, 120). In 1834 it had twenty-four Muslim families (Pashley 1837:II, 317), and in 1881 it had 160 Muslim inhabitants (Stavrakes 1890:54). An Early Christian inscription was found here (Bandy 1970: no. 55).

Churches:
Agios Georgios.
Panagia.

Gavaliana/Agavaliana. It is mentioned in the nineteenth century, situated a mile south of Monochoro; the site, however, has yielded pottery of the Hellenistic and Roman periods, suggesting a settlement there at that time, which was subsequently deserted (Blackman and Branigan 1977:76). Before 1821 it had seven Christian families, two churches, and one olive press; in 1832 only four families remained (Chourmouzis 1842:101) and in 1834 three (Pashley 1837:II, 316). In 1881 it had eighteen Christian inhabitants (Stavrakes 1890:56).

Gergeri. It is almost certain that we have a Byzantine site here: a number of architectural fragments incorporated into two of the village churches may point to the existence of an Early Christian basilica. Among these fragments was an inscription (now lost) referring to the renewal of the altar-pillars, apparently of a basilica (Bandy 1970: no. 48). Two Byzantine coins (of Heraclios, 610–641, and Michael II, 820–829) were found here, as well as a crude architectural fragment of uncertain date (Sanders 1982:155). The water fountain (named Fountana) of the village was providing the water supply of Gortyn. Parts of the Roman aqueduct are visible today.

The first mention of this settlement by this name is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and in 1268 in connection with an (unknown) monastery: "the priest Basil who lived at the monastery of Gergeri (papa Vaxili, qui stat ad nonasterium de lo Gergeri)" (Tsirpanlis 1985:143, no. 7). The settlement is mentioned a few years later, in 1281, in a notarial act (Marcello 1960: no. 463), and in 1299 in the treaty between Alexios Kallergis and the Venetians (Mertzios 1949:277, no. 91), in 1339 (Cruce 1999: nos. 175, 176), and again in 1378 (Santschi 1976:208, no. 881). It was an important village and was included in the descriptions of the sixteenth century: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 500 inhabitants), and 1630 (Basilicata). Notarial acts involving inhabitants, in 1599 (Castano ff. 142r, 133v–134r, 196r). In 1671 it had 162 inhabitants paying the poll tax, being the largest village in the province (Stavrinides 1975–1985:II, 164). In 1685 a ruined church in the village, called Chanoutia (see below), was owned by a priest of the village called Gerasimos (Stavrinides 1975–1985:II, 240, no. 843). In 1696 a field in the village was sold to one of its Christian inhabitants from its Muslim owners of Chandax (Stavrinides 1975–1985:III, 195–196, no. 1449). Other mentions: 1706 (list of 28 inhabitants who owed 500 *piastres* to Mustafa Aga, *zaimiz olup* (feudal owner) of the village for the last twenty years; Stavrinides 1975–1985:III, 338, no. 1734), 1723 (an inhabitant converts to Islam: Stavrinides 1975–1985:IV, 133, no. 2086; mention of five inhabitants: Stavrinides 1975–1985:IV, 135, no. 2092), 1730 (another conversion, Stavrinides 1975–1985: IV, 189, no. 2187), 1752 (a Muslim from Gergeri was killed by Muslims of other villages: Stavrinides 1975–1985:IV, 377, no. 2477). Mention of 400 sheep and goats in an undated document of the first quarter of the eighteenth century points to the existence of stock-raising in the area (Stavrinides 1975–1985:III, 334, no. 1724).

In the Venetian as well as the Ottoman period numerous water-mills existed along the banks of the village river, a fact showing intense grain cultivation. In 1821 it was a populous and rich village with many orchards full of fruit trees, with 200 Christian families and only three Muslim families, five churches, and seven olive presses, but after the War of Independence, in 1832 it had fifty-five Christian families, one Muslim family, one church, and two olive presses (Chourmouzis 1842:87). In 1834 Pashley mentions forty-one Christian and four Muslim families (Pashley 1837:II, 316). In the war of 1866 the Turks burned 102 of the 105 houses, five of the seven olive presses, and the churches of St. George, Prophet Elias, Transfiguration, and Dormition. Also destroyed were 800 olive trees, 300 *stremmata* of vineyards, and 350 beehives, all indicative of the economic activities of the inhabitants (Tsatsaronaki 1954:21). In 1881 Gergeri, with the small settlements of Kardamiana, Mastrachiana, and Tzaniana (q.v.), had 619 Christian and six Ottoman inhabitants (Stavrakes 1890: 130).

Churches:

Panagia Chanoutia. It is NE of the village and today it is the cemetery church. The name Chanoutia does not survive among the modern inhabitants. This is a fifteenth-century church with frescoes, dated by a foundation inscription in 1443 (Xanthoudides 1903:143–145; Gerola 1906–1932:IV, 542, no. 7).There is another inscription in the church, quoting a verse from the liturgy, and numerous graffiti, the oldest of which is 1457; others: 1458, 1459, as well as numerous graffiti of the eighteenth century (Tsougarakis 2000: nos. 94–114). The existence of the frescoes and the graffiti suggest that the church was not in ruins in the seventeenth century, as claimed by the document of 1685 (see above). According to Xanthoudides, the church could have been part of a *metochi* of a monastery, perhaps of Vrondisi or Valsamonero (Chatzidakis 1952:59–91; Borboudakis 1974:938).

Agios Georgios.

Prophitis Elias.

Metamorphosis (marble *spolia* with Byzantine decorative sculpture used as lintel: Gerola 1906–1932:II, 258, Fig. 318, 262 and IV, 543, no. 8; Curuni and Donati 1988:378, nos. 809, 1401–1405).

Koimisis.

Agios Ioannis.

Gialomonochoro. Also called Monochoro della Marina in the Venetian period and Monochori later, it was situated a little south of Odigitria monastery. It is first mentioned in 1577 (Barozzi) and then in the 1580/1590 Anonymous description and in 1583 by Castrofilaca with 207 inhabitants. Also mentioned by Basilicata in 1629. In 1671 it had sixty inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123), and at some time in the Ottoman period it became a *vakif* (Stavrakes 1890:148). Before 1821 it had seven Christian families and one church but in 1832 three Christian families remained (Chourmouzis 1842:101). In 1881 it had fifty-two Christian inhabitants (Stavrakes 1890:131).

Churches:

Panagia Gorgoepikoos: wall paintings (Borbourdakis 1971a:521–522, 529; 1971b: 502 [fourteenth century]; Gerola and Lassithiotakis 1961:91, no. 631); numerous graffiti the oldest of which is 1420 (Tsougarakis 2000: nos. 133–175; Curuni 1990: nos. 126–158); and a part of a Late Roman inscription reading SOTERICHOS/SOTERICHOU (Tsougarakis 2000: no.169).

Agia Sophia.

Gianoulgiana Metochi. In 1821–1832 it is mentioned as being one or two miles west of Pigaidakia, with four Christian families, one church, and one olive press (Chourmouzis 1842:101). Stavrinides (1975–1985:II, 123) suggests that it may be identical with Chourdiano Metochi, mentioned in 1671.

Gorgorimo. It is mentioned in the census of Castrofilaca (1583) with fifty-four inhabitants and in 1630 (Basilicata). In 1671 the village paid twelve poll tax receipts together with Metochi Chourdiano (Stavrinides 1975–1985:II, 123, who locates it near Pigaidakia). It was later deserted.

Gortyn. This is the most important site of the Late Roman and First Byzantine period of Crete. As the capital of the Roman province, Gortyn developed in size and importance and was adorned with a great number of monuments. Prominent among these were the temples of Isis and Serapis and of Pythian Apollo, the two theaters (larger and smaller), the Odeion, the Amphitheater, the Circus, the Baths, the Praetorium, and the various Nymphaea and numerous fountains that used water brought by two aqueducts from Zaros, 15 km to the N. The Christian buildings are represented with at least six basilicas of the fifth–seventh centuries: in the urban area of the city, three basilicas of great dimensions (the Mavropapa basilica and the two superimposed ones on the road toward Mitropoli), a *tetraconchon* in the area of the present Agricultural School, in addition to the imposing metropolitan church of St. Titos and the other buildings in the area (as the Mitropoli *triconchon*). The ongoing excavations have brought to light very important remains (private houses, paved roads, cemeteries, workshops, coins, pottery, etc.), which have helped delineate the evolution of the city in the Late Roman and First Byzantine periods. Gortyn, after a period of prosperity and expansion, was later somehow reduced in size and population and its urban network fragmented. Toward the end of the seventh century it suffered a great destruction, possibly by earthquake(s), which caused its final decline. Most of the remaining inhabitants moved to the fortified acropolis, where occupation seems to have continued until the eleventh century, although scattered occupation in various parts of the city in the plain seems to have also continued for quite some time.

Bibliography: Sanders 1982:156f; Di Vita 1991a, 1990:261–265, 1985:137–143; 1984:71ff, 1979:435f. For the acropolis and the Byzantine monastery: Rizza and Santa-Maria Scrinari 1968; Mylopotamitaki 1995; Borbourdakis 1973a (Tetraconchon).

Izounida. It is met for the first and only time in 1671 with four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). It is probable that this is a misspelling of the name of another settlement.

Kalathiana. Situated near **Moroni**, it appears in the Ottoman period. In 1671 it had four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). In 1866 the Turks destroyed its eight houses together with two olive presses and fifty olive trees (Tsatsaronaki 1954:21). In 1881 it had fourteen Christian inhabitants (Stavrakes 1890:55).

Kalogeriana. Together with **Neoniana** and **Filidiana** it is mentioned only once: before the 1821 War of Independence all three settlements, being a little to the N of **Kandila**, had sixteen Christian and four Muslim families, four churches, and one olive press, but in 1832 they were deserted (Chourmouzis 1842:99).

Kaloi Limenes (Kaloi Limiones, Kalolimiones). This is a Roman and Early Byzantine site, known from the Acts of the Apostles as the harbor where the ship carrying St. Paul stopped on its way to Rome probably in AD 61 (Acts 27.7). As a settlement it must have declined after the seventh century, and it is not mentioned in any later Byzantine source, but the natural harbor must have remained in use, because the name reappears in the beginning of the Venetian period (de Monacis:154). In 1576–1577 it is mentioned by the traveler Filippo Pigafetta (Da Schio 1985:127). In 1600 and 1602 Moro suggested that a tower be built there to safeguard the place from the corsairs, as the illegal traffic of ships in the area was out of control (Moro 1958: 69–70). Same request by Basilicata in 1630 (Basilicata 1630:17). Other mention in 1641 (Papadia-Lala 1996:160). No settlement existed there in either the Venetian or the Ottoman period.

Church: Agios Nikolaos (remains of Byzantine sculpture: Gerola 1906–1932:II, 262).

Kamaria. It was near Kandila and is mentioned in the sixteenth century only: 1577 (Barozzi), 1580/1590 (Anonymous). In 1583 Castrofilaca recorded 196 inhabitants for Kamaria and Kandila together.

Church: Agia Marina (Gerola and Lassithiotakis 1961:92, no. 638).

Kanatiana. It is only mentioned once in 1671 with four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Its location is unknown.

Kandila. It is a settlement mentioned for the first time in 1558 (Detorakis 1996:78, 80) and is present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 196 inhabitants with Kamaria), and 1630 (Basilicata). In 1671 it had twenty-four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Before 1821 it had two churches and twelve Christian families, of which seven remained in 1832 (Chourmouzis 1842:99). It had 121 Christian inhabitants in 1881 (Stavrakes 1890:131).

Churches:
Panagia.
Agios Georgios.
Agios Nikolaos.
Profitis Elias.

Kapariana. There is a possibility of it being mentioned in 1672, if a *metochi Kapra* is a misspelling for *Kapariana* (Stavrinides 1975–1985:II, 96, no. 668). It is mentioned again before 1821 with thirty-five Ottoman families, of which fifteen had remained in 1832, and two ruined churches (Chourmouzis 1842:96). In 1834 Pashley recorded seven Ottoman families (Pashley 1837:II, 316). It seems that it was subsequently inhabited by Christians, because in 1866 the Turks destroyed half of its forty houses (Tsatsaronaki 1954:21). It is not mentioned in 1881, probably because it was already united with Moires.

Kardamiana Metochi. A little south of Gergeri, it is mentioned for the first time in 1866 together with *metochia* Tsachiana (=Tzaniana), Mastrachiana, and Apomarma. The four settlements had forty houses, two churches, and seven water mills, all of which were destroyed (Tsatsaronaki 1954:22). In 1881, Gergeri with Kardamiana, Tzaniana, and Mastrachiana had 625 inhabitants, of which only six were Muslims (Stavrakes 1890: 130).

Kastelli. See **Castel Nuovo.**

Kavalato. It is only mentioned in 1671 as being near Anogia, with three inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123, who records that near this village the place-name survives today as *Kavadato*.)

Keramos. Situated a little to the NE of Kourtes, it is known from the Venetian period onward: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 54 inhabitants), 1630 (Basilicata). It had eleven inhabitants paying the poll tax in 1671 (Stavrinides 1975–1985:II, 124). Before 1821 it had twelve Ottoman families and two olive presses, but in 1832 only three families remained, the presses were destroyed, and two churches were in ruins (Chourmouzis 1842:96). It is not mentioned later, because it was deserted.

Church: Christos (Sotir): according to a foundation inscription it was founded in 1644 by one George Katzaras, a priest, and his three sons, Xenophon and Ioannikios (who were monks) and Manuel (Gerola 1906–1932:IV, 525).

Kirolako. It is mentioned only once, in the Ottoman census of 1671, with three inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Its location is unknown as is the exact form of its original name in Greek.

Kitia. It is mentioned in the Feudal Registers of the thirteenth and fourteenth centuries as Kitea (Gasparis 2001:199) and then only in the sixteenth and seventeenth centuries, but its location is unknown and the original Greek form is uncertain: 1577 (Barozzi: Chitia), 1580/1590 (Anonymous: Chitia), 1583 (Castrofilaca: Chitia with 44 inhabitants), 1630 (Basilicata). It had nine inhabitants paying the poll tax in 1671 (Stavrinides 1975–1985:II, 124: Kite). Spanakis (1991:I, 415) suggests that the name comes from *koithio*, a place to lie down or a place where the flock gathers and rests. Faure and Van Spitael (1977:58) refer to a Kithio, near Moires.

Koukiana. It is only mentioned in 1671 with four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). Its location is unknown, and there is a strong possibility that this is a misspelling of another place-name.

Kourtes. The name (from the Byzantine *kourte* or *korte*) indicates a closed or narrow place for bringing in the sheep, and the settlement may well be of Byzantine origin, since it is mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198). If a "Curte maior-um" mentioned by Brixano 1950: no. 585 in 1302 refers to this settlement, then this is also one of the oldest mentions of the village. In 1367 it belonged to Petrus Ialina who let a piece of his land for cultivation to an inhabitant of Agioi Deka and another of Apolychnos (Gasparis 1997: 387). In 1415 the heirs of this Ialina divided his possessions: the *serventaria* of Kourtes comprised (1) twenty-one households of *franchi* and *villani*; (2) land of twenty-one oxen, producing 537 $^1/2$ *mensure* of wheat and 107 $^1/2$ of barley; (3) pasture land whose rent was worth 23 *hyperpyra* and four *grossi*; (4) various orchards, which were rented for thirty *hyperpyra* and three *grossi*. In all the *serventaria* was worth 228 *hyperpyra* and 10 *grossi* (Gasparis 1997:320–323). Inhabitants of Kourtes are mentioned in 1377 (Santschi 1976: 194, no. 787) and again in 1428 (Noiret 1892:322). It is mentioned subsequently in all the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 172 inhabitants), 1630 (Basilicata). It had twenty-two inhabitants paying the poll tax in 1671 (Stavrinides 1975–1985:II, 124). Before 1821 it had sixty-three Ottoman and one Christian families and eight olive presses, but in 1832 only twelve Ottoman and one Christian families remained with one olive press, and the four churches of the village were in ruins (Chourmouzis 1842:95–96). In 1834 Pashley recorded twenty Ottoman families (Pashley 1837:II, 316). In 1881 it had 150 Ottoman inhabitants (Stavrakes 1890:130).

Kouses. Roman(?) graves have been found here (BCH 59 [1925]:474), but its oldest mention is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and again in 1394 (Santschi 1976:351, no. 1621: Ghusse). It is later mentioned in 1577 (Barozzi), 1583 (Castrofilaca: 76 inhabitants), and 1630 (Basilicata). In 1671 it paid thirteen poll tax receipts (Stavrinides 1975–1985:II, 123). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). Before 1821 it had forty-two Christian families with two churches and one olive press, but in 1832 there were six families and one church left. In 1834 Pashley recorded four Christian families (Pashley 1837:II, 316), and in 1881 it had 236 Christian inhabitants, having become a *vakif* (Stavrakes 1890: 131 and 148 n. 2).

Churches:

St. Pelagia with a slab bearing a cross and an inscription with the date October 1608 and the name of priest Michael Varouchas (Xanthoudides 1903:146–147).

Sts. Konstantinos and Eleni.
Agios Georgios.

Krotos. It is first mentioned in 1340 (Theotokis 1933a:193–194: locus vocatus Groto) though it existed long before that. At some time prior to this date it belonged to Petro Stadi and Marco Fontanela, but later it had been included in a fief called Thau owned by Marco Venerio. In 1340 this fief belonged to Nicolaus Venerio, son of Marco, but the Senate ordered that Krotos be given to Franciscus Grimaldi who had bought it from Petro Stadi. It appears in the province of Monofatsi in the later Venetian censuses: 1577 (Barozzi), 1583 (Castrofilaca: 117 inhabitants), and 1630 (Basilicata). In 1671 it had seventeen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). Before 1821 it had eighteen Christian families, two churches, and one olive press, but in 1832 only seven Christian families had remained (Chourmouzis 1842:100), having become eight in 1834 (Pashley 1837:II, 316). It had 115 Christians in 1881 (Stavrakes 1890:131).

Churches:

Agios Georgios of the fourteenth–fifteenth centuries (Gerola 1906–1932:IV, 565; Borbourdakis 1971a:521, 1971b:501; Gerola and Lassithiotakis 1961:92, no. 637).
Panagia.
Crucifixion.

Kyrmousi. This is the site of a Byzantine monastery around or near which a settlement developed. It is first mentioned in 1248 (Tsirpanlis 1985: no. 105Xc: "Monasterium nomine Kirmosi; est monasterium imperiale"—a monastery named Kirmosi, an imperial [= Byzantine] monastery) and again in 1270 (Tsirpanlis 1985: no 16). Later, however, it is mentioned as a *casale* in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and later in the fourteenth century (Santschi 1976:215, no. 939: 1379). It is included in the Venetian censuses: 1577 (Barozzi), 1583 (Castrofilaca: 31 inhabitants), and 1630 (Basilicata). In 1671 it had nine inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). During the Ottoman period it became also known as Kermesi. Before 1821 it had twenty-five Ottoman families and one olive press, but in 1832 only ten Ottoman families remained (Chourmouzis 1842:97), the same number as in 1834 (Pashley 1837:II, 316). In 1881 it had fifty Ottoman inhabitants (Stavrakes 1890: 130), but after the exchange of populations it was not inhabited again and became deserted.

Churches:

Panagia with remains of two inscriptions: (1) destroyed foundation(?) inscription with part of the date 68.. (= AM 6801–6899, AD 1293–1391: Xanthoudides 1903:145; Gerola 1906–1932:II, 309). Gerola 1906–1932:IV, 546 believed that the date was1302–1377. (2) in the nave, inscription-signature of the painter George (Xanthoudides 1903; Borbourdakis 1971b:502). There is a fountain nearby with the date 1551 (Tsougarakis 2000: no. 128).
Agios Ioannis.
Agia Eirini.
Agioi Apostoloi.

Laloumas. A settlement mentioned as Louma in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) is most probably Laloumas. It appears again from the Venetian period onward: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 39 inhabitants), and 1630 (Basilicata). In 1671 it had seven inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). There is no other information about it until 1881 when it had eighteen Christian inhabitants (Stavrakes 1890:130).

Lasaia. This is the site of an ancient (Greek and Roman) city, also known as *Halai*, which was prosperous probably until the early seventh century. It is mentioned in the Acts of the Apostles (27.7), the Stadiasmos Maris Magni (322, 323), the Peutinger Table (Lisia), and the Anonymous of Ravenna (Tissia). The Arab raids and, most important, the disruption of the East-West sea route contributed to its gradual decline and abandonment, and it does not seem to have been resettled ever since. The name, however, has paradoxically survived until today. Around 1415 Buondelmonti noted for the place: "Erat . . . civitas non magna, Lapsea, ... In qua, . . . templum vetustissimum cum columpnis marmoreis erigebat et in eo ydolum alte sublimitatis collocatum, sicut inter nos percipere poteramus" (1981:109–110). For the few finds and the existing ruins see Blackman and Branigan (1975: 28–32) and Sanders (1982:114, 160).

Lebena (**Lentas**). This is the site of another Graeco-Roman city, the most important of the south coast settlements. Although the site was inhabited from the Minoan period (Alexiou 1961:88), it flourished in the Roman and Late Roman times, due, on the one hand, to its famous sanctuary of Asklepios and, on the other, to its being one of the ports of Gortyn. It is mentioned by Strabo (10.478), the Stadiasmos Maris Magni (321, 322), the Peutinger Table (Ledena), and the Anonymous of Ravenna (Libena). In the late fifth/early sixth century a Christian basilica was built among a complex of other buildings. It declined after the seventh century and was eventually abandoned, not to be resettled until the twentieth century. In the fourteenth/fifteenth centuries, a small chapel was built on the ruins of the basilica. The earliest design of its sanctuary was executed in 1586 by Onorio Belli, and the first excavations of the Roman remains began in 1884 by Federico Halbherr and the Italian School. For a bibliography on the finds (the sanctuary complex, the Treasure, the Nymphaeum, mosaics, inscriptions, etc.) and the ruins existing today, see Sanders 1982:113–114; Spanakis 1991: 476; Tsougarakis 1988:317–318.

Church: Agios Ioannis.

Limene/Limne. This is a settlement first mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199), but a document of 1300 suggests this was the older name of the village Pobia (*Bombea*), q.v.

Listaros. It is known from the Venetian period onward: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 72 inhabitants), and 1630 (Basilicata). In 1650 the village, along with many other possessions, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). It is not included in the Ottoman census of 1671. Before 1821 it had two churches and eleven Christian families, of which three remained in 1832 (Chourmouzis 1842:102). In 1834 it was inhabited by six Christian families (Pashley 1837:II, 316), and in 1881 it had seventy-six Christian inhabitants (Stavrakes 1890:130). In the Ottoman period it had become a *vakif* (Stavrakes 1890:148, mentioned as *Listaros Elias*).

Churches:

Agios Georgios, with a tomb with coat of arms (Gerola 1906–1932:II, 362, IV, 268–269).

St. John Baptist (1572) (Mertzios 1964:175).

Makres. Although not mentioned in the Venetian censuses, it apparently existed as a very small settlement from the thirteenth or fourteenth century, because it was included in the Feudal Registers of that time (Gasparis 2001:199). In the first Ottoman census of 1671, Drosoi and Makres together paid nine poll tax receipts (Stavrinides 1975–1985:II, 124). Before 1821 it had ten Ottoman families and one olive press, but in 1832 only two of the families remained and one church was in ruins (Chourmouzis 1842:102). This must be the settlement that in 1834 is mentioned as Makriana with three Christian families (Pashley 1837:II, 316). In 1866 its ten houses, one olive press, and two churches were burned down (Tsatsaronaki 1954: 21). In 1881 it had sixty-three Christian inhabitants (Stavrakes 1890:130).

Churches:

Agios Ioannis.

Agia Irene.

Makriana see **Makres.**

Manousana. This was a small settlement situated two miles west of Pigaidakia and about three miles east of Odigitria monastery. It is mentioned only in the nineteenth century, although it existed at least from the eighteenth, as John Markakis Xopateras, one of the rebel heroes of Mesara, was born here in 1788. It had twelve Christian families, one olive press, and two churches before 1821, but in 1832 only three of the families remained (Chourmouzis 1842:101) and in 1834 there were two (Pashley 1837:II, 316). There is no later mention, which means that it was subsequently deserted.

Mastrachiana. A little south of Gergeri, it is mentioned for the first time in 1866 but, as in the case of Manousana, it existed at least from the eighteenth century, as one of the heroes of Mesara in the wars against the Turks, Frangios Mastrachas, was born here in 1792. The settlement seems to bear the name of this family. In 1866 the four settlements Gergeri, Tsachiana (=Tzaniana), Kardamiana, and Apomarma had forty houses, two churches, and seven water mills, all of which were destroyed (Tsatsaronaki 1954:22). In 1881 Gergeri with Kardamiana, Tzaniana, and Mastrachiana had 625 inhabitants, of which only six were Muslims (Stavrakes 1890:130).

Mastrogergiana. A small settlement situated between Keramos and Zaros, mentioned only in the nineteenth century: in 1832 it had twelve Christian families, two olive presses, and two churches (Chourmouzis 1842:96). It is not mentioned later, apparently because it was deserted.

Mertori Metochi. It is only mentioned as a small *metochi* with two houses that were burned down in 1866 (Tsatsaronaki 1954:21). It was between Laloumas and Mesiskli.

Mesiskli. A little to the SW of Zaros, it is first mentioned in 1377 (Santschi 1976:194, no. 787: Mesischi). It is then mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 88 inhabitants), and 1630 (Basilicata). In 1671 it had five inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). It disappears from mentions and the censuses of the eighteenth and nineteenth centuries until it reappeared in the mid-twentieth century.

Metochi Armoutidon see **Armoutidon Metochi.**

Metochi Baga see **Baga Metochi.**

Metochi Chourdiano see **Chourdiano Metochi.**

Metochi Gianoulgiana see **Gianoulgiana Metochi.**

Metochi Galia see **Galia.**

Metochi Kardamiana see **Kardamiana Metochi.**

Metochi Mertori see **Mertori Metochi.**

Metochi Palladiana see **Palladiana Metochi.**

Metochi Tzagaraki see **Tzagaraki Metochi.**

Miamou. Near here, at Makry Livadi, are the remains of a small Roman settlement, which could be connected with ore exploitation at Asterousia (Sanders 1982:159). The present settlement is known from the Venetian period onward: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 204 inhabitants), and 1630 (Basilicata). In 1671 it had forty-six inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). Before 1821 it had fifty Christian families, three olive presses, and three churches, but it had twenty-four families and two olive presses in 1832 (Chourmouzis 1842:100), and fifteen families in 1834 (Pashley 1837:II, 316). In 1881 it had 281 Christian inhabitants (Stavrakes 1890:131). A cave with traces of Neolithic habitation is near the village (Taramelli 1897:288–312).

Churches:

Agios Ioannis (Gerola and Lassithiotakis 1961:92, no. 636, 2).
Agios Eleftherios.
Agios Georgios.
Agia Paraskevi.
Agios Ioannis.

Mitropoli. Situated in the outskirts of Gortyn, it was part of the inhabited area of the capital. Within the village a fifth-century building, apparently a martyrion, has been excavated, with Corinthian capitals and mosaics, which was in use until the ninth century (Borboudakis, 1968a, 1969; Sanders 1982:112–113). Two great superimposed Early Christian basilicas with granite columns have been discovered a little to the N of the village on either side of the main road (Di Vita 1984, 1991: 174ff). It is first mentioned with this name in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) and in 1325 (Nigro lib. 2, f. 4v), then again in 1368 (Santschi 1976:129, no. 199) though the name suggests that it became the seat of the Metropolitan after the abandonment of Gortyn proper, or rather for some time after the Byzantines expelled the Arabs in 961, and so it is certainly a Second Byzantine period site. It was the center of some important possessions of the Latin archbishopric, as witness a document dated 1467 (but quite probably referring to 1306: Tsirpanlis 1985:28–30). In 1544 the possessions of the church in the area (*loco de Mytropoli)* formed a *canonicatum*, which was rented by one Georgius Foscolo (Panagiotakis 1986:221, no. 28). It is mentioned in all the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 147 inhabitants), and 1630 (Basilicata). In 1671 it had thirty-one inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Mention of litigation between two Christian inhabitants the same year (Stavrinides 1975–1985: I, 392–393). Before the 1821 war it had fourteen Ottoman and twelve Christian families, four olive presses, and three churches, while in 1832 it had five Ottoman and five Christian families and two olive presses (Chourmouzis 1842:88) and the same number of families in 1834 (Pashley 1837:II, 316). In 1866 twenty of its houses and all the olive presses were destroyed (Tsatsaronaki 1954:23). In 1881 it had 123 Christian and forty-five Ottoman inhabitants (Stavrakes 1890: 129).

Church: Agios Nikolaos, beside an older one.

Moires. A *solidus* of Constantine IV (668–685) was found here (Sanders 1982:155), but the settlement may be a late Venetian creation, if the mention of a settlement *Mirexe* in 1373 (Santschi 1976:170, no 602) is a misspelling of another village. The oldest known proper mention of the name occurs in 1599 (Castano f. 198r), and it may have come into use by the 1548 allocation of allotments (*moires*) to refugees from Monemvasia and Nauplion (Kolyva-Karaleka and Moatsos 1983). In the Ottoman census of 1671 the settlement referred to as *Metres* may be a misspelling of Moires (Stavrinides 1975–1985:II, 124); likewise in 1685, when a *reaya* owned a *metochi* of Mourinos Theotokopoulos in the area of Moires (Stavrinides 1975–1985:II, 219, no. 810). In 1694 a number of the inhabitants of Moires were suspected of collaborating with outlaws (Stavrinides 1975–1985:III, 1, no. 1153). Before the 1821 war it had twenty-six Christian and twenty-five Ottoman families, two olive presses, and two churches, but in 1832 it had six Christian and seven Ottoman families (Chourmouzis 1842: 96) and in 1834 six Christian and six Ottoman families (Pashley 1837:II, 316). In 1866 the fifteen Christian houses were destroyed, together with the church and 250 olive trees (Tsatsaronaki 1954:23). In 1881 it had eighty-three Christian and sixty-two Muslim families (Stavrakes 1890:129).

Church: Agios Georgios.

Monochori. See **Gialomonochoro.**

Monochoro (**De Galea, Galia**). This must be a Byzantine site, as it is first mentioned in 1237–1241 and 1248 (Borsari 1963:150, 153; cf. Gasparis 2001:199). In 1265 a "media serventaria [a subdivision of a fief] de Monochoro" had been taken away from Leo Metaxaris and given to one Orfaniakis (Gerland 1899:80). In 1320 "una et dimidia [seruentaria] de Monochoro" was confirmed in the possession of Georgius Gradonico, having been bought by his father Iohannis (Gerland 1899:81). Other mentions: 1394 (Santschi 1976:336, no. 1542); in 1402 one Demetrios Arcoleos was living in Monochoro (Manoussakas 1964:90), and in 1451 a priest named Andreas Floudakas was from the same village (Manoussakas 1964:86, n. 3). In 1592–1594 the inhabitants of Pitsidia and Monochoro, to avoid recruitment, fled to the deserted islet Paximadi, south of the island of Gaudos (Spanakis 1940–1976:III, 36). It is mentioned in all the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 86 inhabitants), and 1630 (Basilicata). Noted are ruins of a Venetian palazzo (Curuni and Donati 1988:384, nos. 813, 814). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In 1671 it had twenty-three inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). It had three Christian families in 1834 (Pashley 1837:II, 316), and in the war of 1866 its five houses and one olive press were destroyed along with 300 olive trees and fifty beehives (Tsatsaronaki 1954:25). In 1881 it had fourteen Christian and seventeen Muslim inhabitants, and it had become a *vakif* (Stavrakes 1890:148, 129).

Churches:

Panagia of the fourteenth century. (1) In the narthex there was a wall painting of a scene with the Cretan Greek nobleman

George Mousouros and his family and an inscription in two parts (Xanthoudides 1903:135–138). (2) Another (foundation) inscription mentioning the founder George Mousouros (Xanthoudides 1903). The date can be either AM 6853 [= AD 1345] or 6953 [= AD 1445], but the former is to be preferred because there exists a graffito of 1427, and another of possibly 1387 (Tsougarakis 2000: no. 129). A stone with the coat of arms of the Mousouros comes from a house of this village (Gerola 1906–1932:IV, 268). (3) Third inscription in eight lines mentioning the name Orfanopoulos. Xanthoudides (1903) suggests that this Orfanopoulos may have been a descendant of Orfaniakis, the thirteenth-century owner of Monochoro (see above).

Evangelismos (Annunciation), dated by partial inscription to the fourteenth/fifteenth centuries (Kalokyris 1957:44, no. 27).

Christos (Gallas, Wessel, and Borboudakis 1983:333–334).

Monochoro della Marina see **Gialomonochoro.**

Moroni (**Moroni Apano**, **Kato**). The name of the settlement may derive from its Byzantine founder, although it is an Italian name as well. The oldest mention of Moroni is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) and in 1382 when one of its inhabitants is recorded in a notarial act (Manoussakas 1964:88). At some time it developed into two distinctive settlements (Moroni Apano and Moroni Kato), which are mentioned separately in 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 49 and 120 inhabitants, respectively), and 1630 (Basilicata). After that it is simply mentioned as Moroni. In 1671 it had thirty inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Before the war of 1821 it had ninety-two Muslim families with nine olive presses, but in 1832 only twenty-six of these families remained with three olive presses; there were also two ruined churches (Chourmouzis 1842:97). It had thirty Muslim families in 1834 (Pashley 1837:II, 316) and 287 Muslim inhabitants in 1881 (Stavrakes 1890:130).

Churches:
Panagia.
Agios Georgios.
Agia Pelagia.

Moulia (Moulia Apano). This is a Byzantine site that also developed into two quite distinct settlements, which remained so until today. During the Byzantine period it was owned by the archbishopric of Crete, but after the Venetian conquest it was given to fief-holders. In 1248, when we have its first mention, it was claimed back by the Latin Church of Crete along with the rest of the former possessions of the Byzantine Church. It had cultivated land of two pairs of oxen and was worth 36 *hyperpera* annually ("paria bovum IJ" and "valet annuatim yp. XXXVJ") (Tsirpanlis 1985: nos. 105I–III). In 1347 (and probably quite a long time before that) it belonged to Paolo Venier (Gasparis 1994:107–108). In 1379 it is mentioned as Mulia or Apanomulia (Santschi 1976: 88, no. 346: the village of Mulia or Apanomulia from now on will depend on Castro Novo and not on Castro Bonifacio; 211, no. 903), which means that Kato Moulia was already in existence, though mentioned for the first time 200 years later. Other mentions: 1348 (McKee 1998:57); 1394 (Santschi 1976:327, no. 1481: Apano Moulia); 1395 (Santschi 1976:363, no. 1671); 1411 (Manoussakas 1964: 95: an inhabitant mentioned in a notarial act). In 1423 Nicolaus Grimani bought the village from Gabriele Fallier (Gasparis 1994; mention of inhabitants). It is present in all the Venetian censuses: 1577 (Barozzi: Mulia Apano), 1580/1590 (Anonymous), 1583 (Castrofilaca: Mulia pano, with 119 inhabitants), and 1630 (Basilicata: Muglia Apano). In the Ottoman census of 1671 it had sixty inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122: Apano Mulya). Other mentions in the seventeenth century: 1685 (Stavrinides 1975–1985:II, 224, no. 816: Moulia); 1688 (place-names in the vicinity of Epano Mulia: Torachi [Aetorachi?], Prinio, Sopata, Lagonouri, Tzouvata, Agia Paraskevi[?]: Stavrinides 1975–1985:II, 315, no. 955); 1696 (Stavrinides 1975–1985:III, 205, no. 1466: Epano Mulia). Before 1821 Apano Moulia had twenty-five Christian and twenty-five Muslim families, three churches, and two olive presses, but in 1832 only eight

Christian and fifteen Muslim families remained, with one church and two olive presses (Chourmouzis 1842:87), and in 1834 it had five Christian and ten Muslim families (Pashley 1837:II, 316). In 1866 ten of its twenty (Christian) houses and the church of Sts Apostles were destroyed (Tsatsaronaki 1954:23). In 1881 Apano Mulia had seventy-eight Christian and ninety-seven Muslim inhabitants (Stavrakes 1890:130).

Churches:

Agioi Apostoloi with wall paintings of twelfth or thirteenth century (Gerola and Lassithiotakis 1961:89, no. 602).

Panagia, with graffito of 1479 (Kalokyris 1957: 46, no. 27; Gerola and Lassithiotakis 1961: 89, no. 604).

Agios Theodoros.

Agios Dimitrios.

Moulia, Kato. This settlement always belonged to the province of Bonifacio/Monofatsi but is examined here because of its close relationship with (Apano) Moulia. Its first mention is in the sixteenth century but must have existed from the fourteenth century at least, as a document of 1379 mentions Apano Mulia (see the entry for Moulia). It is present in the Venetian censuses: 1577 (Barozzi:), 1580/1590 (Anonymous), 1583 (Castrofilaca: 107 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had twenty-four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). After 1671 it is mentioned again in 1881 with ninety-four Muslim inhabitants (Stavrakes 1890:129).

Church: Agios Georgios.

Nassi, Nassus. This is a Byzantine settlement whose Greek form of the name is uncertain. During the Byzantine period it was owned by the archbishopric of Crete, but after the Venetian conquest it was given to fief-holders. In 1248, when we have its first mention, it was claimed back by the Latin Church of Crete along with the rest of the former possessions of the Byzantine Church (Tsirpanlis 1985: no. 105I: “casale Nassi laborabant paria bouum IIIJ”—at the village of Nassi four pairs of oxen worked). Mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199). Mentions of inhabitants in 1301 (Brixano 1950: no. 402: casali Nasi) and 1304 (Pizolo 1975–1985: no. 1192: Nasi), and 1325 (Nigro lib.2, f. 1v). In 1365 it was in the possession of Petrus Cornaro (Santschi 1976:10 no. 37: Nassi). Other mentions: 1367, 1373 (Santschi 1976:73, no. 288). It is present in the Venetian censuses: 1577 (Barozzi: Nassus), 1580/1590 (Anonymous: Nasus), 1583 (Castrofilaca: Nassus with 76 inhabitants), and 1630 (Basilicata: Nassus), when it is mentioned for the last time. Faure and Van Spitael (1977:60) believe that its ruins are SW of Raftis, but there is no certain identification of its location. Spanakis (1991:577) suggests that the form Nassus is the accusative of Nassi.

Churches:

Agios Ioannis.

Agios Antonios.

Neoniana. Together with Kalogeriana and Filidiana it is mentioned only once: before the 1821 War of Independence all three settlements, being a little to the N of Kandila, had sixteen Christian and four Muslim families, four churches, and one olive press, but in 1832 they were deserted (Chourmouzis 1842:99).

Nivritos. This is a prehellenic name (see Faure 1965:42). It is first mentioned in a document of 1332 (but referring to 1330) as a possession of the Latin Patriarchate of Constantinople along with Zaros (Tsirpanlis 1967:200–203: Iurito). Mentioned again in the same context in 1467 (Tsirpanlis 1967: Ivrito) and in an auction of its income, together with Plouti and Zaros, in 1573, when the three villages belonged to the heirs of Marin Zane (Baroutsos 1996:173–174). It is mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 210 inhabitants), and 1630 (Basilicata: Gnivrito). In 1671 it had thirty-six inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124: Ivrito). Mention of Muslim inhabitants in 1752 (Stavrinides 1975–1985:IV, 377, no. 2477). Before the War of 1821 it had eight Christian and seven Muslim families, one olive press, and two churches, but in 1832 it had four Christian and four Muslim families (Chourmouzis 1842:96) and in 1834 five of each (Pashley 1837:II, 316). In 1866 its fifteen houses were destroyed, along with the church of St. Methodios (Tsatsaronaki 1954: 21). In 1881 it had 115 Christian and forty-two Muslim inhabitants (Stavrakes 1890:130).

Churches:
Agios Methodios.
Agia Marina.

Paleo Chorio. Two documents of 1390 and 1395 refer to this settlement as being in the district of Castro Novo (Santschi 1976:292, no. 1328 and 368, no. 1696, respectively). It is mentioned for a third and last time in the census of Barozzi (1577) as Palioghorio in the district of Castro Novo, but it is otherwise unknown. Castrofilaca, however, in 1583 and Basilicata in 1630 mention a Vreli Paglioghorio in the same district, which makes it quite possible that this was an alternative name for Vreli (q.v.).

Paliama. The settlement is first mentioned in a document of 1467 as one of the possessions of the Latin archbishopric; however, the document is a copy of an "antiquo quaterno papiri," which certainly dates back at least to the fourteenth century, if not earlier (Tsirpanlis 1985:28–30: Palamia). In 1513 one Petrus Foscolus, who was renting Paliama from the archbishopric, leased it for ten years to Petrus de Thomasis (Tsirpanlis 1985: no. 251: Palamia; notarial act of Andreas Divo, notary of Palamia). It is mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 66 inhabitants), and 1630 (Basilicata: Gnivrito). One of its inhabitants is mentioned in 1604 (Foskolos 1985:166). In 1671 it had ten inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Before 1821 it had (together with Fitzana and Salisima) twenty-five Christian and four Muslim families and four churches, but only eleven Christian families remained in 1832 with one church (Chourmouzis 1842:97) and six Christian families in 1834 (Pashley 1837:II, 316). In 1881 it had thirty-six Christian inhabitants (Stavrakes 1890:131).
Churches:
Agioi Apostoloi.
Agios Charalambos.

Paliokefala. This is mentioned for the first and only time in the census of Barozzi in 1577, in an unknown location. No other mention of it exists and there is a strong possibility that it is a misspelling of Petrokefali (q.v.).

Palladiana Metochi. There is only one mention of this *metochi*, which is said to have existed near Kastelli but was deserted in the early twentieth century (Xanthoudides 1948:526).

Panagia. Apart from this settlement in Kainourgio, there are two more villages with the same name in the district of Herakleion (provinces of Pediada and Monofatsi). In the Feudal Registers of the thirteenth and fourteenth centuries the village is mentioned in the Sexterium Santa Croce, which includes villages of the provinces of Pyrgiotissa and Kainourgio (Gasparis 2001: 199). In other mentions of settlements with this name from the thirteenth and the fourteenth centuries (Marcello 1960: no. 94 [1279]; Pizolo 1975–1985: nos. 168, 429 [1300]), however, the province is not specified, and one cannot tell which one is meant. Later mentions of this village are in 1577 (Barozzi: Panaia), and then in 1583 (Castrofilaca: Panagia with 56 inhabitants), and 1630 (Basilicata). It had eleven inhabitants paying the poll tax in 1671 (Stavrinides 1975–1985:II, 124), and before 1821 it had one Christian and thirty Muslim families and two olive presses, but in 1832 only one Muslim and two Christian families remained with one olive press (Chourmouzis 1842:97). It had five Christian families in 1834 (Pashley 1837:II, 316), but in 1866 its twelve houses, the church, and two olive presses were destroyed (Tsatsaronaki 1954:21). It had sixty-two Christian inhabitants in 1881 (Stavrakes 1890:130).
Churches:
Agios Georgios.
Panagia (marble chancel screen with ninth–eleventh century decorative sculpture: Gerola 1906–1932:II, 258, Fig. 319, 262; Gerola and Lassithiotakis 1961:88, no. 596).

Panassos. This is certainly a Byzantine site and the name seems to be prehellenic (Ypomnema 1956:400). Ancient remains exist near the village at the sites of Lenika and Loutra; at the latter place there seems to have been a bath house with water coming from a spring with sulphurous water (Vromolimni). A bronze lamp of fifth/sixth century date comes from here (Sanders 1982:155). The first mention of the village is in a notarial act of 1280 (Marcello 1960: no. 194; half of "milicie Panasso" belongs to Petrus de Equilo), but it is also included in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199). The *serventaria* of Panassos is mentioned again in 1319 (Ratti-Vidulich 1965: no. 229); other mentions in various instances between 1369–1399 (Santschi 1976: passim). It is mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 319 inhabitants), and 1630 (Basilicata). In 1671 it had fifty-six inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Before the 1821 war it had thirty Muslim and twenty Christian families, four churches, and three olive presses, but in 1832 it had twenty Muslim and eleven Christian families, one church, and two olive presses (Chourmouzis 1842:87). It had twelve Muslim and six Christian families in 1834 (Pashley 1837:II, 316). In the war of 1866 its twenty-five houses, two olive presses, and two churches were destroyed, along with 200 olive trees, 100 *stremmata* of vineyards, and 100 beehives (Tsatsaronaki 1954:22). In 1881 it had 103 Christian and 104 Muslim inhabitants (Stavrakes 1890:130).

Churches:
Panagia.
Christos.
Panagia Odigitria.

Peri. A Roman building was found here with fifteen pithoi sunk in the ground for use as storage vessels (Platon and Davaras 1960:525). The earliest mention of the settlement is in 1389 (Santschi 1976:271, no. 1225). It is subsequently mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 145 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had thirty-five inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). It had forty Christian families and three churches before the 1821 war, but only four families remained in 1832 (Chourmouzis 1842:102) as in 1834 (Pashley 1837:II, 316). In 1866 twenty-five houses were burned along with the church (Tsatsaronaki 1954:25). In 1881 it had 98 Christian inhabitants (Stavrakes 1890:131). It was a *vakif* in 1878/1884 (Stavrakes 1890:148 n. 2).

Church: Agios Nikolaos.

Petrokefali. It is first mentioned in 1583 by Castrofilaca with 103 inhabitants, but there is a strong possibility that the mention in 1577 by Barozzi of the otherwise unknown Paliokefala may actually refer to Petrokefali. It is mentioned again in 1630 (Basilicata) and in the Ottoman census of 1671 with fourteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 126). Before the 1821 war it had forty Christian and eighteen Muslim families, with two churches and three olive presses, but in 1832 only sixteen Christian and ten Muslim families remained, with one church and one olive press (Chourmouzis 1842:102); in 1834 there were twelve Christian and five Muslim families (Pashley 1837:II, 316). In 1881 it had 342 Christian and thirty-five Muslim inhabitants (Stavrakes 1890: 130).

Churches:
Agios Eleftherios.
Metamorphosis.
Agio Pneuma with Venetian tombstone (Gerola 1906–1932:II, 358).

Pigaidakia. It is mentioned in a document of 1497, but in all probability the reference in the document goes back to 1449 (Ploumidis 1974b: 287: in 1497 the income of the villages Bonbea [=Pobia] and Pigaidakia is auctioned; it was held by Francus Cavalaro, probably from 1449, then by Caterucia, wife of Paulus Justiniano, and was finally bought by Alexandro Dradua for 4,250 *hyperpyra* for 4 $^1/_2$ years). The village is present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 319 inhabitants), and 1630 (Basilicata). In 1671 it had forty-one inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Before the 1821 war it had twelve Christian and two Muslim families, two churches, and one olive press, but only four Christian families remained in 1832 (Chourmouzis 1842:101), and six Christian and one Muslim families in 1834 (Pashley 1837:II, 316). It had 133 Christian inhabitants in 1881 (Stavrakes 1890:131).

Churches:
Agios Ioannis (at Farkatines), with graffito of 1507 (Kalokyris 1957:46 no. 30; Gerola and Lassithiotakis 1961:91, no. 630).

Taxiarchai (at Platani), with graffito of 1521 (Gerola and Lassithiotakis 1961:46, no. 32).
Agios Georgios with Venetian tomb (Gerola 1906–1932:II, 255, 362).
Agios Andreas (at Kalamitsi) (Gerola and Lassithiotakis 1961:91, no. 629) with unknown coat of arms (Gerola 1906–1932:IV, 266).

Platanos. A Roman dwelling, probably a farm, and a kiln were found near the village at Siderogourna (*Archaeologikon Deltion* 2 [1916]:25). The settlement itself is mentioned once in the seventeenth century, when in 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). It is mentioned again only in the nineteenth century: before 1821 it had twenty Christian and two Muslim families, one church, and four olive presses, but only fifteen Christian and one Muslim families, one church, and two olive presses remained in 1832 (Chourmouzis 1842:101) and fifteen Christian families in 1834 (Pashley 1837:II, 316). In 1866 twenty-five houses and the church were destroyed (Tsatsaronaki 1954:24). In 1881 it had 162 Christian and thirteen Muslim inhabitants (Stavrakes 1890:130). It was a *vakif* in 1878/1884 (Stavrakes 1890:148 n. 2).
Church: Agios Charalambos.

Plora. The settlement is mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) and then again from the sixteenth century onward, but the site shows traces of much earlier habitation: an Early Christian inscription was found here (Bandy 1970: no. 58), as well as fragments of statues (Alexiou 1969c:532) and remains of buildings of the Roman period (Sanders 1982:159). Further remains (columns and sherds) exist at Logarotopos, thirty-five minutes SW of Plora (Pendlebury, Eccles, and Money-Coutts 1932–1933: 89). Pashley (1837:I, 295) believed that the settlement preserved the name of the ancient Cretan city Pyloros, mentioned by Pliny (4.12, 59). It is present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 167 inhabitants), and 1630 (Basilicata). In 1595 a church was built within the site of a mill belonging to a maistro Nicolo Kapsali (Konstantoudaki 1995: 378). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In 1671 it was a large village with 114 inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Before the 1821 war it had fifty-six Christian and three Muslim families, four churches, and three olive presses, but only twelve Christian and two Muslim families, one church, and two olive presses remained in 1832 (Chourmouzis 1842: 99), with eighteen and three families, respectively, in 1834 (Pashley 1837:II, 316). In 1866 thirty houses and three churches were destroyed (Tsatsaronaki 1954:24). In 1881 it had 219 Christian and eleven Muslim inhabitants (Stavrakes 1890:131). It was a *vakif* in 1878/1884 (Stavrakes 1890:148 n. 2).
Churches:
Agios Panteleimon.
Agios Antonios, with unknown coat of arms (Gerola 1906–1932:IV, 269, no. 412; Gerola and Lassithiotakis 1961:91, no. 622).
Metamorphosis.
Agios Georgios Kalamiotis (or at Kalamniona) (wall paintings and Byzantine crosses: Gerola 1906–1932:II, 197, Fig. 198, 262 note; Curuni and Donati 1988:387 nos. 855–856: photographs by Gerola of ruins of the monastery at Agios Georgios; Gerola and Lassithiotakis 1961:91, no. 623).

Plouti. Its earliest mention is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) and in a document of 1332 (but referring at least to 1330) when it belonged to the Latin Patriarchate of Constantinople and was rented by Petrus Mudacio (Tsirpanlis 1967:179, 203, 233). It is subsequently mentioned in an auction of its income, together with Nivritos and Zaros, in 1573, when the three villages belonged to the heirs of Marin Zane (*Eoa kai Esperia* 3 [1996–1997]:173–174). It is present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 146 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had twenty-two inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). Mention of Christian and newly converted Muslim inhabitants in 1671 (Stavrinides 1975–1985:I, 341 and 362–363, respectively). Before the 1821 war it had forty-two Muslim families and two olive presses, but in 1832 only sixteen families and one olive press remained (Chourmouzis 1842:96; ruins of two churches), and twelve Muslim families in 1834 (Pashley 1837:II, 316). It had seventy-four Muslim inhabitants in 1881 (Stavrakes 1890: 129).

Churches:

Agios Georgios.

Archangel Michael.

Pobia. This is almost certainly a Byzantine site (and possibly Roman or even Classical, as the name has been connected to either the ancient Cretan city Boibe or to the Roman Pompeii. However, the place-name seems to have been new in 1300: see below). Some Byzantine graves found east of Pobia and a fourth/fifth century inscription may be connected with the existence of a former monastery (Pendlebury, Eccles, and Money-Coutts 1932–1933:90; Bandy 1970: no. 59). Earlier material found in the area includes Roman houses with pithoi and other pottery, a denarius of Domitian, a tombstone, and lamps (Borboudakis 1972:492; Platakis 1965:291). Its earliest mention is in 1300, when the brothers Hemanuel and Constantinus Armachi, sons of Gavrili Armachi, leased to Marino Quirino "totam terram nostram nobis pertinentem de iure millicie Limne, que hodie dicitur Bombea" (Carbone 1975–1985: no. 412). In 1352 Nicoletus Dondi, on behalf of the owner Ançollus Tedaldo, leased to "Georgio Sclavo dicto Metaxoto . . . totum illud farangi vocatum *Marçallo* . . . de iuris casalis Bombea" (de Fredo 1968: no. 30). In 1364 and 1393 Bombea is in the possession of the Cavalario family (Zaninus and his sons Nicolaus and Marinus: Santschi 1976:321, no. 1433 and notarial act of the Greek notary of Bombea Hemanuel Geriti). The village is mentioned again in a notarial act of 1367 (Gasparis 1997:187–188 n. 18) and in a will of 1378 (McKee 1998:II, 757). In the fifteenth century it was still in the hands of the same family, until a little before 1497. At that date the income of the villages Bonbea (=Pobia) and Pigaidakia is auctioned; shortly before that it was held by Francus Cavalaro (probably from 1449), then by Caterucia, wife of Paulus Justiniano, and was finally bought by Alexandro Dradua for 4,250 *hyperpyra* for 4 1/2 years (Ploumidis 1974b:287). It is mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 399 inhabitants), and 1630 (Basilicata). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In the Ottoman census of 1671 it was the second largest village of the province after Gergeri with 131 inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). Before the 1821 war it had 290 Christian and three Muslim families, three churches, and five olive presses, but in 1832 it had sixty Christian families, two churches, and two olive presses (Chourmouzis 1842:102) and fifty Christian families in 1834 (Pashley 1837:II, 316). In 1866 130 of its 250 houses were destroyed along with three churches and 250 beehives (Tsatsaronaki 1954:25). It had 838 Christian inhabitants in 1881 (Stavrakes 1890:131). It was a *vakif* in 1878/1884 (Stavrakes 1890:148, n. 2).

Churches:

Archistratigos (in 1378 money was left in a will for the wall paintings of this church [McKee 1998:II, 757]).

Sts. Kosmas and Damianos with inscription dated 1620 (?) and mentioning the founder Nikolaos (Gerola 1906–1932:IV, 562).

Metamorphosis.

Agios Georgios.

Agios Ioannis (Gerola and Lassithiotakis 1961:91, no. 621).

Agia Paraskevi (Burgel 1965).

Panagia.

Prinias. It is mentioned in different provinces at different instances due to the fact that it is situated at the border of three provinces. From 1881 it belongs to the province of Malevizi, but before that it was in Kainourgio. It is first mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199), then in 1339 (Cruce 1999: no. 355) and then again in a will of 1365 (McKee 1998:397). In 1389 it was part of the inheritance of Marco Pasqualigo, which was divided among his sons (Gasparis 1997:312–315). It is mentioned again in the census of 1577 (Barozzi) among the villages of Castro Novo, but in 1583 Castrofilaca mentions two distinct settlements, Prinea Appano and Prinea Cato, in the province of Monofatsi with fifty-nine and forty-eight inhabitants, respectively. Basilicata (1630) mentions them as Prinea and

Prinea Cato in the province of Monofatsi. In the Ottoman census of 1671 it is mentioned as one settlement (Pirnya) in the province of Kainourgio with twenty-one inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Before 1821 it had sixty Christian and three Muslim families and four churches, but in 1832 it had thirty Christian families and one church (Chourmouzis 1842:87) and in 1834 fifteen Christian and two Muslim families (Pashley 1837:II, 316). In 1866 ten of its twenty houses were destroyed along with one church (Tsatsaronaki 1954:23). In 1881 it is mentioned in Malevizi with 216 Christian and nine Muslim inhabitants (Stavrakes 1890: 116).

Church: Agios Georgios.

Psallida. It is mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199), and then only in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 60 inhabitants), and 1630 (Basilicata). It is absent from later censuses although it certainly existed in the nineteenth century: in 1866 it had ten houses, which were destroyed by the Turks (Tsatsaronaki 1954:22). Its location is uncertain, although an Early Christian inscription has been reported as found here (Bandy 1970: no. 47). Faure and Van Spitael (1977:61) suggest that it was toward Vreli, but the reference in Tsatsaronaki seems to point to a site near Gergeri. There is a hill with this name 500 m east of Moroni.

Church: Agios Georgios (Gerola and Lassithiotakis 1961:90, no. 610).

Raftis. This village is first mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:200: Rapti) and in the acts of Andrea Nigro in 1323 and 1325 (lib.1, f. 3r, lib. 2, f. 1v), but it is obviously much older. In 1339 a village church of St. George was rented by a priest from the owner of the village, Quirilus Pantaleo, son of Andrea (Cruce 1999: no. 102). In 1414 it was divided in two between Nicolaus Dandulo and Andreas Calica, and a complete register of its lands, its inhabitants, and their possessions has survived: it comprised 56 households, 44 of which (78.5%) belonged to *franchi* and twelve (21.5%) to *villani*. The total arable land of the village was 42 $^1/2$ pairs of oxen in addition to thirty-two vineyards, ten old vineyards, five orchards, and two mills (Gasparis 1997:220–223, and Tables 37–39, p. 289–291). It is later mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 224 inhabitants), and 1630 (Basilicata). Only eighteen inhabitants paid the poll tax in 1671, probably because most of the formerly Christian inhabitants became Muslims (Stavrinides 1975–1985:II, 122). Before 1821 it had ninety Muslim and one Christian families, and two olive presses, but in 1832 only forty Muslim families remained and one olive press (Chourmouzis 1842:87–88; ruins of six churches) and eighteen Muslim families in 1834 (Pashley 1837:II, 316). In 1881 it had 121 Muslim inhabitants (Stavrakes 1890:130).

Churches:

Agios Konstantinos (Gerola and Lassithiotakis 1961:89, no. 600), with unknown coat of arms of the fourteenth century (Gerola 1906–1932:IV, 267).

Agios Nikolaos.

Agios Georgios (Gerola and Lassithiotakis 1961:89, no. 601).

Agios Antonios (near Raftis).

Rixo. The Ottoman census of 1671 mentions a village named Rikso or Dikso with sixteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). There is no other mention of this site before or afterward, and it is certain that there has been a confusion with some other settlement. Stavrinides wonders whether this place-name has any connection with Raxos, a site mentioned in the *Life of St. John Xenos* (eleventh century) in the area of Mount Lithinon in southern Pyrgiotissa, where the saint built a church to Sts. Eutychios and Eutychianos. There does not seem to be any connection, however, other than the similarity of the name.

Roufas. This is very possibly a Byzantine site, if a "casale de lo Riffa" mentioned in a document of 1248 as being very near the monastery of Kyrmousi is actually Roufas (Tsirpanlis 1985: no. 105Xc; Gasparis 2001:200). It is mentioned again in 1360, when Marinus Greco was in the possession of half a "*cavallaria*" of Rufa (Santschi

1976:4, no. 6:1364). In 1382 the Jews of Castro Novo were paying rent to Marcus de Medico for the use of the waters of "Ruffa." Twelve years later, in 1394, the same Jews dissolved their agreement for the waters of Roufa with Marcus de Medico and Francesco Greco, son of Marinus, while retaining their rights on the water flow (Santschi 1976:236, no. 1091 and 87, no. 341). Other mentions: Santschi 1976:20, no. 87 (1368: fief "de Rufa" belonging to Iohannes de Lago); 222–223, no. 1014 (1380: mention of inhabitant); 236, no. 1091 (1382); 371, no. 1710 (1395); Gasparis 1997:106 (1382). Apparently the Greco and de Medico families owned half of the "*cavallaria*" of Rufa each. The village is again met in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 424 inhabitants: the third largest after Castro Novo and Gergeri), and 1630 (Basilicata). A notarial act of 1598 refers to inhabitants of the village (Castano f. 103v). In the Ottoman census of 1671 it had thirty-four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). Before 1821 it had forty Muslim families and six olive presses, but in 1832 it had only sixteen Muslim families and one olive press (Chourmouzis 1842:96; ruins of two churches) and ten Muslim families in 1834 (Pashley 1837:II, 316). It had 118 Muslim inhabitants in 1881 (Stavrakes 1890:129).

Churches.

Three churches were reported in 1635:

Panagia.

Christ.

St. George (Census 1635: f. 59v).

Salisima. Together with Fitzana it is mentioned only once as being in the neighborhood of Paliama: before the 1821 War of Independence all three had twenty-five Christian and four Muslim families and four churches, but in 1832 they had eleven Christian families and one church (Chourmouzis 1842:97).

Seferiana. This was a site 1 mile west of Kastelli, very near Kapariana. Its first mention is in 1832, when it had sixteen Muslim families, while before 1821 it had forty-two (Chourmouzis 1842:96; ruins of two churches). In 1834 it had ten Muslim families (Pashley 1837:II, 316) and in 1881 sixty-five Muslim inhabitants (Stavrakes 1890:129). Stavrinides (1975–1985:II, 123) thinks that the original name of this settlement was Sklaviana.

Sklaviana. This settlement is mentioned twice in the Ottoman period: in the census of 1671 it had fourteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123), which means that it was a small village; in 1731 it is mentioned as *metochi* Sklaviana, which, along with *metochi* Tzagaraki, was very near Kastelli (Stavrinides 1975–1985:IV, 188). Stavrinides (1975–1985:II, 123) thinks that this is the same settlement as Seferiana, which changed its name later in the Ottoman period.

Skourvoula. The settlement is mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:200: Scruvula) and another three times in the fourteenth century (Cruce 1999: no. 310; Santschi 1976:194, no. 787 [1377] and 343, no. 1594 [1394]). It is subsequently mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 104 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had fourteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124; mention of inhabitants in 1691–1692 and 1694: Stavrinides 1975–1985:III, 25, no. 1204). It is mentioned again in 1834 with three Christian families (Pashley 1837:II, 316). In 1866 it had forty houses, twenty-five of which were destroyed as well as its church (Tsatsaronaki 1954:19). In 1881 it had 132 Christian inhabitants (Stavrakes 1890:130).

Churches: Theotokos.

Agia Anna with ornamental screen cornice, on which coat of arms of the Capello family (Gerola 1906–1932:II, 353; Curuni and Donati 1988:388, nos. 797–798).

Thau. There is only one mention of this site in the fourteenth century: a "feudo vocato Thau" (a fief called Thau) was formerly in the possession of Marcus Venerio, but in 1340 it was held by his son Nicolaus (Theotokis 1933a:193–194; a "locus vocatus Groto [= Krotos]"—a place called Groto—had been included in this fief). There is a strong possibility that the name has been misspelled or distorted and its Greek form is unknown. The mention of Krotos places it in the southern part of Kainourgio.

Trypita. It is included in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:200) and mentioned from the sixteenth century onward: 1577 (Barozzi: Tripiti), 1580/1590 (Anonymous), 1583 (Castrofilaca: 147 inhabitants), and 1630 (Basilicata). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In the Ottoman census of 1671 it had twenty-one inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124). Before 1821 it had twenty Christian families, two churches, and one olive press, but in 1832 it was deserted (Chourmouzis 1842:101). It was resettled much later, and in 1881 it had eighteen Christian inhabitants (Stavrakes 1890:131).

Churches:

Archangel Michael (Gerola and Lassithiotakis 1961:91, no. 628).

Prophitis Elias (Gerola and Lassithiotakis 1961:91, no. 626).

Christos.

Tsachiana see **Tzaniana.**

Tzagaraki Metochi. It is mentioned only once, in 1731, as being, along with *metochi* Sklaviana, very near Kastelli (Stavrinides 1975–1985:IV, 188). No other mention of it exists and one wonders whether there has been a confusion with the well-known village (and sometimes known as *metochi*) with this name in the province of Temenos.

Tzaniana. A little south of Gergeri, it is mentioned only in 1866 as Tsachiana (Tsatsaronaki 1954:22) together with *metochi*a Kardamiana, Mastrachiana, and Apomarma. Tsachiana, however, must be a misspelling for Tzaniana, the settlement, which was very near (to the S) of Kardamiana. The four settlements had forty houses, two churches, and seven water mills, all of which were destroyed in 1866.

Trafos. This is the small island lying a little off the shore of ancient Lasaia. It shows traces of occupation in the second Byzantine and Venetian periods, as well as in the nineteenth century. It has been thought that it served as a refuge site in the earlier periods, as it certainly did in the nineteenth century (Blackman and Branigan 1975: 34–36).

Vali. This is certainly a Byzantine site, situated 3 km north of Gangales. It is first mentioned in 1248 as a former possession of the monastery of Paliani, held at this date by fief-holders (Tsirpanlis 1985: no. 105Xb: "Casale Vayli, quod habet paria bouum de terra X"—the village of Vali, which has ten pairs of oxen to till the land). It is mentioned again in 1583 (Castrofilaca: 85 inhabitants, in the province of Monofatsi) and in 1630 (Basilicata). In the Ottoman census of 1671 it had eighteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 120). In 1834 it had ten Muslim families (Pashley 1837:II, 317), and in 1881 ninety-two Muslim inhabitants (Stavrakes 1890:129).

Churches:

Agios Dimitrios.

Agios Antonios.

Panagia.

Christos (Sotir). In one of the churches there are two plaques with unknown Venetian coats of arms (Gerola 1906–1932:IV, 270–271).

Vassiliki. Roman remains have been recorded here (Sanders 1982:159), but this is certainly also a Byzantine site. Its first mention is probably in 1271 (Scardon 1942: no. 445); there is a small possibility that this act refers to the village by the same name in Hierapetra. It is mentioned again in 1281 (Marcello 1960: no. 396), 1302 (Brixano 1950: no. 551), 1320 (Ratti-Vidulich 1965: no. 277), 1325 (Nigro lib. 2, f. 3v, 6v: Apano Vassilichi), and 1340 (Theotokis 1933a:193: "feudo vocato Vassilichi"), as well as during the so-called Rebellion of St. Titos in 1363 (Santschi 1976:95–96, no. 3; other mentions Santschi 1976:25, no. 110 and 133, no. 241 [1368]; 327, no. 1481 [1394]; 348, no. 1778 [1399]). It is present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 406 inhabitants), and 1630 (Basilicata; mention of an inhabitant in 1604: Foskolos 1985:170). In the Ottoman census of 1671 it had thirty-two inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Before the 1821 war it had twenty Christian and eighteen Muslim families, three churches, and two olive presses, but in 1832 only twelve Christian and four Muslim families remained (Chourmouzis 1842:98–99) and five and ten, respectively, in 1834 (Pashley 1837:II, 316: or possibly ten and five?). In 1881 it had 175 Christian inhabitants (Stavrakes 1890:131).

Churches:

Agios Savas.

Panagia.

Agios Ioannis.

Panagia (old in 1635).

Agios Georgios.

Profitis Elias (old in 1635).

Agios Georgios at Platanos.

Viko. This village is first mentioned in 1301 (Brixano 1950: no. 413: "Ego Georgius Musuro, habitator in casali nomine Vico"—I, Georgios Musuros, inhabitant of the village of the name of Vico, leased land in the village owned by Thomas Minoto of Chandax). It is mentioned again in 1583 (Castrofilaca: 87 inhabitants in the province of Kainourgio) and in 1630 (Basilicata: Vicro) but disappeared after this date. Faure and Van Spitael (1977:62) mention Vicos in Galia with no other detail. Its location is not known.

Vithio (or **Vidho**). This is a settlement first included in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:200) and then mentioned only in the Venetian descriptions of the sixteenth century in the province of Kainourgio: Barozzi (1577: Vithio) and Anonymous (1580/1590: Vithio). No such village is known in the province or in the vicinity, and its identity, if it is not a mistake, is unknown. Faure and Van Spitael (1977:62) include it in their Castrofilaca list as Vidho and wonder whether it should be identified with Vidos in Chersonesos, but Castrofilaca does not mention Vidho in his list for Kainourgio and, on the other hand, no Vidos is known in Chersonesos either.

Voriza. It is known from the sixteenth century onward: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 281 inhabitants), and 1630 (Basilicata). In 1592 or 1594 seven of its inhabitants were condemned to the chain (to serve in the galleys) for avoiding recruitment (Spanakis 1940–1976:III, 36). In the Ottoman census of 1671 it had seventeen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). It is mentioned again in 1834 with thirty-five Christian families (Pashley 1837:II, 316). In 1866 it is said to have had a hundred houses, seventy of which were destroyed along with two churches (Tsatsaronaki 1954:19). It had 547 inhabitants in 1881 (Stavrakes 1890:130).

Churches:

Estavromenos (Timios Stavros); Borbourdakis 1973:601; graffito of 1517: Kalokyris 1957: 46; Gerola and Lassithiotakis 1961:88, no. 591].

Agios Georgios.

Theotokos.

Vourvoulitis. Remains of Byzantine sculpture in the village (Gerola 1906–1932:II, 262). Earliest mention in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and in 1370 (Santschi 1976:162, no. 530). Ruins of a Venetian building with one of the oldest ornamental springs, dated between 1450 and 1500 (Gerola 1906–1932:IV, 72). Another spring cut in the rock with remains of wall painting and an inscription near the village church of St. Andreas. Subsequent mention in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 108 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had eight inhabitants paying the poll tax (Stavrinides 1975–1985:II, 122). Before 1821 it had twenty-two Muslim families and one olive press, but in 1832 it had fifteen families (Chourmouzis 1842:88; ruins of four churches) and twelve in 1834 (Pashley 1837:II, 316). It had two Christian and fifty Muslim inhabitants in 1881 (Stavrakes 1890:129).

Churches:

Agios Andreas (Gerola and Lassithiotakis 1961:90, no. 620).

Agia Marina.

Agios Ioannis (coat of arms: Gerola 1906–1932:IV, 269).

Panagia Almyri.

Agio Pneuma.

Vreli. The settlement seems to have had an alternative name, Paleo Chorio (q.v.). The earliest mention of Vreli is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001: 200) and again in 1389 (Santschi 1976:271, no. 1225) and 1390 (Manoussakas 1964:90), but it is also mentioned in a document of 1467, which was a copy of an old original in papyrus, possibly going back to the beginning of the fourteenth century (Tsirpanlis 1985:28). At that time it was one of the possessions of the Latin archbishopric of Crete. In 1583 Castrofilaca mentions it as Vreli Paglioghorio with 303 inhabitants, and in 1630 Basilicata mentions it as Vregli. In the Ottoman census of 1671 it is mentioned as Palyo Vreli with eighteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 123). Before 1821 it had twelve Christian and three Muslim families and two churches, but in 1832 it had five Christian families (Chourmouzis 1842:96) and in 1834 one Christian and five Muslim families (Pashley 1837:II, 316). It had twenty-eight Christian and eighty-four Muslim inhabitants in 1881 (Stavrakes 1890:129). An Early Christian inscription was found here (Bandy 1970: no. 52).

Churches:

- Agios Nikolaos, with foundation inscription of 1313/1314 (Tsougarakis 2000: no. 92) and with graffito of 1448 (Kalokyris 1957:46, no. 26; Gerola and Lassithiotakis 1961:89, no. 608) and Byzantine cross (Gerola 1906–1932:II, 262).
- Timios Stavros (Gerola 1906–1932:II, 249–250, 252, Figs. 311–312).
- Agios Antonios and Agios Thomas (Gerola 1906–1932:II, Table 3). A document of 1671 refers to the church of St. Antonios at Vreli as belonging to Vrondisi "from the oldest years" (Doulgerakis 1958:120, 161–162; Stavrinides 1975–1985:I, 426, II, 33–34).
- Agios Ioannis (near Vreli) (Gerola and Lassithiotakis 1961:90, no. 609).
- Agia Paraskevi.
- Panagia.

Zaros. The name has been considered prehellenic. Apart from a cistern and the remains of the aqueduct that brought water to Gortyn, a Roman building, Early Byzantine pottery, and a coin of Theodosios I were found here (Sanders 1982:155). Earliest mention in a document of 1332 (but referring to 1330): Zaros was in the possession of the Latin patriarchate of Constantinople and had been leased for the past two years, along with Nivritos, to I. Mudacio for 200 *hyperpyra* (Tsirpanlis 1967:200–202). In 1355 Zaros, with two other patriarchal fiefs, Plouti and Ethia, were leased to the brothers Victor and Guido Trivisano, who in turn leased them for eight years to their brother Ludovico for 250 *hyperpyra* annually; a new lease of the village is mentioned in 1467 (Tsirpanlis 1967:203–206.). Other mentions: 1374 (Santschi 1976:177, no. 662); 1378 (Santschi 1976:208, no. 878); 1380 (Santschi 1976:222, no. 1005); 1396 (Santschi 1976:378, no. 1748); 1604 (Foskolos 1985: 166–167), and in an auction of its income, together with Nivritos and Plouti, in 1573, when the three villages belonged to the heirs of Marin Zane (*Eoa kai Esperia* 3 [1996–97]:173–174). It is mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 266 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had forty-three inhabitants paying the poll tax (Stavrinides 1975–1985:II, 124; mention of inhabitant in 1752 in Stavrinides 1975–1985:IV, 377, no. 2477). Mention of inhabitants as representatives of the village in 1755 (Stavrinides 1975–1985:V, 65, no. 2586). Before the 1821 war it had thirty-five Christian and thirty Muslim families, two churches, and ten olive presses; in 1832 it had thirty Christian and ten Muslim families and four olive presses (Chourmouzis 1842:96), and in 1834 there were recorded fifty Christian and six Muslim families (Pashley 1837:II, 316). In 1866 the Turks destroyed eighty of its 130 houses, five churches, four olive presses, and four water mills (Tsatsaronaki 1954:20). In 1881 it had 608 Christian and 103 Muslim inhabitants (Stavrakes 1890: 130).

Churches:

- Agios Georgios (2).
- Theotokos (2).
- Agia Kyriaki.
- Agioi Apostoloi.
- Agios Euthymios with graffito of 1438 (Kalokyris 1957:46, no. 25; Gallas, Wessel, and Borboudakis 1983:324; Gerola and Lassithiotakis 1961:88, no. 593), and of 1442, 1472, 1701 (Tsougarakis 2000: nos. 118–122).

Agios Nikolaos (Papadaki-Okland 1966:434; Gallas, Wessel, and Borboudakis 1983:323–324; Gerola and Lassithiotakis 1961:88, no. 594) with graffito of 1481 (Tsougarakis 2000: no. 116).
Agia Paraskevi (Gerola and Lassithiotakis 1961:88, no. 595).
Agia Pelagia.
Agia Eleni.
Settlements of Unknown Name

At **Agio Pharango** gorge a survey of the area has located about eleven Roman sites. Three of these were farmsteads, probably inhabited by fifteen to twenty people, which produced pottery of the sixth/seventh centuries (Blackman and Branigan 1977:75).

At **Logarotopos**, thirty-five minutes SW of Plora, remains (numerous columns and sherds) suggest an unknown habitation site (Pendlebury, Eccles, and Money-Coutts 1932–1933:89).

At **Trypiti**, at the mouth of the Goulofarango gorge on the south coast, Roman remains suggest the existence of a small fishing village/harbor (Sanders 1982:159).

II. PROVINCE OF PYRGIOTISSA

Agia Triada. This is most probably a Byzantine site, at a different location from the Minoan palace and its later successors (remains of a Roman farm: Sanders 1982:161). It is first mentioned in 1308 (though its church is earlier: see below), when one Iohanninus Fradello leased it from the Commune (Tsirpanlis 1985: no. 224 [1320]), and again in 1394 (Santschi 1976:344, no. 1596). It is subsequently present in the Venetian censuses of 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 150 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had fifty-three inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the tower of Sporgias was defended by men recruited from this village and Voroi (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it had six Christian families (Pashley 1837:II, 315) and in 1881 forty-eight Christian inhabitants (Stavrakes 1890:132). It was a *vakif* in 1878/1884 (Stavrakes 1890:148, n. 2). It remained deserted after the Turks massacred its inhabitants in 1897.
Churches:
Agia Triada.
Agios Nikolaos.
Agios Georgios Galatas (in the present archaeological site of Agia Triada). Inscriptions: (a) inside over the door, painted inscription in two lines mentioning the construction of the church and its wall paintings by the founders in January 1302 (or 1317). (b) Outside, on a built tomb by the N wall the name of the deceased Michael Trivizis and the date 1581. (c) Numerous graffiti (1404, 1495 and later: Xanthoudides 1903:131–132; Tsougarakis 2000: nos. 357–366). (d) A church bell, the oldest in the region, with date 1519 (described by Gerola 1906–1932:II, 371); Borbourdakis 1970:498; 1973:598.

Agios Andreas. This settlement, a little to the north of Odigitria monastery, is first mentioned in an act of 1389: At that time it belonged to the Pasqualigo family and was divided among the children of the late Marco Pasqualigo; Gasparis 1997:314: "(cas.) Santo Andrea, varnisse per quarto de serventaria, ha de intrada perperi LXXIIII"—the village of Agios Andreas is subject to military obligation [or imposition] for one quarter of a *serventaria,* it has an income of 74 *hyperpyra*. It is mentioned again in the census Castrofilaca (1583) with sixty-nine inhabitants, in 1630 (Basilicata), and in the Ottoman census of 1671 with ten inhabitants paying the poll tax (Stavrinides 1975–1985:II, 126). It became deserted in the early nineteenth century when its inhabitants moved to Siva (Stavrinides 1975–1985:II, 126).
Church: Agios Andreas with wall paintings (Gerola and Lassithiotakis 1961:87; Borbourdakis 1970:492–493; Bissinger 1995: 120:1300–1350).

Agios Antonios Antilaras. The location of this settlement is unknown, as is its exact name in Greek. It is mentioned twice during the Venetian period, in 1577 (Barozzi) and in 1580/1590 as a village in the province of Pyrgiotissa with no more details. There is no other later mention.

Faure and Van Spitael (1977:64) connect it with a church of St. Antonios in Phaneromeni, but without any evidence.

Agios Ioannis. The main Roman/Late Roman settlement after the demise of Phaistos may have been here. In the Venetian period the settlement was known as Agios Ioannis Melicha or Meli(n)gha, which apparently refers to a Byzantine place-name *Melix* mentioned circa 1030 in the Testament of St. John Xenos who was born in the nearby village of Siva. According to St. John Xenos the Melicha hill was entirely barren, and on top of it the saint built a church of St. George Douvrikas and a cistern for the rain water (Tomadakis 1983–1984:5). We have now established that the Melicha hill is none other than the hill of Phaistos, on which the church of St. George Falandra was the successor of the Byzantine church of St. George built by St. John Xenos. The church of the village has an inscription dated 1303–1304 (see below) when the area was called Vaptistira (baptistery) and later Loutra because of the remains of a baptistery that exist there (plan in Gerola 1906–1932:IV, 66; see also Xanthoudides 1903:130). The earliest mention of Melica in the Venetian period is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199), of Agios Ioannis in an act of 1388 (Santschi 1976:267, no. 1213), and of Agios Ioannis Melicha in an act of 1394 (Santschi 1976:336, no. 1543) and then again in 1508 (Laourdas 1948:540). The village is mentioned in the censuses of 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 89 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it is simply called Ayo Yani, with eighteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In 1674 there is mention of the ruins of possibly a nearby *metochi* called *tou Alisantraki* and a place-name *tou Pizani e Skala* (Stavrinides 1975–1985:II, 181, no. 756). The family of Pizanis were inhabitants of the village (Stavrinides 1975–1985:II, 224, no. 816). In the Ottoman period the tower of Koukloti was defended by men recruited from this village (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it had eight Christian and three Muslim families (Pashley 1837:II, 315) and in 1881 151 Christian inhabitants (Stavrakes 1890:132).

Churches:
Agios Georgios.
Agios Ioannis (? Tsatsaronaki 1954:27).
Agios Pavlos: In the interior of the base of the tympanum of the dome, a circular inscription about 8.5 m long mentions that the founders had the church constructed at the place called *Vaptistira* and the frescoes painted in 1303/1304 "in the reign of our Orthodox and Christ-loving emperors Andronicos Palaiologos and the most pious empress Eirene and their son Michael" (Xanthoudides 1903:128–129; see also Gallas, Wessel, and Borboudakis 1983:325–328). The mention of the Byzantine emperor here (and in other churches as well) shows that one hundred years after the Venetian conquest the people of Crete had their eyes still turned to Constantinople.

Ampadochori. The location of this settlement is unknown. It is only mentioned in the Venetian censuses: 1577 (Barozzi: Abadoghori Metochio), 1580/1590 (Anonymous), 1583 (Castrofilaca: five inhabitants), and 1630 (Basilicata). It was obviously a small settlement that disappeared in the course of the seventeenth century because it is not mentioned in the first Ottoman census of 1671. (Faure and Van Spitael [1977:62] wonder whether one "Pali. cori" of the latter census refers to this, but without any argument; also without argument is their suggestion that Ampadochori was toward Klima.) The surviving of the place-name Ampadia between Agia Triada and Tympaki may be an indication of its location.

Anemuni or **Animuri**. This settlement is mentioned only in two documents, both of 1373, as being in the district of Pyrgiotissa (Santschi 1976:170 no 607 and 172, no. 618). No other mention of it exists, its location is unknown, and the Greek form of the name is uncertain.

Charka. This appears only in the Ottoman census of 1671 with fourteen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125), but its location is unknown. Stavrinides suggests that it may have been near the Odigitria monastery, because a nearby hill is called Charkokefala.

Chlia Vrysi. It is mentioned in the Venetian censuses of 1577 (Barozzi: Ghliavrissi), 1580/1590 (Anonymous: Gh. urissi) and 1583 (Castrofilaca: Ghria Vrissi with 31 inhabitants) but is absent from that of 1630 (Basilicata). It is mentioned, however, in the Ottoman census of 1671 as Helyavrisi or Hilyavrisi with four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). It became subsequently absent and does not exist today, although the British Admiralty maps mention the place-name west of Kamares.

Etea or **Ethia**. The village is first mentioned in 1355 as a fief (together with Zaros and Plouti) of the Latin Patriarchate of Constantinople. This could mean that Ethia had been in the possession of the Constantinopolitan patriarchate before the Venetian conquest and so a Byzantine settlement. In 1355 all three villages were leased to the brothers Victor and Guido Trivisano, who in turn leased them for eight years to their brother Ludovico for 250 *hyperpyra* annually (Tsirpanlis 1967:203–206). In 1369 the village was part of four *serventarie* held by Petrus de Vigoncia (Van Gemert 1980:96). In 1445 the village was leased to Antonio Contareno and Constantino Crusolora, who received a court decision whereby the neighboring monastery of Eutychios and Eutychianos, which belonged to the jurisdiction of the village, came under their jurisdiction with all its possessions (Van Gemert 1980). According to Cornelius (Cornaro 1971:40) the revenue of the village was 51 *ducats* (*ducat*: a gold Venetian coin). (The village of Elea mentioned in an act of 1373 [Santschi 1976:172, no. 618] should be certainly read Etea). Ethia is mentioned in the Venetian censuses of 1577 (Barozzi: Ettea), 1580/1590 (Anonymous: Etea), 1583 (Castrofilaca: Ettea with 66 inhabitants), and 1630 (Basilicata: Etea) but is absent from the Ottoman one of 1671 and later.

Falandra. This was a monastery (St. George Falandra, q.v.) around which a settlement apparently developed, on the hill of Phaistos in a location called Ubrica. This is the location of the tenth–eleventh century monastery St. John Doubricas founded by St. John Xenos. The settlement first appears in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198) and then again probably in 1577 (Barozzi: Ghandra, but see Faure 1977:63 for an emendation to Falandra); in the census of Castrofilaca in 1583 it had forty-one inhabitants; it appears for the last time in the Venetian period in Basilicata (1630). All the later mentions refer to the monastery with the exception of Chourmouzis (1842:38), who refers to it as a settlement in 1832.

Church: St. George with Venetian tomb and coat of arms (Gerola 1906–1932:II, 362 Fig. 404, IV, 266, no. 398).

Gligoria. The settlement is first mentioned as Agiagligoria in the thirteenth and fourteenth centuries (Gasparis 2001:198) and then again in 1372 and 1391 (Santschi 1976:307, no. 1383), which points to the existence of a church with the same name. It is subsequently present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 186 inhabitants), and 1630 (Basilicata); in the Ottoman census of 1671 it had thirty-one inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the tower of Gourgouri was defended by men recruited from this village, Magarikari, and Kamares (Stavrinides 1975–1985:II, 343, no. 991). Other mentions in the Ottoman period: 1692 (Stavrinides 1975–1985:II, 412, no. 1090) and 1699 (Stavrinides 1975–1985:III, 220–221, no. 1498: mention of place-names in the region of the village). It had three Christian and eighteen Muslim families in 1834 (Pashley 1837:II, 315), while in 1881 it had 95 Christian and 89 Muslim inhabitants (Stavrakes 1890:132).

Churches:
Agios Antonios.
Agios Georgios.

Kalochorafitis. First mentioned in an act of 1399 with its original name (Manoussakas 1964:92: *chorion to Kalo Xorafi*). It is mentioned again with the same name in 1454 (Manoussakas 1960:95: in casale Calo Chorafi), but a century later the present name had been established: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 108 inhabitants), and 1630 (Basilicata). In 1671 it had five inhabitants paying the poll tax (Stavrinides 1975–1985:II, 126) and in 1834 four Christian and four Muslim families (Pashley

1837:II, 315). In 1881 it had twenty-eight Christian and forty-three Muslim inhabitants (Stavrakes 1890: 131).

Church: Agios Georgios (Papadaki-Okland 1966:432).

Kalyvia. The first mention is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:198), and then in 1304, when the village belonged to one Iacobo Lolin from Chandax: the owner settled the family of a *francus* (free farmer) for five years to cultivate wheat (Carbone 1975–1985: no. 755). It is later present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 151 inhabitants), and 1630 (Basilicata). In the Venetian period it belonged to the Castellania of Castro Novo. In the Ottoman census of 1671 it had eleven inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125; other mention, Stavrinides 1975–1985:III, 30 no. 1217 [1694]). In 1660–1661 two of its inhabitants were among the leaders of the people of Mesara still fighting the Ottomans (Karathanassis 1973: 111). It had fifteen Muslim families in 1834 (Pashley 1837:II, 315), while in 1881 it had 100 Muslim inhabitants (Stavrakes 1890:132).

Church: Panagia Kalyviani (Papadaki-Okland 1966:433).

Kamares. In 1248 a village called Camare belonged to the Byzantine monastery of Sfacha (Tsirpanlis 1985: no. 105Xa). Although Tsirpanlis believes it to refer to Kamari in the province of Malevizi, the form of the name seems to suggest Kamares of Pyrgiotissa. Subsequent mentions in the Venetian censuses: 1577 (Barozzi, erroneously called Camadis), 1580/1590 (Anonymous), 1583 (Castrofilaca: 113 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had nine inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125; other mention, Stavrinides 1975–1985:III, 138, no. 1355 [1697]). In the Ottoman period the tower of Gourgouri was defended by men recruited from this village, Magarikari, and Gligoria (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it had eight Christian and eight Muslim families (Pashley 1837:II, 315), and in 1881 it had 200 Christian and ten Muslim inhabitants (Stavrakes 1890:132).

Church: Panagia.

Kamilari. This settlement is first mentioned in an act of 1370 as one of four *serventarie* (parts of a fief), which one Andrea Baffo had bought from the late G. Barbo before that date (Santschi 1976:52, no. 220: Santschi thinks that the four *serventarie* were "Palla Picidia, Camilari et Gonies et Camenu" but it is fairly certain that Picidia Camilari was one *serventaria*, see below). It is possible that Barbo was in possession of Camilari as early as 1349 (Santschi 1976:52; other mention, Santschi 1976:172, no. 618 [1373]). In 1377 A. Baffo transferred "unam serventariam vocatam Picida Canulari" ([*sic*], a *serventaria* named Picidia Canulari [Canulari is certainly a scribal error for Camilari]) to Noticlorius a Bochollis, due to his great debts (Theotokis 1937:208). It is later present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 77 inhabitants), and 1630 (Basilicata). In 1660–1661 one of its inhabitants was among the leaders of the local Christians still fighting the Ottomans (Karathanassis 1973:111). In the Ottoman census of 1671 it had twenty-one inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In 1834 it was inhabited by thirty Christian families, and in 1881 it had 313 Christian inhabitants (Stavrakes 1890:132).

Church: Metamorphosis.

Kissoi. Oldest mention in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) and in of 1339 (Cruce 1999: no. 310: "Chisus"). In an act of 1373 (but referring to an older date), Chissi was part of the possessions of the late Ioh. Baroci (Santschi 1976:74, no. 291). Mention of inhabitants in 1414 (Manoussakas 1964:96: family of Gabalas) and 1604 (Foskolos 1985:166). It is present in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 157 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had only four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125), and in 1834 it was inhabited by fourteen Muslim families (Pashley 1837:II, 315). In 1881 it had 124 Muslim inhabitants (Stavrakes 1890:131).

Church: Agios Georgios.

Klima. This village was transferred to the province of Pyrgiotissa in 1900, having belonged to that of Amari in Rethymnon before. Oldest mention in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 52 inhabitants), and 1630 (Basilicata). It appears again in 1834 inhabited by twenty Christian families (Pashley 1837:II, 314), while in 1881 it had 166 Christian inhabitants (Stavrakes 1890: 110).

Koutsounari. It is only mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 75 inhabitants), and 1630 (Basilicata), but it disappeared after this last mention. Its exact location is not known.

Lagolio. It first appeared in the Ottoman census of 1671 with six inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the tower of Pyrgiotissa was defended by men recruited from this village, among others (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it was inhabited by two Christian and four Muslim families (Pashley 1837:II, 315), and in 1881 it had fifty-four Christian and twenty-one Muslim inhabitants (Stavrakes 1890:132).

Church: Agios Ioannis.

Magarikari. The place-name seems to be of Byzantine origin (Ypomnema 1956:401), and it appears early in the Venetian sources: in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199) and in 1339 (Cruce 1999: no 249). It is included in the later censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 140 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had twenty inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the towers of Pyrgiotissa and Gourgouri were defended by men recruited from this village, among others (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it was inhabited by twenty-five Christian and two Muslim families (Pashley 1837:II, 315), and in 1881 it had 205 Christian inhabitants (Stavrakes 1890:132).

Churches:

Agioi Assomatoi.

Panagia Kardiotissa.

Matala. The ancient port of Festos and then Gortyn is mentioned as late as the Late Roman period in the Stadiasmos Maris Magni. An Early Christian basilica (and a corresponding settlement) has been postulated here as a number of marble columns have been found. The most notable remains are first/second-century tombs cut in the rock on the north side of the bay (Lembesi 1969:242) and the ship shed on the S side (Blackman 1973:14). Other ancient remains exist on the hill to the S, while a marble sarcophagus was found near the beach (Sanders 1982:114, 161. Other remains (sarcophagi, rings) came to light in 1821 (Chourmouzis 1842:102). No mention of the site exists until the fourteenth or the fifteenth century (Gasparis 2001:199), but the survival of the name indicates a continuous use of the harbor, if not the existence of a settlement. Around 1415 to 1420 Buondelmonti claims to have seen mosaics, statues, and the remains of buildings but does not mention a contemporary settlement (Buondelmonti 1981:110–111), nor do the later Venetian censuses although they mention the site—1577 (Barozzi), 1580/1590 (Anonymous) and 1630 (Basilicata) and the church of Santa Maria di Matala or Madonna di Matala. (This must be the rock-cut church on the south side of the harbor, which houses some Early Christian marble capitals.) The habitation here during the Venetian and Ottoman periods must have been on a temporary basis, as is shown by two acts of 1703 (Stavrinides 1975–1985:III, 302, 304 nos. 1656, 1663). The modern settlement is only mentioned from 1900 onward.

Church: Panagia.

Melic(h)a see **Agios Ioannis.**

Moulia Pizaniana. This was a *metochi* in the area of Agios Ioannis mentioned in 1682/1695 (Stavrinides 1975–1985:III, 98–99, no. 1306 and 157, no. 1383). It originally belonged to the consul of Venice in Chandax, but in 1695 it was appropriated by the fisc and then was sold to the vizier of Crete Ishmael Pasha. The family of Pizanis is frequently mentioned here and the place-name *tou Pizane e skala* exists today (Stavrinides 1975–1985:II, 125 n. 19).

Mournidi. It is mentioned for the first time in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 65 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had four inhabitants paying the poll tax (Stavrinides 1975–1985:II, 126). It is mentioned for the last time in the same year when a Christian woman donated a property in the area of Mournidi to her Muslim husband (Stavrinides 1975–1985:I, 145). Faure and Van Spitael (1977:63) place it north of Lagolio.

Phaneromeni. It first appears in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 141 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had seventeen inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the tower of Pyrgiotissa was defended by men recruited from this village, among others (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it had ten Christian and ten Muslim families (Pashley 1837:II, 315). In 1866 ten of its houses were destroyed (Tsatsaronaki 1954:28), and in 1881 it had 138 Christian and 65 Muslim inhabitants (Stavrakes 1890:132).

Churches:
Panagia Phaneromeni.
Agios Antonios.
Agia Sophia.

Pitsidia. The earliest mention is in 1319, which makes it a possible Byzantine site (mention of inhabitants: Ratti-Vidulich 1965: no. 233 [1319]; 115–116, no. 348 [1321]). In 1327 the possessions of the late Iohannes Cornaro, comprising thirty-two *serventarie*, were divided between his heirs; among them was the *serventaria* of "Picidhia" returning a total income of 113 *hyperpyra* (Gasparis 1997:305). The *serventaria* of Picidia is mentioned again probably in 1349, and then in 1370, while the *serventaria* of "Picida Canulari" is noted in 1377 (see Kamilari). Before 1369 the *serventarie* of Pala and Picidia belonged to Iohannes and Ludovicus Habramo who sold them to Benedictus Zane for 2,150 *hyperpera*. Zane failed to pay the price and the *serventarie* were resold (Santschi 1976:31–32, nos. 136–137). Other mention: Santschi 1976:357, no. 1654 [1395]: Pizidea. In 1592–1594 the inhabitants of Pitsidia and Monochoro, to avoid recruitment, fled to the deserted islet Paximadi, south of the island of Gaudos (Spanakis 1940–1976:III, 36). Mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 189 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it was a large village with fifty-two inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In 1674 one Nicolas Pizanis was selling land in Pitsidia and Sympallousa (Stavrinides 1975–1985:II, 181, no. 756). Mention of inhabitants as representatives of the village in 1755 (Stavrinides 1975–1985:V, 65, no. 2586). In the Ottoman period the tower of Manousos was defended by men recruited from this village (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it had thirty Christian families (Pashley 1837:II, 315), and in 1881 it had 417 Christian inhabitants (Stavrakes 1890:132).

Churches:
Agios Georgios.
Agia Paraskevi.

Potamitis. The earliest mention is in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199); in an act of 1358 the well-known poet Stephanos Sachlikis owned land in the village (Van Gemert 1980:43–44) but the reference certainly goes before 1348. Mentioned in the censuses of 1577 (Barozzi), 1580/1590 (Anonymous) and 1630 (Basilicata), but not in that of Castrofilaca (1583). In the Ottoman census of 1671 it had ten inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). Although it is not included in any later census, it is mentioned in 1832 (Chourmouzis 1842:38), 1890 (Lamprinakis 1890:144: Potamides [*sic*]) and 1894 (Kalomenopoulos 1894:173) with a few inhabitants. It was between Kissoi and Phaneromeni.

Pyrgiotissa.

1. The castle and the settlement. The name of the province, first mentioned in the so-called *carta concessionis* in 1212, is of Byzantine origin: a church of Panagia Pyrgiotissa was thus named because it was standing beside a Byzantine defense tower on the coast of the province (at the site of the present airfield). This is probably the church of Sancta Maria dela Pyrgiotissa mentioned in a will of 1320 (McKee 1998:I, 451). The tower, first mentioned in 1340 (Thomas 1880: 254) but no longer existing today, was repaired and rebuilt repeatedly by the Venetians because it was frequently damaged by corsairs. In 1558 it was destroyed by Turkish pirates, and was rebuilt in a plan made by Giulio Savorgnan, to be destroyed again shortly afterward.

In 1601 the tower was described as ruined and half buried by Angelo Oddi, and thirty years later Monani reported that only the foundations remained (Gerola 1906–1932:I/1, 261). It is shown in various plans or maps of the area, for example, the maps of Basilicata in 1630, on the left bank of the Ieropotamos River. It was the seat of the *castellan* and there was a small settlement around it (the "burgus castri Priotisse" [1357]: Theotokis 1933a:96), which was described as "parvum oppidum" (a small town) around 1415 by Buondelmonti (1981:112). In 1403–1404 a fine was imposed on Iohannes Bono, a former *castellan* of Pyrgiotissa, for illegally appropriating an amount of money during his term of office (Thiriet 1978: no. 105). In 1548 Nicolao Rizardo was the *castellan* of Pyrgiotissa (Kolyva-Karaleka and Moatsos 1983:400). In 1393 the *capitanus super fures* of castel Pyrgiotissa was one Iohannis Cavalario (Santschi 1976:321, no. 1436), and in 1399 a monk named Ianichi Clostogeni was made priest (Santschi 1976:324, no. 1460) and a Ioh. Quirino was scribe of Pyrgiotissa (Santschi 1976:386, no. 1797). Description: Monanni 1631: 179. In the Ottoman period a tower of Pyrgiotissa was defended by men recruited from the villages of Phaneromeni, Lagolio, Magarikari, Sympallousa, and Tympaki (Stavrinides 1975–1985:II, 343, no. 991). In 1689 all those guarding the defense towers were made responsible to compensate anyone who suffered damage by pirates (Stavrinides 1975–1985:II, 330–331, no. 978).

Church: Panagia.

2. The province. Defense**:** The inhabitants of the coast of Pyrgiotissa (along with those of some other coastal areas) were exempted from serving in the galleys because they served in the defense of the province (Pasqualigo 1594:30). This coast was 10.5 miles long and in 1630 it was thought that it needed 2,000 soldiers and 100 mounted troops to be properly defended (Spanakis 1940–1976:217; Basilicata 1630). Settlers: In 1357–1358 the Duca di Candia Philippus Aurio settled a number of *franchi* to cultivate state lands in the area (Theotokis 1933a:96). A number of refugees from Nauplion and Monemvasia were also settled in an area between Pyrgiotissa and Castel Nuovo called Francotopi in 1547 (Kolyva-Karaleka and Moatsos 1983:396), which lands were until then leased by the commune to other refugees. Population: In 1554/1555 there were fourteen priests in the province (Gerola 1906–1932:II, 174 n. 377). In 1570 it had twenty-six villages (Ntourou-Iliopoulou 1982:140, no. 9). In 1583 Castrofilaca (c. 100) recorded twenty-two villages with 2,438 inhabitants (of which there were 716 men, 1,088 women, 605 children, and 29 old persons [men?]) and fifteen priests. In 1671 and 1672 it had twenty-four villages with 475 *reaya* (Stavrinides 1975–1985:II, 67). In 1691 the province paid 296 tax receipts (Stavrinides 1955:251), and in 1693 and 1694 paid the same amount of tax receipts worth 1,464 *aspra* (Stavrinides 1975–1985:III, 116, no. 1332A, 103, no. 1314, 106, no. 1316). In 1705, according to the land register, there were twenty-eight villages and 1,170 owners (Stavrakes 1890:189). In 1834 according to the Egyptian census the province had twenty-two villages with 268 Christian and 91 Muslim families (Pashley 1837:II, 315); in 1881 there were sixteen villages with 3,459 Christian and 488 Muslim inhabitants (Stavrakes 1890: 195). Other mentions: in 1684 one Osman Aga was the tax collector of the province (Stavrinides 1975–1985:II, 271, no. 884); in 1685 the *ketkhountas* (representative of the Christian community) of the province was one John son of Michael (there is an inscription in marble over a door in a house in Voroi, "John son of Michael"; Stavrinides 1975–1985:II, 231, no. 824); in 1694 sums of money illegally collected were returned to inhabitants of the province (Stavrinides 1975–1985:III, 35, no. 1227, 56–57, no. 1260, 72–73, no. 1274); similar case in 1703 (Stavrinides 1975–1985:II, 271, no. 1596, 280, no. 1612, 281, no. 1614); in 1685 the *kethountas* of the province was one George (Stavrinides 1975–1985:II, 271, no. 1596).

St. Georgius Condarato. A settlement with this name is included in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:200) which seems to imply that a village existed where now there is only a church of Agios Georgios Kontaras near Voroi (q.v.)

Siva. This is a definite Byzantine site mentioned around 1030 but referring to circa 970 (Tomadakis 1983–1984:5). It has been suggested that the name is of Greek (Ypomnema 1956:400) or prehellenic (Faure 1967:70) origin, but an Arab origin seems more probable (Xanthoudides 1964:18). The fact that there is another village with the same name in the province of Malevizi makes it difficult to identify each one in the sources: it is mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:200) and in 1248 (Tsirpanlis 1985: 1940), and again in 1271 (Scardon 1942: nos. 308, 393), in 1325 (Nigro lib. 2, f. 4v), in 1378 (Santschi 1976:210, no. 895), and 1381 (Santschi 1976:81, no. 314). In all these mentions we cannot identify which one was meant. At some time before 1572 its income was auctioned by the state and bought by Nicolo Paleologo for 5,515 *hyperpyra* for an unknown length of time (Mertzios 1964: 175). Mentioned in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 156 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it was a fairly large village with thirty-five inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). Mention of inhabitants in 1699 (Stavrinides 1975–1985:III, 226, no. 1509). In the Ottoman period the tower of Matala was defended by men recruited from this village (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it had twenty-two Christian families (Pashley 1837:1837:II, 315) and in 1881 357 Christian inhabitants (Stavrakes 1890:132).

Churches:
Agios Ioannis.
Agios Spyridon.
Agia Paraskevi.

Sympallousa. First mentioned in the Venetian censuses: 1577 (Barozzi: Silabussa), 1580/1590 (Anonymous), 1583 (Castrofilaca: 25 inhabitants), and 1630 (Basilicata). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In 1660–1661 three of its inhabitants were among the leaders of the people of Mesara still fighting the Ottomans in the area (Karathanassis 1973:111). In the Ottoman census of 1671 it had twenty-nine inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the tower of Pyrgiotissa was defended by men recruited from this village, among others (Stavrinides 1975–1985:II, 343, no. 991). Mentions of landed property: Stavrinides 1975–1985:II, 181, no. 756 (1674: 800 olive trees); II, 246–247, no. 853 (1685). Last mentioned in 1832 (Chourmouzis 1842:38). Today only the place-name "Panagia Sympallousa" exists between Tympaki and Agia Triada.

Temeneli. This was between Kissoi and Magarikari and is first mentioned in 1248, which makes it a definite Byzantine site. It used to belong to the monastery of Paliani but was at that time held by fief-holders and it had arable land of five pairs of oxen (Tsirpanlis 1985: no. 105Xb: Themenelo). It is subsequently included in the Venetian censuses: 1577 (Barozzi), 1580/1590 (Anonymous), 1583 (Castrofilaca: 99 inhabitants), and 1630 (Basilicata). In the Ottoman census of 1671 it had ten inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In 1834 it had five Muslim families (Pashley 1837:II, 315) and in 1881 thirty-five Muslim inhabitants (Stavrakes 1890:132).

Tympaki. This must be a Byzantine site since a "casale nomine Chimbachi" mentioned in 1248 apparently refers to it (Tsirpanlis 1985: no. 105Xb), as does the mention in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:199: Kimbachi). It used to belong to the monastery of Paliani but was at that time held by fief-holders and it had arable land of two pairs of oxen. In 1388 Chimbachi belonged to Franciscus de Molino (Santschi 1976:279, no. 1271 [1390]). It is mentioned in the censuses of 1577 (Barozzi: Timbachi mettochio), 1580/1590 (Anonymous) and 1630 (Basilicata: Timbachi Apano and Timbachi Cato), but it is absent from that of Castrofilaca (1583). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In the Ottoman census of 1671 it had forty inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the tower of Pyrgiotissa was defended by men recruited from this village, among others (Stavrinides 1975–1985:II, 343, no. 991). In 1834 it had ninety-five Christian and three Muslim families (Pashley 1837:II, 315). In 1866 eighty of its houses were destroyed by the Turks along with 2,000 olive trees (Tsatsaronaki 1954:26). In the nineteenth century it had become a *vakif* and in 1881 it had 1,070 Christian inhabitants (Stavrakes 1890:148 and 132).

Churches:
Agios Titos.
Agios Nikolaos.
Zoodochos Pigi.
Agio Pneuma.

Voroi. It is first mentioned in the Feudal Registers of the thirteenth and fourteenth centuries (Gasparis 2001:200) and then in 1394 (Santschi 1976:344, no. 1596: Vari [*sic*]) but excavations in a private house have yielded pottery probably of the twelfth century. A mention of a "loco dicto Vorus" in 1348 in connection with a village Cavalu (McKee 1998:I, 292) probably refers to Vorou in Monofatsi. Its subsequent mention is in the Venetian censuses: 1577 (Barozzi: Verus), 1580/1590 (Anonymous), 1583 (Castrofilaca: Vorus with 312 inhabitants), and 1630 (Basilicata: Vorus). In the Ottoman census of 1671 it was the largest village of Pyrgiotissa, with fifty-five inhabitants paying the poll tax (Stavrinides 1975–1985:II, 125). In the Ottoman period the tower of Sporgias was defended by men recruited from this village and Agia Triada (Stavrinides 1975–1985:II, 343, no. 991). Other mentions: Stavrinides 1975–1985:I, 233 (1671); II, 182–183, no. 759 (1675: seat of the *naipes,* a local representative of the Kadi, of Pyrgiotissa); II, 239–240, no. 841 (1685); III, 195, no. 1448 (1696); III, 224, no. 1505 (1699). In 1834 it had twenty-five Christian and five Muslim families (Pashley 1837:II, 315) and in 1881 it had 380 Christian inhabitants and one Muslim (Stavrakes 1890:132).

Churches:
St. Pelagia: sixteenth century; partial inscription 1599 (Xanthoudides 1903:133).
St. George Kontaras: fourteenth century wall paintings; graffito of 1380 (Gerola and Lassithiotakis 1961:no. 580); later inscription August 1646 above the S door with the mention of a monk probably named Constantine Dossas (Gallas, Wessel, and Borboudakis 1983:333; Borbourdakis 1965:442; 1975, 354). Another inscription also of 1646 above the W entrance (Tsougarakis 2000: no. 367).
St. John: fourteenth century (Gerola and Lassithiotakis 1961: no. 579; Papadaki-Okland 1966:432).
Agia Photeini.
Agia Paraskevi.
Panagia Kardiotissa (Papadaki 1966:433).
Agia Marina.
Panagia.

Xeri Kara (*metochi*). In 1650 the village, along with many others, was part of the fief of one Deli or Gazi Hussein Pasha (Stavrinides 1955:315). In the nineteenth century it had become a *vakif* (Stavrakes 1890:148). No other information is available.

Appendix H

Byzantine–Ottoman Period Settlements in Kainourgio and Pyrgiotissa: First Recorded Appearance and Continuity

Dimitri Tsougarakis and Helen Angelomatis-Tsougarakis

Settlement Name	12th c. or previously	13th c.	13th/14th c.	14th c.	15th c.	1583	16th c.	1630	1671	17th c.	18th c.	1821 or previously	1832	1834	1866	1881	1900 or later
Agia Marina	+	+	+?			+	+	+				+	+				
Agia Triada	[+]	[+]		+		+	+	+	+					+		+	
Agios Ioannis	+		+	+		+	+	+	+	+				+		+	
Agios Konstantinos	+	+		+		+	+	+									
Alithini	+	+	+			+	+	+	+			+	+	+		+	
Anogia	+	+		+	+	+	+	+	+		+	+	+	+	+	+	
Apolychnos	+	+		+		+	+	+	+					+	+	+	
Apomarmas	[+]	+	+	+		+	+	+	+			+	+			+	
Camethachi	+	+															
Etea/Ethia	[+]?			+	+	+	+	+									
Gergeri	[+]	+	+	+		+	+	+	+	+	+	+	+	+	+	+	
Kamares	+					+	+	+	+	+				+		+	
Kyrmousi	+	+	+			+	+	+	+			+	+	+		+	
Mitropoli	[+]?		+	+	+	+	+	+	+			+	+	+	+	+	
Monochoro	[+]	+	+	+	+	+	+	+	+	+				+	+	+	
Moulia Apano	+	+		+	+	+	+	+	+	+		+	+	+	+	+	
Nassi	+	+	+	+		+	+	+									
Panassos	[+]	+	+	+		+	+	+	+			+	+	+	+	+	
Pobia	+	[+]		+	+	+	+	+	+	+		+	+	+	+	+	
Roufas	[+]?	[+]	+	+		+	+	+	+			+	+	+		+	
Siva	+	+?	+?	+?		+	+	+	+					+		+	

Continued next page

Settlement Name	12th c. or previously	13th c.	13th/14th c.	14th c.	15th c.	1583	16th c.	1630	1671	17th c.	18th c.	1821 or previously	1832	1834	1866	1881	1900 or later
Temeneli	+	+				+	+	+	+					+		+	
Tymbaki	+	+	+	+			+	+	+	+				+	+	+	
Vali	+	+		+		+		+	+					+		+	
Vassiliki	[+]?	+		+	[+]	+	+	+	+	+		+	+	+		+	
Agioi Deka		[+]	+	+		+	+	+	+			+	+	+	+	+	
Castel Novo		+		+	+	+	+	+	+			+	+		+	+	
Chryssostomos		+		+						+							
Gangales		[+]		+		+	+	+	+					+		+	
Kourtes		[+]	+	+	+	+	+	+	+			+	+	+		+	
Panagia		[+]?	+	[+]?		+	+	+	+			+	+	+	+	+	
Pyrgiotissa		+		+	+		+		+								
Viko		[+]	+	+		+		+									
Antiskari			+	+	+	+	+	+	+			+	+	+	+	+	
Drosoi			+			+	+	+	+			+	+		+	+	
Falandra			+			+	+	+									
Galia			+			+	+	+	+	+				+	+	+	
Gligoria			+	+		+	+	+	+	+	[+]			+		+	
Kalyvia			+	+		+	+	+	+	+				+		+	
Kissoi			+	+	+	+	+	+	+					+		+	
Kitia			+			+	+	+	+								
Kousses			+	+		+	+	+	+	+		+	+	+		+	
Laloumas			+			+	+	+	+							+	
Magarikari			+	+		+	+	+	+					+		+	
Makres			+						+			+	+	+	+	+	
Matala			+		+		+	+			+						+
Moroni Apano/ Kato			+	+		+	+	+	+			+	+	+		+	
Plora			+			+	+	+	+	+		+	+	+	+	+	
Plouti			+	+		+	+	+	+			+	+	+		+	
Potamitis			+	+			+	+	+				+				
Prinias			+	+		+	+	+	+			+	+	+	+	+	
Psallida			+			+	+	+							+		
Raftis			+	+	+	+	+	+	+			+	+	+		+	
Raptis			+	+	+	+	+	+	+			+	+	+		+	
Skourvoula			+	+		+	+	+	+					+	+	+	
Trypita			+			+	+	+	+			+				+	
Vico			+			+		+									
Vidho/Vithio			+			+	+	+									

Settlement Name	12th c. or previously	13th c.	13th/14th c.	14th c.	15th c.	1583	16th c.	1630	1671	17th c.	18th c.	1821 or previously	1832	1834	1866	1881	1900 or later
Voroi			+	+		+	+	+	+	+	[+]			+		+	
Vourvoulitis			+	+	+	+	+	+	+			+	+	+		+	
Vreli			+	+	+	+		+	+	+		+	+	+		+	
[Paleo Chorio] Vreli				+		[+ Vreli]	+	[+ Vreli]									
Agios Andreas				+		+		+	+		[+]						
Agios Kyrillos				+		+	+	+	+			+				+	
Anemuni				+													
Apesokari				+		+	+	+	+			+	+		+	+	
Flathiakes				+													
Kalochorafitis				+	+	+	+	+	+					+		+	
Kamilari				+		+	+	+	+					+		+	
Krotos				+		+	+	+	+			+	+	+		+	
Messiskli				+		+	+	+	+								
Moires				[+]?					[+]?	+		+	+	+	+	+	
Moulia Apano/ Kato				[+]		+	+	+	+							+	
Nivritos				+	+	+	+	+	+		+	+	+	+	+	+	
Paliama				[+]	+	+	+	+	+			+	+	+		+	
Peri				+		+	+	+	+			+	+	+	+	+	
Pitsidia				+		+	+	+	+	+	+			+		+	
Thau				+													
Zaros				+	+	+	+	+	+	+	+	+	+	+	+	+	
Pigaidakia					+	+	+	+	+			+	+	+		+	
Agios Antonios Antilaras						+											
Agios Eleftherios						+	+	+	+								
Ampadochori						+	+	+									
Azogyreas						+	+	+									
Chlia Vrysi						+	+		+								
Faneromeni						+	+	+	+		+			+	+	+	
Flabanochori						+	+	+									
Gialomonochoro						+	+	+	+			+	+			+	
Gorgorimo						+		+	+								
Kamaria						+	+										
Kandila						see Kama-ria	+	+	+			+	+			+	

Continued on next page

Settlement Name	12th c. or previously	13th c.	13th/14th c.	14th c.	15th c.	1583	16th c.	1630	1671	17th c.	18th c.	1821 or previously	1832	1834	1866	1881	1900 or later
Keramos						+	+	+	+			+	+				
Klima						+	+	+						+		+	
Koutsounari						+	+	+									
Listaros						+	+	+		+		+	+	+		+	
Miamou						+	+	+	+			+	+	+		+	
Mournidi						+	+	+	+								
Petrokefali						+	+	+	+			+	+	+		+	
Sympallousa						+	+	+	+	+			+				
Voriza						+	+	+	+					+	+		
Baga Metochi									+								
Chourdiano Metochi									+								
Fari									+			+	+		+	+	
Izounida									+								
Kalathiana									+						+	+	
Kanatiana									+								
Kavalato									+								
Kirolako									+								
Koukiana									+								
Lagolio									+		+			+		+	
Fradio										+							+
Kapariana										+		+	+		+		
Platanos										+		+	+	+	+	+	
Manoussana											+	+	+	+			
Mastrachiana											+				+	+	
(A)Gavaliana												+	+	+		+	
Aistratigos												+					
Filidiana												+					
Fitzana												+	+				
Gianoulgiana												+	+				
Kalogeriana												+					
Neoniana												+					
Salissima												+	+				
Seferiana												+	+	+		+	
Agios Antonios															+		+
Armoutidon Metochi															+		

Glossary

advocatores communis: officials with judicial duties
aga: administrative official; governor of a province
agalia: measure equal to roughly 10 *okades*, literally, an apronful
agria fita: wild plants
agrotika: agriculture
agrotis/pl. *agrotes:* farmer/farmers
ahtname: pact, agreement
akce: Ottoman coin; one-third of a *para*
allelovoethia: mutual aid, helping out one another
ammoudara, ammoudochoma: sandy soils in the Western Mesara
angareia: corvée, forced labor
Anonymous of Ravena: a geographical work of the seventh/eighth century AD
antallagi: population exchange between Greece and Turkey, 1923, a provision of the Treaty of Lausanne
apotheke: storage area, storeroom
archon: an official in general, or a governor of an *archontia*
archontia: administrative unit of lesser status than a *theme*
argoulida, agrilida, agrilia: wild olive
asprochoma, asproulias, asprouli: the eroded, whitish soils of the Mesara
bakse: fruit orchard
berat: warrant, order
camera fiscal: the Treasury
Capitan General: head of the army in Venetian Crete
Capitanei contra fures: officials with police duties against robbers and thieves
Capitanei super latronibus: officials with police duties against the contraband of grain
carta concessionis: the document whereby Crete was ceded by Boniface of Monferrat to Venice in 1204
castellania: administrative unit within a *territorio*
chontroelaia: tree producing eating olives
cizye: capital tax
consiliarii: two concillors who aided the Duca in his duties
Consilium dei Rogati: the Cretan Senate
Consilium Feudatorum: the Council of fief-holders
curia: local assembly
datio della Porta: a toll-tax
demati, dematia: half a donkey load, one bundle, equally five *agalies*, roughly 50 *okades*
donum: superficial measure (97 square yards)
Duca di Candia: the Governor of Crete
ducat: gold coin of Venice first minted in 1282
edaphos, edaphi: the soil
elaia, dendri: olive tree
elaiolado: olive oil
elaiones: olive groves
elaiotriveio, *fabrika:* olive oil mill
emborio: trade
emboros: merchant, middleman
emeromisthio, (e)merokamato: day labor
Epano Mesara (Mesa Mesara): local names for the Eastern Mesara, literally, Upper Mesara (Inner Mesara)
eparch: governor of a province
epafes, desmous: ties, social connections, relations
epitropoi: officials managing the affairs of monasteries; wardens
ergatis: measure of vineyard surface
franchi: villagers free from the personal tax
frangotopoi: places belonging to *franchi*
geotrisis: drilling of deep wells
gerani: watering system using bucket suspended from a lever (equivalent of *shaduf*)
gomari: one donkey load, roughly 100 *okades* or two *dematia* (bundles)
gourna: carved limestone basin
Gria Saita: major manmade water channel running through the Western Mesara
grosso: Venetian silver coin
haakamet sancak: self-governing province
hains: Christian rebels against the Turks
horio/pl. *horia:* village/ villages
horta: wild greens

hyperperon/pl. *hyperpyra:* originally a Byzantine gold coin; in Venetian Crete, money of account
kadi: Muslim judge of the sacred law
kafeneio: village coffeehouse
kalliergeia: cultivation, tillage
kampos: the plain
kantari: measure equaling 44 *okades*
kanunname: Muslim code of laws
katapotes, avlakia: man-made water channels (see *saites*)
Kato Mesara (Exo Mesara): local names for the Western Mesara, literally, Lower Mesara (Outer Mesara)
katochi: occupation by an army; the German and Italian occupation of Crete beginning in 1941
katsikes, eges: goats
kephalohorio: major village, primary village
kipos, perivoli: garden, kitchen garden
koilo: measure of weight (22 *okades*)
koinotis: community; two or more villages joined together as a community
kokkinochoma, kokkinas, rousses: the Pleistocene red soil of the Mesara
kome: a settlement of lesser rank, not a polis
kopadi, egoprovata, oza: flock, herd of sheep and/or goats
kopria, kopries, kopros: manure
koprolakkos: manure pit
kouroupes: small clay storage jars
krithari, krithos: barley
ktimata, horafia: landholdings; fields
ktinotrophia: shepherding
larnax/pl. *larnakes:* Minoan clay coffin
lepida, lepidochoma, lepidias: the gray-green clay-based soil of the Mesara
Levadia: alluvial bottomland immediately east of Phaistos; marshland below Phaistos during winter months
lipasmata: chemical fertilizers
mantinada: poetic verse
mastoras, technitis: craftsman
mensura/mouzouri: a measure of weight (15 *okas*)
metochi: a small settlement; a monastic possession; landholdings in locations away from the main settlement; a shepherd's fold and landholding away from the village
miri: state property in Ottoman period
mistato: measure of liquid of varying content
mitato: shepherd's establishment
monastir agasi: influential Turks who acted on behalf of monasteries
mukataa: farming out of the revenue of imperial (Ottoman) possessions
muzuri: see *mensura*
naipes: a local Turkish official representing the Ottoman Kadi
neromylo: watermill for grinding of grain
nobilis cretensis: a Cretan noble, as opposed to a Venetian noble
nome: an administrative division (gr. *nomos*)
nopa proionta: fresh vegetable products
oka: measure of weight (1.28 kilograms); pl. *okades*
orgoma: plowing
ori, vouna: mountains
ospria, psimika: pulse crops
ox: measure of field surface
para: money; fortieth part of a *piastre*
Pasha: Ottoman governor of one of the *sancaks*
pazari, laiki agora: Saturday market in Moires
Peutinger Table: map of the world of the fourth/fifth century AD
pezoulia: terraces, terracing; the actual shelf of earth in terraces (see *traphos*)
piastre: Ottoman coin; money
pithari/pl. *pitharia; kioupia*: large clay storage jar(s)
Porte: the seat of the Ottoman government in Istanbul; the Government
portofoli: spending power, cash; term applied to surplus crops for sale
potisma: irrigation, watering
prasinaria, hortaria: weeds; wild greens
provata: sheep
psyloelaia: tree producing oil olives
reaya: Christian subject of the Ottoman state
rector: governor of the one of the three *territoria* of Crete, apart from Candia
Regno di Candia: the Venetian province of Crete
saites: large-scale man-made water channels
serventaria, sergentaria: subdivision ($^1/_6$) of a fief
sexterio: original administrative division of Crete (6 *sexteria*)
sinoro: field border; border between the landholdings of two villages; literally, a stone marker at the corner where two fields meet

sitari, stari: wheat
sitira, karpos, sparmena, demetriaka: grain
spiti: home, house
Stadiasmos of the Great Sea: geographical work of uncertain date (sixth–eleventh century AD)
staphides, staphilia, ambelia: grapes dried, grapes fresh, vines
stavropigion: a monastery under the direct supervision of the Patriarchate
stradioti: soliders in the service of Venice
strategos: governor of a *theme*
stremma/pl. *stremmata:* measure of land surface, 1000 square meters, 1/4 of an acre
Synecdemos of Hierocles: sixth century list of provinces and cities of the Roman Empire
tagi, vromi: oats
tagidomigado, migadi: bread made from interplanted barley, wheat and oats
territorio: administrative division of Crete (four *territoria*)
thamnos: wild shrub growth
themes: Byzantine provinces where the army unit (*theme*) was recruited locally
Thrapsaniotes: potters from the Pediada village of Thrapsano who regularly traveled to the Mesara Plain
timar: fief granted by the Sultan to soldiers
toplou (of a monastery): having cannons (Turkish *top*)
traphos, kserotoichos, kserolithi: stone wall holding a terrace in place
tsopanis, voskos: shepherd
turma: subdivision of a *theme*
vakif: pious foundation (Ottoman)
varnitio: the obligation for military service of the fief-holders in Venetian Crete
Venetokratia: period of Venetian rule in Crete (1210/1211–1669)
villani: dependent villagers paying the personal tax
xerizampelo: a former (old) vineyard
zevgari: pair of oxen; a rough measure of village population and landholdings

Abbreviations

The abbreviations used in the text follow those presented in the *American Journal of Archaeology* 104 (2000):3–24. Other examples are listed below.

Chronological Periods

A	Archaic
Byz	Byzantine
C	Classical
EM	Early Minoan
ER	Early Roman
Geo	Geometric
Hell	Hellenistic
LB	Late Bronze
LM	Late Minoan
LN	Late Neolithic
LR	Late Roman
MM	Middle Minoan
O	Orientalizing
PG	Protogeometric
T	Turkish
V	Venetian

Specialized abbreviations used in ceramic studies appear at the beginning of appendix E.

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Plates

PLATE 3.1. View of the Mesara Plain from the north, near Ano Moulia

PLATE 3.2. View of Phaistos and the Phaistos ridge from the east

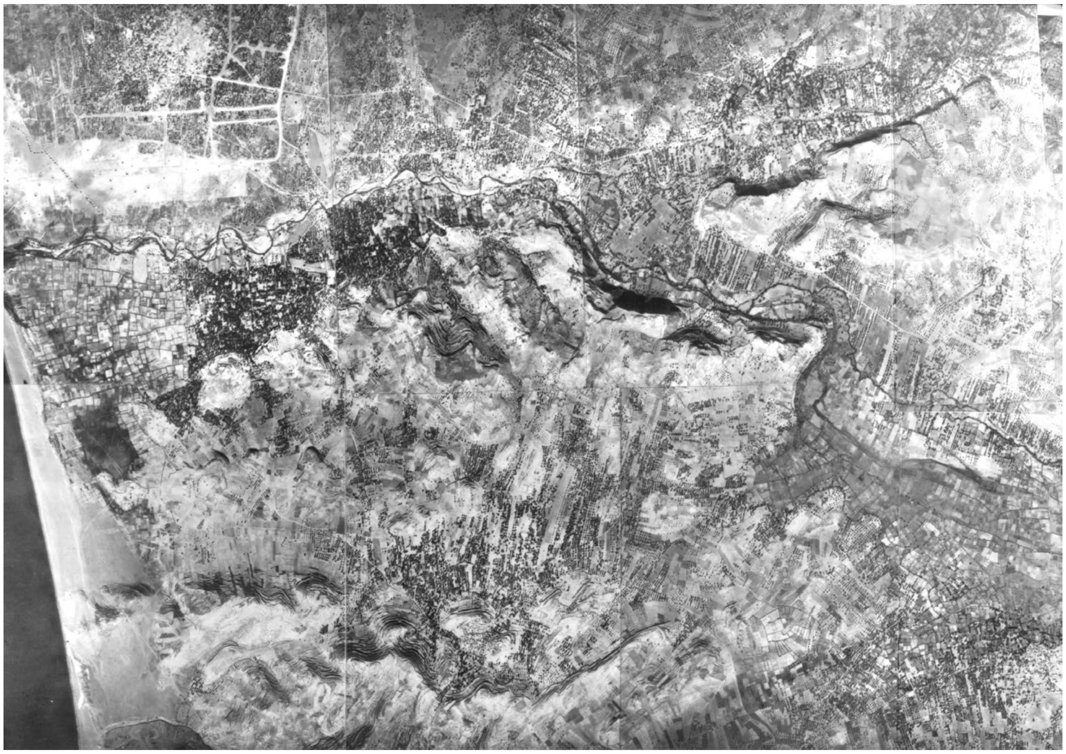

PLATE 3.3. Aerial view of the Western Mesara. The village of Kamilari is visible in the lower center; Voroi appears at the top, toward the right corner. *Composite photograph based on aerial photographs reproduced with the permission of Her Britannic Majesty's Stationery Office and courtesy of Keele University.* *© British Crown Copyright/MOD.*

PLATE 3.4. View of the west coast of the Mesara from the south.
The town of Timbaki appears in the upper left; the church of Agios Nikolaos at the center right.

PLATE 3.5. View of the Idaean foothills near the village of Grigoria

PLATE 3.6. View of the south coast of the Mesara from Kaloi Limenes looking east

PLATE 3.7. View of Matala from the north

PLATE 4.1. Road section with buried Late Neolithic site marked by line of stones and sherds

PLATE 5.1. View southward of the bay of Kaloi Limenes

PLATE 5.2. View south of the Agio Pharango Valley

PLATE 5.3. View of the Ieropotamos River (marked by the line of trees in the foreground) and Phaistos on the ridgetop in the center

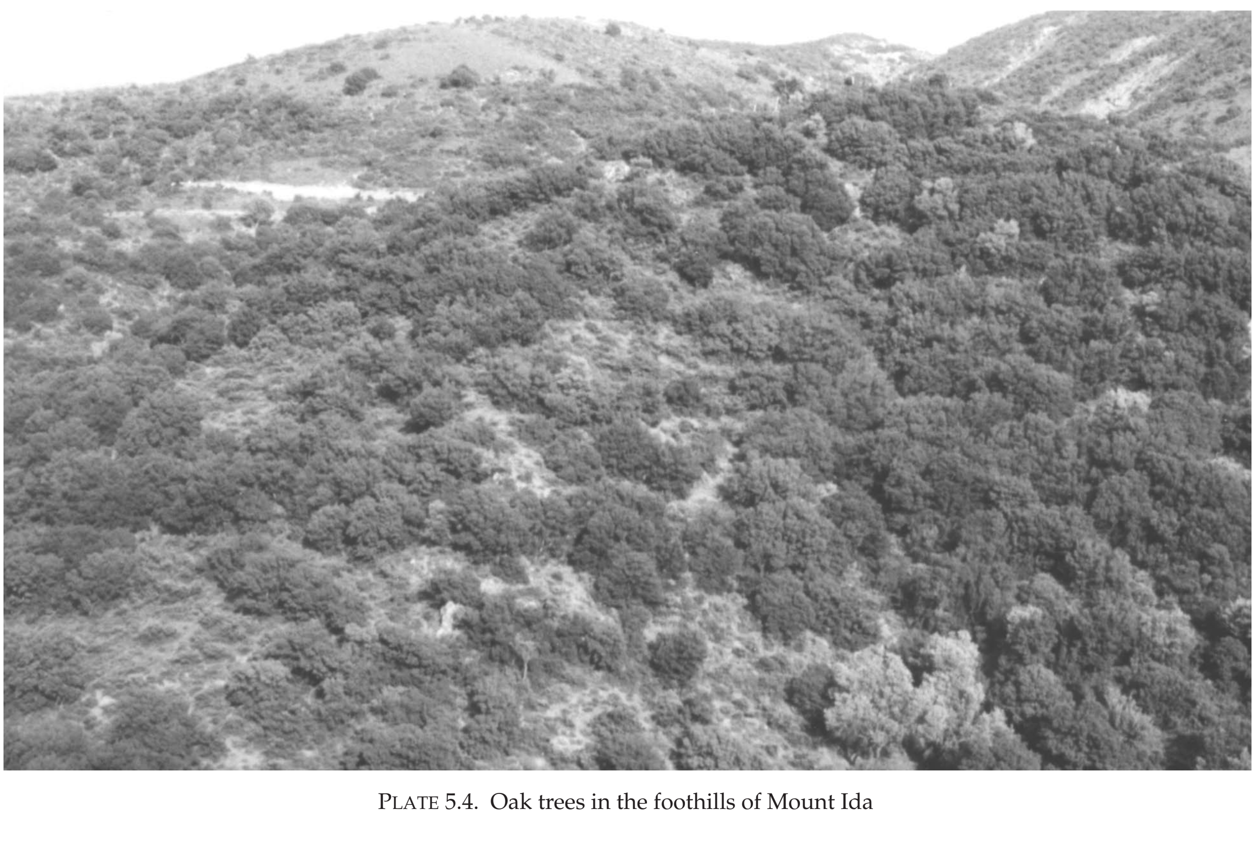

PLATE 5.4. Oak trees in the foothills of Mount Ida

PLATE 5.5. Idaean landscape with thorny burnet

PLATE 5.6. Botanical sampling in quadrant near Sivas

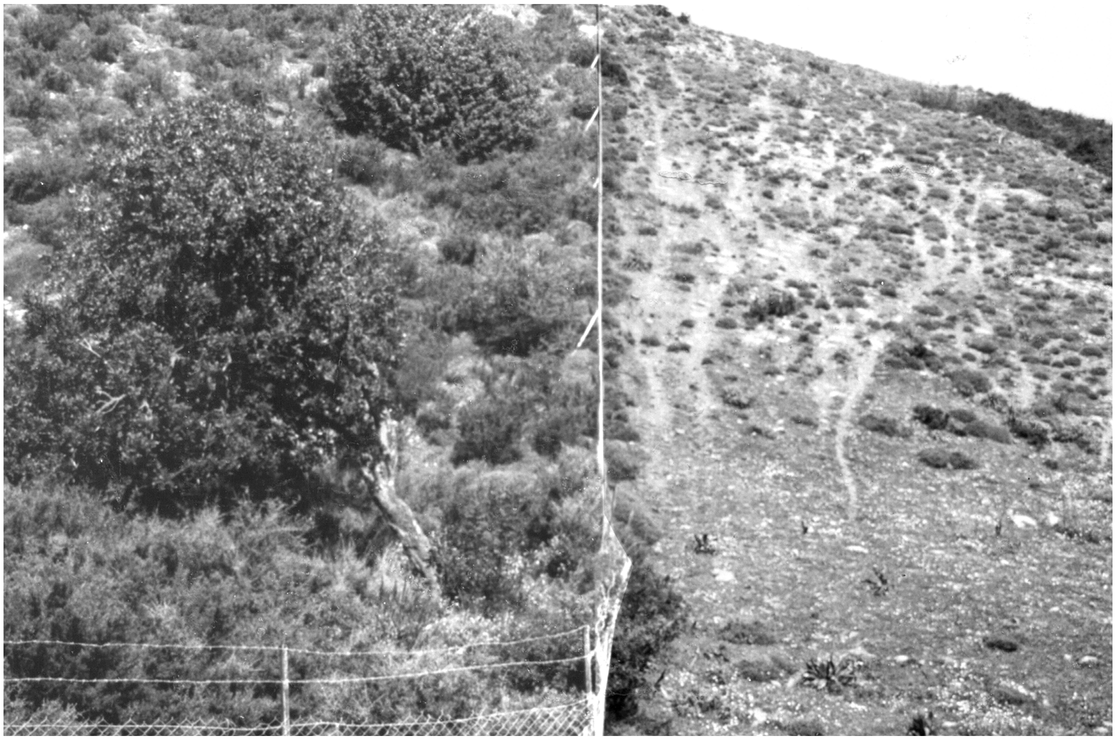

PLATE 5.7. View of fenced-in enclosure near Listaros

PLATE 5.8. View of field abandoned since 1942 near Matala

Plate 6.1. Intensive cultivation of the Western Mesara bottomlands between Pobia (foreground) and Moires (background). View from the south.

Plate 6.2. The courtyard of the Odigitria Monastery with chapel, workrooms, storerooms, and living areas on its margins

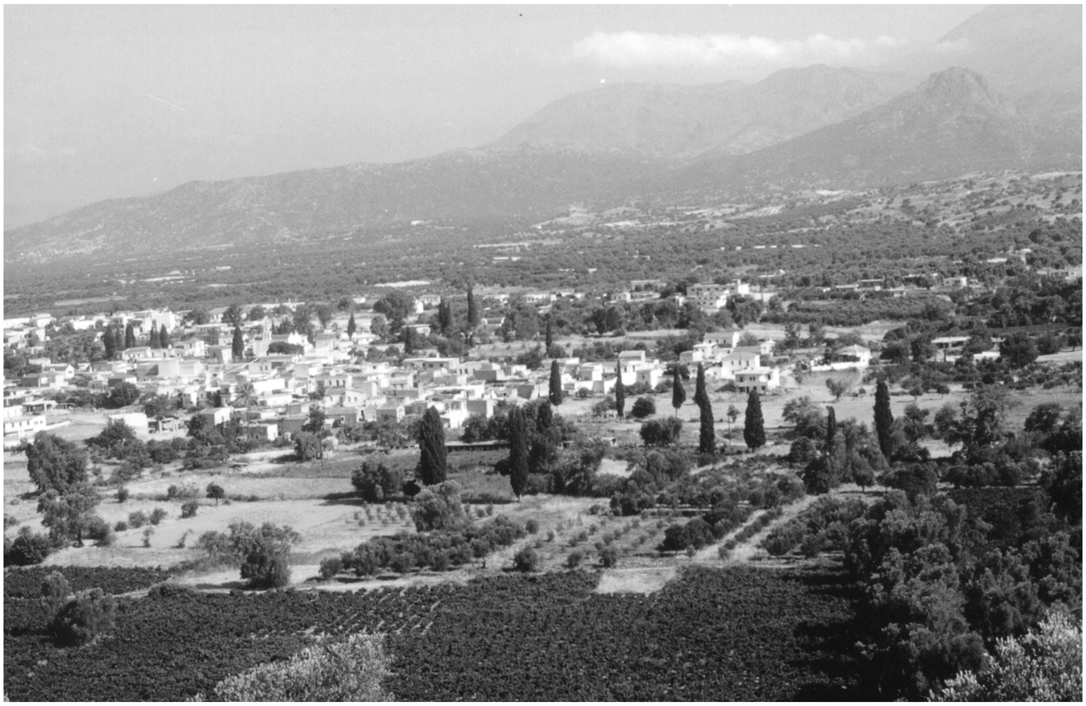

PLATE 6.3. The village of Voroi with its landholdings of *asprochoma* (fertile white soils). View from the southwest.

PLATE 6.4. The village of Listaros ("*me tsi faskomilies tou*") in the foothills of the Asterousia. View from the north.

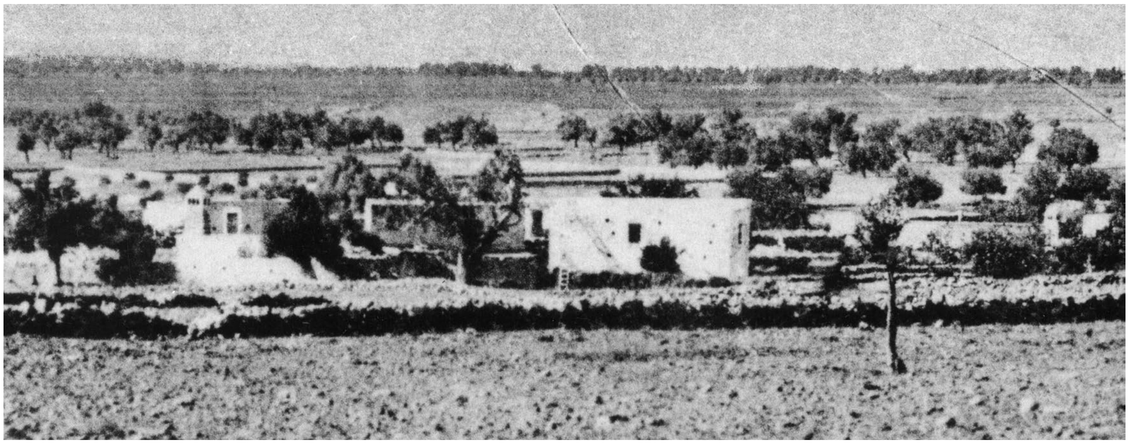

Plate 6.5. The village of Agioi Deka in the Eastern Mesara at the turn of the century, showing plowed fields, limited shrub growth, and few olives. View from the north.

Plate 6.6. Three fundamentals of Mesara subsistence: grain, grapes, and olives

PLATE 6.7. Degraded terracing in the foothills on the southern margins of the Mesara

PLATE 6.8. Plowing the fields at the beginning of the twentieth century in Crete.
Photograph courtesy E. Kadianakis.

PLATE 6.9. The ox team (*zevgari*) and the wooden plow *(aletri)* at the end of the nineteenth century in Crete. *After Provatakis 1990:103.*

PLATE 6.10. The Mesara sickle *(drepani)* made by the local ironworker *(charchias)* with its water-resistant oleander *(sphaka)* handle

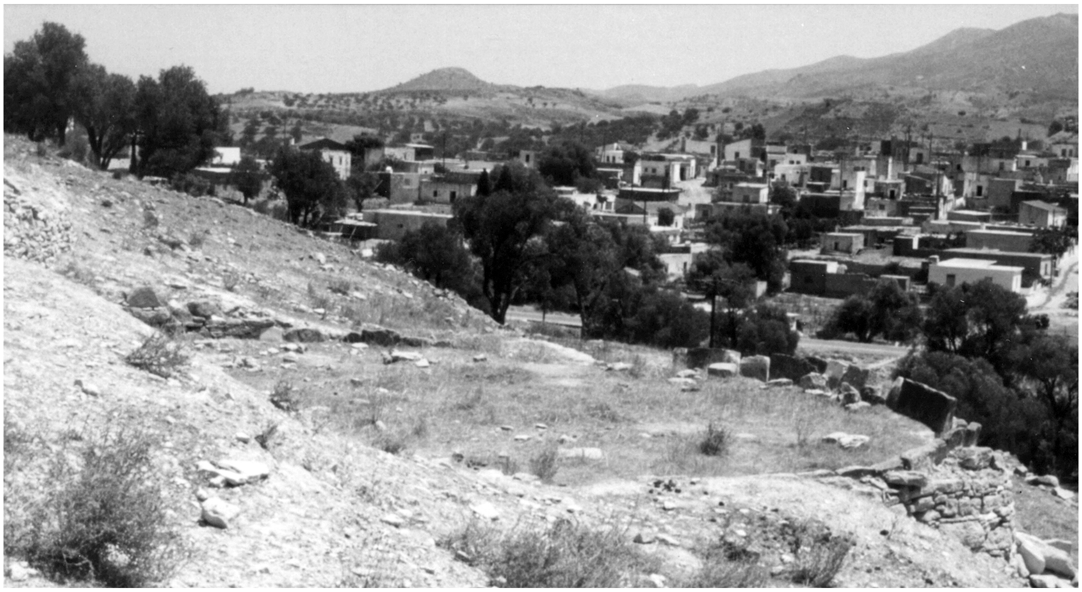

PLATE 6.11. A threshing floor *(aloni)* located on the slopes above the village of Pitsidia

PLATE 6.12. The threshing floor handbroom *(paraseira)* braided of rush, shown on the newly laid threshing floor of mud, ox dung, and straw

PLATE 6.13. Spreading the barley on the threshing floor in readiness for *doules* (rounds of threshing)

PLATE 6.14. The pine threshing sledge *(voloseiro)*

PLATE 6.15. Repairing the denticulated iron strips *(sarakakia)* on the threshing sledge. To the farmer's right are visible the chert blades *(nuchia)* imported from Anatolia.

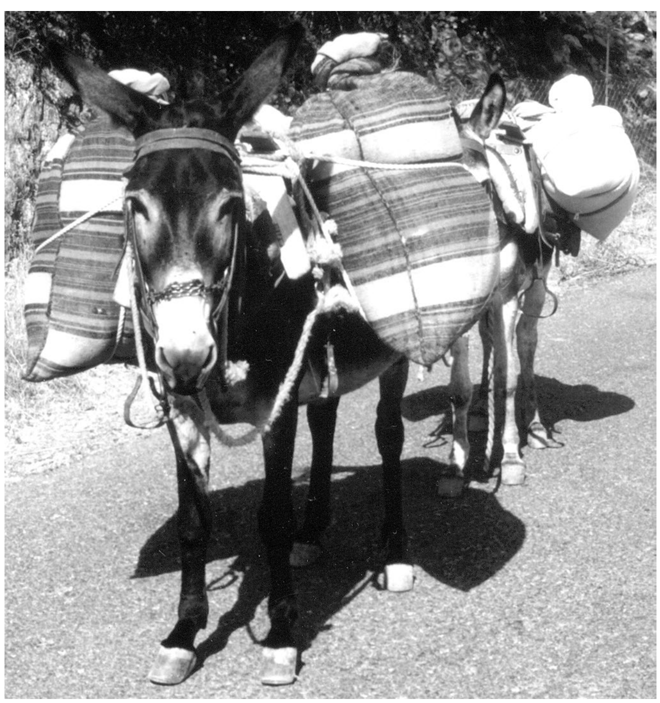

PLATE 6.16. Transportation of grain to the watermill in handwoven *tsouvalia* and *sakkia* (cloth sacks) via donkey. Each sack holds roughly 50–60 *okades* of grain.

PLATE 6.17. Imported millstones *(mylopetres)* from Melos for the construction of a watermill. Shipped to Crete in pieces and bound with iron strips at the mill site.

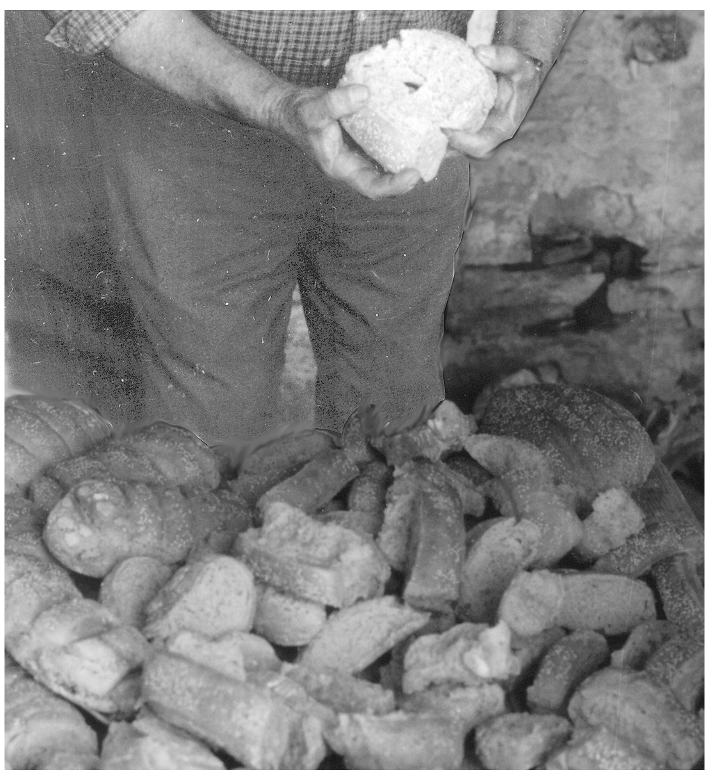

PLATE 6.18. A fundamental of the Mesara subsistence system: *dakkos*, twice-baked bread

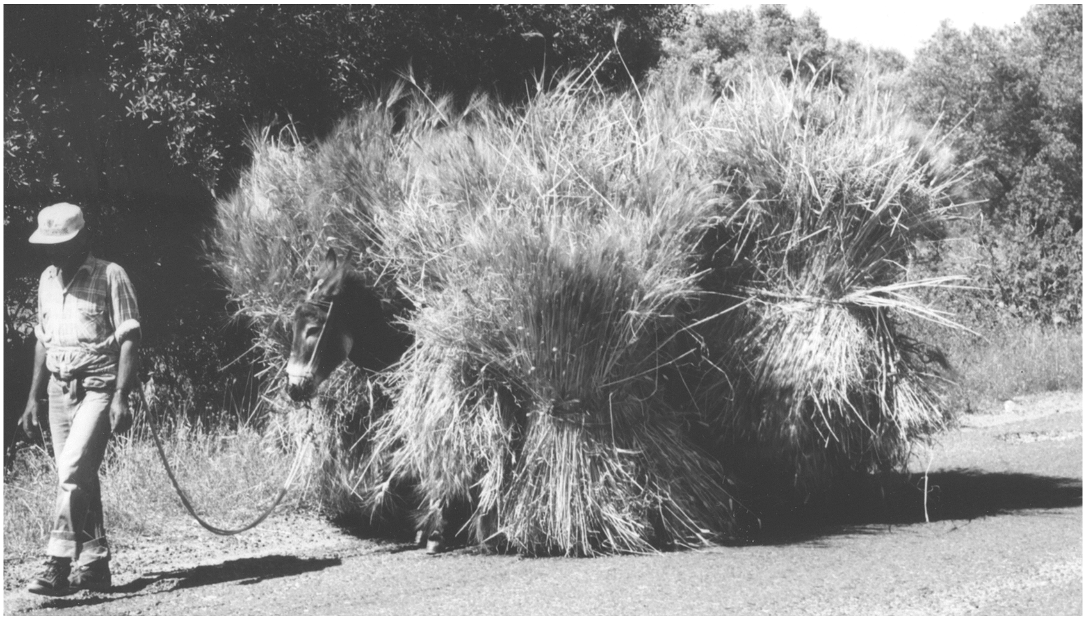

PLATE 6.19. Transporting shocks of grain *(dematia)* to the *acheironas* (fodder storeroom)

PLATE 6.20. The household handmill *(cheromilo)* used to grind grain for bread (in times of economic stress) and for everyday processing of *hontro* and pulses

PLATE 6.21. Tools of the threshing floor: the threshing fork *(thrinaki)* and the sieve *(koskini)*

PLATE 6.22. Bales of pulses on the margins of the threshing floor prior to processing

PLATE 6.23. Broad beans *(koukia)* in their dried husks prior to beating

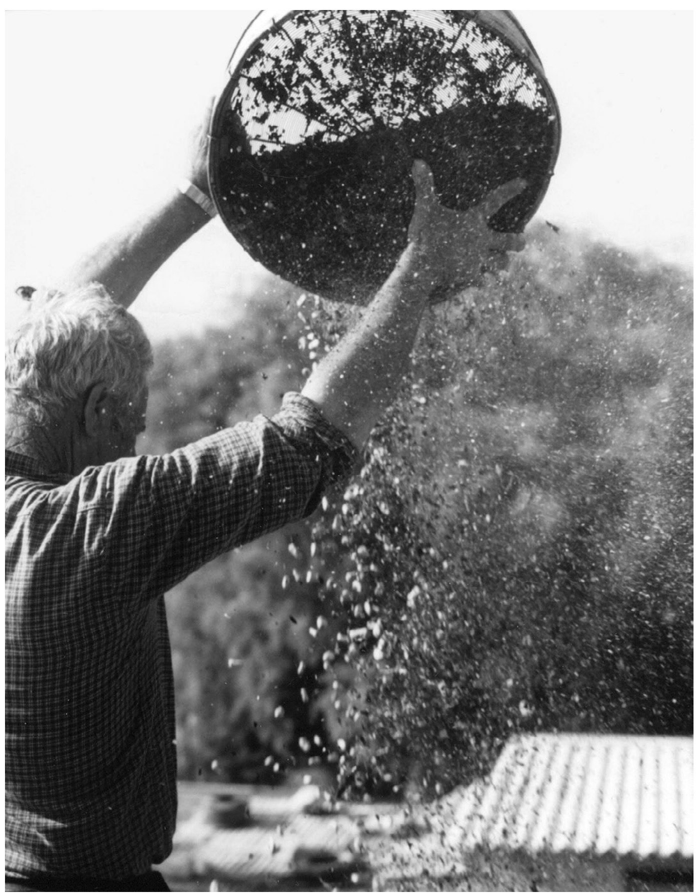

PLATE 6.24. Sieving the beaten broad beans on the roof of the house

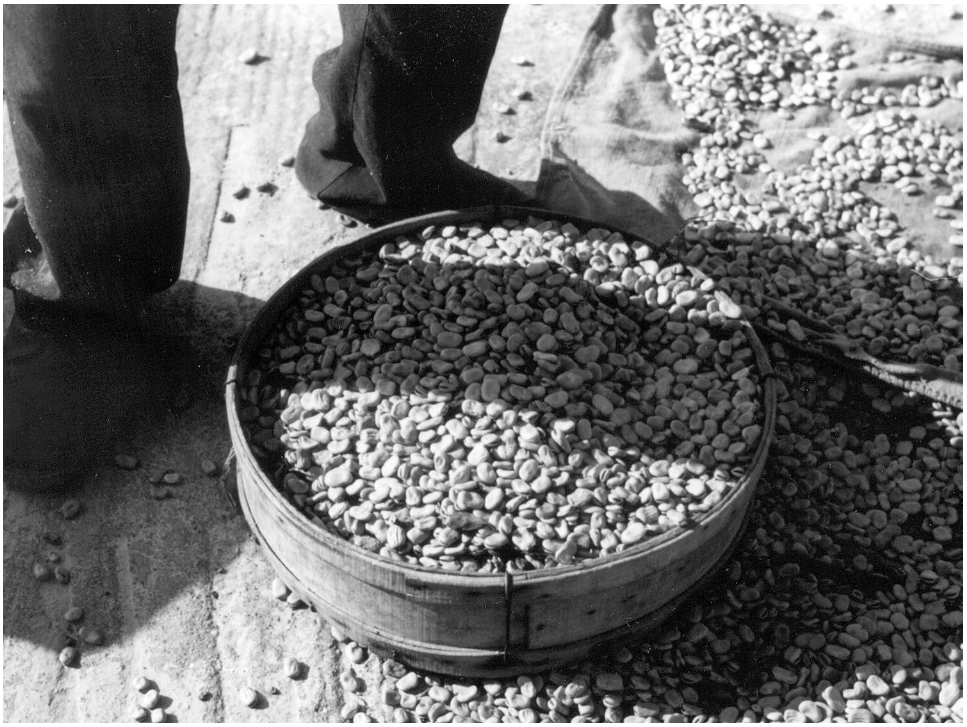

PLATE 6.25. The finished broad beans: sieved, dried, ready for storage

PLATE 6.26. A grafted Mesara oil olive (*psyloelaia*) showing the standard great height and breadth of branching in trees cultivated by traditional means

PLATE 6.27. Spacing of Mesara olive trees in the white soils of the plain bottomland

PLATE 6.28. A Venetian-Ottoman period olive showing the enormous diameter of its trunk

PLATE 6.29. The graft: means of domestication for most Mesara fruit and nut trees

PLATE 6.30. A traditional olive oil mill *(fabrika)* in the village of Sivas

PLATE 6.31. Roofing of Mesara buildings included beams *(traves)* of imported cypress, and insulation of oleander (shown) or other shrubs, stuffed above the beams

PLATE 6.32. The the animal feeding bin *(pachni)* located in the corner of Mesara buildings. This example in the Sivas olive mill.

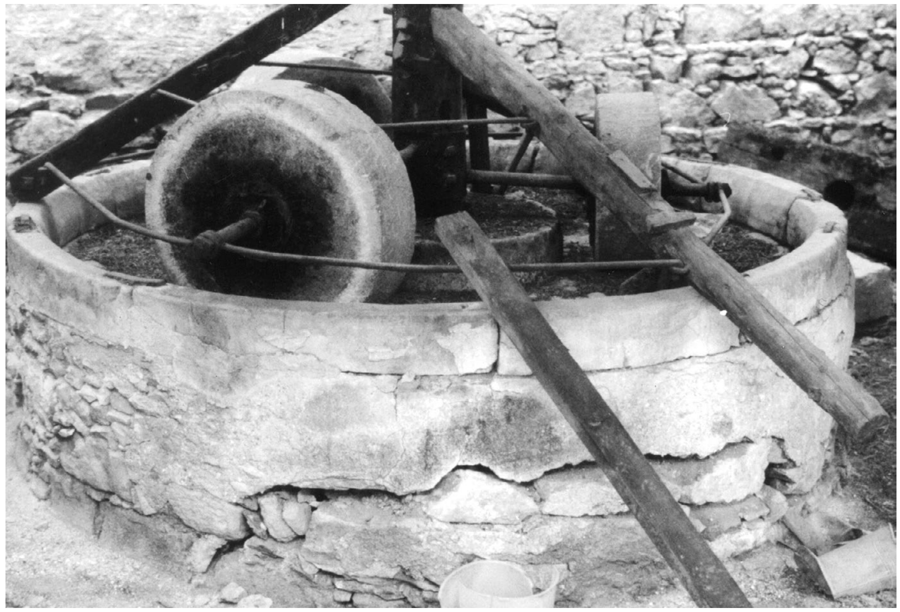

PLATE 6.33. The animal-driven *aloni* or stone crushing bed with three locally made mill stones in the Sivas oil mill

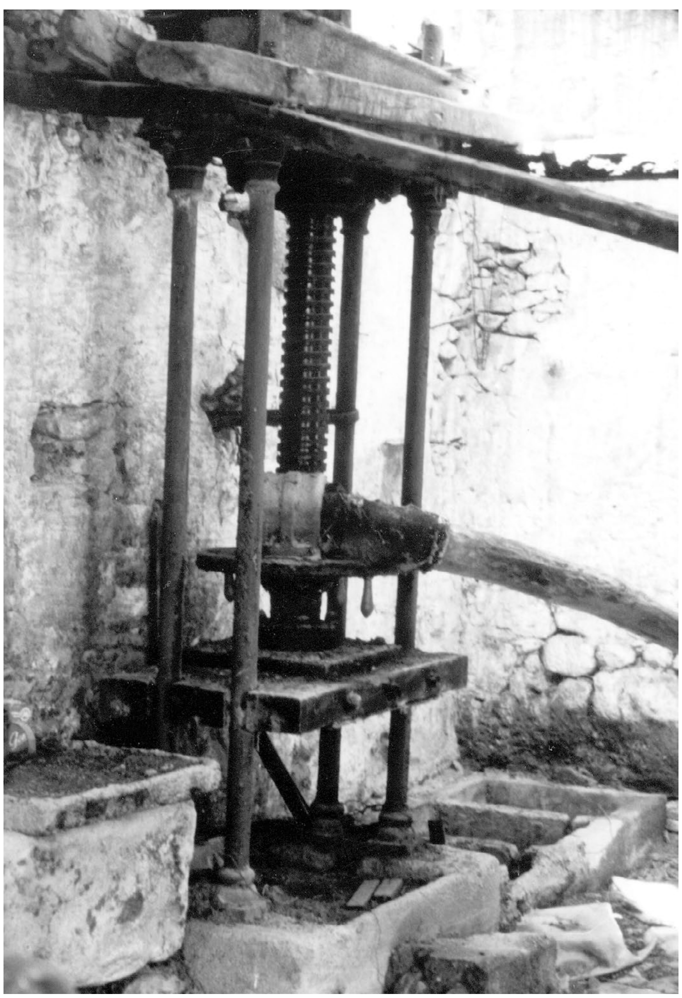

PLATE 6.34. The iron pressbed *(piesterio)* which replaced an all-wood example from the nineteenth century. Sivas oil mill.

PLATE 6.35. Goat-hair sacks *(boxades)* made especially in Sphakia for use as frails in the original wood, and in the twentieth century, the iron pressbed. The center of the envelope was filled with olive pomace, and the four flaps were folded over it.

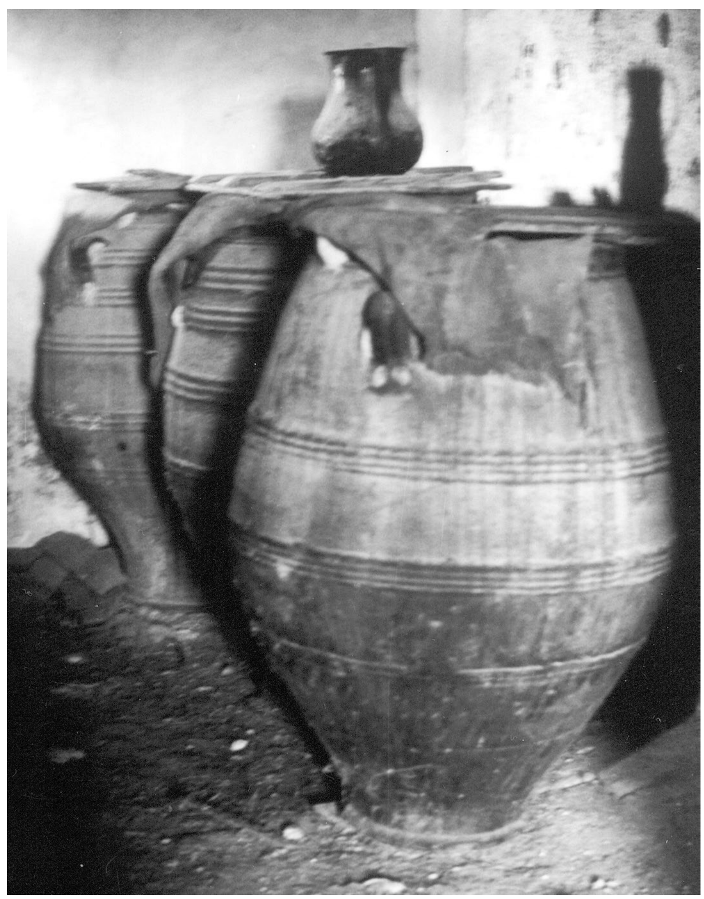

PLATE 6.36. Clay storage jars *(pitharia)* called locally "*trakosia oka*" (300 *okades*)—the largest of the traditional jars used for oil and grain storage in Mesara homes

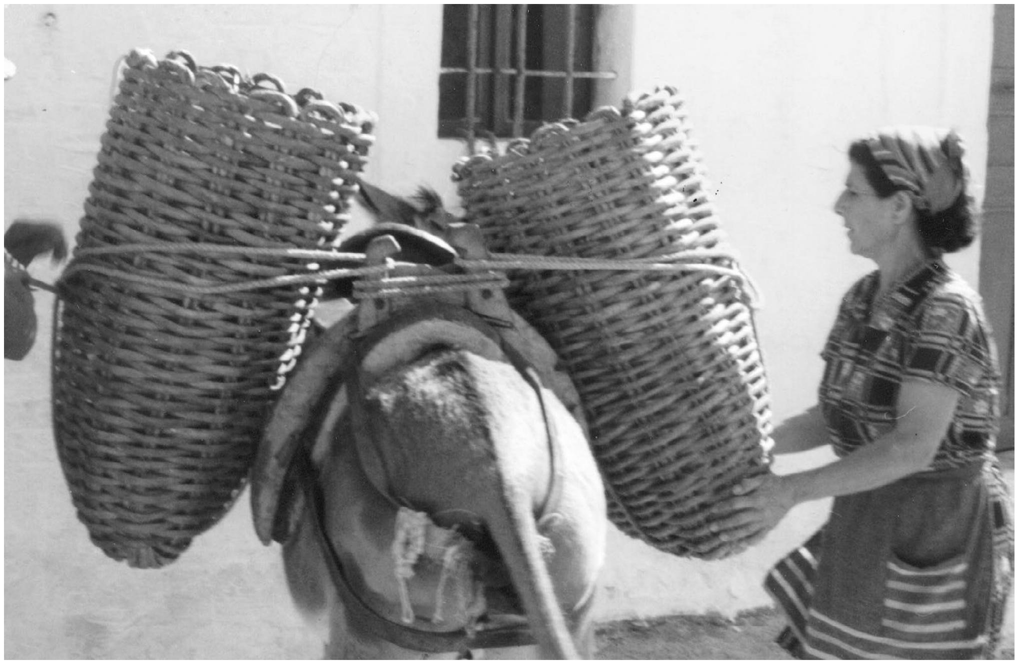

PLATE 6.37. Pack baskets *(kofes)* made of *Pistachia lentiscus (schinos)* and used especially for the transport of fragile, freshly picked grapes

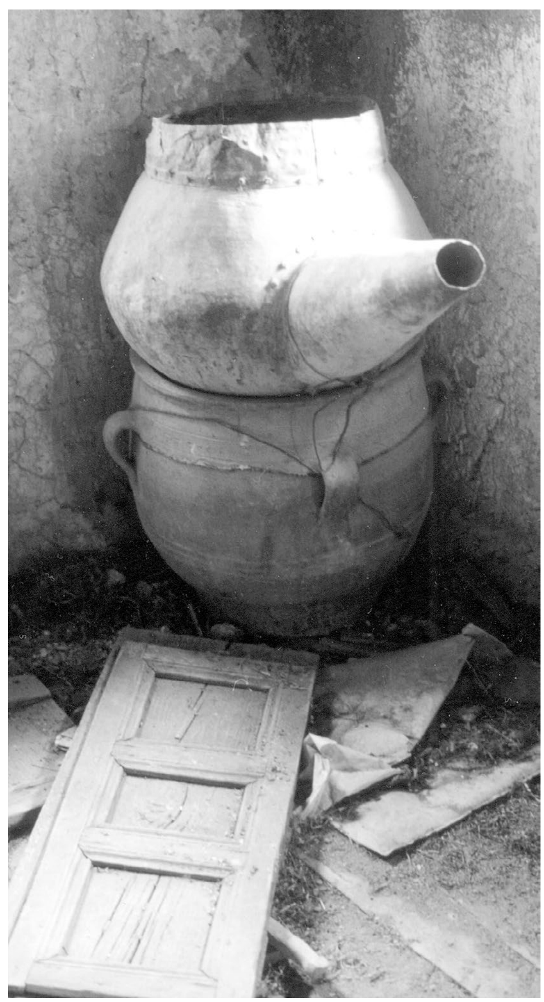

PLATE 6.38. The alembic used in the production of distilled spirits *(raki)* from the must of wine production. This example in the Odigitria Monastery.

PLATE 6.39. Transportation of kindling and fodder to the home

Plate 6.40. A feeding-frenzy of goats presented with their favorite green fodder: prunings of almond leaves and olive leaves

PLATE 6.41. Firewood and brush covered with stone slabs to flatten them as they dry in the summer sun before collection

PLATE 6.42. Transportation of cut green branches of lentisc *(Pistacia lentiscus)* to the firewood storage area at home

PLATE 6.43. A traditional water channel (*katapota* or *avlaki*) dug to fertilize a fruit garden *(bakse)* north of Phaistos

PLATE 6.44. Traditional beehives (*flasches*) made by Thrapsano potters and used in specially constructed ultra-clean areas throughout the Mesara. The current weedy state of this space is unusual.

PLATE 6.45. Detail of a beehive showing wooden slabs, dried plant lining (frequently *Hypericum*), and a stone cover slab

PLATE 6.46. Suspended shelf in the storeroom with drying homemade cheese made in *madaria* (reed and rush moulds)

PLATE 6.47. Winding the wet skeins of newly spun wool using traditional tools: *anemi* and *tiligadi*

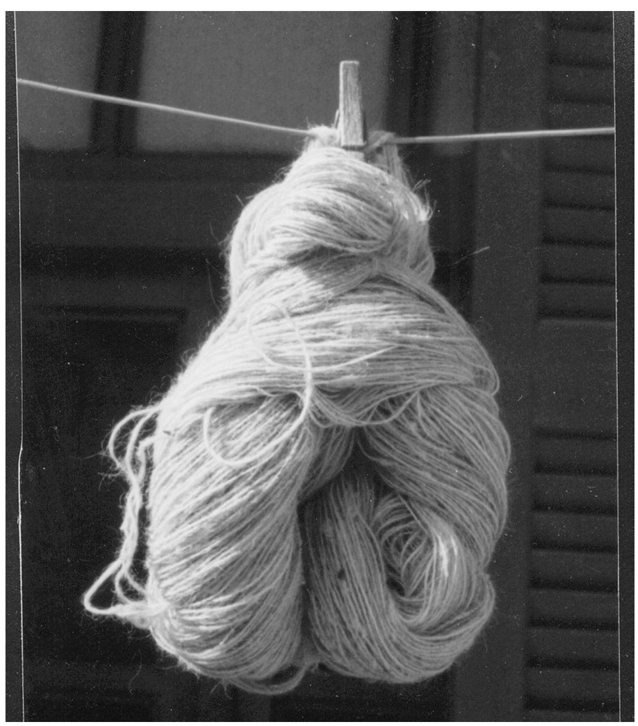

PLATE 6.48. The finished skein of wool hung up to dry

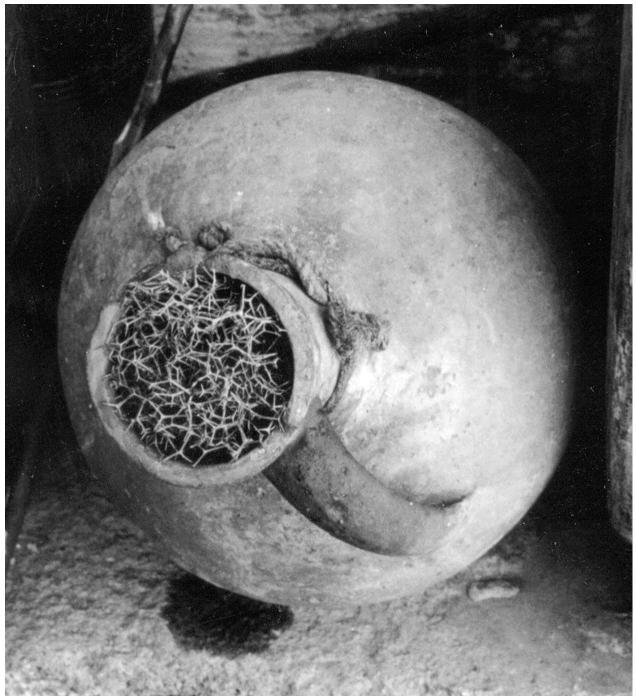

PLATE 6.49. *Stamnagathi (Cichorium spinosum)* used as a filter in the mouth of a Thrapsano water jar *(stamni)*

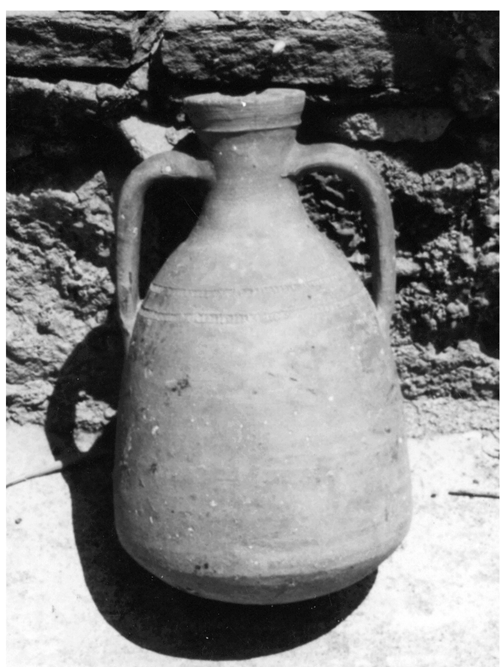

PLATE 6.50. The smaller portable water jar *(lai, laini)* used while working in the fields and in travel from one location to another.
Meant for suspension.

PLATE 6.51. The *lekanida*, the wide, open, low basin used for multiple purposes in the Mesara home

PLATE 6.52. Greens *(horta)* such as *stamnagathi (Cichorium spinosum)* supplemented the traditional Mesara diet in spring and summer

PLATE 6.53. The sap of the almond tree exuding from the bark in large oozing bulbs. Used as an adhesive.

PLATE 6.54. One type of rush used for basketry, as binding media, and in other domestic activities

Plate 6.55. Fashioning an eel-trap from rush *(vroulo)*. Village of Voroi.

Plate 6.56. The tools of the village shoemaker *(tsangaras)*

PLATE 6.57. On the right, the extra-tall *bougiatzopitharo* (dyer's *pithari*) used in the dyeing of cloth, especially for the extensive lengths needed for *salvaria* (men's clothing)

PLATE 6.58. The land snail *(salingari)*, a much sought-after delicacy in the Mesara

PLATE 6.59. A sack of land snails ready for trade and transport to Herakleion

PLATE 6.60. One of a group of interrelated lime kilns *(asvestokamina)* used in alternating years by Pitsidia villagers before World War II as a supplement to agricultural income. The fuel *(thamnous)* for the kiln was located around it.

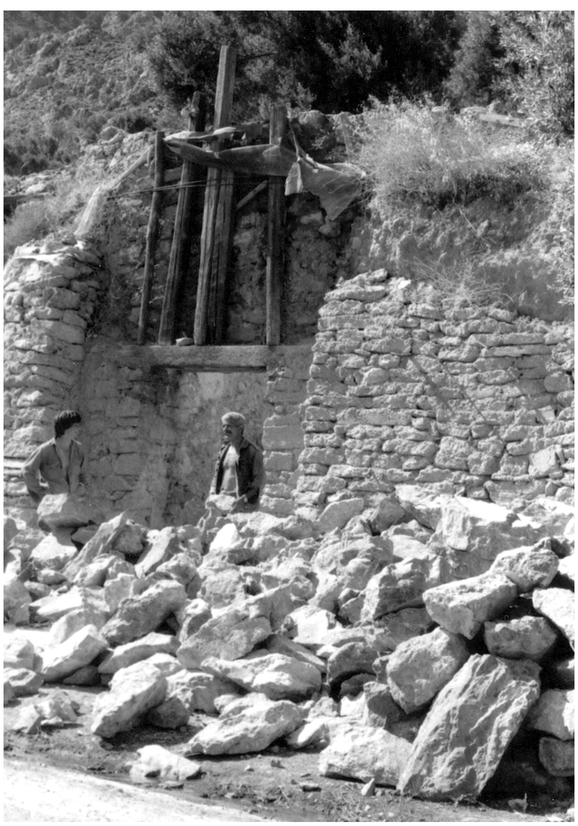

PLATE 6.61. A lime kiln built into a slope outside of Voriza

PLATE 6.62. The interior of the Voriza lime kiln, showing the pattern of limestone chunks built up on the marginal shelf and in the center

PLATE 6.63. Prunings and uprootings of olive trees waiting to be made into charcoal. North side of Mesara Plain.

PLATE 6.64. The constructed pile of pruned and processed branches for charcoal production

PLATE 6.65. Covering the pile with green branches and earth

PLATE 6.66. The completed mound of charcoal

PLATE 6.67. Charcoal ready for transportation to the Herakleion market, to local *kafeneia*, and to local craftsmen (e.g., ironworkers)

PLATE 6.68. The *havani* (mortar) of the *kafetzis* (cafe owner), a sign of coffee processing

PLATE 6.69. The Moires *pazari* (Saturday open-air market) at the beginning of the twentieth century. *Photograph courtesy E. Kadianakis.*

PLATE 6.70. *"Na me pareis ena koulouri"* ("Buy me a *koulouri*."). A seller of sesame-seed rolls in Herakleion early in the twentieth century. *Koulouria* were considered a special delicacy brought as a courtesy to neighbors and friends after a trip to the city. *Photograph courtesy E. Kadianakis.*

PLATE 6.71. The local peddler *(metapratis)* weighing out his fruit from a saddle box *(santouki)* mounted on a pack animal

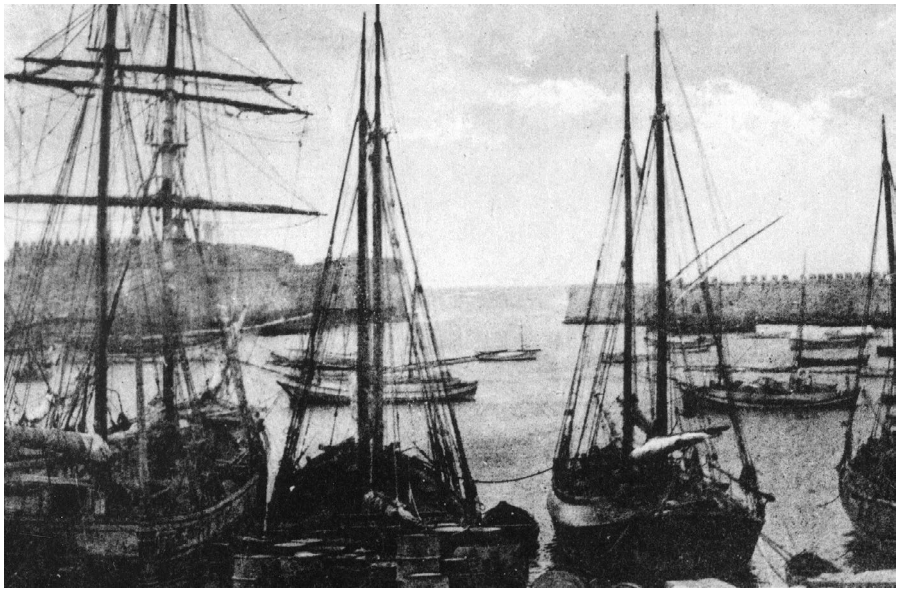

PLATE 6.72. The 10- to 20-ton sailboats *(kaikia)* of three and four sails that stopped regularly at the port of Matala in the early twentieth century.
Photo of kaikia in Herakleion harbor *courtesy of E.Kadianakis.*

PLATE 6.73. The two-wheel cart *(caro)*, once the largest vehicle for transport in the Mesara trade system

PLATE 8.1. View eastward of the coastal plain at Lebena. The promontory in the center, shaped like a crouching lion, gives its name to the area. (Tholoi II and IIIA are located in the center of the plain; their associated settlement is on a ridge at the north edge of the plain just off the photograph to the left. Tholoi I and IB are at the center rear of the plain with the site on the ridge immediately south of the Lebena promontory.)

PLATE 8.2. View looking north at the valley belonging to the EM II settlement of Sivas. (Tholoi and settlement are located at the left-hand corner of the open field.)

Plate 8.3. View of cyclopean masonry of Agia Triada Tholos B

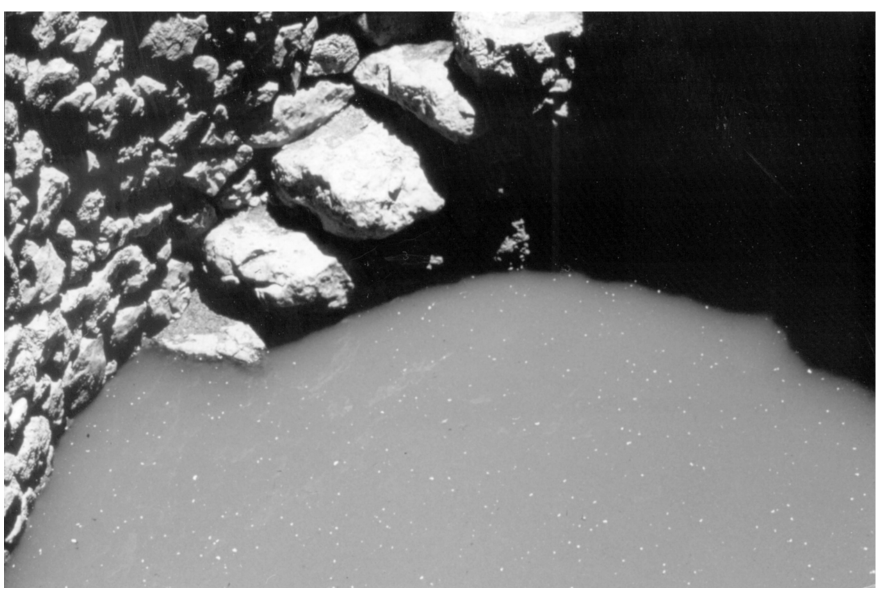

Plate 9.1. View of a Venetian period cistern near Kritsa in East Crete

PLATE 10.1. Minoan (Protopalatial) check dam near Kamilari

PLATE 10.2. Protopalatial mason's mark found near check dam

PLATE 11.1. Fourth century *Ergasterion* near Kalamaki

PLATE 11.2. Fourth century stone press in *Ergasterion*

PLATE 11.3. Rural shrine to Demeter (?) at Kamilari

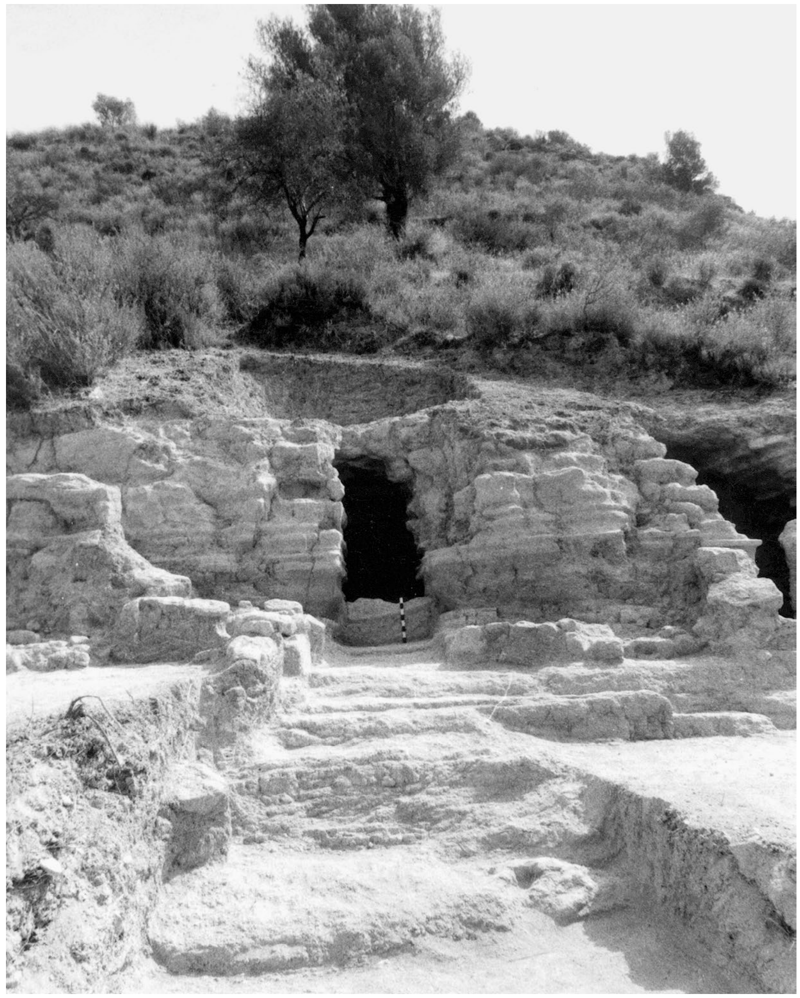

PLATE 11.4. Hellenistic chamber tomb at Phaistos

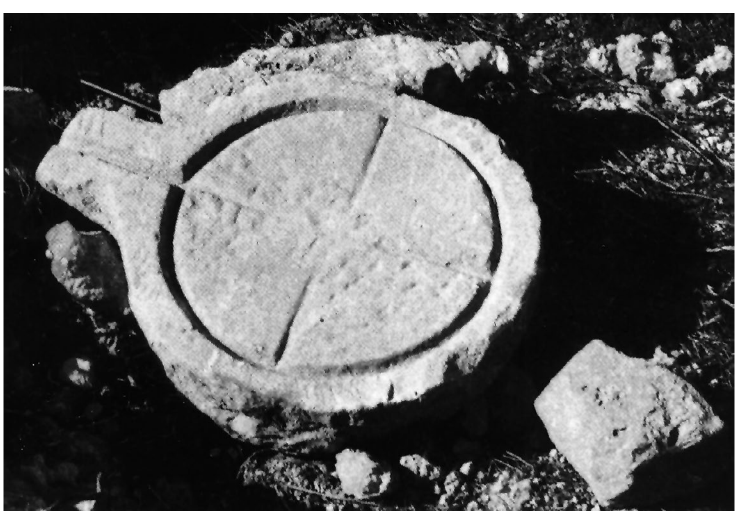

PLATE 11.5. Hellenistic stone press from site 56 near Kamilari

PLATE 12.1. View of Temple of Apollo Pythios at Gortyn. Note Hellenistic inscribed decrees set on front stylobate. Archaic examples were similarly placed.

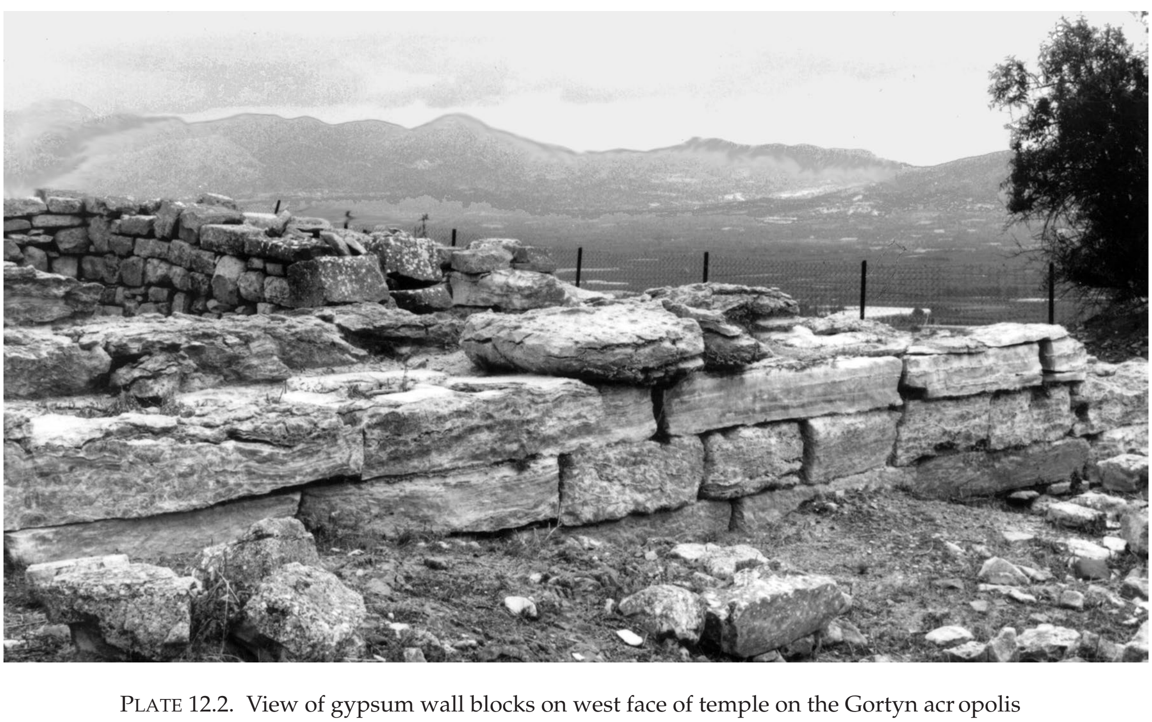

PLATE 12.2. View of gypsum wall blocks on west face of temple on the Gortyn acropolis

PLATE 13.1. Stone oil press from site 26 north of Phaistos

PLATE 13.2. Stone pressbed from Roman farmstead south of Sivas

PLATE 14.1. Church of Agios Pavlos at the village of Agios Ioannis (Phaistos)

PLATE 14.2. The abandoned village of Lakathiana (Kyrmousi)

PLATE 14.3. Venetian period watermill north of Moires

PLATE 14.4. Monastery of Panagia Odigitria

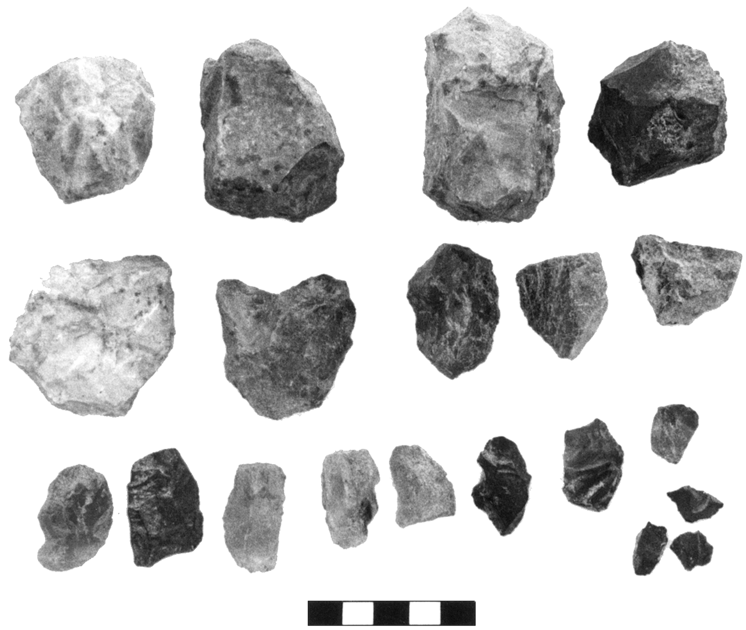

PLATE C.1. Site 65: Multidirectional cores, chunks, and flakes of chert

PLATE C.2. Site 65: Multidirectional chert cores

PLATE C.3. Site 65: Chert percussion struck flakes with and without retouch.

PLATE C.4. Site 65: Percussion struck flakes retouched as burins

PLATE C.5. Site 65: Chert notched flakes (extreme left also appears in figure C.6)

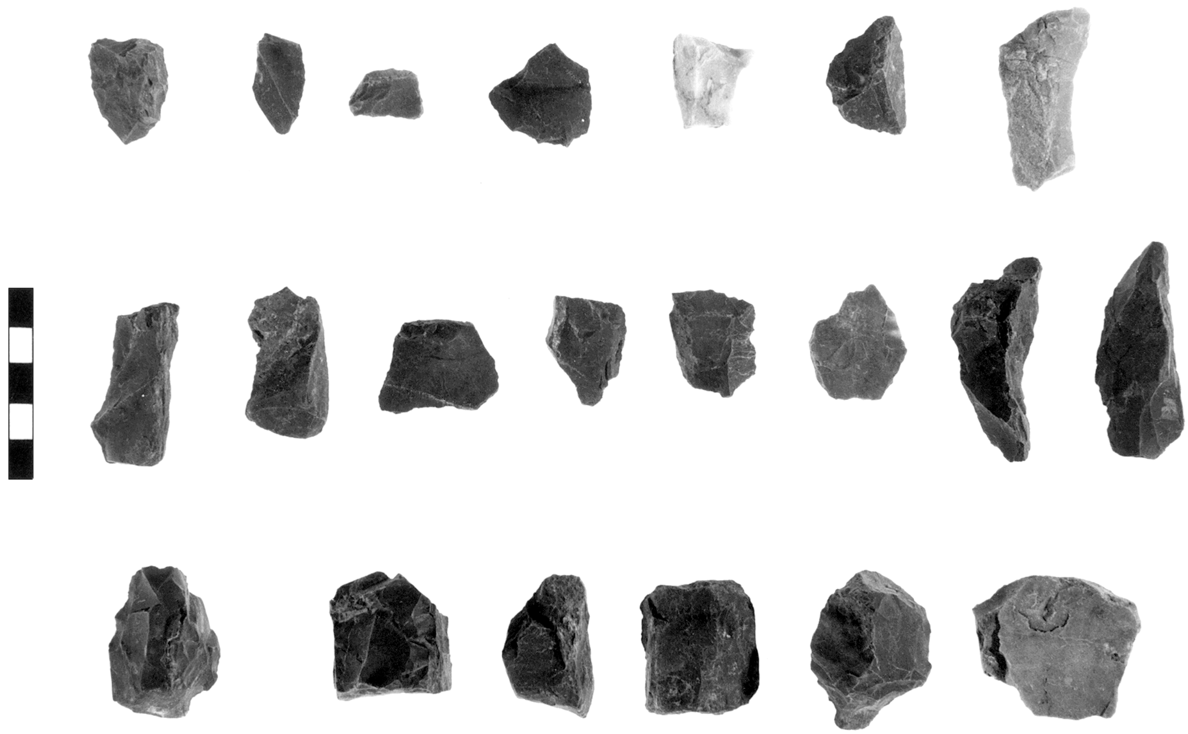

Plate C.6. Site 34: Chert flakes and chunks

Plate C.7. Site 98: Siliceous limestone retouched flake

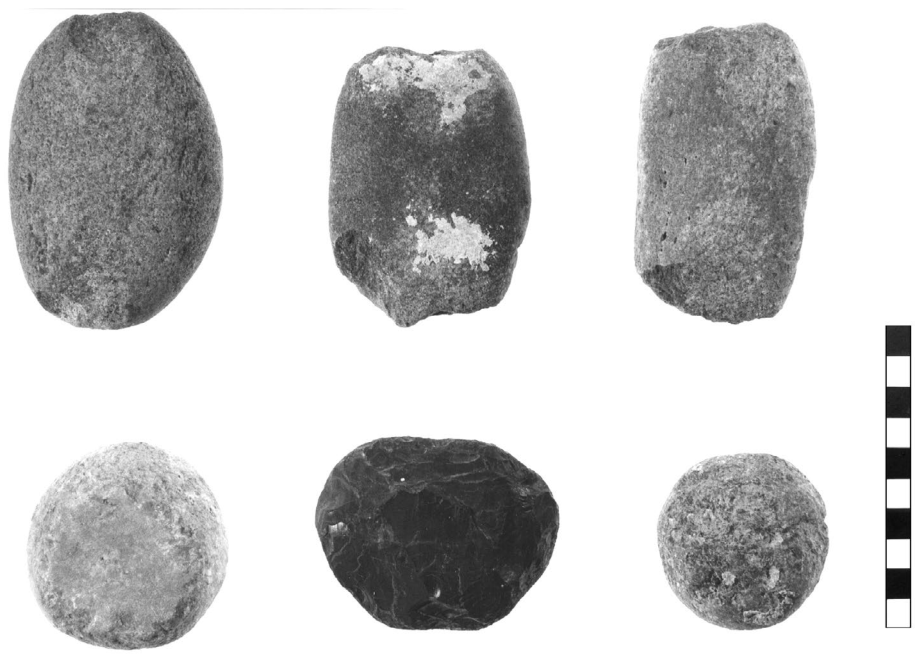

PLATE C.8. Ground stone finds from the Mesara Survey

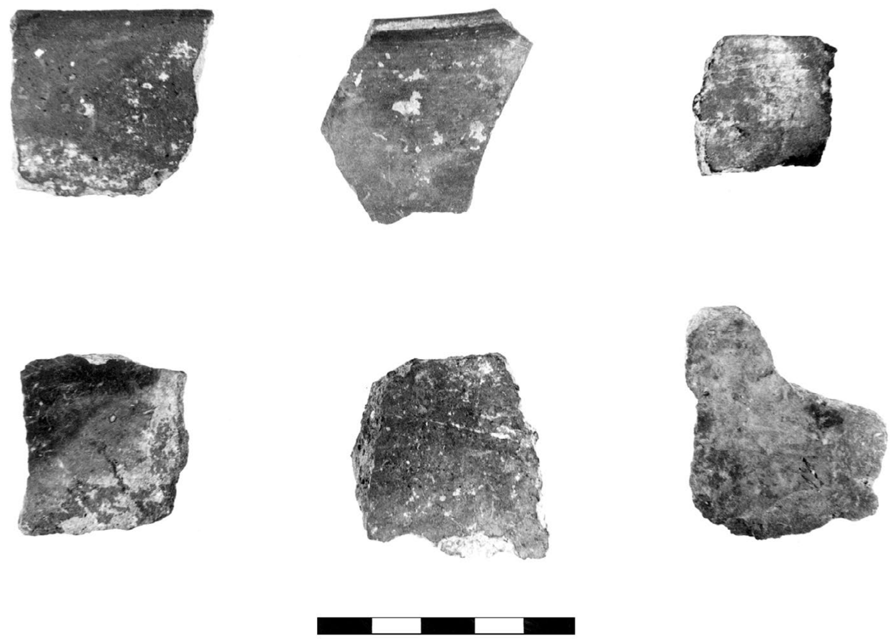

PLATE E.1. Late Neolithic pottery. Site 19.

PLATE E.2. Late Neolithic, Early Minoan I, and Middle Minoan pottery. Site 8.

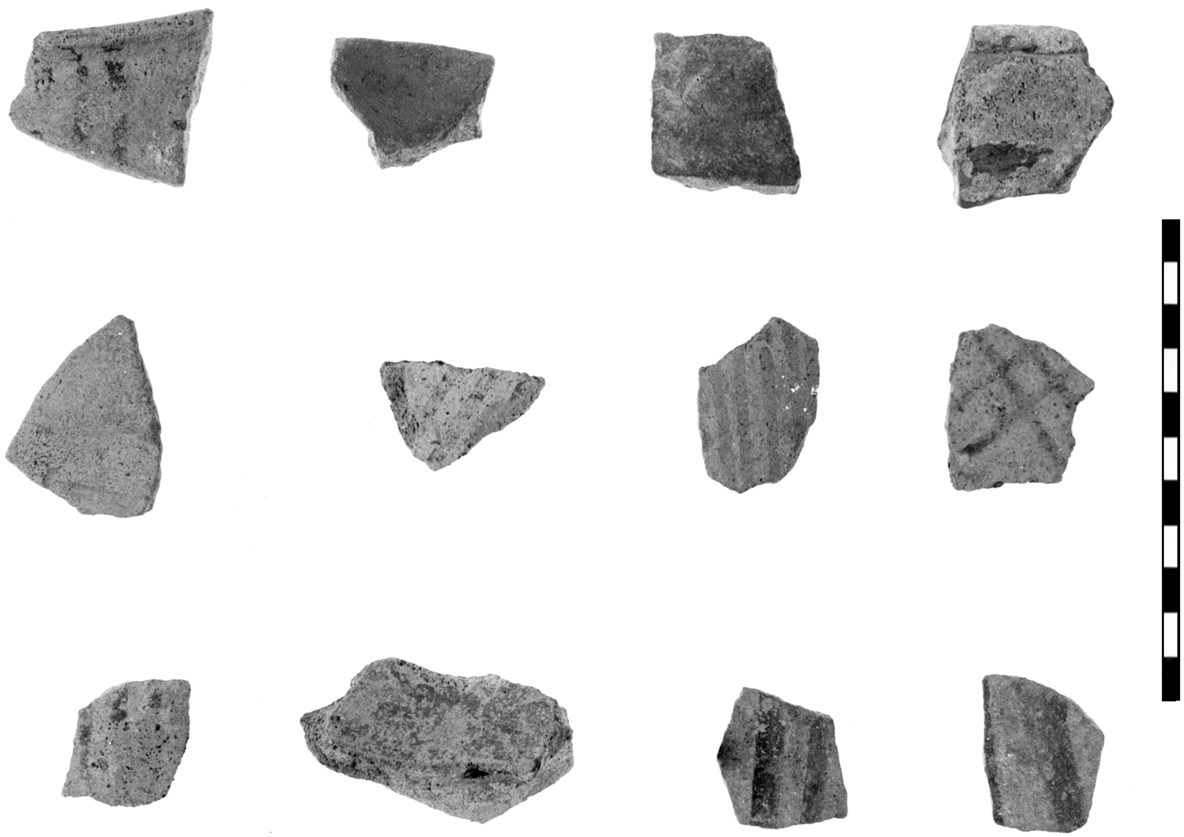

PLATE E.3. Early Minoan pottery from various sites

PLATE E.4. Early Minoan pottery. Sites 19 and 68.

PLATE E.5. Middle Minoan IA pottery. Site 80.

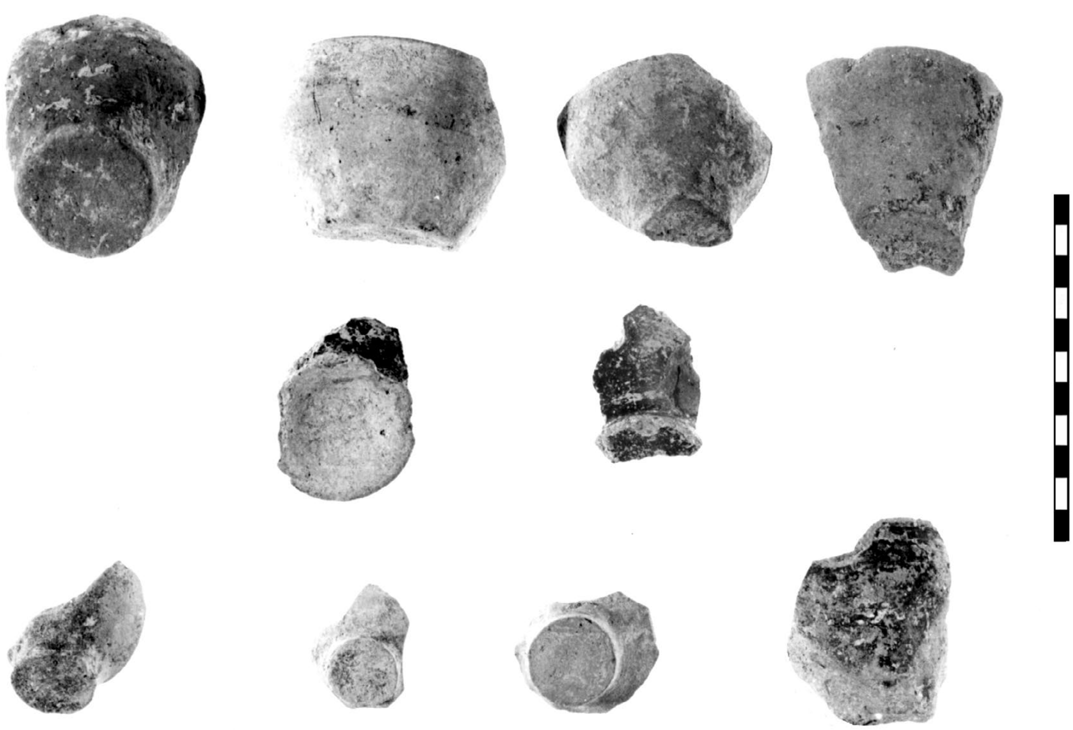

PLATE E.6. Middle Minoan IA–II pottery from various sites

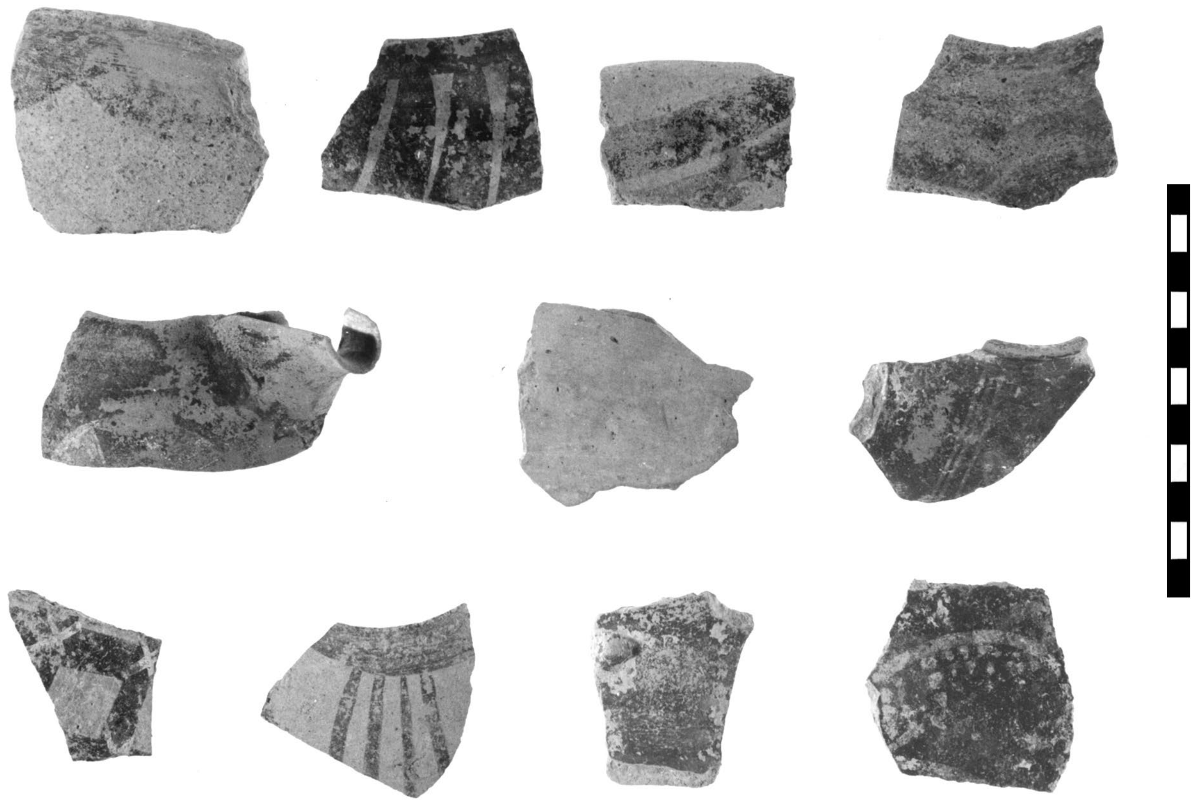

PLATE E.7. Middle Minoan IB–II pottery from Kalamaki

PLATE E.8. Middle Minoan I–II pottery. Site 1.

PLATE E.9. Middle Minoan IB–II pottery from Kalamaki

PLATE E.10. Middle Minoan IB–II pottery. Site 1.

PLATE E.11. Early Minoan–Late Minoan I pottery. Site 2.

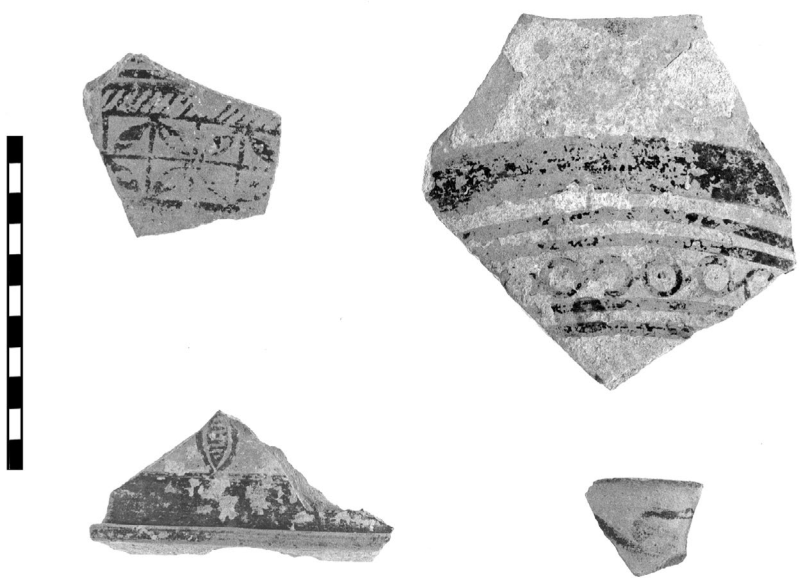

PLATE E.12. Geometric–Orientalizing pottery. Site 1.

PLATE E.13. Late Minoan IIIC–Protogeometric clay statuette head. Site 1.

PLATE E.14. Archaic pithos with griffin (?) in relief. Site 77.

PLATE E.15. Archaic relief pithoi. Site 70.

PLATE E.16. Archaic relief pithoi. Sites 70, 77, and 15.

PLATE E.17. Archaic, Hellenistic pottery and loomweight. Site 1.

PLATE E.18. Classical and Hellenistic pottery. Site 1.

PLATE E.19. Hellenistic and Early Roman pottery. Sites 16 and 20.

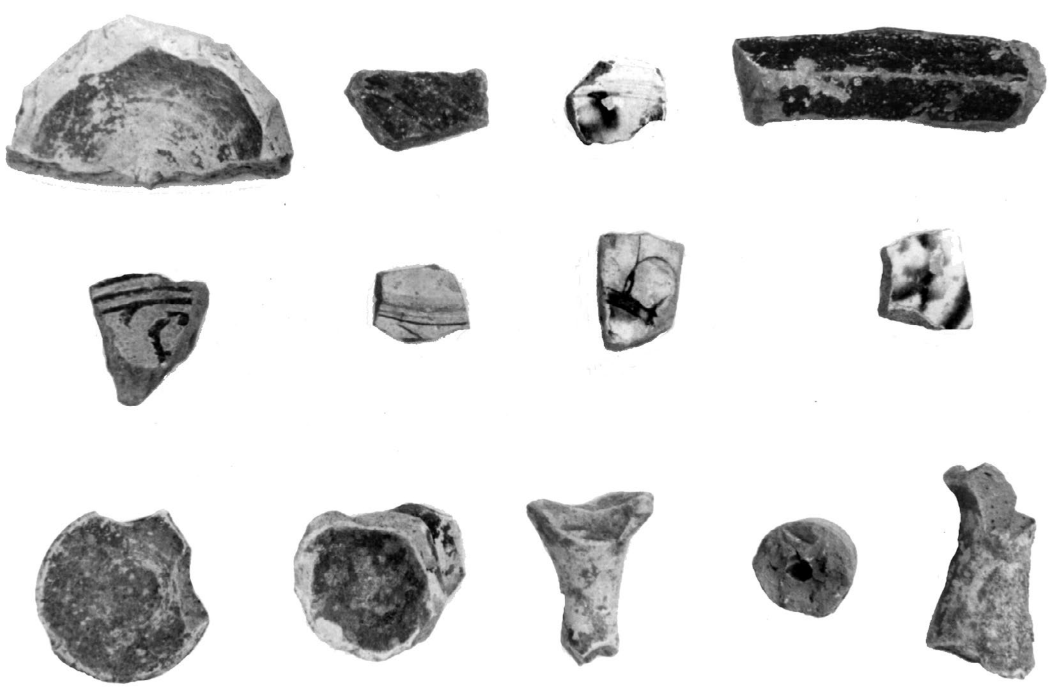

PLATE E.20. Venetian and Late Minoan III pottery from various sites

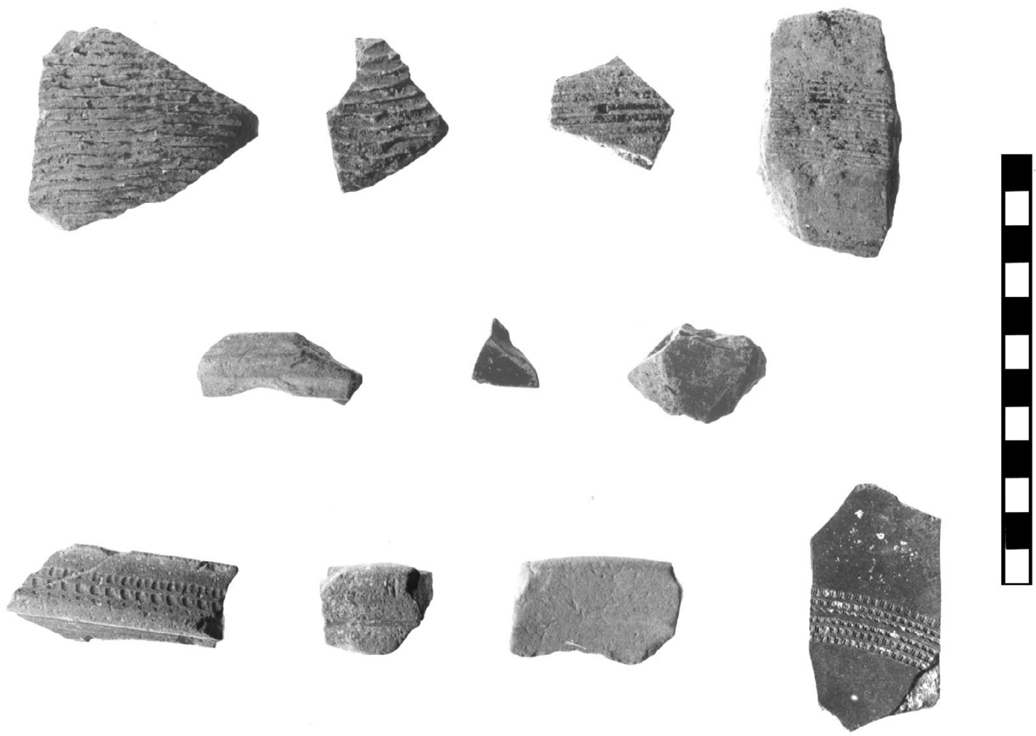

PLATE E.21. Early Roman pottery from various sites

PLATE E.22. Early and Late Roman pottery. Sites 1 and 72.

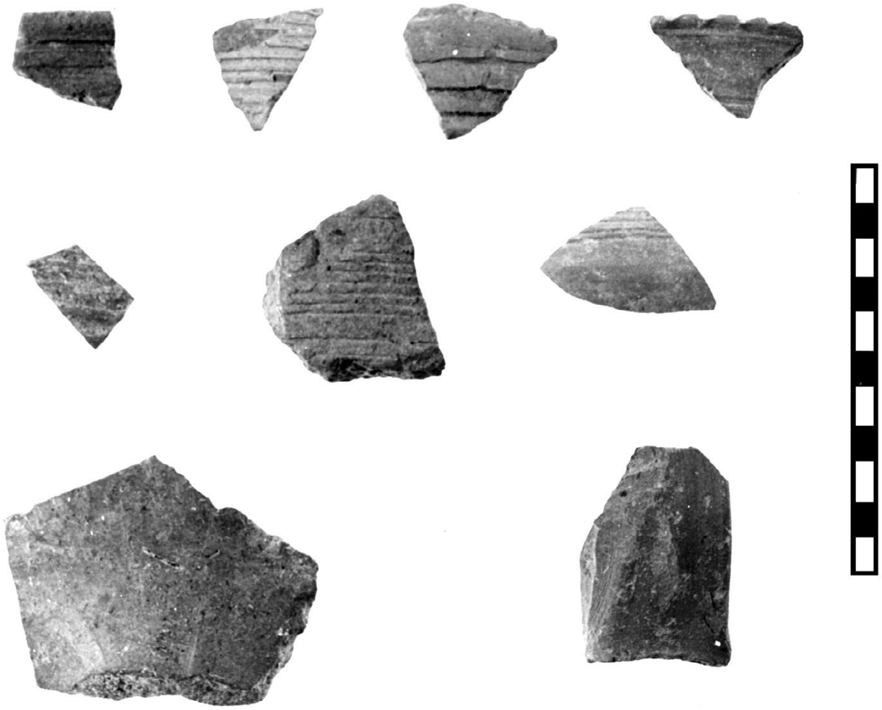

PLATE E.23. Venetian–Ottoman pottery. Site 10.

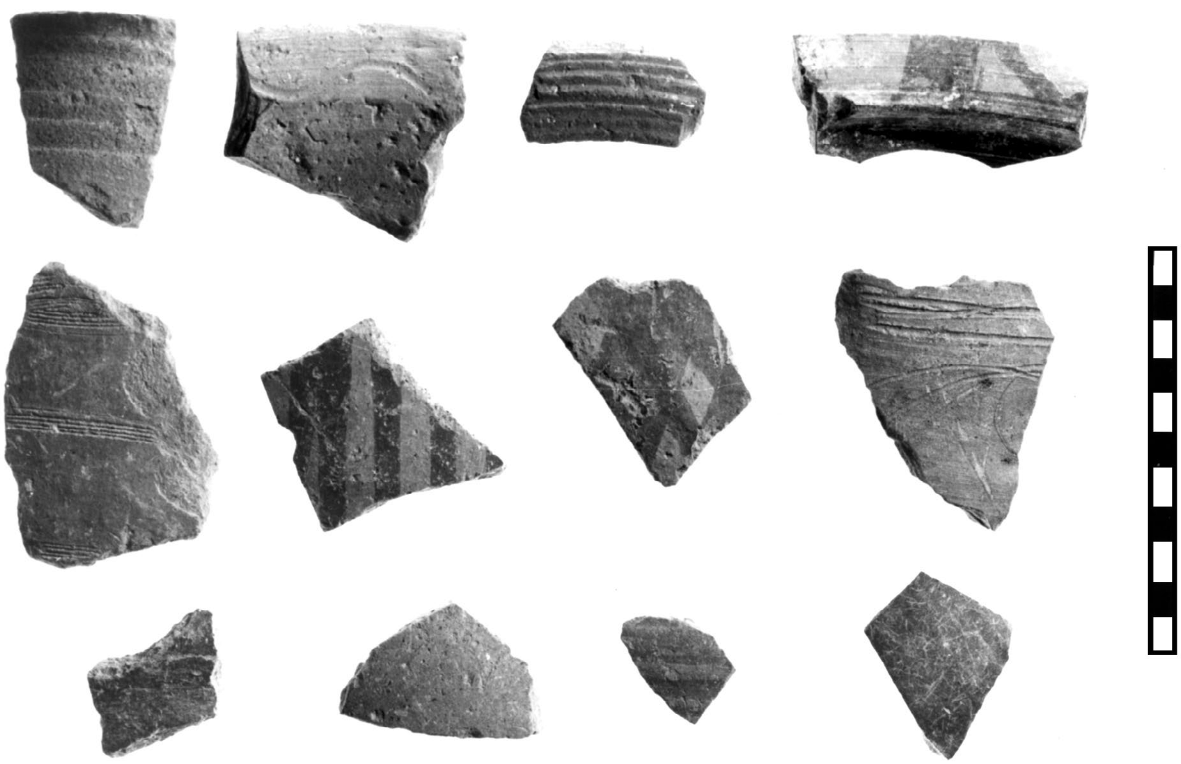

PLATE E.24. Venetian–Ottoman pottery. Site 58.

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