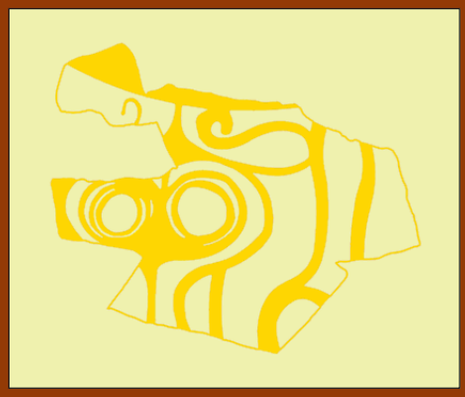
KAVOUSI I

The Archaeological Survey of the Kavousi Region



KAVOUSI

The Results of the Excavations at Kavousi in Eastern Crete

directed by

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

sponsored by

The University of Tennessee

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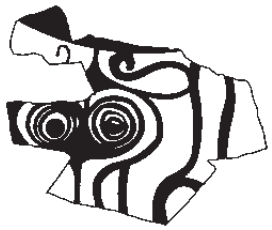

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KAVOUSI I

The Archaeological Survey of the Kavousi Region

by
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Preface to the Kavousi Excavation Series

Kavousi I: The Archaeological Survey of the Kavousi Region is the initial volume of the Kavousi Excavation Series, which presents the final report of the Kavousi Project, a program of archaeological investigation around the modern village of Kavousi in eastern Crete. Subsequent volumes will publish the results of the 1987–1992 excavations at the Vronda and Kastro sites in the Siteia Mountains above Kavousi and of the cleaning and new study of the excavations of Harriet Boyd in 1900 and 1901.

The first recorded archaeological interest in the Kavousi area is that of Sir Arthur Evans, who passed through the region on trips to the eastern part of the island in 1894 and in 1899, when he purchased pottery and metal objects from a tomb at Plaï tou Kastrou for the Herakleion Museum. He recommended the site to Harriet Boyd, who excavated briefly at a number of sites in the area in 1900. After a week of excavation around the Kavousi Plain, she moved up into mountain sites above the village. She spent one week at Azoria, where she found puzzling remains that included circular structures and pottery of the Archaic and Hellenistic periods, followed by a week each on the Kastro peak and the Vronda ridge. On the Kastro she uncovered what she described as a "chieftain's house" of thirteen rooms of the Geometric period; not far away at Skouriasmenos was a perfectly preserved, though robbed, tholos tomb with some Geometric and Orientalizing pottery in it. On Vronda she found a building and eight small tholos tombs, which she dated to sub-Mycenaean, a transitional period between the Bronze Age and Iron Age. She returned in 1901 to test other sites, particularly at Aloni and Avgo, and to look for a Bronze Age settlement site. When she was shown the promising Late Minoan site at Gournia, she transferred her excavation there, leaving the Kavousi area permanently. In 1912, however, Edith Hall, one of her colleagues at Gournia, briefly explored burial sites at Kamara tou Tholou just north of Kavousi village and at Hagios Antonios near the Bay of Mirabello.

After this active period of excavation, interest in the Kavousi area declined, even though chance finds continued to appear. One such find, discovered during the construction of the water system, led to the excavation of a Geometric shrine at Pachlitzani Agriada by Stylianos Alexiou in 1950. In 1951 a tholos tomb was discovered by a farmer, George Sekadakis, while planting an olive tree. The tomb was never scientifically excavated, but the pottery was taken to the small museum in Ierapetra.

In 1974 the authors of this preface began a project to update the information available on the early American excavations in the Isthmus of Ierapetra. Because many of the sites were not marked on a map, the first task was to locate them. By 1978 the scope of this project was narrowed to the Kavousi sites and defined as the Kavousi Project. At this time William Coulson joined the project because of his particular interest in studying the pottery found in the Vronda tholos tombs. The first step of the Kavousi Project was to study all the pottery and artifacts from Boyd's 1900 and 1901 excavations. Some of this material had not been previously published, while the interpretation of the rest of the artifacts needed to be brought in line with recent archaeological discoveries. Permission was also obtained to publish the material from the 1951 tomb discovered by George Sekadakis.

Because no map with the sites of the Kavousi area had ever been drawn, the task of the first season in 1978 was to remedy this situation. In the summer of 1979 the vases from the Sekadakis tholos tomb were studied at the Ierapetra Museum. In December of the same year, three weeks were spent in the Herakleion Museum cataloging, drawing, and photographing the material from the Plaï tou Kastrou tomb and the tombs excavated by Boyd at Vronda, Chrondrovolakes, Aloni, and Skouriasmenos.

The summer of 1981 saw the first of four cleaning seasons. The Vronda tholoi, both those which had been excavated by Boyd and the one uncovered by Sekadakis as well as a tenth tholos, newly discovered but thoroughly robbed, were cleaned and added to the area map. The Aloni cemetery, southwest of the Kastro, and a tomb identified by Sekadakis at Ridopoulia, east of Kavousi, were also cleaned this season.

In 1982 it was arranged that the members of the Kavousi Project would supervise the cleaning of the Kastro for the balloon photograph to be published in the *Aerial Atlas of Ancient Crete,* and permission was given to publish any finds. New architectural features and considerable pottery were found in the cleaning, and these helped refine the dating of the site.

In 1983 and 1984 the Project received permission to clean the building excavated by Boyd on top of the Vronda ridge and to make a plan of the structures she mentioned. Many new architectural features and finds appeared during this cleaning.

The results of the cleaning seasons indicated that an excavation of the Vronda and Kastro sites would reveal much new information about the little understood end of the Bronze Age and the beginning of the Early Iron Age in Crete, a time when Crete experienced a major culture change from the prehistoric Minoan and Mycenaean civilizations to the historic Greek civilization. It had become clear that the Vronda "building" was a settlement dated to LM IIIC, the very end of the Late Bronze Age, at that time a rarely encountered period, and that it was important to uncover the settlement and allow it to contribute its part to the history of Crete. It was also evident that the rooms on the Kastro did not belong to a chieftain's citadel, as Boyd had thought, but to a large settlement of the Geometric period with evidence of earlier use in the Protogeometric era. Because the Kastro was being used as a type site for the Geometric period in Crete, it was particularly important that it be more fully excavated and that corrections be made in its date and function. At the same time, advances in scientific archaeology, particularly in the fields of soil science, faunal analysis, human osteology, and palaeobotany, made it possible to obtain new information for reconstructing the environment and human interaction with it. The development of modern technologies for the study of clays, metals, and stone implements offered promise for reconstructing the social, economic, and political environment of the period.

In 1985 a conference held in Ierapetra and Kavousi presented the new findings and the evidence for a profitable excavation. The conference initiated interest in reopening work on this neglected period, and in 1986 the Project was granted one of the three excavation permits allotted to the American School of Classical Studies at Athens.

Regular excavations of the Vronda and the Kastro sites began in 1987, at which time the Kavousi Project became the Kavousi Excavations under the directorship of Geraldine C. Gesell (Executive Director), Leslie Preston Day (Field Director at Vronda), and William D.E. Coulson (Field Director at Kastro). These excavations continued through 1992, interrupted by a study season in 1991. Since then study seasons were held regularly each summer until 2003.

From the beginning, the Kavousi Project was designed as a regional study of the Kavousi area, combining the excavation of two major sites with archaeological and environmental survey. The goal was to reconstruct as thoroughly as possible the culture of the Vronda and Kastro communities at this transitional period between the Minoan and Greek cultures and define their relationship to each other and to the rest of Crete. Donald Haggis was asked to conduct an archaeological survey that would provide the diachronic pattern of settlement in the Kavousi area. This would be the basis for the placement of the two excavated sites, Kastro and Vronda, within the complex history of the Kavousi area. The specific goals that were defined for the excavation will be addressed in the following volumes. These include the chronological sequences of pottery, necessary in working out the chronology of the sites, study of the architecture and artifacts used in the different periods, a study of the life styles of the people, their religion, funerary customs, level of technology, agriculture, and contacts with the rest of Crete and the eastern Mediterranean.

This volume, *The Archaeological Survey of the Kavousi Region*, provides a comprehensive look at the topography of the area, its natural resources, and the way in which the local people interacted with them over time, as shown in the changing pattern of settlement. It sets the stage for the report on the excavations and provides an introduction to the local soils and to the pottery classification used by the excavators.

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Knoxville, TN, 2005

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Crawfordsville, IN, 2005



Preface to *Kavousi I*

This book presents the results of an archaeological survey that was conducted in the area of the modern village of Kavousi in northeastern Crete during three successive field seasons from 1988 to 1990, followed by study seasons in 1991, 1992, and 1996. The fieldwork, the Kavousi-Thriphti Survey (KTS), was carried out in conjunction with the Kavousi Project's excavations of the Early Iron Age sites of Vronda and Kastro (Day and Snyder 2004; Gesell, Day, and Coulson 2000; 1995; Coulson et al. 1997) and formed the basis for my Ph.D. dissertation at the University of Minnesota (Haggis 1996a; 1992). The aims of the survey were to provide a broad archaeological and environmental context for these excavations, to explore the wider region, and to recover and examine sites contemporary with Vronda and Kastro. The project was thus initially conceived as a complement to ongoing excavation, a means of augmenting the data used in the interpretation of the excavation context.

The scope of the survey included the examination of a number of different periods of human activity in the Kavousi region, while the reconstruction of the history of settlement benefited from the results of a number of neighboring projects (Gesell 2004). In addition to the excavations at Vronda and Kastro, work at Pseira (Betancourt and Davaras 2003; 2002; 1999; 1995; 1988; McEnroe 2001; Floyd 1998), Mochlos (Soles 2004; 2003; Soles et al. 2004; Barnard and Brogan 2003), Chalasmenos (Tsipopoulou 2004; 2001; Coulson et al. 1995), Katalimata (Nowicki 2003; 2000b; Coulson et al. 1995), Vasiliki (Eliopoulos 2004; 1998), Kalo Chorio (Haggis 1996c), Evraïka, and Chrysokamino (Betancourt and Floyd 2000–2001; Muhly and Betancourt 2000; Betancourt 2000a; Floyd 2000; Betancourt et al. 1999), provided stratified contexts for establishing ceramic sequences and detailed information on site histories and functions, ceramic distribution, metallurgy, trade, and staple production. It remains to integrate these data into discussions of the wider regional contexts. The Vrokastro Archaeological Survey Project (Hayden 2004a; 2004b) and the Gournia Project's survey of the north Ierapetra Isthmus (Watrous et al. 2000; Watrous and Blitzer 1999; 1995) have documented contiguous areas of the Mirabello region, and their results will provide the broad regional perspective necessary in understanding settlement patterns at Kavousi. The full application of these data from both excavation and regional survey must, however, await the final publication of projects in the Mirabello area. The aim here is not to anticipate results but to integrate such data where available and immediately relevant.

The core of the present text and site gazetteer were written in residence at the American School of Classical Studies at Athens in 1991–1992 and revised on Crete

in 1996, allowing me to consult preliminary reports of recent and ongoing excavation and survey in the Kavousi and Mirabello areas, which were published between those dates. While my approach and perspective have changed considerably since 1992, the chapters incorporate little new information. The data are essentially as they were recorded from 1989 to 1992. The objectives of the project were to provide:

1. A site catalog and documentation of the archaeology of the Kavousi region
2. A broad overview of the data and summary of results
3. An interpretation of the settlement patterns and land use toward a reconstruction of the history of human activity in the sample area

The chronological framework was from Final Neolithic (4000 B.C.) to Late Roman (4th–7th centuries A.D.) with a specific focus on the Bronze Age and Early Iron Age (3200–700 B.C.). The fieldwork was conducted as a dissertation project under a topographical survey permit; inherent limitations of the permit from the Greek Ministry of Culture, as well as of time, funding, and expertise of the primary investigator precluded systematic collection of stone tools, and the study of Byzantine, Venetian, Ottoman, and 20th century material.

Topics forming focused or detailed synthetic studies on Early Iron Age settlement patterns (Haggis 2001; 1993a), Early Bronze Age chronology and settlement structure (Haggis 2002; 1999a; 1993b), and the Roman remains at Tholos (Haggis 1996b) have been published elsewhere and will thus be treated summarily here. My own changing perceptions of the data have required reconsideration of old ideas and, indeed, the identification of new problems. Not only has new evidence come to light but also, as projects in East Crete are brought to the publication stage, entirely new issues and avenues of research have developed. Furthermore the methods, approaches, and technology of intensive archaeological survey have changed radically in the past 15 years since the initial design and implementation of the KTS (cf. Alcock and Cherry 2004a). The goal of this present book, however, is neither to engage this rich and problem-oriented literature, nor to present a discourse on survey methodology. The purpose here is simply to present the data that were collected during the Kavousi-Thriphti Survey, to introduce various archaeological contexts that have a relevance to current issues and problems in the archaeology of Crete, and to explain how the idiosyncratic process of conducting the survey has affected the results.

In the course of the fieldwork, an ongoing dialogue between excavation and survey was complemented by, and indeed in many cases generated by, scientific methods and the parallel research interests of zoologists (Snyder and Klippel 1999; 1996; Klippel and Snyder 2000; 1991), botanists (Flint-Hamilton 2000; 1999), geologists and soil scientists (M. Morris 2002; 1994; Timpson 1992; Watrous et al. 2000), and physical anthropologists (Liston 1993). Ceramic petrography (P. Day 1997), for example, employed in regional ceramic provenience studies has greatly enhanced and in many ways utterly changed the way we perceive economic and cultural spheres of influence in the Bronze Age Aegean. The discussion of the pottery (Chapter 4 and Appendices 2 and 3) has been revised to include some information from recent excavations. The original pottery sherd descriptions are retained and appended to the site entries in the gazetteer (Chapter 6), providing a catalog for each site where collections were made. The original KTS (Kavousi-Thriphti Survey) pottery catalog numbers are included for cross-referencing with the dissertation (see Appendix 4).

Since the initial fieldwork was carried out between 1988 and 1991, an unprecedented number of projects have been conducted within the survey zone. The catalog

entries in the site gazetteer make use of published and unpublished information, but they have been greatly abbreviated because detailed preliminary reports have been published by the excavators since the original records of these sites were made. Most important are the excavations in the area of Monastiraki at Katalimata and Chalasmenos (by Metaxia Tsipopoulou, William Coulson, and Krzysztof Nowicki) and the survey of the north Isthmus of Ierapetra by L. Vance Watrous and Harriet Blitzer. Such work now replaces my and Nowicki's topographical study of these sites and areas (Haggis and Nowicki 1993). Nowicki's work at Katalimata has recovered Neolithic, Protopalatial, and Neopalatial phases, while Watrous's study of the nearby plain of Kamina and Monastiraki will elucidate its broader context. Excavations at the Chrysokamino (habitation and metallurgical) sites by Philip Betancourt, Cheryl Floyd, and James Muhly have significantly augmented the data, changing our understanding of their chronology and function. I am grateful to these excavators for their permission to use information from these sites. With these exceptions, the catalog entries in the gazetteer are essentially as they appeared in my dissertation.

The local Bronze Age coarse-ware chronology has, since its initial publication, become refined through the efforts of numerous researchers on various Mirabello projects, and represents the continuing work of Margaret Mook, co-author of the original study of Kavousi material, and the petrographic work by Peter Day (Appendices 2 and 3). The details of this complex chronology will be refined and elaborated in the publications of the ceramic sequences of the Kavousi Excavations (Mook 2004; 1999; Mook and Coulson 1997; 1993), the Mochlos Excavations (Barnard and Brogan 2003), and the Vrokastro Archaeological Survey Project (Hayden 2004a; 2004b; 2003a; 2003b). These areas represent two vitally important ceramic production centers in the north Isthmus area, which have informed our understanding of material patterns and exchange systems in the broader region and have helped to shape the research design of the Kavousi-Thriphti Survey (Haggis 2000).

While I have made every effort to update and utilize relevant bibliography, reflecting the vast amount of excavation, intensive survey work, and synthetic studies published since this manuscript was revised in the fall of 1996, the primary aim of this book is to present the data as originally compiled and examined (1989–1992)—the gazetteer of sites, the physical context, and the settlement history—as a contribution to the archaeological record of the region. Thus, this study reflects on the most relevant of this recent work, which has indeed already been effectively integrated into a wider discourse on regional settlement patterns in Crete and the Aegean (e.g., Hayden 2004a; Cunningham and Driessen 2004; Borgna 2003; Wallace 2003; Driessen 2001; Cunningham 2001; Nowicki 2000a; Farenga 1998).

Donald C. Haggis
Koutsouras, Crete, 1996
Chapel Hill, NC, 2004



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Abbreviations

The following chronological abbreviations are used (Final Neolithic and Bronze Age dates are based on Hankey and Warren 1989 and Nowicki 2003):

FN	Final Neolithic (ca. 4000–3200 B.C.)	A	Archaic (ca. 600–480 B.C.)
EM	Early Minoan (ca. 3200–2100 B.C.)	C	Classical (ca. 480–323 B.C.)
MM	Middle Minoan (ca. 2100–1600 B.C.)	H	Hellenistic (ca. 323–69 B.C.)
LM	Late Minoan (ca. 1600–1100 B.C.)	R	Roman
SM	Subminoan (ca. 1100–1000 B.C.)	ER	Early Roman (69 B.C.–4th c. A.D.)
EPG	Early Protogeometric (ca. 1000–950 B.C.)	LR	Late Roman (4th–7th c. A.D.)
PG	Protogeometric (ca. 1000–900 B.C.)	B	Byzantine (8th–12th c. A.D.)
G	Geometric (ca. 900–700 B.C.)	V	Venetian (12th–17th c. A.D.)
LG	Late Geometric (ca. 760–700 B.C.)	Ott.	Ottoman (17th c.–1900 A.D.)
EO	Early Orientalizing (ca. 700–660 B.C.)	Mod.	Modern (1900–present)
O	Orientalizing (ca. 700–600 B.C.)	B.P.	before present

The following other abbreviations are used:

a	angular	Max.	maximum
AMSL	above mean sea level	PPL	plane polarized light
c:f:v	coarse:fine:void ratio	Pres.	preserved
D.	diameter	r	rounded
E	Early	sa	subangular
frag.	fragment	sr	subrounded
H.	height	tcf	textural concentration feature
ha.	hectare	Th.	thickness
KTS	Kavousi-Thriphti Survey	W.	width
L.	length	XP	cross-polars
m	meter		

The following soil science abbreviations are used:

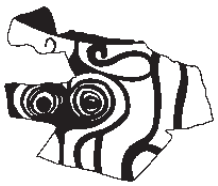
A	Mineral master horizon formed at the surface or below an O horizon that exhibits mixing of mineral and organic materials
Ap	An A-horizon that exhibits disturbance by plowing or other agricultural uses
B	Mineral master horizon that forms below an A, E, or O horizon that exhibits obliteration of much or all of the original rock structure
BC	A transitional horizon with characteristics of both an overyling B horizon and an underlying C horizon, but is more like B than C
Bss	A B-horizon that exhibits the presence of slickensides
Bt	A B-horizon that exhibits accumulation of silicate clays that either formed in place or were translocated from the overlying horizon
Bw	A B-horizon that exhibits development of color or structure with little or no apparent accumulation of alluvial materials
C	Mineral master horizon, excluding hard bedrock, that exhibits little effects of soil forming processes
Cb	A C-horizon that has been buried
Cr	Weathered or soft bedrock sometimes referred to as a paralithic contact
C-T	Cretaceous-Tertiary
E	Mineral master horizon exhibiting loss of clays, sesquioxides, or organic matter
O	Master horizon dominated by organic material
R	Hard bedrock



Glossary

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

akrotiri	headland; promontory; peninsula
aloni	threshing floor, usually with a stone-built border
argillic	a soil horizon that is characterized by the movement of phyllosilicate clays in the horizon from a horizon above
basic	refers to an igneous rock with a low silica content
cutans	modifications to soil peds due to processes such as coatings of clay on ped surfaces as the result of argillic horizon formation
geotrese	deep well
kalderimi	cobbled path (paved or partially paved mountain road)
mandra	sheep or goat pen
mass-wasting	downslope movement of soil or rock material as a direct result of gravity
metochi	rural hamlet or field house
ped	a natural unit of soil structure (similar to a clod except that a clod is formed artificially)
pedon	a three dimensional body of soil that adequately expresses the horizons developed from soil formation processes
perivolia	household or in-field gardens
plateia	town square; village center
polypedon	a group of contiguous or similar pedons, usually considered the primary unit for soil mapping
residuum	soil formed by the weathering of bedrock in situ
revma	torrent; gully; seasonal river
sideropetra	gray crystalline limestone
slickensides	stress surfaces that are polished and striated produced by one mass sliding against another
soil profile	a vertical section of soil through all its horizons and extending into the C horizon
thermokepion	impermanent greenhouse
trapetum	olive crushing bed/press
type pedon	a pedon used to characterize a soil mapping unit
ultrabasic	refers to an igneous rock with a lower silica content than basic



1

Introduction

This chapter gives a brief account of the history of archaeological research in the Kavousi area and describes the theoretical and methodological background of the Kavousi-Thriphti Survey. It aims to bring together what was known of the area's archaeology and history before fieldwork began and to describe the reasons for conducting the survey. In addition, the chapter outlines the archaeological problems and issues that had a bearing on the research design.

The area of the modern village of Kavousi and its surrounding district is composed of three converging environments in northeastern Crete: the Isthmus of Ierapetra (the narrow, twelve-kilometer-long lowland running north to south between the Bay of Mirabello and the Libyan Sea), the east coast of the Bay of Mirabello, and the Kavousi mountains (west Siteia Massif or Thriphti Range) (Figs. 1, 2; Pl. 1A). These distinct geophysical features are not only important factors in past and recent land use and communication patterns; their particular manifestation in this spot suggests that topography should be of paramount consideration in our interpretation and reconstruction of ancient human activity in this region. Although topography has been a central concern in early archaeological reconnaissance since the turn of the 20th century, and often a focal point in discussions of causal factors related to historical discontinuities, today it is only one of many environmental features recorded by regional projects toward reconstructing ancient environments and assessing human-landscape interaction. For Harriet Boyd Hawes who first explored the Kavousi area in 1900, it was the correlation of diachronic changes and regional variability in settlement patterns with physical terrain that led her to conduct her extensive survey of the north Isthmus and Kavousi areas, perhaps one of the first such surveys in the Aegean (Boyd 1904–1905; 1904; 1901). Topography was a guide for examining new areas and for discovering and interpreting new site types. It was a context for understanding periodic variation in settlement patterns in a specific defined region.

The reinvestigation of the Kavousi region was guided by many of the same problems—generated by a past century of research (cf. Haggis 2004; Gesell 2004, 15). Most important was that the region itself is a crossroads and gateway, a link

between two major natural routes connecting the north and south coasts, the Aegean and Mediterranean, and between eastern and central Crete. The physical situation of the survey zone suggested two premises: first, the definition of patterns within the survey zone would have to take into account a wider scale region, beyond the boundaries of the predetermined study universe. And second, human activity and settlement patterns, while necessarily affected by external stimuli, are unique to their environment and could change periodically in a variety of ways depending on local social systems as well as ecological conditions. It is however the past century of intensive archaeological research in the north Isthmus of Ierapetra and the regions contiguous to the Bay of Mirabello, that has helped to shape the research design of the archaeological survey at Kavousi.

History of Research

Archaeological sites in the Kavousi area were first examined in 1896 and 1899 by Sir Arthur Evans, who identified a number of sites, including the settlement on the Kastro (site 80), a tholos tomb at Plaï tou Kastrou (site 79), the Roman village at Chordakia (site 37), and the Minoan house on Chomatas at Chrysokamino (site 34; Fig. 2) (Gesell 2004; Evans 1896, 513; Frothingham 1896, 455–459; Hogarth and Bosanquet 1899, 321). The first systematic exploration of Kavousi, however, was carried out by Harriet Boyd, who surveyed on foot and horseback, identifying and excavating some fifteen sites in 1900 and 1901 (Gesell 2004; Hawes et al. 1908; Boyd 1904; 1901). The Early Iron Age sites of Vronda (site 77), Kastro (site 80), and their associated cemeteries were the primary focus of Boyd's expedition, and the best recorded and published of the sites that she examined. In addition to the full-scale excavations of the Vronda settlement and cemetery at Xerambela, the Kastro peak, and cemeteries at Skala (or Aloni; site 78) and Skouriasmenos (site 81), Boyd explored the neighboring hilltop of Azoria (site 71)—a site that she believed was of some importance as an Early Iron Age center continuing into later periods—and a nearby cemetery at Chondrovolakes with Orientalizing burials (Fig. 2). In the Avgo Valley, Boyd excavated a Minoan house at Panagia (site 87) and identified the location of an LM III larnax burial nearby (site 86), as well as a tholos tomb on the Trapeza Ridge above Panagia (Hastings 1905). In exploring the Kambos plain in search of a major Minoan site to excavate, Boyd dug a test trench in the Roman warehouse at Tholos Bay (site 1) and identified Bronze Age buildings on the farthest point north of the Roman site. These walls were the remains of the Minoan town that Boyd was seeking, but the shallowness of the deposition and the evidence of Roman-period disturbance of the early levels discouraged excavation. At Hagios Antonios, she explored the Minoan town (site 5) but excavated only a portion of a terrace wall and, in the valley below, a Hellenistic–Roman grave and cult site. Most important was Boyd's identification of the Prepalatial site of Alykomouri (site 8) on the hill above the Hagios Antonios valley. Farther south, in Chordakia, she excavated Roman rock-cut cist tombs (site 30) and Late Roman–Byzantine walls and a cistern at Katsoprinos (sites 28 and 29). Boyd's detailed observations of the landscape are indispensable in reconstructing archaeological sites today and periods of occupation that are now lost or disturbed by modern land use and natural formation processes. Furthermore, her descriptive accounts of contemporary agricultural practice, water supplies, vegetation, soil types and conditions, and traditional land use are data that have been used in visualizing the pre-World War I environment and settlement structure—important sources of analogy in reconstructing ancient land use patterns and the occupational history of the region.

Boyd left Kavousi in 1901 to begin excavating Gournia (Boyd 1904–1905). Edith Hall (Dohan) and Richard Seager joined Boyd at Gournia but also conducted a number of small excavations in the Kavousi area. Seager excavated LM I–III burials at Ridopoulia, immediately east of Kavousi village (Gesell, Day, and Coulson 1983, 413–420). In 1910, Hall explored the area of the Metallurgical Site of Chrysokamino (site 32), which had been known to Boyd; she also excavated within the EM I–II cave of Theriospilio (Kolonospilio; site 31) (Foster 1978,

6–9; Hall 1912; Mosso 1910, 289–290). Hall returned to Kavousi in 1912 to excavate LM III burials at Kamara tou Tholou (site 26) and the EM I–II burial cave at Hagios Antonios (site 6) (Hall 1914, 183–185). Subsequent work in the Kavousi area was largely topographical in nature, although in 1950, Stylianos Alexiou excavated the important Geometric–Archaic hearth temple at Pachlitzani Agriada (Makellos; site 82) (Alexiou 1956).

The first systematic regional study of the Kavousi area was an extensive survey conducted by Geraldine Gesell and Leslie Preston Day, who discovered and cataloged several new sites as part of an exploration of the entire north Ierapetra Isthmus and east Mirabello regions (Gesell 2004, 14; Gesell and Day 1976). Their aim was to bring together the disparate pieces of information from past research in the Mirabello area into a coherent account of regional settlement patterns, by locating and documenting the incompletely published and unpublished sites that had been recovered during the reconnaissance and sporadic excavations since the turn of the 20th century. The scope and results of Gesell and Day's work—which identified some thirty-three sites in the Kavousi area alone—demonstrated the complex patterns and density of Bronze Age, Early Iron Age, and Roman settlement in the Kavousi and north Isthmus regions. Gesell and Day were joined by Coulson in 1978 to form the Kavousi Project, and efforts were focused on the excavation and study of the sites of the Xerambela or northern Papoura drainage south of the modern village, including Vronda, Kastro, and neighboring cemeteries (Gesell 1990; 1986; Gesell, Day, and Coulson 2000; 1995; 1990; 1988; 1985; 1983; Coulson et al. 1997; Gesell, Coulson, and Day 1991).

The Kavousi Project was, however, only one of many research endeavors in the Mirabello region, many of which are now in various stages of study and publication. Between 1971 and 1985, Jeffrey Soles and Costis Davaras conducted extensive topographical studies and excavation at Gournia and Mochlos (Soles 1992; 1991; 1988; 1979; 1978), beginning full-scale excavations at the latter site in 1989 (Soles and Davaras 1996; 1994; 1992; Soles 2004; 2003; Soles et al. 2004; Barnard and Brogan 2003). At Vrokastro, lying to the west of Kavousi across the Ierapetra Isthmus, where Barbara Hayden had been studying the architecture of the Early Iron Age settlement (Hayden 2003b; 1983; 1981), a regional survey was begun in 1986 by Hayden and Jennifer Moody, including the important area of the Classical *polis* of Olerous and the Minoan town of Priniatikos Pyrgos (Hayden 2004a; 2004b; 2003a; 2003b; 2001; 1997a; Hayden and Moody 1990; Hayden, Moody, and Rackham 1992). In 1985, Philip Betancourt and Costis Davaras began excavations on the island of Pseira, subsequent to a number of important studies of pottery and artifacts from the Kavousi and Mirabello areas (Betancourt and Silverman 1991; Betancourt 1984; 1983; 1977; Betancourt and Davaras 2003; 2002; 1999; 1998; 1995; 1988; Betancourt et al. 1979; Betancourt, Davaras, and Hope Simpson 2004; 2005; Floyd 1998; McEnroe 2001). More recently, excavation has been conducted by Tsipopoulou, Coulson, and Nowicki at two Early Iron Age sites known to Boyd, Katalimata and Chalasmenos (Tsipopoulou 2004; 2001; Tsipopoulou and Coulson 2000; Nowicki 2003; 2002; 2000b; Coulson et al. 1995), and survey in the Gournia and north Isthmus areas, begun in 1992 by L.V. Watrous, has closed the spatial gap between the Kavousi and Vrokastro survey zones (Watrous et al. 2000; Watrous and Blitzer 1999; 1995). Excavations in 1993 by the author in Kalo Chorio have produced the first stratified habitation deposits of EM I date in eastern Crete (Haggis 1996c). In 1995–1997, Philip Betancourt, James Muhly, and Cheryl Floyd conducted survey and excavation at the Early Minoan III Metallurgical Site of Chrysokamino and the Minoan house on Mount Chomatas, sites important in reconstructing the history of settlement in the Kavousi plain and the coastal hills bordering the Bay of Mirabello (Muhly 2004; Betancourt 2000a; 1998; Muhly and Betancourt 2000; Betancourt and Floyd 2000–2001; Floyd 2000; Betancourt et al. 1999). The continuing reinvestigation of Vasiliki by Antonis Zois (Betancourt 2000b; Zois 1993; 1992; 1982; 1976) and the recent excavations on the neighboring hilltop of Kephala by Theodoros Eliopoulos (Eliopoulos 2004; 1998; Rehak and Younger 1998, 169) have changed our perception of settlement structure in the north Isthmus. This fieldwork in the Mirabello area has created an extraordinary database and research environment, where the results of survey and excavation can be combined to determine local ceramic sequences and spatial distribution, site types and functions, and settlement patterns.

The Kavousi-Thriphti survey was a component of the Kavousi Project and thus a single part of this larger research effort in the Mirabello area. The complementary interrelationships of these various projects and the effects of their diverse aims, perspectives, and periods of interest have helped to form both the methodology and the interpretation of results presented in this volume.

The Goals and Background of the Kavousi-Thriphti Survey

The Kavousi-Thriphti Survey provides a broad history of settlement from Neolithic to Roman times. The principal objectives were, however, to explore the physical setting of Vronda and the Kastro and to reconstruct the settlement patterns in the region in the Early Iron Age and the periods of transition between the Bronze and Early Iron Ages. Given the large sizes and complex and overlapping chronology of these two settlements and their associated cemeteries, an immediate concern was to determine their agricultural and pastoral catchment areas by examining the sites' physical surroundings, available natural resources, and the botanical and zoological data derived from the excavations. An important consideration was the functional relationship between the excavation sites and other contemporary settlements in the Kavousi area, the north Isthmus of Ierapetra, and the Kavousi mountains (Figs. 1, 2). Another objective was to construct from the archaeological evidence a local model of settlement that might be applied to the exploration of Early Iron Age cultural environments elsewhere in Crete and the Aegean. Important in the model were the combined dimensions of space and time derived from results of survey and excavation (Haggis 2001; 1999b; 1993a). The overlapping catchment areas and chronology of these settlements and their cemeteries suggested interesting patterns of socioeconomic interaction as well as diachronic changes in settlement patterns that might have been related to changing social and economic systems. We began to visualize Early Iron Age society on a regional scale, that is, with occupation and local identity linked to an area wider than the spatially focused realm afforded by excavation alone. Control of water supplies, access to resources for staple production, pastoral boundaries, and social ties across the landscape were seen as driving forces of territorial definition and regional organization, and ultimately the behavioral systems potentially underlying the material patterns in the archaeological record.

Although considerable effort has been expended in recent years toward reconstructing important regional Early Iron Age ceramic chronologies (Coulson 1986), studies of Early Iron Age society have relied almost exclusively on incomplete and unstratified burial assemblages (Whitley 1991a; 1991b), or the results of single-site excavations (cf. Nowicki 1999a; 1987a). Survey in the Kavousi region was an opportunity to explore in detail an Early Iron Age cultural landscape and to reconstruct the scope of its economy and resources. The settlement history integrates information from sites of various periods and functions, in conjunction with an unparalleled continuously stratified ceramic sequence (Mook 2004) and accompanying faunal and botanical data (Flint-Hamilton 2000; 1999; Klippel and Snyder 2000; 1991; Snyder and Klippel 1999; 1996). The regional information from the survey will eventually supplement the publication of data from the excavations of Vronda and Kastro and nearby settlements of Katalimata and Chalasmenos, permitting a detailed reconstruction of Early Iron Age communities in East Crete, and contributing to on-going and future synthetic studies across the island (Borgna 2003; Wallace 2003; 2001; 1997; Nowicki 2000a; 1999a).

This transition from Bronze Age to Iron Age is an important focus of this study, especially because historical models and broad cultural generalizations for the Aegean have traditionally stressed the significant, but not unproblematic, evidence for demographic change; military conflict; foreign invasions; internecine strife and interregional conflicts; and systems collapse (Karageorghis and Morris 2001; Hayden 2001; 1988; Nowicki 2001; 2000a; 1999a; 1996; 1995; 1994; 1990; 1987c; 1987b; Rutter 1992; Snodgrass 1991; 1990; 1987; 1971; Schachermeyr 1979; Desborough 1973; 1972; 1964;

Pendlebury, Pendlebury, and Money-Coutts 1937–1938b, 136–141). Linguistic, ethnic, and cultural transformations involved not only the decline and disappearance of palatial economic and political systems, but a myriad of complex causal factors related to historically documented catastrophes. Disturbances in the eastern Mediterranean manifested themselves in changes and discontinuities in the archaeological record (Nowicki 2001; 2000a). Recent archaeological approaches to culture change in this period have, however, also tended to see cultural processes as responses to a changing Mediterranean economy and as positive adaptations to economic, social, and political conditions after the dissolution of the Bronze Age palace-based systems (Borgna 2003; Haggis 2001; 1999b; Foxhall 1995; cf. Snodgrass 1987; Betancourt 1976). These approaches tend toward explanations of how staple-based economies developed and functioned in regional environments. What, they ask, was the relationship of Early Iron Age settlements to neighboring settlement systems, territories, and the coastal mercantile centers that were based not on state-controlled exchange but on local merchant interests in expanding trade routes in the Mediterranean? (Sherratt and Sherratt 1993). The Kavousi-Thriphti Survey takes this same approach to the Early Iron Age settlements at Kavousi, addressing issues of adaptation to the local environment that provided its resource base (cf. Borgna 2003; Wallace 2003; 2001). We examine the nature of intersite relationships on various spatial scales within the survey zone and ask how these relationships might reflect the long-term development of social, political, and economic systems following the dissolution of Bronze Age palatial organization and leading to the rise of *poleis* in eastern Crete. Analysis of culture change in the Early Iron Age was thus at the core of the research design, as much as the interest in exploring the nature of land use and the sociopolitical dimension of the territory of the Early Iron Age settlements.

The small Early Iron Age communities formed a physical context and test case for evaluating the discontinuities in the use of settlements and cemeteries, the diverse forms and functions of cult places, and the idea of regional identity in early Greek society on Crete (cf. Foxhall 1995; Morgan 1993; Coulson 1986). The Early Iron Age is seen as a formative period in the emergence of regionally integrated social and economic systems.

Similarly, Prepalatial Crete has long been the focus of discussion of incipient complexity leading to palace societies (Day and Wilson 2002; 1994; Driessen 2001, 53; Schoep 1999; Watrous 1994; Wilson 1994; Wilson and Day 2000; 1999; 1994; Branigan 1991; 1988a; 1988b; 1984; 1968; Cherry 1984; 1983a; Warren 1987). Thus a series of problems, parallel to that of the Early Iron Age, took shape in our analysis of the Bronze Age settlement patterns. Among these issues is the question of emerging complexity and the processes involved in early state formation in the late Prepalatial and early Protopalatial periods. The KTS recovered late Prepalatial settlement patterns that might indicate aspects of organizational structure in EM III–MM IA and the early Protopalatial period (Haggis 2002; 1999a). Recognition and recovery of late Prepalatial remains on the surface of sites proved, however, to be complicated by the density of EM I–II or Protopalatial occupational phases at these sites. The difficulty of this task was compounded by lack of well-published, substantial, and clearly stratified EM III–MM IA pottery in Crete, especially in the eastern part of the island. Nevertheless, the recovery of this phase in intensive survey (and excavation), and in diverse contexts (ritual, mortuary, and habitation), is absolutely essential to our understanding of the processes of state formation, or evaluating evidence for changing social and political systems around 2000 B.C. (Haggis 2002; Driessen 2001; Schoep 1999; Manning 1994; Watrous 1994; Tsipopoulou 1992; 1988; Dabney and Wright 1990; Cadogan 1988; 1986; Peatfield 1987; Cherry 1983a). The essential problem in most approaches to the emergence of palatial society is perhaps less in the richly varied theoretical sphere, than in the realm of data and chronology. Past studies drew primarily on EM II material as representing the formative cultural phase, or extrapolated from the Protopalatial period or worse yet from LM I palatial society and organizational structure (cf. Day and Wilson 2002; 1998; Knappett and Schoep 2000). The purpose of our work at Kavousi was to examine this crucial transitional phase in late Prepalatial Crete on a regional scale. Another related focus of the survey was on the development of Neopalatial settlements. Does the evidence suggest a continuous and uninterrupted expansion of sites and growth of population through the Protopalatial period into the LM I phase, or a discontinuity implying