

ARCHAEOLOGICAL SURVEY AT KAVOUSI, EAST CRETE PRELIMINARY REPORT

(PLATES 81 and 82)

χαιρέττε μου τὴν Κρήτην
Αλέκος Ιωάννης Χατζόπουλος, 1921–1995

INTENSIVE ARCHAEOLOGICAL SURVEY was conducted in the region of Kavousi in northeastern Crete during 1988, 1989, and 1990.¹ The purpose of this paper is to describe the physical environment of the survey zone, to outline the history of archaeological investigations in the Kavousi area, and to present an overview of field methods and a brief analysis of settlement patterns from the Late Neolithic to the Roman period. The aim of the project was to provide a broad regional archaeological context for excavations taking place concurrently at the Late Minoan (LM) IIIC and Early Iron Age sites of Vronda and Kastro by reconstructing the history of the region and its settlement patterns in the Bronze Age and by evaluating on a regional scale the archaeological evidence for the transition from the Bronze Age to the Early Iron Age.² The broad diachronic scope of the survey involved the recovery and study of remains of all phases of habitation from the Neolithic period to Roman times; the Byzantine, Venetian, and Ottoman periods and the 20th century were not examined in sufficient detail to provide a complete record of human occupation in the study zone.³ One focus of fieldwork

¹ The survey of the Kavousi area (Kavousi-Thripti Survey [KTS]) is a part of the Kavousi Project and was the basis of a Ph.D. dissertation at the University of Minnesota (Haggis 1992). The primary fieldwork and research were conducted under the auspices of the American School of Classical Studies at Athens; I thank the staff of the School and especially the director, William D. E. Coulson, for facilitating all parts of the study. Detailed acknowledgments are given at the end of this report on p. 432.

² For the Kavousi Project see Gesell, Day, and Coulson 1983; Gesell, Day, and Coulson 1985; Day, Coulson, and Gesell 1986; Gesell 1986; Gesell, Day, and Coulson 1988; Day, Coulson, and Gesell 1989; Gesell, Day, and Coulson 1990; Coulson 1990; L. P. Day 1990; Gesell 1990; Gesell, Coulson, and Day 1991; Coulson 1991; Klippel and Snyder 1991; Mook and Coulson 1992; Day and Glowacki 1992; Tobin 1993; Mook and Coulson forthcoming; Gesell, Day, and Coulson 1995. For the Kavousi-Thripti Survey see Haggis 1992; Haggis and Mook 1993; Haggis and Nowicki 1993; Haggis 1993a; Haggis 1993b. For soil studies in the Kavousi and northern Ierapetra Isthmus areas see Timpson 1992 and W. M. Morris 1994.

³ While sites of these occupational periods were recorded in broad terms (Byzantine–Venetian, Ottoman–Modern, 20th-century) and will be included in the final site catalogue of the survey, limitations of time, funding, and permit restrictions, coupled with the emphasis of the research design on the prehistoric and Classical periods, precluded study of this material. While current excavations and surveys in the Mirabello area are filling out ceramic, stratigraphic, and historical pictures of these periods (Betancourt and Davaras 1988; Gesell, Coulson, and Day 1991; Hayden, Moody, and Rackham 1992; Watrous and Blitzer 1994), the post-Roman ceramic sequences and local wares were not familiar to the author and were not adequately

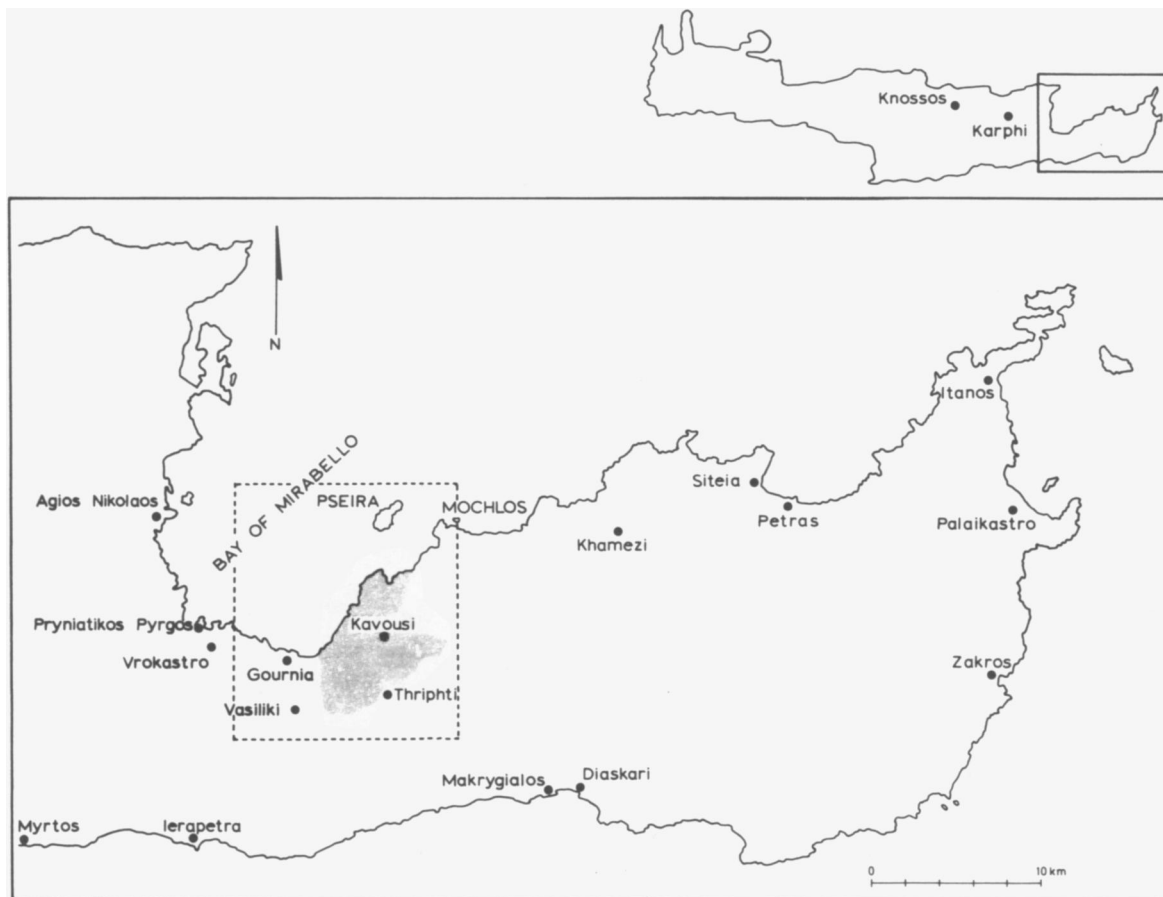


FIG. 1. Map of East Crete: Kavousi-Thripti Survey zone

was to assess the functional relationships between sites in the early Iron Age;⁴ another was to examine the physical environment and topography as contexts for the study of faunal remains from the excavated settlements.⁵ Finally, Middle Minoan (MM) I–II (late prepalatial and protopalatial) and Early Iron Age (or Dark Age; *ca.* 1200–900 B.C.) sites, land use, and settlement patterns became important aspects of the study

published at the time of the fieldwork to include such a component. Permit restrictions greatly limited the volume and range of material that could be gathered, stored, and studied; thus it was decided that Early Byzantine–Ottoman and 20th-century material would not be collected.

⁴ The initial problem orientation of the Kavousi-Thripti Survey was to explore the regional context of Vrokastro and the Kastro (Haggis 1993a). See the critical perspective of Cherry (1994, p. 93) on “surveys that have grown out of an excavation and are intended mainly to ‘put the site in its context’; prospection that has tried to tackle either too much, or too little, territory to allow conclusions that are well-grounded in a spatially satisfactory sample of empirical data; and so on.”

⁵ Klippel and Snyder 1991. The soil study of the Kavousi area will be published elsewhere by J. T. Ammons; at the time of this preliminary report soil maps were not available for analysis and discussion.

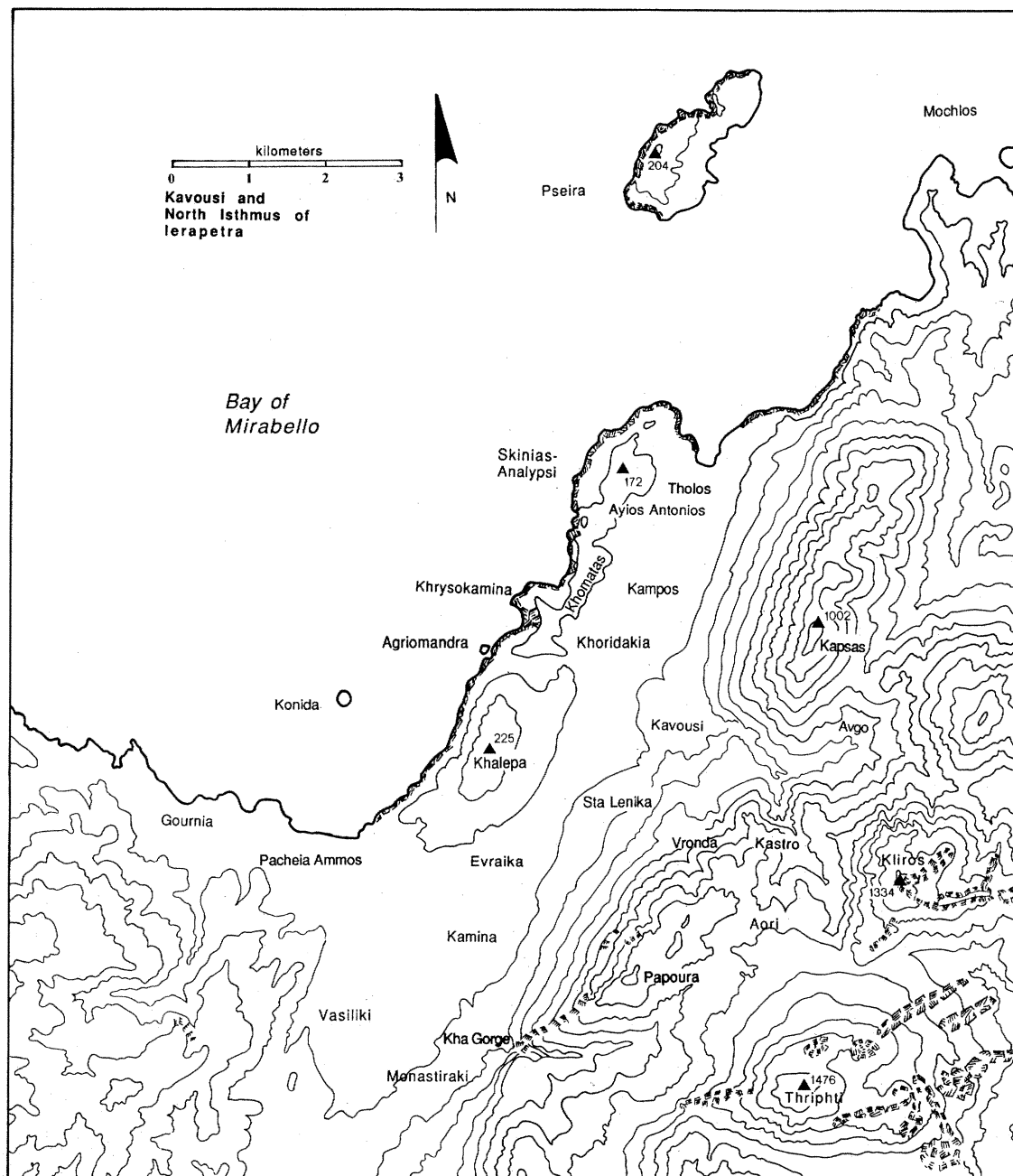


FIG. 2. Map of Kavousi and northern Isthmus of Ierapetra

because these periods are seen as crucial stages in the development of complex societies on Crete, encompassing precisely the time spans preliminary to and during the first appearance of Minoan palaces and the rise of Greek city states.

The chosen study area corresponds to the modern geopolitical district (the *koinoteta*) of Kavousi and a topographical and environmental cross section of mountains and plain; the zone is also essentially the Platys River catchment area, extending from Thriphiti and Avgo through the Kampos plain to the bay at Tholos (Figs. 1–3).⁶ The scale of the survey zone was small enough to be manageable by one field walker, yet large enough to assess intersite relationships in a number of periods. The analysis of the data from a number of small contiguous areas within the region was viewed not only as a contribution to a cumulative picture of the Cretan or Aegean archaeological landscape⁷ but also as one means of assessing diverse cultural responses to local topography and environment, as well as the island-wide effects of the palatial and *polis* systems.⁸ It was hypothesized that small-scale patterns of human activity might elude reconstructions of political hegemonies, broad interregional exchange systems, and strict site hierarchies but nevertheless demonstrate aspects of cultural systems that are essentially scale dependent. While the area of study is neither a discrete or insular geographical unit, such as the Lasithi plateau or the island of Pseira, nor the agriculturally rich hinterland of a Minoan palace or urban center, such as the western Mesara or the plain of Mallia,⁹ the history of habitation in the Kavousi area might illustrate characteristics of human-landscape interaction for which parallels can be found in environmentally similar areas of Crete, where predictive models based on physical geography and sociopolitical systems are not readily useful in the initial research design or forthcoming in the analysis of settlement patterns. Ultimately, the broader social and political context of regional and island-wide palatial and *polis* systems will have affected local settlement patterns; but the complete understanding of those effects is possible only if local and micro-regional topographical and cultural contexts are fully explored. One purpose of the survey was to begin defining the nature of settlement in a terminology and with an approach that required close consideration of local patterns of human behavior

⁶ There was no intent in the design to conduct a “catchment study” (Roper 1979), and no presumptions are made that the area was necessarily a closed cultural unit or that the results are somehow validated by virtue of the topographical boundaries. See discussion in Cherry 1983a, pp. 385–389, and Plog, Plog, and Wait 1978.

⁷ See Cherry, Davis, Mantzourani, and Whitelaw 1991, p. 16, on the aims of small-scale regional survey.

⁸ Hayden 1983, Hayden and Moody 1990, Hayden, Moody, and Rackham 1992 (Vrokastro); Betancourt and Davaras 1988, Betancourt and Hope-Simpson 1992 (Pseira); Soles 1978, Soles and Davaras 1994 (Mochlos); Watrous 1993, Watrous and Blitzer 1994 (Gournia). The comparison of results with that of other surveys on Crete must await full publication of the data and methods. The regionally specific environments, problems, and aims of such projects will produce potentially diverse illustrations of the Cretan countryside. Since the early intensive surveys at Ayio Farengo (Blackman and Branigan 1975 and 1977), Lasithi (Watrous 1982), and Khania (Moody 1987), small-scale archaeological surveys in Crete have been providing a vast amount of data that will eventually permit interregional comparisons. See Nixon, Moody, and Rackham 1988 (Sphakia); Tsipopoulou 1989 (Ayia Photia); Müller 1990, 1991, and 1992 (Mallia); Schlager 1991 (Zakros-Xerokampos); Watrous *et al.* 1993 (Mesara); Whitley 1992–1993 (Praisos); see also Watrous 1994, pp. 696–699, for summary and bibliography of early reconnaissance and current surveys on Crete.

⁹ See Watrous *et al.* 1993 (Mesara), Müller 1992 (Mallia), and Hope Simpson and Betancourt 1989 (Pseira) for diverse environments and research strategies in current survey on Crete.

that might be largely lost in modern methodological terms of spatial ordering and social and political systemics.

THE KAVOUSI REGION

The survey zone consists of the modern district, or *koinoteta*, of Kavousi in northeast Crete (Figs. 1, 2). The area includes the northeastern edge of the Isthmus of Ierapetra, the western edge of the west Siteia massif (the Kavousi mountains, or Thriphti range), and the lowland plain and coastal hills bordering the eastern edge of the Bay of Mirabello. The zone is neatly divided between mountains and coastal plain. The mountain peaks of Kapsas, Kliros, and Thriphti form a natural eastern border to the Kavousi highlands, which consist of the regions of Avgo, Papoura, and Aori (Fig. 2). Three main drainage basins originate in these mountains. The Thriphti watershed (Kha River), situated between the village clusters of Aori and Thriphti, drains to the southwest through the Kha gorge at Monastiraki, into the plain of Kamina and the north Isthmus of Ierapetra, and eventually terminates in the sea at Pacheia Ammos. Another drainage extends north of the Thriphti watershed and forms the deep gorge of Makellos on the east side of the Kastro; this river joins the Avgo torrent, which descends from the east, and both feed into the Platys River (Kamos plain) at Kavousi village. The Platys River runs the full extent of the Kamos (from Kavousi village to the sea) and terminates in the bay of Tholos (Fig. 2).

The environmental disparity between the mountains and coastal plain was an important consideration in the design of the survey methods (see pp. 384–388 below), since it was observed that the regions comprise vastly different terrain, topography, and water and land resources. The highlands south and east of Kavousi village (Avgo, Papoura, and Thriphti) consist of mixed dolomite and phyllite bedrock and soil. While steep and precipitous mountain terrain dominates this topography, the terraced hillsides are ideal for rain- and spring-fed agriculture,¹⁰ and the upland plain of Papoura, with its silty phyllite soil, was long exploited for barley cultivation. The perennial springs at Avgo, Thriphti (Aori), and Xerambela (Vronda) are numerous and widespread along the divisions of limestone and phyllite. Today at Avgo and Thriphti various springs are tapped directly for irrigation of adjacent terraced fields even in dry summer months or in times of drought. The springs and fields of Xerambela (Vronda), Avgo, and Aori-Thriphti were the focus of settlement and agricultural activity in the Kavousi region before the extensive (post-World War II) irrigation of the Kamos plain. The upland terraces supported crops of barley, fruit and nut trees, and disparate small gardens. Olives were grown sporadically

¹⁰ The terraces of the Kavousi highlands are remarkably stable and have probably been continuously maintained since the Bronze Age. Terraces south of Kavousi village and between Vronda and the Kastro contained *in situ* sherd scatters and house walls of EM–LM IIIC date; on the terraces of Aloni, southwest of the Kastro, are Early Iron Age tholos tombs. For excavation of Bronze Age agricultural terraces in the northern Isthmus area, see Boyd 1901; Betancourt and Hope Simpson 1992; and Hope Simpson and Betancourt 1989.

at the lower elevations (*ca.* +400 m.). The perennial water and the rich, silty phyllite and mixed terra-rosa soils were mountain resources fundamental to the subsistence base in the traditional (pre-World War II) economy. Extensive terracing, while a sign of the scarcity of adequate agricultural land, is also a strong indication of the productivity of this mountain environment. The traditional pattern of settlement consisted of a series of satellite communities in the Kavousi mountains. These are clusters of hamlets,¹¹ at Avgos, Aori, and Vronda (Fig. 2), strategically located in proximity to water and land resources and situated along major mountain routes that connect the clusters and provide access to grazing land and distant fields.¹²

In sharp contrast to the well-watered and agriculturally viable mountain environment, the coastal plain of Kampos west and north of Kavousi village consists of rocky terra-rosa soils formed as alluvium from the surrounding hills. Mount Kapsas on the east side of the plain is a gray crystalline limestone peak whose west face erodes in steep and dramatic landslides of scree. The hills Skinias, Khomatas, and Khalepa, which border the plain along the west, are alternating phyllite and dolomite outcrops with numerous torrent-fed gullies draining into the Kampos (Fig. 2). The Kampos plain is composed primarily of terra-rosa soils that are densely packed with angular scree and alluvial stone debris; the deeply incised basin of the Platys River, which runs the full extent of the Kampos and Tholos plains, has an over-bank deposit approximately fifty meters wide on either side of the river channel.¹³ The rocky soils of the Kampos were frequently planted in barley before World War II, and carob trees are seen today throughout the plain at traditional field boundaries. Local landowners considered the large extent of the plain to be marginal agricultural land, of limited value for dry agriculture and uncultivable in times of drought. Before the irrigation projects of the 1950's and 1960's the variation in yields between the Kampos plain and upland terraces was often reported in terms of the value of olive trees or the amount of grain yields; trees in the Kampos were one-fifth the value of trees at

¹¹ The identification of "farmhouse" (< 0.10 ha.) and "hamlet" (0.10–0.60 ha.) remains largely impressionistic. The "farmhouse" sites have discernible architecture that suggests no more than three units; pottery consists of a presumably domestic assemblage of storage and cooking vessels and jugs, amphoras, and cups. The site-size definition is based on an estimate of the number of possible houses/households extrapolated from the agglomerate plans and spatial extent of EM II Myrtos-Phournou Koriphi, LM IIIC Vronda, and 20th-century Trapeza (Avgos valley, Kavousi): Myrtos: 0.24 ha. (5–6 households); Vronda: 0.60 ha. (12–16 households); Trapeza: 0.375 ha. (10–20 households).

¹² For the early-20th-century (pre-World War II) Kavousi settlement system see Haggis 1993a, pp. 138–143.

¹³ There is little evidence that alluvium and Platys River overbank deposits have obscured Bronze Age sites in the plain; Minoan house walls and sherd material were observed throughout the Kampos, even at the extreme eastern edge, where dense scree from Mount Kapsas reaches the valley floor. At the far northern end of the Kampos, in the area of Ayios Antonios, Bronze Age sherds have been recovered not lower than 0.80 m. below ground level in a river scarp. I am grateful to John Ammons and Mike Morris for walking the Platys River channel and showing me the location of the river-scarp deposit. See W. M. Morris 1994 for soil formation in the Kampos plain.

Xerambela (Vronda; *ca.* +400 m.); 200–250 kilos of barley per stremma were produced at Xerambela compared to 100 kilos or less in Kampos. Two areas of the plain were seen as the most viable for rain-fed agriculture: Khordakia and Ayios Antonios (Figs. 2, 11, 12). These areas, nestled along the extreme western edge of the Kampos, are localized pockets of phyllite alluvium. The oldest olives in the plain were grown here, as well as some wheat. While both areas are ideal environments for springs, only Ayios Antonios is reported to have had a perennial water supply that was adequate for irrigation. It is not surprising that these isolated regions also contained the most dense and concentrated Bronze Age and Roman remains in the plain.¹⁴

The lowland plain, and indeed the entire Kavousi area, was transformed by the irrigation projects undertaken as part of the Marshall Plan and with the Junta from 1947 to 1968;¹⁵ the most important change to the landscape resulted from the drilling of deep wells in the Avgo valley, in the Kampos plain, and in Kamina southwest of the village (Fig. 2). These wells, or *geotreseis*, for the first time allowed the widespread cultivation of the Kampos plain, brought a permanent water supply to Kavousi village, and completely transformed the agricultural landscape, economy, and traditional settlement pattern. The lowland fields that had produced negligible crops of barley were converted to olive groves, fruit groves, and small gardens. The olive now dominates the plain and is the main cash crop for the nucleated village. The shifting emphasis from mountain to plain during the past three decades has led to the conversion of upland barley terraces to the cultivation of vines, and the abandonment of a large number of mountain communities for all but seasonal or pastoral use.¹⁶ Many of the remote settlements are still used for growing vines, fruit, and nuts, and the cool summer temperature, pure water, and pristine landscape have attracted a new generation of *Kavousanoi*, who have refurbished the abandoned buildings as summer homes.

¹⁴ See discussion of methods (p. 388 below) for the disparity in off-site sherd densities between the Kampos plain and Khordakia.

¹⁵ Allbaugh 1953, pp. 258–263.

¹⁶ For the traditional intensive use of upland terraces for barley cultivation at Kavousi and Thriphti, see Boyd 1901 and 1904, pp. 10–13; Haggis 1993a, p. 141. While Rackham and Moody (1992, p. 125) have concluded that stepped terraces in Thriphti were designed for vine cultivation, this contradicts our understanding of the ethnographic evidence as well as the agricultural potential of the lowland plains of Kamina and Kampos. Stepped terraces (and many “pocket terraces”) in Avgo, Thriphti (see Rackham and Moody 1992, p. 125, fig. 2), and Papoura were constructed initially, and used prior to World War II, for growing barley; even tree planting on “pocket terraces” was incidental to maintaining the primary grain and garden food sources. For the details of the traditional system of settlement and agricultural exploitation of mountain zones in Kavousi-Thriphti see Haggis 1993a, pp. 138–143. See also Blitzer’s comments (p. 132) following Rackham and Moody 1992. The process of terrace construction and the cultural implications of terracing in traditional environments of Kavousi and the northern Isthmus are being studied by Harriet Blitzer (see Watrous and Blitzer 1994).

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS IN THE KAVOUSI AREA¹⁷

The first archaeological investigations at Kavousi were carried out by Harriet Boyd in 1900.¹⁸ Her campaign consisted of excavation at no less than ten separate sites, concentrating efforts first in the Kampos plain area at Ayios Antonios, where she excavated a segment of a Minoan agricultural or architectural terrace wall. Boyd's interest in the plain area soon lessened as she ascertained the extent of erosion at Ayios Antonios and the alluviation at the bay of Tholos, where she had hoped to find a Minoan settlement (Figs. 2, 17, 23). While she excavated a Roman warehouse at Tholos, and other Roman and Byzantine remains at Ayios Antonios and farther south at Katsoprinos and Kephallimnos (Khordakia; Figs. 2, 11), she was disappointed by the results and turned her attention to the uplands of Vronda and Kastro and the Early Iron Age settlements and cemeteries. Here she excavated a LM IIIC–Geometric building at Azoria and chamber tombs at Khondrovolakes, a portion of the Vronda hilltop settlement and cemetery, the tholos tomb at Skouriasmenos, the buildings of the Kastro summit (rooms 1–13), and a Geometric shrine on the southwest slope of the Kastro.¹⁹

Boyd returned to Kavousi in 1901 in order to conduct surface surveys in the Kampos plain and in the coastal hills.²⁰ At Ayios Antonios she identified the site of Alykomouri, which the present survey has been able to determine was a significant EM I settlement.²¹ Excavation in 1901 was again concentrated in the mountains south and east of Kavousi village. At Avgos Boyd excavated a LM I–III megalithic farmstead, and in the area of the Kastro she recovered several tholos tombs at Aloni (or Skala). On May 19 of the same year Boyd moved to Gournia to begin excavation of the Minoan town (Figs. 1, 2).

Work in Kavousi was continued by Edith Hall in 1910 with a brief exploration of Khrysokamina (Fig. 2) and actual excavation within the cave of Kolonospilio (Theriospilio), where Hazzidakis had found EM II–III material during earlier visits from 1906 to 1910.²²

¹⁷ Excavations at Kavousi and in the northern Ierapetra Isthmus were initiated by Harriet Boyd (Hawes), who worked in the area of Kavousi in 1900–1901 (Boyd 1901 and 1904) and then at Gournia from 1901 to 1904 (Boyd 1904 and 1904–1905; Hawes 1908). Richard Seager followed at Vasiliki in 1903, 1904, and 1906 (Seager 1904 and 1906–1907), at Pseira in 1906–1907 (Seager 1910), at Mochlos in 1908 (Seager 1909 and 1912), and finally at the cemetery at Pacheia Ammos in 1914–1915 (Seager 1916). Edith Hall (Dohan) joined Seager in the excavations at Sphoungaras in 1910 (Hall 1912) and later went on to excavate the Early Iron Age site of Vrokastro in 1910 and 1912 (Hall 1914). See also Evans 1896; Frothingham 1896; Hastings 1905; Pendlebury, Money-Coutts, and Eccles 1932–1933; Schachermeyr 1938. For summaries of early exploration and excavation in the Kavousi, Gournia, and northern Isthmus areas, see Betancourt 1983; Gesell, Day, and Coulson 1983; and Fotou 1993.

¹⁸ Boyd 1901 and 1904.

¹⁹ Boyd 1901; Fotou 1993, pp. 101–104. For Khondrovolakes see Fotou 1993, p. 103 and Tsipopoulou 1987, pp. 263–264, 275–276.

²⁰ Boyd 1904, pp. 18–22, 29–30.

²¹ Haggis 1993b.

²² Hall's excavations at Kolonospilio were never published. The only existing written description of the work is in a letter to her family (Sunday, April 24, 1910, Pacheia Ammos; University Museum Archives, University of Pennsylvania). A. Zois and A. Nikakis (personal communication) collected Neolithic and

In 1912 Hall returned to Kavousi and uncovered several LM III tholos tombs at Kamara tou Tholou, just north of Kavousi village, and excavated the EM burial cave at Ayios Antonios.²³

Subsequent surface reconnaissance by Pendlebury²⁴ and Schachermeyr²⁵ in the 1930's affirmed the location of several new sites, and excavations by Alexiou in 1950 at Pachlitzani Agriada (Makellos) brought to light an important Geometric shrine.²⁶ Chance finds from Vronda and Khordakia (or Khoridakia) were published by Platon in 1962,²⁷ and the last major discovery was a Vronda tholos tomb (tomb IX) excavated by the owner of the land, George Sekadakis.²⁸

The recent reexploration of the Kavousi district was initiated by Geraldine C. Gesell and Leslie P. Day and took place from 1974 to 1978 as part of a larger, comprehensive survey of sites throughout the area of the Isthmus of Ierapetra and the Bay of Mirabello.²⁹ This extensive and exploratory survey sought to reexamine and catalogue known and excavated sites in the Istron, Gournia, Ierapetra Isthmus, and Kavousi regions and to augment these data with new discoveries. Day and Gesell's results included the identification of no less than 33 sites in the Kavousi area alone, dating from Neolithic to Roman times.³⁰ These early reconnaissances culminated in the formation of the Kavousi Project in 1979, under the joint direction of Gesell, Day, and William D. E. Coulson. The primary aims of the early phase of the project (1979–1985) were to study and publish known habitation and burial sites and unpublished artifacts from the early

EM II pottery from the cave in 1991; see Zois 1993, p. 340. Prepalatial pottery, apparently from the cave but labeled "Krysokamino", in the Mount Holyoke College collection, was published by K. Foster (1978) and included fragments of EM IB chalices. Khrysokamina is a different site entirely, located on the small headland, or *akrotiri*, north of Agriomandra, on the west side of Mount Khomatas and jutting out into the Bay of Mirabello (Fig. 2). The site today (*ca.* 0.05–0.08 ha.) is an isolated but extremely dense scatter of slag with copper prills, pottery, and fragments of terracotta vessels of some kind; the latter have a series of holes piercing their walls and may be pieces of furnaces for smelting. The associated surface pottery is EM III–MM II in date. Stos-Gale (forthcoming) sampled the terracotta fragments, postulated a smelting-furnace function for them, and derived thermoluminescence dates in the prepalatial range. For Khrysokamina see Stos-Gale forthcoming; Nakou 1995, p. 17; Stos-Gale 1993, p. 124; Zois 1993, pp. 340–341; Branigan 1968, pp. 50–51; Schachermeyr 1938, pp. 472–473; Mosso 1910, pp. 289–290; Boyd, Avgo Notebook, May 14, 1901; Hall, letter to her family, April 21, 1910.

²³ Hall 1914, pp. 183–185.

²⁴ Pendlebury, Money-Coutts, and Eccles 1932–1933, p. 95.

²⁵ Schachermeyr 1938, p. 470.

²⁶ Alexiou 1956; Drerup 1969, p. 8; Desborough 1972, pp. 285, 384; Mazarakis Ainian 1988, p. 116. The shrine of Makellos, or Pachlitzani Agriada, is located at the base of the gorge northeast of the Kastro. Gesell and Day located the shrine during their survey. I was guided to the site by Leslie Day in 1991, only to discover that the remains had been obliterated by the construction of the Kavousi-Avgo agricultural road. The shrine was located at an important position, precisely at the topographical division between the Kavousi and Avgo Dark Age settlement clusters (Fig. 22).

²⁷ Kanta 1980, pp. 144–145.

²⁸ Gesell, Day, and Coulson 1983, p. 393.

²⁹ Gesell and Day 1976.

³⁰ I am grateful to Professors Day and Gesell for allowing me the use of their field notes, unpublished data, and extensive bibliographies of the Kavousi-area sites.

excavations of Boyd, Hall, and Seager.³¹ This work eventually led to the second phase of the project: the reopening of excavations at Vronda and Kastro from 1986 to 1992.³² The excavations have remained the central focus of the Kavousi Project, and the results are currently being studied in preparation for final publication. The Kavousi-Thriphiti Survey (KTS) was begun with a preliminary reconnaissance in 1987 and a full survey season in the fall of 1988. Two seasons followed in 1989 and 1990, with a study season taking place in 1991.

METHODS AND PROCEDURES

THE SCALE OF THE SAMPLE AREA

The concern for comparability of survey results and the usefulness and scope of the problem orientation have generated critical debate on matters of field-walking methods, sampling procedures, and, most important, the level of survey intensity;³³ furthermore, the scale and boundaries of target areas have been recently discussed.³⁴ One implicit problem of scale in survey is that if a study area does not include all the formal elements of a hypothetical hierarchical pattern of settlement, then it may not be possible to discern with any clarity the spatial attributes of an organizational structure. If a survey area is too small, it might include only the urban center of the area, or worse, it might exclude completely a town, city, or palace, along with economically or politically subordinate secondary or tertiary centers. The prevailing assumption of Bronze Age and Classical Aegean archaeology is that social and political complexity will be manifested in state societies as hierarchical patterns of material culture and, most important (for survey), a spatial hierarchy of settlement. Early emerging states of the prepalatial period or the Dark Age should thus manifest themselves in *formative* complexity represented by *incipient* hierarchization.³⁵

³¹ Gesell, Day, and Coulson 1983; Gesell, Day, and Coulson 1985; Day, Coulson, and Gesell 1986; Gesell, Day, and Coulson 1995.

³² Most recently, Gesell, Coulson, and Day 1991 and Gesell, Day, and Coulson 1995.

³³ For discussions of current problems, trends, and issues in survey methods, see Cherry 1983a; Bintliff and Snodgrass 1985; Runnels and Van Andel 1987, pp. 301–309; Cherry *et al.* 1988; Wright *et al.* 1990, pp. 603–608; Cherry, Davis, Mantzourani, and Whitelaw 1991, pp. 13–36; Cherry, Davis, and Mantzourani 1991b, pp. 457–462; Hayden, Moody, and Rackham 1992, pp. 300–307; Watrous *et al.* 1993, pp. 214–222; Alcock, Cherry, and Davis 1994, pp. 137–143; Cherry 1994, pp. 95–105; Kardulias 1994, pp. 10–17. Cherry (1983a, pp. 405–409) has long questioned the usefulness of one-person surveys.

³⁴ Watrous (Watrous *et al.* 1993, p. 215), for example, doubts that the results derived from a survey area lacking a known palatial or urban center can help to elucidate the problems involved in the emergence of early state societies: “Ultimately, all modern surface surveys collect data to understand questions about the economic, social and political systems of their region, but as Flannery remarks. . . a survey that does not include the metropolitan center of its region is unlikely to understand its region very well.” Cherry, Davis, Mantzourani, and Whitelaw (1991, p. 16) have suggested that in the Keos survey they covered “as a study area just one block of land that probably supported only parts of diverse systems of variable size.”

³⁵ The top of the spatial hierarchy is the urban center, and in the Mesara, for example, an area and a spatial scale were chosen that would encompass the formal features of the hierarchical structure in both

The Kavousi-Thriphiti Survey was designed with no preconceived or perceptible hierarchical settlement structure within which to delineate the survey boundaries; the problem orientation centered around the topography of a modern political district and three known Dark Age settlements. While the actual survey boundaries were essentially arbitrary, the assumption was that chronology and scale are crucial variables in discerning any settlement structure and social organization. While site hierarchies may be discernible within the area surrounding a LM I palace or a Classical *polis*, the organizational structure presumed by that spatial hierarchy may have little explanatory force on a scale smaller than the actual territory of the urban center or in periods other than those in which the urban center manifests itself or expresses its structure.³⁶ That is to say, (1) the structure resulting from human behavior in the landscape need not appear in uniform or even discernible spatial hierarchies in all areas of the Aegean in all periods; and (2) the focus of many surveys on a hierarchical system of settlement and the definition of that system as the “organizational structure”, even if valid, often precludes analysis of micro-regional patterns of activity and numerous other forms of societal organization, which may be independent of the hierarchical model.

The Kavousi-Thriphiti Survey zone lacks a palace, metropolitan center, or Greek city and perhaps should be considered spatially peripheral to the developments at the central places that occurred in the protopalatial, neopalatial, and Classical periods. East Crete, however, is an extremely problematic region; any definition of “territory” or “state” applied to Bronze Age East Crete is as controversial as it is hypothetical.³⁷ While some have postulated a largely politically unified island in the neopalatial period,³⁸ Warren’s lucid explication of possible neopalatial territories allows for greater autonomy in many areas, especially in that of Mirabello Bay.³⁹ Tsipopoulou visualizes still smaller state territories centering around Gournia in the northwest, Petras in the northeast, Zakro in the far east, and Diaskari in the south.⁴⁰ In short, the actual disposition of palatial territories

the Bronze Age and Early Iron Age (Watrous *et al.* 1993, p. 215); see also I. Morris 1991, pp. 40–50 on Early Iron Age hierarchy.

³⁶ See Cherry 1983a, pp. 385–389; Cherry 1994, p. 93; Crumley and Marquardt 1987; Crumley 1979 and 1987 on problems of scale and the definition of survey boundaries.

³⁷ For diverse hypotheses of protopalatial and neopalatial “territories”, see Cherry 1986, p. 21; Soles 1991, pp. 75–76; Bennet 1990, p. 209; Watrous 1982, pp. 16, 23; Desborough 1973, p. 67. See also Bennet 1985 and 1987, p. 87 on LM I and LM III palatial territories. Cadogan and Poursat have convincingly argued that a Mallia-based sphere of influence in MM I–II extended from the Pedhiada to Chamaizi and as far south as Myrtos, thus transcending Bennet’s topographical criteria (Cadogan 1990, pp. 172–174 and 1991; Poursat 1987).

³⁸ Wiener 1987, p. 266.

³⁹ Warren 1985, pp. 100–101; Warren 1984, pp. 40–41. Bennet (1990, pp. 194–200) sees Gournia as a secondary center within a larger palatial territory; for the Mirabello coastal sites see, most recently, Soles 1991, pp. 73–74.

⁴⁰ Tsipopoulou in press; see also Warren 1985, pp. 100–101 on the autonomy of East Cretan towns and Warren 1984 on “non-palatial” village territories. The notions of “political sphere”, “economic sphere”, “ceramic sphere”, or “agricultural sphere” are not spatially equivalent or necessarily mutually determinable

in East Crete remains far from clear;⁴¹ and the functions of the large coastal towns of Palaikastro, Diaskari, Priniatikos Pyrgos, Mochlos, Pseira, and Ayios Antonios and Tholos in relation to palatial centers are yet to be defined.⁴² Similarly, our evidence for the spatial organization of Classical and Hellenistic states and our understanding of their Early Iron Age origins are equally incomplete. Where data do exist, regional variation is the rule, in terms of both chronology and the spatial settlement pattern.⁴³ Is it methodologically sound to design a survey or interpret spatial patterns in East Crete around an abstract or hypothetical and largely hierarchical concept of "territory" or "catchment area"?⁴⁴ Such models really help in understanding only one possible form of administrative or economic structure, not all aspects of social or economic complexity, and their viability is perhaps restricted chronologically and geographically.⁴⁵ The implication is that questions of social organization and state complexity are both scale and time dependent. Settlement "structure" needs to be determined or defined on a number of spatial scales and for a number of chronological periods for which our bias of palatial or *polis* hierarchy may not be entirely relevant in determining the boundaries of the target area of a survey.⁴⁶ The Kavousi-Thripti Survey undertook the close examination of a number of very small (1.0–2.0 sq. km.) contiguous areas as one means of addressing still very basic questions of site forms, local site hierarchies, and topographic and environmental diversity.

FIELD WALKING

The modern Kavousi *koinoteta* formed the broadest limits of the survey zone, an area of about thirty-three square kilometers. Within that region, the decision was made to survey intensively a contiguous twenty-one-square-kilometer area, which consisted of an evenly stratified landscape of highlands, coastal hills, and alluvial plain (Fig. 3). Conveniently, this area is also a topographical unit in itself, bordered on the east by the mountains of

constructs in the archaeological record. Scale, chronology, and the functional components of the system are crucial variables in discerning hypothetical "territories".

⁴¹ Discussion seems now to have centered on questions of scale, resource management, and site hierarchies: Was there one single territory under the hegemony of Zakros, or were there a number of small autonomous or semiautonomous towns and palaces? Was Gournia a palace, and was Zakros itself under the control of Knossos?

⁴² See Bennet 1990, pp. 195–198 for the problems involved in the definition of palatial and postpalatial organization in the East Cretan landscape.

⁴³ Studies of settlement patterns in Classical and Hellenistic Crete remain in their archaeological infancy; most current work continues to be historical and epigraphical in emphasis; see Chaniotis 1995 and Viviers 1994; see also Alcock 1994, pp. 179–180; Watrous *et al.* 1993, pp. 229–233; Hayden, Moody, and Rackham 1992, pp. 329–333; Haggis 1993a, pp. 160–164.

⁴⁴ Such a LM I Central Cretan conceptual model has of course been widely accepted and is stated explicitly by Bennet (1990, p. 198): "Within their clearly defined territorial units the palaces acted as centers for the mobilization of resources through rural sub-centers."

⁴⁵ Bennet himself (1985, 1987, and 1990) has underscored the problems in discerning palatial and postpalatial territories in East Crete.

⁴⁶ As Cherry (1984, p. 40) has emphasized, it is the *region* "which represents the highest level autonomous political unit." It is this region itself that remains to be defined by intensive archaeological survey, and not necessarily or exclusively in terms of centers of period-specific types of political organization.

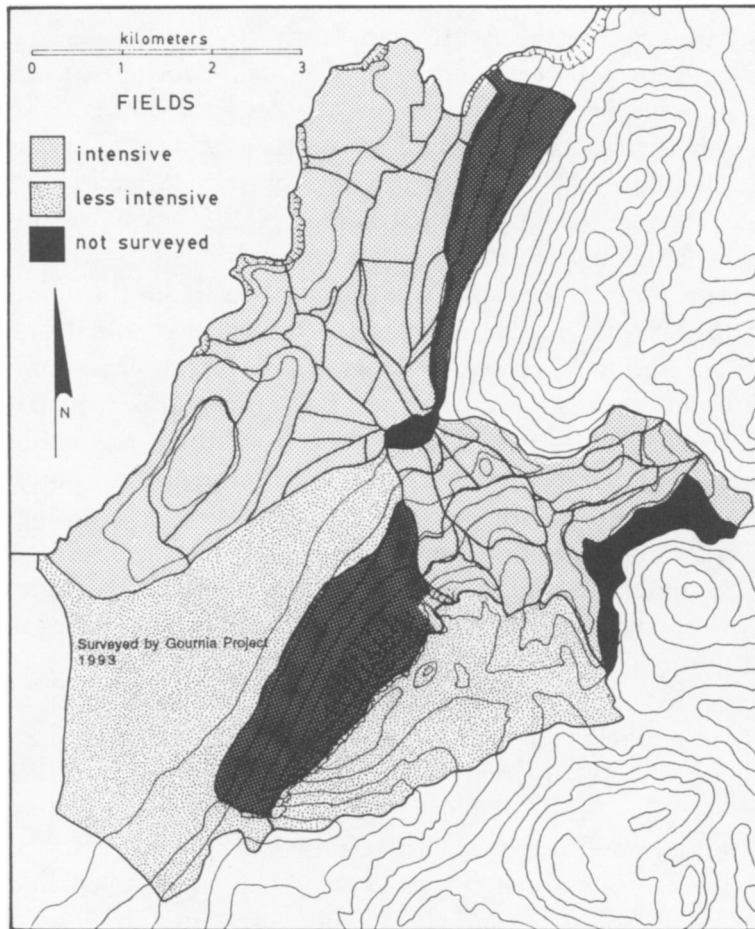


FIG. 3. Map of the survey zone showing boundaries and fields surveyed

Kliros, Kapsas, and Orno (the Avgo watershed); on the west and north the border is the Bay of Mirabello; the southern boundary is the Thriphti watershed (Fig. 2). The target area thus consisted of the catchment area of the Platys River, which begins at Thriphti and Avgo and feeds into the alluvial plain of Kampos and the bay of Tholos. Excluded entirely were the talus slopes of Kapsas and Papoura, the cliffs of Kliros, and the east side of the Kastro. The areas that were not surveyed are shaded in black on the map (Fig. 3). The field of Kamina was not surveyed intensively in 1988–1991 but was incorporated into the Gournia Project's intensive survey of the zone of the northern Isthmus in 1993.

Field walking was usually conducted in the plain and coastal hills from August to October and in the mountains from October to December. Because of the extensive use of highland terraces for vine cultivation, survey at upper elevations had to be conducted in late fall and early winter. Individual segments of land (fields) were initially defined by manmade or natural features such as field roads, fences, walls, ravines, hillocks, etc.

These “fields” varied in area between 1.0 ha. and 1.0 sq. km.⁴⁷ Once an area was defined from aerial photographs and Greek Army maps (scale 1:5000), it was located in the field, and walking lines or transects were plotted.⁴⁸ The field procedure consisted of one to three persons walking measured transects across the designated area at intervals of about twenty-five meters; the transects conformed to compass bearings previously determined and drawn on the 1:5000 map. It often proved necessary to walk fields first and then plot in the transects, especially in areas, such as the Platys River alluvium in the Kampos plain, where the distinguishing features had become significantly transformed since the publication of the army maps (1967–1974) that were available for the area. Transects were frequently as much as 300–500 meters in length, and biodegradable flagging tape was left at the beginning, end, and at intermediate stages of each transect in order to locate the walking line as accurately as possible and to discern any divergence from compass bearings. A transect was divided into 50-meter units, for each of which records were kept of the ground visibility, soil type, land use, architectural features, a total pottery sherd count, and an impression of the nature of the archaeological material (chronology, function, and ceramic fabric types); additional notes were made describing the specific location (e.g., at 10 paces) of notable artifacts or groups of artifacts. This procedure provided an illustration of topography, environment, and artifact densities for each field; when plotted on the map, the values for each 50-meter segment of each of the transects provided a mosaic of sherd densities. In instances where more than five sherds appeared in more than two contiguous 50-meter units (or more than about eight to ten sherds in a contiguous 5 × 25 m. area), the area was reinvestigated.⁴⁹ When such an anomalous increase in artifacts (or a discreet deposit) was noticed, either while walking or after plotting the densities on a map, the area was revisited, and a preliminary record was made of the area as a “locus” by means of a locus record sheet. The locus record provided more detailed information about location, size, vegetation, soil type, and the artifacts present. These records, along with the sherd density maps, served as a guide for returning to the locus for final study and definition. This was the procedure followed for field walking in the Kampos plain and, where topography would allow, in the highlands of Thriphti.

For the coastal hills and the mountainous areas of Vronda, Kastro, Avgo, and Thriphti an alternative method was employed. This consisted of walking first the ridges and then the contours of the backslopes and footslopes of the hills. The method usually involved walking along narrow agricultural terraces between natural boundaries such as *revmata* and ravines. A definable unit, such as a portion of hillside, was located on a map, then walked in a *boustrophedon* fashion from top to bottom along the hillside. In most cases, counting

⁴⁷ These fields tended to be large in size, especially in the plain of Kampos, because there were usually insufficient field boundaries that might have allowed efficient identification and location of smaller diagnostic units by one or two field walkers.

⁴⁸ “Transect” here refers simply to a directional walking line across the landscape, not a regional sample unit. For discussion of current field-walking nomenclature see Watrous *et al.* 1993, p. 218; Cherry *et al.* 1988, p. 162; Cherry, Davis, Mantzourani, and Whitelaw 1991, pp. 20–28; Jameson, Runnels, and Van Andel 1994, p. 219.

⁴⁹ In many cases fewer than five sherds in adjacent transect units led to close reexamination of areas; in these instances, however, loci were usually not recognized or defined.

paces in measured units proved ineffective, especially on small agricultural terraces of uneven contour and on slopes of 20 degrees or more. In these instances, the location of every piece of cultural material (including individual sherds) was plotted directly on a map, which supplemented the information recorded in the field notebook. The intensity of slope walking varied and often required walking lines at 5- to 10-meter intervals, while in the plain the average was 20 meters. Although the production of a field map illustrating sherd densities (comparable to that of the Kampos plain) was precluded by the methods employed in the mountains, it soon became apparent that the steep slopes, dense riverine vegetation, and precipitous terrain of the Kavousi highlands were not environments where adherence to the regularized field units would produce meaningful results. In point of fact, "background noise", or off-site material, was rarely observed at all in the upper elevations; where artifacts were discovered a locus was defined, and a site was usually present.

Every locus consisted of an area, field, transect, unit, and pace number (or numbers), which initially defined its location. A locus was any area of any size that required further investigation after the primary field walking. Usually a locus consisted of a scatter of pot sherds with definable spatial limits. A locus may, however, consist of architecture, rock cuttings, or similar features, without any associated pottery, bone, or stone tools. When a locus was reinvestigated it was defined as a site, adjacent loci were collapsed with it into a single site, or a single locus was divided into two or more sites. A locus may be defined as "displaced material", such as slope-wash debris or fluvial deposit, which was ignored completely as "background noise" or simply recorded and left undefined. "Background noise", or off-site material, was not systematically collected or studied as part of the present survey; such material was measured only in terms of density to provide an initial basis for locus definition.

Ceramic chronology was an initial concern in the field-walking stage. Ceramic sequences are ill-defined in many areas of Crete, and results of current excavations and surveys suggest that regionalism in pottery styles prevailed in nearly all prehistoric and historic periods. While problems in dealing with the chronology of ceramic assemblages in survey are often seen as secondary to matters of scale, sampling, and field-walking strategies, it was apparent that some 32 percent of all the sites recovered in the Kavousi-Thriphti Survey produced no chronologically diagnostic fine ware but an abundance of coarse utilitarian pottery, mostly cooking, storage, and transport vessels.⁵⁰ Fortunately, ceramic comparanda were available from a number of ongoing excavations in the vicinity of the survey zone and have provided important stratigraphic contexts for local ceramic sequences.⁵¹ Neighboring surveys continue to provide valuable comparative data for

⁵⁰ See Haggis and Mook 1993, pp. 268–270, 288–293. The obtrusiveness of the coarse-ware sample was seen as a result of a combination of formation processes, site function, and artifact size and function, as well as the sampling strategy employed. In East Crete, particularly in the Mirabello area, few well-published deposits were known that might have provided the full range of comparable vessel types, shapes, and fabrics that are to be found in surface survey, and in most early excavations coarse wares, the most frequently recovered survey artifacts, were often poorly recorded and frequently discarded.

⁵¹ Gesell, Day, and Coulson 1995 (Kavousi); Betancourt and Davaras 1988, Floyd *et al.* 1994 (Pseira); Soles and Davaras 1992 and 1994 (Mochlos); Zois 1976 and 1993 (Vasiliki); Haggis *et al.* 1992, Haggis 1994 (Kalo Khorio); Coulson *et al.* 1995 (Khalasmeno and Katalimata). For preliminary investigations in

assessing patterns of ceramic regionalism,⁵² and the consideration of local fabric types eventually led to the design and implementation of an effective chronology for coarse ware from Bronze Age and Early Iron Age occupational phases in the survey zone.⁵³ Since the coarse ware chronology was determined and refined *during* the course of the initial stages of field walking and locus definition, and since collection of artifacts was not allowed by the permit from the Greek Ministry of Culture during the first two years of survey, it was decided that off-site material would be recorded initially for the purpose of determining site locations. Following the field-walking stage and after designing the coarse-ware typology, all loci were revisited and recorded.

SITE DEFINITION AND SAMPLING

The field-walking method described above was designed to recover “loci”, or *relatively* high-density concentrations of artifacts with discernible spatial limits. Loci were reinvestigated in order to define or confirm their spatial characteristics and the nature of the artifacts or architectural components, in other words, to determine whether they should be called “sites” or definable locales of human activity. In most cases the sherd-density maps indicated only the broadest outlines of the site location; that is, adjacent transect units uniformly produced less than five, usually less than two, sherds per 50 m. In the Kampos plain, for example, the mean off-site density was 0.028 sherds/100 sq. m., while the average on-site density was 0.457 sherds/100 sq. m. In the contiguous plain of Khordakia (Figs. 2, 11, 12) the on-site mean was considerably greater (5.58 sherds/100 sq. m.) than that of the Kampos, and the off-site average (0.46 sherds/100 sq. m.) was significantly higher than the Kampos off-site densities and even slightly greater than the Kampos fields containing sites. Overall, the background sherd densities per 100 sq. m. in the Kavousi area are considerably lower than in the western Mesara (3.17), Nemea (2.0), and Boiotia (0.4–6.0); even the Keos survey’s low 0.5/100 sq. m. is roughly equivalent to high-density fields like Khordakia at Kavousi.⁵⁴ One conclusion that might be drawn from the relative field density averages is that the Kavousi area, especially the central plain of Kampos-Tholos, was less densely exploited and not continuously inhabited during antiquity; indeed, all phases of the Neolithic, LM II–III, and Classical–Hellenistic periods are either poorly represented or absent in the data. Another factor in the overall low background densities for Kavousi is the level of intensity of field coverage, which may be assumed to be less than in the

the region and related studies, see Soles 1978, 1979, 1991, and 1992; Betancourt *et al.* 1979; Betancourt 1983 and 1984; Betancourt and Silverman 1991. Pottery from excavations at Mallia (Quartier Mu) and Myrtos Pyrgos was also examined in efforts to understand the local ceramic sequence, and I am grateful to Jean-Claude Poursat and Gerald Cadogan for permitting such study.

⁵² Hayden 1983, Hayden and Moody 1990, Hayden, Moody, and Rackham 1992 (Vrokastro); Betancourt and Davaras 1988, Betancourt and Hope-Simpson 1992 (Pseira); Soles 1978, Soles and Davaras 1994 (Mochlos); Watrous 1993, Watrous and Blitzer 1994 (Gournia).

⁵³ Haggis and Mook 1993. On coarse-ware chronology in Cretan survey, see Moody 1985. A petrographic and ethnoarchaeological study of East Cretan ceramic production and exchange, undertaken by P. M. Day (1991), included a substantial and important component from the northern Ierapetra Isthmus.

⁵⁴ See Bintliff and Snodgrass 1988, p. 510; Cherry, Davis, and Mantzourani 1991c, p. 47, table 3.4; Watrous *et al.* 1993, pp. 220–221.

Mesara, Nemea, Kea, Boiotia, and the southern Argolid, where numerous field walkers, usually spaced no more than 15 m. apart, recovered surface scatters as small as 12 sq. m.⁵⁵ While perhaps less intensive than other Aegean surveys, the Kavousi-Thriphiti Survey did recover surface scatters as small as 25–100 sq. m. and installations, such as graves and cisterns (without surface pottery), that were smaller still (10–25 sq. m.).⁵⁶ The overall low sherd densities notwithstanding, the density maps themselves proved effective for initial site definition and in comparing relative densities in adjacent areas of the survey zone.

The purpose of site sampling was to determine the size, density, and chronology of the site. The sampling units were two-meter wide rectangular radii extending outward uniformly along cardinal points from a notional center of the site. Sherds were counted in units five meters long and two meters wide along the transects until less than two sherds were counted in two contiguous units. The borders of the site were marked at the cardinal points, and the areas in between and beyond the markers were examined to determine any meaningful irregularities in the shape of the scatter and possible errors in the density counts at the presumed outer edges of the site. Finally, ceramic material, bone, shell, and stone tools were collected, sorted, and recorded from the transects, and a “grab sample” of chronologically diagnostic pottery and fabric types was taken from each of the four quadrants formed by the bisecting radii.⁵⁷ Although much potentially important provenance information was, no doubt, lost by such a method,⁵⁸ the procedure proved to be an efficient means of determining the size and boundaries of the site, the full range of periods represented by coarse fabric types and fine diagnostic sherds, and the general functions of the site based on artifact types and extant architecture.

HISTORY OF SETTLEMENT

EARLY MINOAN PERIOD

A total of nine sites with at least trace remains of Early Minoan date are known; of these, two significant centers of habitation are apparent and produced sherds of Neolithic date (LN–FN) and clear evidence of an EM I phase (Fig. 4). These are the first signs of nucleated settlement in the Kavousi area. The sites are located at Kavousi village (locus 92) and in the northern Kampos plain at Ayios Antonios-Alykomouri (locus 58)

⁵⁵ In the South Argolid Survey walking was conducted at intervals of 5–15 m. (Jameson, Runnels, and Van Andel 1994, p. 219); see also Watrous *et al.* 1993, p. 218; Cherry, Davis, Mantzourani, and Whitelaw 1991, p. 22; and Wright *et al.* 1990, pp. 604–605 for intensity of off-site coverage and artifact distribution.

⁵⁶ In order to gauge the comparability of off-site densities and thus the level of intensity of the Kavousi-Thriphiti Survey compared with other Aegean surveys, it might be advantageous to assess first the data from adjacent surveys at Vrokastro, Pseira, and Gournia, which are similar environments employing ostensibly more intensive strategies of ground coverage. These data are not yet available.

⁵⁷ See Haggis and Mook 1993, p. 270 for the details of the sampling method. Within the transects all sherds were collected irrespective of specific location in order to recover as wide a representative range of coarse-fabric types as possible. On multi-period sites the method proved to be a means of avoiding concentrations of single vessels (such as pithos scatters), thus increasing the likelihood of meaningful relative percentages of coarse fabric types of different periods.

⁵⁸ Plog, Plog, and Wait 1978, p. 407.

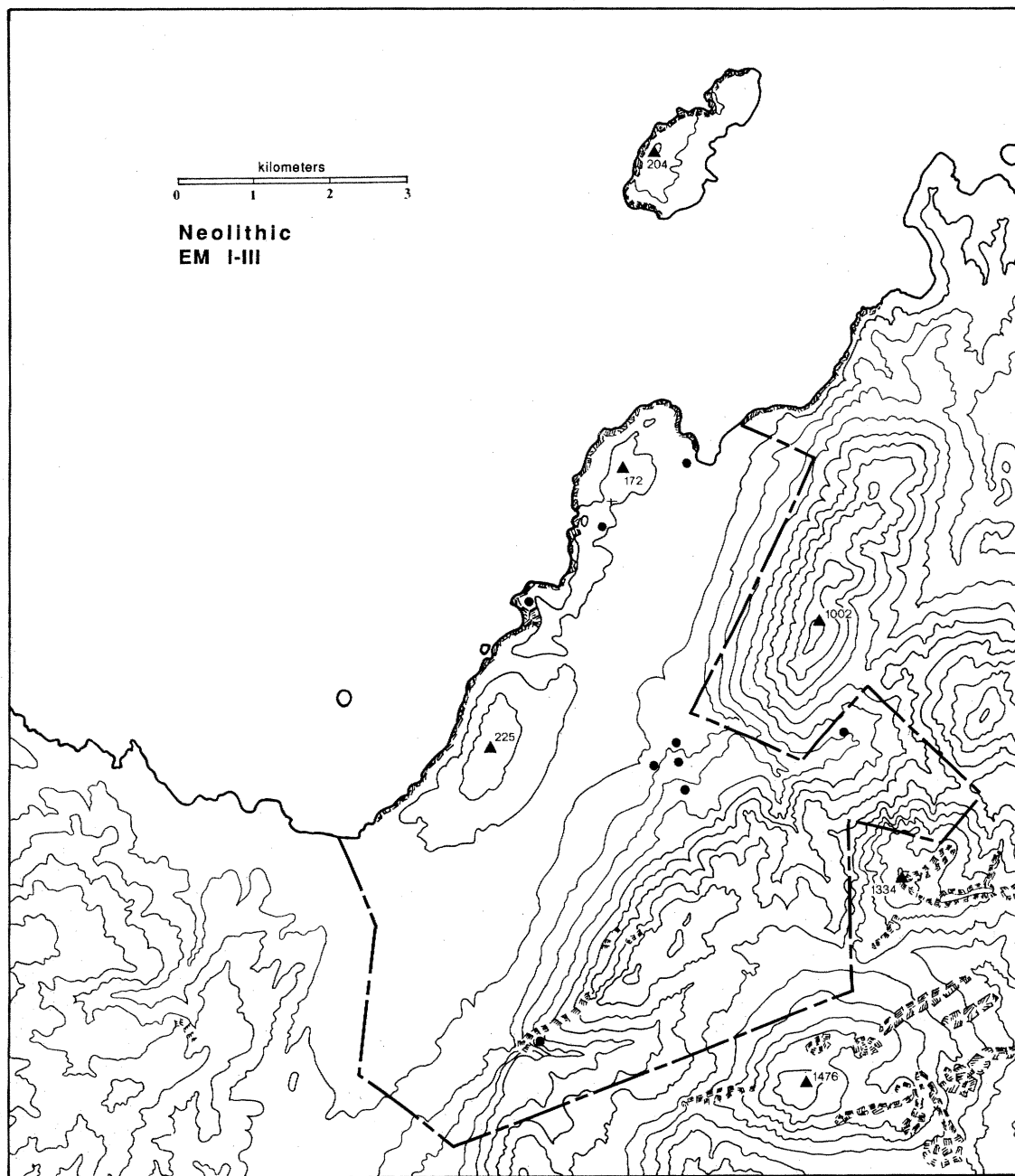


FIG. 4. Neolithic and Early Minoan I-III sites

(Figs. 2, 4). The Kavousi-village site produced a substantial amount of Neolithic and EM I-II material from a deep excavation conducted by local builders in connection with the demolition of an abandoned Ottoman-period *forno* immediately southwest of the central *plateia* of the village. The size of the site is impossible to determine, but it is likely

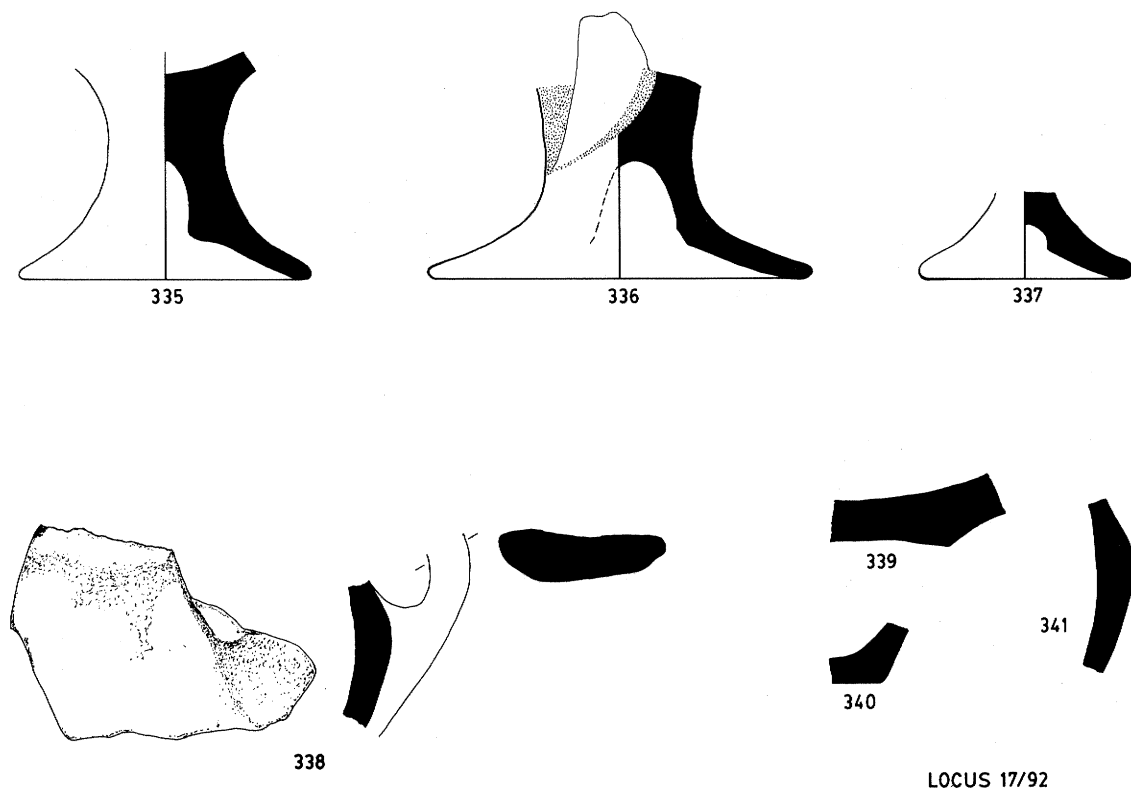


FIG. 5. Neolithic and Early Minoan pottery from Kavousi village. Scale 1:2

that an early settlement thrived here on the stable alluvial ridge underlying the modern village. A spring on the western edge of the *plateia* no doubt attracted early settlers to this spot. Ceramic remains included large burnished carinated bowls with wide strap handles (Fig. 5:338, 341), concave-bottom bowls (Fig. 5:339), burnished goblets of the EM IB–IIA type (Fig. 5:335–337), Vasiliki Ware bowl or goblet fragments (EM IIB; Fig. 6:342); bowls with heavy wiped and scored surfaces, and bowls with perforated rims (FN–EM I; Fig. 6:343, 344).

About 3.5 km. northwest of Kavousi village in the area of Ayios Antonios is the site of Alykomouri (locus 58; Fig. 2); an associated burial cave is located nearby to the east of the chapel of Ayios Antonios.⁵⁹ While the habitation site has been recently disturbed by a bulldozer, the remains are clearly confined to a phyllite terrace (*ca.* 0.15 ha. in extent) and represent a small village or hamlet comparable in size to Myrtos-Phournou Koriphi or Vasiliki. Interesting finds from the settlement including patterned-burnished ware and

⁵⁹ For the Ayios Antonios cave see Hall 1914, pp. 183–185; Pendlebury 1939, pp. 61, 77; Alexiou 1951, p. 287; Faure 1964, pp. 36, 67, 73; Branigan 1968, pp. 41, 58, 73; Betancourt 1983, pp. 5–6; Betancourt 1985, pp. 49–51; Branigan 1988, pp. 13, 94–95; Branigan 1991, pp. 99–100; Soles 1992, p. 27; Haggis 1993b.

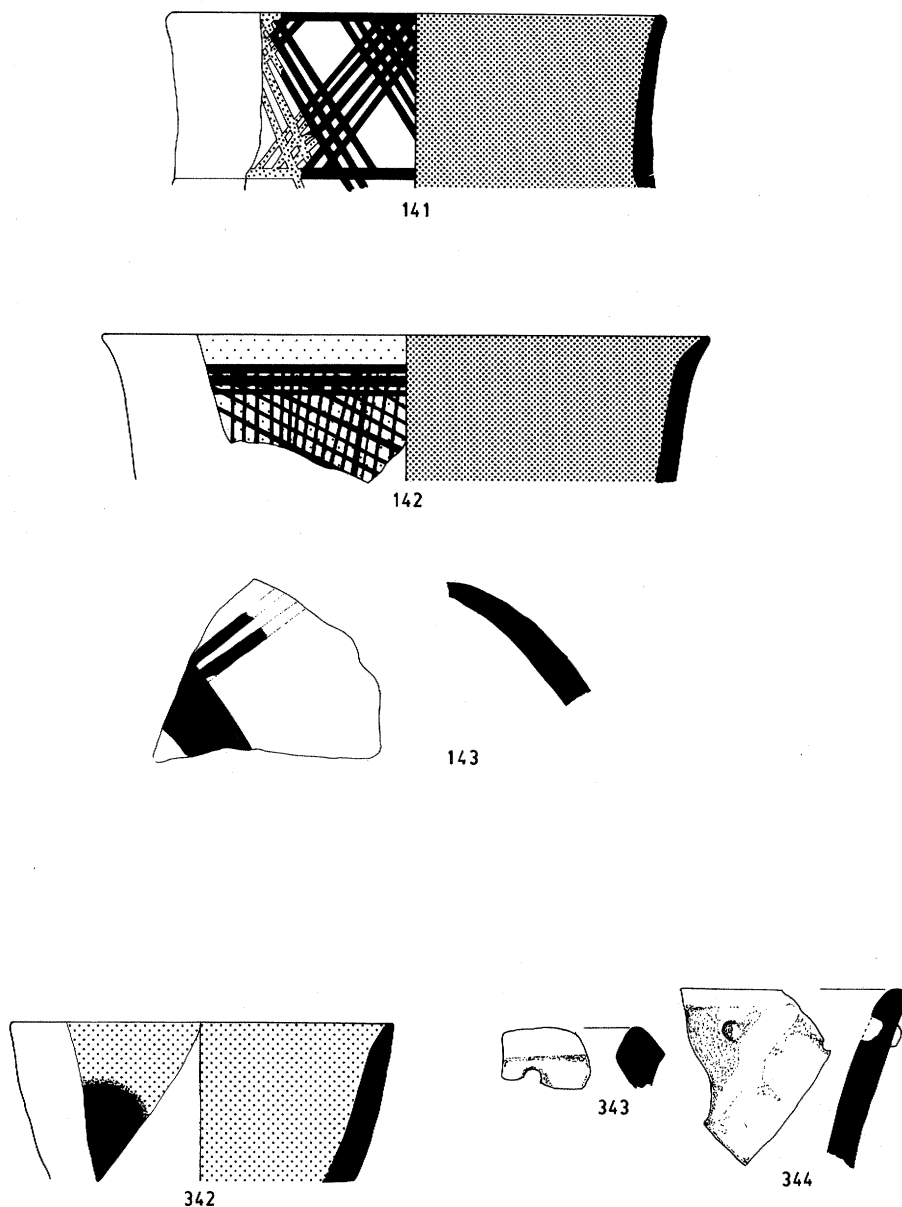


FIG. 6. Early Minoan I and II sherds from Alykomouri and Kavousi. Scale 1:2

dark-on-light painted wares of EM I date (Fig. 6:141, 142); the presence of Vasiliki ware and white-on-dark ware suggests continuous habitation throughout the Early Bronze Age.

Both Kavousi and Alykomouri sites appear typical of Early Bronze Age nucleated settlements in Crete. They are located on ridges above the Kampos plain, on defensible

ground and secluded from, but within reach of, the sea.⁶⁰ Perennial water supplies and good arable land were obvious attractions of the two locations. While no cemetery has been located for the Kavousi-village site, at Ayios Antonios burials were located in rock shelters on the hill slope opposite the settlement at Alykomouri.

MIDDLE MINOAN I–II PERIODS

By MM I–II there is a drastic increase in the number of sites, from 9 in FN–EM II to 53 by MM II (Figs. 7, 8).⁶¹ Since the actual number of EM III–MM IA sites was difficult to determine during survey, the rate of population increase represented by the distribution map is somewhat exaggerated. EM III material was most commonly recovered from EM II sites but was generally less obtrusive or recognizable than the EM II artifacts.⁶² The map no doubt includes material from as early as EM III–MM IA and some material as late as MM IIIA in Knossian terms. While sherds of EM III–MM IA and MM III date have been identified in survey samples, local shapes and fabrics were not understood in sufficient detail to argue strongly for these periods or phases at all but a few sites.⁶³ At locus 7, for example, the widening of a road through the site produced an entirely MM IB–II assemblage (Fig. 9) in a vertical face of the bulldozer scar, and a similar road scarp at locus 86 provided a distinct and homogeneous “deposit” of MM III pottery (Fig. 10).

It can be argued, however, that there was a population peak, settlement dispersal, and increase in the number of new sites by MM II.⁶⁴ This increase and maximum dispersal of population is paralleled at Lasithi, Khania, Vrokastro, and, most recently, in the Mesara and at Gournia.⁶⁵ An interesting aspect of protopalatial habitation at Kavousi is a noticeable clustering of sites around perennial springs and at the fringes of

⁶⁰ See Watrous 1982, p. 11 and Cosmopoulos 1991, pp. 14–15 on EM site locations. See Branigan 1988, p. 235, and Warren and Tsedakis 1974, pp. 338–339 on the shift in settlement location from cave sites to defensible hilltop locations in FN–EM I.

⁶¹ The spatial pattern suggests a remarkable increase in population and density of settlement, evoking the impression of a startling demographic discontinuity between EM II and MM I. Yet it should be remarked that a minimum of 100 years most likely separates these broad chronological phases. For the “punctuated equilibrium” analogy for increased complexity in the protopalatial period, see Cherry 1983b and 1984; see also Warren 1987, pp. 53–54 for demographic factors involved in emerging palatial structure.

⁶² See Pendlebury 1939, p. 78 on the paucity of EM III surface remains and the difficulties in their recovery and interpretation; see also Watrous 1994, pp. 717–720 for discussion of the problems of EM III as a ceramic and chronological phase.

⁶³ Maps for these phases are thus not included in this preliminary report. However, Haggis and Mook (1993, pp. 277–279) coarse-fabric types XX and XXI, originally believed to be MM I–II, have been correlated to EM III–MM IA deposits at Mochlos as a result of the study of the fabrics of the prehistoric pottery from the Gournia Project in 1995. Since these distinctive wares were systematically recorded on KTS sites, it will eventually be possible to create a late prepalatial map for the Kavousi area.

⁶⁴ See Warren 1987, pp. 53–54 for population increase as a correlate of urbanization and increased socioeconomic complexity. Driessen and MacGillivray’s argument (1989, pp. 101–102) for MM III–LM IA maximum settlement dispersal seems untenable in light of the results of current intensive surveys, where MM I–II emerges as the period of maximum intensification of land use and settlement dispersal.

⁶⁵ Watrous 1982, pp. 13–14; Moody 1987, chap. 8, p. 18; Watrous *et al.* 1993, p. 225; Hayden, Moody, and Rackham 1992, pp. 323–324; Watrous and Blitzer 1994. In the Ayio Farango, population decrease is perhaps the result of movement to the center at Phaistos (Blackman and Branigan 1977, p. 69).

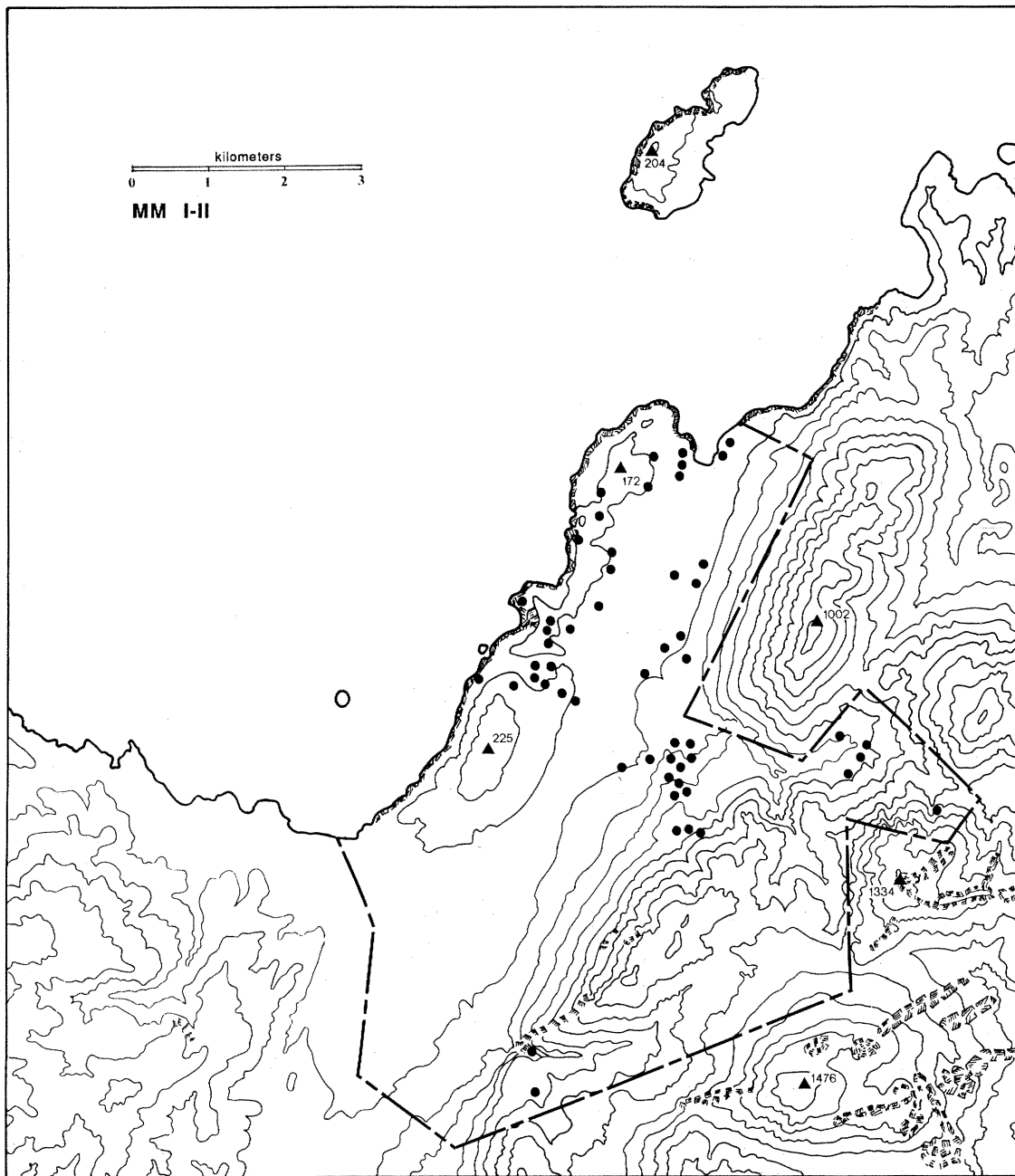


FIG. 7. Middle Minoan I-II sites

discrete concentrations of arable land in the areas of Tholos, Ayios Antonios, Khordakia, Kavousi village, and Avgo (Figs. 8, 11). Site sizes range from 0.02 ha. to 0.10 ha. and probably represent individual farmhouses or small hamlets; they are uniformly smaller than the EM I-II nucleated sites, and architectural remains suggest the foundations of

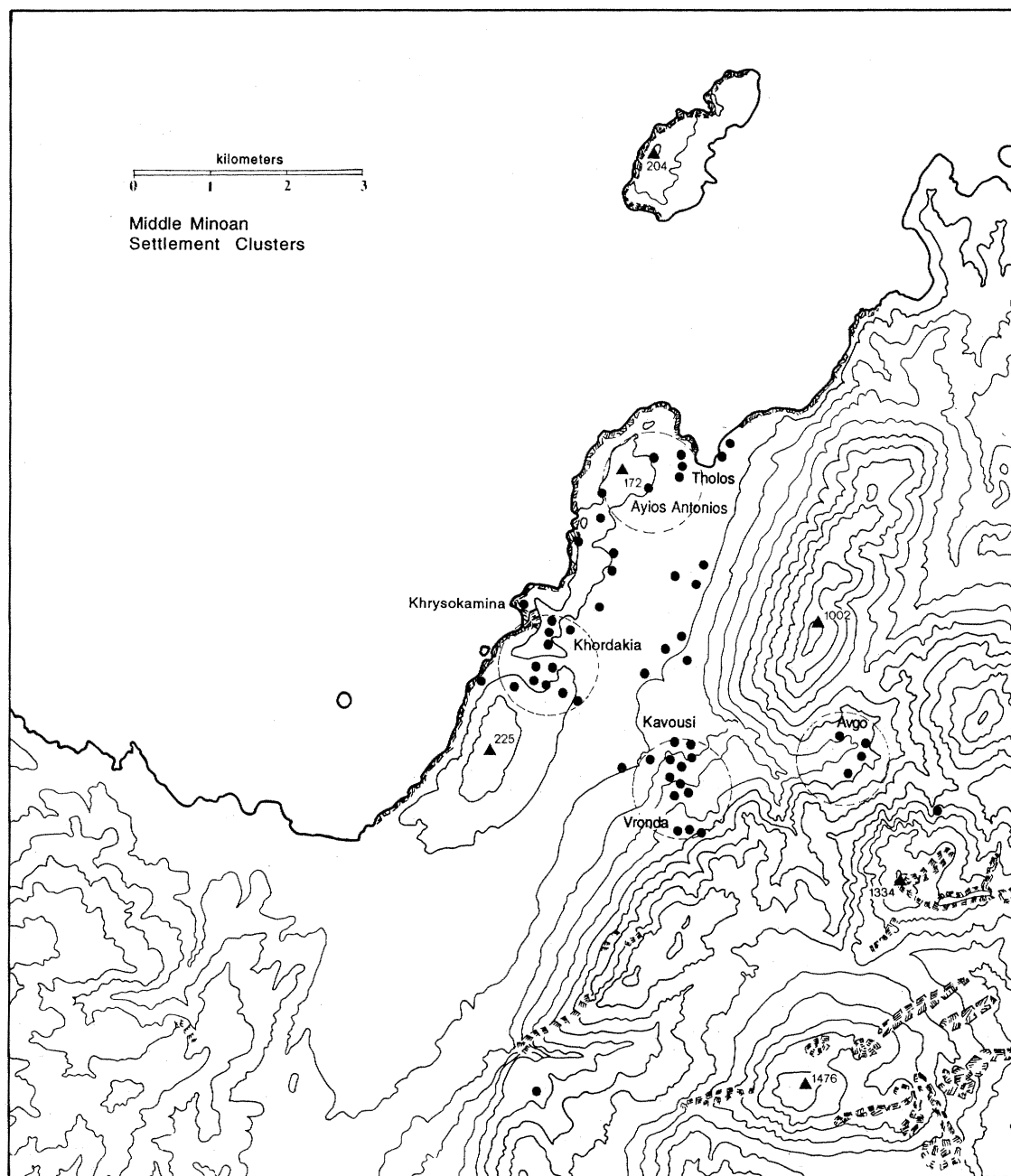


FIG. 8. Middle Minoan settlement clusters

single houses (Fig. 11). Frequently the MM I–II houses are very obtrusive in the landscape and usually consist of “cyclopean” walls made with large boulder-sized stones, sometimes with two faces (Pl. 81). In most cases only the foundations are preserved, forming large square or rectangular terraces (Pl. 81:a, d). These protopalatial clusters, roughly illustrated

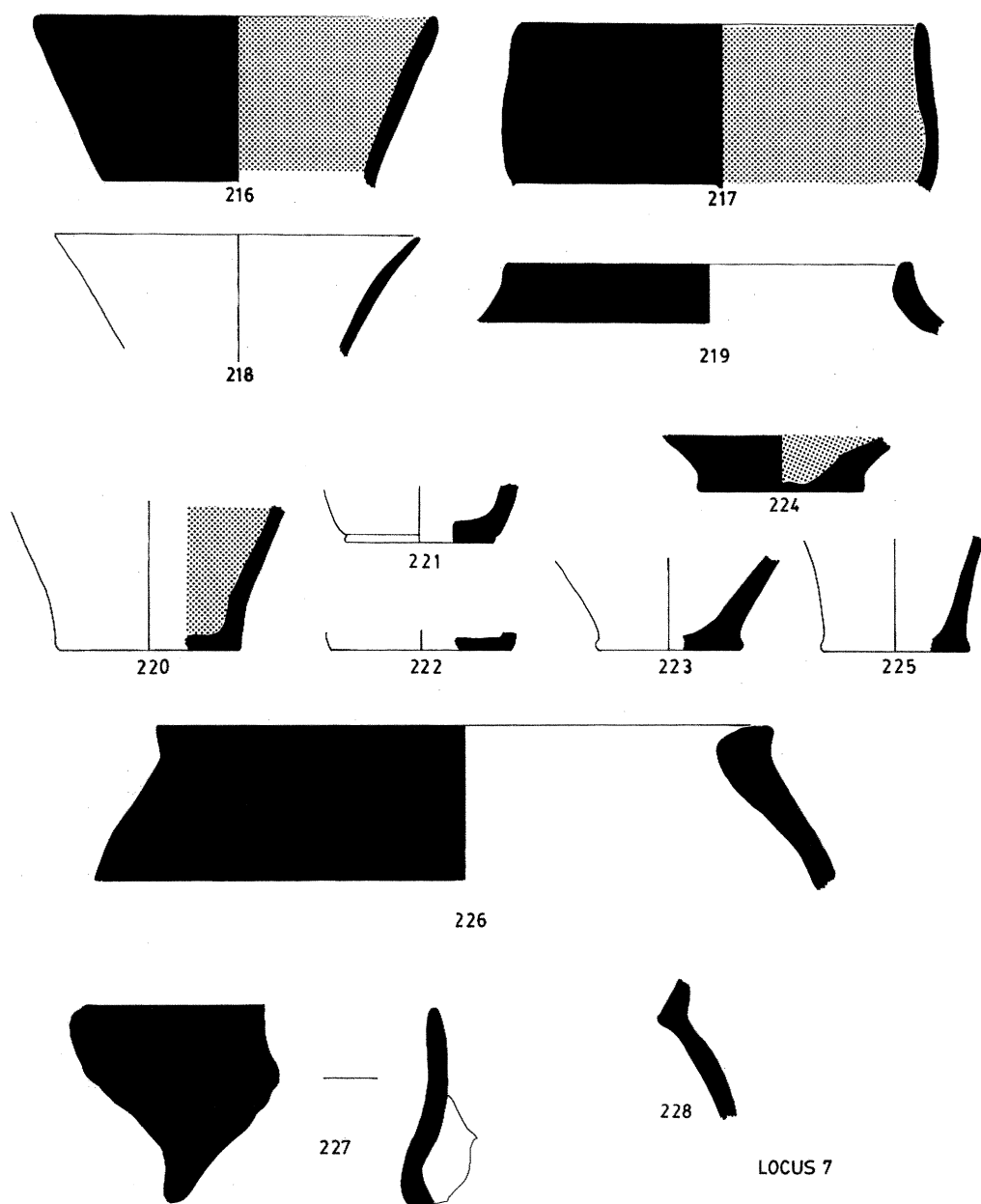


FIG. 9. Protopalatial pottery from Katsoprinos. Scale 1:2

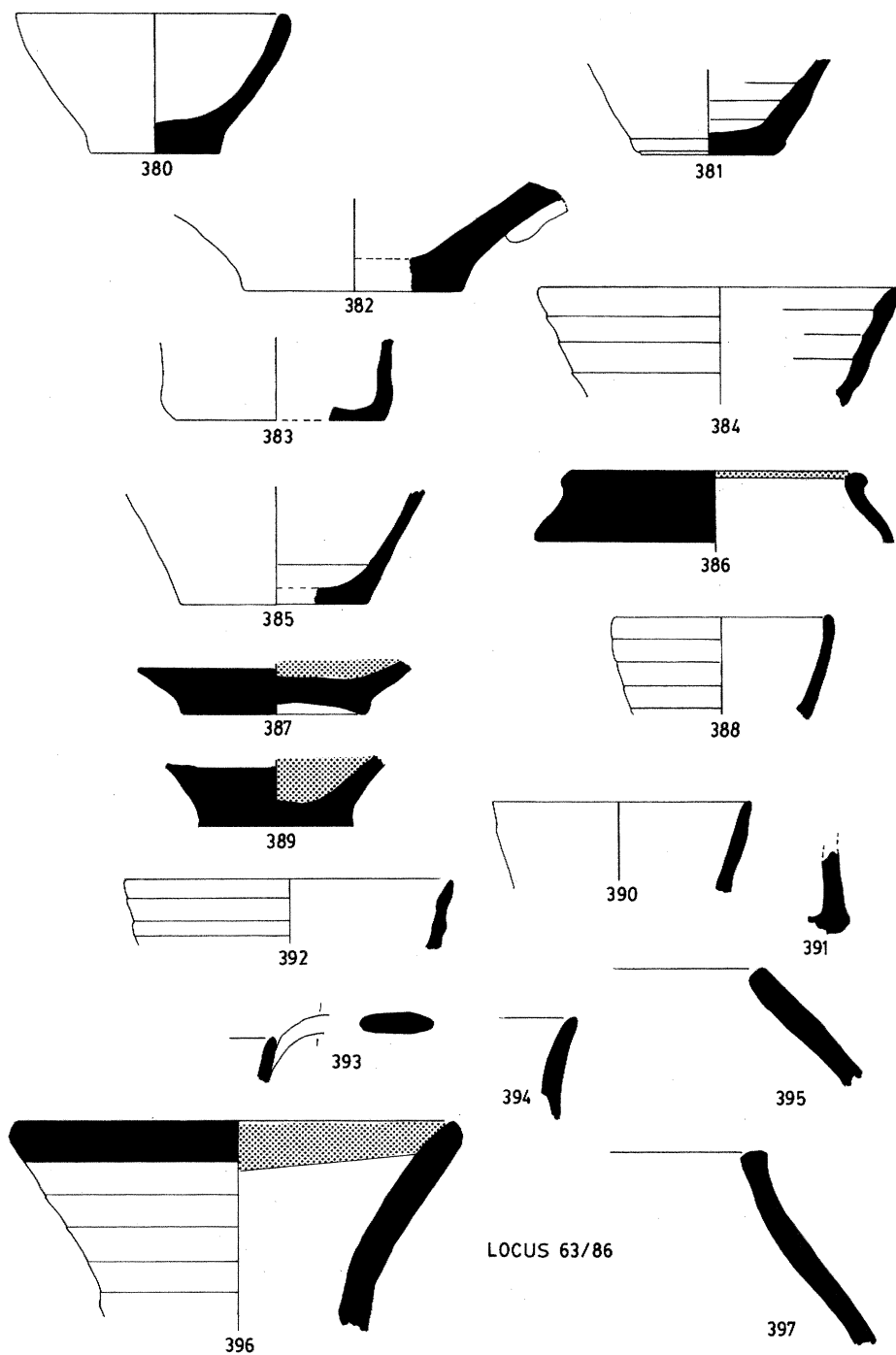


FIG. 10. Middle Minoan III pottery from Panagia Skali. Scale 1:2

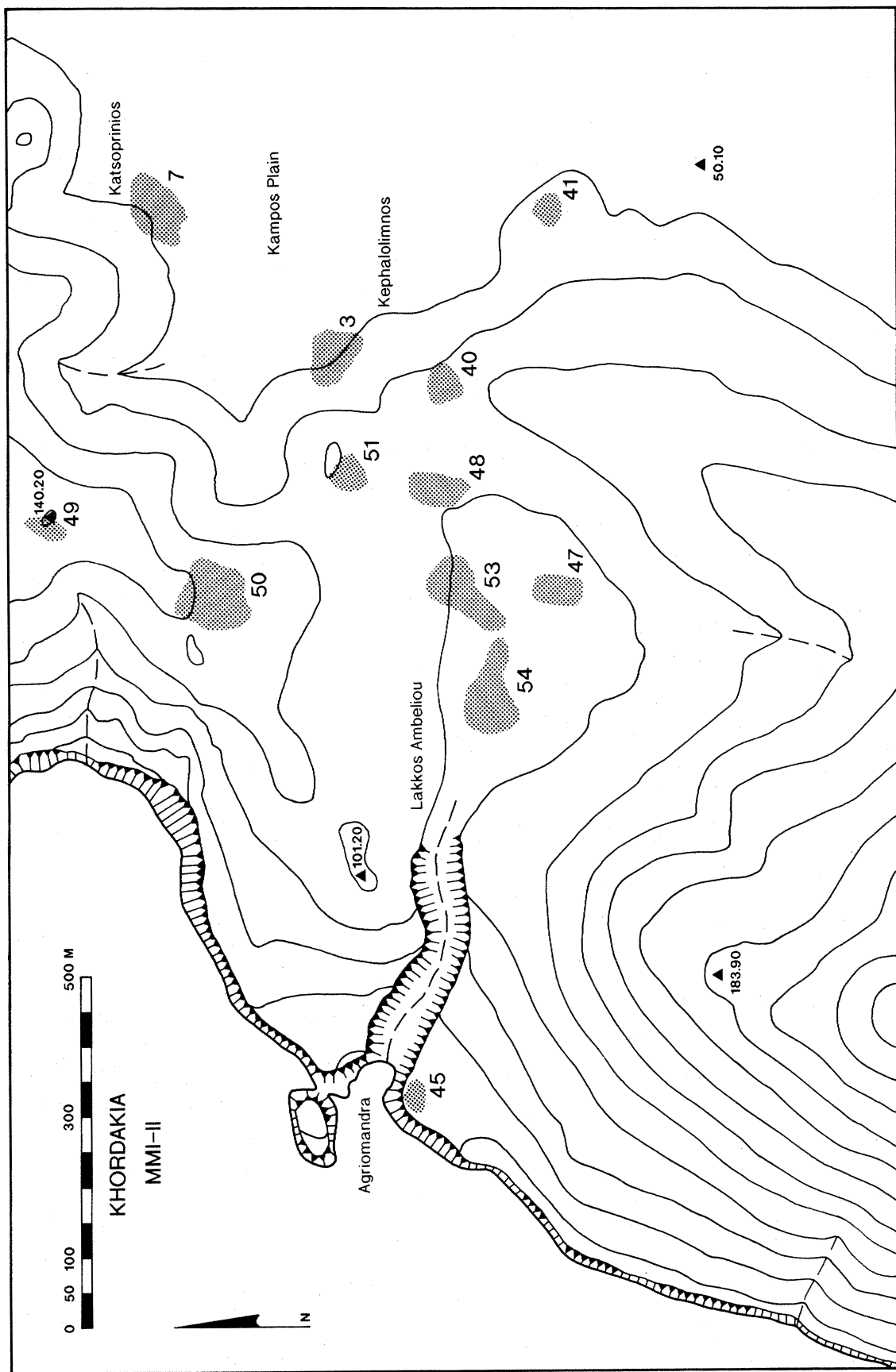


Fig. 11. Khordakia in the protopalatial period

by the circles on the map in Figure 8, form separate agglomerations of settlement activity throughout the survey zone, and no visible size hierarchy is apparent among the sites or among the clusters.⁶⁶

The absence of a distinct hierarchy of settlement within the cluster pattern might indicate that the survey has excluded an economic or political higher-order center lying somewhere outside the study zone. The Gournia and northern Isthmus areas, or even Kavousi village itself, are likely locales for such a site. However, even if a size-ranked order of settlement could be determined within a larger area, the mere existence of that spatial structure would not necessarily dictate or even help define the specific *form* of settlement dispersal in the Kavousi area. Could the linking of closely spaced sites through clusters provide a micro-regional framework for understanding local social, economic, or even religious organization? Could the clusters have been occupied by growing families or clans, and might the distribution suggest local agricultural and pastoral territories? And what might be the social and economic organization of such small units?⁶⁷ The lack of discernible site hierarchies should not lead to an assumption of simple agricultural self-sufficiency or the lack of complex organization. Excavation at the LM IIIC site of Vronda (Fig. 8), for example, has recovered MM I–II remains, including a sealing that is similar in form to those found at Monastiraki in West Crete.⁶⁸ The full spatial extent of the MM IB–II material at Vronda is obscured and distorted by subsequent LM IIIC occupation, but the site may have been of special importance.⁶⁹ It is situated at *ca.* 400 m. above sea level, commanding the whole of the north Papoura drainage, an important spring, and the major transportation route connecting the highland plain of Papoura and the lowland plain of Kampos (Fig. 2).⁷⁰ About 0.70 km. northeast of Vronda at Khondrovolakes is a MM I–II farmstead of megalithic construction (Pl. 81:a–c) that lies at the center of a settlement cluster (pottery spanning MM IB–III). The house produced

⁶⁶ The MM I–II farmhouse clusters are definable groups associated within discrete topographical and environmental units, and the details of their environments and topography are admittedly difficult to illustrate adequately on site-distribution maps. Sites are of fairly uniform size, interspaced at distances of roughly 100–200 m., and all fall within a 0.50-km. radius of distinct concentrations of phyllite soil, spring locations, or both. The cluster located farthest to the north, in the area of Tholos and Ayios Antonios (Fig. 8), is less well defined because of substantial rebuilding and nucleation of settlement in the neopalatial period.

⁶⁷ See, for example, Warren 1984, pp. 40–41 on the intensive agricultural exploitation of land in the vicinity of Mirabello settlements.

⁶⁸ See Day, Coulson, and Gesell 1986, pp. 364–365, 382, 386 and Gesell, Day, and Coulson 1995, pp. 75, 116 for discussion of protopalatial remains; Day, Coulson, and Gesell 1986, p. 364, fig. 6 for the clay seal impression; and Haggis and Mook 1993, p. 282 for the MM I–II fabric types. See Watrous 1994, pp. 742–745 for summary discussion of Monastiraki Charakas.

⁶⁹ The protopalatial levels of Vronda are currently under study; the author is grateful to Leslie Day for information on the Vronda settlement and much useful discussion of the MM settlement pattern.

⁷⁰ Leslie Day (personal communication) has postulated that this site might represent a significantly larger contiguous area of occupation than most of the typical houses represented by the MM cluster pattern. It should be added that the area of Xerambela, of which the Vronda settlement is only a part, is a gently sloping hill of some 25 ha. and is situated at the far southern edge of the settlement cluster; it is the most expansive cultivable area in the Kavousi highlands, second only to the plain of Papoura, which was no doubt exploited as well by the Vronda settlement.

a cushion, or flattened cylinder, seal of a soft, veined stone (Pl. 82:b), probably sandstone. The simple design (on one side only) is a quadruped, perhaps a bull, with an arched neck and a "pica" or spear piercing its back. Such evidence is suggestive of complex or special economic roles for these settlement clusters or for individual buildings.⁷¹ If the houses within these MM clusters can be differentiated on the basis of size, construction technique (e.g., cyclopean masonry), or associated artifacts (seals, sealings, or cult materials), then it might be possible to reconstruct various micro-regional site hierarchies within an overall regional pattern that appears dispersed but is spatially unranked.⁷²

The shift from the nucleated EM II village to the MM farmhouse cluster, however, while possibly the result of changes in social or political structure⁷³ in the transition from the prepalatial to the protopalatial period, is suggestive of a constant population increase, continuing dependence on local agricultural resources, and the need to maximize use of arable land and scarce water supplies. The settlement clusters in the areas of Avgos, Kavousi village, Xerambela (Vronda), and Thripti understandably exist in mountain environments, given the rich land and water resources in these areas. In the Kampos plain, however, these concentrated settlement groups are located at the peripheries of very specific and localized phyllite soils in Ayios Antonios and Khordakia (Figs. 2, 8, 11).⁷⁴

At Khordakia, a MM settlement cluster that can serve as an example, loci 3, 7, 40, 41, 48, 50, 51, 53, and 54 are individual farmsteads grouped within a 0.5-km. radius along the fringes of the arable pockets of land at Lakkos Ambeliou and Kampos. The architectural remains at these sites are of single house foundations, clustered closely in and around the fine, silty terra-rosa soil of Lakkos Ambeliou and the phyllite soils of Kephallimnos and Katsoprinos (Fig. 11). Not only is this the optimal agricultural land in the Kampos region but also the juncture of limestone and phyllite bedrock in this area created an ideal condition for springs. Two other considerations for protopalatial settlement siting in this area deserve mention. First, the natural roadstead at Agriomandra (Figs. 2, 11) might

⁷¹ The seal probably dates to MM II–III: Younger 1993, pp. 166–167, 172–177. Flattened cylinder seals come into use in MM (Hood 1971, pp. 108–109; Dickinson 1994, pp. 190–191). For the shape see Kenna 1960, pp. 30, 37, 39; for the motif see CMS 2.60 (Knossos, Profitis Elias T. VII). A date for the seal in MM III is suggested by Younger's description of the "Kamilari Agrimi Group", dating to *ca.* 1600 B.C.: "the body of the animals is made of three drilled areas, a large dot for the eye, straight strokes for the muzzle and legs, and slightly curved strokes for the horns and tail; the field is filled with branches and weeds, which lend a talismanic flavor" (Younger 1993, p. 166). While MM III pottery was recovered in the vicinity of the site, the sherds immediately associated with the seal stone are MM IB–II. Thanks are owed to John Younger for examining a photograph of the seal and discussing the shape and iconography.

⁷² Watrous (personal communication) has suggested that differentiation of houses by size, location, and construction technique within MM settlements may be indicative of aspects of social organization.

⁷³ Whitelaw (1983, pp. 332–333) argues for individual nuclear family units at EM II Myrtos. Waterhouse (1983, p. 316) suggested that the appearance or proliferation of individual houses in MM I is a reflection of a change in social organization, the communal- or clan-oriented society of EM I–II giving way to the household as the basic economic and social unit. See also Warren 1987, p. 53 for the emergence of the "family" as a "more individual, distinct, powerful social unit."

⁷⁴ The relative sherd densities for the phyllite soils of Khordakia (0.46/100 sq. m.) and the rocky terra-rosa alluvium of the Kampos plain (0.028/100 sq. m.) might serve to illustrate the disparity in land use in these contiguous areas.

have provided seaborne communication to the Mirabello Bay and littoral zones of the northern Isthmus, Gournia, and Priniatikos Pyrgos. Second, the bronzeworking site of Khrysokamina is located nearby, on the headland immediately northwest (*ca.* 0.45 km.) of the Khordakia cluster (Fig. 8).⁷⁵ The site is about 0.08 ha. in size and consists of a shallow (*ca.* 0.50 m.) and eroded deposit of ceramic (phyllite- and chaff-tempered) vessels, possibly furnace fragments. The surface pottery, consisting of storage jar, larnax, and cooking-pot shapes and fabrics, is MM I–II in date. It is possible that the population supporting the metallurgical establishment was derived from the Khordakia settlements.⁷⁶

LATE MINOAN I PERIOD

The existence of a spatial settlement hierarchy, including sites outside the Kavousi-Thripti Survey sample, might eventually suggest an economic or political impetus for the settlement expansion and dispersal in the Kavousi area. On the present evidence, however, it is not until the neopalatial period that site-size ranking becomes apparent. In the neopalatial period (MM III–LM IB) the topography of the Khordakia cluster changes remarkably (Fig. 12). Loci 41, 48, 51, and 53 are completely abandoned, and loci 3, 40, 47, and 49 are probably no longer used as habitation sites since they show only trace remains of neopalatial activity. Locus 7 (overlooking Khordakia) and locus 50 (above Lakkos Ambeliou) continue in use, and the full extent of the pottery scatters of both sites are smaller in size. Locus 50 is particularly interesting, as there is well-preserved evidence for a single neopalatial house constructed over the MM I–II remains (Figs. 13, 14). The plan and orientation is similar to the typical “Type 3” house defined by McEnroe; it contains a hall, vestibule, stairway, at least three rooms along the west, and surrounding terrace walls.⁷⁷ Unfortunately, a *mandra* (shepherd’s hut), now abandoned, has disturbed much of the southern side of the building (Fig. 13). The significance of these new and large rural LM I houses is underscored by the disappearance of the farmsteads of the MM I–II clusters (Fig. 16). While these neopalatial buildings exhibit no palatial architectural features, such as ashlar masonry, pier-and-door partitions, gypsum moldings, or elaborate columnar halls, it is plain that their function within the landscape is related to a settlement hierarchy and perhaps a new economic system within the wider region.⁷⁸ Towns or large villages appear in the Kavousi area in LM I along with the country houses, filling out a new two-tiered site hierarchy (Fig. 16). The dissolution of the farmhouse clusters of the MM II period highlights a change in local economy; the new LM I rural houses occupy the same pockets of arable land, perhaps indicating a role that was related to the organization of agricultural production. Chance finds from MM III–LM I settlements include a figurine fragment (Fig. 15:105, Pl. 82:a) and a terracotta bull-rhyton fragment (Fig. 15:532) that

⁷⁵ For Khrysokamina see Mosso 1910, p. 219; Hawes 1908, p. 33; Branigan 1968, pp. 50–51; Zois 1993, pp. 340–341; Stos-Gale 1993, p. 124; Stos-Gale forthcoming; Nakou 1995, p. 17.

⁷⁶ Philip Betancourt of Temple University began a study of the sites in the Khordakia and Khrysokamina areas in 1995.

⁷⁷ McEnroe 1982, esp. ill. 3.

⁷⁸ For the role of rural neopalatial settlements and “country houses”, see Cadogan 1971; Watrous 1982, p. 14; Hood 1983; Nixon 1987, pp. 95–98; Wiener 1984, p. 18; Wiener 1987, p. 266. For discussion of locus 50, see Haggis and Mook 1993, pp. 287–288.

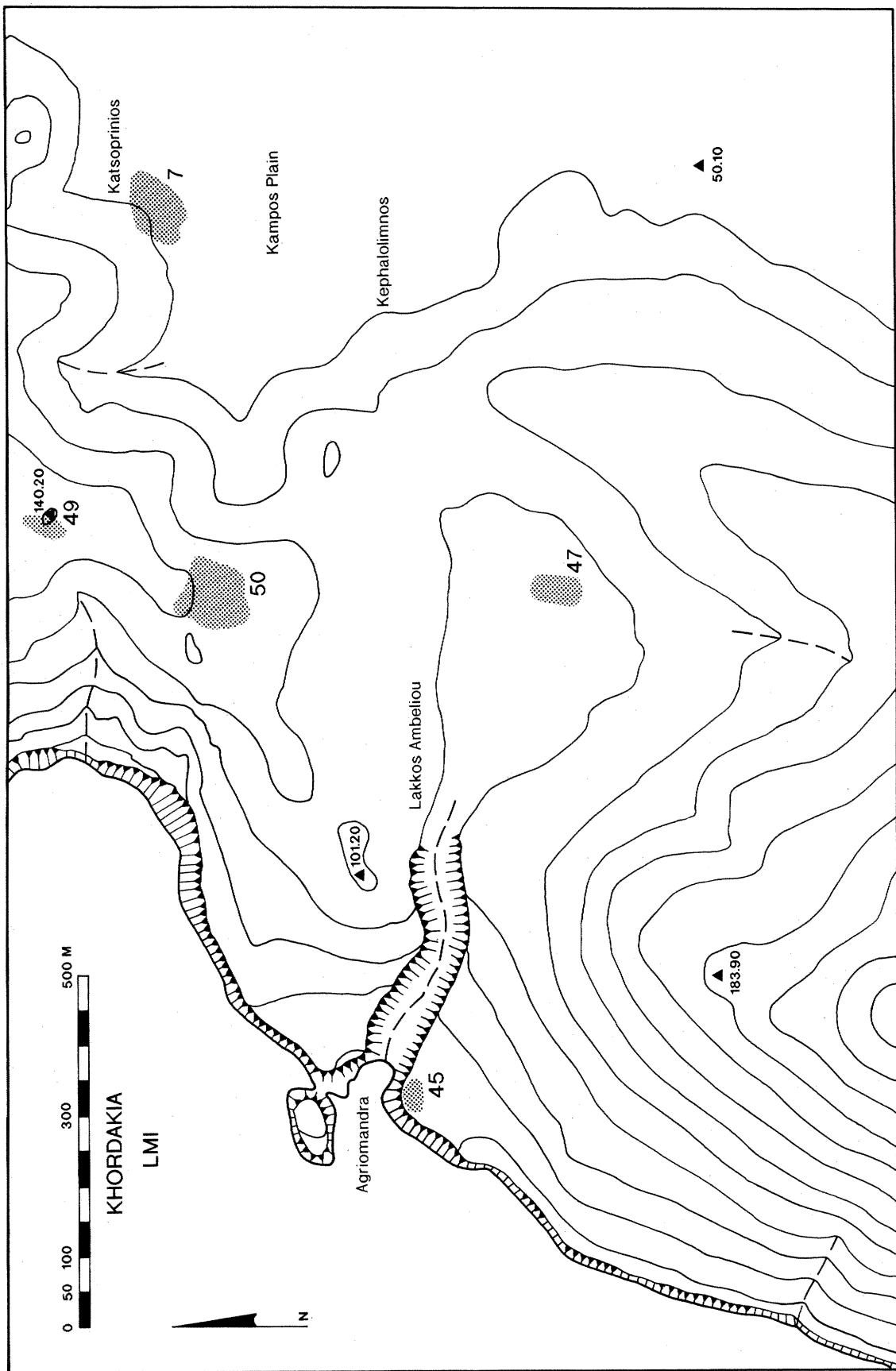


Fig. 12. Khordakia in the neopalatial period

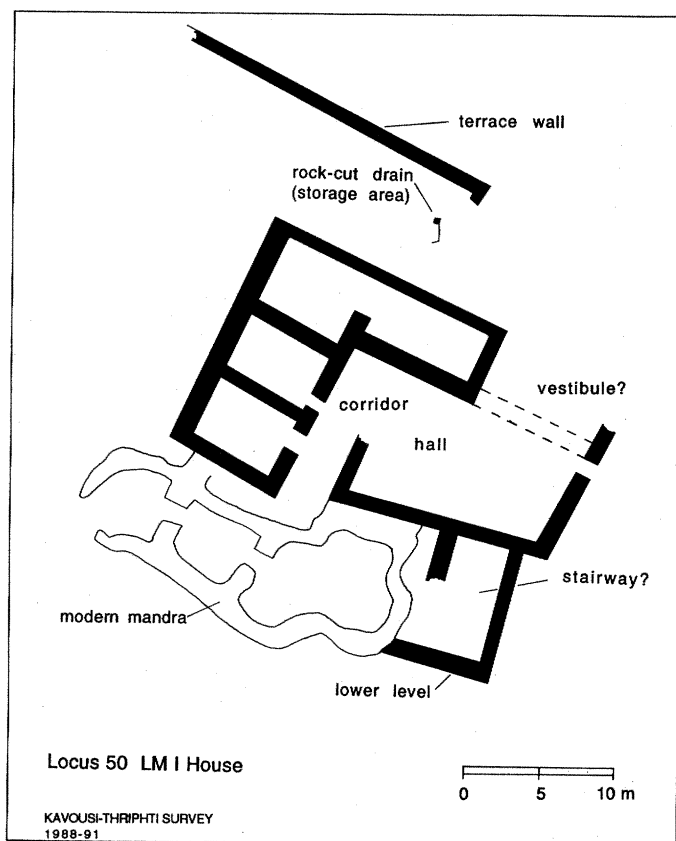


FIG. 13. Khordakia (locus 50): neopalatial house

might suggest household cult activity, perhaps now more prevalent with the simultaneous decrease both in the number of MM peak sanctuaries and in evidence for local community cemetery cult.⁷⁹

The changes observed in the LM I settlement pattern at Khordakia and Lakkos Ambeliou are evident throughout the survey zone and involve a significant restructuring of the spatial pattern of habitation and land use, suggesting changes in political and economic conditions. By LM I there is an obvious shift in settlement activity toward the north end of the Kampos plain at Ayios Antonios and along the west shore of the Tholos bay (Figs. 16, 17). At the latter site a continuous scatter of LM I pottery extends from locus 16 in the north to locus 24 in the south. Although the Roman warehouse (locus 39), the modern church of Panagia (locus 38), and a recently constructed taverna (locus 24) have obscured, destroyed, or otherwise altered much of the Bronze Age landscape, architectural remains and a uniformly dense scatter of LM I pottery were observed across the full extent of the bedrock terrain. The site is a village- or town-size settlement of at least 3.5 ha. and represents the first clear indication of nucleation of population and definable site-size

⁷⁹ See Peatfield 1987, pp. 90–91 for the decrease in the number of peak sanctuaries in LM I.

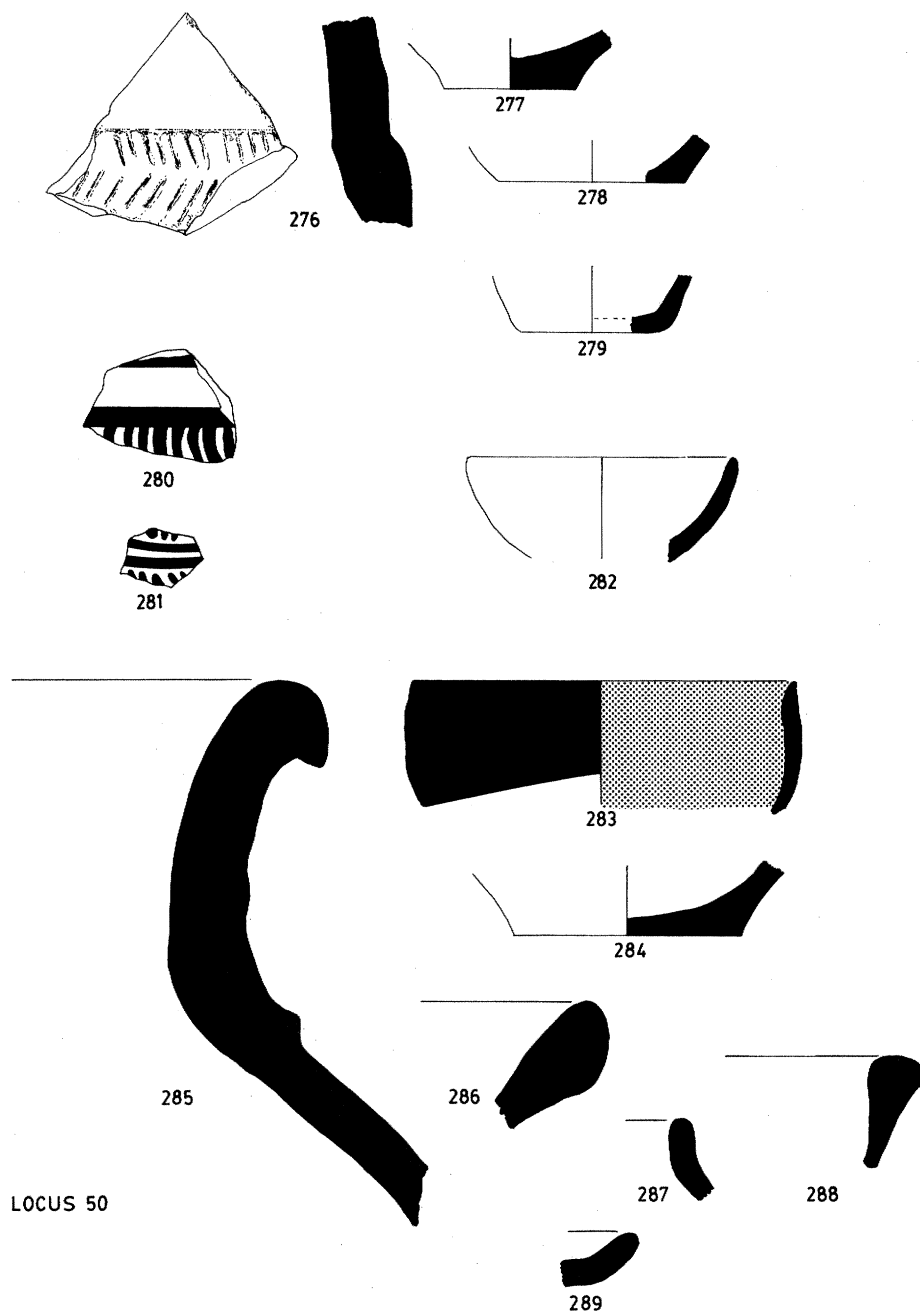


FIG. 14. Middle Minoan III–Late Minoan IA pottery from locus 50. Scale 1:2

hierarchy since the Early Minoan period. Its size and location suggest that it functioned as a port. The overall settlement pattern is a result of a shift in emphasis from the household economy of the MM I–II hamlets to the town economy of a port facility. Depopulation in each of the protopalatial settlement clusters corresponds directly to an increase in the

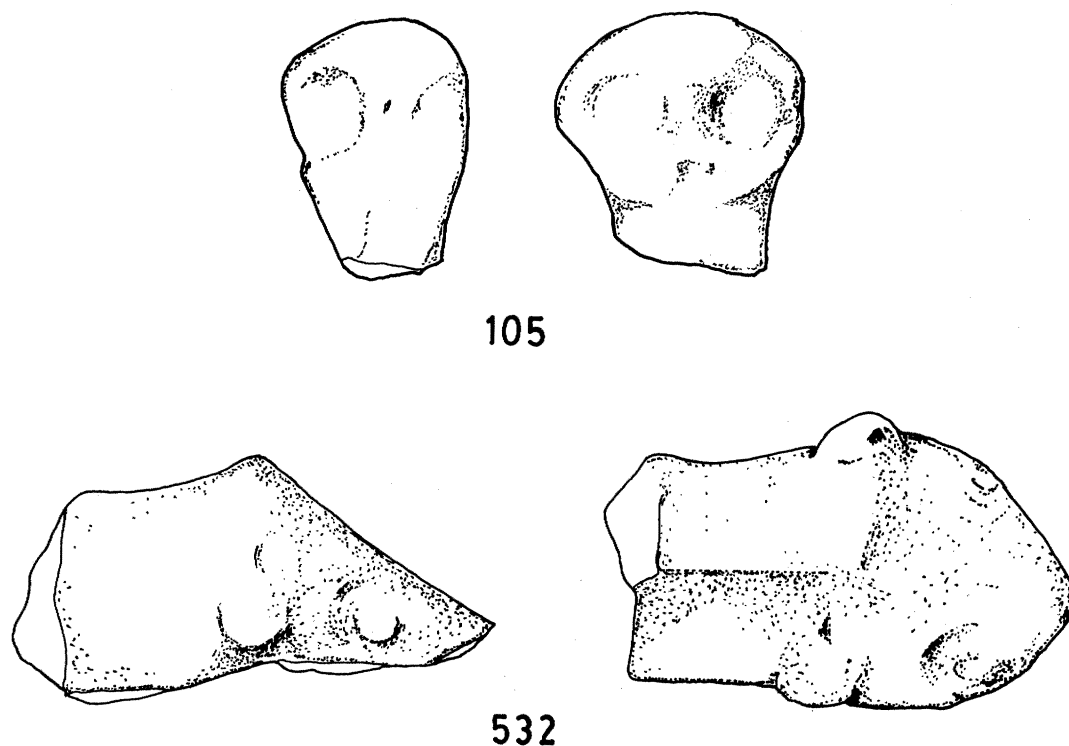


FIG. 15. Neopalatial figurine (105) and rhyton (532) fragments. Scale 1:1

size of Tholos and an expansion of settlement nearby at Ayios Antonios; there another settlement (*ca.* 2.5 ha.) had emerged by LM I in an area previously occupied by scattered MM I–II houses (Figs. 2, 16).⁸⁰ The increased population of the Ayios Antonios settlement is very likely the result of the growing importance of the nearby port and of off-island ties with Pseira and the Aegean through interisland trade routes.⁸¹ Inland from the coastal towns are the large, singular neopalatial houses that dominated the rural landscape and perhaps organized an important aspect of local agricultural activity.

The renewed interest in the sea accords well with the growth of the neopalatial town of Pseira off the coast to the north; the shore buildings, ship sheds, and “hill house” of Gournia to the east; and the apparently wealthy coastal community of Mochlos with its ashlar buildings (Fig. 2).⁸² Synchronous developments in East Crete show the emergence of a small-scale palace at Kato Zakro and buildings with large courts at Makrygialos

⁸⁰ Warren 1984, pp. 40–41; Soles 1991, pp. 75–76; see also Floyd *et al.* 1994 for a study of the LM I houses opposite the town of Pseira.

⁸¹ Betancourt and Banou (1991) have described the growth of Pseira as a trading station in LM I.

⁸² For Gournia see Rutkowski and Nowicki 1988, p. 1481; Fotou 1993, pp. 97–98; Watrous and Blitzer 1994. For Mochlos see Soles and Davaras 1994, pp. 405–411; Soles and Davaras 1996, pp. 184–194.

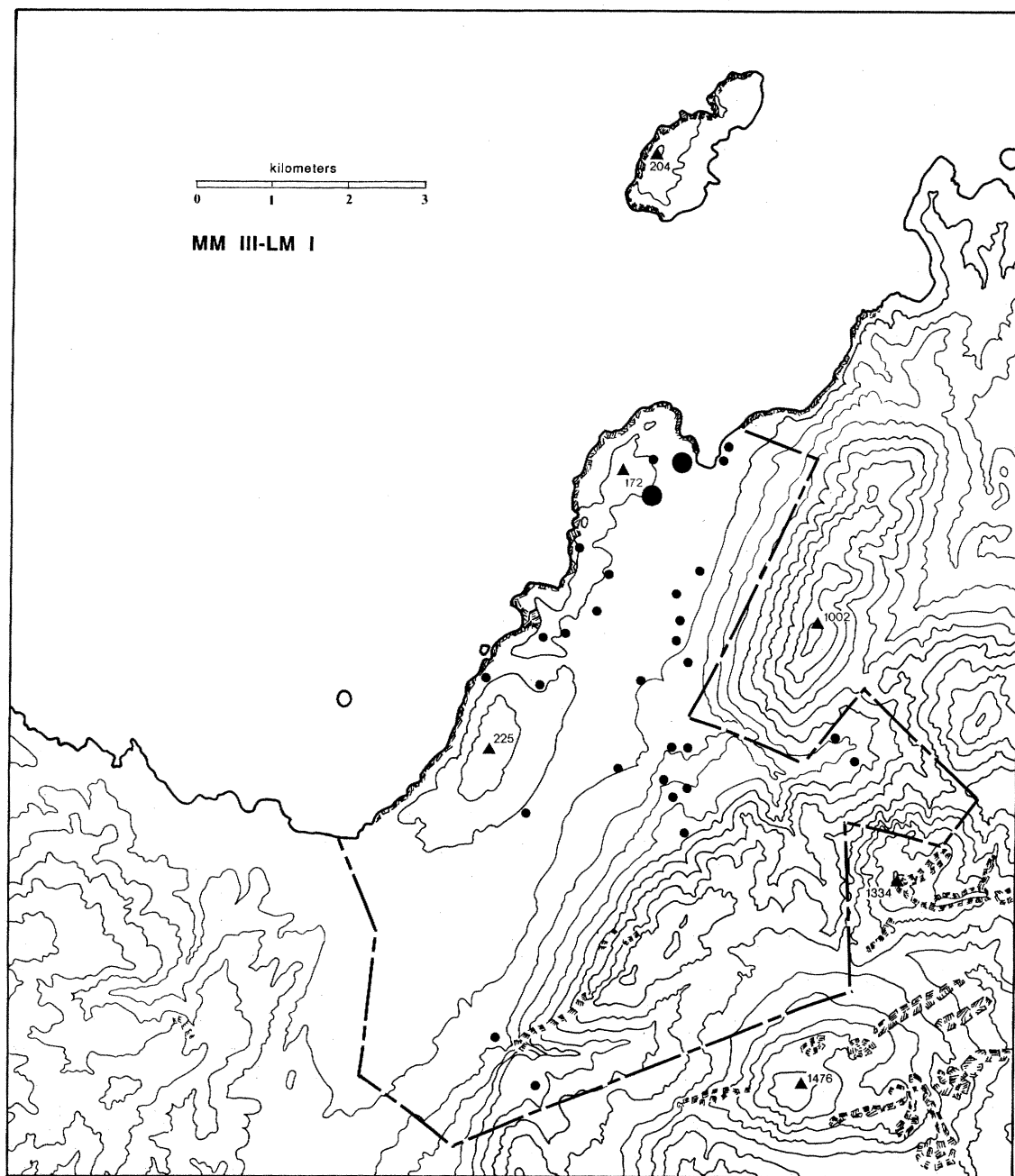


FIG. 16. Middle Minoan III–Late Minoan I sites

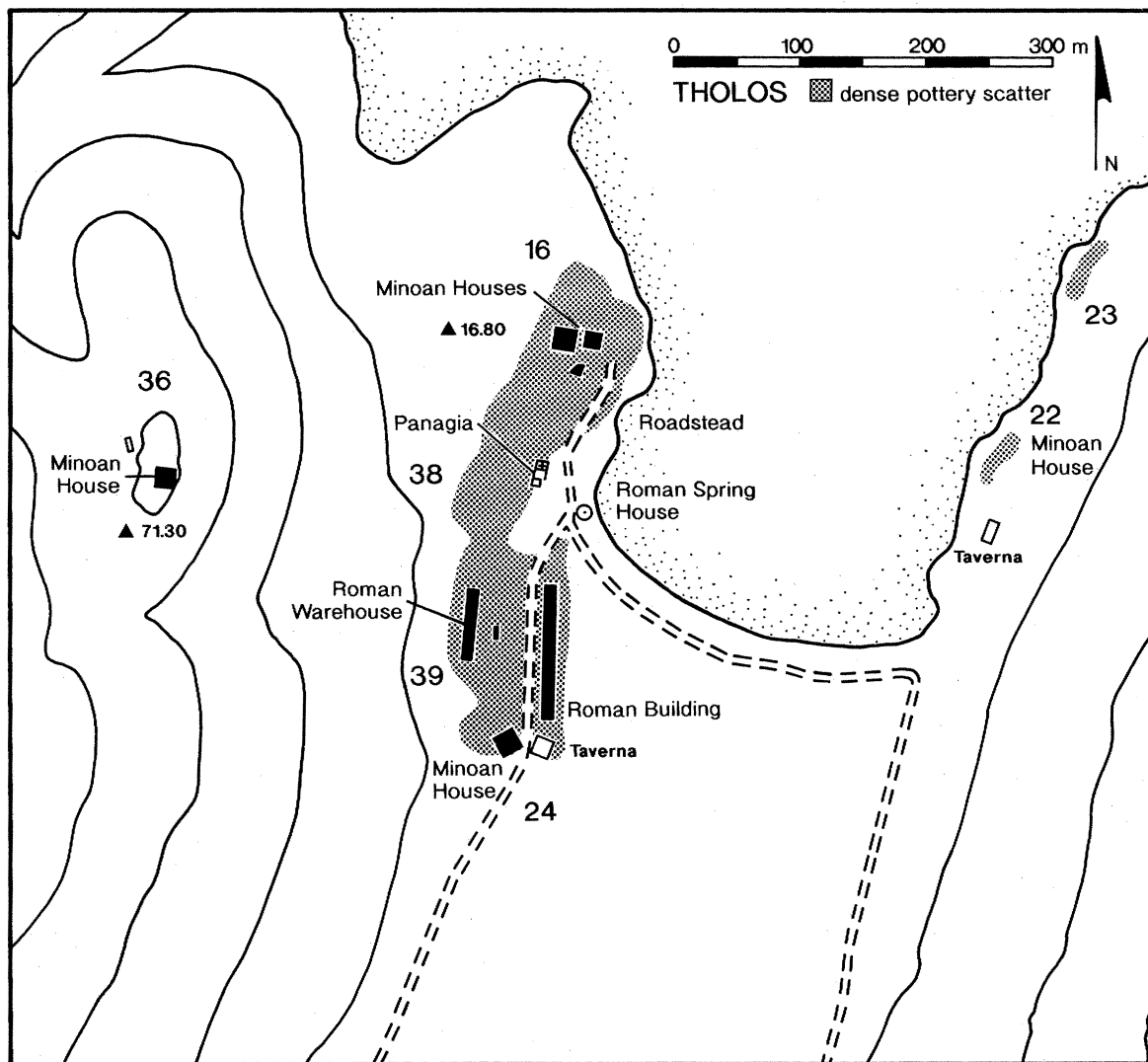


FIG. 17. Map of Tholos bay

Plakakia, Petras, and Gournia (Fig. 1).⁸³ These are all coastal communities commanding bays, rivers, and access to trade routes and communication by sea.⁸⁴ Another striking economic change in MM III–LM I Kavousi is a drastic shift in the production and distribution of coarse-ware pottery, involving a sudden drop-off in wares with origins in

⁸³ For Petras see Tsipopoulou forthcoming. See Shaw and Shaw 1993, pp. 186–187 for “court-centered buildings” at Gournia, Petras, Kommos, and Makrygialos.

⁸⁴ Warren (1984, pp. 40–42) has argued that demographic and territorial factors were crucial variables in neopalatial expansion beyond Crete’s landed borders.

the neighboring Gournia and Kalo Khorio regions and a concomitant increase in local Kavousi-area production.⁸⁵

The increase in local coarse-ware production is a sign of growing local markets and manufacturing that perhaps replaced the dominant Gournia center, whose town and newly installed palace may have shifted production strategies, with a view toward different products and wider extraregional markets. Thus, while the Kavousi area appears to be decidedly peripheral to palatial territorial organization or direct palatial control, the change in settlement patterns in MM III–LM IA is an indirect response to palatial influence or, more likely, to new economic systems encouraged by the LM I palaces. Could autonomous town territories have emerged in areas of East Crete in response to economic changes within an island-wide palatial economy? If so, then the most striking aspect of the data from Kavousi is perhaps the implicit latency of the effects of palatial complexity, frequently reconstructed in the form of a farm-town-villa-palace hierarchy. On the scale of the present survey, urbanization and large-scale nucleation of settlement in the Kavousi area appear to be particularly LM I phenomena, and the conspicuous lack of palatial features in the landscape only emphasizes local autonomy, regional diversity, and the slowness to accept the influence of palace-based social and economic systems.

POSTPALATIAL (LM II–III) AND EARLY IRON AGE PERIODS⁸⁶

In LM II–III there is a striking reduction in settlement activity, suggesting a near abandonment of the Kavousi area (Fig. 18). The LM II and LM IIIA periods are puzzling gaps in the survey sequence, and the problem is probably exacerbated by our lack of knowledge of the local ceramic phases or our inability to isolate distinguishing features of the LM II and LM IIIA1 pottery on the surface of LM IB and LM IIIA2–IIIB sites.⁸⁷ The population reduction and drop-off in site numbers and size, however, even if exaggerated, are supported by excavations at Gournia, Pseira, and Mochlos, where a similar retraction of settlement occurs at the site level. Insubstantial but certain evidence for LM IIIA2–IIIB was recovered from only six sites on the fringes of the Kampos plain and at Kavousi village (Figs. 19, 20; Pl. 82:c). Equally striking is the marked increase in settlement size and numbers in the subsequent LM IIIC and Protogeometric periods.

Dark Age Kavousi emerges from the LM III hiatus with no less than ten sites distributed in the highlands of Avgo, Kavousi-Thripti, and Monastiraki (Figs. 21, 22). The sites are large village-size (*ca.* 0.60–2.00 ha.) settlements and form distinct clusters around the upland valleys, terraced hillsides, and perennial springs of Avgo, Vronda, and the Kha

⁸⁵ See Haggis and Mook 1993, pp. 288–293 for the economic implications of changes in coarse ceramic production and distribution from MM II to LM I.

⁸⁶ The term “postpalatial” is a misnomer and is gradually falling into disuse; see Bennet (1985, p. 231), who proposes the term “Mono-palatial” for the period before the destruction of Knossos; this term is perhaps still viable if the Kydonian and Knossian destructions are not contemporary. Dickinson (1994, pp. 12–17) uses the term “Third Palace Period” (roughly LM II–IIIB2), “Postpalatial” essentially beginning in LM IIIC. Here I retain the term “postpalatial” to indicate the period after the LM IB destructions of the Minoan palaces and before the start of the Early Iron Age (LM IIIC–SM).

⁸⁷ See Hayden, Moody, and Rackham 1992, p. 327; Hayden and Moody 1990, p. 51; and Haggis 1993a, p. 168 for difficulties in determining LM II–IIIA1 phases in surface survey.

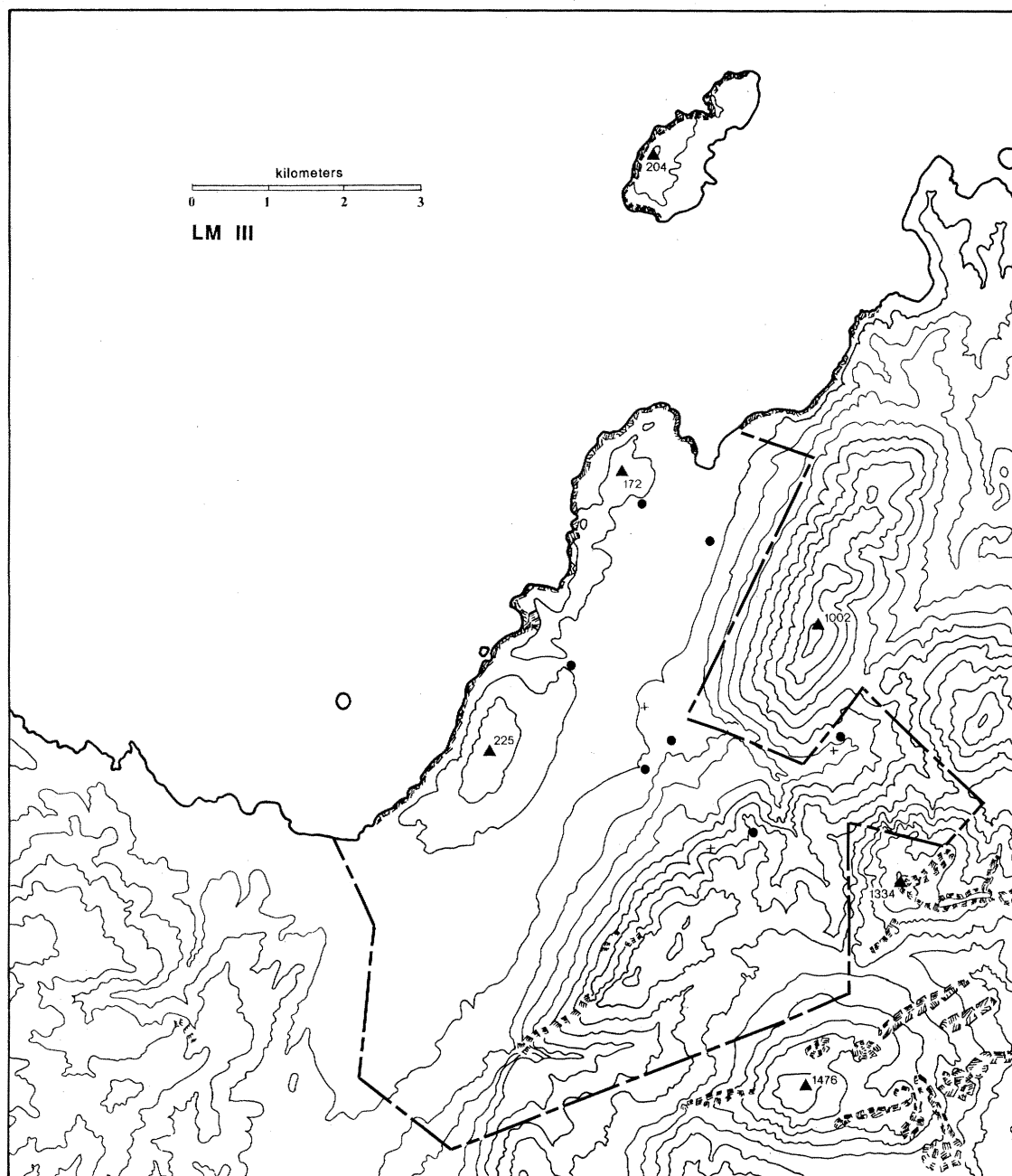


FIG. 18. Late Minoan IIIA-B sites

gorge (Monastiraki). This shift in settlement from the lowland plain to mountains is often interpreted by scholars as being a result of the general instability in the Aegean and eastern Mediterranean following the collapse of “postpalatial”, or Mycenaean, administrations of

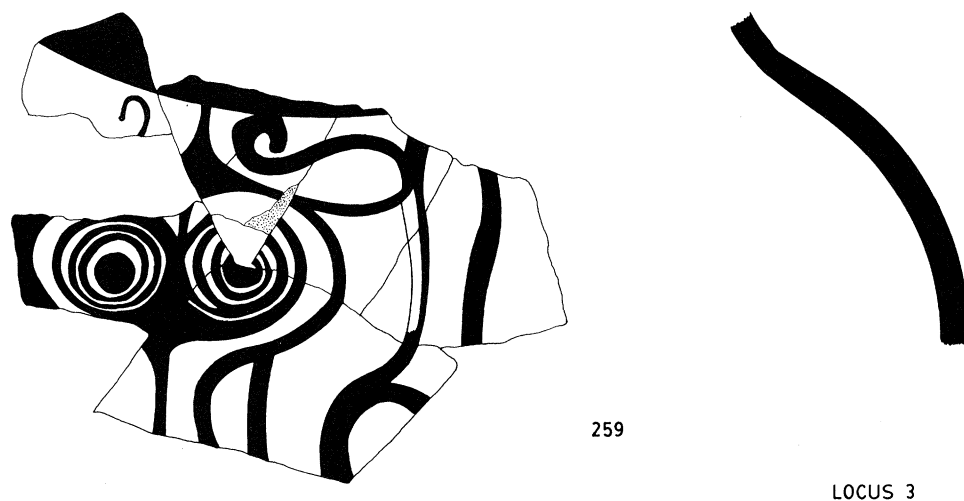


FIG. 19. LM IIIA2–IIIB amphoroid krater from Kephallolimnos. Scale 1:2

the palaces.⁸⁸ In the area of the Kavousi-Thripti Survey, it can be said that the Kavousi mountains, exploited extensively in the protopalatial period, were by LM IIIC once again densely settled, with an estimated population of about 600–1200 inhabitants.⁸⁹ The chief difficulty in assessing this transition from Bronze Age to Iron Age is the lack of identifiable LM II and IIIA1 remains that might help to explain the socioeconomic changes or process of growth after the destructions at the end of LM IB. It might be possible to imagine that a small local population remained in the area throughout the period of LM III and combined efforts with newcomers from other nearby areas of Crete to develop new subsistence regimes. Such an economic transition would involve dependence on the local environment. At Kavousi the optimal areas are in the upper elevations of Vronta, Avgo, and Thripti, where there is land suitable for rain-fed agriculture and where perennial springs provide year-round water supplies. While seclusion and defense were no doubt significant concerns, the strongest impetus for settlement development in LM IIIC–PG was probably the high agricultural productivity of the upland fields, terraces, and pastures of the Kavousi-Thripti mountains, coupled with changes in social systems following the break-up of the palatial economies.

The Dark Age settlement pattern at Kavousi consists of clusters of interdependent nucleated hamlets and villages that are situated in topographically distinct and isolated

⁸⁸ Kanta 1980, p. 326; Moody 1987, pp. 309–315; Hayden 1988, pp. 2, 21; Rutter 1992, p. 69; Haggis and Nowicki 1993, p. 334. See also Nowicki 1987b, 1987c, and 1990. Drews (1993) presents a surprisingly extreme characterization of the Early Iron Age, and his discussion of Crete (1993, pp. 26–29) exemplifies traditional tendencies to distort matters of topography and chronology to fit historical reconstructions of the Bronze Age–Dark Age transition.

⁸⁹ This estimate is based on the minimum sizes of Vronta, Kastro, Azoria, Panagia Skali, Khalasmeno, Katalimata, and Avgo Trapeza and Melisses, which represent an average of 15 house units per settlement and presumably 5–10 individuals per household.

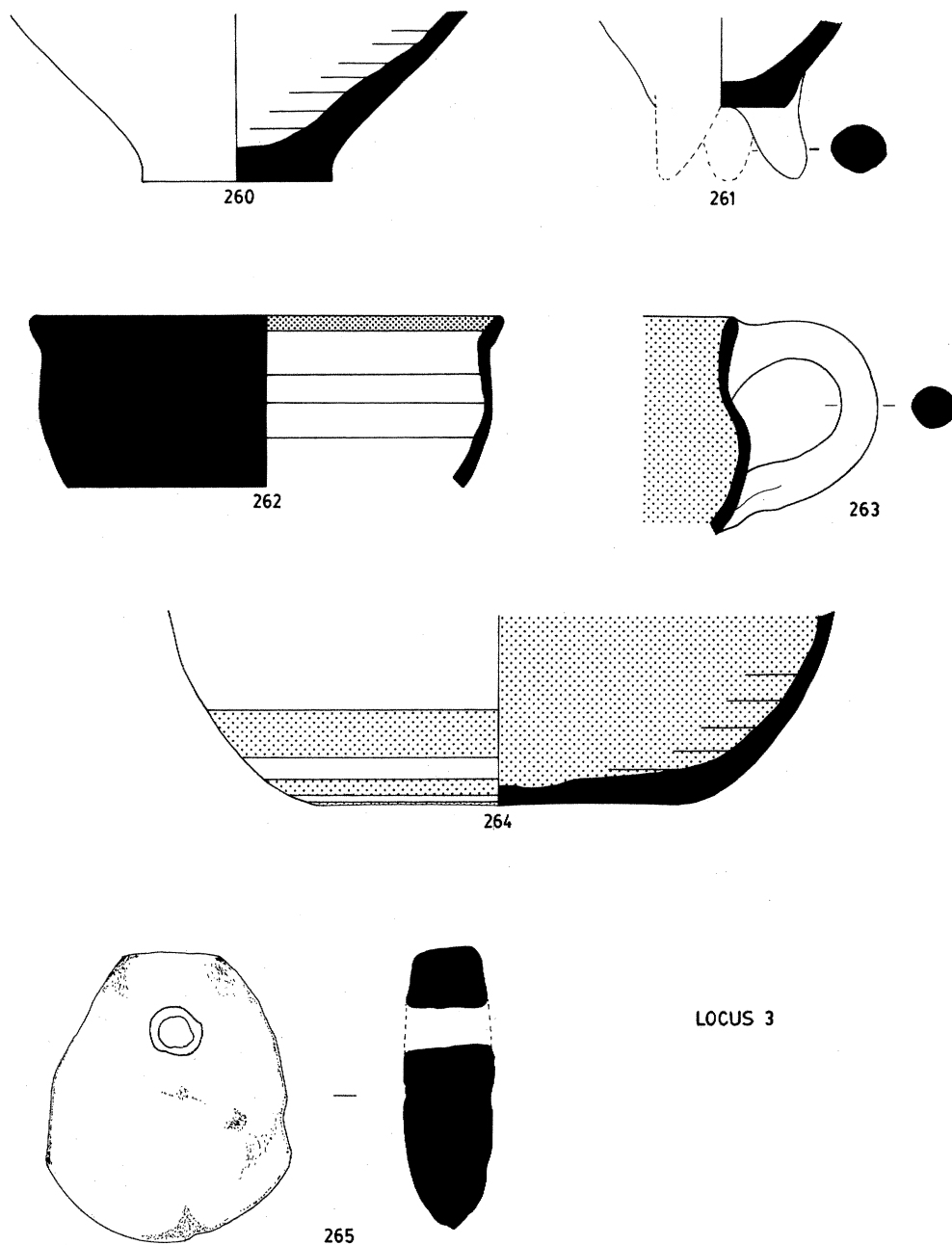


FIG. 20. Late Minoan IIIA–B pottery from Kephallimnos. Scale 1:2

regions (Fig. 22). It has been demonstrated that the settlements within a cluster are disparately located because of purely local factors of topography and proximity to arable land and water supplies.⁹⁰ It can be argued that the villages in such clusters are neither

⁹⁰ Haggis 1993a, pp. 157–161.

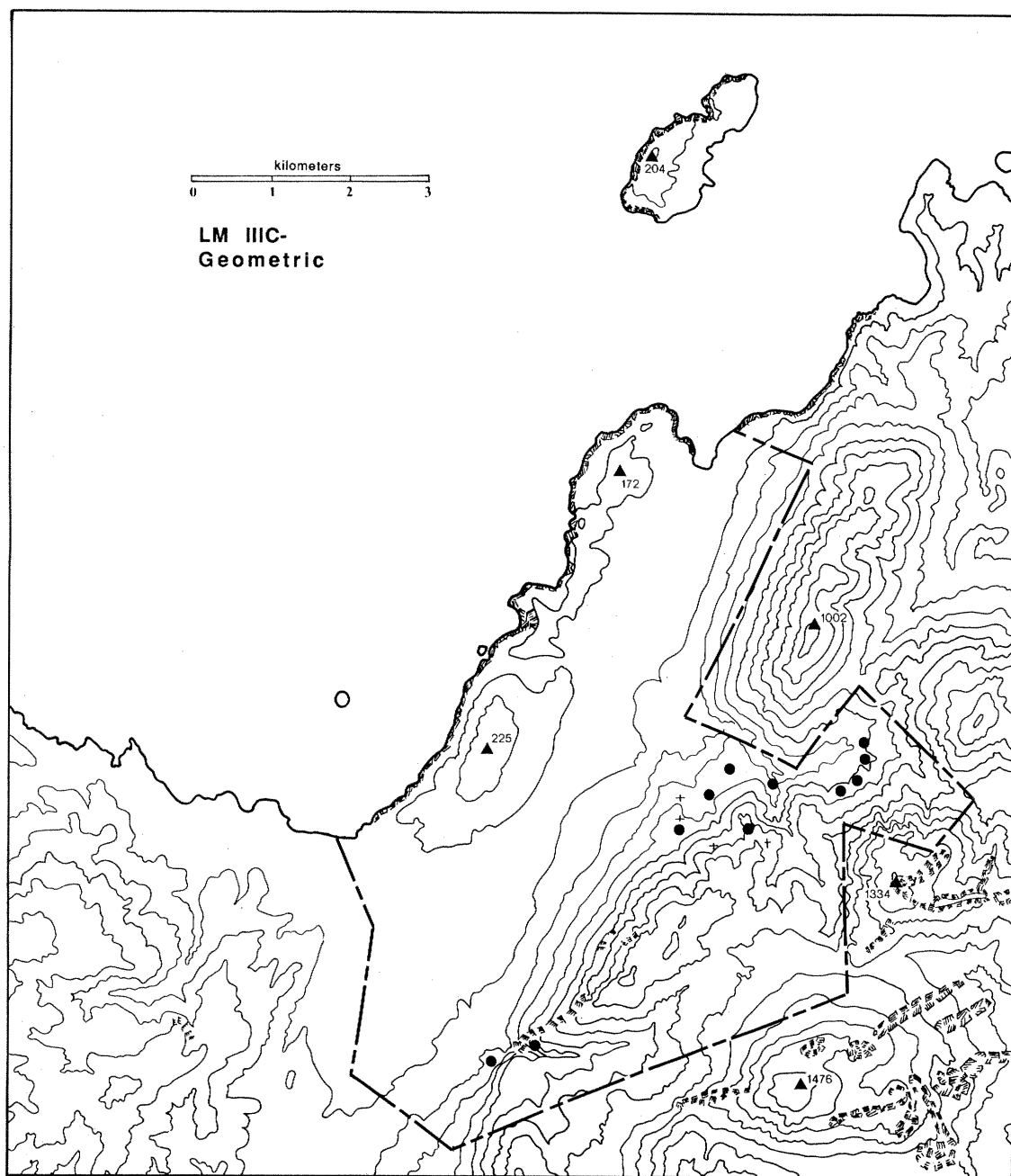


FIG. 21. Late Minoan IIIIC-Geometric sites

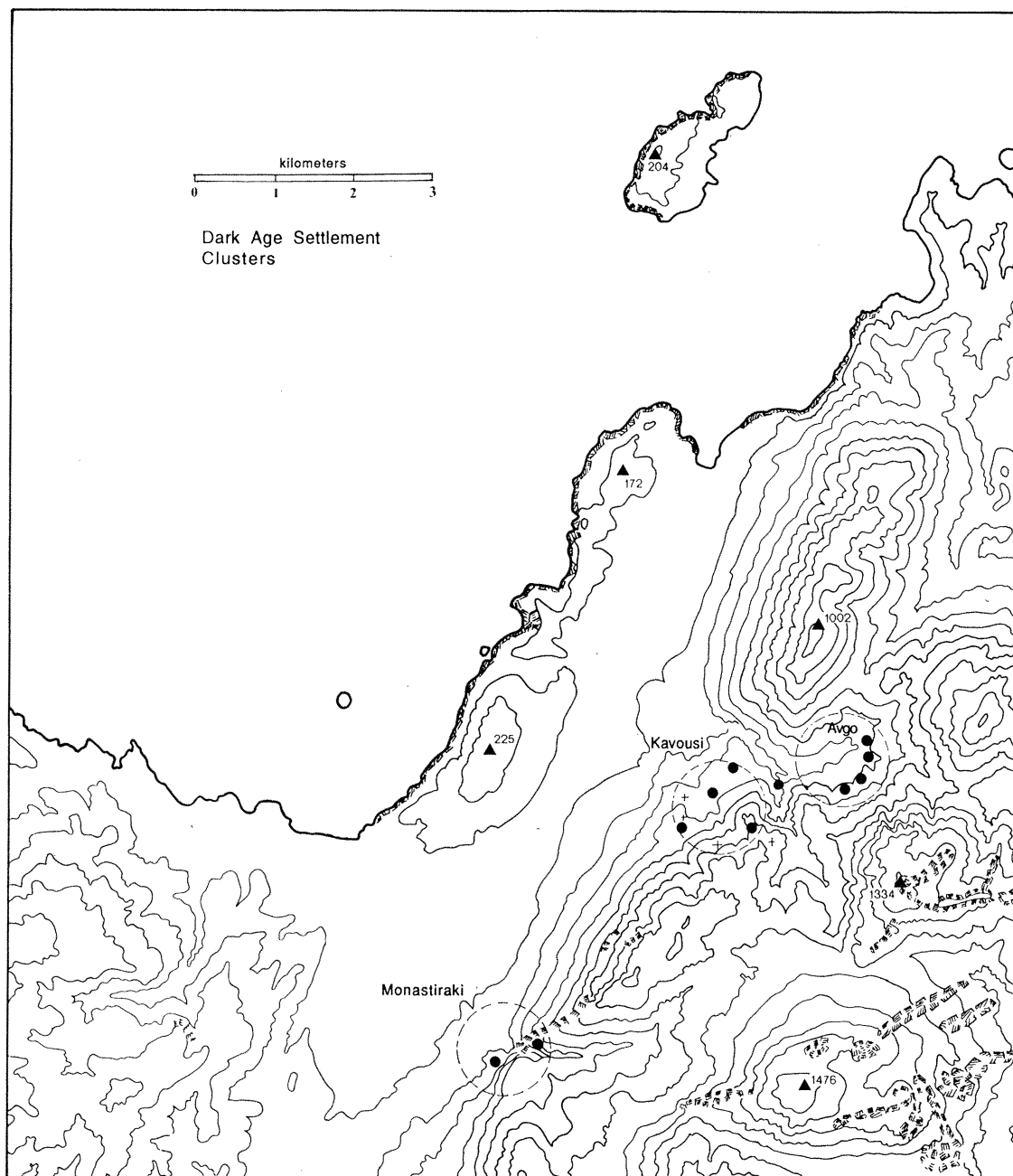


FIG. 22. Dark Age settlement clusters

“unstable settlements”⁹¹ of short duration nor exclusively “refuge settlements”.⁹² They represent burgeoning miniature communities of groups that were possibly lineage based⁹³ and whose growth, prosperity, and regional identity were strengthened by the confines of the topography, the dependence on localized and limited land and water resources, and a sense of agricultural and pastoral territory. The defensive and isolationist character of these Dark Age clusters could, as well, be a result of perennial external threats to this territory and the insular clan-based social system. Could the cause of such threats be internecine strife or competition between similarly developing communities in the neighboring valleys of Orino, Khrysopigi, and Ayios Ioannis, or farther afield across the isthmus in Asari and Vrokastro (Fig. 1)?⁹⁴ The clusters are the physical reflection of the early community within its territorial boundaries, however small. The “community of place” that Snodgrass argues could not have existed in the earliest Iron Age finds concrete expression in the site-cluster pattern at Kavousi.⁹⁵

It is the small scale of the territories and the limitations of the agricultural catchment areas that eventually allowed or caused the coastal city-states of the 7th and 6th centuries to draw population away from the Early Iron Age site clusters; the growing population that is attested on the Kastro and perhaps neighboring Azoria could not be maintained by the spatially restrictive cluster arrangement.⁹⁶ The dissolution of the Dark Age community, however, was a scaling-down process. The population growth (and settlement expansion) reached its apex by around 750 B.C.; by the Orientalizing period (700–600 B.C.), house sizes on the Kastro were reduced for a significantly smaller population group.⁹⁷ No doubt the broad economic growth of urban centers provided a strong attraction for the descendants of the residents of early Dark Age clusters. Morris has shown that a preexisting high population and complex social structure in the Dark Age are crucial factors in the apparent

⁹¹ Whitley 1991.

⁹² Nowicki 1987b and 1987c.

⁹³ The social organization of the Dark Age clusters at Kavousi remains a matter of speculation. House types and settlement plans suggest groups of extended families (Hayden 1981, p. 180; Jameson 1990, p. 108; Day and Glowacki 1992; Haggis 1993a, p. 151; Mook 1994; Gesell, Day, and Coulson 1995, p. 116); the most striking evidence is the cemetery data, especially from Vronda, which in both periods (LM IIIC–SM and Geometric) suggest multiple burials in what might be “family tombs”. I have suggested elsewhere (1993a, pp. 164–165) that continuity of use of the Vronda cemetery is a strong indication of stability and interdependence of settlements within the Kavousi cluster. For the Vronda burials see Gesell, Day, and Coulson 1990 and Gesell, Coulson, and Day 1991.

⁹⁴ For Dark Age settlements in East Crete see Hayden, Moody, and Rackham 1992, p. 328; Nowicki 1987a, 1987b, 1987c, 1990, 1994.

⁹⁵ Snodgrass 1991, pp. 8–9. Rutter (1992, pp. 68–70) comments on the LM IIIC nucleation of settlement in the southern Argolid and the phenomenon of the “island settlement pattern”, which may be functionally similar to the Dark Age “cluster pattern” at Kavousi; see Runnels and Van Andel 1987, pp. 325–327.

⁹⁶ See Snodgrass 1991, pp. 8–9. On Early Iron Age nucleation of settlement to large-scale urban centers see Coldstream 1984 and 1991; Watrous *et al.* 1993, pp. 229–230.

⁹⁷ The site of Azoria (its maximum size possibly over 2.0 ha.) may have become a nucleated center by the end of the 8th century, representing a transitional phase of depopulation on the Kastro, with population moving to a lower elevation and in direct contact with transportation routes linking East Crete with the Isthmus through the Avgo valley; see Boyd 1901, p. 154; Boyd 1904, p. 20; Haggis 1993a, pp. 147–153.

emergence of the *polis*.⁹⁸ One aspect of the pre-*polis* society is community organization, which is defined by the limitations of its territory and the individual and perhaps unique exigencies and benefits of its specific environments: topography, agricultural and pastoral land, and water resources. The Kavousi highlands are comprised of rich arable land, well suited, albeit on a limited scale, to self-sufficient pastoral and agrarian communities. In East Crete the abandonment of many sites in the 7th century B.C. may be seen less as a political transformation than as a shifting of economic emphasis or a matter of economic necessity, with the transfer of the community consciousness from the local cluster to the regional territory as the population was drawn away from local subsistence interests and into a wider economic sphere. Classical cities emerged in direct relationship to interisland and off-island transportation routes: in the Mirabello area at Oleros and Istron, in the Isthmus at Larisa, and farther south at Hierapytna.⁹⁹

ABANDONMENT IN THE CLASSICAL PERIOD

The gradual depopulation in the 7th and 6th centuries was clearly accelerated by the Classical period, when the Kavousi area experiences a complete abandonment. The most likely explanation for this phenomenon is nucleation of population in urban centers outside the Kavousi-Thriphti survey zone and the emergence of a new economic and political system and hierarchy of settlement. The Sherratts have characterized the first half of the first millennium B.C. as a period of expanding state territories, where "merchant enterprise, rather than state controlled exchange, became the dominant mode of trading activity," and where "tension between land-rooted and commercial interests became more explicit. . ." and "manifested in a complimentary relationship between territorial empires and mercantile city-states on their boundaries—and especially on coasts—through which foreign trade was channeled."¹⁰⁰ Such a view of the economy of the Early Iron Age Mediterranean provides a remarkably vivid backdrop for changes in settlement patterns in East Crete in the 7th and 6th centuries. The gradual dissolution of the Geometric settlement clusters (*ca.* 750–650 B.C.), outlined above, may be symptomatic of a significant tension between local clan-based agrarian interests and the town-oriented economies of the new coastal communities. The development of such a coastal emphasis in the 7th and 6th centuries, accompanied by increasing off-island commercial interests, accords well with what we know of the fully developed Hellenistic and Roman polities, whose wealth and power were based primarily on piracy, harborage fees, fishing rights, murex fishing and purple production, and the slave trade.¹⁰¹ The epigraphic, literary, and archaeological records for East Crete are clearly dominated by references to such a maritime economy.¹⁰² Could prominent East Cretan ports such as Lato pros Kamara, Hierapytna, Siteia, Stalis, Leuke, and Itanos have attracted population into their urban centers as early as the Archaic period?

⁹⁸ I. Morris 1991, p. 43.

⁹⁹ For Istron and Oleros see Hayden, Moody, and Rackham 1992, pp. 329–333; for Larisa see Watrous and Blitzer 1994.

¹⁰⁰ Sherratt and Sherratt 1993, p. 362.

¹⁰¹ Spyridakis 1970, p. 38; Casson 1984, p. 80.

¹⁰² Spyridakis 1970.

THE ROMAN PERIOD

In Roman times (1st century B.C.–6th century after Christ) the densest human activity appears in the area of the Tholos bay and possibly Kavousi village (Fig. 23). It is likely that by the 2nd century B.C. the area of Gournia, Minoa (Pacheia Ammos), and Kavousi, that is, the entire northern Isthmus region (Figs. 1, 23), became part of the economic sphere of Hierapytna. Hierapytna was already an established power and ever-growing presence in East Crete in the 3rd century B.C.¹⁰³ This south-coast city expanded its territorial influence northward by controlling Oleros and thus important mountain passages to the Gulf of Mirabello.¹⁰⁴ While Minoa, situated directly on the gulf, may still have been in the hands of Lyttos in this period, the situation changed drastically in the next two centuries.¹⁰⁵ Complex alliances with Priansos, Gortyn, and Lyttos early in the 2nd century greatly facilitated Hierapytna's expansionist policies at the expense of Lato to the west and Itanos to the east.¹⁰⁶ By the last quarter of the 2nd century B.C., the north coast of the Ierapetra Isthmus, no doubt including the port of Tholos, was under the influence of Hierapytna.¹⁰⁷

In the Kavousi area, in the 1st century B.C., traces of settlement appear at Tholos and Kavousi village. By the 2nd century after Christ, a small rural population had once again returned to the Kavousi hinterland (Fig. 23).¹⁰⁸ While a detailed picture of the growth and development of the Tholos bay itself (Figs. 17, 23–25) cannot be traced chronologically without further excavation, the post-Bronze Age pottery recovered from the site spans an unbroken period of occupation, roughly from the 1st century B.C. to the 7th century after Christ. Eastern Sigillata A (Fig. 24:111), Sigillata B (Fig. 24:109), Phocaean Red-slipped Ware (Fig. 24:110), and Late Roman cooking wares and dishes (Fig. 24:108, 106) are common. In fields at the periphery of the Kampos plain scattered Roman farmhouses with olive-producing machinery, cisterns, and associated grave sites are found;¹⁰⁹ a series of small warehouses of uncertain Roman date were constructed on a

¹⁰³ Spyridakis 1970, pp. 37–38; Bennet 1990, pp. 201–202; Bosanquet 1939–1940, p. 73; Chaniotis 1995, pp. 74–75; Bowsky 1994.

¹⁰⁴ Hayden, Moody, and Rackham 1992, p. 333; Spyridakis 1970, pp. 36–37.

¹⁰⁵ First, by establishing a firm alliance with Rhodes (200–197 B.C.) and, second, by maintaining anti-piratical policies that were, of course, beneficial to her own mercantile aims, Hierapytna seems to have usurped the lion's share of maritime interests in East Crete. See Spyridakis 1970, pp. 37–39. After taking over the territories of Praisos, Hierapytna extended her power eastward and eventually attained control over the coastal towns, cities, and territories of Istron, Stalis, Leuke, and possibly Ampelos. Bosanquet (1939–1940, pp. 69–70) discusses the territories of Praisos in the 3rd century B.C. and Hierapytna's claims to coastal revenues in East Crete. See Hayden, Moody, and Rackham 1992, pp. 318, 331–336 on Hierapytna's influence on the north coast.

¹⁰⁶ Spyridakis 1970, pp. 37–39.

¹⁰⁷ Even Olous, far to the north on the east coast of the Gulf of Mirabello, sided with Hierapytna and Gortyn in border conflicts with Lato. See Spyridakis 1970, p. 61 on the role of Oleros and Roman and Magnesians in the disputes between Hierapytna and Itanos. On the expansion of Hierapytna's territory in the Isthmus area and the subjugation of the neighboring city of Larisa, see Chaniotis 1995, pp. 74–75; Papadakis 1986, p. 15. See also Bennet 1990, pp. 200–202 and his intriguing map (fig. 2) for the furthest extent of Hierapytna's territory by the 1st century after Christ.

¹⁰⁸ Chaniotis (1988, pp. 79–82) discusses the restructuring of rural settlement and agricultural production on Crete in the 1st century after Christ.

¹⁰⁹ Boyd 1901, p. 155; Boyd 1904, p. 15; Sanders 1982, p. 141; Pendlebury 1939, p. 375; Blegen 1936.

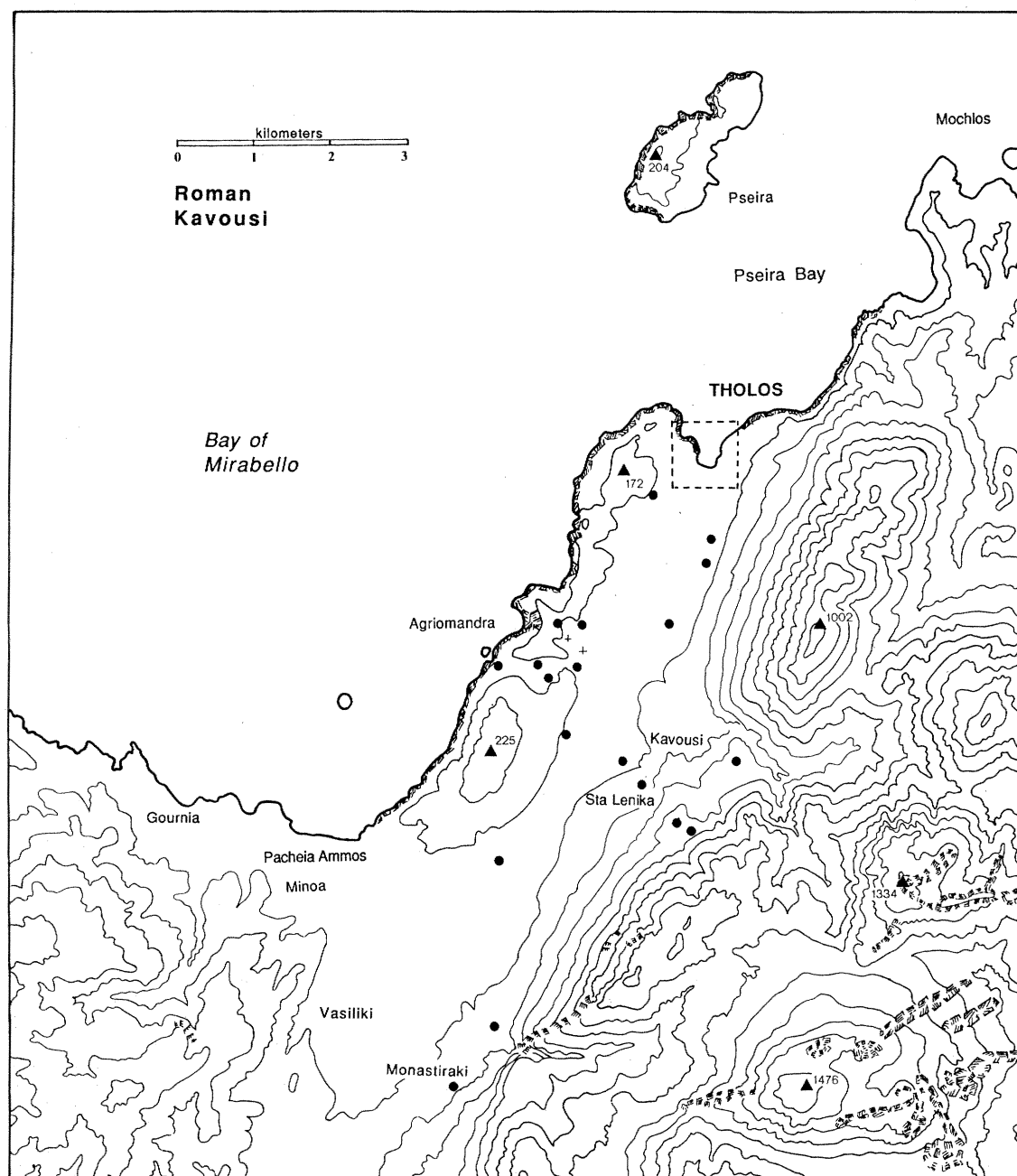


FIG. 23. Roman sites (1st century B.C. to 7th century after Christ)

hill above the plain (southwest of Kavousi village) at the site of Sta Lenika (Fig. 23),¹¹⁰ possibly for the mobilization and storage of produce from the villages along the Isthmus

¹¹⁰ For the Roman remains at Sta Lenika see Schachermeyr 1938, p. 470 and the sketch plan in Haggis 1992, pp. 195–196. The pottery of Sta Lenika (locus 71) spans a period from the 1st to 7th centuries after Christ.

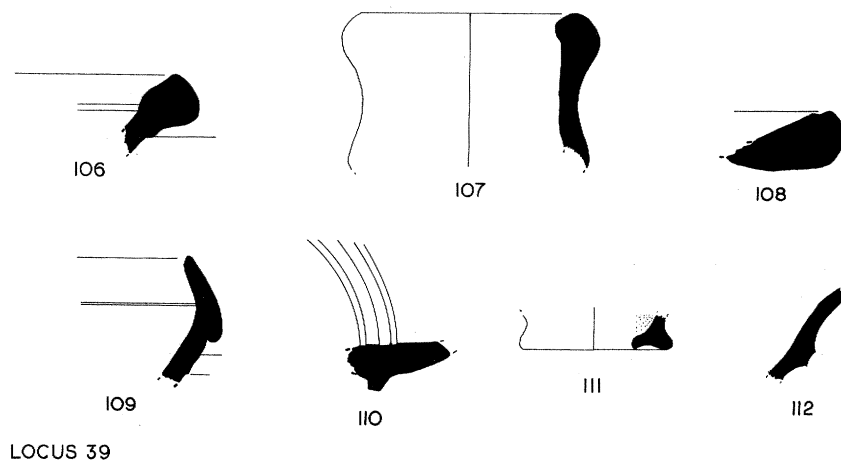


FIG. 24. Roman pottery from Tholos. Scale 1:2

route or in the Kavousi hinterland.¹¹¹ In the small roadstead at Agriomandra, at a depth of some three meters underwater, are dense deposits of amphoras.¹¹² Kavousi village itself has produced Early Roman sherds from sporadic modern construction and agricultural activity. While such evidence is not conclusive, some kind of aggregated settlement of uncertain size existed in the area that is now obscured by the modern village. To the southwest of Kavousi village, hamlets or small villages dotted the Isthmus area at Gournia, Pacheia Ammos, Monastiraki, Vasiliki, and Episkopi.¹¹³ The density of settlement at the periphery of the Kavousi plain from the 1st century B.C. until the 3rd century after Christ suggests a small local population and nonextensive agricultural production for local consumption and limited export.¹¹⁴

¹¹¹ Chaniotis (1988, pp. 80–82) has suggested an increased specialization of agricultural production in the Roman period, wine being a particularly important export crop. See Sanders 1982, p. 30 on the expansion of rural settlements in the Mesara in the 2nd century after Christ and Mitchell 1993, p. 257 on the increase in grain production and urbanization in Roman Asia Minor. It is indeed possible that a limited local wine and oil production in the Kavousi area might account for the warehouses at Sta Lenika and Tholos and the port at Agriomandra. Given the agricultural potential of the Kampos region, however, the siting of farmhouses in distinct areas of arable land and water supplies suggests nonextensive irrigation and limited intensive agricultural production. Unlike the rich alluvium of the Mesara (Gortyn) and Knossos, or the expansive arable land of central and coastal Anatolia, the Kavousi and northern Isthmus soils are poor and generally unsuitable for dry agriculture. It is doubtful that the area could have produced any significant or consistently viable export crops. See Chaniotis 1995, pp. 74–75 on low rainfall and subsistence strategies in the Isthmus of Ierapetra; see also Bowsky 1994, p. 7 for contrasting settlement patterns in the Mesara and Hierapytna areas.

¹¹² Agriomandra is reached from the Kampos plain by a *kalderimi* (cobble path) of uncertain date. While few Roman remains are visible on the shore, dense deposits of Roman pottery are found in the small cove.

¹¹³ For Roman sites in the northern Isthmus area see Sanders 1982, pp. 17–18, 138–141.

¹¹⁴ See Sanders 1982, pp. 30–31; Chaniotis 1988, pp. 79–83; and Harrison 1988, p. 150 on changes in rural production and settlement patterns in the 1st century after Christ; see also Alcock 1993, pp. 80–85, 93–127 on changes in settlement patterns and land use in Achaia.

One important Roman site is Tholos (Figs. 17, 23–25), where a substantial granary or warehouse was established probably by the 2nd century after Christ.¹¹⁵ The site at Tholos should not be evaluated in terms of the agricultural production from the local hinterland and the presumably minimal potential for export, but in terms of its size (*ca.* 2.5 ha.), coastal position, spring house, and numerous special-function buildings (Fig. 25). Survey has demonstrated that inhabitants had returned to the small bay for the first time in the 1st century B.C. after a long hiatus beginning with the abandonment of the LM I town, whose function in the Bronze Age was surely related to maritime traffic within a complex palatial economy. Perhaps by analogy Roman Tholos can best be evaluated by exploring its specific function as a port facility at the northern edge of the Isthmus overland transportation route and within the broader framework of the territorial and economic interests of the city of Hierapytna on the south coast.¹¹⁶

In the Classical and Hellenistic periods, cities had developed as a direct result of an economic structure that apparently involved maritime activities in the context of expanding inter-Mediterranean exchange and communication routes.¹¹⁷ The coastal Classical–Hellenistic centers such as Hierapytna, Stalis, Kouphonisi (Leuke),¹¹⁸ and Itanos drew their wealth and grew prosperous as points along important east–west routes. Maritime activity reached its peak in the 2nd and 1st centuries B.C. but continued to develop well after the Roman conquest of the island by Metellus in 67 B.C. and only thrived in the wake of economic and political stability that accompanied the Roman intervention.¹¹⁹ A decrease in piracy and mercenary services and a concomitant unification of rural regions

¹¹⁵ Boyd 1901, pp. 155–156; Boyd 1904, p. 13; Pendlebury 1939, p. 376; Sanders 1982, pp. 17, 91, 140–141; Harrison 1993, pp. 188–191, 214, 217, 220, 280, 284; Harrison 1990. For Late Roman and Byzantine remains see Bolanakis 1987 and Tsoungarakis 1988, p. 306.

¹¹⁶ Sanders (1982, pp. 31–35) has emphasized the importance of coastal trade in the prosperity and survival of many Cretan cities: “Perhaps the most important effect of trade was on the southern coast cities, some of which must have relied on it for their wealth, if not their existence” (p. 35). See also Bowsky 1994, p. 7 on East Cretan routes.

¹¹⁷ See Lembesi 1990, p. 27 on the topography of inland settlements in the Classical and Hellenistic periods and Chaniotis 1995, p. 74 for discussion of the growth of Hierapytna in the Hellenistic period through “colonization, emigration, and conquest” and as a direct response to the limited availability of productive arable land in the Isthmus and the need for securing agricultural territory for a growing population. On the development of Hierapytna’s economy see Bowsky 1994, pp. 4–9. Alcock (1994, pp. 179–180) observes a great deal of diversity in settlement patterns in the Hellenistic period (based largely on examination of the settlements at Chania, Ayio Farango, and Lasithi). Such observations are echoed in the most recent survey in the Mesara, which shows that after perhaps an initial stage of Early Iron Age nucleation, from the Orientalizing period on there was a growing population and ever-increasing dispersal of hamlet and farmhouse-type settlements that “may have been outgrowths from the center at Phaistos.” See Watrous *et al.* 1993, pp. 229–231. While a pattern of continued nucleation in the Classical and Hellenistic periods may be an East Cretan phenomenon, the Vrokastro survey has shown that along with the nucleated city of Oleros, there was a fairly dispersed Archaic–Classical pattern; see Hayden, Moody, and Rackham 1992, pp. 329–332.

¹¹⁸ Bosanquet (1939–1940, p. 71) comments on the economically strategic position and maritime importance of Kouphonisi.

¹¹⁹ Chaniotis 1988, p. 79; Chaniotis 1995, pp. 35–37.

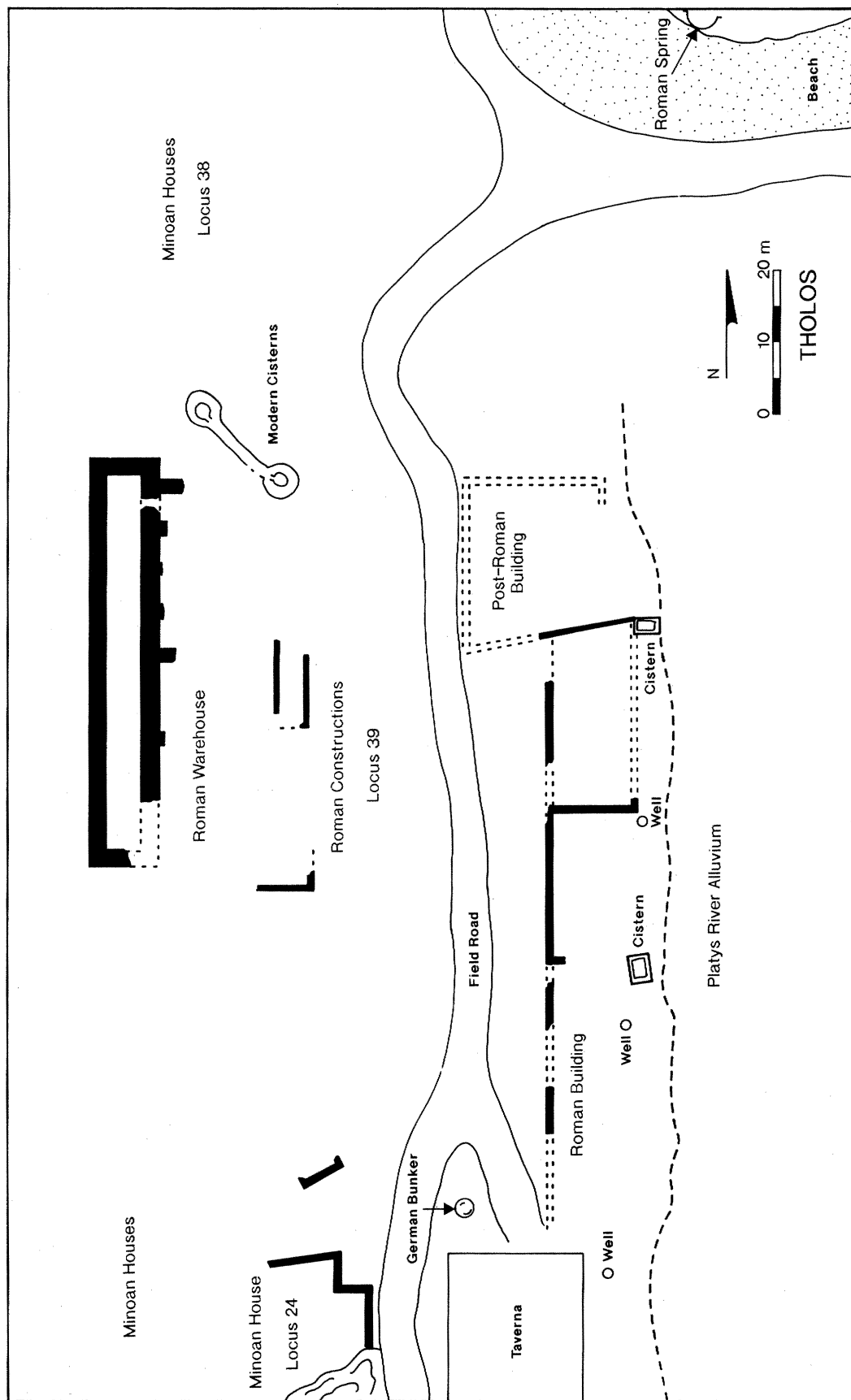


FIG. 25. Sketch plan of Tholos

and state territories required a shift in economic behavior by the 1st century B.C.¹²⁰ Bennet has pointed out the role and status of cities in the Roman period: "The increase in the importance of coastal settlements undoubtedly reflects Crete's participation in wider, off-island systems of interaction, such as the major east-west trade route along the south coast."¹²¹ By the 1st century B.C. there is every indication that an important aspect of the economic base of cities was the control of ports and their exploitation of the expanding and peaceful coastal trade. In the Roman period Cretan cities were exporting wine, cypress wood,¹²² and exotics such as purple and herbs, but their activities involved a wider sphere of international communication,¹²³ and their primary role ultimately became connected with the eastern Mediterranean *periplous* and the Cretan transshipment points along the route from Egypt, the Levant, and southwestern Anatolia to Rome.¹²⁴ The return of population to the Tholos bay in the 1st century B.C. coincides with, and can be explained by, the spread of Hierapytna's maritime interests to the north coast in the last quarter of the 2nd century.¹²⁵ It is possible that Tholos was the main northern port of Hierapytna's landed hegemony and that its significance lies in its favorable position at the northern end of the Ierapetra-Isthmus corridor, which is the narrowest (12 km. wide) land link between the Cretan and Libyan seas and thus between the Aegean and the Mediterranean. The well-built *horreum* at Tholos is an indication of the mobilization of wealth and human resources that are not easily seen as products of local investment but rather as those of the port's role within Hierapytna's scope of economic and political influence.¹²⁶

¹²⁰ See Chaniotis 1988, p. 80 and Chaniotis 1995, pp. 35–37 for the economic restructuring of Hellenistic states in the Roman period.

¹²¹ Bennet 1990, p. 201. Fishing rights, purple production (murex fishing and processing) and export, the slave trade, and perhaps textile production had become significant components of the economy of these East Cretan communities. Their prosperity depended initially on their autonomy, control of port facilities, and pastoral, lumbering, and fishing interests. See Lembesi 1990 for the importance of autonomy in the evolution of Cretan cities.

¹²² See Petropoulou 1985, p. 61 for cypress wood exports.

¹²³ See Mitchell 1993, p. 257 on the importance of trade routes and external economic contacts to the prosperity and growth of Roman towns in Asia Minor. Sherratt and Sherratt (1993, p. 367) have emphasized the role of Crete as a crucial "stepping stone" in inter-Mediterranean trade (9th–6th centuries B.C.).

¹²⁴ On Cretan exports in the Roman empire see Sanders 1982, pp. 32–35; Tsoungarakis 1990, pp. 67–69; Chaniotis 1988. See Chaniotis 1995, p. 76 on wine, herb, and wool exports; see also Harrison 1988, pp. 152–153 and Bosanquet 1939–1940, p. 72.

¹²⁵ On the role and importance of Hierapytna, see Sanders 1982, pp. 18, 31, 35, 139; Bennet 1990, p. 203. See Bowsky 1994, p. 6 for the process of Hierapytnan synoecism.

¹²⁶ Hierapytna's power, economic viability, and longevity were initially based on its own maritime commercial expansion and were perhaps sustained precisely because the position of the city was in accord with the conditions of Rome's trading interests. As Alcock (1993, p. 170) has observed about provincial Achaia, "episodes of direct imperial interference by no means represent the full spectrum of change within provincial geography. Further major modifications came about through local responses to incorporation within a larger more demanding system." It was Hierapytna's economic status and, foremost, its ability to become functionally assimilated within this larger imperial system that might account for its continuing prosperity. The minutiae of the internal changes within East Cretan cities must be sought on social and political levels. See, for example, Bowsky 1989a, 1989b, 1994.

The position of the granary at Tholos requires an explanation that is not easily produced. The location of the site, however, at the first viable landfall on the north coast west of Siteia and at the northern edge of the Isthmus of Ierapetra, must have been a factor directly related to the function of the building. While a good roadstead and artificial mole existed to the east at Mochlos, the narrow coastal plain there is entirely enclosed by the precipitous peaks of the Orno mountains, thus precluding any reasonably efficient land transport in or out of that area.¹²⁷ Pacheia Ammos, to the west of Tholos, is an exposed harbor, vulnerable to devastating north and south winds in the spring and summer and unusable even today for most of the winter months.¹²⁸ In marked contrast, the port at Tholos and the sheltered anchorage of Pseira (Fig. 23: Pseira Bay) would have provided a safe harbor and protection from the elements nearly all year round.¹²⁹ Two conditions of the site at Tholos are significant: its coastal location suggests involvement with sea traffic in or out of the Aegean, and its position at the north end of the Isthmus corridor places it at a crucial point on the shortest land route across the island of Crete.¹³⁰ Harris has pointed out the complexities of the grain, oil, and pottery trades in the Mediterranean and the frequency of overland shipments: "There was in reality a great deal of medium-distance commercial land transport. Sometimes goods that were transported by water also had to be carried for considerable distances over land."¹³¹ The situation of the Tholos buildings and the obvious Isthmus connection to Hierapytna are surely related to such landed transport and are an ostensibly important link between the Aegean and Mediterranean. The existence of a substantial granary adds considerable importance to this small port facility and might be an indication of some level of Roman influence or intervention in the affairs of Hierapytna.¹³²

The hinterland of Tholos again experienced a population dispersal at precisely the time when nucleation occurred in many areas on the mainland.¹³³ Admittedly, economic

¹²⁷ See Sanders 1982, p. 136 and Soles 1978.

¹²⁸ See Boyd 1904, pp. 13–15 for Roman Pacheia Ammos and other sites in the northern Isthmus.

¹²⁹ For the difficulties in the Egypt–Rome "corn route" along the south coast of Crete in late August and September, see Casson 1959, pp. 237–238; Casson 1974, pp. 152–153; and Rickman 1980, pp. 265–267. See also Tomber 1993, p. 147. Even today, westbound Mediterranean transport vessels (tankers and freighters) regularly seek safe haven in the ports of southern Crete. In July and August 1994 I observed one freighter anchored off the coast of Makrygialos (ancient Stalis) and three freighters immobilized in the harbor of Ierapetra, waiting for the abatement of nine-Beaufort winds.

¹³⁰ Harrison 1993, p. 215 discusses the repairs to the road systems of Hierapytna in the reign of Claudius (*IC* III iii, 25–29).

¹³¹ On overland transport of African grain see Harris 1993, pp. 27–28. See Mitchell 1993, pp. 245–246, 258 on the difficulties and importance of land transport in Roman Asia Minor; see also Greene 1986, pp. 35–36, Rickman 1980, pp. 264–265, and Tengstrom 1974, p. 29 on roads and land transport, and Harrison 1993, pp. 214–215, 219–220 on trans-Ierapetra Isthmus shipments and Hierapytna's roads. See Pleket 1983, p. 143 for a discussion of the problems and cost of land transport.

¹³² Rickman (1971, p. 147) has pointed out that "we have so far surprisingly few extant remains of *horrea* in Italy or the provinces. . . . Perhaps however we should also bear in mind the possibility that the construction of massive *horrea* was most often brought about by state interference and the needs of the imperial *annona*."

¹³³ Alcock 1993, pp. 105–107; see also Alcock 1994, p. 179 on nucleation and urbanization in Hellenistic Crete and Bintliff 1991 on depopulation of the Boiotian countryside, 400–100 B.C. The phenomenon of

diversification and some agricultural specialization are probable factors related to the rehabilitation of the Kavousi area in the Roman period. But the real impetus for this change was most likely an expansion of settlement activity into the countryside from increasingly large secondary economic centers (villages) that had emerged along the Isthmus route and within the political sphere of Hierapytna. Local trade, maritime commerce, and the establishment of connections or outlets to international routes in the Aegean and Mediterranean were probably vital forces in the economics of this marginal agricultural environment.¹³⁴ Rome's exploitation of a preexisting settlement structure in East Crete would, no doubt, have suited its most important concern, that of securing safe and efficient mobilization of Egyptian and Anatolian grain for the imperial *annona*, or annual quota.¹³⁵ The small rural community that had returned to the Kavousi area with the establishment of Hierapytna's control of northern cities found its subsistence base in the marginal hinterland. In the Roman empire, could such settlements have supplemented their grain supply and livelihood by providing maintenance support, custodial service, and transport facilities for the port and storage buildings of the Tholos bay?¹³⁶ It is important that archaeological survey in the neighboring area of Vrokastro has recovered Roman sites along a southeastward route originating from the northwest coast at Istron and following inland mountain passages leading toward Hierapytna. Hayden and Moody have observed, "The emphasis placed on this route, as suggested by the change in settlement pattern, may reflect the increased power and prominence enjoyed by Hierapytna during Roman times."¹³⁷ At Kavousi a similar ruralization of settlement had taken place, as suggested by the evidence for small secondary centers and isolated farmhouses. The Roman granary and warehouse at Tholos bay show that the renewed activity in the area could well have been the result of increased and expanded international trade during the Roman Empire. The controlling interest in such maritime economic growth was the city of Hierapytna, which had enjoyed continuing city status into the Roman period. While

population movement from the countryside to the *astu* that Alcock observes for the 2nd–1st centuries B.C. in mainland Greece was a process that might already have begun to take place in areas of East Crete in the 7th and 6th centuries B.C.

¹³⁴ Thus, the extent of Rome's direct influence in the affairs or formal development of East Cretan cities might have been considerably less than in the central part of the island, where Gortyn was established as capital of the province and where Knossos was Crete's only Roman colony; these two sites are located inland and precisely within the most important and substantial grain- and vine-producing environments (Harrison 1991, p. 115). Rome's interest in maximizing control and encouraging nucleation of settlement activity in such high-population agrarian regions is not surprising.

¹³⁵ Settlement nucleation, as a condition or a result of Roman economic and political restructuring (Alcock 1993, p. 144), had already been accomplished by Hierapytna by the Hellenistic period; Rome could simply absorb a city-state whose territory and economy were established not for local agricultural production and mobilization for export but as a trade conduit and land link for off-island seaborne commerce. Most important in this respect was the imperial *annona*.

¹³⁶ It is interesting that even before the large-scale importation of flour and the abandonment of barley and wheat production for olive-oil and vine exports in the 1960's, Kavousi had relied on state or private importation for nearly 30 percent of the village's total annual grain consumption. See Casson 1971, pp. 365–370 for Greek and Roman harbors and their specialized personnel. See also Garnsey 1983 and Tengstrom 1974, pp. 33–34 on administration of harbors and mechanisms of transport and storage.

¹³⁷ Hayden, Moody, and Rackham 1992, p. 333.

certainly peripheral to the urban expansion on the south coast, Tholos was only one of many market and administrative centers in the Isthmus area.¹³⁸ Such villages and mercantile establishments must have relied on and, in turn, supported the economic and political center of Hierapytna and certainly benefited from the city's coastal importance.

CONCLUSIONS

Kavousi appears to have been peripheral to other areas of Crete where early state centers developed in the neopalatial and Archaic-Classical periods. That this region was unaffected by the socioeconomic changes that were ushered in by the emergence of such political systems is unlikely. The evidence at Kavousi of changing settlement patterns through time provides a localized context in which to assess the nature of palatial influence, economic change, and diverse forms of cultural complexity. The data suggest a normative mode during the formative prepalatial period and Early Iron Age in which dispersed patterns of apparently unranked site clusters are persistent; such clustering appears also in the protopalatial period, precisely the phase of Minoan cultural development in which we expect to see a two-tiered or three-tiered hierarchy within emergent palatial economies. Might it be possible to gauge the residual effects of state formation, the extent of early palatial landed hegemonies, and the level or intensity of palatial economic influence by regional and periodic divergence from this pattern? At Kavousi the most salient variation from the normative system occurred once in MM III and again around 600 B.C. By LM I a clear two-tiered hierarchy existed as towns formed in coastal zones; the causal factors of this change must be sought in the economic conditions of palatial organization and maritime economy, as well as in the extreme limitations of the agricultural environment of Kavousi. In the Classical period nucleation of settlement to coastal centers outside the Kavousi area is likewise a probable response to the growing population in urban centers and off-island economic interests. Perhaps the development of apparently unranked site clusters in the MM, Dark Age, and modern periods represents a periodic maximum dispersal of population, arranged in basic economic and social units in the landscape. While the patterns are suggestive of agricultural dependence on local arable land, this is only one indicator of local micro-regional identity; the nature of relationships between the clusters remains to be analyzed. The departure from this recurring spatial pattern suggests new connections to wider regions beyond the survey zone and population movement to nucleated economic centers. The results of survey at Kavousi strongly suggest that the study of regionally specific settlement patterns and the examination of purely local responses to environment are viable means of assessing the diverse effects of political and economic changes involved in the emergence of palatial and *polis* societies.

¹³⁸ See Bennet 1990, p. 201 on site hierarchies in the Roman period.

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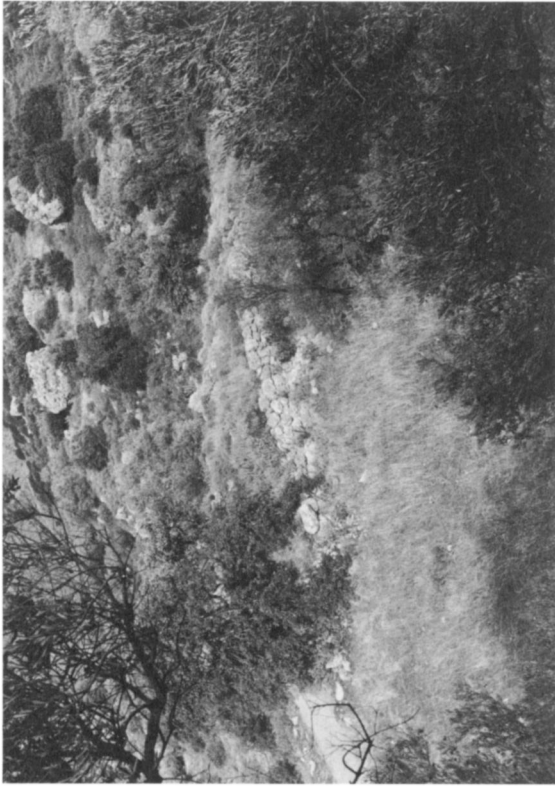
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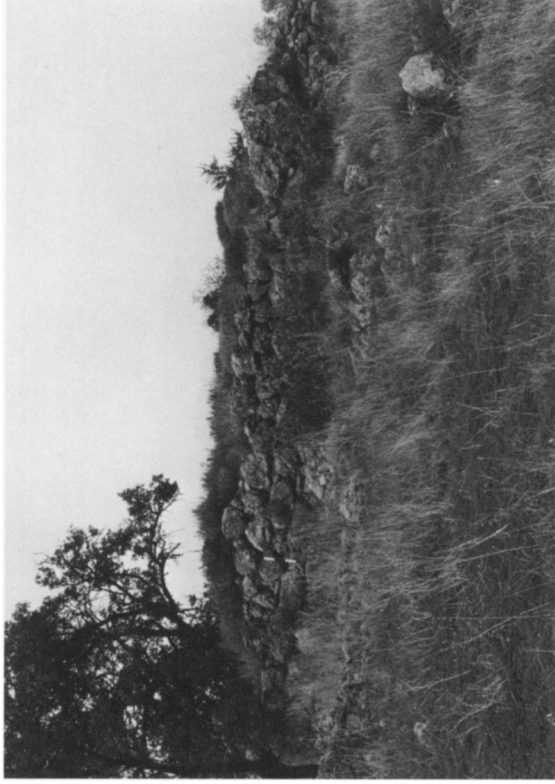
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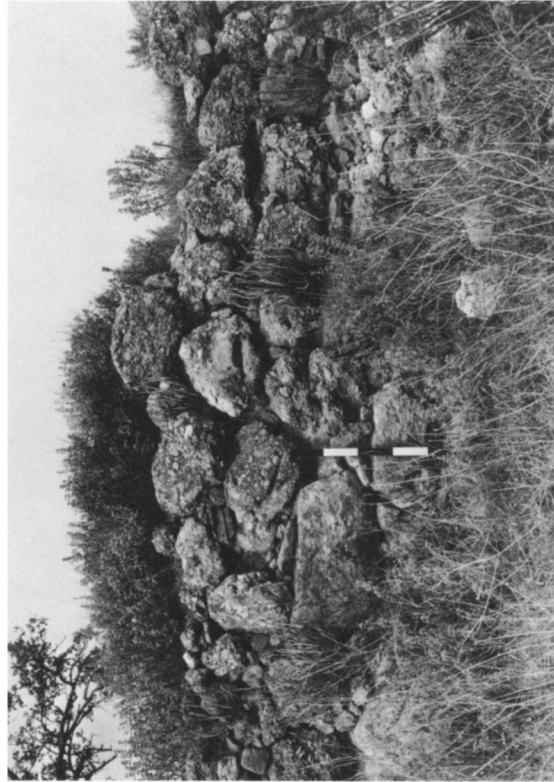
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a. Khondrovolakes: Protopalatial house from southwest



b. Khondrovolakes: Protopalatial house from south



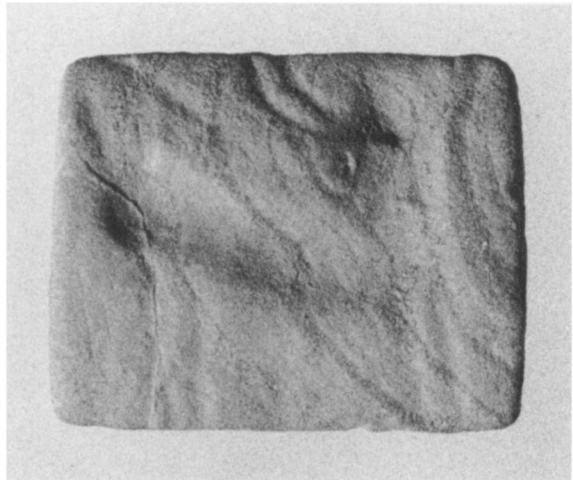
c. Khondrovolakes: Protopalatial house, wall detail



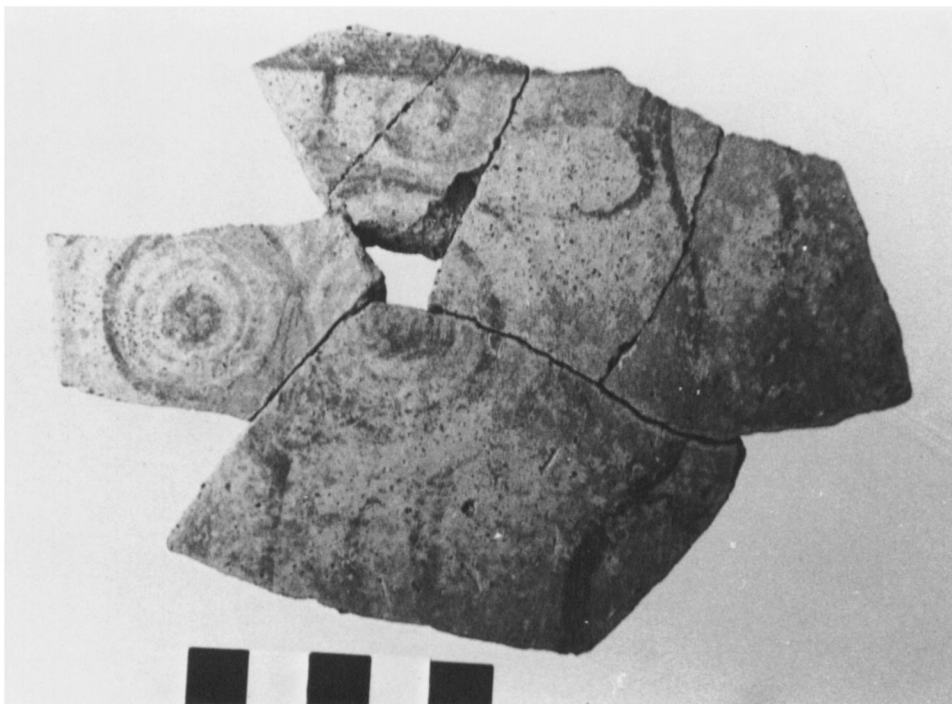
d. Kavousi village: Protopalatial house foundations from northwest



a. Neopalatial figurine fragment
(105) from locus 38. Scale 5:4



b. Cushion seal from Khondrovoulakes.
Scale *ca.* 3.5:1



c. LM IIIC amphoroid-krater fragment from Kephalolimnos