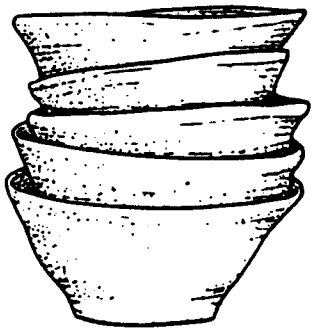
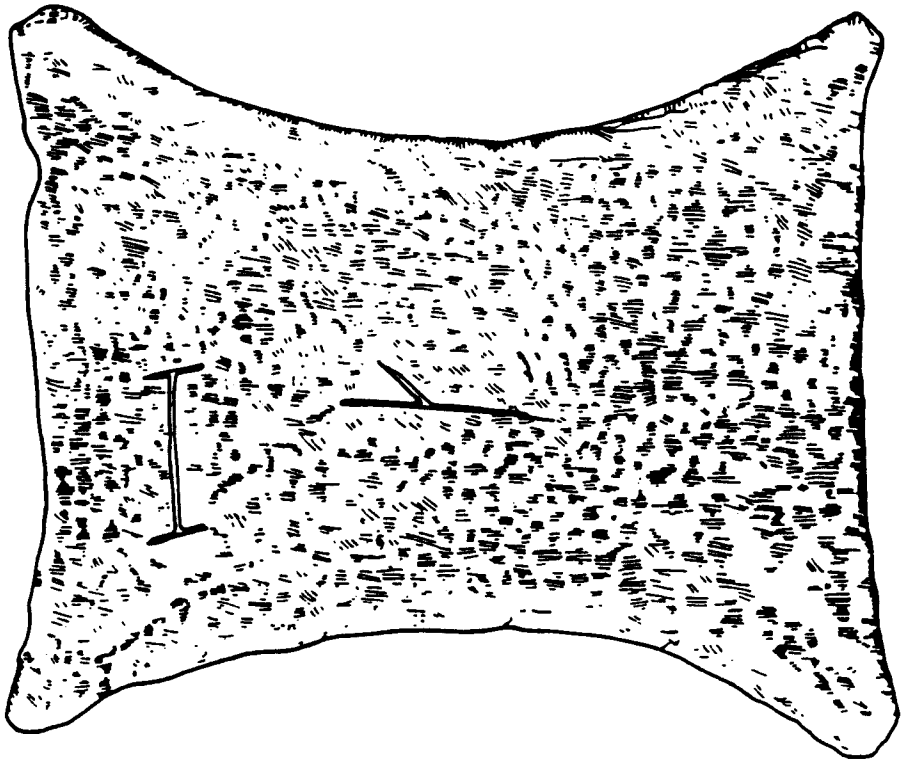


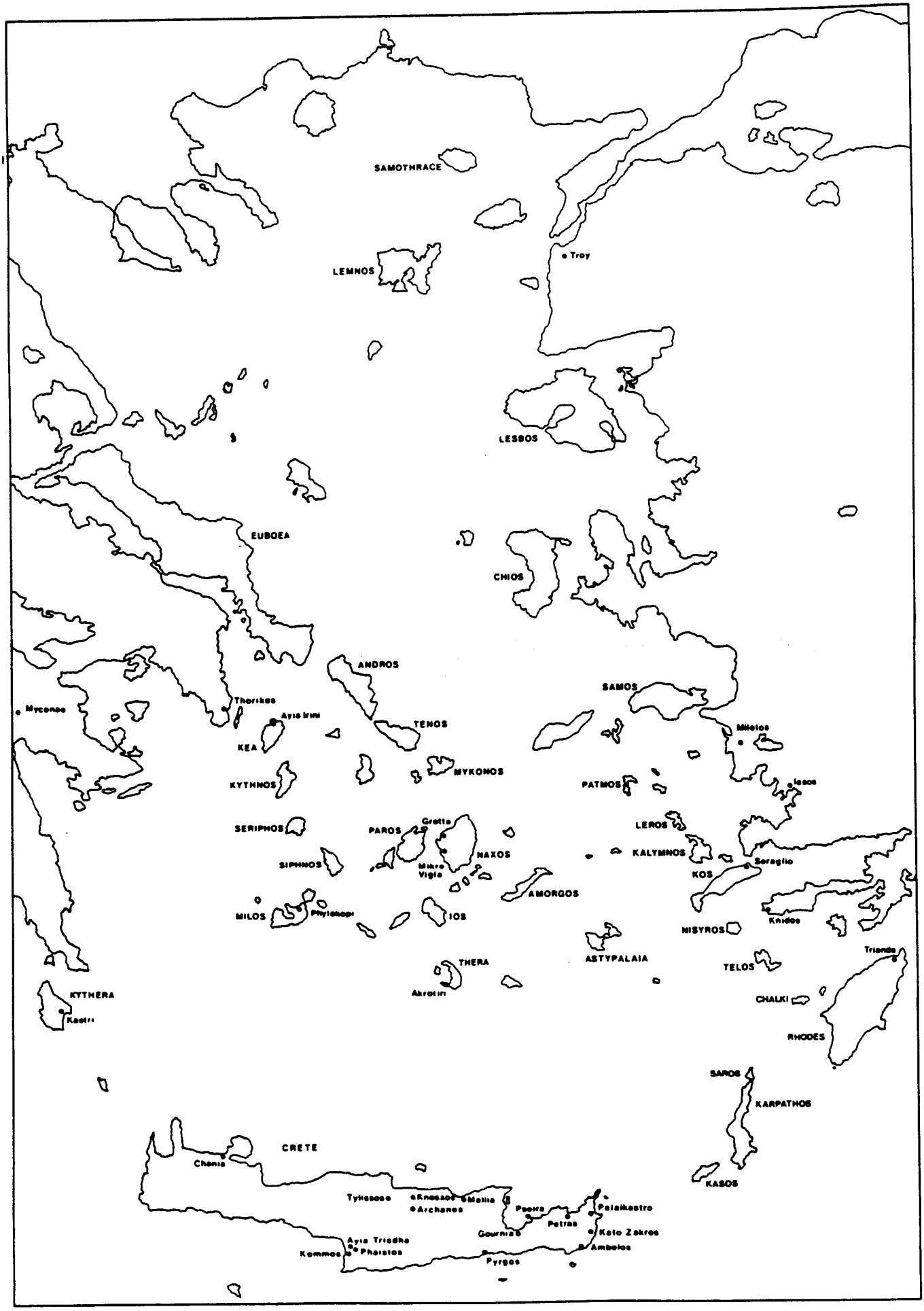
THE ISLES OF CRETE?

The Minoan Thalassocracy Revisited

M. H. WIENER



The following article (but with numerous errata, some affecting statements of fact) appeared in ***Thera and the Aegean World III, Volume One: Archaeology***, Proceedings of the Third International Congress held in Santorini, Greece, on September 3-9, 1989, eds. D. A. Hardy with C. G. Doumas, J. A. Sakellarakis and P. M. Warren, The Thera Foundation, London, 1990, pages 128-160. The errata were published in ***NESTOR***, 18:8, November 1991. This text incorporates all the corrections. The pagination indicated in brackets in the text refers to ***TAW III, Volume One***. The cover page drawings depict a stack of Minoan conical cups and a copper oxhide ingot with Cypro-Minoan signs from Ayia Triadha in Crete.


SAMOTHRACE
LEMNOS
Troy
LESBOS
EUBOEA
CHIOS
ANDROS
SAMOS
Mycenae
Thorikos
Ayia Irini
KEA
TENOS
KYTHNOS
MYKONOS
Miletos
PATMOS
Iasos
SERIPHOS
PAROS
Grotta
LEROS
NAXOS
KALYMNOS
SIPHNOS
Mikro Vigla
Seraglio
KOS
AMORGOS
MILOS
Phylakopi
IOS
NISYROS
Knidos
ASTYPALAIA
Triandа
THERA
TELOS
Akrotiri
KYTHERA
Kastri
CHALKI
RHODES
SAROS
KARPATHOS
CRETE
Chania
KASOS
Tylissos
Knossos
Malia
Archanes
Palaikastro
Petras
Gournia
Kato Zakros
Ayia Triadha
Phaistos
Kommos
Ambelos
Pyrgos

THE ISLES OF CRETE?
THE MINOAN THALASSOCRACY REVISITED

M. H. Wiener

ABSTRACT

This paper examines the proposition that sites in the Cyclades, the Dodecanese and along the coast of Asia Minor constituted major, purposive, differing but complementary parts of a Minoan empire at the time of the Theran volcanic eruption during LMIA. Considered first are:

A. the size, population, internal organization and special function of Aegean sites;

B. the pottery from these sites, including in particular (1) the adoption of the Minoan "kitchen kit" at sites in the Cyclades and Dodecanese, (2) Minoanization versus indigenous tradition in the pottery of Kea, Melos and Thera, (3) the presence of the archetypal Minoan vessel, the conical cup, in vast numbers at all the sites in question, (4) alternative explanations for the Minoanization of pottery in the light of other categories of evidence;

C. the evidence for Minoan-inspired town planning and architecture in the Cyclades and Dodecanese, including the extent to which neopalatial innovations of the "School of Knossos" are adopted in the island sites in comparison to sites in East Crete;

D. the wall painting of Akrotiri for its depiction of Minoan religious iconography and social mores, executed in a local style.

The information gained is next used to consider:

1. the role of Minoan ritual in Crete and the islands;

2. the significance of Minoan overseas trade, and especially Minoan dependence on critical foreign sources of copper and tin, in terms of the interest of Crete and its palatial elite in trade routes; and

3. the impact of Minoan power, based on population, resources, organization, literacy, numeracy and technical skills (including skill in the manufacture of weapons) on the Cyclades and Dodecanese.

The final section then assesses the likelihood that sites on the principal trade networks were major parts of a Minoan empire ruled, however indirectly, from Knossos.

[Page 129 begins]

BACKGROUND

The years since the Thera Congress of 1978 have seen many proposed models of Minoan-Cycladic interaction in the Late Bronze Age, as well as many suggestions concerning the development of Cretan palatial economy and society with implications for the analyses of Minoan activity abroad (e.g., Barber 1987; Branigan 1981; Cadogan 1984; Cummer and Schofield 1984; J. Davis 1979; Davis and Cherry 1984; Davis and Lewis 1985; Hiller 1984; Hood 1984; N. Marinatos 1984 A; Melas 1988 A; Schofield 1982; Wiener 1984, 1987; and generally in the papers at the Third and Fourth International Symposia of the Swedish Institute at Athens, published in 1984 and 1987). The Hood/Hiller view that Crete through its preponderance of strength and weapons could and did exercise political control over Thera and other islands, Branigan's contrary proposal that we recognise at Akrotiri and other Cycladic sites Minoan "community colonies" rather than "governed colonies" and N. Marinatos's suggestion of a Minoan threskeiocracy are three examples. In 1982 I argued that the "Versailles effect" of Minoan palatial culture on the prestige artifacts of surrounding areas did not in itself provide evidence of Minoan political domination, economic domination or emigration, and proposed that movement of people should be sought instead in items of ordinary life such as cooking or weaving equipment, and particularly in unique features such as the enormous numbers of conical cups at various sites (1984, 17-25). In 1984 I proposed that a critical aspect of Minoan-dominated trading networks was the palatially supported and directed search for copper and tin beginning in the protopalatial period, and that by LM-LCI at the latest Crete and the trading networks were controlled from Knossos (1987, 261-266). The present paper considers further the probable nature of relations between Crete and the Cyclades/Dodecanese in LMI.

A. The Size, Population, Internal Organization and Special Functions of Sites in LM/LCI

(1) Size

Warren (1984, 40) estimates the area of intensive occupation of Knossos, on the basis of the definitive survey by Hood and Smyth (1981), as 75 hectares of which 30 hectares were occupied by houses. The area of Malia, including the palace and running north to the agora, east to House Zeta, south to House E and west to Quartier Mu, covers about 6 hectares of apparent contiguous habitation. If, as seems likely, the town extended to House Alpha on the north and to House Theta on the northwest toward the harbour, another 15 hectares would be added giving an overall total of around 23 hectares at the least (van Effenterre 1980. I am greatly indebted to J. A. MacGillivray for these calculations.). Palaikastro is believed by its excavators to cover 36 hectares based on surface indications, primarily of pottery (MacGillivray, Sackett, et al. 1984, 135), but how much of the area was actually occupied by houses can only be determined by excavation. The excavated portion of Kato Zakro, including the buildings on the hill of Ayios Antonios across the ravine and surface indications of yet unexcavated buildings, covers 7.5 to 9 hectares (S. Chryssoulaki, personal communication, for which I am most grateful). Phaistos, Ayia Triadha, Kommos, Tylissos and Chania are difficult to estimate with respect to size on present evidence.

Gournia is about 2.5 hectares (1.5 hectares of excavated area, plus surface indications of roughly 1 additional hectare of buildings), Pseira 1.6 hectares and Pyrgos 0.5 hectare.

Turning to the Cyclades, it is at once evident that Thera differs markedly from Melos and Kea with respect to size of principal site and extent of other occupation. In LCI, Ayia Irini including the unexcavated portion is one hectare (Davis and Cherry, this volume) and Phylakopi

an estimated two hectares (Wagstaff and Cherry 1982, 139-140), while Akrotiri in the estimate of Doumas based on the ground formation may cover 20 hectares (1983, 45). This disparity in size (and at Akrotiri the reasonable anticipation of what may lie behind the grand ashlar facades, in some cases preserved to the third story, of Xestai II, IV and V, and along the wide street leading to the east) suggests that while Ayia Irini and Phylakopi were small ports, Akrotiri was a major town (Hope Simpson and Dickinson 1979, 343-345; Sperling 1973; Palyvou 1986, 181, 184, Note 10; Davis and Cherry, this volume. The disparity in size of sites is given careful consideration in Davis and Cherry, this volume. Estimates of size of partially excavated sites of course depend on conjecture as to whether the **[Page 130 begins]** structures that have been found or suggested by the amount of sherd scatter would form a contiguous whole.).

As a caution against the construction of inflexible patterns of trade based on presently known and excavated sites, we may note the situation of Grotta on Naxos, where a double harbour, separated by a promontory with some evidence for habitation on both sides, was linked by a well-built road. At Grotta however the evidence is mostly LCIII (Barber 1987, 15, Fig. 17). Only some Marine Style pottery and perhaps a few large building blocks are known from the earlier LC-LMI occupation (Kondoleon 1958, 228-229; 1959, 180-187; 1961, 600-608; Lambrinoudakis 1970, 249-254; Hadjianastasiou 1988). If, as some believe, the LCI site extends from the present harbour to Grotta, it could equal the Seraglio on Kos in size; but any estimate at the present stage of excavation is highly tenuous.

Kastri on Kythera like Ayia Irini is a small port on a promontory of roughly 1 hectare, or perhaps a little more or less depending on the degree to which the now-denuded promontory and the area of the Byzantine fortifications were occupied in LCI (Coldstream and Huxley 1972, 67-76 and Fig. 3).

Turning from the sites to their hinterlands, we again note the difference between Kea and Melos on the one hand and Thera on the other. Intensive survey of Kea disclosed no evidence of significant habitation within 20 square kilometers of Ayia Irini, the notional hinterland and the area embraced by Classical Koressos, except on the hilltop of Troullos overlooking Ayia Irini (Davis and Cherry, this volume). Moreover, surveys of large parts of Kea and Melos have produced little evidence of significant habitation apart from the principal center on either island. MC to LCII sherds were identified from at least ten places on Kea, but these came only from the standard Minoan shapes of pithoi, cooking vessels and conical cups (Davis and Cherry, this volume) and may have been used by inhabitants of Ayia Irini while at their farms in the countryside. On the Troullos hilltop the finds, which include stone offering tables, a bronze figurine and hundreds of conical cups, suggest that the site may have been a peak sanctuary or hilltop shrine of Minoan type, although it lacks the typical clay figurines of people, limbs and animals (J. Caskey 1971, 292-295).

On Thera the situation is quite different. Casual quarrying operations along the rim of the caldera have disclosed 16 sites, many containing significant finds including corners of houses and stone pillars built of ashlar blocks, painted frescoes, Minoan and locally-made stone bowls, stone bases supporting wooden columns and decorated fine wares (Davis and Cherry, this volume; Sperling 1973; Doumas 1983). Thera thus may mirror Crete with respect to the neopalatial emergence of the "country house".

In the Dodecanese, Trianda on Rhodes was also a major town, with a size of about 15 hectares (Marketou 1988, 28, where an estimate of 12.25 hectares was given, but now extended to 15 hectares as a result of subsequent excavation, personal communication. See also Marketou 1988, 32 and Mee 1982, 4). In the case of Trianda the evidence for size seems sufficient, since it comes from 18 rescue excavations which have indicated both the extent of contiguous occupation within the proposed 15 hectares and the lack of occupation outside it. Earlier excavations produced evidence of the arrival in LMI of ashlar facades; recent excavations by T. Marketou

disclosed a house in the process of construction with a polythyron; three bronze figurines, otherwise rarely found outside of Crete, bringing the total for Rhodes to at least five; waste from a large metallurgical installation near the polythyron, in the area containing the most important buildings of the town, and bronze tools (Marketou 1988, 30-31, Note 26; paper in this volume and personal communication). Trianda in LMIA was like Akrotiri ringed by smaller settlements (Marketou 1988, 32). Melas's recent surface survey discovered evidence of what may well be a Minoan promontory site of the Kastri on Kythera type at Kolimbia-Theodokos on the east coast of Rhodes, with typical MMIII pottery (1988 B, 299-300).

The evidence for the size of the Seraglio on Kos is less substantial. Rescue excavations by the Archaeological Service following the pre-war Italian excavations (Morricone 1975, Fig. 3) have disclosed structures on both sides of the promontory separating the fine double harbour, connected by a main road through the town center. If structures covered the whole of the area indicated, the Seraglio would conceivably have equalled or exceeded Trianda in size; on the basis of present evidence, however, T. Marketou estimates the size of the Seraglio at about half that of Trianda, or 7.5 hectares (personal communication. I am deeply indebted to Dr. Marketou for her advice and assistance with respect to Trianda and the Seraglio.).

[Page 131 begins]

The following table, provided for ease of reference, is subject to the caveats stated in the text.

Site	Estimated size in hectares in LC-LMI
Knossos	75
Malia	23+ (?)
Palaikastro	20 to 36
Akrotiri	20 (?)
Trianda	15
Kato Zakro	7.5 to 9
Seraglio	7.5 (?)
Gournia	2.5
Phylakopi	2
Pseira	1.6
Ayia Irini	1
Kastri	1 or less
Pyrgos	0.5

(2) Population

Population estimates for Aegean Bronze Age sites are notoriously difficult. Evans changed his estimate for Knossos dramatically over the years; Hutchinson's estimate of a possible 100,000 (1950, 206) is termed grandiose and unrealistic by Renfrew (1972, 238), whose own estimate for the total size of Knossos, however, is equal to one-third the area of occupation suggested by the Hood and Smyth survey (1981; see also Warren 1984, 40).

Among the many serious problems inherent in any population estimate are the difficulties of gauging what percentage of a site was occupied by housing, how many floors the buildings had, how many servants slept in the basements or workrooms, and how much space per person was regarded as necessary in LBI. Large, complex sites such as Knossos would have had a

higher proportion of space devoted to public and ceremonial rooms, courts (including the central and west courts of the palace), roadways, and perhaps royal parks and zoos, than smaller sites. Hood (Hood and Smyth 1981, 10) on the basis of his meticulous survey estimates that at Knossos about 30 hectares of the total 75 were available for houses. On the assumption that the average house size was about 250 square meters, roughly the size of the South House by the palace, a total of about 1,200 houses is obtained for the site. Hood observes that if 10 people lived in each house, a total population of 12,000 would result, or 160 per hectare for the entire site and 250 per hectare for the dwelling area, not counting those who lived in the palace. Hood further notes that estimates and census reports for the population of Candia/Herakleion from around 1300 A.D. to 1834 A.D. provide numbers between 8,000 and 15,000. On the other hand, the palace, villas and houses at Knossos and the houses in general at larger complex sites would have had more floors than the houses at smaller sites like Gournia. What the net effect on population of greater vertical but lesser horizontal density would have been is hard to say, and may have depended on differences in societal factors such as the number of servants, if any, per house at the two types of sites.

For the small site of Ayia Irini, Davis and Cherry in this volume estimate the likely population resident in LCI-II, when the settlement reached its maximum extent of around 1 hectare, at "780 to 1,250 individuals, roughly comparable to the later Classical polis of Koressos, which embraced much the same territory".

Wagstaff and Cherry (1982, 140, 252) estimate the population of Melos in the later Bronze Age at 2,000-3,000, about the population of Classical Melos, of whom not more than 2,000 were in Phylakopi. The authors note the relative lack at Phylakopi of open and public space as against houses, which they estimate covered about 70% of the excavated area. To this estimate they apply broad cross-cultural formulas relating population to floor area which would yield a range of around 1,400 to 2,250 for Phylakopi on the basis of the surviving habitation area, while noting the possibility that the site may have been somewhat larger (Wagstaff and Cherry 1982, 140, 252; Naroll 1962, 587-589; Cook 1972, 16; Casselberry 1974, 117-122). A rough rule of thumb of 1,000 people per hectare of contiguous habitation may be derived from these formulas, which are based in significant part on contemporary Indian pueblos in the southwestern United States. It should be noted that the formulae cited are properly applied to dwelling area and not total site size. Sanders notes that the fertile soil near Phylakopi could easily have supported a population in the range suggested (Sanders 1984, 251-262).

Branigan, however, reaches very different conclusions for the comparable Cretan sites of Pseira and Gournia, stating his view of the problem and methodology as follows: "What these figures [of size] mean in terms of population cannot be objectively calculated, and the population figures which **[Page 132 begins]** I suggest for the East Cretan towns are little more than guesses. I have however studied each building individually (insofar as the excavation reports allow this to be done) and tried to assess the area given over to living quarters as opposed to that occupied by storerooms, kitchens, workshops and vestibules. I have also taken into account the proportion of large houses to small ones, and at Gournia the additional factor of the "palace" and its inhabitants. With these various factors in mind I would suggest the following population figures for the East Cretan towns of the Late Bronze Age -- Pseira approximately 400, Gournia approximately 700..." (1972, 755). For these two sites, Branigan's estimate results in a population density of about 300 inhabitants per hectare for Pseira, and 470 for Gournia. (Branigan estimated the total area of Gournia at 2.5 hectares, but his population estimate was based on his analysis of the structures of the excavated area which covers 1.5 hectares. His lower estimate for Pseira was based on the assumption that the steep hillsides were sparsely inhabited, and that some of the structures were one-storied and housed nuclear families [personal communication].)

Schofield believes there is simply no way of knowing how many people actually lived in House A or any of the other large houses at Ayia Irini, but finds it difficult to imagine 1,000 people crowding through the narrow alleys; accordingly she would regard any population figure above 500 as surprising (personal communication). Betancourt has expressed similar skepticism concerning the high numbers generated by a formulaic estimate of 1,600 people for the 1.6 hectares of Pseira. He estimates instead that the site comprises 60 to 70 houses, each of two stories and averaging 12 to 15 rooms per house. He also notes (as does Schofield) that there is no way of knowing how many servants or slaves would have slept in each house, but a rough approximation of ten people per house would produce a population for the site of 600 to 700 (personal communication). Betancourt's estimate results in a population of approximately 400 per hectare for Pseira. An additional element of uncertainty arises from the fact that seaports like Ayia Irini and Pseira may have had rooms available for ship's crews; moreover, the population may have differed in the sailing and winter seasons, with more local sailors in port in winter but more visitors the remainder of the year.

Frankfort made the same estimate of 400 people per hectare for the cities of Sumer. He and Delougaz found that various sites in the period 2800-2000 B.C. had about 50 houses per hectare, with an average area of 200 square meters per house. They estimated 6 to 10 occupants per house, including children and servants, resulting in a population density of 300 to 500 people per hectare. They then compared the areas and populations of Aleppo and Damascus in 1950, two modern cities which Frankfort and Delougaz believed to continue in many ways the ancient conditions, for Aleppo in 1950 was a trading center and Damascus an oasis-city. In both cases they found a density of 400 people per hectare, the average of their figures (1950, 103-104). Renfrew (1972, 251), proceeding from the assumption that Aegean sites of the Middle and Late Bronze Age were not so closely packed as Mesopotamian cities, adjusted Frankfort's figure to 300 per hectare for the Aegean.

For Chalcolithic to MB Palestinian coastal sites numbers of between 120 and 250 per hectare depending on the site have been suggested, with the estimate of 250 per hectare preferred for major MB sites (Broshi and Gophna 1984, 41-53 and 1986, 73-90; Gophna and Portugali 1988, 11-28. I am grateful to J. Weinstein for these citations.).

The population of Ugarit in the Late Bronze Age has been considered by Garr (1987, 31-43). Administrative texts there indicate an average nuclear family size of 5.25 persons, not counting elders, workmen or slaves living with the family. Public or monumental areas are thought to occupy 27.5% and residential areas 72.5% of the 20- to 22.5-hectare site. Of the residential area 47.9% is considered enclosed living space, covering 7.64 hectares. Three formulae for estimating population from these data, based respectively on the presumed number of persons per room, per total floor area, and per hectare, are considered, giving widely differing results ranging from 3,000 to 13,500 people at Ugarit in the Late Bronze Age. Garr proposes a middle number of 7,635 based on Naroll's total enclosed floor area method as the most reasonable estimate in light of all the evidence. Dividing this number by the total size of the site would result in a population of 340-380 per hectare.

A similar result is obtained for Kahun in Egypt during the 12th Dynasty in a careful study by F. Arnold (1989), who estimates a population of 3,600 people living in about 562 houses on a 9.1 hectare site. Here the data includes, in addition to Petrie's record of his excavation (1890; 1891) of most of the site, census papyri giving the population of houses of various types in five separate years (Griffith 1898, 19-23), and estimates of the capacity of the granaries of Kahun in terms of the **[Page 133 begins]** population this could support (Kemp 1986, 130-134). F. Arnold notes that the population census records indicate significant changes in the number of people occupying individual houses in various years, reflecting largely the morbidity rates of members of extended families, and a decline in population for the site as a whole in the 13th Dynasty, when some houses are abandoned.

In Cyprus, on the other hand, a much more dispersed pattern of occupation within settlements apparently prevailed, both in the Late Bronze Age and in much more recent times (Swiny 1981, 78-79). The areas enclosed by the city walls of the major LBA sites in Cyprus (assuming the proposed outline of the city wall of Kition proves accurate; see Karageorghis 1976, Fig. 5; Nicolaou 1976, Fig. 1) are: Kition, over 70 hectares; Hala Sultan Tekke, 27 hectares (Åström 1972, Fig. 12; Åström, et al. 1976, IV); and Enkomi, 12 hectares (all of the above cited in Swiny 1981, 78-79). Habitation within these walls is not continuous, however.

The perils of any attempt to estimate population densities is illustrated by recent data from the Cyclades. During World War II the fifteen island capitals averaged 160 people per hectare, but the range of the individual communities went from about 70 to about 300. This level of variation in an area whose inhabitants presumably shared similar cultural values regarding crowding suggests that we should be cautious in expecting even broad similarity in population densities between Aegean communities in the Late Bronze Age (Cherry, Davis and Mantzourani 1989).

Of course it is conceivable that our modern sensibility underestimates Late Bronze Age tolerance of crowding, especially at times when intramural safety is a paramount concern, and that the Davis and Cherry, Wagstaff and Cherry, and pueblo-derived estimates of roughly 1,000 per hectare are closer to the truth. It would appear, however, that in considering questions of social complexity in the Late Bronze Age Aegean a more reasonable estimate on balance (grosso modo and allowing for large differences between sites) for the most densely populated urban sites is not greater than 500 people per hectare, and for Knossos and other larger sites considerably less.

(3) Internal Organization and Special Functions

The internal organization and external function of the various Cretan, Cycladic and Dodecanese sites is of great interest. At Zakros "town" and "palace" appear to function as an economic unit, with all storage and workshops for luxury imports including oxhide ingots occurring in the palace, but with essential foodstuffs stored and prepared in the town where six or seven houses contain wine or oil presses, and wine production is concentrated on the southwest hill (Chryssoulaki and Platon 1987, 77-84). Indeed, the town blocks on the flanking hills seem to tower over and encroach upon the palace. At the corner of the hill to the north, at what may have been the landward entrance to the town, stands House A with its 525 nodules bearing 1,005 seal impressions stamped by 214 seal types, some showing contact with parchment or hides (Weingarten 1983, 38-42). It seems likely that House A was a control point for goods coming in and out of Zakros. From what evidence we have, Zakros gives the impression of a coherent, centrally-administered whole, its evident wealth and its concentration of foreign luxury goods stemming from its role in trade with the east. Zakros also appears to be integrated into an island-wide system with Knossos at its head (Wiener 1987).

With regard to Pseira in Crete, Betancourt believes that major differences in the floor plans and finds between structures, with almost all the imported non-Cretan pottery coming from one house, suggests intense, palatially-directed specialization within the site itself in LMI, as at Zakros. The south-facing harbour of Pseira, two miles off the north coast of Crete, lay on the trade route running from Chania eastward to Siteia and then to Karpathos in the 19th century (Betancourt 1989).

Ayia Irini on Kea presents a different picture. Here the entire site, a small port on a defensible fortified promontory opposite the mines of Laurion, seems to specialize in metallurgy, to judge from the litharge spread throughout the site and the crucibles which appear in numbers in every house, though with a particular concentration in House A, the evident

administrative center of the site. Minoan-style terra-cotta "fireboxes" also appear in numbers in each house. Georgiou in the excavation report (1986, 8) observes that it is of singular interest that the distribution of these vessels is limited almost entirely to Crete and Minoanized sites in the Cyclades and Dodecanese, and to the neopalatial period. She concludes that fireboxes were used in the manufacture of aromatics. Betancourt (personal communication) notes that the distribution of fireboxes widely among individual houses at Ayia Irini and in Crete, rather than in concentrations in specific locations, may suggest household use in heating aromatic fats to dispel odors rather than industrial use. Similar interpretations **[Page 134 begins]** of fireboxes as incense burners have been advanced by Hazzidakis, Chapouthier, Coldstream and Huxley, and Warren, as noted by Georgiou in the excavation report. Schofield observes that at Ayia Irini "whatever expert knowledge was required for recasting bronze or manufacturing aromatics was shared by just about every household", and that "in a sense, Ayia Irini can be viewed as one big workshop". Schofield concludes that "Ayia Irini as a settlement appears to have specialized in certain industries" and "this might be related to external trade", adding that other towns may have developed special roles for an external market, but using equipment less special in shape and hence more difficult to identify in the archaeological record (this volume).

All of the small sites considered -- Ayia Irini, Phylakopi, Gournia, Pseira and Pyrgos -- follow the pattern of a main building which displays some of the architectural innovations of the neopalatial "School of Knossos" (see below), surrounded by smaller dwellings or blocks of dwellings lacking almost entirely any "Knossian" features.

In comparison with these small sites, Akrotiri in Thera displays a high degree of social complexity and significant differentiation of function between various buildings, even on the basis of the small 1-hectare portion of the site exposed to date, and with the largest building known, Xeste IV with its facade composed entirely of ashlar, still unexcavated. Xeste III, for example, the structure most Minoan in architecture and with the strongest evidence of cult activity (including Minoan religious iconography) contains relatively little pottery and no loom weights. The West House, on the other hand, contained over 450 loom weights, more than half the total number of loom weights from the entire site to date, and sufficient to fill the house with looms, suggesting that on Thera production of at least certain types of cloth was a specialized industry (Tzachili, this volume). Tzachili perceptively notes the importance of sailmaking to a maritime economy and naval power, and the demand for cloth the need for sails would have generated. Accordingly, the concentration of loom weights in the West House with its frescoes containing depictions and symbols of seafaring may be meaningful.

Evidence of metallurgy at Akrotiri comes from Block Delta, where a significant amount of litharge of silver or silver-rich lead was found (Stos-Gale and Gale, this volume), from Block Gamma in the form of a possible anvil (S. Marinatos 1970, 43-46, Plate 40), and from Room 4 of the West House, where S. Marinatos reported recovering a piece of litharge which Puchelt submitted to Oxford for testing (Stos-Gale, personal communication). The keroussite block previously reported from the West House (S. Marinatos 1974, 29-31) has been analyzed as emery as reported by Michailidou at this Congress (Discussion after Schofield paper).

Akrotiri has so far produced only 10 fireboxes of typically Minoan type versus 90 for Ayia Irini (Schofield, this volume), but only a few of the 90 came from unambiguous Period VI deposits contemporaneous with the Theran examples, the great majority having been found in Period VII deposits (Georgiou 1986, 11-12, Table 3).

Theran soil as the result of prior volcanic activity may have produced valuable vines in LMIA. The traveler Bent reported that in the 1880s Santorini with its 70 kinds of grapes produced more wine than any other place in Greece (1965, 121) and he added that without wine Santorini would have been a desert, since there was not enough barley to support the inhabitants (123). The Ottoman taxation records for the year 1670, however, report generally similar

proportions of land devoted to grain versus wine at Naxos, Paros, Andros, Syros and Santorini (Slot 1982, 294-306. I am deeply indebted to J. Davis for this information.). Perhaps in early Ottoman times the memory of prior chaotic conditions inhibited dependence on outside sources for grain, in contrast to more settled conditions in the late 19th century permitting Theran specialization in viticulture. A pax Minoica would similarly have encouraged specialization. (Bent also reported that a ten days' stay in the waters off the Burnt Islands of Thera would clean the bottoms of ships without any effort on the part of the sailors [118]. Any similar condition in LCI would have increased the attractiveness of a Theran port.)

B. The Pottery

Aegean sites during the neopalatial period produce enormous amounts of pottery for their size. A single basement room in House A at Ayia Irini contained 1,400 pots (Cummer and Schofield 1984, **[Page 135 begins]** 140), or many more pots than the entire population of the island. Of these 1,400 vessels from the Period VI, LMIA destruction deposit in Room 18, 820 were "that nightmare vessel", the conical cup, and the adjacent basement room contained an additional 550 from the same destruction (Schofield 1979). House A contained over 10,000 pots, 8,000 of them conical cups; that is to say, the main house (of the excavated area) contained over 20 pots, 16 of them conical cups, per person at Ayia Irini, assuming a population of 500 as suggested by the preceding section and by Dr. Schofield. (Of course these pots did not all come from the same destruction horizon; but on the other hand not all pots were preserved.)

(1) The Adoption of the Standard Minoan "Kitchen Kit" at Sites in the Cyclades and Dodecanese

Branigan has proposed as one criterion for identifying a "community colony" or foreign enclave (as distinguished from a "governed colony" or "settlement colony") the existence of separate culinary equipment or other evidence of distinctive eating or drinking habits (1984, 51). Accordingly, it is worth noting that in LCI the kitchen, dining and drinking vessels at the sites in question are of standard Minoan shape. The two most common, of course, are the omnipresent tripod-leg, coarse-ware cooking pot and (to whatever extent it was used for eating or drinking) the conical cup.

This is the case both with regard to sites considered purely or largely Minoan such as Kastri on Kythera and Trianda on Rhodes (but cf. Marketou 1988, 32 and Melas 1988 A, 47-70 as to Trianda) and sites where a local pottery tradition continues such as Akrotiri and, to a lesser degree, Phylakopi and Ayia Irini. Moreover, at least on Kea (the one island for which we have evidence due to the intensive survey conducted by J. Davis, Cherry and Mantzourani) the pattern continues for the hinterland as well. As Davis and Cherry report in this volume, finds outside Ayia Irini are limited in number and confined "to a very restricted range of shapes: tripod legs from plain cooking vessels, conical cups and, most characteristically, pithoi and large jars with relief bands of overlapping disks". The Kean hinterland thus contains the same Minoanizing ordinary cooking, dining and storage vessels in local coarse ware as Ayia Irini itself, a fact made even more notable by the near-total absence of obvious imported wares in the hinterland in contrast to the great number of imports at Ayia Irini (Davis and Cherry, this volume). The resurvey of Melos begun this year should determine whether the pattern of exclusively Minoan shapes of locally-made coarse wares in the hinterland applies to Melos as well. Popham has observed that the kitchen equipment on Crete and Thera appears remarkably similar (personal communication).

(2) Minoanization vs. Indigenous Tradition in the Pottery of Kea, Melos and Thera

While sites like Ayia Irini, Phylakopi, Akrotiri, Kastri on Kythera and Trianda yield thousands of imported vases (the great majority from Crete except in the case of Ayia Irini, where in LCI mainland imports roughly equal Cretan), the great bulk of the pottery at each site is of course locally made. The local wares, however, except for the special categories discussed below are largely dependent on Minoan prototypes in shape and when painted in decoration. There is some copying of mainland types as well, however. (I am grateful to J. Davis for calling this fact to my attention.)

On Kea the Minoanization of local pottery is already well underway in Period V (which includes the end of the Middle Cycladic period and the first appearance of LMIA material from Crete) affecting vases for drinking, serving, pouring and storing, as well as lamps, stands and trays, with Cretan styles copied in each of the five types of fabric and decoration found on the site (J. Davis 1986, 86). By Period VI (LMIA) indigenous ceramic development almost disappears in the face of "overwhelming foreign influence", only to reassert itself in Period VII (LMIB) (Cummer and Schofield 1984, 145). A possible single exception is the pedestaled bowl with broad, flat rim (J. Caskey 1972, 390, Fig. 12, F35) of Period V which may have continued to evolve in Period VI (J. Davis, personal communication).

Melos is probably still producing and exporting the bird or griffin jars popular in the preceding period, but beyond that the vitality of the local tradition is in doubt. The excavator of Phylakopi declared that in LCI (apart from the bird and griffin jars) "the entire ceramic production of Melos, or at any rate the entirety of the fine ware, was modelled upon Minoan prototypes. The autonomous inspiration of the preceding period has gone" (Renfrew 1982, 225; also Barber 1984, 180). Marthari, however, notes that the neck bands, dot-rosettes and form of the crocuses on some Melian LCI **[Page 136 begins]** pottery (Atkinson, et al. 1904, Plate XXIII) are all local elements applied to Minoanizing or local shapes, and believes that Melian pottery followed a course of development quite similar to Theran pottery (personal communication).

On Thera the continuing evolution and vitality in LCI of the indigenous ceramic tradition seems clear. Marthari's recent skillful study of the pottery from the destruction level divides the locally-made fine ware into six categories, of which two are purely Minoan in inspiration, two adopt Minoan decorative designs, and two evolve directly from Theran MC wares (Marthari 1984, 119-133; 1987, 359-379). The traditional Cycladic non-Minoan shapes which appear in the destruction level are the nippled ewer (whose history in the Cyclades begins in ECIII), cylindrical plant pot, ribbed vase, Cycladic bowl and rectangular tray or kymbe.

Of course the users of traditional Cycladic pottery could have been Minoan, or Therans of mixed Minoan-Cycladic stock. The kymbe exists in only ten examples, many of them decorated with dolphins, and some of which on the other side depict horned animals galloping in a field of crocuses. N. Marinatos presents the reasons for regarding them as ritual vessels in this volume. The nippled ewers, however, appear in large numbers and various contexts; it may even be the case that each household had them. There are good reasons for attributing cultic significance to these attractive vessels as well (N. Marinatos, this volume). The shape is similar to one known in Crete from EMI. It is easy to imagine that the Theran nippled ewer would have been readily accepted by Minoan colonists, even for cult use. The appearance of nippled ewers in Xeste III, a building with frescoes rich in Minoan religious iconography, with one polythyron above another and with the only LMI adyton or "lustral basin" outside Crete, perhaps may serve as an illustration. Three nippled ewers, presumably heirlooms, appear in a cult context in Crete in the LMIB destruction level at Myrtos. (Perhaps the obverse of the Theran nippled ewer appearing in Minoan contexts is the popularity of Minoan rhyta in Syria and Egypt [Kopcke 1987, 256].)

Even if the patrons of this traditional Cycladic pottery were Minoans or descendants of Minoans, there remains the impression of a lively and still-evolving local pottery tradition, perhaps represented by more than one Theran workshop, whose products are found in the Shaft Graves of Mycenae, in Messenia and Elis, and at various places in the Cyclades. It is this continuing evolution in the local tradition which seems significant in terms of Cycladic cultural survival, at the time of maximum Minoan power, wealth and cultural influence; otherwise the existence of pottery in local style might indicate nothing more than Minoan colonists' fashionable acceptance of local motifs, analogous to the frequent appearance today of American Indian pottery in non-Indian homes in the southwest United States or wooden bowls in the houses of non-native Hawaiian islanders.

The spatial distribution of pottery types at Akrotiri and Ayia Irini, the two sites for which we have adequate information, is worth noting. While fine-decorated wares of all Marthari's categories tend to be stored or used together, there is no evident example of separate storage or use of Minoan or Minoan-imitating wares on the one hand and those in the local tradition on the other (Marthari, personal communication). At Ayia Irini also, the proportion of imported, Minoanizing and local pottery in each deposit and building is similar (J. Davis, personal communication), except perhaps for the lack of fine-decorated pottery in the local idiom in House A (Cummer and Schofield 1984, 142) apart from the Griffin Jar (which J. Davis believes may be of Melian origin). House A, however, has large quantities of the local undecorated ware, mostly in the typical Minoan shapes common in Period VI.

Accordingly the spatial distribution of the pottery at these two sites gives no indication of Minoan (as distinguished from Cycladic) areas or households to support the proposition that we are dealing with Minoan "community colonies". Moreover, on present evidence there is no discernible difference between the pottery from Ayia Irini and the material collected from intensive surface survey of the adjacent quarter of the island of Kea, or between the material from Akrotiri and the scattered finds from elsewhere on Thera with respect to degree of Minoanization.

Can we draw any broader inference from the seemingly greater vitality of the Cycladic pottery tradition on Thera than on Kea at the time of eruption? Schofield is careful to note one possible mundane explanation for the decline of the local tradition on Kea in Period VI, namely that in an era when painted decoration for pottery was in vogue, Kea suffered a severe aesthetic disadvantage because of the "sheer nastiness" of the local clay which could be disguised by burnishing but not by painting (Cummer and Schofield 1984, 145. J. Davis, however, feels that Kean clay covered with a **[Page 137 begins]** yellow slip is not unattractive [personal communication]). Accordingly it would be unwise to base judgements of differing degrees of Minoanization, to say nothing of extent of emigration or colonization, solely on the varying vitality of local Cycladic pottery traditions on different islands in LC-LMIA. Rather these differences may be viewed as one facet among many of the differences among the various island sites discussed further below.

(3) The Conical Cups

The vast numbers of conical cups at all Minoan and Minoanizing sites both defy and demand explanation. At Knossos a zembil of 17 kilos of MMIII-LMI pottery may produce 300 cups or fragments (Warren, personal communication). The peak sanctuary at Juktas has produced enormous numbers, accounting for about two-thirds of all vessels (Karetsou, personal communication). The sanctuary at Kato Syme, the Diktaian Cave, Building 4 at the Phourni Cemetery at Arkhanes, and neopalatial tombs in Crete and in Kythera had masses of conical cups (Wiener 1984, 19-21). Whatever the reason, "a superabundance of conical cups, so it appears, was essential to the well-being of any Minoan society in this period" (Coldstream and Huxley 1972, 285).

Each of the sites in the Cyclades and Dodecanese discussed in this paper follows the pattern. The over 8,000 conical cups in the main House A at Ayia Irini, very roughly 16 per person for the whole site, with 820 in one basement room and 550 in the adjacent room, have already been cited; outside the main house the floor of a small room in Area C held another 566 (Schofield 1979). Of course most of the 8,000 came from the Period VII destructions; only the 820 and 550 cited from basement rooms 18 and 17 can be securely dated to a Period VI destruction. On the other hand, those preserved in destructions must constitute a small fraction of those which would have been available, a fact to which the vast numbers found in dumps can testify.

Conical cups were of course used for every conceivable purpose: as containers for drink and food, as lamps and ladles, spindle whorls and jar stoppers, possibly as incense burners, and for any odd purpose that came to hand, such as forming the breasts of at least two of the large terra-cotta statues of bare-breasted women from the temple at Ayia Irini (M. Caskey 1985, 29, Plate 32 e and g and Plate 37 a), or providing wall backing for the plaster of a fresco from Trianda (Monaco 1941, 71, Note 4. I am indebted to E. Davis for this example.).

Some cups travelled; a handful of Cretan and Melian examples were found at Ayia Irini, and a few from the northern Cyclades at Phylakopi (J. Davis, personal communication), but these could easily have come as stoppers for wide-mouthed jars carried on ships, rather than as personal possessions.

Schofield (1979) has observed that at Ayia Irini conical cups appear in practically every room of every house, and often in large numbers in areas where there is evidence of some sort of industrial activity, such as metal working or the making of unguents. No one, however, has thus far been able to suggest how conical cups could have been used in either enterprise. Few if any conical cups have been found with traces of metal, and only a small percentage show evidence of scorching, of which the majority show scorch marks only on the lip or rim, indicating use as lamps.

Conical cups could be made quickly and inexpensively; experiments employing the original method of building clay on a cone and cutting off sections with a string have shown that a production rate of 10 conical cups per minute is feasible (I am most grateful to Mrs. Vronwy Hankey and her daughter, the potter Mrs. Veronica Newman, for this and other information.). It may have been easier (at least at an inland site like Knossos) to discard them than to wash them; and given their porous nature, if left unwashed they would surely have drawn insects. Washing in sea water would have left a salt residue, changing on next use the taste of whatever they held. Indeed, one may question whether conical cups were used for drinking purposes at all, given their porous quality. In any event it seems reasonable to assume, given the numbers of conical cups in general and the number found whole in dumps, that for whatever reason of religious taboo, banqueting custom or convenience, some conical cups used in eating and drinking were used only once.

Certainly one among the many uses must have been ritual, as shown by the numerous examples of conical cups found with ritual equipment, or in foundation deposits, or in inverted rows in ritual contexts and containing vegetable matter (Wiener 1984, 20; for a contrary view, see Rutkowski 1986, 13, 48). The Spring Chambers at both Knossos (the Caravanserai) and Zakros contained conical cups with olives. N. Platon conjectured that at Zakros they represented offerings made to the divinity during the last moments of the palace (1971, 196-197). Platon also found at Rousses **[Page 138 begins]** Viannou a room with a layer of ash and about 40 inverted conical cups, which to him suggested a ceremony involving offerings and burning (1957, 90). In a small room built below ground level at Vathypetro, S. Marinatos found many inverted conical cups sealed by gypsum, which he interpreted as the remains of a ritual frequently repeated (1951,

260-261, Fig. 2). The 200 conical cups containing carbonized remains of vegetable matter inverted in rows in the pillar crypt of a house on the lower Gypsades Hill at Knossos provide perhaps the clearest illustration of the practice (Hogarth 1899-1900, 76). Did the cups inverted in rows contain mezedhes for the gods, or did each participant in a ritual leave one cup? Is such a ritual practice, frequently performed, sufficient to account for the vast number of cups?

In both Egypt and the Near East, ritual use of cups identical or similar to Minoan conical cups and also occurring in great numbers has been suggested. In Egypt conical cups begin in the 5th Dynasty and appear in vast numbers in the Middle and New Kingdom. In the New Kingdom, Egyptian conical cups are visually indistinguishable from Cretan examples and are often found containing olives, dates and seeds in ritual contexts. Indeed, in Egypt conical cups in the Late Middle Kingdom and 18th Dynasty seem to be used almost exclusively in such contexts as offerings for the gods, appearing not only in foundation deposits in the temples of Tuthmosis III and Hatshepsut and in their tombs, but also in the foundation deposits of the private tombs of Senenmut and of his parents. Conical cups also appear in Egypt in offering lists, where they serve as hieroglyphic symbols of offerings of stated amounts of wine, beer and oil (Dorothea Arnold, personal communication). In the Near East, where the beveled-rim bowl resembles the conical cup in its ubiquitous frequency, ritual use has been proposed as a major reason for the vast numbers required (Beale 1978, 289-313. A contrary view is held by Millard 1988. I am indebted to P. Harper for this reference.)

The pattern of distribution of conical cups at Akrotiri may be somewhat special. While conical cups were present in very large numbers, as could be seen in particular in the pottery dumps (M. Marthari, personal communication), nevertheless in the building deposits they do not seem quite as omnipresent as at Ayia Irini (where they appeared in practically every trench and every room). At Akrotiri they are concentrated in three major deposits in the West House, the House of the Ladies and Complex Delta. Each area contains indications of cult activity, ritual feasting, or at the least, plain feasting. The inverted cups found in Delta 7 were thought by S. Marinatos to signify cult practice (1971, 15).

That the central authority at a site required a large supply of conical cups is shown (e.g.) by the enormous numbers stored in House A at Ayia Irini and by a Linear A tablet from Ayia Triadha (HT 31) listing 3,710 conical cups along with 75 vases of other kinds. It will be interesting to see how many conical cups are found when Xeste IV at Akrotiri is excavated, given its palatial features of ashlar construction, masons' marks, procession fresco and pottery of exceptional quality.

That rulers, sacred or otherwise, might have been expected to provide ritual feasts on occasion would not surprise an anthropologist dealing with early states (Schmandt-Besserat 1982, 875) or recent chiefdoms. Frazer argued at the outset that ritual and politics meet in food (Frazer 1890, 1913-1915, 1936; Feeley-Harnik 1985, 288). Conversely, participants in a ritual might have been expected to bring an offering, as might anyone bringing supplies to the palace or main building serving as a cult center.

The evidence for use of conical cups in funerary ritual in the Cyclades is enigmatic. We have as yet no LCI burials at Akrotiri. Only two tombs at Ayia Irini, 28 and 29 (40 and 58 in the initial numbering system used in the preliminary reports), are of Period VI. Tomb 28 had been completely cleaned of contents at some point, and it is hard to say how far into Period VI Tomb 29 goes. Tomb 29 contained 10 pots, of which five were conical cups, four of them of the deep type. While the percentage of conical cups may correspond to Minoan practice -- in one of the LMI tombs at Poros, roughly 100 out of 200 vessels are conical cups (P. Muhly, personal communication) -- the number in Tomb 29 is much smaller than is typical for LMI Crete. The great tomb at Pyrgos in Period IV (LMI) contained over 450 conical cups (of which 235 were the standard undecorated variety and the remainder had paint decoration of splash, trickle or dipped

rim) out of a total of about 1,000 vessels (Hankey 1986), and Tombs D and E at Kastri on Kythera each contained between 75 and 100 (Wiener 1984, 20 with citations). On the other hand, another typical Minoan chamber tomb at Kastri, Tomb H, was cleaned of Minoan remains by later users and contained only **[Page 139 begins]** one conical cup with nothing else (Coldstream and Huxley 1972, 222). It should be noted that neither Tomb 28 nor 29 at Ayia Irini is of Minoan type; indeed both tombs have mainland parallels, and Tomb 29 seems to have been surrounded by a peribolos wall, or grave circle, perhaps as late as Period VII (Overbeck 1974, 80-83, 103-107).

(4) Alternative Explanations for the Minoanization of Pottery in the Light of Other Categories of Evidence

The argument for accepting the vast numbers of conical cups at Thera, Melos and Kea as strong evidence, in the context of other factors, for the presence of large numbers of Minoans or descendants of Minoans has been presented previously (Wiener 1984, 19-21). We should note here, however, two alternative hypotheses for explaining, or partially explaining, the vast numbers of conical cups: changes in manufacturing techniques and adoption for local Cycladic ritual. Davis and Lewis (1985) have shown how the spread of a simple technology of rapid production could have placed local potters under competitive pressure, and thus caused significant changes in the pottery repertoire in the islands. C. Doumas has noted that mat impressions which previously appeared on the bases of MC pots on Thera disappear at the beginning of LCI (1983, 117), implying a change in ceramic technology at this time. The same shift occurs on Melos (Davis and Cherry, forthcoming), and the Minoan type of potter's wheel appears at both sites (as well as at Mycenae and other sites outside the sphere of putative Minoan colonies [Georgiou 1986, 36-38]). Other changes in technology appear as well at this time. A Minoan stone vase-making technology exists on Thera in LCI (Warren 1978, 555-570) and in this period both Thera and Kea appear to adopt the Minoan technique of weaving as indicated by the appearance in large numbers of the Minoan-type discoid loom weight. J. Davis has noted that in MC two fundamentally different weaving methods were in use on Kea, but by LCI only the Minoan warp-weighted loom was used (1984, 161-162; Carington Smith 1975, 276-286). On Thera discoid loom weights are already found in the debris of the Middle Cycladic period (Tzachili, this volume).

Are these changes in work techniques more likely to reflect the arrival of Minoan settlers, rather than merely the appearance of traveling potters, stoneworkers and weavers, local adoption spurred by competition and/or the development of a specialized craft of weaving? At Ayia Irini the discoid loom weights appear in practically every house; Davis remarks, "We have some evidence which suggests that in time this essentially Minoan device permeated the entire population of Ayia Irini" (italics in text quoted, 1984, 162). We should note in this regard that generally women do not change casually the way they cook and weave; the total substitution of a technologically different weaving technique throughout the site suggests either central direction or the arrival of substantial numbers of settlers from Crete. Braudel has noted this general resistance of cultures to change in habit or custom of this nature (cited with commentary in Melas 1988 B, 310).

The contrast between the situation at the Cycladic sites and at the large Assyrian "community colony" at Karum Kanesh is instructive; there the Assyrian contingent consisted solely of men who took local wives. Accordingly no change occurred in the local pottery and weaving equipment.

As to the production of conical cups, the fact that inhabitants of the Cyclades and Dodecanese would have become familiar with the Minoan technique of rapid manufacture off the hump does not imply that they accordingly would have wished to produce and store conical

cups in such astonishing numbers; that desire required a change either in custom or population. Could the appearance of vast numbers of conical cups on the islands have been due largely to the former? The wholesale adoption of a Minoan religious or feasting ritual by a basically indigenous Cycladic population is the main possible alternative explanation (to major if not overwhelming Minoan immigration) for the superabundance of conical cups at Akrotiri, Phylakopi and Ayia Irini in LMIA-LCI. Changes in custom without changes in population can indeed affect the archaeological record; the conversion of pagans to Christianity was the probable cause of the sharp decrease in grave goods in some areas, and the break with Rome of Henry VIII led to the replacement of funerary masses by funerary banquets.

If the superabundance of conical cups stood alone as a Minoanizing feature, perhaps change in religious or feasting ritual could serve to explain even so singular a Minoan practice. In view, however, of the contemporaneous shift to Minoan cooking, eating and drinking vessels, lamps and braziers, weaving technique and religious iconography (see below), and the appearance of Minoan Linear A script (in the case of Kea even as potters' marks [Bikaki 1984] as well as on a jug with a ligatured sign **[Page 140 begins]** including the "wine" ideogram, a tablet and a fragment of a roundel, the distinctive Minoan administrative device, all in local clay [J. Davis 1986, 99; Palaima 1982]), the simpler explanation may well be the presence of large numbers of Minoans or descendants of Minoans at these sites. The appearance of all the items of Minoan daily life over so wide an area, encompassing the Dodecanese and the coast of Asia Minor as well as the Cyclades, reinforces the hypothesis.

If the island sites in question were indeed major parts of a Minoan empire, then the rates of change of technology, items of daily life and prestige features reflecting palatial developments should have been similar on Crete and the islands (allowing of course for the possibility of provincialism in smaller and more distant sites). In order to probe further the nature of Minoan impact at the various sites in the Aegean, we turn next to a consideration of the evidence of architecture and frescoes.

C. The Architecture

Fortification walls and/or town drainage systems at Ayia Irini, Phylakopi, Kastri on Kythera and Akrotiri provide evidence of communal planning. The wall of Ayia Irini has a long MBA history, but is substantially rebuilt at the beginning of LCI, at the general time the drainage system is created. The fortification wall at Phylakopi (Renfrew 1978, 405-408; Davis and Cherry 1984, 154; Davis 1986, 104; pace Barber 1987, 66-67) and the impressive drainage system at Akrotiri were built sometime after the beginning of LCI; in the case of Akrotiri the construction is superimposed on the early LCI destruction level (Doumas, personal communication). At the Minoan settlement of Kastri, however, the section of drain excavated was built at some point in the MBA (Coldstream and Huxley 1972, 56). At Phophitis Elias south of Trianda on Rhodes a section of pipe was found in a trench with pottery of an earlier phase of LMIA; the excavator has suggested that the pipe was part of a conduit for bringing water (Marketou 1988, 27-28).

Drainage systems showing a high degree of engineering skill and hydraulic sophistication are of course a feature of major Minoan sites in the proto- and neopalatial periods. The grand drains in the east wing ("Domestic Quarter") of Knossos were constructed in MMIIA (Macdonald and Driessen 1988, 248); while the drainage systems at Palaikastro (Dawkins 1904-1905, 290; MacGillivray, personal communication) and Gournia (Boyd-Hawes 1908, 28) begin in the neopalatial period. Branigan notes that the sections of new drain pipe stored in Room G24 of the "palace" of Gournia may indicate a palatial role in the planning and maintenance of the drainage system (Branigan 1972, 755). In contrast, the drains at Palaikastro

were not restored after the LMIB destruction (MacGillivray, personal communication), notwithstanding the major LMIII occupation.

We cannot say, of course, whether the Cycladic drainage systems were primarily the product of Minoan architects, the "Versailles effect" or Minoan direction. If Minoan control of the sites in question was indeed imposed not long after the beginning of LCI, then control may have preceded the final wave of Minoan settlement, to judge from the steadily increasing number and proportion of conical cups at Phylakopi through the various LCI levels (Davis and Cherry 1984, 150-151. On page 151 of the work cited an erroneous reversal of the adjectives "earliest" and "latest" in the legend of Figure 1 reverses the meaning of the tabulation.). The increasing Minoanization of pottery at Akrotiri and Ayia Irini during LCI has already been noted. At Trianda "the Minoan influence seems to have been more noticeable during LMIA late" (Marketou 1988, 29-32).

Turning from evidence of planning in the fortifications and drainage systems to the architecture of the buildings, we notice at once the quality of the construction at Akrotiri, and the extent to which the LCI architecture incorporates elements of what I have called (Wiener 1989) the LMI "School of Knossos", whose architectural features include axiality of plan of major rooms, the "Minoan Hall" (Driessen 1982; Marinatos and Hägg 1986, 57-73), pier and door partitions, column bases, ashlar facades and lustral basins (adyta) faced with ashlar or gypsum. (I am most grateful to S. Chryssoulaki and J. A. MacGillivray for directing my attention to this question and for much helpful advice. It should be noted that the axial Minoan Hall has thus far not been found at Akrotiri.) Also visible in some buildings at Akrotiri is the adoption of Minoan-type wooden door and window frames in place of the local ashlar frames, and the importation for building purposes of Cretan gypsum (Gale, Einfalt, Hubberten and Jones 1988, 57-72; Palyvou 1984; Einfalt 1978, 523-527; for the architecture of Akrotiri in relation to Crete, see J. Shaw 1978, 429-436). Gale, et al., note that **[Page 141 begins]** the samples of gypsum from the House of the Ladies have a striking similarity in colour, mineralogical composition, grain size and shape and the arrangement of fluid inclusions to the gypsum from Gypsades Hill at Knossos, but that because gypsum from Kyllini in the western Peloponnese has similar features a petrographic attribution cannot be definite.

The excavation of Akrotiri has thus far followed the modern ravine where the depth of volcanic deposit is less, and deferred tackling the technical problems posed by the depth of deposit covering the fine ashlar facades of Xeste II, IV and V and the important street running to the east. Xeste IV with its facade composed entirely of neatly laid courses of ashlar (one block of which displays a double-axe mason's mark) seems particularly to approach Minoan palatial standards and practices. What we see already indicates that Thera was at least abreast of major sites in East Crete in its response to Knossian architectural innovation. At the same time Akrotiri resembles Zakros, Palaikastro and Gournia in the manner in which the architecture still retains, alongside fine freestanding buildings with Minoan neopalatial antecedents, elements of the old block construction, as in Block Delta (perhaps recalling in this regard the building techniques suggested by the "Town Mosaic" from Knossos, dating from before the MMIIIA destruction).

At Zakros, the neopalatial palace departs from the north-south orientation of the town and earlier palace and is built over a part of the harbour road which is displaced by a new northeast gate. A few new buildings, such as Building G with its rectangular layout, portico with a single column, vestibule on axis with the main hall and decorated floors, display aspects of the "School of Knossos" and are built on the orientation of the palace (Chryssoulaki and Platon 1987, 77-84). The rest of Zakros retains its "block" construction.

At Palaikastro, aspects of the new Knossian style are found in Building 1 of the current excavations with its fine-cut ashlar (MacGillivray, Sackett, et al. 1988, 272), but most of the

structures, including the houses from the earlier excavations, lack any of the stated indicia of the "School of Knossos". For example, there are as yet no polythyra at Palaikastro, but excavations to date have probably not uncovered the main public buildings. The section of the town excavated by Dawkins at the beginning of the century did however reveal a "high street" between Blocks D and M which "runs straight and true, broad and well-surfaced, and flanked by impressive facades" (Branigan 1972, 754). Some of the houses at Palaikastro are highly idiosyncratic, particularly with regard to the existence of "impluvia" otherwise almost unknown in Crete (MacGillivray, personal communication), a fact which may act as a caution against drawing sweeping conclusions concerning degrees of Minoanization from architectural variations in the Cyclades.

Trianda, in size a major site like Akrotiri, also displays ashlar facades and (as previously noted) a pier and door partition in LMI.

Ayia Irini seems to have no distinguished building before Period VI, and no palatially-inspired houses, though House A gradually takes on a few Minoan refinements, such as a lightwell, bathrooms, a toilet and frescoes (Cummer and Schofield 1984, 41). Of course the soft volcanic stone of Thera would have been much easier to cut into fine ashlar blocks than the schist of Kea, which easily breaks into slabs. But it would seem that the Keans could have built polythyra easily enough if they had wished. J. Davis (personal communication) has suggested that the two wide doorways between the columned hall and walled courtyard with its hearth and benches (Cummer and Schofield 1984, Plate 25, Room 36), if covered with curtains, could have satisfied some of the functional requirements of a polythyron.

In general the architecture of Akrotiri (even as we know it now without the evidence of Xestai II, IV and V) seems more advanced and expressive of the "School of Knossos" than the "town" architecture of major Cretan sites, including Zakros.

We should note two other respects in which Akrotiri resembles Knossos architecturally: masons' marks and religious areas. The 1 hectare of the town of Akrotiri investigated to date has already yielded over 80 masons' marks (Palyvou, personal communication, for which I am most grateful), compared to well over 1,000 for all of Knossos (of which over 750 come from the palace), over 220 for Phaistos and over 130 for Malia. Sites in Crete other than the three main palatial centers have yielded only small numbers of masons' marks, and Minoan or Minoanized sites outside Crete, apart from Akrotiri, practically none (Hood 1987 A, 205-212). If, as Hood has argued, masons' marks have a religious rather than functional significance, their appearance takes on additional meaning.

[Page 142 begins]

As to cult areas, N. Marinatos has presented forcefully the arguments for regarding various buildings or areas of buildings at Akrotiri as having religious functions (1984 B). Knossos also has many buildings with areas set apart for cult use such as the House of the High Priest, House of the Chancel Screen, South House, Southeast House and Royal Villa. It is on these particular buildings, at Knossos as at Thera, that maximum architectural effort was expended (Fotou 1988, 178). Xeste III at Akrotiri is both the most "Knossian" of the excavated buildings in terms of architecture and the most expressive of cult.

Finally we should note one feature of town life in LMI/LCI-II common to many Cretan sites and to Akrotiri and Ayia Irini as well: the internal growth or "infill" development of sites. The rapid increase in number and close proximity of sites along both the north and south coasts of Crete (Warren 1984, 39-43) is matched by internal growth of sites resulting in greater density of occupation, contiguous arrangement of buildings and coexistence of different types of houses within a block (McEnroe 1979, 330-337, 345-346; Palyvou 1986, 189; Schofield 1985). At Zakros

in LMI houses are built in what previously had been main streets (Chryssoulaki, personal communication). Pseira doubles in size in the neopalatial period, and retaining walls are built on terraces in order to cultivate all available soil on the island (Betancourt 1989). The evidence of new foundations in Crete, and marked increase in intensity of occupation at Cretan sites, Akrotiri and Ayia Irini suggests, in the context of the other categories of evidence cited, an expansive, outward-thrusting Crete in a time of population increase.

Akrotiri thus appears to follow closely the lead of Knossos in architectural innovation and abundant provision of buildings or areas for cult purposes, and to resemble Crete in general including Knossos with respect to population increase in LMIA.

D. The Frescoes

The relation of the Theran wall paintings to those of Crete, and particularly the relation of the Minoan iconography of many of them to Minoan iconology and religion has been the subject of much discussion (e.g., Cameron 1978, 579-592; N. Marinatos 1984 B; Morgan 1988; and the papers in the sections on art and religion in this Congress).

Our purpose here is not to analyze the iconography and technique of the frescoes in detail, but only to note certain features which may be particularly suggestive for the nature of the relationship of Thera to Crete.

E. Sapouna-Sakellaraki at the Fourth Cretological Congress (1981, 479-509) and E. Davis at this Congress have noted a basic difference in technique: Minoan wall painting relies on polychrome background to set the scene, while Theran wall painting mostly employs a white ground, giving sharp definition to the figures. On Kea the fresco fragments include examples which seem to be directly inspired by paintings from Knossos such as the blue bird frieze and griffin, others like the Dolphin Fresco from House J which recall Theran paintings on white ground, and still others in a style so far unique to Kea and completely independent of any Minoan influence (E. Davis, this volume). Trianda also displays various tendencies, but "on the whole, the Trianda paintings appear closer to the Minoan tradition than to that of Thera" (E. Davis, this volume); the fragments bring to mind Knossian parallels (Marketou 1988, 30). Of course it is dangerous to attempt to derive historical inferences from this evidence; we are dealing with many hands over several generations at a time when painters probably travelled. Still the conjunction of the Theran white-ground technique in fresco painting with the white-ground tradition in pottery suggests that the vibrant and still-evolving local Cycladic pottery tradition was matched in wall painting.

Turning from technique to iconography, we note the appearance both of (1) features which have no known close parallels in Crete, such as the antelopes, swallows and near-life-size nude youths carrying fish, or which appear less frequently in what is preserved in Crete, such as dolphins or lions chasing deer; and (2) features which are typically Minoan. Among the latter are depictions of Minoan religious iconography (such as those in Xeste III discussed in N. Marinatos 1984 B), including specific aspects such as horns of consecration with botanical elements, altars with incurving sides (M. Shaw 1986, 100-123), monkeys in the service of the divinity, emphasis in floral representation on the reproductive organs of the crocus, lily, ivy and date palm (Porter, forthcoming) **[Page 143]** and the gathering of saffron from the crocus; depictions of scampering monkeys and other exotic animals shown in landscape settings; depictions of boxers; and the manner of representing women.

In Crete, depiction of flowers emphasizing pollination is already well-attested in the MM period, as for example in the well-known bowl from Phaistos whose lilies display bright red anthers (Porter, forthcoming).

The acute observation and vivid depiction of the monkeys and antelopes indicates an artist who had observed them at first hand, either on Thera, at a palace zoo-garden at Knossos or elsewhere in Crete, or abroad, and perhaps suggests as well a similarly knowledgeable (elite) patron or audience whom the artist strove to satisfy.

The boxing children, apparently seven or eight years old, from Block B, Room 1 again seem to imply close links with Crete of a special sort involving the training and education of youth. One possible hypothesis is explored in the concluding section of this paper; here we note only the singular details, some with parallels on the boxer rhyton: the boxers wear gloves on their right hands only and looped belts at their waists, and have partially shaved heads and long hair locks; one wears jewelry consisting of earrings, a necklace, bracelets and an anklet.

The depiction of women deserves special notice. Often they are shown in Minoan fashion with breasts exposed, not only in the House of the Ladies fresco with its apparent religious connotation but also in the Miniature Fresco, where the women watching the flotilla occupy the most prominent positions and are larger than the males. At Knossos the surviving part of the Grandstand Fresco also shows women who are larger than men and in a prominent position. The depiction of women in this manner does not to my knowledge occur (divine images apart) in any other culture. It would appear that either Cretan and Theran religious belief and social mores were similar in these respects, or that the Minoan role on Thera was sufficiently secure that any conflicting Cycladic belief, custom or sensibility could be ignored.

A word of caution as to whether we may regard this uniquely Minoan aspect of the depiction of women as evidence of the presence or dominance of Minoans at Thera may be appropriate in view of the mainland evidence of the attraction and durability of Minoan iconography; for example, LHIII frescoes depict women in Minoan fashion with breasts exposed. We should also note that certain details of women's dress differ on Thera and Crete (Televantou 1982, 113-135). Of course we have too few examples on either side to draw general conclusions, and no way of knowing whether the examples we have are even roughly contemporaneous -- on Thera walls could have been painted at any time between the construction of each room or building in question and the time of the volcanic destruction, while on Crete, and particularly at Knossos, it is generally difficult to say which frescoes are LMIA, let alone where in this long period they are likely to fall. The lack of chronological precision is a significant barrier to drawing conclusions based on differences in dress, since in a palatial society fashions may undergo frequent change.

The abundance of brilliant wall painting at Thera stands in marked contrast to its almost total absence at Malia and Zakros and to the lack of figural painting at Phaistos. It is always dangerous to argue from silence and conceivable that fresco fragments were missed in the early excavations at Phaistos and Malia, but it is worth noting that generations of subsequent excavation, including many areas of neopalatial occupation at Malia, have produced none. From Zakros we have only some three-dimensional spiral decoration and the horns of consecration from the adyton, notwithstanding the fact that the LMIB destruction sealed many areas of the palace. Again Thera (and to a lesser extent Kea, Melos and Trianda on Rhodes) seems in a special category, and linked to Knossos.

DISCUSSION

Thus far data and analyses have been offered concerning the size, population, internal organization and special functions of principal Aegean sites and the evolution of their pottery,

architecture and frescoes in relation to developments in Crete. We now attempt to apply the information gained to discuss the impact of Minoan (1) religion, (2) trade and (3) power, in order to address our ultimate question: Were Akrotiri and the other island sites major, purposive, differing but complementary parts of a Minoan Empire?

1. The Role of Religion

Do the wall paintings and other likely indicia of Minoan cult such as horns [**Page 144 begins**] of consecration, offering tables, stone vases, seashells, animal rhyta and special drinking vessels suggest a dominant or predominant Minoan presence on Thera, or even, taken together with the other finds from Thera and the evidence for the role of religion in Crete, a Minoan threskeiocracy? Three other possible explanations for the Minoan iconography and cult equipment in Thera require consideration: (1) religious conversion of a local ruler, perhaps stimulated by intermarriage; (2) adoption of Minoan religion by a local ruler or elite because the belief structure, ritual, access to prestige objects or trained scribes strengthened the ruling establishment (as in the adoption of Christianity by English chieftains [Trigger 1978, 218-223; J. Davis 1984, 165] or the adoption of Sinhalese Buddhism on the southeast Asian mainland and Islam in the southeast Asian islands, where rulers converted in their search for more potent forms of sacredness that would bring them more followers [Feeley-Harnik 1985, 286]); (3) reflection of a common cult background on Crete and Thera, with Anatolian antecedents, reinforced by Cycladic elements in the Cretan population, strengthened by intensive contact, perhaps including religious contact, during the protopalatial period (see below), and influenced in its LMI manifestation by Minoan religious fashion and iconography -- the "Versailles effect" operating in the sphere of cult practice. (For evidence of possible Cycladic elements in the Cretan population, we can now add tombs with Cycladic connections in FN-EMI contexts at Pseira [Betancourt, personal communication] to the evidence from Ayia Fotia in East Crete where the grave types and goods are of typical Kampos I type, the considerable body of Cycladic material present in prepalatial tombs from Arkhanes, the material from Knossos and the Cycladic finds from the Platyvola Cave in West Crete.) For possible evidence of Minoan cult practice in the Cyclades during the protopalatial period, see the MMII finds at Mikre Vigla on Naxos and on the hill above the site (Barber and Hadjianastasiou 1989).

In considering the role of religion in Minoan Crete it is necessary at the outset to note the difficulty of separating the spheres of religion, economy and state. Cadogan (1984, 13-15; 1987, 71-73) and N. Marinatos (1984 A, 167-176) have proposed that religion and the state were one. N. Marinatos has followed her proposal of a Minoan threskeiocracy with the further suggestion that we consider for Crete and Thera the analogy of the Mesopotamian Temple-State, controlling the economy as well (1984 B, 24-25). Certainly the neopalatial concentration of cult, administration and valuable raw materials in the palaces is notable. Weingarten has noted that by far the most active seal users at Ayia Triadha and Zakros just before the LMIB destructions employed very similar gold rings showing two men dressed as priests stepping forth in procession from a columnar structure, possibly a shrine (1988, 106, Note 41). (The proposition that the palace and "town" of Zakros functioned as a coherent whole is presented above.)

The neopalatial period in Crete seems to exhibit an intensification and centralization of religious ritual and display, with a significant portion of the wealth and resources of society devoted to these purposes. Luxury goods stored in and near palatial shrines, creation of precious objects for cult purposes, lavish rituals depicted on frescoes, rings and seals, major building programmes at Juktas and Syme, concentration of peak sanctuary cult practice at sites connected to the main palatial centers, and frequent feasting in ritual contexts as suggested by the great increase in numbers of conical cups in MMIIIB-LMIA all indicate the importance of

palace-directed state religion in Crete at this time. If human sacrifice was sometimes practiced, even if only on rare occasions or under extreme circumstances (J. and E. Sakellarakis 1979, 331-392; J. Sakellarakis 1981, 205-222; Wall, Musgrave and Warren 1986, 333-388), the case for a major role for religion, though not necessarily for a threskeiocracy, is perhaps strengthened. The fact that in Crete (as in the Theran frescoes) the wall paintings, rings and seals depict gifts presented to a goddess or priestess rather than to a secular ruler, together with the absence of recognizable ruler iconography (or at least bombastic ruler iconography similar to Egypt or the Near East -- the person in the cabin in the flagship in the flotilla in the West House could be a ruler) may support the proposition that religion formed the basis of state authority.

Of course the frequent depiction of cult scenes in various media and the concentration of state resources on temples and shrines do not in themselves suggest a theocratic state, as the example of Archaic and Classical Greece demonstrates. Rather it is the concentration of cult in the palatial centers of administration and redistribution, and the concentration of precious materials in or near the palace shrines that is noteworthy.

J. Davis has suggested that a rapid change in religious practice under the influence of Crete may [**Page 146 begins**] have occurred at Ayia Irini in LCI, in light of the introduction of the large terra-cotta statues of Minoan shape and dress into what appears to have been initially a free-standing shrine of local type (the "Temple"); the appearance of terra-cotta feet similar to several found in Crete (perhaps from a cult statue) and of stone offering tables, and the first use of the putative peak sanctuary at Troullos (J. Caskey 1971, 292-295; J. Davis 1984, 164-166). Schofield has observed that the association of metallurgy with cult in Room 7 (identified by the excavators as a shrine) of House A is of great interest (1979). The connection between religion and metallurgy in the following centuries of the LBA, particularly in Cyprus, has recently been reaffirmed by Knapp (1986).

At Akrotiri N. Marinatos has proposed that five areas of the part of the site excavated to date may be identified as shrines: Xeste III, the Room of the Antelopes and Boxing Children, the Room of the Lilies, the West House and the House of the Ladies (1984 B, 9). Others have questioned whether five areas within a space of 150 meters could be shrines. But whether the areas identified were used exclusively as shrines or were used for cult purposes once a day, once a week, or once a month, there remains a sense of the pervasive presence of cult in Thera as in Crete. Perhaps Minoan artistic convention may to a certain extent hide local or syncretized religious belief and practice; still the singular features of the frescoes discussed above -- the dominant female roles in religious iconography, both as goddesses and priestesses; the details of the representation of boxing; and particularly the unique depiction of women in narrative frescoes as larger than men and in more prominent positions -- suggest close similarity at the least in religious and cultural practice between Crete and Thera, and the clear possibility that the houses and shrines in question were occupied and used by Minoans or descendants of Minoans. At least we may say that nothing in the archaeological record is inconsistent with the possibility that a Minoan or mixed elite was living in the excavated part of Akrotiri, but enjoying the creations of local workshops in wall paintings and pottery, including cult pottery.

Whatever the various sources of the outward thrust of Crete in the neopalatial period -- the achievement of internal security and cohesion, growth of population, or voracious demand for bronze and desire for foreign luxury goods necessitating ports and protected trade routes -- one would expect religion, omnipresent in LMI Crete, to have participated in Minoan expansion abroad. (Forty to fifty clay offering tables with plaster decoration and several large double axes of bronze sheet mounted on poles were stored at the double-harboured port at Nirou Chani on the north coast of Crete [J. Shaw, this volume; S. Marinatos 1925-1926, 141]. Xanthoudides suggested that the offering tables were awaiting export to Minoan sites abroad [1922, 15, Fig. 12]. Warren has made the same suggestion in regard to the double axes [1975, 93].)

A word of caution is in order, however, in light of Trigger's demonstration, discussed above, that "cultural borrowing is not limited to traits or trait complexes but extends to institutions and entire cultural subsystems" (1978, 218). For example, in one case study Trigger discusses the material effects of the conversion of Nubian kings to Christianity. Beginning in 580 A.D., trained church architects and painters arrived and erected churches built of dressed stone masonry with frescoed walls. The Church also (re)introduced literacy. Major towns were fortified with walls, which served to protect trade routes. Trigger notes that

> the greater political stability and economic complexity that resulted from the development of the church as an institution within Nubia seem to have more than offset the not inconsiderable economic demands that it made upon the Nubian people (1978, 224-225).

Accordingly we cannot rely on the wall paintings and other evidence of religious practice alone to define the nature of Minoan presence on Thera and the other Aegean islands in LMIA.

It is therefore appropriate to turn our attention now to a major -- indeed, critical -- aspect of Minoan impact in expansion abroad: trade and the search for bronze.

2. The Role of Trade and the Search for Bronze

A thousand years of Near Eastern and Egyptian imports beginning in EMIIA precede our LMIA horizon. The expanded use and concentration of resources in the palaces at the beginning of the protopalatial period provided the stimulus for the growth of long-distance trade, with a major increase in MMII, a time also of wide-ranging international trade in the Near East and Egypt (Wiener 1987). The neopalatial period sees a further intensification, of which the copper oxhide ingots, elephant tusks and precious materials from abroad stored near the shrine at the palace of Zakros provide a vivid picture.

Minoan trade must have included a wide variety of items. Exports, in addition to the weapons **[Page 146 begins]** and bronze vessels discussed below and depicted in 18th Dynasty tombs, probably included oil (sometimes perfumed), woolen cloth, wood, agricultural products, medicinal herbs (Wiener 1987) and agrimi horns for Egyptian composite bows (Wachsmann 1987, 85-90, 136, Plate XLIV, 137, Plate LXV). Imports aside from bronze included precious metals, lead from Laurion for rivets, plugs and linings (such as those used to waterproof the cists in the west magazines of the Palace of Knossos), stones of various sorts, ivory and a wide variety of luxury products and exotica.

It is, however, Minoan dependence on trade for obtaining vital supplies of bronze and the critical importance of insuring such access for the maintenance of the palatial and local elites that requires particular consideration here.

Minoan copper sources are insignificant (Stos-Gale and Gale 1984, 59; Gale and Stos-Gale 1986, 96; Stos-Gale 1988, 275) and apart from a possible source in the Troad (Çagatay, Altun and Arman 1979, 40-48; Wager, et al. 1984, 45-81. I am indebted to K. A. Yener for these citations) there is no known source of tin in the Aegean, yet Crete in the neopalatial period is extremely rich in bronze. Bronze was of course essential to the functioning of an advanced Bronze Age society. Among its critical uses were providing: (1) weapons for defense (including the Minoan Type A swords, so popular in the Shaft Graves); (2) tools for building the palaces of Crete, the grand houses of Thera and the ships of both islands; and (3) prestige vessels as illustrated by the great bronze ewers from Delta 3 at Akrotiri and the vessels carried by Keftiu

depicted on the walls of Egyptian tombs. (MacGillivray and Sackett have noted the striking impact of Minoan metal vessels on pottery and stoneworking [1988, 277] and Schachermeyr the influence of Minoan metal vessels on Mycenaean ceramics [1976, 222-228].) Finds from Crete showing lavish use of bronze include the massive swords and axes from Arkalochori (Hazzidakis 1912-1913, 35-47), cauldrons from Tylissos (Hazzidakis 1921, 54), two-man saws from Knossos (Evans 1928, 629), Tylissos and Zakros (Platon 1971, 80, Fig. 39) and the double axes previously mentioned from Nirou Chani.

The security, economy and hierarchy of Crete depended significantly on bronze. It seems inconceivable under the circumstances that Minoan palatial rulers would have waited passively hoping for a Near Eastern merchantman to arrive with copper and tin. Rather copper and tin, or already-alloyed bronze, would have been the object of intensive search, planning and investment by the controlling elite.

The planning, provision and investment would surely have encompassed: (1) appropriate ships for long-distance trade, such as those we see on the Miniature Fresco from Akrotiri (which would have served as well for transporting troops to attack pirate lairs); (2) ships' crews and perhaps provision for the crews and their families in the winter months; (3) shipwrights, shipyards and shipsheds, of which a building at Nirou Chani (S. Marinatos 1925-26 and 1933, 197) and structures depicted in the Miniature Frescoes from Akrotiri and Ayia Irini have been suggested as LMI examples (J. Shaw, this volume); (4) goods for export, in some cases of a nature sufficient to interest foreign rulers including the court of the Pharaoh; (5) establishment of relations with foreign courts and ports of trade, without which it would have been impossible to conduct major trade and exchange; (6) perhaps armed convoys at times; and (7) a chain of island ports of call or bases en route to the metal sources.

Three chains of island sites probably comprised the maritime routes in the major Minoan trade networks providing critical supplies of copper and tin. One ran north through Thera, Naxos and Kea to the mines of Laurion. A second chain ran east toward Cyprus and on to the Levant. This chain may have had another destination in the vicinity of Mersin or Iskenderun below the Cilician Gates, just north of which supplies of various metals including tin have been located (Yener, et al. 1989; Yener, Özbal, Kaptan, Pehlivan, and Goodway 1989, 117-264). The way stations on this route (depending on wind, weather, the Cretan departure point and whether the mariner wished to hug the coastline) would have included Kasos, Karpathos, Saros or Chalki (Mee 1978, 121-156; Melas 1983, 53-61 and 1988 B; Love 1984, 251; Niemeier 1984, 205-207), but above all the important site of Trianda on Rhodes (see works cited above; also Watrous 1989; Cadogan 1984, 14). All of these sites produce large numbers of Minoan-type tripod-leg cooking pots and conical cups. The location of the Minoan site on Kasos is interesting; it is not in the north near a fertile plain, but on the south coast near a harbour sheltered from the Meltemi where there is little arable land (Melas 1983 and 1988 B). On Crete the major ports of Palaikastro and Zakros surely owed their size and wealth largely to trade with the east.

A third major chain in the metal network probably ran along the western coast of Anatolia to **[Page 147 begins]** Knidos, Iasos (which in the LBA seems to have been a small island near the coast, again with a double harbour, where excavation has disclosed buildings of Minoan type, much Minoan pottery including local imitations and masses of conical cups all beginning in the MBA, and where discoid loom weights also appear -- Laviosa 1984, 183-185), Miletus (where there is evidence of Minoan-style frescoes along with imported and locally-made Minoan pottery -- Weickert 1940, 325 and 1957, 25; Gödecken 1988, 307), perhaps Teichiussa (sherds, mostly MMIII-LMI -- Voightländer 1988, 605 and 608; 1986, 622 and 642-650) and other coastal sites not yet excavated (or not yet excavated to BA levels) and then via Samos perhaps to Troy, where Minoan stone bowls in particular provide evidence of contact (Cadogan 1984, 14; Dörpfeld 1902, 391, Fig. 373; Blegen, Caskey and Rawson 1953, 230, Plate 298, 38-116;

and cf. Warren, 1967, 37-56, especially 39, 43, 51). Stos-Gale on the basis of her lead isotope analysis of the copper oxhide ingots from Ayia Triada in Crete has noted similarities in composition with material from the Troad and Kastri on Syros (1988, 275). On this route the major port and town serving Minoan trade was (on present evidence) the Seraglio on Kos, where recent excavations have produced significant Minoan and Minoanizing material including a kiln filled with conical cups. Marketou notes the protected harbour at Kos provides a safe port in certain seasons for ships headed north or northeast (Marketou 1987, 167). Minoan finds, consisting largely of sherds of tripod-leg cooking pots and conical cups, appear at possible island way stations along this route on Saria, Kalymnos, Telos, Nisyros and Astypalaia (Melas 1988 B; Wiener 1987, 261 and works cited). Thera lies on this route for voyages starting from west or central Crete.

Marketou observes that "the Seraglio was settled earlier than Trianda in Rhodes and seems to have belonged to a different cultural assemblage which includes Miletus, Iasos, Knidos, Kalymnos (Vathy Cave), and Tigani on Samos. This is especially striking in LMIB when Trianda's foreign connections are with Cyprus and those of Seraglio are with the settlements to the northeast and Caria" (1987, 169).

Unfortunately two of the trade networks end in mystery. At Thorikos near the mines of Laurion there is evidence of an extensive MH/LHI-II site on the summit and in the saddle of Velatouri Hill (Stais 1895, 193-263; Mussche, Bingen, Servais, DeGeyter, Hackens, Spitaels and Gautier 1967, 20-24 and 1969, 68, Note 7; Dickinson 1977, 96 and 124, Note 16; Hope Simpson and Dickinson 1979, 209) about which little is known, and J. A. MacGillivray has observed that a promontory at the shore which could have been the location for a harbour site is now buried under modern slag heaps and an electric power station built at the turn of the century. At Toumba tou Skourou in Cyprus, on an estuary by the sea ten miles from major copper mines, the great mound with its LMIA pots among the much more numerous Late Cypriote IA local wares was almost completely destroyed in the 1950s by bulldozers clearing the ground for orange groves. Trucking company records document the removal of over 100 truckloads of stone walls, some of them of fine ashlar which was then used to construct the post office, jail and market in nearby Morphou (Vermeule and Wolsky 1978, 294-317; Wolsky, personal communication). "Surface indications, however, suggest a site approaching the size and importance of Enkomi, with whose position it has much in common" (Catling 1962, 142). Another mound two miles closer to the present seacoast, Toumba tou Tillirou, with Late Cypriote IA surface finds and large stone walls, was leveled in 1973 (Vermeule and Wolsky 1978, 299, Note 19). (The major Minoan site of Trianda has also been much damaged in very recent years by the construction of hotels; only the great efforts of the excavator and the Archaeological Service have preserved what vital information we have.) Three LMIA or LHI cups were recovered from tombs at the Cypriote coastal site of Ayia Irini, about 10 km to the north of Toumba tou Skourou (Pecorella 1976, 125; 1973, 19-24; 1971, 57-59).

All of the pieces of LMIA pottery recovered from the tombs at Toumba tou Skourou (Vermeule and Wolsky 1978, 298-299, 305) have good parallels in the Theran volcanic destruction level, and in the case of one sherd to a Palaikastro pedestaled cup. Late Cypriote I white slip bowls have been found at Knossos and a number of coastal sites in Crete, and at Trianda, Kea, Melos and Thera as well (Vermeule and Wolsky 1978, 295, Note 1) The Toumba tou Skourou excavation also discovered fragments of Syrian or Egyptian ostrich eggs and ivory plus Tell-el-Yahudiyeh ware which was imitated in local fabric as well, indicating links between this part of Cyprus and the tin routes of the Near East. One Middle Bronze Age Mari tablet refers to trade in tin via Ugarit with Kaptara, which is generally thought to be Crete (Dossin 1952, 3, 37, Letter 20; Wiener 1987, 262).

That the first known script in Cyprus appears at this time and is a close relation to Linear A, **[Page 148 begins]** with 18 out of 20 distinctive signs in common (Palaima 1989, 136-

139; contra Godart and Sacconi 1979, 128-133), rather than to the developed cuneiform closer at hand, may reflect a significant presence of Cretan traders in Cyprus and the importance of the metal trade. (Another possible explanation is the relative ease of learning Linear A compared with the complexity of cuneiform.)

It seems likely that the initial smelting of ores would have occurred near the mines, rather than in towns, given the noxious fumes created by the process and the inefficiency of bringing ores, fluxes and wood fuels to coastal sites. Swiny has calculated that it would have required a caravan of 50 donkeys to carry the raw materials to produce a single donkey-load of 10 kg of metallic copper (Stech 1985, 103). Recasting, melting or combining copper and tin may often have taken place in ports along the way or on the coast of Crete. The many crucibles distributed throughout Ayia Irini and other abundant evidence of metallurgy, the waste from a metallurgical installation and bronze tools from Trianda, the imposing crucibles and other evidence of large-scale bronze working from Kommos (Blitzer 1985, 17) and the recent evidence for slags in an MMIIIB-LMIA context at Palaikastro (MacGillivray, Sackett, et al. 1989) illustrate this tendency. Kea was a natural location for converting bulk copper into easily transportable intermediate and end products, such as bronze tools. A fine stone mold from House A at Ayia Irini has faces for producing five different tools (Cummer and Schofield 1984, No. 978). On the basis of lead isotope analysis of two plano-convex bronze ingots from an LHIII hoard at Tiryns indicating a Laurion source for the copper of one and a Cypriote source for the other, but with identical tin content of 12.5% for each, Gale and Stos-Gale have suggested that tin was at least on some occasions obtained and added separately at the major centers (1989).

From Crete about 25 objects from LMI levels have been subject to lead isotope analysis by Stos-Gale and Gale to determine the provenience of their copper ores (this volume). Almost without exception the objects tested came from LMIB destruction levels, two or three generations later than the Theran volcanic destruction (depending on which chronology one adopts, and the length of time assigned to LMIB). Fourteen copper oxhide ingots from Ayia Triadha and six from Kato Zakro constitute the bulk of the Cretan material tested. None of these ingots was cast from ores with a known Cypriote lead isotope composition. The fact that the ingots from Ayia Triadha inscribed with Cypro-Minoan signs do not appear to be cast from Cypriote ores raises interesting questions about the role of Cyprus in the metal trade at the time of the LMIB destructions. None of the LMIB ingots matches the Laurion field profile either, but the single LMIA object from Nerokourou in West Crete is consistent with a Laurion provenience. The bulk of the Ayia Triadha ingots and one of the Zakros ingots show striking similarity in lead isotope composition to objects from the Troad. The lead isotope composition of the other ingots does not match any presently known ore source (Stos-Gale and Gale, this volume).

Of the nine bronzes from the volcanic destruction horizon at Akrotiri, six contain copper from Laurion and three from Cyprus (Stos-Gale and Gale, this volume). Moreover, the two fragments of copper oxhide ingots from House A at Ayia Irini, one from Period VI and one from Period VII, both come from Cyprus (Stos-Gale 1988, 275-277; Stos-Gale and Gale 1984, 62). Kea, which may have had lead, silver and copper sources of its own (M. Caskey, et al. 1988), was in all likelihood a transhipment point for copper and silver from Laurion. A significant amount of lead from Laurion appears in Crete, Thera, Melos and Kea. Moreover, the appearance of large cakes of litharge of Laurion origin at Akrotiri, indicative of silver production at the site, underscores the significance of these trade routes (Stos-Gale and Gale, this volume). Silver after all was the principal unit of account and a major medium of exchange in the Near East and Egypt in the Middle and Late Bronze Age.

The appearance at Ayia Irini of Dodecanese pottery and Giali obsidian (Davis, Schofield, Torrence and Williams 1983, 361-366; Schofield, personal communication concerning subsequent identifications of East Aegean pottery) provides a further illustration of the

interconnection of the trade networks suggested, as does the appearance of significant amounts of pottery from Kos at Akrotiri and along the coast of Asia Minor (Marthari, Marketou and Jones, this volume).

The extent and nature of the investments required for major long-distance trade (see above); the paucity of identified Cycladic material in the Dodecanese (Mee 1975, 383), Anatolia, the Near East and Egypt compared to the sweep and long protopalatial history of Minoan trade; and the network of Minoan or Minoanizing sites show clearly the predominant Minoan role in Aegean trade during [**Page 149 begins**] the neopalatial period, as does the appearance on Thera, Melos and Kea of Linear A together with a probable Minoan system of weights (alongside other, perhaps local, systems) (Petruso 1978, but see Cherry 1980). The Cyclades may of course have contributed ships, as they did at the behest of Athens for the Delian League over 1,000 years later, or rowers as claimed by Herodotus.

The importance on present evidence of Akrotiri and Trianda as fulcrum points in a Minoan-dominated trade network should be emphasized, for they were major towns and as ports capable of provisioning ships and crews, and when necessary serving as bases for assembling convoys for merchantmen or squadrons for attacking pirate lairs. Thera in particular occupies not only a key position on the trade routes from Crete to Kea and Laurion to the north and to the Anatolian coast to the northeast, but also lies on the natural route from the Near East and Rhodes to the Greek mainland. Accordingly we find evidence of contact between Akrotiri and Mycenae at both sites in the form of pottery, and perhaps in other respects as well.

It is possible that the requisite copper, tin, and other palatial imports could have been obtained by a single major trading venture each year, or perhaps even less frequently, as in the joint venture organized by Solomon and Hiram, the rulers of Tyre, to the land of Punt. The Kaş shipwreck contained enough copper when mixed with tin to produce 6,000 bronze swords (Bass, personal communication); the other contents of the wreck suggest a high-level trading mission and/or ambassadorial voyage. Even so, the advantage of a secure chain of ports to support even occasional long voyages and insure their continuance would have been obvious to the ruling elite. The ability to seek raw materials in various places, both to diversify sources of critical supplies and to obtain the most favorable terms of exchange, would also have been significant.

It is important to recognise that Minoan dependence on foreign metal sources would have begun well before our LM-LCI horizon. The critical interest and role of the ruling elite in the acquisition of bronze would surely have existed at least from the beginning of the protopalatial period, with its concentration in the palaces of administration, literacy, agricultural surplus, craft skills and precious materials (including foreign imports such as the gold, obsidian, alabaster and faience in one primary deposit at Knossos [Branigan 1987, 245-249]).

The interest of the old palaces in bronze, and in particular weapons, is illustrated by the great MMII swords from the Palace of Malia, superior to any swords of Egypt or the Levant at that time. (Branigan stresses the luxurious and exotic nature of the pommel of one of the swords, made of gold in the form of a backward-bending acrobat with curly "African" hair, as evidence of the palatial interest in foreign trade [1988, 14].) While these protopalatial swords were prestige items intended for display (and perhaps for export, as a reference in the Mari tablets suggests), behind them surely lay a developed tradition of weapon manufacture. In the case of Malia, a metallurgical installation lay adjacent to the north wall of the later palace, and from the same general area came steatite molds for casting axes and blades (Pelon 1987, 269-271). Swords of the kind found at Malia would have constituted a major, perhaps dominant, advance in military technology. MMII seems increasingly to have been a troubled time (Hood 1987 B) justifying defensive measures (Tzedakis and Chryssoulaki 1989) and requiring an intense palatial interest in the acquisition of bronze.

While neither extensive MC levels nor the area of the suspected harbour at Akrotiri have as yet been excavated, classical Kamares appears regularly in the pits dug to support stanchions or test for bedrock. These sherds appear to be almost entirely Knossian, of the highest palatial quality, and to come mostly from cups and bridge-spouted jars, sent or brought from Knossos to Akrotiri as fine ware, perhaps intended, at least in part, for ritual use (Marthari, personal communication; S. Marinatos 1974, 31 and Plate 67 b and d; Doumas 1983, 43; Papagiannopoulou, forthcoming; for Kamares elsewhere in the Aegean see Papagiannopoulou, forthcoming; Hood 1989 [Phylakopi] and Barber and Hadjianastasiou 1989 [Naxos]). Of course palatial-quality Kamares has also been found in Syria, the Levant, Cyprus and Egypt. The influence of Kamares ware in Egypt and at Ugarit was sufficient to inspire local (or at least non-Minoan) copies.

The Middle Cycladic population of Thera would surely have been familiar with Minoan ships and probably Minoan flotillas engaged in palatially-inspired trading ventures, impressed by palatial wealth and power, and attracted by palatial culture. Therans would have been conscious both of the benefits and potential perils of relations with Crete, looming visibly at times on the horizon, and perhaps particularly conscious of relations with Knossos. Perhaps they would have known of palatial Minoan use of force to suppress Aegean (or for that matter Cretan) pirates. (See generally, **[Page 150 begins]** Poursat 1984, 85-87; Buck 1962, 129-137.) The MC inhabitants of Thera would have met not only Minoan merchant crews, traders and traveling craftsmen, but perhaps also the first Minoan settlers as well. The tremendous Minoan impact of the neopalatial period would thus have occurred on prepared soil.

During LMIA Thera and the other island sites experience a simultaneous increase in intensity and geographical extension of trade, and in wealth, social complexity and Minoanization. A comparison of the quantity and range of objects in beginning and late LBI deposits at the major island sites (Barber 1987, 190; Buchholz 1980, 227-240), of their planning and buildings (see above), and of the respective degree of Minoan impact attested in the early and late LBI levels offers a clear picture. The gradually increasing proportion of conical cups in the successive LCI levels at Phylakopi previously noted may illustrate the process.

Even apart from the likely arrival of growing numbers of Minoan settlers, the increase in trade and wealth stemming from an expanding Minoan-dominated trade network would have resulted in new occupations and statuses, greater social complexity and stratification, and an increasingly commercial, urban and cosmopolitan orientation in the islands as more resources were devoted to external trade and concentrated in fewer hands. It seems likely under these circumstances that any existing local elites would increasingly have perceived their interests, desires and ambitions as allied with, and probably dependent upon, Minoan elites and Minoan culture, thereby hastening the process of Minoanization.

3. The Role of Minoan Power

That Crete in LMIA possessed the requisite power to control Thera and the other Minoanized sites discussed seems highly probable. The difference in population, resources and scale of organization between a unified Crete and the various Cycladic islands is evident (see Part A above).

The case for Knossian control of Crete in LMI has been made elsewhere (Betts 1967, 15-40; Warren 1984, 39-44; Wiener 1987, 265-266). The evidence in brief consists of (1) the generally peaceful appearance of Crete in the neopalatial period, when fine country houses dot the landscape, undefended and undefensible, in marked contrast to most other periods in the

turbulent history of Crete, an island whose topography invites separatism and rebellion; (2) the relative size of the palace at Knossos, 2.5 times the size of Phaistos and almost twice that of Malia; (3) the degree of Knossian cultural hegemony, particularly as evidenced by architecture and pottery, where Knossos now appears to be the sole source of innovation in contrast to the regional pottery traditions of the old palace period; (4) the appearance of impressions from the same or very similar highest quality Knossian seals at Gournia, Ayia Triadha, Tylissos and Zakros, together with the appearance of impressions from Zakros seals at Ayia Triadha, Sklavokambos and Katsambas, the port of Knossos (Betts 1967); (5) the wealth of luxury goods from the east and copper oxide ingots stored in the palace shrine at Zakros in relation to the fact that Zakros alone of the palaces has a relatively small agricultural hinterland immediately adjacent, perhaps insufficient to create a significant agricultural surplus for trade, a contrast which suggests that Zakros was linked to Knossos; and (6) the network of roads guarded by watchtowers or forts (some established perhaps as early as MMIIA) which appear to have covered large parts of Crete (Tzedakis and Chryssoulaki 1989). Similarities in the hieroglyphic inscriptions on seals and documents and in their use from various parts of Crete indicate at least the existence of a scriptural koine, if not a single administrative power, throughout Crete from at least the last part of the protopalatial period onwards (Olivier 1989).

It is also possible that Knossos controlled more or less directly only (1) its surrounding area including sites such as Arkhanes, Tylissos, Amnisos, Katsambas and Zominthos; (2) some harbour sites along the north coast of Crete, such as perhaps Pseira and Gournia; (3) sites on the east coast, particularly Zakros; and (4) the Cyclades and Dodecanese. On this hypothesis the palaces of Phaistos and Malia with their respective hinterlands could have been separately ruled. The relationship between the palaces need not have remained constant in any case, given the accidents of dynastic succession and intermarriage. Without texts we cannot be certain about the relationship, but the case for general Knossian supremacy during LMIA seems compelling.

Minoan expertise in the manufacture of arms, already recognizable in MMII (Hiller 1984, 27-30; Branigan 1974, 157ff.), continues in full force in the neopalatial period (and indeed through at least LMIIIA1 when a Knossian sword-manufacturing workshop exports its products throughout **[Page 151 begins]** the Aegean and the Dodecanese [Sandars 1963, 117; Popham, Catling and Catling 1974, 252; Driessen and MacDonald 1984, 49-74]).

LMI Crete is remarkably rich in bronze. The great number of bronze weapons which must have been available is illustrated by the Arkalochori Cave deposit of masses of bronze swords and daggers, as well as ritual models of swords in gold leaf. The finds from Arkalochori represent what remained from interrupted looting, the larger portion of the original deposit having been melted and sold (Hazzidakis 1912-1913). (We should note that in general the archaeological record tends to preserve a deceptively small proportion of the arms and armor used at any time. An illustration of the phenomenon is the contrast between the evidence for the Norman conquest of England provided by the Bayeux tapestry and the archaeological record. In the tapestry senior ranks on both sides wear an iron-link tunic, but no Norman and only one Anglo-Saxon piece of the period survives [Wilson 1985]).

The use of force in this period, even if employed mainly to suppress or engage in piracy, was surely not uncommon. Scenes of troops attacking towns from land and often from the sea appear on the Town Mosaic from Knossos, on the Siege Rhyton and Battle Krater from Shaft Grave IV (both probably Minoan; E. Davis 1977, 223-230), on the fragments of the steatite rhyton from the Apollon Maleatas shrine (Papadimitriou 1950, 200, Fig. 10; Lambrinoudakis 1981, 62) and on the Miniature Fresco from Thera (unless the scene in question represents a shipwreck, which seems less likely contextually). Rings and seals also depict fighting (Hiller 1984, 29, Note 12). Whether Akrotiri was fortified is uncertain, but the much smaller sites of Ayia Irini and Phylakopi had impressive fortification walls at this time, as did Aegina.

For the wealth of bronze on which the security, economy and prestige of Crete and its ruling elite largely depended, Crete was in turn dependent on raw materials from abroad and on the security of its trading network, in which Thera and in particular the harbour at Akrotiri held a key position.

Hood (1984) and Hiller (1984) have argued that in the LBA power was apt to be exercised. Of course power may also remain dormant -- Egypt did not exert direct power in western Asia until the New Kingdom, and Athens did not attempt to coerce Thera and Melos into joining the Delian League/Athenian Empire until after the outbreak of the Peloponnesian War in 431. Moreover, the safeguarding of trade routes and establishment of colonies need not necessarily involve political control from the homeland, as the Greek example of the 8th to 6th centuries B.C. shows. (Carthage, on the other hand, did attempt to make the adjacent western Mediterranean a "closed sea".) A unified Crete acting within the Aegean is of course quite a different matter from a large number of city-states competing across the Mediterranean.

In the case of Crete, moreover, the power and prestige of the palatial elite depended in significant part on the availability of bronze whose constituent elements, copper and tin, could only be obtained through long-distance trade. Accordingly the palaces with their concentration of resources would surely have made whatever investment was required in transportation (ships, shipwrights, crews, and warriors as needed); trade goods (including objects appropriate to high-level reciprocal exchange); relations with foreign rulers; and a secure network of ports and bases. In addition to bronze, a wide range of luxury products, raw materials and exotica was obtained from abroad by the palaces, and may have played an important role in maintaining palatial prestige and control, in part through setting standards for emulation (the "Versailles effect").

Of course there may have been other motives as well for maintaining parts of the island chain, namely providing security for Crete and protecting Minoan settlers abroad.

CONCLUSION

Political developments may have stimulated Minoan expansion abroad. It is conceivable that perceived threats to trade routes and access to bronze arising from events in the Near East or the growth of Mycenaean power led Crete to control and fortify Melos and Kea. Perhaps it was not until the beginning of LMI, after a recovery from the destructions at the end of MMIIIA and the presumed consolidation of Knossian power, that growth in population, in numbers of bronze weapons, and in the size and number of ships created a sufficient differential degree of power to permit relatively stable and continuing Minoan control.

[Page 152 begins]

The nature of protopalatial trade networks described above raises the possibility, however, that the major factors at play in the neopalatial period -- the need for bronze, palatial concentration of resources, and Minoan superiority within the Aegean in numbers of people, weapons, wealth and scope of technology and administration -- resulted in some form of Minoan hegemony in the old palace period as well. It is unclear on present evidence whether major trade between Crete and the rest of the Aegean and major Minoan settlement preceded or followed Minoan control (if ever it existed).

Three additional arguments may be made for some form of Minoan control in the Aegean during the neopalatial period: (1) the ongoing prosperity in the various islands, (2) the

tradition/legend/myth of a Minoan thalassocracy and (3) the similar path of development at sites essentially founded by Minoans and at Cyclado-Minoan sites.

(1) The apparent general increase in wealth and complexity throughout LMIA of all of the Minoan and Minoanized sites discussed may suggest the existence of a dominant power protecting the functioning of the trade networks on which the prosperity of the sites clearly depended (Braudel 1973, 115-116; Renfrew 1972, 262-263; Cadogan 1984, 13-15).

(2) The tradition, legend or myth concerning the Minoan thalassocracy, including the reference to dynastic intermarriage at Kea, have long been studied, most recently and thoroughly by Huxley (1968). To the extent the various accounts depend on oral tradition and particularly epic poetry, it would be wise to note that much legend and epic verse has been created from minor battles or events completely misunderstood (Finley 1970). Even if we assume some significant historical basis, we must allow for the possibility that the memory of a Minoan thalassocracy refers to an Achaean ruler during LMIII or the brief renaissance of trade and Cretan-inspired pottery around the middle of the 12th century B.C., or even to an Early Iron Age Cretan ruler. The problem is beyond the scope of this paper, where we can only note the possibility of transmission of historical memories via (1) Mycenae and other mainland centers, particularly Mycenae itself where there is evidence for the continuing strength of dynastic tradition and Minoan iconography; (2) Minoans to Mycenaeans to Dorians in Crete (where the Mnamon had the task of remembering the laws of Minos which were later inscribed -- Huxley 1971, 507; Jeffery and Morpurgo-Davies 1970, 118-154); (3) oral tradition in the Cyclades, perhaps least likely given the abandonment of many sites in the Early Iron Age; (4) Minoan/Mycenaean migration to Anatolia and Cyprus at the end of the Bronze Age, and Ionian/Anatolian migration at the beginning of the Iron Age; and (5) Minoan survival in Crete, where an Eteocretan language continued in use until the 4th century B.C. Herodotus says his knowledge of the Minoan thalassocracy comes from the people of Praisos, and it is of some interest that texts in both Greek and Eteocretan were inscribed on the blocks of the Temple of Apollo Delphinios at Dreros (Huxley 1971, 506). Whatever the path of transmission and for whatever reasons, perhaps including recitation of the tradition over a wide Aegean area, Hesiod, Herodotus, and Thucydides accepted the historicity of a Minoan thalassocracy. (Of course Thucydides may in part have relied on Herodotus.) Homer, on the other hand, describes a Minos who lived two generations before the Trojan War, and is silent regarding a thalassocracy.

(3) The last of the additional arguments mentioned favoring the existence of a Minoan thalassocracy is perhaps the most significant of the three: The spread of neopalatial, Knossian-inspired cultural traits over a wide area, and (so far as we can determine) at roughly similar rates and degrees of intensity at sites generally thought to have a mixed Cycladic and Minoan population or a prominent Minoan community within a Cycladic population (such as Akrotiri, Phylakopi and Ayia Irini) as at sites generally considered entirely Minoan foundations (such as Trianda and Kastri), and encompassing religion and items of daily life.

Power may of course be exercised in various ways, from requiring a symbolic gift of earth and water to many more onerous possibilities. We cannot hope in the absence of texts to distinguish archaeologically between a Minoan ruler, a Cycladic ruler imposed by Crete or a Cycladic ruler and elite eagerly embracing Minoan culture and religion and entering into dynastic and other marriages with Cretan elites. Neither can we hope to identify archaeologically anything akin to the Egyptian practice of taking the sons of the rulers of subject lands to Egypt for education and residence and returning them upon the deaths of their fathers to rule, after thorough Egyptianization. (The Annals of Tuthmosis III inscribed on the walls of Karnak record that in his sixth Asiatic campaign [in 1460 B.C. on the middle chronology] 36 sons of the princes of Asia were taken [Breasted 1906, Volume 2, **[Page 153 begins]** 467; Wilson 1951, 183. I am grateful to C. Roehrig of the Egyptian Department at the Metropolitan Museum of Art for these references]. Similarly, the Inca empire of Peru required the sons and daughters

of the local nobility in subject lands to spend some months each year in Cuzco, the capital, to learn the ways and acquire the culture of the Inca.) If a similar Minoan practice existed, any Theran youth required to box before puberty and undergo other aspects of a Minoan "agoge" (Säflund 1987, 227-233) would have been well-indoctrinated.

There is, moreover, no reason to assume that the mode of exercise of Minoan power was the same for each island or remained constant through LMIA. Large towns and small ports might have had quite different relationships to Crete and to Knossos, and different islands may well have had differing dynastic or religious ties. (A consideration of differences in the manner of Venetian rule in various islands may be suggestive. The Ionian islands were governed much less severely than the Archipelago. The more prominent citizens were ennobled rather than imprisoned; intermarriage was encouraged and its frequency served to consolidate the domination of Venice. Italian became the official language and the Roman Catholic religion was established, but the mass of the population continued to speak in Greek and follow the Orthodox Church.)

In addition, fortuitous historical factors may have affected the seemingly different nature of Minoan presence in the various islands, as well as the Minoan role in the Aegean in general. Between the beginning of LCI and the Theran eruption three Bronze Age generations passed; between the beginning of continuous contact in MMII and the eruption, perhaps 300 years -- enough time in either case for the fortuitous but significant effects of plague, drought, malaria and earthquake, or of strong and weak rulers and the accidents of longevity affecting succession, to be felt. (As an example of shifting fortunes at sea affecting islands, we may recall that at one point in the 17th century corsairs from the Barbary Coast [Algeria] sailed the English Channel and Irish Sea with impunity, conducting raids and taking slaves. On one occasion 237 men, women and children were captured on a raid into Ireland and sold on the African slave market where they commanded top prices; on another, Englishmen were ransomed at 38 Pounds each. Yet within a few years of seizing power Cromwell was able to restore naval strength to the point that English ships were taking captives for ransom in the Mediterranean [Lloyd 1981]. At times in the 18th and early 19th centuries the fleet of one small island [such as Hydra] or a group of islands was able to exercise significant power in the Aegean.) Apart from such factors of chance, however, we must in general take account in LMIA of the wealth, organization, population and power of Minoan Crete.

A palatial role in the establishment of Minoan settlements at major and minor ports important for securing access to essential raw materials and trade routes seems likely under the circumstances, but some emigrants probably went on their own as well. We perhaps need not choose between the casual, unofficial, small-scale migration involving merchants, passersby and middlemen envisaged, particularly for the Dodecanese, in an interesting analysis by Melas (1988 A, 69), or an expanding Minoan elite seeking to carve out baronies, or a Cretan nobility exercising loose diplomatic control over the islands for defense (Doumas 1982, 12). Each of the foregoing possibilities may have existed in some part on some islands at some time. It is unlikely, however, that the palatial rulers would have relied entirely on personal initiative or have been content merely to tax or levy customs duties on individual traders, given the great concentration of resources, crafts, religion and administration in the palaces, and the position in LMI of Knossos.

The question posed at the outset was whether these island sites considered were major, purposive, differing but complementary parts of a Minoan empire. That Akrotiri, Trianda and the Seraglio were major sites on trade networks seems clear. Small sites such as Ayia Irini appeared to have played significant roles in these networks as well. As to Minoan power, motive and need to maintain secure trade routes there can be little doubt; accordingly we may regard these sites as purposive, without implying anything in the way of detailed central planning. (Rather it may be appropriate to recall an observation of a minister of Czar Alexander I: "All the

order is based on disorder".) It seems highly probable that the Cycladic, Dodecanese and Anatolian sites discussed and their elites depended on trade for their prosperity and security no less than Crete, and acted within a Minoan sphere of influence at the least.

With regard to these sites playing differing but complementary roles in a Minoan thalassocracy, we have noted their geographical positions vis-à-vis the apparent major metal trade routes and sources, and the likely differing roles of the large and small sites. Ayia Irini, for example, was a **[Page 154 begins]** small, busy port on a defensible, fortified promontory, well-situated for converting bronze, copper or lead received in bulk to more easily transportable intermediate or end products.

Unlike Ayia Irini, Akrotiri was even on present evidence a town of considerable size and complexity reflecting, as we have seen, many facets of Knossian elegance (perhaps to a greater extent than major sites in East Crete); at the same time Akrotiri is notable for the continuing evolution of its indigenous Cycladic ceramic tradition and local technique of wall painting. Outside of Akrotiri there were habitations on Thera which also contained Minoan or Minoan-inspired prestige items such as frescoes, columns and stone bowls. It seems safe to assume on the basis of geological indications that Akrotiri had a good harbour facing south, surely safer in winter and during the Meltemi than the harbours on the north coast of Crete such as Amnisos, which was known to Homer as difficult (Odyssey XIX, 188; J. Shaw, this volume).

Of course Thera may have had a special role in religion within the Minoan world (for example, Minoans may have connected its volcano to earthquakes, such as those which shook Crete at the end of the old palace period), resembling the special role of Delos in later times (and possibly Keros earlier). Akrotiri resembles Knossos in its significant number of buildings or areas with strong evidence of cult use, as noted above. Xeste III, the structure with the most evidence of cult or ceremonial use of those excavated to date, also exhibits more of the architectural features of the "School of Knossos" than any other building.

The presence on Thera as on Crete in LBI of scattered settlements, villas or farmsteads with Minoan prestige artifacts or architectural features is worth noting, and may indicate the coming of Minoans to settle. The possibility of population pressure in Crete in LMI (Warren 1984; Wiener 1984, 18) perhaps has received further support through Betancourt's discovery of dams and retaining walls on the somewhat barren hillsides of Pseira (personal communication, for which I am most grateful).

Were Thera and the other sites considered in this paper then "Isles of Crete", i.e., parts, however specialized or differing in function, or in form of participation or submission, of a Minoan empire? The Minoan impact on each of the categories of evidence discussed in the first part of this paper -- pottery in general, the kitchen kit, ceramic technology, conical cups, weaving, writing, architecture, wall painting and religious iconography -- may perhaps be attributed in each individual case to factors such as (1) the adoption of a superior technology, stimulated by the presence of a Minoan enclave and the process of competition; or (2) the "Versailles effect" of Minoan palatial culture; or (3) the religious conversion of local rulers, elites or populace. When all of the categories of evidence are considered in tandem, however, and in the context of Minoan power, wealth, population, trade networks and neopalatial expansion both within Crete and abroad, a major presence on Thera of Minoans and descendants of Minoans seems certain. They may have begun to arrive as individuals or an enclave in the protopalatial period, their number growing subsequently through further immigration and intermarriage. At the time of the volcanic eruption in a mature phase of LMIA Minoans were probably the predominant, though not sole significant, element of the population, occupying a critical position in trade networks vital to Crete and its rulers, and subject to the ultimate authority, perhaps expressed primarily through cult and ritual, of Knossos.

ENDNOTE

This paper is phrased in the traditional language and terms of Aegean archaeology. It would have been equally possible to have adopted the approach and language of anthropology or new archaeology. A summary of the argument in those terms might run as follows:

This paper states, establishes a methodology to test, and offers empirical verification for, a basic, if special, theoretical hypothesis involving the development of society. The hypothesis proposed is that an entity achieving

1. a differential technology of power, scale of magnitude of society and social complexity,

2. arising in part from a newly dominant mode of production -- bronze, but

3. totally dependent with respect to the newly dominant mode of production and the attendant security and prestige it provides on raw materials only obtainable overseas,

will move in the direction of **[Page 155 begins]**

A. the centralization and concentration of resources on obtaining the critical foreign inputs through trade and

B. the securing of the trade routes through emigration and eventually empire.

Our methodology of testing these propositions is as follows: First, we discard results from tests dependent upon the appearance of, and trade in, high-status luxury goods, or the adoption of certain types of status-affected behaviors, since such aspects of the archaeological record may be produced through cultural emulation by local elites, sometimes of a self-serving nature with respect to maintenance and aggrandizement of power (Trigger 1978). Instead we seek verification of our hypotheses through empirical tests based on

1. items of daily life across the social spectrum, including particularly matters normally resistant to change such as a) cooking, eating, drinking and weaving practice, b) religion and cult practice, and c) statistically significant evidence of any particular identifying mass behavior (e.g., the conical cups);

2. a requirement that all sites considered in testing the hypothesis, including both new foundations of the dominant power and major settlements within already-established sites of other cultures, should evolve in the direction of complexity, intensification of trade contacts and similarity to the dominant power in the critical respects noted above at approximately the same rate of change.

Verification of the hypothesis for the Aegean in LBI is postulated in light of the contemporaneous appearance at all sites of the material phenomena of daily life and cult noted in the paper, within the context of the power, population, complexity, and concentration of resources of the dominant power and its dependence on trade for its critical resources.

This paper also examines as a corollary the hypothesis that early states generally have a basis in religion (Webster 1976), expressed through behaviors such as the erection of numerous shrines, bonding via ritual feasting and the frequent communication of religious messages.

Confirmation from the Aegean archaeological record in LBI is noted in the form of elaborate shrines, both in distant places and within the major administrative and redistribution complexes, prestige cult objects such as enormous bronze double axes and figurines in precious materials, frescoes with religious and indoctrinating messages and pottery intended for ritual or feasting.

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