Petras, Siteia
– 25 years of excavations and studies

Acts of a two-day conference held at the Danish Institute at Athens, 9–10 October 2010

Edited by
Metaxia Tsiropoulou

Monographs of the Danish Institute at Athens
Volume 16
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It is indeed hard and dull to lead a life, both personal and professional, without celebrations, anniversaries, gatherings of friends and colleagues, symposia of any type. The 25th anniversary of the Petras excavations offered a wonderful opportunity for me to organize a Symposium, and for an international group of scholars, known for many things, including being members of the Petras team, to work hard, and then gather in Athens and present the results of their studies.

It was an exciting experience organizing and conducting this two-day Conference, and also editing the Proceedings and preparing the present book. I was very happy to be able to work during the multiple tasks of the preparation, the coordination of the contributors, the two days of the event itself, the collection of the papers and the editing of the present volume, with two hard working, creative, and very patient colleagues, Ms Garifalia Kostopoulou and Dr Maria Psallida. They are responsible before the event for the invitations, the preparation of the catering, the reservation of the restaurant for the speakers’ dinner, and the printed material of the Conference. During the Symposium they made sure that everything went smoothly. After the Conference they worked for many months to do the pagination, the bibliography and the list of contributors, and they helped significantly with the proof reading and the index (Psallida), and the plates and the cover design (Kostopoulou). The editing of the volume was a very interesting task for me, and having no day job at the Ministry after the end of November 2011, a victim of the crisis that struck Greece, I was able to dedicate myself entirely to it. Furthermore, I am responsible for the transcription of the discussions, an interesting first-time experience. Many thanks go to David Rupp who patiently corrected all the English manuscripts of the 11 non-native speakers, as well as the discussions. Also my warmest thanks to Melissa Eaby for the final proof reading and significant improvements. The specialized text of Konstantinos Togias, the developer of the Petras website, was translated from Greek by Ms Effie Patsatzi, a specialist in the Management of Digital Heritage.

Dr Erik Hallager is responsible for the final pagination and the insertion of the figures into the text. I wish also to thank the creators of the four posters presented at the Conference: two posters, one of which was in collaboration with the director of the excavation, were by Ms Clio Zervaki, the Petras Conservator, MA in Museology and MA in Cultural Management, and another two were by Garifalia Kostopoulou.

The Danish Institute at Athens, and its two consecutive Directors, Erik Hallager, a dear old friend and member of the Petras team, and Rune Frederiksen, have my gratitude for hosting the Symposium and for including the publication in the series of monographs of the Institute.

The Institute for Aegean Prehistory (INSTAP), which has been supporting the excavations at Petras, the conservation of the finds and the studies since 1987, also funded the Symposium and the publication of the present volume. My deep gratitude goes to INSTAP and its Executive Director, Philip Betancourt, also a good friend and member of the Petras team.

The success of the Symposium, which was really a wonderful and very stimulating experience, is due to all the participants, the speakers, and the chairpersons. More than 100 colleagues, Greeks and foreigners, from the Hellenic Archaeological Service, the Universities and the Foreign Schools of Archaeology in Greece, including senior members and graduate students, were present at the Danish Institute, and were very active during the discussions. They contributed to the creation of a very
friendly and positive atmosphere throughout the Symposium. A very special thanks goes to the chairpersons, Philip Betancourt, Michael Wedde, David Rupp, Erik Hallager, Colin Macdonald, Lefteris Platon, Thomas Brogan, Olga Krzyszowska and Alexander MacGillivray. I am very grateful to Peter Warren, my mentor, who enthusiastically agreed to write the concluding remarks for this volume.

Three generations of scholars participated at the Symposium, some of the younger ones had come to Petras as undergraduate or graduate students, long ago. Their names in the order they presented their papers are: Yiannis Papadatos, Eleni Nodarou, Tatiana Theodoropoulou, Cesare D’Annibale, Philip P. Betancourt, Susan C. Ferrence, James D. Muhly, Olga Krzyszowska, Sevasti Triantaphyllou, Heidi M.C. Dierckx, Donald C. Haggis, Maria Emanuela Alberti, Kostis S. Christakis, Nektaria Mavroudi, Erik Hallager, David W. Rupp, Anna Simandiraki-Grimshaw, Photini J.P. McGeorge, Natalia Poulou-Papadimitriou, Chrysa Sofianou, Thomas M. Brogan and Konstantinos Togias.

The 25 years of the Petras excavations and studies coincided with a period of crisis for Greece that worsened significantly between October 2010, the time of the Symposium, and spring 2012, the time these lines are written. From the beginning my idea for the organization of this event and its publication was an idea of resistance to the crisis. I am very happy that we succeeded and very grateful to all who worked hard and made this success happen.

Athens, Exarcheia, Easter 2012

Metaxia Tsipopoulou
Abbreviations

Archaeological periods

EBA  Early Bronze Age
EH   Early Helladic
EM   Early Minoan
FN   Final Neolithic
LH   Late Helladic
LM   Late Minoan
LN   Late Neolithic
LBA  Late Bronze Age
MBA  Middle Bronze Age
MH   Middle Helladic
MM   Middle Minoan
MN   Middle Neolithic
PPN  Pre-Pottery Neolithic

PTSK Petras cemetery
PTSU Petras-Rock Shelter
Σ-palace Stratigraphical trenches of the palace

Other

A.S.L. Above Sea Level
diam. diameter
gr  gram
h   height
kg  kilogram
w   width
wt  weight
th  thickness
lt  liter
NISP Number of Identifiable Specimens
MNI Minimum Number of Individuals
SM Archaeological Museum, Siteia
vol. volume

Petras Area

HT   House Tomb
L    Lakkos
P    Petras

The form of the English language for the native speakers (British or American) was the author’s choice. For the non-native speakers the American form was applied.
Neolithic and Minoan marine exploitation at Petras: diachronic trends and cultural shifts*

Tatiana Theodoropoulou

Abstract

The marine world has always fascinated people living at the edge of landscapes in close connection to the sea, such as the island of Crete. Numerous are the examples of the influence of the marine element in the everyday life and artistic or symbolic expressions of the prehistoric populations of Crete. These latter are evident in both Neolithic and Minoan contexts, yet it is rare to find continuity in the behavior of the inhabitants of one region. The extensive excavations at the Neolithic settlement of Kephala and the Minoan palace at Petras provide one such marine record. Numerous marine animal remains, found at both Kephala and the Minoan palace, offer a unique opportunity for a detailed insight into marine animal utilisation in two different cultural and social contexts. This paper aims to explore the possible uses of fish and molluscs within the Neolithic settlement and the Minoan palace and to reveal the common trends and differential perceptions of the fruits of the sea by two distinct human groups.

Introduction

The marine world has always fascinated people living at the fringe of landscapes in close proximity to the sea, such as the island of Crete. Numerous are the examples of the influence of the marine element in the everyday life and artistic expressions of the prehistoric populations of Crete. Among various strands of evidence, the presence of marine animal remains in an increasing number of archaeological contexts from the island confirms what Vickery was one of the first scholars to pinpoint, as early as 1936, that fish and shellfish formed part of the diet and everyday life of Aegean populations.¹

The lengthy excavations at the Neolithic settlement of Kephala and the Minoan palace at Petras provide one such marine record. Beyond the obvious interesting information on the exploitation of marine fauna that these remains may provide, the importance of these two marine assemblages lies in the fact that they offer a unique opportunity for a detailed insight into marine animal utilisation in two different sociocultural contexts situated in the same environment. In this respect, this paper does not intend to cover detailed aspects of exploitation within either the Neolithic settlement or the Minoan palace. It rather aims to explore the relationship of the Neolithic and Minoan populations of Petras to the sea as a whole and to draw upon

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¹ I would like to thank Dr Metaxia Tsipopoulou and Dr Yiannis Papadatos for entrusting me the study of the marine remains from Petras. My work at INSTAP was rendered easier and, above all, more pleasant thanks to the help and company of Garifalia Kostopoulou and Clio Zervaki. My thanks also to Dr Eleni Nodarou for providing help with geomorphological data for the region. The study was funded by INSTAP.

¹ Vickery 1936, 74: “The modern Cretans are fond of octopods and eat a great many of them. Neither do they fail to utilize squid, shellfish and vertebrate fish. What was the practice of their predecessors on the islands and elsewhere in the Aegean in the New Stone Age and in the various periods of the Bronze Age? Formerly, a ready partial answer was forthcoming: the Greeks rarely, if ever, ate fish. But more recent study of the remains of the homes and settlements of the early peoples has compelled a revision of this answer.”
potential converging trends regarding marine re-
sources and the perception of the marine element
by two different communities installed in the same
coastal environment.

Living by the sea in Neolithic and Minoan Petras

To understand cultural behavior related to a specific
environment, the nature and boundaries of this en-
vironment need to be defined. Both Neolithic and
Minoan Petras are situated on low coastal hills, in
close proximity to the shore, and have visual con-
tact with the Siteia Bay.2 Geological evidence in-
dicates that, at least during the Minoan period, the
sea extended far into the present day valley west
and southwest of Hill I at Petras, and the coastline
lay at the base of the foothills, about 2 km to the

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2 Tsipopoulou this volume, Introduction, Fig. 10a and 10b.
south of the modern coastal front. A small protected bay was formed between Hills I and II. Pandelis River lay at the deepest reaches of the bay.

Although detailed information on the types of shores surrounding the Petras Hills is not available for the studied periods, the described environmental background as a whole would provide a potentially favourable setting for a coastal community to efficiently exploit marine resources.

**Shells and some methodological considerations**

Although fishing for fish and shellfish may seem like the natural choice for communities living by the sea, it is not a straightforward one. Marine animal remains from Neolithic and Minoan Petras offer the possibility of testing this scenario on two different coastal communities. The Neolithic settlement of Kephala and the Minoan palace produced marine faunal assemblages, both of which were studied by the author. Although neither assemblage can be considered abundant, especially when considering the time span of use at both sites, they still offer a significant sample to work with. Kephala Petras yielded 1,739 shell remains, while the shell material from the palace of Petras includes 2,216 marine remains (invertebrates and fish).

Although this is not a detailed study report on the marine faunal remains from these sites, a few methodological points need to be cleared up. Both materials underwent the same zooarchaeological analysis, consisting of species identification, quantification and recording of primary data, environmental reconstruction and zooarchaeological interpretations. The study of fishbones and shells from archaeological contexts may contribute to the reconstruction of ancient coastal environments and help define specific coastal or marine zones of ancient human gathering, as well as provide information on the collecting methods and equipment involved. These aspects of marine exploitation become even more interesting when comparisons between two communities that shared the same areas at different periods of time can be conducted. With respect to the latter, counts and estimates are given in minimum numbers of individuals (MNI). This type of count, closer to the original number of animals used at a site, was preferred against NISP (number of identifiable specimens), so as to set a common ground for inter-site comparisons (Table 1).

**Reconstructing Neolithic and Minoan shellfish exploitation**

Primary analysis and environmental reconstruction of the Petras marine assemblages offer the possibility of shedding light on different periods of coastal exploitation in the Sitea Bay. Species identification and relative frequencies of taxa reveal common features as well as several differences between the two sites.

Both assemblages share a common core group of taxa, even if significant differences in the frequencies of species can be observed from one period to another (Fig. 1, Table 1). This group comprises limpets, murex shells, top shells and tritons, and occasionally oysters, dog cockles and cockles, whelks, spiny oysters, cowries, horns and crabs. On the other hand, there are certain shellfish solely present either in the Kephala (arks, scallops, fan shells, helmets, file shells, cone shells and carpet clams) or in the Minoan material (mussels, worm shells, wedge shells, turbins, dove shells and barrel shells, as well as a lobster fragment). Although the respective numbers of these species are too low to allow any secure interpretation of this diverging pattern, an overall evaluation of the shellfish material puts forward two distinct exploitation patterns.

The identification of marine remains from Kephala

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3 At least 5 m lower from the base of the wall to the west, as well as very close to the villa of Klimataria to the east (Tsipopoulou 1991a; Tsipopoulou 2003).

4 Tsipopoulou 2003.

5 The Minoan palace also produced a number of fossil oysters and cockles. Their presence within the Miocene marly limestones of the region (according to the 1959 geological map issued by the Institute for Geology and Subsurface Research) would point to a non-cultural presence. We thus decided not to include them in the counts. See also n. 27.


7 Peres 2010.
I. The earliest occupation: FN-EM I Kephala

Petras revealed quite a focused pattern of collection. Limpets are the prevailing species in the Neolithic settlement, accounting for nearly 80% of the collected shellfish (MNI). They are accompanied by a fair number of topshells (14%). A few other species are present in limited numbers, such as dog cockles, tritons, ark shells and murex shells. A different situation is observed in the Minoan material. Although limpets are still collected, their numbers decrease (38%) in favour of murex shells (50%), while top shells and other shellfish are only occasionally present (Fig. 2). Despite these differences, both sites show a similar pattern of exploitation of a relatively rich but not quite diversified spectrum. In other words, it may be suggested that Neolithic Petras exhibits quite a specialised strategy towards coastal resources. This is an expected pattern in coastal sites, where a wide range of taxa are present, yet only few substantially contribute to the diet. Although this tendency is maintained in subsequent Minoan occupation, the focus of collection is rather divided into two major resources, limpets and murex, with a range of other minor species present.

In light of these two diverging situations regarding shell and fish exploitation by the two coastal communities, the question of differential behavior towards marine resources needs to be addressed both on an environmental and a cultural level.

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Notes:
8 These terms, borrowed from biology, are used in zooarchaeology to describe the composition of an assemblage. Taxonomic richness is the number of taxa in an assemblage, while diversity refers to the relative importance of the species present (number of individuals of the identified taxa); Reitz & Wing 1999, 233–4; Claassen 1998, 117–20; Peres 2010.
9 Reitz & Wing 1999, 234.
Changing environments, changing strategies

The change observed from the Late Neolithic/EM I to the MM II/LM IIIB material is principally illustrated by the shift from one almost ubiquitous species, namely limpets, to a more evenly distributed collection of limpets and murex shells, accentuated by the presence of two other groups of shells occasionally present in either the one or the other assemblage. The nature of the two major species as well as any possible relation between them, thus needs to be explored.

Limpets are a common conical gastropod found attached to rocky shores or other hard substrates, usually in colonies.\(^\text{10}\) They may share the same habitat with top shells and other species tolerant of periods of exposure to the air. Murex shells, on the other hand, are larger, spined gastropods that live in the intertidal or shallow subtidal zone, among rocks, corals, or detritic substrates.\(^\text{11}\) The description of the environmental parameters of the prevailing species that form the bulk of the material in the archaeozoological assemblages of Petras highlights the exploitation of two different marine zones at two different periods: a collection on the upper levels of rocky shores at Kephala, and a more diversified collection in either rocky or mixed substrates from the intertidal zone to deeper waters at Minoan Petras (Figs. 3, 4). Furthermore, the contribution of sandy-muddy environments, somewhat important during the Kephala occupation, becomes almost negligible in the Minoan assemblage.

The environmental profile provided by represented marine organisms needs to be viewed in a foraging perspective with regard to both Late Neolithic and Middle/Late Minoan communities of the Petras Hills. In general, it is accepted that archaeo-

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\(^{10}\) Fischer et al. 1987, 608–11. The term *colony* in biology refers to several individual organisms of the same species living closely together.

\(^{11}\) Fischer et al. 1987, 588.
logical shell remains are the result of what has been chosen and collected by humans. In this respect, they primarily reflect a human choice among other potentially available resources. On the other hand, human choices can be driven by environmental conditions, such as availability and abundance. In the following section, both cultural and environmental factors affecting the change in species composition in the two Petras materials are considered.

Change in species representation in archaeomolluscaly may in fact be related to either environmental or cultural reasons. Environmental pressure, namely sudden changes of environmental or climatic nature, concurrence between species, and extensive human foraging in the upper and more easily reached levels of the shore feature among most common reasons for changes of species representation through time. The impact of coastal foraging is often related to the decrease or depletion of natural stocks of marine organisms or even the reduction or extinction of the larger age classes.12

Based solely on quantitative criteria from both sites, it is not possible to speak in favour of large-scale shellfish exploitation capable of bringing about significant changes to the coastal environment near Petras. On the other hand, information on possible environmentally-derived coastal changes at the period of time between the Kephala settlement and the Minoan occupation is lacking. However, such a scenario might be reflected in shells from archaeological contexts. It was thus decided to test the hypothesis of a change in species representation in these two assemblages due to depletion of limpet populations. Measurements of limpet length were taken on complete shells of limpets using an electronic vernier calliper (>0.1 mm, Fig. 5). It was possible to measure 865 and 395 specimens from Kephala and Minoan Petras, respectively.13 The average lengths and standard deviations of the two samples have been calculated in order to provide a reliable comparison between the two sites. The results not only negate the hypothesis of size reduction from the older to the more recent assemblage, but they suggest a slight increase in average limpet length from the Late Neolithic to the MM/LM periods. On the other hand, it is interesting to note a more generalised pattern of collection at Kephala, with a preference for rather small individuals (around 2 cm long). This observation correlates well with the pattern of a more intensive collection of one type of shellfish. The latter is further

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<th>Minoan</th>
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<td>MNI</td>
<td>865</td>
<td>395</td>
</tr>
<tr>
<td>Min (mm)</td>
<td>9,5</td>
<td>10,0</td>
</tr>
<tr>
<td>Max</td>
<td>50</td>
<td>52,0</td>
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<td>AVER (mm)</td>
<td>23,8</td>
<td>31,4</td>
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<td>STDEV</td>
<td>6,5</td>
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Fig. 5. Typical limpet hip and shell size measurements (expressed in mm) for Kephala and Minoan Petras.

Fig. 6. Relative frequencies (%MNI) of limpets in Kephala and Minoan Petras.

12 Mannino & Thomas 2002; Milner et al. 2007.

13 For the purposes of this study, it was decided to include all three limpet species, since they share common habitats.
supported by the relative frequencies of the three limpet species present in both sites, *Patella caerulea*, *P. rustica* and *P. ulyssiponensis* (Fig. 6). Although the common limpet (*P. caerulea*) is the dominant species in both assemblages (60% and 89% MNI, respectively), the two other species are better represented in the Kephala material (28% for *P. rustica* and 13% for *P. ulyssiponensis*) than at Minoan Petras, possibly indicating an omni-harvesting strategy in the first case compared to a more selective choice (one species, larger individuals) in later times. However, there is also the possibility that shellfish were being gathered from different areas of the shoreline during the FM/EM and MM/LM periods. More detailed geological data may allow for refinement of the reconstructed image of the ancient shoreline in the Siteia Bay.

The scenario suggesting two different collection grounds may be supported by the general increase of a more mixed, less rocky environment. However, available archaeomalacological or geological data do not offer any clear answer as to whether this shift occurred following a gradual environmental change in the Petras Bay or whether different marine environments were selected on the basis of what shellfish were desired. It is possible that the coastal environment surrounding the Petras Hills underwent some change in the time between the FN/EM and the MM/LM occupations, through either sea-level fluctuations or geomorphological changes related to the flow of the Pandelis River. In either case, the collectors would have adjusted their collecting strategies and methods to the newly exploited resources. Alternatively, the introduction of different tools and new methods of collection as a determining factor for exploited grounds should also be considered. The ethological behavior of rock-dwelling limpets allows for easier location and collection with simple procurement methods and tools, either by hand or with a sharp instrument (a knife or a stick picked up on the beach) for detaching the animal from the hard surface. On the other hand, epifaunal carnivore molluscs living in deeper waters,14 such as murex shells, may require more elaborate methods of collection.15 This observation also points to a deliberate effort to collect this mollusc despite a higher level of difficulty in acquiring it. In order to explain why this and other shellfish were collected by these two coastal communities, it is necessary to consider their uses.

**Using shells at Neolithic and Minoan Petras**

Shellfish have been used by the Aegean populations both as a food resource and as a raw material (both hard and soft tissue) for a variety of objects and substances. One basic distinction to be made is between food and non-food uses. Both assemblages from Petras offer evidence for the consumption of shellfish as well as for the use of their hard shell for other purposes. These various uses thus need to be presented.

Shellfish constituted a food resource for both Petras communities (Fig. 7). The marine diet of the Kephala inhabitants consisted chiefly of limpets and top shells, occasionally diversified by cockles and dog cockles, arks, spiny oysters, oysters and murex shells, rarely by fan shells, clams, file shells, tritons, horns and crabs. Minoan in-
I. The earliest occupation: FN-EM I Kephala

habitants maintained a taste for limpets, although they also turned to the consumption of murex and whelks, and rarely top shells, crabs and lobsters. The question of fish consumption also needs to be addressed. Although soil sampling and dry sieving (Minoan) or water flotation (Kephala) was conducted on both digs, only the Minoan site produced six severely burnt caudal vertebrae and one cranial bone of a gilthead seabream (*Sparus aurata*).16 The relative absence of fish from the Petras sites is striking, especially in light of the abundant fish assemblages from other sites on Crete.17 Although soil acidity might be in part responsible for this lack, cultural aspects related to taste, consumption or food waste management need to be studied in detail for every site. Turning to shellfish, their consumption usually did not require any preparation or cooking at either site. Most taxa can be eaten raw by simply detaching the shell from its surface and extracting the animal from its shell, or by crushing the shell of the mollusc. Traces of tool use and crushing are left on several specimens from both sites, including limpets, top shells and horn shells. The cooking of molluscs, crabs and lobsters is also possible, but it is extremely difficult to distinguish such procedures on archaeological specimens. Several burnt invertebrate fragments have been found in both assemblages, especially the palace and settlement area, however their presence must be related to post-consumption contact with fire, as they all exhibit traces of heavy burning, which would have rendered the flesh of the molluscs inedible.18 The detailed contextual study of shell samples from Kephala and Minoan Petras may reveal specific areas related to shell preparation, storage and consumption. Preliminary observations point to a rather scattered distribution of shell remains, with a few exceptions, such as the presence of a concentration of murex shells in the area of the Minoan occupation.

The latter observation brings the discussion to the use of this mollusc for purple-dye production during the palace period of Petras. Although murex fragments have been found scattered in all areas of the Minoan occupation, including the palace, houses and other areas, one substantial deposit came from the so-called Lakkos in Sector III, to the west of House I.1, which contained several fragments of *Hexaplex trunculus* attributed to more than 120 individuals (Fig. 8). These concentrations were recovered from the fill of a sizable dump that contained large quantities of fine-quality tableware, nearly 60 loom weights, stone tools and several ritual objects.19 The archaeological debris from the Lakkos has been associated with MM IB–IIA cultural material used in elite buildings on the upper plateau that were destroyed during the modification of the hill to accommodate the palace. An industrial installation has been identified in the same sector, dated to the EM II–III period.20 If this murex concentration from Minoan Petras represents

16 Three *Sparus* bones have also been identified in the hieroglyphic archive of Petras (Mylona 2010). Rose (1994, 344) notes the presence of one caudal vertebra of a fairly large barracuda (*Sphyraena sphyraena*), reported by David Reese.
17 Several examples in Rose 1994 and Mylona 2003.
18 Theodoropoulou 2007a.
20 House II.1 at Petras is also associated with cloth production, as it preserves some of the best evidence for this activity in eastern Crete, including tools, installations and inscriptions associated with the textile industry (Burke 2006). However, there are no significant murex shell concentrations suggesting purple-dye production in this house. It is possible that this would have been an unpleasant, and thus unwanted activity, for the owners of the house staying on the first storey, as production of purple usually releases a strong pungent smell (Ruscillo 2005).
Theodoropoulou: Neolithic and Minoan marine exploitation at Petras

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purple dye production debris, it would support the hypothesis that purple-dyeing was concentrated at palatial centers, further suggested by the study of marks and stamps on the loom weights from this deposit. However, the preserved quantities are far from the numbers, as suggested by Spanier and Karmon (1987), needed for an industrial-scale production, although a few hundred individuals would suffice to produce a fine colour on light garments. If, on the other hand, this murex deposit represents food debris, it would be interesting to define its association with the high-quality tableware and ritual vessels found in the Lakkos and the role of murex in elite feastings.

The role of shells in ritual and other symbolic acts, as well as in everyday life, is to be seen on a number of specimens from both sites. It seems that marine animals played an important role in the aesthetics and symbolic sphere of both communities. Several shells with holes, either naturally occurring or deliberately pierced, are found both in the Kephala and the Minoan material (Fig. 9). The study of the holes and the state of preservation of the shells suggest that people from the Neolithic settlement and the later Minoan occupation acted in a similar way, either collecting worn shells of simple shapes on the shore to wear as ornaments (cockles, dog cockles, cone shells, dove shells) or intentionally transforming shells into objects of adornment (cockles, dog cockles, horn shells, turban shells, helmet shells). A higher degree of elaboration may be found in the Neolithic settlement, which has produced a number of singular items, including pendants and other possible objects of adornment, comparable to similar Neolithic objects from the Aegean. Several other shell specimens occur at both sites either in an unmodified or in a modified state, yet their use remains unclear. This is, for instance, the case of whole or fragmented cowries found at Kephala and at the Minoan site. Their association to female fer-

21 Tsipopoulou 1990b; Burke 2006. Purple-dye production in Crete has been identified during the MM IB period (Ruscillo 2005; 2006) and purple, as well as possibly female purple dyers, are also mentioned in the Knossos tablets (po-pu-ro2, po-pu-re-ja, Palmer 1963, 292, 297, 447). It is suggested that the production may have begun even in the third millennium BC (Bruin 1970).

22 Ruscillo 2005.

23 According to Haggis 2007. The same author notes that other faunal remains (animal bones) are found scattered throughout the assemblage but not in amounts suggesting a concentration of food debris or discard.

24 For example, Vialou 1974; 1981, pl. L; Jacobsen 1973, pl. 48d.

Fig. 9. Shell ornaments from Kephala (a, b, c, d, e, i, j, l, m, n) and Minoan Petras (f, g, h, k).

Fig. 10. Triton shell fragments from Kephala (i, j, k, m) and Minoan Petras (a, b, c, d, e, f, g, h, l, n, o).
I. The earliest occupation: FN-EM I Kephala

The earliest occupation: FN-EM I Kephala

...ility in various cultures around the world raises the question of the symbolic use of shells in Neolithic and Minoan Petras.  

Distinguishing the function of shells, whether practical or more symbolic or ritual is not always straightforward. The case of triton shells from the Petras excavations is worth mentioning. A range of modified triton fragments has been recovered from Kephala (Fig. 10). The shape of these fragments resembles a spool, cup or other receptacle. Neo-lithic Petras also provides one of the oldest Cretan modified examples of hollow tritons, often interpreted as drinking cups. However, it is not clear whether these modified fragments or the hollow triton fulfilled a secular or a ritual need. Intentionally fragmented triton shells, such as those found in Neolithic Petras, seem to survive in the Minoan occupation, but their presence in the Minoan period is generalized and covers a number of new uses as well, such as scrapers or polishers. On the contrary, although hollow tritons are found in Minoan contexts, the Minoan levels of Petras did not yield any such example. However, other large gastropod shells might have fulfilled similar uses, such as the helmet shells from Kephala and Minoan Petras (both with stringing holes, Fig. 11:c), as well as the modified limpets (Fig. 11:a) from the Neolithic site or even some of the numerous fossil oysters (Fig. 11:d) found at Minoan Petras.

In any case, the boundaries between practical and symbolic are difficult to draw. More refined contextual analysis may shed light on the various uses and meanings of shells in the Petras sites.

Summary and conclusions

The Petras excavations offer a unique opportunity for a comparative approach to marine acquisition behavior towards marine environments by two chronologically distinct yet geographically identical sites. Moreover, the material from the two sites covers a unique time span for the Cretan record, shedding light on well-documented, as well as on less known, cultural horizons.

The preliminary study of these two marine assemblages highlighted various cultural responses towards the adjacent marine environment and revealed divergent choices regarding the same type of resources. As a whole, the Neolithic occupants developed a more focused collection of limpets on the upper levels of the shore, possibly with more rudimentary tools and less time involved. Although later Minoan inhabitants maintained a taste for the main molluscan resource, they turned to other resources as well, and expanded collection to deeper waters, possibly enabled by technological advances. This diverging pattern may be in part related to the differential use of marine resources by the two coastal communities, namely an intensive collec-tion...
tion for consumption during the Kephala period versus more occasional food exploitation of molluscs during the Minoan one. The use of marine shell as raw material is also well exemplified at both sites, in similar ways but also with quite a few differences. Shells are used in both periods as ornaments or receptacles of some sort, using a range of techniques, occasionally very elaborate in the Kephala collection, while somewhat simpler in the Minoan specimens, and often making use of the natural shapes and breakages. Although common shapes and utilitarian uses are to be found at both sites, a few singular pieces from Kephala remind one of similar examples from the Neolithic Aegean. Finally, the possibility of purple-dye production within the limits of the Minoan palace of Petras needs to be further explored in conjunction with other strands of evidence, such as relevant installations and related material culture.

Future research will focus on spatial distributions within each context and a more refined contextual approach bringing together various archaeological and bioarchaeological evidence. The coastal character of these two communities living at the coastal fringe needs to be viewed both in light of the cultural spheres they represent and the environmental background they make use of. In this respect, any common responses as well as different interactions with the sea, are extremely useful for a better understanding of communities living by the sea.
That was very nice, a brilliant contrast. An issue of wider interest. If we were to reconstruct an inland environment as opposed to an estuary, I wonder whether these were also a technical selection decision in the Minoan period.

I have not identified any brackish species, which might have been indicative of an estuary environment, but still mixed substrates can also be found in this type of environment. So, yes.

My other question is about the food consumption, the boiling and all, is there an indication on the surface of the shells?

No, it does not leave remains.

Metaxia knows about the coring that was done in what once was an estuary. If you go to the Richardson plot, where the two Mycenaean type walls were excavated, toward the west, there was a beach there. There is clear evidence from that excavation of the beach level there. I think it went up to reach, what was the level?

The Minoan sea level was proved to be 4 m higher than the present one.

So this is evidence about the ancient seashore.

So that your reconstruction was rather timid, only what would have been possibly in the last phase.

Thank you.

Is there a direct indication about murex exploitation?

I deliberately choose not to include this in my presentation because the remains of purple shells, although they are crushed and they might have been used for purple, were not concentrated in one place, and also it is difficult to imagine how they would have proceeded in this activity within a habitation area, not to mention the palace, because we all know that this exploitation is very smelly. They usually would want to do this close to the water and out of the settlement.

It seems to me that what your evidence indicates is that there is no purple dyeing industry in the Final Neolithic. I think this is confirmed by other sources. This is definitely not a fourth millennium industry.
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Theodoropoulou: At least not in Petras.

Alberti: I want to ask you about purple uses. I want to tell you that in many cases in the Neolithic period we do find ritually crushed shells reused in buildings. So you do not need to find the proper context for dyeing.

Theodoropoulou: Not necessarily, but at least you need some shells to do so. But I would be interested to know a little bit more about this house where dyeing and wool spinning were found, I cannot remember if there were any significant concentrations of murex, from this area, but this is something to work on.

Triantaphyllou: Thank you for your very good presentation, Tatiana. I have a question: Can you estimate population units and how many people were fed from the remains you have from Kephala Petras, because this would be very interesting.

Theodoropoulou: Of course what we can have in zooarchaeology is minimum numbers of individuals, so we have a very small proportion of what would have been the total, but we can test this hypothesis. Then there are ways to estimate life flesh from molluscs eaten, but then again it would be very vague and we would also have to take into account the other resources’ input, not just marine ones, to have it. It is an idea and actually there used to be a whole school, back in the '1960s and 70’s, with reconstructions of protein and other marine input from shells.

Papadatos: I would like to intervene on that. It is very important, the deposition, at least at Kephala Petras, because the settlement was used for many decades, perhaps for more than one century, and what we have excavated is only what was left at the very end, in the final phase.

Theodoropoulou: We can only have this if we have a closed context, a very precise context, and then we know for sure that this was one deposition event.

Brogan: I think you have seen some of the stuff that has been found in House A at Papadokampos. We had tremendous evidence for limpets. In many cases they were cooking them, definitely they were heating them. My question to you is: Did you say that they were heating them to clean them, to take the sand out of them, or did I misunderstand you? Did you say that one of the reasons that they might have chosen to heat them rather than eat them raw was to clean them?

Theodoropoulou: No, actually what I said was that in the palace we have burnt shells, a few burnt shells, but these are burnt deliberately or accidentally once the flesh was removed, once they have eaten the mollusk, and then they deliberately or accidentally have thrown the debris into the fire. This is something we find also today in several tribes around the world. Maori would dump shells into the fire, in order to clean out the space, etc. This has nothing to do with food consumption.

Brogan: Yes, we found the same thing, the exact same thing.
I am going back to the purple dyeing. I want to give an example from my excavations in Khania. In several rooms we found a lot of crushed murex shells as floor packing, indicating that purple dyeing might have happened elsewhere and then they reused the crushed shells in the architecture. Metaxia do you have any evidence for that at Petras?

Yes, this is a possibility, but then you have to have large quantities of shell. This is something that has been found in Akrotiri; there was an underlying layer of crushed shells that had been used, isolating material underneath, I cannot remember which house it was. This is not the case at Petras, we have very few shells, they are all over, but they are not concentrated in one area.

I would like to bring into the conversation the evidence from the recent excavations at the cemetery, and there we also have lots of limpets. Since all the soil is water sieved, we have practically every remain collected and we have hardly any fish bone. This is, I think, very interesting. In many areas of the cemetery we have concentrations of shells and limpets in particular.

So you have shells inside the tombs?

Mostly outside of the tombs, in the so-called votive deposits.

I just want to go on from Metaxia’s point. I am not sure how many other people here were a bit startled, but to look at a community level at Petras sitting at the mouth of a river on the Aegean sea and not having any fish bones, do not you find this strange?

Yes it is strange. On the other hand we do not know if they were dumping, throwing away food debris outside of the settlement, or in some other areas, although we would have found some anyhow, and conditions are not unfavorable for preservation of fish bones in Crete. This is what is usually put forward when we do not find anything that they are very fragile, that they are small, but this is not true, not all, we have found them on several other occasions in Crete, in Minoan contexts, so this is an issue to explore further.

We found a lot at Palaikastro.

Yes.

Since we have reached the bottom of the page, I would like to add a footnote. You showed a seal CMS VII, no. 17 a man with an object, that consists of a bar, three or four round objects and some ligatures attaching the round object to the bar, it is an interesting comment on how we do, what we do, when we do archaeology, because if you speak to textile people, Brendan Burke for example, it is obvious that this is a shorthand for a loom with the loom weights and if you speak to people from my area of specialization, the ship crowd, then that is obviously a proper raft and you call it a raft.
Εκμετάλλευση των υδάτινων πόρων κατά τη Νεολιθική και την Μινωική περίοδο στον Πετρά. Διαχρονικές τάσεις και πολιτισμικές αλλαγές.

Ο θαλάσσιος κόσμος πάντα γοήτευε τους ανθρώπους που ζούσαν στα άκρα τοπίων συνδεδεμένων με τη θάλασσα, όπως ήταν το νησί της Κρήτης. Πολυάριθμα είναι τα παραδείγματα της επίδρασης του θαλάσσιου στην καθημερινή ζωή και στις καλλιτεχνικές και συμβολικές εκφράσεις των προϊστορικών οικισμών της Κρήτης. Οι τελευταίες είναι φανερές τόσο σε Νεολιθικές, όσο και σε Μινωικές αποθέσεις, και είναι σπάνιο να βρεθεί συνέχεια στη συμπεριφορά των κατοίκων μιας περιοχής. Οι μακροχρόνιες ανασκαφές στο νεολιθικό οικισμό της Κεφάλας και το μινωικό ανάκτορο του Πετρά προσφέρουν μια ανάλογη θαλάσσια μαρτυρία. Πολυάριθμα λείψανα θαλάσσιων ζώων, τα οποία βρέθηκαν τόσο στην Κεφάλα, όσο και στο Μινωικό ανάκτορο, προσφέρουν μοναδική ευκαιρία για μια λεπτομερειακή ματιά στη χρήση των θαλάσσιων ζώων σε διαφορετικά πολιτιστικά και κοινωνικά περιβάλλοντα. Η ανακοίνωση σκοπεύει να εξερευνήσει τις πιθανές χρήσεις των ψαριών και των αλατιών σε ένα Νεολιθικό οικισμό και στο Μινωικό ανάκτορο, και να χαράξει τις κοινές τάσεις και τις διαφορετικές αντιλήψεις σχετικά με τους καρπούς της θάλασσας από μέρους δύο διαφορετικών ανθρώπινων ομάδων.
I do not know about you, but I feel dizzy after two days full time; Petras information overload in some ways. I think like with all excavations and all research projects you come away with more questions than you do answers, but I guess that is why we do it. Like many people yesterday, I should probably start by asking why Metaxia Tsipopoulou asked me. That is possibly because we are such good neighbors, and we have been good neighbors – I worked at Palaikastro since the very beginning. Hugh Sackett and I went in 1983 to Palaikastro though we did not start digging until 1986. We were both younger then, it was a really long time ago. So I have been associated with Petras, and with Metaxia, for all of those 25 years. One thing that does come through is the sheer amount of hard work that is involved, I do not just mean the digging, that is the easy part, it is the bureaucracy, the fund raising, and she had to deal with land owners. That part does not really show in the Symposium. We sit back now and we marvel at these results, but there is a whole back story to this, that perhaps should never be told, or nobody would ever go into archaeology. In Metaxia’s case, it was very complicated, very difficult, and she showed amazing staying power, and we are very grateful that she did. When I first went to eastern Crete in 1983, you would drive by Petras, and there was nothing there, now 25 years later, what Metaxia has done is that she has given us this amazing site, she has put Petras on the map. Bosanquet went through there for a couple of days in 1901, and wrote about it, but Metaxia has effectively put Petras on the map. It has now become a fairly big dot in the discussions of Bronze Age Crete. One of the things she has shown us, and Costas Paschalidis was reminding me that, from the very beginning, from the Final Neolithic IV to the Byzantine period, Petras, I suppose by virtually being by the sea, has an international spirit and it has international connections. We are even talking about connections with Egypt in MM IB, and it functions very well as a harbor town.

What I thought I might do, in order to lead this discussion, and you may want to talk more with the speakers, was really think about what these 25 years at Petras have given us. Being an old school archaeologist I still tend to think chronologically, instead of thematically. I thought it would be simpler really to run through what these excavations have given us in terms of the broader picture of Bronze Age Crete, and then Bronze Age Aegean, and then in the later periods, in Byzantium. Obviously the place to start is FN IV, when we have the first settlers, and we have strong Cycladic influence. What do you think that means? Are the people of Petras like people from Hagia Photia in the next period? I suppose Petras was looking for metals and lithics. The thing that still amazes me is that these people who we see trading abroad, which means that either they are going by the sea, or somebody is coming to them by sea, were not eating fish; there is a problem sailing over all this wonderful food, and not eating it, although we did see the fish hooks.
So, you can look at EM I and EM II and see what that gives us, in terms of the overall picture, what happens in EM III–MM IA, when we have the wonderful ossuaries with their pots, especially that collection of whole vases, at the end of that period. MM IB is a very interesting period when you had very expensive well painted ceramics that were put down in the Lakkos. And there is the wonderful tempting reconstruction that the hill was used, certainly in that period, if not earlier, for social gatherings, people coming together; feasting, if we want to use that trendy term, it is a focal point, for perhaps more than one community going there. What they are consuming is, certainly, when we are looking at the pottery, material locally made, but also imported, and therefore, slightly more expensive. Who are these people, where do they live, are they coming from further afield, to gather at this place? This was obviously important, and then this was replaced by the first palace, which if I am not mistaken, could be fortified; you think that the terrace wall could work as a fortification wall?

**Tsipopoulou** Not entirely, one part yes.

**MacGillivray** So it gives an impression, like the façades of the other palaces, we then have this change. There is enough wealth, enough power and enough desire to build this larger center, and this coincides with the change, it seems, in the Kephala cemetery, where, instead of re-deposited burials, we have these two males, these two fairly interesting individuals, who are using, presumably, these wonderful seals, that we saw Olga Krzyszkowska present. As they coincide with the construction of the palace, it would be interesting to speculate who were these young men, and why they were buried differently, inhumations, as opposed to whatever their normal practice was.

Then there is the destruction of this first palace, at the end of MM IIB, and we have the archive, that is one of the main reasons why we can talk about it as a palace. How big a center is Petras, is it controlling a wide area, can we tell that from the goods in the archive? I am still not entirely convinced, we might be misleading ourselves with these big state maps that we draw for Middle Minoan Crete. They could be much smaller, like Hellenistic city-state areas, much smaller areas of control. I think we are reading back almost from the modern Greek church boundaries, which currently separate Crete, and so we trying to recreate something like that, but that may have not been the case. That is something we can discuss.

This palace then, like many other buildings throughout Crete, towards or at the end of MM IIB, gets trashed, fortunately for people like Erik Hallager, who then have all this wonderful material to work with, and allows him, or us, to reconstruct what is actually being recorded in this building. And does this palace, that is very well excavated now, much better excavated than Knossos, does this allow us to answer the question that Jan Driessen has posed most recently, is this, are these, social ritual centers, or are they really the palaces of a monarch? Are we meant to view kings, or queens, living here? Or is Crete the only place in the ancient world where you do not have some divinely inspired, or actually divinely stated ruler in charge? Can Petras help us to solve that question in this period?

We then go to MM III, and that is something that we will have to see what it gives us over time, but we have that rather amazing rod, with the Linear A inscription. So, certainly there is administration in that period. But where is the building that has
been used? It is probably the building in which they have the LM IA floor deposits afterwards.

The LM IA period is amazing, I thought that we would never go through a whole two-day conference about a site in the Aegean, talking about its Bronze Age history, without mentioning the Thera eruption. But it came through at Papadiokampos, and it is kind of interesting that it was not mentioned by any of the workers at Petras.

**Tsipopoulou**  
We do not have ash.

**MacGillivray**  
You would not have ash, because the tsunami does not get up on a hill. That is what is preserving the ash at Mochlos, Papadiokampos, Palaikastro and other places. But even without the ash, you have destruction, you have abandonment, and then you have a change in LM IB, when you have a smaller courtyard, a slightly rearranged building, could that be a reflection of the kind of damage you had in the period, depopulation, etc.? When Zakros and Gournia and Mochlos and other sites have all these wonderful buildings in LM IB, the Late Minoan Renaissance, Petras has suffered somehow, the harbor at Petras may have stilted in, as a result of the debris flows coming back? It is worth discussing.

Then you have the LM IB destructions. Petras comes in line with the rest of the world. You do not seem to have evidence for LM II, so there is no instant reoccupation of the area, and in a sense it is your great LM IA palace with the Linear A that may be the last glory days at the site.

It is interesting that there is that memory of the place, where for some reason, I suppose it is the topography that demands it as well, where people would come and relocate, but not necessarily relocate to live, because in different periods you live in different places but some local community, possibly even just a family, was coming through where you have the LM IIIC settlement and megaron on Kephala.

Then in the Byzantine period, with a time span of 150 years for the use of the cemetery, it would not have been simply serving just one family, one farmstead. And they were manufacturing stuff also, up on the hill, but it remains a sacred place.

The fun thing is that Hill I has now become a sacred place again. Metaxia has fought tooth and nail to keep it from becoming a suburb of Siteia, and instead she has turned it into a place that reminds people from Siteia, or at least should remind people from Siteia, like Giorgos Alexopoulos, that they do have a very long and rich history, with a lot of external communications.

These are some of the themes I am thinking of. Then there is the theme of burial practices. That would be very interesting, changes in burial practices, what happens in MM III–LM I. If anybody would like to start, attacking, commenting on ideas that have come up, please do.

**Hallager**  
I was struck by one thing that you mentioned, at the very beginning, the lack of fish, and if I may suggest one possible solution. Based on my experience from the excavations in Khania, is has always been a very great mystery to me why you have no rubbish pits in the LM I settlement. As I travelled around the island I asked all our colleagues excavating LM I settlements “where are your rubbish pits?”, and they were not there. It was Phil Betancourt who gave me an answer, which I am going to suggest also for the missing fish bones. He said that during that period and probably
also in the earlier periods, such organic remains were very important and they were taken out into the fields to be used as manure. This might be one possible suggestion for the missing fish bones.

**MacGillivray** Interesting.

**Vallianou** I just want to point out that Metaxia must be a very happy Greek archaeologist. After 25 years of hard work, and having faced many difficult problems, she managed to complete an important work, to excavate a particularly important site, to establish its relations with other areas, to have very good collaborators, to publish a lot, to reach almost the end of her research, and to make the site accessible to the public, with modest but appropriate interventions. I would like to wish her luck in the future, and I believe that she deserved all she has achieved up to now.

**MacGillivray** Excellent. She has been very clever about getting the right sort of collaborators.

**Macdonald** Can I just ask about the end of LM IB, perhaps you did not go into detail, at least House II.1 is abandoned, not destroyed by fire?

**Tsipopoulou** There is fire, especially since the industrial activity taking place there was connected with hearths, heating water, etc. The whole of Room E gave evidence for a fire. In the Shaw Festschrift, the *Krinoi kai Limenes* volume (Tsipopoulou 2007c), I published, for the first time, several pictures of the destruction deposit over the central court of the palace. There was a thick LM IB destruction deposit, full of blocks fallen from the upper floor, door jambs, from *polythyra*, many with mason’s marks among them (we have identified 29 on fallen blocks, and some more are *in situ*). There was this very thick deposit with intense burning, all over the central court and to the east of it. In the central court we had 10 Byzantine graves and also the ossuary. Some of them, as Natalia Poulou-Papadimitriou said, used one Minoan wall and then built another three walls, to have a cist built tomb. In other cases, they excavated in this very thick and compact destruction deposit, which was like the bedrock, and they put their dead in it.

**MacGillivray** So the LM IB fire destruction reached very high temperatures.

**Tsipopoulou** It is something very similar to the Phaistos *“astraki”*. We do not have much LM IB pottery, because what we call the west wing of the palace, the parallel corridors on the plan, are all basement, or rather they are structural features to support the upper floors, so they were practically empty of any traces of the latest use. When we dug deeper, we found the walls of previous buildings. The latest phase of the palace is not well preserved, but we do have the destruction deposit.

Besides the central court, there was a room with an intense LM IB destruction deposit. This room is adjacent to the so-called “shrine” with the 4 m long plastered bench. This room with the bench was Protopalatial, and following the MM IIB destruction was sealed and never re-used. To the northeast of it, there was a long room with a flagstone floor, and in it even the slabs were burnt. It was also full of plaster and mudbricks both from the ground and from the upper floors.
That suggests that in LM IB the building was sufficiently important for someone to need to destroy it.

What always makes me wonder is why they kept this smaller, sort of symbolic, central court, and they did all the re-arrangement with the alternating columns and pillars. It has always been a palace with the memory of the earlier glory.

The Linear A tablets come from that?

Yes.

So there is administration.

Yes, but we do not know about the existence of an archive. There were two tablets, in the same trench, at the west part of the building, the same trench that contained the hieroglyphic archive in a deeper stratum. And in between there was also an LM IA destruction deposit, all that in the same trench, we excavated almost 3 m. Kostas Christakis excavated the LM IA destruction deposit.

I wonder if, maybe Kostas Christakis will talk about the notion of foreigners and locals that Tina McGeorge brought up quite clearly.

I would like to change the subject, based on a comment we exchanged yesterday with Metaxia. In this Symposium, the LM III period was not adequately represented, not because it did not exist at Petras.

So, in order to have a complete picture of the site we should need to include this important period as well.

Is there LM IIIA and IIIB?

And also LM IIIC, as we saw.

There was a cemetery, Metaxia, that you showed us yesterday.

Yes, there has been a cemetery; we had the larnakes, both chest-shaped and bathtub. The cemetery started in LM IIIB and continued into LM IIIC.

The interesting thing about having a settlement like Petras, that was occupied for thousands of years, is that you can almost visualize populations coming and going. One of the best ways to see them is through their burial practices and to see how these change over time. Because you are dealing with the same spot, but obviously you are not dealing with the same people, you are watching populations come and go.
Tsipopoulou: I would like to remind you about the Achladia tholos, which is Mycenaean in type and construction. This is very close to Petras, only 4 km from the coast, and it was also almost on top of an earlier settlement, a very small one, a metochi type, both Proto- and Neopalatial.

MacGillivray: Was that the one with the 80-year old in it?

Tsipopoulou: Not 80, she was 45–65 years old when she died.

MacGillivray: That is pretty old, anyway.

Tsipopoulou: It was pretty old, and she had suffered from a very significant stress when she was very young, probably malnutrition.

MacGillivray: The Theraeruption? No the Mycenaean invasion.

[Laughs from the audience!]

Tsipopoulou: The LM IB destruction. She was an upper class lady.

MacGillivray: Does everybody know whatever they possibly want to know about Petras?

Blackman: I am actually working on Ramnous and I found out about this conference while studying there, with surprise. We are studying with ΕΛΚΕΘΕ [Hellenic Center of Marine Research] the problem of relative sea level change. Relative is the important word here, has the sea gone down and the land gone up, or both phenomena? The question goes back to Spratt and the whole question of what Crete has done, we know about elevation in the west, but something was happening in the east, and we have these submerged buildings at Palaikastro, which we wanted to survey. The whole issue of reconstructing the palaeoenvironment is very important. Now, at Siteia we have a neoreion that is classical, too late for our Prehistorian friends, but there you have something which functions with a precise sea level, not far from your site. Firstly, the geologists disagree about what has happened to the sea. Secondly, the land is not one block, so what applies to Palaikastro will not necessarily apply to Siteia.

MacGillivray: No, you have local tectonics.

Blackman: But, nevertheless, a local study of the evidence for submerged beach lines would enable you to understand what has happened in the later periods, including eruptions, what has happened to the shoreline. Geologists can help with all that. Keep working with geologists, it is a challenge, they do not know how to apply for archaeological permits, and also the jealousies of geologists are far greater than the jealousies of archaeologists.

MacGillivray: Impossible!

[Laughs in the audience!]
Blackman  Nevertheless, it is very important for reconstructing communications by sea in the Minoan period, it is very important to try to reconstruct where the coastline was before you can understand the use of harbors, whatever harbors mean. It has been a wonderful conference. Congratulations to Dr Tsipopoulou.

MacGillivray  I think this is probably the best time, to thank not only Metaxia but also her whole crew, for putting together the Symposium, and obviously these two days represent the end-result of 25 years of hard work, but you are probably less than half way there on the site, so we should probably meet every five years and get all the new information. [Laughs in the audience] And I hope you will all join me thanking Metaxia and her colleagues for this fantastic Symposium!
Bibliographic abbreviations

AASOR – Annual of the American School of Oriental Research

ActaArch – Lov Acta archaeologica Lovanensia

AJA – American Journal of Archaeology

AJPA – American Journal of Physical Anthropology

AR – Archaeological Reports

ArchDelt – Archaeologikon Deltion

ArchEph – Archaiologike Ephemeris

ASAtene – Annuario della Scuola archeologica di Atene e delle Missioni italiane in Oriente

BAR-IS – British Archaeological Reports, International Series

BASOR – Bulletin of the American Schools of Oriental Research

BCH – Bulletin de correspondance hellénique

BCH Suppl. – Bulletin de correspondance hellénique. Supplément

BÉPAR – Bibliothèque des Écoles françaises d’Athènes e de Rome

BICS – Bulletin of the Institute of Classical Studies of the University of London

BSA – Annual of the British School at Athens

BSPF – Bulletin de la Société préhistorique française


CMS – Corpus der minoischen und mykenischen Siegel, Berlin 1964–2000; Mainz 2002–


CrehChron – Kretika Chronika

CurrAnth – Current Anthropology

JAnthArch – Journal of Anthropological Archaeology

JAS – Journal of Archaeological Science

JMA – Journal of Mediterranean Archaeology

JPR – Journal of Prehistoric Religion

Kentro – Kentro: The Newsletter of the INSTAP Study Center for East Crete

OpAth – Opuscula Atheniensia

Prakt – Praktika tes en Athenais Archaïologikés Etaireias

SIMA – Studies in Mediterranean Archaeology

SkrAth – Skrifter utgivna av Svenska Institutet i Athen

WorldArch – World Archaeology

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