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ISLAND ARCHAEOLOGY AND THE ORIGINS OF SEAFARING IN THE EASTERN MEDITERRANEAN

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In memory of John D. Evans

Eurasian Prehistory Guest Editors:
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INTRODUCTION

The aim of this article is to bring together what we have learned in the preceding chapters of the proceedings of the Wenner Gren Workshop: to sum up where we stand today and to look out on the horizon in terms of the research that we need to do in the years to come. As a point of departure, it is worth returning to one of the questions of major interest at the Workshop, which was held at Reggio Calabria in October of 2012, what do we know today when it comes to voyaging between the mainland and large off shore islands in the Mediterranean Sea at the time of the transition between the late Pleistocene to the early Holocene? As explained by Vigne (2013) in his contribution, there are five “true” islands to consider: Cyprus, Crete, Sardinia, Corsica and Majorca. While Sicily is a large island, it is not considered to be an off shore island since the Strait of Messina is quite narrow (see Mannino in this issue). How many of the “true” islands have produced reliable evidence for pre-Neolithic voyaging? The answer to this question is that four of the five have now yielded some good evidence for pre-Neolithic voyaging? The answer to this question is that four of the five have now yielded some good evidence for pre-Neolithic voyaging in the time before the Neolithic period. The exception here appears to be Majorca. If we turn back the clock thirty years and asked the same question then, the state of knowledge was quite different. In 1984, none of the five

SETTING OUR SIGHTS ON THE DISTANT HORIZON

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Abstract

The article constitutes the closing chapter of the proceedings of the Wenner Gren Workshop on “Island Archaeology and the Origins of Seafaring in the Eastern Mediterranean,” which was held at Reggio Calabria in October of 2012. The task here is to bring together what is said in the other twenty chapters of the proceedings and discuss where we stand today and what needs to be done next. In particular, we are interested in sites of pre-Neolithic age that occur on the islands in the Mediterranean Sea and what we can learn from them about early voyaging, which goes back the time before the Neolithic period. What we mean by “voyaging” (a more appropriate term than “seafaring” for the activity we are concerned with) is making trips on the open sea that were undertaken on a fairly regular basis (and not just a rare or accidental crossings of the sea). It is important not to conflate the two. They are two quite different things. A wide range of topics is discussed in this article. They include among other things: (1) the question of whether or not there is reliable evidence for hunter-gatherers on the “true” islands of the Mediterranean in the time before 16,000 years ago, (2) the sites on islands in the Eastern Mediterranean that go back to the Younger Dryas and (3) voyaging and the Neolithic transition. For years in the previous literature, obsidian was commonly taken to be the hallmark that was synonymous with the advent of voyaging in the Mediterranean world. We now know that it is a trailing indicator of voyaging in various part of the Mediterranean world. One of the take-home messages of the discussions at the Wenner Gren Workshop itself was that we are just at the beginning of the study of pre-Neolithic voyaging in the Mediterranean. For instance, far too little work there has been concerned with submerged prehistory so far. Thus, while many gains have been made in the field during the last ten years, it is premature to draw final conclusions with regard to early voyaging and early voyagers at the present time: there is a great deal of fieldwork that remains to be done.

Key words: Mediterranean Sea, island archaeology, early voyaging, early seafaring, Neolithic transition, the circulation of obsidian
off shore islands (with the possible exception of Corsica) had yet to produce reliable evidence for pre-Neolithic voyaging. Thus, we have come a long way in a short span of time. Indeed, one could argue, as I have done in the opening chapter of the proceedings (Ammerman, 2013a), that it is only since 2003 that major strides have really been made in the Eastern Mediterranean. Just six years ago, there was no known Mesolithic site on Crete. And in 2003 when I first went out to Cyprus, there were still many doubts about Aetokremnos, the one good candidate for a pre-Neolithic site on Cyprus (Ammerman, 2013b:117-118). Today Cyprus is the “true” island with the best suite of archaeological sites for forager voyagers in the time between 14,000 and 10,000 years ago (see various contributions in the previous issue of Eurasian Prehistory). In the case of Crete, there is still no well-defined chronology – on basis of either 14C dates or the typology of chipped stone tools – for the “Mesolithic” sites at Plakias on the island’s south coast (the attribution to the Mesolithic is still a rather generic one). Moving to the Central Mediterranean and the situation on Sardinia and Corsica, there are very few reliable radiocarbon dates that go back to the time before 10,000 years ago (Costa et al., 2003:fig. 2.2; Mannino this issue). Further to the west, human presence on the island of Majorca can only be taken back to around 7,000 years ago. In short, there appears to be a pattern that runs from east (older) to west (younger) for the five “true” islands and the earliest reliable evidence that they have each produced for human presence and, in turn, for early voyaging. At least, this is the situation so far. There is, on the other hand, good reason to think that what we currently know about these five islands will continue to grow at a fast pace over the next twenty years. Accordingly, if we look out on the distant horizon – and take the long view, it is premature to draw final conclusions on the basis of what we know today. In 2033, when the archaeologists who are working on forager voyagers in the Mediterranean decide to meet again, they will look back with wry smiles on what we discussed at Altafiumara in 2012. Thus, while there have been major gains in the last ten years, it is fair to say that what we have taken so far are only the first steps towards the study of the first Argonauts (Ammerman, 2010).

Before we turn to a summary of where we stand today in the study of forager voyagers on Cyprus, it is worth recalling the purpose of the workshop. Its two main objectives were to review what is currently known about early island archaeology in the Eastern Mediterranean and to explore the new evidence that has recently become available for making inferences about how seafaring began there. In using the word “seafaring” here, it should be understood that we are talking about voyages that were made over some distance on the open sea as well as voyages that were undertaken with some frequency (e.g., one or two trips made seasonally in any one year and not just rare voyages or accidental crossings of the sea). Indeed, my own thinking on the matter has evolved in the last two years to the point where I have moved away from using the term “seafaring” (except in speaking to the wider public) since it brings with it connotations of maritime practices in more recent historical times. In short, “seafaring” is not really the appropriate term to use in writing about what forager-voyagers were doing in the remote past (Ammerman, 2013a:14). Instead, many of us now prefer to speak of “voyaging” and “voyagers,” as Harding (1967) did in his ethnographic study of the Siassi.

It is worth adding at this point that pre-Neolithic voyaging in the Mediterranean involved more than just the five “true” islands. It can be documented in a range of other cases as well. On the island of Kythnos, there is, for instance, the Mesolithic site of Maroulas, whose oldest 14C dates fall in the first half of the 9\(^{\text{th}}\) millennium cal BC (see the contributions by Kaczanowska and Kozlowski and by Sampson in this issue). The many pieces of obsidian from the island of Melos recovered by the excavations at Maroulas provide good evidence for voyaging on the Aegean Sea by this time. The advantage of the five “true” islands is, of course, that one can avoid the complication of having to work out if an island had actually become an island by a given time in the remote past (see Appendix B in Ammerman, 2013a). In such case studies, there are three limitations that can arise in terms of what is known in the earth sciences at the present time: (1) the details of the bathymetry around the island, (2) the curve for sea-level change in
the area where the island is located and (3) the record of local tectonic activity as it relates to the formation of the island and its evolution over time. Achieving good knowledge of all three still constitutes a challenge in some case studies (e.g., the research in progress on the islands of Lemnos and Gokceada; see the contributions by Efstratiou and by Özbek and Erdogu in this issue). In short, sources of uncertainty enter the picture, and the archaeologist ends up in an awkward position when it comes to making arguments for voyaging in the remote past: that is, trips not just made in coastal waters but covering some distance on the open sea. Even in the case of going to sea in local waters, there is uncertainty and ambiguity when it comes to some of the claims in the literature for short crossings of the sea during Palaeolithic times, as we shall see in the next section of this chapter. Thus, the five “true” islands provide a more reliable footing when it comes to making a sound case for early voyaging on the basis of island archaeology.

Already by 10,700 years ago (Fig. 1), there are two settlements of PPNA age on the island of Cyprus: Klimonas (Vigne et al., 2013; Briois and Guilaine, 2013 and references therein) and Asprokremnos (Manning in this issue and references therein). The inference for voyaging is based on the close parallels in the material culture – architecture and lithics – between the PPNA settlements on the mainland and the two sites on Cyprus, where subsistence draws upon the cultivation of cereals and the hunting of wild boar. On the other hand, there is modest evidence for the consumption of marine foods at Klimonas and none at Asprokremnos (Bar-Yosef Mayer, 2013). In fact, both settlements are located in the interior and not on the coastline itself. In environmental terms, both sites occur in an ecotone situation where the hunter-cultivators could exploit a range of ecological zones as well as good sources of chert. At Klimonas, the excavations also led to the recovery of several pieces of obsidian from one or more sources in Anatolia. Accordingly, the obsidian at Klimonas now provides a separate and more direct line of evidence for voyaging in the Eastern Mediterranean already by 8,700 cal BC.

As documented by the large-scale excavation at the settlement known as Shillourokambos (Guilaine et al., 2011), the PPNB has made its appearance on Cyprus by 10,400 years ago (Fig. 3). Again, there are close parallels between the material culture on the island and the mainland, and obsidian from the source called Göllü Dag in Turkey is making its way by boat to the island. By 10,000 years ago, a suite of mammals had been introduced – both domesticate ones and wild species – on Cyprus. And the introduction of new animals from the mainland continued during the course of the 8th millennium cal BC. Based on the arrival of domesticated sheep and goats on the island by around 10,000 years ago, Vigne and co-authors (2013) argue that boat technology and navigation skills had reached a fairly advanced level of development by this time. This now made it possible to voyage between the mainland and Cyprus in just a day or two (on the challenges that early voyagers had to face in transporting sheep and goats in small boats, see Vigne et al., 2013). Thus, there is good evidence for voyaging between the mainland and the island during the period of the so-called Cypro PPNB. On the other hand, the excavations at most of the PPNB settlements on the island have yielded only modest quantities of fish remains and marine shells (Bar-Yosef Mayer, 2013). The latter were used mainly for purposes of decoration at Shillourokambos and not for food. The one possible exception here is the site of Akanthou situated right on the north coast, where around 5,000 blades of obsidian have been recovered so far (some of them probably come from the workshop called Kaletepe in central Anatolia; Balkan-Atli and Binder, 2012) and where marine foods are said to be present in some quantity but there is still no comprehensive report on them. On the whole, while voyaging is well attested during the PPNB period on Cyprus, there does not seem to be all that much interest in the consumption of fish and shellfish among the first farmers. Likewise the exploitation of fish from the Mediterranean Sea does not appear to have played much of a role in the subsistence strategies of those who lived at PPNB sites on the mainland (for a review of the literature on the topic, see Bar-Yosef Mayer, 2013 and references therein). Thus, while voyaging is well documented at PPNB sites on Cyprus and while those who made the crossings between the mainland and Cyprus no doubt consumed fish and shellfish during a voyage, what we do not see –
at least on the basis of the settlements currently known on land (submerged prehistory may tell a somewhat different story) – is a good correlation between voyaging and a diet based on the exploitation of marine resources. On the contrary, the limited quantities of fish and shellfish remains recovered from excavations of most sites would seem to indicate a more expedient approach to the consumption of seafood. This is a matter – a puzzle – that calls for further study in the years to come. On the other hand, if we look at the bigger picture and turn our attention to the Western Mediterranean at the same arc of time (10,700 and 9,000 years ago, the Mesolithic period; see the contributions in this issue by Mannino on Sicily and by Zilhão on the Iberian Peninsula), we get the sense that voyaging between the mainland and off shore islands is less active there. Of course, things will begin to change one the Neolithic way of life makes its appearance in the

Fig. 1. The calibrated chronology of the Levant and Cyprus. This table was prepared by Ofer Bar Yosef; it updates the table that he prepared in 2001 (see Davis, 2013: fig. 2). Three time lines for the Levant, southeast Turkey and Cyprus are also given in the second chapter of the proceedings (Davis, 2013: fig. 1)
respective regions of the Western Mediterranean, starting about 8,200 years ago in the heel of Italy and then around 7,500 years ago in several areas of the Iberian Peninsula (Fig. 3). This is a subject that we shall return to in the third section of this article.

When we go back in time to the climate event known as the Younger Dryas (Fig. 1), forager voyagers were crossing over to Cyprus at least by the 11th millennium cal BC, as seen at sites on the coast such as Aetokremnos (Simmons, 2013) and Aspros on the aeolianite (Ammerman, 2013b). A fair number of other pre-Neolithic sites have recently been found elsewhere on coastal formations of aeolianite. They too have produced chipped stone tools of small size, which were made by means of a pebble-and-flake based reduction technology. In terms of establishing the cultural affiliations of the forager voyagers, the most diagnostic lithics recovered so far come from Aspros. Aspros has produced a Natufian point as well as the set of lithics recovered at Dive Site C, which include microlithics much like those found at the Ökuzini Cave in southern Turkey (Ammerman, 2013b:130; Kaczanowska and Kozłowski, 2014b:63). The Younger Dryas was a cold and dry time when environmental change gave rise to heightened mobility among hunter-gatherers and foragers living in Southwest Asia (Moore and Kennett, 2013; Bar-Yosef, 2013). There was at that time the exploitation of a broader range of ecological niches on the mainland. One of the more daring steps in the process of extensification saw groups of coastal foragers on the mainland now voyaging out to Cyprus on a seasonal basis. In section four below, more will be said about the reasons for going out to the island during the Younger Dryas.

Turning briefly to the Aegean Islands for comparative purposes, it is worth saying a few more words about the site of Maroulas on the island of Kythnos. The excavations there have produced good evidence for circular huts, human burials, small chipped stone tools made of Melian obsidian and radiocarbon dates that cluster around 8,750 cal BC. In effect, Maroulas is a Mesolithic site that is contemporary with the hunter-cultivator sites of Klimonas and Asprokremnos on Cyprus. In addition, in making inferences for early voyaging in the Aegean world, there is the “old” evidence for a few pieces of Melian obsidian that occur in lithic phase VI at the Franchthi Cave in the Peloponnese (Perlès, 1979, 1987), which is carbon dated to the 11th millennium cal BC. This lithic phase at Franchthi is more or less contemporary with Aetokremnos (layer 2) and Aspros on Cyprus. Here it is worth recalling that, prior to 2006, it was not really feasible to produce calibrated 14C ages that went so far back in time. Accordingly, it is understandable that there was uncertainty at times in the previous literature (even confusion) about the absolute ages of layer 2 at Aetokremnos and lithic phase VI at Franchthi. In short, we are in a better position today to recognize the degree of correspondence between what is happening at sites such as Franchthi and Maroulas in the Aegean world and what is seen at Aspros, Aetokremmnos, Nissi Beach, Klimonas and Asprokremnos on the island of Cyprus. What is outlined above is, of course, just a rapid sketch of the big picture that is beginning to emerge in the Eastern Mediterranean. One of the points to underscore here is how recent the excavations are at most of the seven sites mentioned in this thumbnail sketch. The first excavations to be conducted at four of them took place only since 2006. Thus, the gains in new knowledge stem, for the most part, from recent work in the field. Again, it is too soon to start thinking in terms of final conclusions. What we are dealing with is work in progress. Indeed, on the basis of the recent observations (2012) made by Kozłowski and Kaczanowska on the lithic material at Aspros (Ammerman, 2013b:130; Kaczanowska et al., 2014:45), it is entirely possible that the earliest forager voyagers who frequented the coasts of Cyprus go back to around 12,000 cal BC (that is, the time between Dryas II and Dryas III).

By way of introduction, a few words need to be said about the organization of the chapter as a whole. In the next section, the plan is to turn to the question of what is happening on the large offshore islands during the time before 16,000 years ago. No attempt will be made to develop a comprehensive review of the topic in this chapter (see Broodbank, 2006). Much of the evidence for the time before the Younger Dryas is either uneven in quality or else one is dealing with work in progress. The latter is the case of the study of the early lithics recovered from the surface.
at Plakias on Crete (Runnels and co-authors in this issue). When it comes to the claim for the Lower Palaeolithic there, scholars have yet to reach a consensus. Archaeologists who come from the Neolithic tradition of research tend to take a more positive view of what has been found there than those who come from the Palaeolithic tradition (on the two traditions of scholarship, see Ammerman, 2013a:16-24). The third section of the chapter takes us to a more recent time – the Neolithic transition in the Mediterranean world – when the evidence available today is, in marked contrast, more abundant. While studies on this subject have now reached a fairly advanced stage of development, it will be of interest to turn to the new paradox of the slowness of the rate of spread of early farming between Cyprus and southern Italy (Ammerman, 2011). The spread of early farming from Italy to the Iberian Peninsula then unfolds at a much faster pace. One of the factors to take into consideration is the climate event that took place about 8,200 years ago (Fig. 1). In the fourth section, we return to the 11th millennium cal BC (Fig. 2) and revisit the Younger Dryas as the catalyst of early voyaging and consider some of the other reasons why forager voyagers started going out to Cyprus on a regular basis. The aim of the fifth section will be to review the five main lessons that we have learned from the investigations carried out during the last ten years. In the sixth and last section, the plan is to outline the work that still needs to be done in the years to come.

**WHAT IS HAPPENING ON THE ‘TRUE’ ISLANDS IN THE TIME BEFORE 16,000 YEARS AGO?**

This is the question that I wish to take up in this section. In other words, if we go back to the time several thousand years before the Younger Dryas, what do we know about the presence of hunter-gatherers on the large off shore islands in the Mediterranean Sea? The short answer is that reliable evidence is quite limited for all five of the “true” islands. In other words, the evidence that is currently available does not measure up to the

![Fig. 2. Map showing the location of seven sites that date to the time of the Younger Dryas in the Eastern Mediterranean: Abu Hureyra, Aetokremnos, Aspros, Direkli Cave, Franchthi Cave, Ökuzini Cave and Ouriakos (red dots). It also give the location of two sites that date to the first half of the 9th millennium cal BC: Maroulas and Nissi Beach (black dots).](image-url)
Setting our sights on the distant horizon

standards set out in “The Form of the Argument” (Appendix B in Ammerman, 2013a). There is, for example, no high-quality excavation – on Cyprus, Crete, Sardinia, Corsica and Majorca – that has lead to the recovery in situ of a lithic assemblage of any size or that has produced good radiocarbon dates going back to that time. Thus, we have to be cautious when it comes to making inferences about voyaging at such an early time. In the Mediterranean, discourse on the question of sea going in the time before the Younger Dryas tends to shift to what can be said about shorter crossings between the mainland and an island such as Sicily or Cephalonia (Broodbank, 2006, 2013; see now in the former case, Mannino in this issue). However, the distances involved in these two cases – more will be said about this below – were quite short at the time of the Late Glacial Maximum, and it is better to speak of trips that were made in coastal waters and not voyaging on the open sea. Here it is worth recalling that Sicily is not an off shore island. At Messina, for example, the distance between the mainland and the island today is less than 4 km (at its closest point), and the crossing would have been slightly shorter at times of lower sea level in the Pleistocene. As we shall see below, there was, in all likelihood, a land bridge between Sicily and the mainland at the time the Late Glacial Maximum (Antonioli et al., 2012; Mannino this issue).

In the literature and also in the chapters of the proceedings, we find two quite different attitudes when it comes to what was taking place on the “true” islands in the arc of time between 30,000 and 16,000 years ago. On one side, there are scholars who take a rigorous and tough-minded view of the situation (e.g., Vigne, 2013; Vigne et al., 2013). They hold that there is still no reliable evidence for the presence of hunters and gatherers on any of the five “true” islands during this considerable span of time. In this context, they see no support for the idea that voyaging – in the sense of crossings on a regular basis between the mainland and any of the five “true” islands – goes back so far in time. For them, voyaging to an off shore island such as Cyprus began only around the time of the Younger Dryas. In addition, they are cautious about the claim that has been put forward for the Lower Palaeolithic at Plakias on the south coast of Crete. Their position is that one is dealing with an open question. The Lower Palaeolithic material at Plakias does not come from an excavation. Instead, it was collected from the surface during the course of a survey, and the collections made at a given find spot were at times selective in character and not systematic. In addition, most of the artifacts in question are made of quartz, which does not constitute a favorable raw material for lithic analysis. All of this suggests that the claim for such early lithics at Plakias should be regarded as a working hypothesis. In effect, more fieldwork needs to be done there (to show that the pieces are not geofacts but artifacts of Lower Palaeolithic age) and at other places on Crete (to show that sites with Lower Palaeolithic material occur elsewhere on the island; that is, the third step in “The Form of the Argument,” Appendix B, Ammerman, 2013a:29). What is called for is patience and not a rush to decide either for or against Plakias.

On the other side, we find the enthusiasts: those who take the position that going to sea has much deeper roots in the Mediterranean – ones that go back in time well before the Younger Dryas and the Epipalaeolithic. In their eagerness, the optimists often take any glimmer of evidence for “seafaring” in the remote past and give it a positive spin. In their view, the task at hand is to make up for the late start of the study of early voyaging and look positively on the thin and uneven evidence for the time prior to 14,000 cal BC. The enthusiasts include Broodbank (2006, 2013), Knapp (2013) and Runnels and his co-authors (in this issue). Examples will be given in the next three paragraphs to illustrate how they envision the remote past. At times, they are not fully aware of the limitations of the evidence used in the arguments that they are trying to put forward. At other times, they do not seem have a good idea of “the form of the argument,” when it comes to the use and abuse of island archaeology in making inferences for early voyaging. This is why I decided to include Appendix B in my introduction to the proceedings (Ammerman, 2013a:27-30). It should be seen as a first attempt to outline some of the main elements that we need to keep in mind. In short, it should be seen as just a first attempt – one that can be refined and elaborated in the years to come. Above all, we have to avoid conflating short trips that were
made locally in coastal waters with voyages that involved longer distances on the open sea. They are two quite different things. Over the long run, it will be important to strike a balance between those who are too cautious and those who are too optimistic.

One of the archaeologists who has made a concerted effort to explore the question of hunters and gatherers who may have gone to sea before 16,000 years ago is Broodbank (2006, 2013). On the whole, he has done a good job of gleaning what happens to be available in the Mediterranean literature and providing an overview. He too finds that there is no pattern of reliable evidence on the five “true” islands for voyaging at such an early time. Instead, he turns his attention to the possibility of shorter crossings: for instance, one at the Strait of Messina (between Sicily and the Italian mainland) and another one to the island of Cephalonia (a small island located just off the west coast of Greece). In his view, the Strait of Messina should be considered one of the hot spots in the study of early attempts at going to sea in the Mediterranean. In contrast, Mannino (in this issue), a native of Sicily, puts forward what he now proposes to call the Sicilian paradox: namely, the very thin archaeological record for the early Upper Palaeolithic on the island (one not really living up to Broodbank’s high expectations). More specifically, Broodbank draws attention to the site called Riparo di Fontana Nuova. In his discussion of the Aurignacian in Italy, Broodbank (2013:114) singles out this rock shelter as a site of “unquestionably” wide importance. According to him, Fontana Nuova is a place “where a bunch of pioneers hunted red deer and scouted out the land widely enough to find flint about 100 km further north at Monte Judica.” Previously, he claimed that “the first definite sign of sea-crossing in the Mediterranean is a nominal one over the narrow Strait of Messina, indicated by an undisputed early Upper Palaeolithic Aurignacian site at Fontana Nuova in southeast Sicily” (Broodbank, 2006:206). The problem here is that Fontana Nuova is not above dispute. Indeed, some archaeologists, who live and work on Sicily, have their doubts about the fieldwork at the site. And they may have reason on their side. The lithic material was actually recovered by Bernabò Brea when he re-excavated the spoil of an unsystematic excavation at the site. In other words, there is a cloud that hangs over a key site for Broodbank. In such a case, his language is far too enthusiastic. On top of that, a recent geological study of the Strait of Messina is shedding new light on the long-standing debate over the existence of a land bridge between Sicily and the mainland. Indeed, a good case for such a land bridge at the time of the Late Glacial Maximum can now be made (Antonioli et al., 2012; Mannino in this issue). If this is true, it changes the whole story. In short, there will be the need to rethink the ways in which archaeologists have previously used Upper Palaeolithic sites on Sicily in their attempt to make inferences for early, short crossings at Messina.

Turning to Cephalonia, we have another case of cheerleading for going to sea in the remote past. In his brief discussion of the chipped stone tools of Middle Palaeolithic age, which occur on several islands in the Aegean Sea (Kaczanowska and Kozłowski in this issue) and also on some of the islands just off the west coast of Greece where Cephalonia is located, Broodbank (2013:108) claims that it offers the prime candidate: “the best case” in his words. What is at stake here is the chance to use the lithics found on Cephalonia to infer that Neanderthals were already making short trips in coastal waters between the mainland and the island. However, the matter may be quite far from a simple and straightforward one. What the archaeologist is dealing with is not a true island. Again there is the challenge of establishing – on the basis of bathymetry, sea-level rise and tectonics – whether or not the island was always an island during the Middle Palaeolithic (see the first step in “The Form of the Argument,” Appendix B in Ammerman, 2013a:27-28). If there happened to be a land bridge between the mainland and the island at one or more times during the Middle Palaeolithic, then the whole story will become a much more complicated one. It may not be possible to show unequivocally that such an early crossing was made even in the context of coastal waters. While the bathymetry around the island is reasonably well documented today (Ferentinos et al., 2012), the real challenge concerns the history of tectonic activity in the area. Until local tectonics are worked out in greater detail and there are good estimates of the rates of uplift in different parts of the island over
the last 300,000 years, the archaeologist will not be in a good position to say whether Cephalonia is “the best case” or whether it is more like the Sicilian case.

It is useful at this point to turn to one more example of excessive enthusiasm in the recent literature. It involves the island of Cyprus and takes us back to the Middle Palaeolithic again. In The Archaeology of Cyprus, Knapp (2013:46-47) encourages the reader to think that voyaging to the island will be taken back one day to this early time. At the present time, there is no reliable evidence for a Middle Palaeolithic site on the island, as Knapp himself acknowledges. Nevertheless, he is quite confident that sites of this age will soon come to light once archaeologists focus their attention on finding them. By the way, this is just what happened in the case of Aspros and Nissi Beach when a new approach was taken in the field. In the present case, Knapp’s optimism is unwarranted, however. Here one is dealing with a possibility whose odds are those of a long shot and not a sure bet. This is so because, in recent years, a fair amount of work has actually been done on Cyprus by archaeologists who are now committed to looking for early lithics on the landscape. In addition, most of the archaeologists are quite capable of recognizing chipped stone tools of Middle Palaeolithic age, if they happen to encounter them in the field. At the same time, no diagnostic artifact of this age has yet to be found on the island. In the next paragraph, more will be said about the work that has been done in different places on Cyprus over the last two decades. Here it is worth noting that the expression of enthusiasm on Knapp’s part is found at the end of his review of the “old” debate on whether or not the island of Cyprus has sites that date to the time before the Neolithic. He does, on the whole, a good job in tracing the history of this debate. Thus, while he reaches the conclusion that there are still no sites older than Epipalaeolithic on Cyprus today, he then shifts his gaze surreptitiously to what has recently come to light at Plakias on Crete (Strasser et al., 2010). This, in turn, emboldens him to be optimistic about the situation on Cyprus. Knapp does not seem to realize that there is no consensus among Palaeolithic archaeologists when it comes to the question of the Lower Palaeolithic at Plakias. At best, this claim should be viewed as a working hypothesis. On the other hand, if one turns one’s attention to the other three true islands (Sardinia, Corsica and Majorca), the situation is much the same as the one on Cyprus. Reliable evidence for the Middle Palaeolithic is still missing on four of the five “true” islands in the Mediterranean. To put it another way, Crete is the exception. Again, it is premature to use Crete as a guide or model until more fieldwork, including the excavation of a Lower Palaeolithic site, is done on the island.

In this paragraph, five examples of recent work on Cyprus are mentioned in which the archaeologist has been in a good position to recognize chipped stone tools of Middle Palaeolithic age (assuming that such material does occur on the landscape). And yet nothing of this age has come to light so far. (1) The lead archaeologist of the survey at Amathous (located to the east of Limassol on the island’s south coast) was François Briois, a lithic specialist who was trained in France. The survey’s intensive coverage of about 20 square km led to the recovery of 19 sites that date to the aceramic Neolithic (Briois et al., 2005:fig. 101). There are good sources of chert at Amathous, and while large numbers of worked flints were collected during the course of the survey, none of the lithics is attributed by Briois to the Middle Palaeolithic.

(2) In the project known as EENC (Elaborating Early Neolithic Cyprus), Carole McCartney took the lead in putting together an international team to investigate early sites in the central part of the island. The research began in 2005 and involved a combination of reconnaissance work and excavations at more than 10 different sites (e.g., McCartney et al., 2006:fig. 1-2). This part of the island also has a number of good chert sources. Again, after a series of field seasons, the project yielded no good candidate for a Middle Palaeolithic site. (3) In 2006, survey work undertaken by the direction of Nikos Efstratiou began in an upland area near the Xeros Gorge on the west side of the island. An excavation was then started at the early site of Roudias in 2007 (Efstratiou et al., 2010). It will be recalled the Efstratiou had previously worked on the Middle Palaeolithic sites that occur near the massive outcrop of silicified volcanic rock at Petrota in Aegean Thrace (Ammerman et al., 1999). While good sources of chert occur in the vicinity of Roudias, nothing of Middle Palaeolithic age has come to light there so far.
(4) Between 2003 and 2009, I had the opportunity to conduct reconnaissance work – in search of pre-Neolithic sites – in many different parts of the island (Ammerman, 2013a; 2013b). Over the years, we had the chance to examine a large number of places – mostly on the coast but also in the interior – with a combination of good visibility and favorable geomorphological conditions. And we too were not able to find any lithic material that could be reliably attributed to the Middle Palaeolithic. It is perhaps worth adding here that when I had previously conducted survey projects in Italy and Greece, we had always managed to find some Middle Palaeolithic material on the landscape. Thus, Cyprus is the exception in terms of my own experience. (5) As a further control on the absence of the Middle Palaeolithic at Nissi Beach, Aspros and Aliman, it is worth recalling the recent study of the lithics at these three sites by Kozłowski and Kaczanowska, who have many years of experience when it comes to working on material of this age in Europe. No evidence for Middle Palaeolithic material was observed at these three sites. Taken together, the five lines of studies suggest that it will not be easy to find sites of Middle Palaeolithic age on Cyprus. Of course, one needs to keep an open mind in such matters. It is always possible that, in time, a Middle Palaeolithic site will be found on the island. In the meantime, it is important not to get carried away and create exaggerated expectations about hunters and gatherers in the Mediterranean crossing the sea in Middle Palaeolithic times.

VOYAGING AND THE NEOLITHIC TRANSITION

The contrast between the very limited evidence for voyaging to the five “true” islands in the time before 16,000 years ago and the rich corpus of evidence that is available once we reach the Early Neolithic could not be more marked. In this section, we turn to a subject that is much better known. The literature on the Neolithic colonization of the Mediterranean islands goes back to the publications of John D. Evans, Luigi Bernabò Brea and others in the 1960s and 1970s. And one can trace the history of scholarship on the subject back even further in time. Indeed, one could write a whole monograph on the intellectual history of how the study of this question has evolved over the last six decades. This was, of course, not the purpose of the meeting at Altafiumara. Instead, the main focus of the workshop was on what was happening of the Mediterranean islands in the time before the Neolithic period. For the sake of completeness, only a few highlights and comments will be offered here on the Neolithic side of the story. Emphasis will be placed on the early Neolithic period, the spread of agro-pastoralism and the good evidence for voyaging provided by the circulation of obsidian within three basins (Cyprus, Aegean and Tyrrhenian) of the Mediterranean Sea (Ammerman, 2010:83-86).

In terms of the big picture, it is well known that some of the elements in the so-called Neolithic package were already starting to make their way to the site of Shillourokambos on the island of Cyprus by ca. 8,400 cal BC (Guilaine et al., 2011; Vigne et al., 2013; Briois and Guilaine, 2013)) and that agro-pastoralist then first reached the Iberian Peninsula by ca. 5,500 cal BC (Zilhão in this issue). In effect, it took around 3,000 years – the equivalent of more than 100 human generations – for the Neolithic transition to travel from east to west across the Mediterranean world. When we view the first farmers from this perspective, they appear to have been in no hurry to move across the Mediterranean Sea (Fig. 3). This map shows a selection of Early Neolithic sites along with a few dates in order to give a basic sense of the pace of the Neolithic transition. There is one notable exception in Figure 3: it concerns the famous site of Çatalhöyük in central Anatolia. Less well-known are the older Neolithic settlements in the same area, Asikli and Bonçuklu (with architecture, domesticated cereals and obsidian), which go back to around 8,500 cal BC (on this part of Anatolia, see the map, the chronological table and the respective chapters in The Neolithic in Turkey (Özdögan et al., 2011-2013). In light of what we know today, it no longer makes much sense to use the old-fashioned term, “the Neolithic Revolution,” to characterize the slow-footed spread of early farming in the Mediterranean world. To put it another way, using the language of music, the tempo of the Neolithic transition – between Cyprus and southern Italy, in particular – was adagio and not andante (Fig. 3).
In the west, the tempo would then pick up in the last movement: that is, the spread from Italy to Spain and Portugal. The quantitative analysis of the spread of early farming in Europe has a long history (Ammerman and Cavalli-Sforza, 1971, 1984; Gkiasta et al., 2003; Pinhasi et al., 2005; Davidson et al., 2006; Bocquet-Appel et al., 2009; see also Zeder, 2008:fig. 2, whose dates are often on the high side, however). Today the focus of research is on trying to measure rates of the spread for the various regions of Europe now that the big picture is established at the continental scale. Here it is worth recalling that even in the first attempt to measure the rate of spread of early farming in Europe, it was possible to observe that the rate of spread in the Western Mediterranean was faster than the average rate for Europe as a whole (Ammerman and Cavalli-Sforza, 1971:683-684). So the idea of studying regional rates is not a new one. The challenge that arises in estimating rates at the regional level is that of having to work with high-quality radiocarbon dates. Among other things, the samples to be dated should come from good archaeological contexts; the dates should be on organic materials with short lives (such as seeds); the determinations should have small standard deviations; and there should be several dates for each site used in the analysis. This is, of course, a wish list. In practice, we work by steps of approximation in line of research.

Returning to Figure 3, we see that voyaging has taken the Neolithic package out to Knossos on Crete by 7,000 cal BC. At more or less the same time, the spread of early farming had made its way to the settlement of Ulucak Höyük in Western Turkey. In the case of the Neolithic sites at the head of the Aegean Sea (e.g., Ugurlu on the island of Gökçeada, Hoça Çeşme and Makri) the 14C dates do not go back to the time before ca. 6,500 cal BC. On the other hand, there are now good AMS dates run on seeds from the Franchthi Cave, and they place the transition to the Neolithic at ca. 6,700 cal BC (Perlès et al., 2013:fig. 6). In turn, this provides support for the argument that early farming reached the Peloponnese by crossing the sea and not by a land-based route (that is, by moving around the head of the Aegean and then down the east side of the Greek mainland). The spread of the first farmers next...
makes its appearance at Pokrovnik in Croatia (Moore in this issue) and at a settlement such as Torre Sabea in the heel of Italy by about 6,000 cal BC. During the first half of the 6th millennium cal BC, there are many Neolithic settlements in the regions of Apulia, Calabria and Sicily in southern Italy, although few of them have produced much evidence for the consumption of marine resources (Robb, 2007:123; Lelli et al., 2012). By this time, more than 2,000 years have elapsed since the PPNB was well established on Cyprus. The Neolithic transition then picks up pace in moving from Italy to Spain and Portugal (Fig. 3). Early farming is documented in several regions of Spain by or else soon after 5,500 cal BC (Zilhão in this issue). It is worth noting, however, that even in the far west the actual pace of the spread of early farming was comparatively slow by the standards of ancient history. For early farming to move from the heel of Italy to Portugal, it would take a century or two more than the full length of the Republic in Roman history (a span of 500 years or some 20 human generations). What appears to be fast for the prehistorian may have been rather slow on the ground or the seascape when we take into consideration the number of human generations that were involved and also the fact that voyaging in the Mediterranean had by now a long history behind it.

In terms of explaining the Neolithic transition, there has been for some time a tug-of-war between two quite different positions: those who advocate cultural diffusion and those who hold that demic diffusion played the leading role. In effect, it is more productive to see the real task as that of working out the relative importance of the two kinds of processes in the respective regions of Europe (Ammerman and Cavalli-Sforza, 1984:6, 62, 135). It is unfortunate that our position has been misrepresented at times in the literature. Here the plan is to mention briefly two recent publications that may help to give some idea of where we stand in this field of study today. Taking a quantitative approach to the formulation of the question, Fort (2012) has now made the first attempt to integrate the demic and cultural models in a unified framework. Working at the continental scale of analysis, he finds that demic diffusion accounts for some 60 per cent of the Neolithic transition in Europe. In the field of human population genetics, a recent study based on the analysis of complete mitochondrial genomes reaches much the same conclusion. To quote directly from the abstract of the article (Fu et al., 2012:1), “our analyses revealed a population expansion between 15,000 and 10,000 years before present (YBP) in mtDNAs typical for hunters and gatherers, with a decline between 10,000 and 5,000 YBP. These corresponded to an analogous population increase approximately 9,000 YBP for mtDNAs typical of early farmers. The observed changes over time suggest the spread of agriculture in Europe involved the expansion of farming populations into Europe followed by the eventual assimilation of resident hunter-gatherers.” Thus, a new genetic study provides further support for the hypothesis of demic diffusion that was first put forward in the 1970s (Ammerman and Cavalli-Sforza, 1973, 1984).

In retrospect, it is possible to see that research has come a long way from the 1970s when the idea of any connection between archaeology and human genetics was once seen by the majority of scholars – in both fields of study – as too radical to be plausible. In any event, the last word has yet to be said on the best way or ways to explain the Neolithic transition in Europe. A stream of new articles on the subject will continue to come out as the present century unfolds.

One of the questions that we now need to consider is the paradox that emerges when the slowness in the spread of early farming between Cyprus and Italy is viewed in the context of what is currently known about early voyaging in the Eastern Mediterranean (Ammerman, 2011). In short, why did it take so long for the Neolithic transition to travel from Cyprus to southern Italy in a world where early voyaging was already well established? As mentioned above, it somehow took more than 2,000 years for the Neolithic package to move from Cyprus to southern Italy. And yet the distance between the two places – as the crow flies over the seascape – is only around 1,500 km. Why in a world where there is good evidence for voyaging between the mainland and Cyprus already by 8,700 cal BC (as now shown by the two PPNA sites on the island) and where the circulation of obsidian in early Neolithic times relied upon the use of boats in the Cyprus basin, the Aegean basin and also the Tyrrhenian
basin (Ammerman, 2010:83-86; more will be said about obsidian below) did the Neolithic transition move forward at such a slow pace? And why in a world where voyagers in small boats were able to cross between Cyprus and the adjacent mainland in a matter of a day or so (Vigne et al., 2013) did the Neolithic package not make it all of the way to Spain in a span of just 50 human generations? Of course, this is a counter-factual proposal but it is not totally a wild idea in terms of what we now know about early voyaging in the Mediterranean. At the same time, there is another question to ask: namely, why did the paradox remain off the archaeologist's radar for so long? Remarkably, it was only at the time of the 2007 conference on “The Global Origins and Development of Seafaring” that I first began to recognize this paradox (Ammerman, 2010:90).

This is not the place to repeat what was previously said about these questions in the chapter written for The Seascape in Aegean Prehistory (Ammerman, 2011). There I toyed with an explanation of the paradox based on the idea of two alternative and complementary ways of life – ones that were not always on the same page. On one hand, there were the first farmers who lived in the interior for the most part and who often did not have boats. On the other hand, there were those living nearby on the coast who did have boats and knew how to use them, but whose livelihood was based, at least in part, on the exploitation of marine resources and the exchange of things. In short, it may not have been so easy for a household of first farmers living in the interior to move over the sea and relocate to a new place. In order to do so, they would have had to make arrangements with “the boat people” to move them around. Accordingly, there was a need for a certain degree of collaboration between the two sides – between “them” and “us” – and such a relationship was, no doubt, laden with contention at times and the need for negotiation. In short, things were not so simple and straightforward, and this may help to explain the sluggishness of the spread of early farming between Cyprus and Italy. Obviously, this line of thinking represents just one attempt to explore a complex problem. There are, of course, other ways to try to explain the paradox. For example, it is possible that the slowness of the spread between Cyprus and southern Italy was linked in some way with the mound-based system of Early Neolithic settlement in Anatolia, Greece and the Balkans, which acted to slow down the contribution of migratory activity to the process of demic diffusion (Ammerman and Cavalli-Sforza, 1984). In brief, without exploring this alternative at any length here, the idea is that a fair number of people lived at a given tell or mound site, and they lived there for generations and became quite attached their mound. Accordingly, relocation to other places (where a new mound site was established) may have taken place at a comparatively slow rate. In contrast, the rate of relocation was much higher in the case of the more dispersed forms of Early Neolithic settlement in the Western Mediterranean and also the LBK in Central Europe. And it is not surprising that we find much faster rapid of spread in both cases.

Yet another way to account for the slowness is to turn to the event in the earth’s climate history that dates to ca. 8,200 cal BP (Berger and Guilaine, 2009; on the slow start of the study of this climate event in the Aegean region itself, see Ammerman, 2011:39). This climate event is now incorporated in Figure 1, the latest version of the chronological table that compares the sequence of periods in the Levant and on Cyprus. It was set in motion by the collapse of the Laurentide ice sheet and the sudden release of large volumes of water into the world’s oceans. This event is commonly identified by its 8.2 kya age in the literature of the earth sciences, which corresponds with a calibrated date of ca. 6,250 years cal BC. It is important to note that this date happens to be more or less the same time when the spread of early farming reached the heel of southern Italy (Fig. 3). Thus, the problem with using this line of explanation to account for the slow spread is that the climate event actually takes after most of the slowness – between Cyprus and southern Italy in the years from say 8,200 and 6,300 cal BC – has already occurred. In other words, the climate event enters the game only in the very last inning. Thus, it is hard to see it as a major factor in slowing down this leg of the spread. On the other hand, if we turn to the years after the climate event, what we find is that the spread, instead of slowing down, now picks up pace on its way from Italy to the Iberian Peninsula (Fig. 3). Rather than slowing down the rate of the spread, the event appears to be a catalyst for
just the opposite in the Western Mediterranean. Suffice it to say here that, while this climate event does have interesting implications for the study of the Neolithic transition in the Mediterranean, it does not appear to account for the sluggishness observed between Cyprus and southern Italy. Of course, much remains to be done on establishing the environmental changes that took place at the regional level in response to the climate event and, in turn, on working out the various human adaptations that it set in motion.

In several regions of the Mediterranean, the study of obsidian provides good evidence for voyaging in Early Neolithic period (Ammerman, 2010 and references therein). In the case of Cyprus, characterization studies show that the obsidian blades recovered at PPNB sites such as Shillourokambos, Mylouthkia and Akanthou come from sources in Central Anatolia. More recently, the PPNA site of Klimonas has yielded a few pieces of obsidian as well (Briois and Guilaine, 2013). Turning to early Neolithic sites in the Aegean basin, the obsidian can be traced to sources on the islands of Melos and Giali. Moving west to the Tyrrhenian basin, pieces of worked obsidian are commonly recovered at Early Neolithic sites in southern and central Italy, and characterization studies done there show that the raw material can be traced to sources on four islands: Lipari, Pantellaria, Palmarola and Sardinia (Tykot and Ammerman, 1997). Thus, the circulation and exchange of obsidian in all three basins called for voyaging. Given the high percentage of obsidian artifacts in the lithic assemblages at the site of Akanthou on the north coast of Cyprus and the site of Piana di Curinga on the west coast of Italy, it is reasonable to infer that voyages that were undertaken in connection with the procurement of obsidian took place on a fairly frequent basis. In addition, it is worth noting that there is almost no evidence for the obsidian that circulated in the Cyprus basin to make its way to the Aegean basin (the one notable exception is the site of Ugurlu Höyük on the island of Gökçeada where six pieces come from the obsidian sources called Göllü Dag and Nenezi Dag in Cappadocia; see Özbek and Erdogu in this issue). On the other hand, no obsidian from a source in the Aegean basin made its way to the Cyprus basin. And the same holds for the Aegean and the Tyrrhenian basins in Early Neolithic times: no obsidian from the former reached a site in the latter and vice versa. In short, obsidian very rarely circulated between the three basins. What we seem to be dealing with then are rather timid voyagers. The first Argonauts preferred to stay in their home waters (Ammerman, 2010:85). This also fits with what we now know in the case of Spain where obsidian from Sardinia (the closest source but one located at a considerable distance from the Neolithic sites in Spain) only makes its appearance there towards the end of the fifth millennium cal BC (that is, the Middle Neolithic period in the Iberian Peninsula; Terradas et al., 2014). Thus, the Iberian Peninsula represents a special case in the Mediterranean world: obsidian is not only missing at the time of the initial spread but a fair number of generations would have to pass before the challenge of distance would be overcome there.

If we look at the map of the Early Neolithic sites shown in Figure 3, there are just five of them that have no obsidian. Four are located in the Iberian Peninsula, and the other site occurs in Croatia. In the latter case, obsidian from Lipari will eventually make its way to Pokrovnik in the Middle Neolithic period. In the study of voyaging in the Mediterranean, this pattern suggests that the circulation of obsidian should be seen as a trailing indicator in the economic sense of this term. While obsidian may not be present in a place where voyaging has already appeared on the scene, sooner or later it will show up. Given that voyaging played an active role in bringing the Neolithic package to Spain and Portugal (as Zilhão argues in this issue) and given the very limited evidence for the circulation of obsidian between the respective basins, there are some places (e.g., Cyprus, Corsica and Spain) where voyaging and voyagers already enter the picture before obsidian manages to get there. It is in this sense that obsidian constitutes a trailing indicator of voyaging. To put it in another way, the presence of obsidian at a site can be read as a sign that voyagers were probably already frequenting that place in an earlier time. On the other hand, we can view the introduction of a new animal species on a “true” island – either in a wild form or else in a domesticated one (Vigne, 2013; Vigne et al., 2013) – as providing a leading indicator of voyaging in the sense that the introduced species
has its own biological clock (one that is ticking from the time of introduction), and this clock can be used, at least in theory, to work out the time when the species first arrived on a given island. Of course, we need to make use of both lines of evidence in the study of the origins of voyaging in the Mediterranean. Toward this end, it is important to develop a more nuanced understanding of the ways in which each of them makes its own contribution.

It may be useful at this point to step back and to make a few comments on the Neolithic study of obsidian from a more historical point of view. In the case of the Aegean and Tyrrhenian basins, much of what is said in “the obsidian story in a nutshell” (Ammerman, 2010:83-86) has been in the literature since the 1980s. So this is an old and familiar territory for those who have worked on obsidian in Italy and Greece over the years. This section of “the first Argonauts” was simply an attempt to bring together the different elements of the story and provide an overview at the most basic level. Indeed, for the last three decades, what was known about the Neolithic circulation of obsidian was commonly taken as the point of departure for the study of early voyaging in the Mediterranean. In this context, it is not surprising that ideas and values associated with Neolithic studies (for instance, the emphasis placed on the colonization of islands by first farmers) became embedded in discourse on the subject. Now that we have learned that voyaging in the Eastern Mediterranean goes back to the time well before the Neolithic period, it is time to rethink the whole question. In short, the earliest voyaging in the Mediterranean is no longer simply synonymous with the Neolithic circulation of obsidian, as it once was for the prehistorian in the 20th century. Indeed, one of the main tasks before us today is to uncouple the question of early voyaging from the question of the colonization of islands (Ammerman, 2010:89).

For forager voyagers leading a mobile way of life at the time of the Younger Dryas, the notion of putting down permanent roots on a given island was one of the last things they had in mind. What we are dealing with is instead anachronism: that is, something that the archaeologist borrows from a more recent time (in this case Neolithic studies) and projects back on an earlier time when it may not be appropriate. The forager-voyagers who lived on the mainland some 12,000 years ago were quite content to go over to the island of Cyprus on a seasonal basis, which is in keeping with the archaeological evidence that is currently available at Aspros and Aetokremnos (e.g., Ammerman, 2013b).

It will be recalled that no obsidian has been recovered at any of the pre-Neolithic sites on Cyprus. The situation is, of course, different in the case of the Aegean Islands (more will be said about this in the next section). What is missing in the literature at the present time is a synthesis that attempts to compare and contrast what is happening in the three basins in greater depth and detail than what is given in “the obsidian story in a nutshell” (Ammerman, 2010:83-86). For example, the obsidian recovered at the PPNB sites of Shillourokambos and Akanthou on Cyprus circulated in the form of finished blades made at a workshop such as the one at Kaletape located near the source called Göllü Dag (Balkan-Atliu and Binder, 2012). In contrast, obsidian in the Tyrrhenian basin moved in the form of cores or pre-formed cores from the island of Lipari to Stentinello sites at Acconia on the west coast of Calabria, where the cores are then worked to produce blades (Ammerman, 1985). In short, there are clear differences in terms of the production of obsidian in each of the three basins. At the same time, there is still a good deal of information on the circulation of obsidian in Early Neolithic times, which has yet to be incorporated in a richer and more comprehensive synthesis. Of course, there is today no one archaeologist who has a good firsthand knowledge of the obsidian story in all three basins. In order to achieve a new and fuller synthesis, what is called for is a meeting of the kind that we held at Reggio Calabria.

In the meantime, there are four main points that we need to keep in mind when it comes to the circulation of obsidian during early Neolithic times. (1) There is very little evidence for the movement of obsidian between the three basins in the Mediterranean Sea at that time. As mentioned before, the one exception here would be the site of Ugurlu in the Aegean basin, where 5 prismatic blades can be linked with Göllü Dag on the basis of characterization studies and 1 core comes from Nenezi Dag; see Özbek and Erdogu in this issue). In contrast, worked pieces of obsidian
from sources in the Aegean basin do not reach the Cyprus basin, and there is no evidence for obsidian moving between the Aegean and Tyrrhenian basins. The inference to draw then is that the circulation of obsidian was kept on a fairly short leash at that time. In other words, the notion of long-distance voyaging – in the sense of boats, voyagers and objects of value moving from one basin to another one at the time of the Neolithic transition – receives little or no support in the case of the circulation of obsidian. In the case of the Tyrrhenian basin, the leash would then become longer in the Middle Neolithic period, as we shall see below (e.g., Ammerman, 2010:fig. 7.3).

(2) The percentage of obsidian in the lithic assemblage at an Early Neolithic site tends to fall off rapidly with its distance from the nearest obsidian source. In the case of Cyprus, there is a high percentage of obsidian at Akantou on the north coast (with more than 5,000 pieces of worked obsidian in all), while the values observed at Shillourokambos and Tenta on the south coast are much lower (Ammerman, 2010:84). In the Tyrrhenian basin, the same holds when a comparison is made between the Stentinello sites at Acconia in the toe of Italy (commonly with 80 per cent or more of obsidian from the nearby island of Lipari) with what is found in the heel of Italy (just 0.5 per cent at the coastal settlement of Torre Sabea; Ammerman, 2010:85). Again, the implication is that voyaging was kept on a comparatively short leash in Early Neolithic times.

(3) In a given region of the Mediterranean, we should not take what is happening in the Middle Neolithic period as a guide and project it back on the Early Neolithic period. In other words, the Middle Neolithic should not be used as a proxy for the Early Neolithic. In the recent literature, there is a tendency to conflate what is happening in different periods of the Neolithic and treat the circulation of obsidian in generic terms (e.g., Tykot, 2011). In short, not enough attention is paid to chronology in the study of the circulation of obsidian. A case study that documents clear differences between the Early, Middle and Late Neolithic periods is provided by Arene Candide in Liguria, where characterization studies were done on all of the obsidian pieces recovered at the site (Ammerman, 2010:fig. 7.3). Without going into the details here, there are no pieces of obsidian that come from the island of Lipari in the Early Neolithic period, whereas Lipari will turn out to be the source of 87.5 per cent of the obsidian at Arene Candide in the Late Neolithic period. At Pokrovnik in Croatia, obsidian makes its first appearance in the Middle Neolithic. There is, as mentioned before, no obsidian at the site in the Early Neolithic period (Moore in this issue); obsidian from Lipari was not crossing over to the far side of the Adriatic at that time. To put it another way, the obsidian found in the Middle Neolithic period does not provide a good guide to what is happening at Pokrovnik in the Early Neolithic period.

(4) Furthermore, we need to be cautious in the case of cave sites: above all, when a fair number of obsidian pieces are present in a given layer and then in the layer immediately below it (the lowest one with obsidian at the site), just one or two pieces are recovered. There is a good chance that the pieces in the lower layer do not occur in situ there. Instead, it is more likely that the piece or few pieces have moved down in the stratigraphic sequence due to taphonomic processes operating at the cave or rock shelter. In such cases, there is the clear risk of attributing an age that is too old for the first appearance of obsidian at the site. This is a problem that Zilhão (in this issue) discusses in the context of early claims for obsidian at sites in North Africa.

THE SITES DATING TO THE TIME OF THE YOUNGER DRYAS

In this section, we now go back in time and return to the theme of leading interest at the workshop. On the basis of the study of obsidian, there is ample evidence for voyaging in the Mediterranean once we reach the Early Neolithic period, as we have just seen. There is, of course, nothing new about this story: work has been done on the Neolithic circulation of obsidian for the last thirty years. What is of interest for our present purposes is the implication that voyaging in Early Neolithic period appears to have been kept on a comparatively short leash. There is little or no evidence for obsidian moving over long distances between the three basins mentioned above. In contrast, the current working hypothesis for the start of voyaging on a regular basis in the Eastern
Mediterranean takes us back to the cold snap of the Younger Dryas (Fig. 1), and it was first put forward eight years ago (Broodbank, 2006; Ammerman, 2010, 2013a). In other words, what we are dealing with is something that is still brand new. In fact, this was one the main reasons for holding the Wenner Gren Workshop. Here it will be recalled that background information on the two deep cores drilled in the Greenland ice sheet in the 1990s, which provide the framework for our current knowledge of the Younger Dryas (ca. 10,800 to 9,600 cal BC), is given a previous chapter of the proceedings (Ammerman, 2013b). Shown in Figure 2 are the locations of seven sites in the Eastern Mediterranean that go back to the time of the Younger Dryas. In addition, the map includes two sites of younger age, Nissi Beach and Maroulas, which shed light on the story of voyaging foragers as it then went on to unfold in the first half of the ninth millennium cal BC. In previous chapters of the proceedings, much has already been said about most of the sites on this map. Here my purpose is not to cover each one of them again in this closing chapter. Instead, the aim is to bring the sites together in one place (Fig. 2) and to highlight what we are beginning to learn from them.

The situation today is quite different from the one in 2000, when several of the sites on the map were completely unknown. And most of the rest of them were known just from brief preliminary reports. Furthermore, at that time, many of the prehistorians working in the Eastern Mediterranean were still unaware of the major gains that earth scientists had recently made in the study of the Younger Dryas (e.g., Alley, 2000; Ammerman, 2013b). Indeed, three of the sites on the map – Aspros, Nissi Beach and Ouriakos – had yet to be discovered even as late as 2003. And nothing had been done at Direkli between the trial excavation conducted at the cave in 1959 and the new cycle of fieldwork initiated in 2007 (Erek, 2010). Accordingly, the investigations at these four sites should be regarded as work in progress.

In 2000, the only site on the map with a full-length publication that had been in the literature for some length of time was the Franchthi Cave in the Peloponnese (for the study of lithic phase VI; see Perlès, 1987). In the case of Aetokremnos, the collapsed rock shelter on the south coast of Cyprus, the book presenting the results of the excavation had just appeared in the last year of the 20th century (Simmons, 1999; see now Simmons, 2013). It will be recalled that while the excavator’s interpretation of stratum 2 is now widely accepted, there has long been a debate in the literature when it comes to his interpretation of stratum 4; Ammerman, 2013a, 2013b; Simmons, 2013 and the references therein). Then, in the following year, the results of the excavations at Abu Hureyra were published in Village on the Euphrates (Moore et al., 2000; see also Moore and Kennett, 2013). And two years later, it would be the turn of Öküzini, the important cave site in Southern Turkey (Yalçinkaya et al., 2002; the Epipalaeolithic layers occur in the upper part of its stratigraphic sequence). More recently, a monograph has appeared on the excavations at the Mesolithic site of Maroulas on the island of Kythnos (Sampson et al., 2010; Kaczanowska and Kozłowski in this issue; Sampson in this issue). Finally, Kaczanowska and Kozłowski have just published the results of their recent studies of the lithics at the sites of Aspros and Nissi in the monograph entitled Contribution to the Archaeology of early Cyprus (Ammerman, 2014; Kaczanowska and Kozłowski, 2014a, 2014b; Kaczanowska et al., 2014). Thus, major publications have now come out on seven of the nine sites shown in Figure 2 (for a preliminary report on the work at Direkli Cave; see Erek, 2010; on the investigation at Ouriakos, see Efstratiou in this issue as well as Efstratiou et al., 2013). So we have come a long way in a short span of time. At this point, it is perhaps worth adding that the site of Damnoni 3, which was recently excavated at Plakias on the south coast of Crete, is not included among the sites in Figure 2 since its chronological attribution (other than to the Mesolithic period in the generic sense of the term) has yet to be worked out. Here the key point to make is how rapidly this corpus of evidence on Epipalaeolithic sites has emerged in recent years.

In terms of obsidian, the excavations at two of the Epipalaeolithic sites on the mainland, Abu Hureyra (Moore et al., 2000:110) and Direkli (Erek, 2010:3) have produced some worked pieces in this raw material. This is what one would expect from their locations in the Near East (Cauvin et al., 1998). In the case of Direkli,
the obsidian is thought to come from sources in nearby Cappadocia. In contrast, none of the Epipalaeolithic sites on Cyprus, as mentioned before, has yet to produce obsidian artifacts (Ammerman 2010:86; Ammerman, 2013b). And much the same is found when we turn to pre-Neolithic sites in the Tyrrenian Basin. There is no reliable claim for obsidian at a Mesolithic site on the Italian Peninsula. The few claims that have been made for such sites on the island of Sicily involve just one or two pieces of obsidian at a given site (Ammerman, 2010:86; Mannino in this issue). Such modest numbers are for some archaeologists less than convincing. They may represent small obsidian pieces that have moved down in the stratigraphic sequence due to taphonomic processes. Even if one is optimistic and assumes, for the sake of argument, that the one piece found at Perriere Sottano and the two pieces recently recovered at Grotta d’Oriente on the satellite island of Favignana are in situ, the evidence for the pre-Neolithic circulation of obsidian in the Tyrrenian basin appears to be quite modest at the present time.

The shortage of obsidian at pre-Neolithic sites on Cyprus and in the Tyrrenian basins means that the circulation of obsidian in the time before the Neolithic is a distinctive feature of the Aegean basin. The Mesolithic sites with obsidian keeps growing each year, as archaeologists have turned their attention to finding them. The obsidian comes from the sources of workable volcanic glass on the islands of Melos and Giali. As mentioned before, the best case study in the current literature is the site of Maroulas on the island of Kythnos (Sampson et al., 2010). There the raw material actually derives from obsidian pebbles and cobbles that were collected in shallow water along the shoreline of Melos (and not from the good outcrops of obsidian that occur on the island itself). Voyaging foragers took them to Kythnos where the pebbles and cobbles were then worked at the site of Maroulas. It is worth noting that there are differences in the approach taken to the procurement of obsidian and its reduction when a comparison is made between a Mesolithic site such as Maroulas and what is found at early Neolithic sites in the Aegean region.

One of the important questions to ask then is how far back in time can we trace the circulation of obsidian in the Aegean Basin. It is worth recalling that no obsidian has yet come to light among the large quantity of chipped stone artifacts recovered at the Epipalaeolithic site of Ouriakos on the east coast of Lemnos, which is carbon dated to the 11th millennium cal BC (Efstratiou in this issue). In effect, the absence of obsidian at Ouriakos suggests that Melian obsidian may have had a fairly limited spatial distribution in the time before 12,000 years ago. The key site in attempting to answer this question has long been the Franchthi Cave (Perlès, 1979; Ammerman, 2010:86). Lithic phase VI at Franchthi has a small number of obsidian pieces as well as four 14C dates that go back to the 11th millennium cal BC. Indeed, there does appear to be some evidence for the circulation of obsidian in the years of the Younger Dyras. However, the number is quite limited. More recently, on the basis of a new method of obsidian hydration dating, the claim has been made that a few pieces of obsidian are even older than those recovered in association with lithic phase VI at Franchthi (Laskaris et al., 2011). Unfortunately, this dating method commonly has a rather low level of chronological resolution. Even in the recent study, using the new SIMS-SS approach to obsidian hydration dating, almost all of the age measurements – in particular the older ones – have large standard deviations (the error value is often greater than 1,000 years). For instance, the measurement of the oldest piece of obsidian from the site of Schisto 1 (14,539 BP) has a standard deviation of plus or minus 1280 years. In statistical terms, this age estimate, when it is presented at the level of 2 standard deviations (as conventionally done for radiocarbon measurements) need not be any older than the oldest 14C date for lithic phase VI at Franchthi. In terms of methodology, what is required is a more controlled study to begin with – one where the samples of obsidian are taken from contexts whose ages are already well known on the basis of radiocarbon dating) – so that those in the field of archaeometry can work out the degree of chronological dating achieved by the hydration method. In short, while this new method has some promise, it needs to be tested first in a more controlled way before conclusions can be drawn from this line of analysis.
Even in the case of lithic phase VI at Franchthi, some caution may be in order: some or even all of its few pieces of obsidian may not occur in situ (recall point 4 in the previous section). This reservation was previously phrases in the following terms (Ammerman, 2010:86): “in light of the small number of obsidian pieces in lithic phase VI at Franchthi (only 12 pieces; Perlès, 1987), caution may be called for here as well. On the positive side, the evidence for lithic phase VII – with three times as many pieces of obsidian, seven radiocarbon dates in the 10th millennium cal BC and again plenty of seashells – is more substantial.” In short, Franchthi does provide good evidence for the pre-Neolithic circulation of obsidian in the 10th millennium cal BC. In turn, this means that coastal foragers were voyaging on the Aegean Sea for well over 2,000 years before the Neolithic transition made its appearance in the Aegean basin (Fig. 3). This is a considerable span of time (on the order of 80 human generations), and it is likely to become even longer as more work is done on the pre-Neolithic circulation of obsidian in the Aegean basin in the years to come.

Here it may be useful to add a few comments on the character of the sites shown in Figure 2 from a comparative perspective. To begin with, there is considerable diversity among the sites. Most of them are campsites that were occupied on a seasonal or short-term basis. This is consistent with the idea that the Younger Dryas was a time of heightened mobility for those whose subsistence was based on hunting and gathering (e.g., Bar-Yosef, 2013; Ammerman, 2013b). Abu Hureyra and Maroulas are the two sites where the case can be made for a more permanent form of settlement. At both of them, the excavations have produced the remains of huts or houses (recall that Maroulas dates to the 9th millennium cal BC and not to the Younger Dryas). Abu Hureyra is a mound site, and it was chosen to illustrate the existence of sites of this kind already in the 11th millennium cal BC (Moore et al., 2000; Moore and Kennett, 2013). Located in a favorable environmental setting, Abu Hurera is the only mound site included in Figure 2. It has produced evidence for early attempts at the cultivation of rye, a cereal that grows well under dry conditions. On the other side of the spectrum, four of the sites are either caves or rock shelters: Franchthi, Öküzini, Direkli and Aetokremnos. In the latter case, the shelter had formed in a weakly bedded rock, and it was in a partially collapsed state in the 11th millennium cal BC. Two of these four sites – Franchthi and Aetokremnos – are located on or else near the coast. The excavations at both of them have led to the recovery of a fair number of marine shells (Shackleton, 1988; Reese, 2006; Bar-Yosef Mayer, 2013). The two taxa with the highest counts in each case are Patella and Mondodonta (now called Osilinus), and they were both collected for food in the intertidal zone of a rocky shore. The same two taxa are observed at the site of Maroulas as well. In all, six of the nine sites occur in a position that is on and near the coastline today: Franchthi, Maroulas, Ouriakos, Aspros, Aetokremnos and Nissi Beach. The complication, of course, is that none of them was actually located on the shoreline some 12,000 years ago, when sea level was on the order of 60 m lower than today (e.g., Ammerman, 2013a; Bailey, 2013). This means that they were often located distance in the range of 1 to 3 km from the shoreline at that time. In short, what happens to be recovered at a given site on land today may not be a good guide to the marine resources that were consumed as food in the Younger Dryas (for ethnographic parallels on subsistence strategies and the places where shellfish are consumed and their distances from the shoreline, see the section by Ken Thomas in his study of the shellfish assemblages at Nissi Beach in Ammerman et al., 2012:23). What we have to work with on land today may represent only the tip of the iceberg (Bailey, 2013). In order to obtain a fuller picture, the archaeologist probably has to work at Epipalaeanolithic sites that occur closer to former shorelines and that now rest on the seabed (Ammerman et al., 2011). Finding submerged sites of this kind and working on them at a depth of 40 m or more in the water is clearly a tall order. In this respect, we do have our work cut out for us.

Turning to the chipped stone assemblages found at the Epipalaeanolithic sites, the recent addition of Aspros, Ouriakos and Direkli helps to fill out the picture in the Eastern Mediterranean. As mentioned in previous chapters of the proceedings, there are now interesting and close connections between the lithics recovered at the respective Epipalaeanolithic sites. On Cyprus, for example,
the lithic reduction technologies and the stone tool types at the sites of Aspros and Aetokremnos are similar to one another (e.g., Ammerman et al., 2008; Ammerman, 2013b; Kaczanowska et al., 2014). In brief, a pebble-and-flake based technology is used to produce the small tools that are common at both sites. And it is now clear that the Epipalaeolithic tradition on Cyprus – as seen at Aspros, Aetokremnos and the other early sites on the aeolianite – is quite different from both the PPNA tradition or the Cypro PPNB tradition on the island (with their blade-oriented reduction technologies, see Briois and Guilaine, 2013). In addition, close parallels can be recognized between the microlithic cores and tools at Aspros and those found in the uppermost levels at the Öküzini Cave (Kaczanowska et al., 2014:45). In turn, there are interesting relationships that can be observed when it comes to the backed bladelets and the geometric microliths recovered at the sites of Öküzini, Ouriakos and Direkli (Efstratiou in this issue). In this part of the Mediterranean, what we now have is a group of five Epipalaeolithic sites that date to the time of the Younger Dryas – Aspros, Aetokremnos, Öküzini, Ouriakos and Direkli – whose chipped stone assemblages share a certain degree of similarity with one another. The next step will be to work out in greater detail the patterns of similarity and difference among the chipped stone assemblages at the five sites. Once this set of relationships has been established, it will be possible to consider their implications for the character of the interactions that may have been taking place between the sites in the respective areas. There is a good chance that it will be possible to recognize what amounts to a network of pan-Mediterranean interaction, which may well have formed as a consequence of the heightened mobility associated with the Younger Dryas.

It is not my intention to try to explore this network of relationships and connections in this chapter. Instead, it is simply to indicate that we have now reached the point where studies of this kind can be done. It is better to leave this task to lithic specialists who come from the Palaeolithic tradition of doing archaeological research (Ammerman, 2013:18-19) and who have more competence in writing about such things as the production of bladelets, backed pieces, geometric microliths and the presence or absence of the micro-burin technique in a given assemblage (e.g., Kaczanowska et al., 2014). In addition to the similarities that can be observed among the five Epipalaeolithic sites, parallels can be observed between the chipped stone assemblage at Maroulas and the oldest lithics recovered at Nissi Beach. The lithic reduction technology is still pebble-and-flake based at both sites. But now in the first half of the 9th millennium cal BC, the types of chipped stone tools produced and used at Maroulas and Nissi Beach are different from those that occur in the Epipalaeolithic assemblages (e.g., Kaczanowska and Kozłowski, 2014b:81-82). At Maroulas, as mentioned before, there is now the expedient use of obsidian in the form of pebbles and cobbles procured on the shoreline of Melos. As mentioned before, no real interest was apparently taken in the use of the good outcrops of obsidian, which occur on the island itself. Likewise at Nissi Beach on Cyprus, we are dealing with a rather expedient approach to the making of chipped stone tools: chert pebbles were collected on or near the beach for making the oldest chipped stone tools found at the site. Those foraging on the coast did not take the time or trouble to exploit the good chert sources found in the island’s interior. On the other hand, such chert sources were actively exploited by the more or less coeval hunter-cultivators who lived at the PPNA settlement of Klimonas in the interior and who used a quite different reduction technology – a blade-oriented one as mentioned above (e.g., Briois and Guilaine, 2013).

THE LESSONS WE HAVE LEARNED

In this short section, the plan is to say a few words about the five lessons we have learned from the work in the Eastern Mediterranean over the last ten years. In retrospect, some of them may seem to be rather obvious today. This was not always the case. Much has taken place in what amounts to a comparatively short span of time. In brief, the five lessons provide an index of the quickening tempo of research on island archaeology and the origins of voyaging in the Eastern Mediterranean.

1. The first lesson is that the archaeologist has to take a more pro-active approach in order to
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find the missing pre-Neolithic sites on an island such as Cyprus (e.g., Ammerman, 2010, 2013b). The same holds in the case of Crete (Strasser et al., 2010; Runnels and co-authors in this issue) and also Lemnos (Efstratiou in this issue). The traditional way of doing survey work on the landscape was too passive to discover the early sites. The fieldwork did not focus on solving a problem. The working assumption was that the early sites would just come to light during the normal course of a multi-period survey. In fact, many surveys of the kind were conducted on the islands of Cyprus in the years between 1970 and 2000. But this did not happen. There were two quite different explanations to consider: either the early sites were not there on the landscape or else the survey archaeologist was not using the right methods in the field. On the basis of my previous experience in Italy together with my interest in site visibility on the landscape, it was reasonable to think that the latter was the case. Thus, when we took a new approach to looking for the pre-Neolithic sites on Cyprus, they soon came to light. And the same again happened on the island of Crete four years later. In the case of Cyprus, the key step was the decision to focus on the coastal formations of aeolianite. Previously, this part of the landscape had been viewed as marginal land (Ammerman, 2010, 2013b). Those conducting multi-period surveys on Cyprus had taken little or no interest before in the aeolianite. In retrospect, we can see that embedded in the multi-period survey is an agricultural agenda. The first lesson is then the need to break with tradition and to rethink method and theory in survey archaeology, if one wishes to learn more about voyager foragers in the Eastern Mediterranean.

2. The second lesson concerns the study of the chipped stone assemblages and, more specifically, the challenge of finding the specialist or specialists with the right experience to do this kind of work at sites dating to the time before the Neolithic period. Initially, I was too optimistic in this regard and did not fully appreciate how demanding this kind of work can be at times. In short, we had to learn this lesson the hard way by having our own “Ötzi Experience”: the saga of the study of the lithics at Dive Site C in front of Aspros (see Appendix A in Ammerman 2013a). At this point in time, there is nothing to be gained by dwelling on the negative side of the story. Lithic analysis is not easy – especially in the case of Epipalaeolithic sites. At the end of the day, we had the great good fortune to bring in the right specialists. While the preliminary analyses seemed to be productive (Ammerman et al., 2006), new and further work was then done the chipped stone assemblages at Aspros and Nissi Beach (Kaczanowska et al., 2014; Kaczanowska and Kozłowski, 2014b). In many ways, they now change the picture. Without the proper identification of the hyper-microlithic tools and cores at Dive Site C, our understanding of the site of Aspros would be quite different today (Kaczanowska and Kozłowski, 2014a). The lesson that we learned the hard way in this case is actually part of a larger problem: the study of the lithics at sites older than the Neolithic should be done by specialists with training and years of experience in Palaeolithic archaeology.

3. The third lesson is the need to uncouple the study of seafaring – or “voyaging” as we now prefer to call it – from the Neolithic and also from notion of the colonization of islands (Ammerman, 2010:89). Here it is worth making a brief digression on the history and meaning of the word colonization. First used in the English language at a comparatively late date (1770), it meant the act of establishing a colony (such as the Plymouth Colony in North America). The word has Latin roots connected with colonus – for a farmer or settler. More recently, in the biological sciences, it has been used in a broader and more metaphorical sense to describe a species expanding its territory. In the fields of history, anthropology and archaeology, the meaning of colonization is normally that of its original usage: the establishment of a new place to farm or settle. Now that pre-Neolithic sites have come to light on Cyprus and some of them date to the 11th millennium cal BC, voyaging goes back to the time well before the Neolithic period. In other words, early voyager foragers were not the water boys of the Neolithic transition. (Ammerman, 2010:89). Foragers began going to sea for reasons other than moving the first farmers into place on the islands large and small in the Mediterranean Sea. What the voyager foragers were trying to do during the Younger Dryas had, in all likelihood, little or nothing to do with the notion of the “colonization” of Cyprus – in the sense of putting...
down permanent roots there. Instead, those who led a mobile way of life were interested in visiting the island on a seasonal basis, as they moved from one place to the next during the course of the year. In other ways, as mentioned before in the proceedings (Ammerman, 2013a), an island such as Cyprus was, in all likelihood, “frequented” by forager voyagers for many generations before it was ever “colonized.” Today we have inherited the mental habit of thinking that “seafaring” and “colonization” are words that naturally go together. This may well have been true in a Neolithic context. Now that voyaging is older than the Neolithic, we have to move behind this anachronistic way of thinking.

4. The fourth lesson is that the archaeologist has to take the plunge and learn more about submerged sites that date to the years between 11,000 and 8,000 cal BC (Bailey, 2013; Ammerman et al., 2011; Ammerman, 2013b:129-131). In retrospect, this now makes good sense in terms of what came to light on the seabed in front of Aspros in July of 2007. If we are really interested in the study of coastal foragers who lived 12,000 years ago, the picture that we obtain by simply working on land is too limited. Thus, we have to have the courage to get our feet wet. At the same time, it is quite understandable why the prehistoric archaeologist has commonly avoided doing underwater archaeology. To begin with, it tends to be expensive. In addition, it is not so easy to do in terms of logistics and putting together a good dive team. And there is always the risk that, at the end of the day, it might not be worth all of the time and effort. In my own case, it was not without trepidation that we finally decided to take the plunge at Aspros. And what we then found at Dive Site C made it worth all of the effort. To put this lesson in broader perspective, we have to overcome the land-based bias that has long been embedded in prehistoric archaeology (e.g., Ammerman et al., 2011: 268). If there are still doubters in the house – and, no doubt there still are – we need only turn to the fine work done at the Neolithic settlement called Atlit-Yam off the Carmel Coast of Israel (Galili and Rosen, 2011). If underwater archaeology had not been conducted there, we would still be without this well-documented fishing village of Neolithic age sitting right on the former coast in the Levant.

5. The fifth lesson has to do with our comfort level when it comes to big events (Ammerman et al., 2012:25-27). When I first went out to Cyprus in 2003, I was not really prepared to deal with either the Younger Dryas, the major event in the earth’s recent climate history, or with the tsunami events at Aspros and Nissi Beach. In the latter case, it had never crossed my mind to think about processes of site formation taking place in such a dramatic form (Ammeraman et al., 2012: 25-26; Ammerman, 2013b: 127-29). Again, the history and tradition of prehistoric archaeology has not really prepared us for thinking in terms of big events, as our colleagues in the earth sciences now do with more ease. We grew up under the paradigm of gradualism, which our discipline borrowed from geology in the 19th century. Geology has moved forward; our field of study has lagged behind. We are relaxed and content when we can write about processes – environmental, economic, demographic, social and so forth – that unfold over the long durée. Having to focus our attention on the Younger Dryas and its implications forces us to realize that our field of study is likewise not immune to big events. In turn, this may even lead us to think about the lives of the people we are trying to study in new ways. For the young person in the 11th millennium cal BC setting out on his or her first crossing from the mainland to Cyprus, this was a big day in that person’s life – one with greater risk than the individual had ever faced before. Collectively, the earliest purposeful attempts to make such voyages may one day be seen themselves as a “big event,” a turning point in the study of deep history – one that launched the wider circulation of people and material cultural and that also transformed the biogeography of the Mediterranean islands.

THE WORK TO BE DONE

In closing the proceedings, it is time to take the long view and say a few words about the work that remains to be done. As mentioned before, we are just at the start of the study of voyaging in the time before the Neolithic period. This is the good news. At the same time, while major gains in our knowledge of early island archaeology and pre-Neolithic voyaging have been made on
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several fronts in recent years, we have taken only the first steps. The further out that we look on the distant horizon, the more we become aware of the limitations of what we know today. In other words, we have to be realistic about what we have learned so far and the wide range of things that remain to be done. At this point in time, it is premature to think that we are in a good position to put together a meaningful synthesis in the Eastern Mediterranean. While some scholars may hold that it is possible to do so (Broodbank, 2013), this is just the sort of thing that encourages overconfidence and leads to misunderstanding in terms of where we stand today. Those archaeologists who have conducted excavations at a pre-Neolithic sites such as Aspros, Nissi Beach, Maroulas, Ouriakos or Damone located right on the coastline at the present time – a dynamic and demanding context in which to work (Ammerman, 2013a:15-16) – will be more cautious and view what we now know as just a stepping stone toward what will be known in 2050 or 2100. At best, all that we can do today is to write a short prologue to a long epic poem or to compose the overture to an opera whose story line, whose songs and whose actors still elude us. Indeed, on the basis of the lessons we have recently learned, it is perhaps far too soon to discern what is actually standing out there on the distant horizon. It is useful at this point to consider in more specific terms some of the lines of work that need to done. They will be introduced briefly under six main headings.

(1) On Cyprus, there is the need to do further reconnaissance work on the coast all around the island. There are still coastal formations of aeolianite on Cyprus, which have yet to be examined. Over the course of a decade, there is a good chance that more than 20 new pre-Neolithic sites will come to light, if the fieldwork is conducted properly. In addition, it is reasonable to expect that there will be the discovery of early sites in the vicinity of the aeolianite but not on the formations themselves, if one looks carefully for them. At the same time, the systematic collection of the lithics that occur on the surface of the early sites should be made using the same kinds of methods (Quick Bird imagery and differential GPS) previously employed at Nissi Beach, Aspros and Alimann – the three sites on the island where this has been done so far (Ammerman, 2013b).

Given the impact of tourism on the coasts of Cyprus in our time, there is some urgency in getting the work done before it is too late.

(2) There is also the need for further excavations at Nissi Beach and Aspros. Only a small fraction of the swale area at Nissi Beach has been dug so far. At Aspros, there is a good chance that OSL dates can be obtained from contexts where lithics of Epipalaeolithic age occur in the paleosols that have formed in depressions in the aeolianite bedrock. This will call for specialists who are qualified in this line of work. Over the long run, it will be important to start new excavations at several of the other pre-Neolithic sites on the aeolianite and to obtain radiocarbon dates from them. It is worth recalling that the decision was made to work initially at Nissi Beach and Aspros since both sites are vulnerable to tourist development. There are other pre-Neolithic sites on the island that probably have more to offer than they do.

(3) Next there is the need to continue the underwater work in front of Aspros and Nissi Beach. In fact, we have taken only the very first steps in this line of investigation. Without going into the details here, there will be the challenge of making dives to greater depths in the water – dives that will make it possible to explore submerged sites located closer to the shoreline some 12,000 years ago. Now that these three points are on our list, we have considered only some of the work to be done on the island of Cyprus.

(4) It is time to widen the horizon and turn other islands such as Crete and Lemnos, where more along the same three lines of investigation is called for as well. And, of course, much the same holds for other islands in the Aegean Sea. There is obviously no shortage of work to do. On Crete, now that Mesolithic sites have been found at Plakias on the south coast, it is important to find sites of similar age in other areas so that there will be the opportunity to see how much variability there is between lithic assemblages of Mesolithic age on different parts of the island. There are, by the way, already good signs that Mesolithic sites can be found elsewhere on Crete (Galandiou, 2011:224). At the same time, it is essential for further reconnaissance work to be done with the aim of identifying two or three other areas on the island where artifacts of Lower Palaeolithic age
have a good chance of being found. This will provide independent support for the claims made at Plakias (Runnels and co-authors in this issue). On the other hand, if other places with similar or related lithic materials cannot be discovered on Crete over the next decade or two, it might be better to view the work at Plakias as jumping the gun. In any event, there will be the need for the systematic recovery of all of the artifacts encountered on the surface of a given find spot (and not the partial collection of selected pieces) as well as the excavation of one or two of the sites. In short, further work of this kind should be seen as one of the top priorities of archaeological research on Crete.

(5) In the case of the Aegean Islands, there will be the need for not just a combination of survey work on the various islands, new excavations and the start of work on submerged pre-Neolithic sites but also for studies specifically concerned with the formation of the respective islands. When exactly did a given island separate from the mainland? What was the island’s size and shape at a series of points in time between 14,000 and 6,000 years ago? And how far was it from neighboring islands as time unfolds? This will call for collaboration between the earth scientist and the archaeologist in an effort to bring together, in specific case studies, the bathymetry, the trends in sea-level change and local tectonic activity in a given area of the Aegean Sea (for recent work along such lines in the North Aegean, see the contributions by Efstratiou and by Özbek and Erdogu in this issue).

(6) Finally, more work should be done on the mainland in coastal areas that face an off shore island such as Cyprus in order to learn more about the voyager foragers who were living on the nearby coast. So far, not much work of this kind has been done either on the south coast of Turkey or on the west coast of Syria. In the case of Syria, we know that early sites can be found on the formations of aeolianite there as well. On the basis of the study of satellite imagery, there does not appear to be much evidence for formations of aeolianite on the south coast of Anatolia. There is the need for reconnaissance work on the ground to confirm that this is the case and to explore other geological contexts for the presence of pre-Neolithic sites. Toward this end and also in connection with the five other points indicated above, what is called for is an international program that will draw attention to the significance of the study of early voyaging in the Eastern Mediterranean. In addition, such a program would help to coordinate the different strands of the research and ideal provide some grant support for such investigations.

There is another side to looking out on the distant horizon. It relates to the lives of the voyager foragers themselves: this is just what they did on the shoreline in getting ready to make a voyage. Again, we are only at the stat of studies that try to pay more attention to what it was like to be a voyaging forager in the remote past. In many respects, the life of the voyager took the form of a waiting game (Ammerman, 2011:44): “there was no shortage of time for the early seafarer to develop a nuanced gaze: one that took in the play of the moon, the seasons and the changing winds on the surface of the water.” Given the small boats that were in use at the time and the great risks that were involved if one made a bad decision, it was important to take in what was out on the distant horizon and to decide whether or not the conditions were just right to embark on a voyage. If they were not, one kept waiting until the conditions improved. We can get a sense of a world of this kind from the photograph below of the Siassi and their small boat (Fig. 4). This is the image that I mentioned in the introduction to the proceedings (Ammerman, 2013a: 14). It is worth commenting, by the way, that the boat shown here is not so different from the one reconstructed by the French team (Vigne et al., 2013:fig. 4). Early voyaging – much like what the Siassi were still doing fifty years ago (Harding, 1967) – was an activity that one did on a seasonal basis. For much of the year, the voyager forager had other things to do. The year itself constituted a patient waiting game. In terms of those who were permitted to take part in a crossing between the mainland and Cyprus, a good deal may have depended upon an individual’s age and social standing. In other words, crossing the sea was something undertaken by those who had reached a certain level of maturity and initiation in the society in which they lived. Thus, biding one’s time until one came of age was part of the waiting game as well. Of course, there were probably differences from one society to the next in how this waiting
game was played but it was, no doubt, always there in one form or another.

Much the same held for those leading this way of life when it came to a sense of differentiation in terms of space as well. At the start of a crossing, the voyager-foragers would have set out from a place on the coast where there was a certain cluster or group of people (that is, a place that was occupied on a seasonal basis but not a year-round habitation). Out at sea, the voyager soon moved into a completely different spatial context – with only the boat, the other members of the crew, the waves and possibly other small boats on the horizon. On the way to their destination on the far shore, the voyagers might decide to stop along the way and make a short-term campsite; in the case of Cyprus, the aeolianite was always a good place for this. It took time, experience and
some planning to reach the eventual destination. If the voyages happened to stop at a remote and unfamiliar place with no inhabitants, there would have been that sense that they were living once again, as perhaps some of them had done before, at “the edge” of the world (at least as far as they envisioned it; Ammerman, 2013a:23). The voyaging foragers then continued on their way until they eventually reached their destination – a place where perhaps there was another cluster or group of people and where they exchanged gifts and shared food with those whose customs were similar in some ways and yet different in other respects. In short, there was the chance, on the far shore, for the voyagers as guests and their hosts to interact with one another across social and cultural lines. This was a time to remember. And sooner or later, the voyagers would re-trace their steps and return home. Finally, when they did make it back, they pulled their small boat upon the shoreline and left it there in a liminal space, the seam that runs between the seascape and the landscape (Ammerman, 2011:44). Of course, each voyage was, in one way or another, slightly different from the previous one, and occasionally there were surprises in store for those who went to sea. My purpose in writing these words is simply to highlight one of the other dimensions of human experience – that of space – that we need to consider in trying to understand the lives of early forager voyagers in the Eastern Mediterranean.

In closing this chapter, it is useful to return to the question of why coastal foragers living on the mainland were interested in making voyages to Cyprus. Of the five “true” islands in the Mediterranean Sea, Cyprus is the case study that is furthest along in its development today. Clearly, it too still has a long way to go. My purpose here is not to put forward a final list of the reason why voyaging foragers might have been interested in crossing back and forth between the mainland and Cyprus in the years between 12,000 and 9,000 cal BC. Indeed, the reasons themselves may well have evolved over such a long span of time. Instead, my aim is to move towards drawing up such a list. Hence, what is offered here a provisional list that includes five reasons. Others could be added, but the list is broad enough for our present purposes.

In many respects, Cyprus is an island that was situated in a favorable position in terms of its physical geography (Vigne, 2013) and also the cultural history of the region at the time of interest (Bar-Yosef, 2013). With regard to the former, the island is not only of fair size but the distances from its northern and eastern coasts to the adjacent mainland are comparatively short (at least in comparison with the distances involved in the cases of Crete and Majorca). The Kerynia Range, which runs just in the interior along much of the island’s northern coast, is tall enough to make the island readily visible to those making a crossing from Anatolia. Furthermore, the south coast of Anatolia has its own high elevations, and this holds as well for the interior just behind the west coast of Syria. In short, in making a crossing to Cyprus from the adjacent mainland, the voyagers would have found themselves seldom in a position where they were out of sight of land. Turning to the cultural side of the story, without making a lengthy digression here, interesting things were happening in the Levant in the time leading up to the emergence of agriculture. In short, the first reason for going out to Cyprus is a fairly straightforward one: the island has a long coast and thevoyager foragers would have found there a range of resources for subsistence – shellfish, fish, sea birds, wild plants and so forth – which had been unexploited in the time prior to the advent of voyaging. In other words, this was the “pull” of Cyprus: going out to the island would broaden the subsistence base of the coastal forager.

The second reason has to do with what we call the Younger Dyras: the shift to colder and drier climate conditions that lasted for a span of some 1,200 years (Fig. 1). Much has been said about the Younger Dryas in the previous chapters of proceedings of the Wenner Gren Workshop. The dry conditions together with the die-back of trees along the coast in the Eastern Mediterranean put pressure on the biological productivity of plant communities (leading to lower yields per unit area and greater variability from one year to the next), and this had a negative impact on the resource base of the mainland. The response was to enlarge the territory that one exploited in a bad year, and this led, in turn, to an increase in mobility. In short, this was the “push” to go out to Cyprus. While the island might have been an interesting option to consider in 11,000 cal BC, it now became in the time of the Younger Dryas (ca.
10,800 to 9,600 cal BC) a move that was essential to one’s survival. Indeed, by living close to the sea, a buffered environmental context, a coastal forager was in a better position than a hunter-gatherer in the interior to cope with the colder and drier conditions of the Younger Dryas.

The third reason is the sea salt of high quality that occurs right on the shoreline in the summer months (Ammerman 2013b; Ammerman et al., 2008: fig. 10). In many different places around the island, it is to be found each year in the shallow basins that form in the aeolianite bedrock at the water’s edge. Salt is, of course, an important resource that people have used in many different ways throughout the course of human history. This includes its well-known exchange in the form of bars of salt between subsistence-level communities in New Guinea (Godelier, 1969). On the coasts of Cyprus, salt was an annually renewable resource. It was the gift of the sea to those who went out to Cyprus in the summer months – the best time of year for voyaging.

The fourth reason brings us to biogeography. This is the option of not just being a passive forager – in the sense of going out to Cyprus and gathering, collecting and exploiting what happened to occur naturally on the island – but becoming a pro-active one, who took over a plant or an animal from the mainland that was formerly missing on the island and introduced a new species there (Vigne, 2013; Vigne et al., 2013). Above all, the number of mammal species on Cyprus was quite limited during the Pleistocene. One of the best examples of the introduction of a new species involves the introduction of wild boar, which Vigne places around 14,000 years ago. In the faunal collections at Aetokremnos, he has identified a number of long bones of wild boar, and they have been carbon dated to the first half of the 10th millennium cal BC. Thus, there is reliable evidence on Cyprus for the hunting of wild boar at least by the later years of the Younger Dryas. If the date that Vigne has put forward for the introduction of wild boar is correct, Cyprus would have become by the end of the 11th millennium cal BC what amounts to a remarkable game park – a hunter’s paradise, as it were, where the wild boar had no other predator on the island. In other words, it would have been a truly memorable experience to go out to Cyprus at that time. It will be recalled that wild boar was the main source of meat at the PPNA sites of Klimonas and Asprokremnos. It is perhaps worth adding here that close relationships between pigs and human beings have been observed in a range of different societies around the world (Nelson, 1998). For instance, women often carry newborn piglets around with them in net bags in the Highlands of New Guinea.

At this point, it is worth commenting that the last three reasons mentioned above had yet to make their way into the literature by 2000. To retrace our steps in reverse order, there is no mention of wild boar in the book giving the results of the excavation at Aetokremnos (Simmons, 1999). There the bones of wild boar had yet to be correctly identified. The discovery of sea salt on the shoreline was made at the time of the underwater work done in front of Aspros in July of 2007 (Ammerman et al., 2008: 28). The term Younger Dryas is not used at any point in the text of Faunal extinction in an island society (Simmons, 1999; Ammerman, 2014: 132). The idea that the extinction of the pygmy hippos on Cyprus was caused by the Younger Dryas and not by hunters carried away with hunting them is not taken up in the book. All three of these reasons have come to light in the present century. Here it is perhaps worth adding that since the bones of the pygmy hippos have yet to be reliably dated at Aetokremnos (on this question, e.g., Ammerman, 2013b; Simmons, 2013, Vigne et al., 2013; Manning in this issue) and a number of scholars (including Binford, Grayson, Mithen and more recently Vigne et al., 2013: 160) hold that the hippo bones in stratum 4 represent a natural bone bed and not the remains of hunted pygmy hippos, then we have to be cautious about putting the hunting of pygmy hippos on our list of the reasons why coastal foragers were going out to Cyprus. On the other hand, if we accept the recent proposal (Kaczanowska et al., 2014: 45) that some of the lithics at Aspros may go back to the end of the Upper Palaeolithic (that is, the time between Dryas II and III), then it is entirely possible that hunter-gatherers who visited the island at that early time once saw and hunted pygmy hippos on Cyprus (before they went extinct during the Younger Dryas, which is also known as Dryas III). If this did happen, then the voyagers may...
well have had a novel and memorable experience on Cyprus, which they then related to friends and others on the mainland when they returned home.

The fifth reason for going out to Cyprus is human curiosity itself. There is an island out there on the sea. And under changing weather conditions, it keeps appearing and disappearing on the distant horizon during the course of the day when it is seen from certain places on the south coast of Turkey. For the coastal forager, it would have been of interest to reach such a place and find out what it was like. Curiosity in this generic form has long been there in the case of mountain peaks, deep caves and distant islands. Whether or not those in the remote past ever decided to act upon it is, of course, another question. For the most part, it did not happen. In the case of Cyprus, we know that people were going out to the island – in part because of curiosity – at least by 12,000 years ago and possibly even earlier than that. Once forager voyagers were able to cross over to the island and return to the mainland, the idea that one could actually visit the island would have spread. Like other things, the idea was talked about; it was tossed around, and it was exchanged with friends and strangers. So now curiosity spread socially even to those who might not otherwise have had much in the way of curiosity before. In this context, it might even have been possible for trips out to Cyprus to be incorporated in the initiation rites of a society living on the mainland. It is known in the anthropological literature that rites of initiation are conducted in what a given society takes to be a liminal space (Turner, 1969), and this might well have happened in case of the island of Cyprus.

Another possible reason to consider is that coastal foragers were interested in going out to the island because of the good sources of chert there. In terms of their spatial distribution, they are usually not found on the coast but a few kilometers in the interior, as seen at Amathous for example (Briois et al., 2005). The chipped stone tools recovered at Epipalaeolithic sites on the coast are commonly small in size, and they are produced by means of a pebble-and-flake technology, which seems to be rather expedient in character. But what is involved is, in fact, a much more refined and demanding reduction technology than appears to be the case at first glance. During the Younger Dryas, the forager voyagers on Cyprus made use of local pebbles and cobbles that occur on or near the coast – and not the good sources of chert in the interior. Then, around 8,750 cal BC, almost a thousand years after the end of the Younger Dryas, chert sources in the interior were exploited for the production of chipped stone tools – now in a blade-oriented tradition as seen at the PPNA sites Klimonas and Asprokremnos. Here it is of interest to note that the PPNA was already flourishing in southeastern Turkey by about 10,000 cal BC. However, the PPNA does not make its appearance on Cyprus – on the basis of the evidence that is currently available – until some 1,200 years later (Davis, 2013:fig. 1). When the PPNA does show up on the island, the best evidence for it comes from the area of the Amathous Survey. As mentioned before, a large number of Cypro PPNB sites have been found there but very few of the sites at Amathous go back to the time before 8,500 cal BC. If good sources of chert constitute one of the reasons for going out to Cyprus, we would expect to see more PPNA sites at Amathous as well as ones that are older in date than ca. 8,750 cal BC. However, this is not what is seen in the archaeological record so far. Thus, on the basis of the survey conducted at Amathous, good sources of chert in the interior do not really help to explain why coastal foragers were going over to the island in Epipalaeolithic times. On the other hand the chert sources there do become a factor once we reach the time of the arrival of the PPNA on Cyprus.

The role that exchange systems may have played in the origins of voyaging is another question that deserves our attention. Was exchange or trade one of the reasons why forager voyagers were going out to Cyprus in the 11th millennium cal BC? Or was it instead one of the consequences, in the long term, of what voyaging foragers had set in motion at that time? As a starting point for the discussion of this topic, it will be recalled that Watkins (2008) recently wrote a review article called “Supra-regional networks in the Neolithic of south-west Asia.” Such networks, by the way, are also observed in the Western Mediterranean, although they only make their appearance there at a much later time. The article by Watkins leads us to ask the following questions. Can we trace exchange networks of this kind back to the
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Epipalaeolithic period? Was the impetus to create such long-distance networks or to expand them one of the reasons why forager voyagers first began going out to Cyprus? Or was it the other way round? Did voyaging, which was already in place for other reasons, simply spur on and facilitate the development of networks that had already come into existence? Of course, it is far too soon to come up with final answers to these interesting questions. The study of the pre-Neolithic movement of artifacts and commodities from the mainland to Cyprus – and the possible movement in the opposite direction of items such as sea salt, exotic marine shells and the feathers of rare birds – is still at an early stage of development today. On the basis of what we know about the circulation obsidian, which has not been found at any of the pre-Neolithic sites on Cyprus so far, the exchange of exotic items seems to get off to a rather slow start on the island. Only around 8,750 cal BC do pieces of worked obsidian from Cappadocia begin to make its appearance at Klimonas in the context of the PPNA. And to date only a few obsidian pieces have been recovered at the site. So the evidence for the circulation obsidian is quite limited prior to the PPNB on Cyprus. It is entirely possible that sites on the island were not all that actively involved in supra-regional networks of exchange in the time before the Neolithic. On the other hand, if we view obsidian as a trailing indicator of voyaging, as discussed above, we have to be careful about being too cautious here. It is better to keep an open mind. There is always the chance that surprises are in store for us when it comes to the obsidian story on Cyprus. It may only be a matter of doing more fieldwork at pre-Neolithic sites on the island’s north coast.

In any event, what we do know from the study of obsidian on the mainland is that already by the middle of the 9th millennium cal BC, the workshop called Kalatepe near the obsidian source of Göllü Dag in central Anatolia had an advanced and standardized form of blade production, which implies highly skilled artisans who lived in a socially well-organized community (Balkan-Atli and Dedier, 2012:76-77). Given the site’s elevation at 1,600 m and the cold winds and snow that falls there in the winter months, Kalatepe would not have been an easy place to endure from late autumn through early spring. Accordingly, it is reasonable to think that a task group – that is, certain individuals in a society and not everyone belonging to it – worked at the atelier on a seasonal basis. What we have then is a society that has some degree of internal differentiation. In terms of social organization, we are dealing with a type of society where the terminology of “hybrides et mélanges” recently proposed by Testart (2005:126-127) may help in pointing us in the right direction. In any event, this appears to be much the same sort of social organization that may be emerging among the foragers who were going out to Cyprus in the 11th millennium cal BC. Early voyaging was, no doubt, an activity that was undertaken on a season basis as well. Those taking part in a given voyage comprised a small task group whose members had a certain level of skills, experience and competence in doing something rather different – and more demanding – than the normal round of life. In other words, what is involved is a society that has its own internal form of differentiation. And the theme of differentiation is one that we have discussed above in the context of time and space in the lives of the early voyagers. In short, differentiation appears to be a theme that goes hand-in-hand with the emergence of early voyaging in the 11th millennium cal BC. This is merely a suggestion to consider in the years to come, when knowledge of pre-Neolithic sites on the islands of the Eastern Mediterranean will put scholars in a better position to explore this and other questions of interest that we have yet to identify or recognize on the distant horizon.

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