Review of Aegean Prehistory IV: The Stone Age of Greece from the Palaeolithic to the Advent of the Neolithic

CURTIS RUNNELS

INTRODUCTION*

The Stone Age of Greece was overlooked in the heroic age of prehistoric archaeology when the Palaeolithic of Europe was brought to light with its rich record of human fossils, stone tools, and painted caves. Serious research on the early prehistory of Greece began only in the 1960s, and even so it has been pursued in fits and starts, perennially short of money and people, and with a surprising lack of interest and support from institutions.

The reasons for this neglect are difficult to evaluate properly because of the lack of historical study of the problem, but some possible factors can be suggested. One must be the long and successful career of classical archaeology that focused the attention of archaeologists firmly on the great monuments of the historical past. When this fact is put beside the tendency for prehistoric archaeology and classical archaeology to be taught in entirely different academic departments in Europe and North America, it is likely that students with different interests were urged by helpful advisors to seek "appropriate" areas for fieldwork. As their advisors were no doubt under the impression that Greece "was for the Classicists," students who wished to study the Palaeolithic were encouraged to seek fieldwork opportunities in Europe, the Near East, or Africa.[1]

Those who consider prehistoric research in Greece face a daunting problem. Because of its position at the boundary between the African and European plates, Greece is active geologically with much uplift, folding, and tectonism, and older deposits have been destroyed or masked through erosion and deposition. Recent studies have shown that the effects of humans on the landscape in the last 8,000 years have been greater than previously thought, and erosion triggered by extensive clearance of vegetation from hillslopes for agricultural purposes has contributed significantly to the destruction or burial of early archaeological sites. The transgression of the Mediterranean in the Holocene has further complicated the picture by submerging large areas of coastal shelf. Offshore sites are submerged beneath 40–120 m of water and may lie under thick mantles of sediments eroded from the mainland interior.[2] As a consequence of these geologic and anthropogenic changes, early sites are preserved only in places where they have escaped the ravages of a landscape constantly on the move. It is understandable that prehistorians often prefer to carry out their research in areas with a better record of preservation.

There are theoretical reasons for investigating prehistory in regions outside of Greece. The origins of humans and the early stages of human evolution are

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[1] For the different approaches to archaeology, see C. Renfrew, "The Great Tradition versus the Great Divide," *AJA* 84 (1980) 287–98; and A.M. Snodgrass, *An Archaeology of Greece: The Present State and Future Scope of a Discipline* (Berkeley 1987) 1–18.

[2] The effects of erosion on the burial of sites are discussed in M.H. Jameson, C.N. Runnels, and T.H. van Andel, *A Greek Countryside: The Southern Argolid from Prehistory to the Present Day* (Stanford 1994) 228–46. See also E. Zangger, *The Geoarchaeology of the Argolid* (Berlin 1993). Changes in sea level are illustrated in T.H. van Andel and J.C. Shackleton, "Late Paleolithic and Mesolithic Coastlines of Greece and the Aegean," *JFA* 9 (1982) 445–54.

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being traced in Africa, which is widely regarded as the homeland of the human race. The later developments that brought humans from Africa into Eurasia have been of comparatively lesser interest, although there has been much new enthusiasm for the subject in recent years. Research on the later periods of prehistory has also been directed to areas outside of Greece. The origins of the Neolithic have been sought in southwest Asia since the time of Raphael Pumpelly and Vavilov, and Greece is usually regarded as on the margins of the region of primary cultural development.[3]

Despite the combined effects of these factors, a complete reversal of our view of Stone Age Greece has occurred in the last decade, and Greece has moved from its position on the margins of European prehistory to a position near the center. This change is the result chiefly of the growing theoretical interest in the emergence of modern humans between 100,000 and 40,000 B.P., and the continuing interest in the origins of agriculture and its spread to Europe in the early Holocene. For the former problem, new fossils and dating techniques have shown that the area encompassing the Balkans, Turkey, and southwest Asia was the center of activity in a key period of human evolution. The importance is based on geography, for these lands lay athwart the passage from Africa into Europe and Asia that was traversed, perhaps repeatedly, by hominids migrating from the heartland of humanity. The second area of interest is of longer standing, but new evidence, chiefly from regional surface surveys, indicates that Greece was the center of the earliest Neolithic cultures on European soil. The new importance of Palaeolithic archaeology can perhaps be gauged by the support for the first conference on the Palaeolithic of Greece and adjacent areas that was convened in Epirus in September 1994. This conference brought together scientists from many countries who are working in Greece and the Balkans, and the generous support for the conference provided by the Greek Ministry of Culture and the large number of participants are indications of the emergence of a new and vigorous discipline.

HISTORY OF RESEARCH

Early Studies

The first indication that a Stone Age sequence existed in Greece comparable with that known from Europe came with the publication of a short paper by George Finlay in 1869.[4] In this little-known pamphlet Finlay drew attention to the similarities between artifacts collected in Greece, chiefly stone axes and obsidian tools, and those found in the newly explored Swiss Neolithic lake villages. He concluded that early prehistoric remains existed in Greece, but sporadic reports of Stone Age finds in the following decades were not followed up with systematic research.[5] The lack of research is understandable when we recall that most of the early finds were made by travelers and classical scholars who had no interest in pursuing the subject once they had made their reports. It was not until the beginning of this century that the pioneering excavations of Christos Tsountas demonstrated for the first time that there was a rich field for prehistoric research in Greece. Tsountas explored the Thessalian plain between Volos and Larisa mapping such prehistoric mounds that could be reached by train. For the purposes of excavation, he focused his efforts beginning in 1901 on two sites, Sesklo and Dimini, which were easily reached from the city of Volos.[6] These sites were perhaps not the best choices for establishing a cultural sequence as they were disturbed by much post-Neolithic cultural activity, making the stratification difficult to decipher. Tsountas was nevertheless able to separate the materials from his excavations into two periods (Neolithic A and B) of considerable length and antiquity, which he thought were more or less comparable with the better-known Neolithic sequences of Europe. Although Tsountas did not have a means of dating his finds, his excavations established the existence of a prehistoric culture on Greek soil evidently much older than the Bronze Age civilization discovered by Schliemann, and inaugurated a period of systematic archaeological research.

Despite the success of Tsountas in Thessaly, the discovery of earlier Stone Age cultures came only after further decades of neglect and disinterest. The first systematic excavations of pre-Neolithic sites in Greece were conducted at the Zaïmis and Ulbrich caves in the Megarid and Argolid, respectively, by the geologist and speleologist Adalbert Markovits beginning in the late 1920s. The results of these excavations were either ignored or deprecated by the few scholars who came to know of them, but there is no question that Markovits was the first to identify the Palaeolithic and Mesolithic in Greece. The important start made by Markovits was not followed up, and the very existence of this work was long forgotten: today the finds and even the caves themselves have been lost.[7] His position as a pioneer in Greek prehistory, however, is well established.

After Markovits, serious fieldwork was held up by the tragic disruptions created by economic depression, invasion, and war. The only notable exception was the excavation of Palaeolithic layers in the Seidi Cave in Boeotia in 1941 by R. Stampfuss. At the end of the war the finds, which had been removed from Greece, were misplaced, and the publication of the excavations in a not very fashionable journal was ignored for a long time.[8] The excavations of Markovits and Stampfuss were indications to the few who studied their publications that early prehistoric cultures existed in Greece.

Neolithic research in these same decades fared much better, with important excavations carried out by scholars from many countries. One reason for the greater interest in the Neolithic, apart from the fact that Tsountas was well known to the international intellectual community and had published his findings in a widely available monograph, was the theoretical interest focused on the Greek Neolithic in the 1920s by V. Gordon Childe. He saw the Neolithic of the Balkan peninsula as the result of the diffusion of the Neolithic way of life from its point of origin in the Near East, and he drew attention to the similarity of the Neolithic remains in Greece to finds being made in the Near East. Childe stimulated further interest in the subject by placing the Greek Neolithic in a wider Near Eastern context.[9] As new information was made available by topographic surveys and excavations, Thessaly was recognized as a center of a highly developed Neolithic civilization, perhaps the oldest manifestation of the village farming way of life in Europe. From the 1920s to the 1960s, Neolithic sites were discovered in the Cycladic islands, Crete, the Peloponnese, and the Ionian islands, and the new technique of radiocarbon dating showed these sites to be roughly contemporary with Neolithic sites elsewhere in the Balkans, but somewhat younger than the earliest sites in the Near East.[10] This steady growth of the field, despite the interruptions of economy and war, is in sharp contrast with the failure of prehistorians to follow the lead of Markovits and Stampfuss. Discerning minds realized, however, that there was potential for further research.

Recent Research

Investigation of the Palaeolithic and Mesolithic since the Second World War can be divided into two phases, the first representing the work of a few pioneers who carried out the initial scientific study of the subject beginning in 1958, and the second phase encompassing the work of projects since 1979 and continuing to the present day.

Sustained systematic research on the Palaeolithic and Mesolithic of Greece began in 1958–1959, coincidently the centennial of the publication of Darwin's *On the Origin of Species*. Palaeolithic discoveries were made in several parts of Greece, more or less by accident. In 1958, Michael Jameson discovered a Middle Palaeolithic stone tool on the slopes of Mt. Profitis Elias near Didyma in the southern Argolid, and this chance find was followed by exploration and excavation supported by the American School of a number of nearby caves, unfortunately without significant positive result.[11] In the same

[3] There is a large literature on these subjects. For summaries of the current views on early human migrations, see P.A. Mellars, M.J. Aitken, and C.B. Stringer, "Outlining the Problem," *Philosophical Transactions of the Royal Society of London* 337 (1992) 127–30; W. Roebroeks and T. van Kolfschoten, "The Earliest Occupation of Europe: A Short Chronology," *Antiquity* 68 (1994) 489–503; and W. Roebroeks, "Updating the Earliest Occupation of Europe," *CurrAnthr* 35 (1994) 301–305. For Neolithic Greece, see J.-P. Demoule and C. Perlès, "The Greek Neolithic: A New Review," *Journal of World Prehistory* 7 (1993) 355–416; and J.M. Hansen, "Agriculture in the Prehistoric Aegean: Data versus Speculation," *AJA* 92 (1988) 39–52.

[4] G. Finlay, *Παρατηρήσεις ἐπὶ τῆς ἐν Ἑλβετίᾳ καὶ Ἑλλάδι προϊστορικῆς ἀρχαιολογίας* (Athens 1869).

[5] An example of what was perhaps a handaxe was shown to Lenormant by an Argos physician, who claimed it was found associated with extinct animal bones at Megalopolis in Arcadia: F. Lenormant, "L'âge de la pierre en Grèce," *RA* 1867, 16–19.

[6] C. Tsountas, *Αἱ προϊστορικαὶ ἀκροπόλεις Διμηνίου καὶ Σέσκλου* (Athens 1908). For a historical overview of this period of research, see K. Gallis, "A Short Chronicle of Greek Archaeological Investigations in Thessaly from 1881 until the Present Day," in B. Helly ed., *La Thessalie: Actes de la table-ronde 21–24 juillet 1975* (Lyons 1979) 1–30.

[7] The most useful discussion of Markovits's excavations is found in C. Perlès, *Les industries lithiques taillées de Franchthi (Argolide, Grèce) 2: Les industries du mésolithique et du néolithique initial (Franchthi 5*, Bloomington 1990) 120–22; see also S.S. Weinberg, "The Stone Age in the Aegean," *CAH* I, 1 (Cambridge 1970) 557–672.

[8] See summary in Weinberg (supra n. 7); and R. Stampfuss, "Die ersten altsteinzeitlichen Höhlenfunde in Griechenland," *Mannus* 34 (1942) 132–47; E. Schmid, "Die Seïdi-Höhle: eine jungpaläolithische Station in Griechenland," *IVème Colloque international de spéléologie, Athènes 1963* (Athens 1965) 163–74.

[9] For discussion of Neolithic Greece in a broad setting, see Demoule and Perlès (supra n. 3) and D. Theocharis, *Neolithic Greece* (Athens 1973) 17–57.

[10] Demoule and Perlès (supra n. 3). See also T.H. van Andel and C. Runnels, "The Earliest Farmers in Europe," *Antiquity* 69 (1995) 481–500.

[11] P. Bialor and M.H. Jameson, "Palaeolithic in the Argolid," *AJA* 66 (1962) 181–82; Jameson et al. (supra n. 2) 326–35.

year a German team directed by Vladimir Milojčić discovered two flint flakes of characteristic Palaeolithic type while excavating a deep well at the Classical and Neolithic site of Argissa on the Peneios River in Thessaly. This accidental discovery was followed by a campaign of research involving many specialists directed toward the recovery of fossil animal bones and lithic artifacts from the banks of the river. A large number of Palaeolithic artifacts were discovered associated with fossil animal bones, and the results of this research were published in 1965.[12] In 1960 men from the village of Petralona in the Chalkidiki discovered a complete fossilized cranium in a deep cavern. Initially identified as a classic Neanderthal, the fossil created great excitement and proved in a dramatic way the existence of prehistoric humans in Greece. Lastly, Jean Servais discovered Palaeolithic artifacts in Elis in 1960 and this discovery was followed by a systematic campaign of research and publication supported by the French School.[13] Chance finds of stone tools, some of which may be Palaeolithic, were made in the Ionian islands and the Sporades in the years that followed.[14]

This evidence of undoubted Palaeolithic artifacts provided by these first discoveries attracted the attention for the first time of prehistorians who specialized in the study of the Palaeolithic. Two men have the distinction of being the first Palaeolithic archaeologists to work in Greece on a significant scale. The better known of these was Eric Higgs of the University of Cambridge who undertook an ambitious survey of Thrace, Macedonia, and Epirus in 1962 with the specific purpose of discovery of Palaeolithic materials. The effects of this project are hard to calculate, but it certainly drew international attention for the first time to the Palaeolithic potential of Greece. His discovery of numerous sites in Epirus, some of which were extraordinarily rich in Palaeolithic artifacts, encouraged Higgs to concentrate his efforts there. Between 1963 and 1967 he excavated one open site at Kokkinopilos and rock shelters at Asprochaliko and Kastritsa, publishing the results of the survey and excavations in a series of detailed and influential papers in the *Proceedings of the Prehistoric Society*.[15] Only shortly after the first efforts of Higgs, Augustus Sordinas began exploration of the Ionian islands for his Harvard dissertation. The research was carried out chiefly between 1964 and 1968. Although his dissertation work focused on the evidence for the Neolithic and the Bronze Age, he also began an intensive survey of Corfu for Palaeolithic and Mesolithic sites. His survey was followed by trial excavations at two sites, the Upper Palaeolithic rock shelter at Grava in southwestern Corfu and the Mesolithic and Neolithic open site of Sidari on the north coast.[16]

The projects described above were exploratory, recalling to mind more the efforts of the early antiquarian topographers in Greece, pioneers who sketched the broad outlines of the picture, rather than the contemporary classical archaeologists who were conducting research and excavation on a large scale, reflecting the interests of a mature discipline with a long history of research. The early projects succeeded in identifying the most likely areas where sites of the Palaeolithic and Mesolithic periods were preserved, and used trial excavations to test the stratigraphy and to obtain samples for classification and dating.

The next logical step was the careful excavation of key sites other than Kastritsa and Asprochaliko in order to obtain a stratigraphic profile and large samples of artifacts and biological materials to permit typological analyses to place the archaeological cultures in established European and Near Eastern sequences and to reconstruct the palaeoenvironments of the Greek cultures. Unfortunately, few excavations were undertaken, and these were mostly of an exploratory nature. In Thessaly, new research was carried out by Demetrios Theocharis who continued to add to the existing collections, but did not conduct any excavations. Freund and Schmid restudied the materials from Stampfuss's excavations at Seidi and the Thessalian finds of Milojčić, and Schmid carried out supplementary excavations in Seidi to confirm the stratigraphy of the site.[17] In the Peloponnese the Kephalari Cave near Argos was the object of rescue excavations by the German Archaeological Institute in the 1970s.[18] In Elis, the French conducted no follow-up excavations. The Greek Archaeological Service carried out small-scale excavations near the town of Nafplion, but the results of these excavations are not published.[19] The only sustained and systematic excavation project directed toward the study of the Palaeolithic and Mesolithic periods took place in the southern Argolid at Franchthi Cave. Excavations were begun there under the direction of Thomas Jacobsen of Indiana University in 1967 and were continued until 1979 with the support of the University of Pennsylvania, Indiana University, and the American School of Classical Studies at Athens.[20]

Despite the spotty record of excavation, the early Stone Age of Greece moved in the short interval from 1958 to 1976 from the status of *terra incognita* into the mainstream of European prehistoric archaeology. Franchthi Cave, for instance, was recognized as one of the key type sites for European prehistory because the stratigraphic succession could be traced from the beginning of the Upper Palaeolithic to the end of the Neolithic, a period of as much as 25,000 years. The success of the excavations at Franchthi also drew scholarly attention to the strategic location of Greece athwart the prehistoric land and sea routes from the Near East to Europe. The study of Stone Age Greece was no longer regarded as something of an oddity or a sideshow to the important research taking place in Europe and the Near East, but was seen as well placed for playing an important part in the study of European prehistory. The pace of prehistoric research in Greece, however, was not sustained. By the mid-1970s research in the two richest areas, Epirus and Thessaly, was at an end, and the pioneers in the field, namely Higgs, Milojčić, and Theocharis, were dead. In the southern Argolid, the excavations at Franchthi were over by 1979, and the many specialists involved in this large interdisciplinary project turned to the study of the excavated materials. Thus ends the first phase of modern Stone Age research in Greece.

The second phase begins in 1979 with the Stanford University Environmental and Archaeological Survey of the Southern Argolid under the direction of Michael Jameson and Tjeerd van Andel.[21] This project had as one of its major goals the continuation of the Palaeolithic research begun by Jameson and Jacobsen, and in the first season an archaeological and geological survey of the region was carried out around Franchthi Cave that recovered data for the reconstruction of the palaeoenvironment in the Pleistocene and early Holocene. In this same period, a University of Cambridge team returned to Epirus under the direction of Geoffrey Bailey to pick up the threads of Higgs's research program and to undertake an entirely new excavation in the small rock shelter of Klithi near the town of Konitsa.[22] For some years these two projects constituted virtually the only Palaeolithic research being conducted in Greece, but the pace has accelerated noticeably since the mid-1980s, with surface reconnaissance in Thessaly, the Argolid, and Epirus directed specifically toward the identification of Palaeolithic and Meso-

[12] V. Milojčić, J. Boessneck, O. Jung, and H. Schneider, *Paläolithikum um Larissa in Thessalien* (Bonn 1965).

[13] The Petralona find was first described by P. Kokkoros and A. Kanellis, "Découverte d'un crâne d'homme paléolithique dans la péninsule chalcidique," *L'Anthropologie* 64 (1960) 438–46. The French discoveries in Elis were published in a series of papers: J. Servais, "Outils paléolithiques d'Élide," *BCH* 85 (1961) 1–9; A. Leroi-Gourhan, "Découvertes paléolithiques en Élide," *BCH* 88 (1964) 1–8; J. Chavaillon, N. Chavaillon, and F. Hours, "Une industrie paléolithique du Péloponnèse: Le Moustérien de Vasilaki," *BCH* 88 (1964) 616–22; Chavaillon et al., "Industries paléolithiques de l'Élide I: Région d'Amalias," *BCH* 91 (1967) 151–201; and Chavaillon et al., "Industries paléolithiques de l'Élide II: Région du Kastron," *BCH* 93 (1969) 97–151. For summaries of the French work, see C. Perlès, *Les industries lithiques taillées de Franchthi (Argolide, Grèce)* 1: *Présentation générale et industries paléolithiques* (*Franchthi* 3, Bloomington 1987) 205; and C. Runnels, "A Prehistoric Survey of Thessaly: New Light on the Greek Paleolithic," *JFA* 15 (1988) 277–90.

[14] For typical examples: G.A. Cubuk, "Altpaläolithische Funde von der Mittelmeerterrassen bei Nea Skala auf Kephallinia (Griechenland)," *ArchKorrBl* 6 (1976) 175–81; A.N. Poulianos, "Petralona: A Middle Pleistocene Cave in Greece," *Archaeology* 24 (1971) 6–11; Theocharis (supra n. 9) gives other examples.

[15] S. Dakaris, E.S. Higgs, and R.W. Hay, "The Climate, Environment and Industries of Stone Age Greece: Part I," *PPS* 30 (1964) 199–244; E.S. Higgs and C. Vita-Finzi, "The Climate, Environment and Industries of Stone Age Greece: Part II," *PPS* 32 (1966) 1–29; and E.S. Higgs et al., "The Climate, Environment and Industries of Stone Age Greece: Part III," *PPS* 33 (1967) 1–29. See also G.N. Bailey et al., "Asprochaliko and Kastritsa: Further Investigations of Palaeolithic Settlement and Economy in Epirus (Northwest Greece)," *PPS* 49 (1983) 15–42.

[16] A. Sordinas, *The Prehistory of the Ionian Islands. The Flints and Pottery* (Diss. Harvard Univ. 1968); "Investigations of the Prehistory of Corfu during 1964–1966," *BalkSt* 10 (1969) 393–424; *Stone Implements from Northwestern Corfu, Greece* (Memphis 1970).

[17] D. Theocharis, *Ἡ αὐγή τῆς Θεσσαλικῆς προϊστορίας* (Volos 1967); Theocharis (supra n. 9); Schmid (supra n. 8); G. Freund, "Zum Paläolithikum Thessaliens," *PZ* 46 (1971) 181–94.

[18] L. Reisch, *Pleistozän und Urgeschichte der Peloponnes* (Diss. Friedrich-Alexander Univ. 1980); Reisch, "The Transition to Middle Palaeolithic in Greece and the Southern Balkan," in A. Ronen ed., *The Transition from Lower to Middle Palaeolithic and the Origins of Modern Man* (Oxford 1982) 223–31.

[19] Perlès (supra n. 13) 204; G. Kourtessi-Philippakis, *Le paléolithique de la Grèce continentale* (Paris 1986) 138–39.

[20] Since 1987 nine fascicles have been published in the series *Excavations at Franchthi Cave, Greece* (Bloomington) under the general editorship of Thomas W. Jacobsen.

[21] Jameson et al. (supra n. 2) 326–35.

[22] See G. Bailey, "The Palaeolithic of Klithi in Its Wider Context," *BSA* 87 (1992) 1–28, for a summary of the project and a list of references to earlier publications.

lithic sites, and surveys and excavations in the island of Kefallinia, in the Boila Cave (Epirus), and Theopetra Cave (Thessaly) among other places.[23]

At the time of writing there are active Palaeolithic research projects being conducted by a large number of scholars with an international background in nearly every part of Greece. The intensity of recent research can be gauged by an examination of the collective results of the first phase of research that were summarized in 1970 by Saul Weinberg in the *Cambridge Ancient History*.[24] In that landmark publication, Weinberg's section on the Palaeolithic and Mesolithic took up a mere seven pages of the printed text, reporting on the work of half a dozen scholars and excavations. Some may recall that when Weinberg wrote his paper the number of archaeologists doing Palaeolithic fieldwork in Greece could be counted, literally, on one hand. The improvement can be measured by the scale and composition of the First International Conference on the Palaeolithic of Greece and Adjacent Areas held in Ioannina, just 30 years after Weinberg's article. This conference was convened in Epirus in the heart of the region first explored by the late Eric Higgs, with the generous support of the Greek Ministry of Culture. There were nearly 100 participants at the conference from at least 10 nations, with reports on most parts of Greece, from Thrace to the southern reaches of the Peloponnese, and from Thessaly to the western Ionian islands.[25] The topics of these papers and the discussions that followed them revealed not only the new interest in and enthusiasm for Stone Age research in Greece, but also a useful convergence of thinking about the principal problems to be addressed by future research in this area. I can confidently predict that the pace of research will increase exponentially in the coming decade.

SIGNIFICANT ISSUES IN EARLY PREHISTORY

In the early days of European prehistoric archaeology, an understandable emphasis was placed on the study of stone tool typology, stratification, and regional chronology. The first step in archaeology is to build reliable regional cultural histories that permit the placement of new finds within relative chronological sequences, allowing comparisons of finds within smaller areas and between larger regions. Once cultural histories are available attention can be turned to questions about human behavior. How do humans go about colonizing previously uninhabited areas? How have humans adapted to the changing climatic demands of the glacial and interglacial periods? How can the study of stone tools and biological remains from archaeological sites be used to understand the dynamics of human evolution? The transition from cultural history to the analysis of problems that are sometimes termed "behavioral" or "social" is the mark of a mature science, and the move to a problem-oriented European prehistory began more than 50 years ago.[26] It is evident that Greek prehistory is moving rapidly in this direction, and several key issues have emerged in recent years that are likely to be the primary focus of future research.

A central question in Greek Palaeolithic studies is the timing of the first entry of human beings into the peninsula. The history of the movement of humans from the African homeland through the Near East into Europe and Asia is obscure. One long-standing hypothesis attributes the first dispersion to *Homo erectus*.[27] According to this hypothesis the distribution of Acheulean lithic industries rich in handaxes in Europe marks the settlement of the continent by *Homo erectus*. It is true that the earliest fossils outside of Africa are indeed *Homo erectus*, but such fossils are absent from Europe, and even the dating of the Acheulean in Europe is fraught with controversy.[28] Interest has shifted in recent years to the hypothesis that Europe was settled after 500,000 B.P. by archaic *Homo sapiens*, the ancestors of both the classic Neanderthals and anatomically modern *Homo sapiens*. The picture is complicated by the existence of two early Palaeolithic technocomplexes in Europe, the Acheulean and the chopper/flake tool industry called Clactonian, which some scholars consider to be an indication of the long-term presence of humans on the continent, or perhaps the existence of more than one hominid group. It must be acknowledged that our understanding of the events after one million years ago, when hominids established themselves outside of Africa, is very uncertain. It is for this reason that it is a matter of importance to know when Greece was first inhabited. It is likely that this peninsula would have been inhabited by the first hominids to pass from the Near East into Europe, and some early sites must survive that throw light on this period.

Another problem is connected with the origins of modern humans. Here two hypotheses are competing for attention.[29] In one view, Eurasia (including Greece) was initially populated by a migration of *Homo erectus* from the African homeland that occurred between one and two million years ago. According to this hypothesis, often called the "Multiregional" theory, anatomically modern *Homo sapiens* evolved from this widely spread *Homo erectus* population, perhaps passing through the stage of archaic *Homo sapiens* (represented in Greece by the Petralona cranium). This multiregional theory predicts the evolution of local populations into *Homo sapiens* in widely separated geographical locations, although allowing for the possibility of gene flow. In another view, usually called the "Replacement" theory, anatomically modern humans evolved from *Homo erectus* in only one restricted geographical area, which is located in Africa on the basis of anatomically modern human fossils that date to as much as 120,000 B.P., and migrated from Africa about 100,000 B.P. to replace archaic humans throughout their range in Europe, the Near East, and Asia. This theory has gained support in recent years as new dates from Israel show modern humans there already by 100,000 B.P., and genetic studies place the emergence of modern *Homo sapiens* in Africa.[30]

It is not necessary to go into a detailed discussion of the evidence for and against these different hypotheses. The important point is that the debate on the origins of modern humans has brought renewed attention to Greece, which is the logical point of first entry for human migrants to Europe. The emergence of modern humans is closely bound up with the well-documented archaeological transition from the Middle to the Upper Palaeolithic. This transition is marked by the disappearance of the Mousterian, a lithic technocomplex rich in side scrapers and points made on short broad flint flakes, and its replacement by the Upper Palaeolithic technocomplexes dominated by tools made on long thin blades, typically points with retouched "backs" and end scrapers. This transition was for a long time dated to approximately 35,000 B.P. and considered to represent a clear-cut boundary between the passing of the Neanderthals as the makers of the Mousterian, and the coming of modern humans with their new blade-tool technology. It is now evident that the transition occurred before 40,000 B.P. in the Near East and slightly later as one moves westward into the Balkans and Europe.[31] The associations of fossil human groups with the different industries have also been challenged. The discovery of modern humans in Israel in association with the Mousterian as early as 100,000 B.P., and Neanderthals in France in association with an Upper Palaeolithic industry as late as 32,000 B.P., is an unexpected reversal of the usual assumptions, and, if sustained by future research, indicates that the picture is very complicated.[32] Industries in the Balkans and Greece appear to have characteristics of both the Mousterian and an Upper Palaeolithic industry (the Aurignacian), and some have proposed that these industries are evidence of "acculturation" that occurred as the result of contact between classic Neanderthalers and the advancing wave of modern humans.[33] A detailed study of the transition from the Middle to the Upper Palaeolithic in Greece is likely to have useful implications for the broader study of modern human origins.

A full study of the Palaeolithic in Greece requires more than stone tools. To add the dimension of human behavior, more attention must be given to the search for human fossils. Fossil-bearing deposits of

[23] A large number of reports on recent Palaeolithic surveys and excavations are being published in G. Bailey et al. eds., *Proceedings of the First International Conference on the Palaeolithic of Greece and Adjacent Areas* (British School of Archaeology at Athens, in press). For a summary account of this conference, see G. Bailey, "The Balkans in Prehistory: The Palaeolithic Archaeology of Greece and Adjacent Areas," *Antiquity* 69 (1995) 19–24. For Kefallinia, see G. Kavvadias, *Παλαιολιθική Κεφαλωνιά* (Athens 1984). Lithic artifacts that may be Palaeolithic or Mesolithic have been noted and collected in the course of numerous regional surveys directed toward the recovery of information about all periods. Particularly worth noting are the patinated stone tools of generally Middle Palaeolithic type discovered in the Nemea Valley Archaeological Project and the Pylos Regional Archaeological Project, but not yet published (J.L. Davis, personal communication, 1995). These finds are an indication that the discovery of Palaeolithic and Mesolithic sites is likely to become a regular feature of regional surveys.

[24] Weinberg (supra n. 7).

[25] Bailey et al. (supra n. 23). The summary of the Palaeolithic offered in 1986 by Kourtessi-Philippakis (supra n. 19), although longer than Weinberg's summary of 1970 (supra n. 7), included few sites or publications not known to Weinberg.

[26] C. Gamble, *The Palaeolithic Settlement of Europe* (Cambridge 1986) is an example of this new direction in Palaeolithic studies.

[27] Gamble (supra n. 26) 177–79; Roebroeks and van Kolfschoten (supra n. 3).

[28] See Roebroeks, and Roebroeks and van Kolfschoten (supra n. 3).

[29] Mellars et al. (supra n. 3) offer a summary of the problem. See also P. Mellars, "Archaeology and the Population-dispersal Hypothesis of Modern Human Origins in Europe," *Philosophical Transactions of the Royal Society of London* 337 (1992) 225–34.

[30] N. Mercier and H. Valladas, "Thermoluminescence Dates for the Palaeolithic Levant," and H.P. Schwarcz, "Chronology of Modern Humans in the Levant," in O. Bar-Yosef and R.S. Kra eds., *Late Quaternary Chronology and Paleoclimates of the Eastern Mediterranean* (Tucson 1994) 13–20 and 21–31, respectively.

[31] For the dating of the Middle/Upper Palaeolithic transition, see C. Stringer and C. Gamble, *In Search of the Neanderthals* (London 1993) 39–60; and Schwarcz (supra n. 30).

[32] Stringer and Gamble (supra n. 31) 123–42; Mercier and Valladas (supra n. 30).

[33] On acculturation, see P. Allsworth-Jones, *The Szeletian and the Transition from Middle to Upper Palaeolithic in Central Europe* (Oxford 1986); F.B. Harrold, "Mousterian, Chatelperronian and Early Aurignacian in Western Europe: Continuity or Discontinuity?" in R.L. Ciochon and J.G. Fleagle eds., *The Human Evolution Source Book* (Englewood Cliffs, N.J. 1993) 585–603; Runnels (supra n. 13).

the Pleistocene are very rare in Greece, and human fossils are likely to be discovered only after extensive searching. The well-preserved Petralona cranium in the Chalkidiki suggests that the search will be successful in the long run, although the skull remains an isolated and enigmatic find. It was found cemented in a stalagmite unassociated with other fossils or artifacts. The cranium is no longer considered a classic Neanderthal, as it was called in early publications, but its exact classification and age remain a subject of considerable controversy. Current opinion holds that it should be classified as an archaic form of *Homo sapiens*, perhaps ancestral to classic Neanderthals and anatomically modern humans, and the designation of *Homo heidelbergensis* is one suggested name for the species.[34] The most reliable estimate of its age is based on the radiometric dating of the stalagmitic stone layer that covered the fossil, which dates to ca. 160–240,000 B.P. The skull must be older, and most authorities assign it an age between 200 and 400,000 B.P.[35] No Neanderthals have been discovered in Greece, and the excavations of Upper Palaeolithic sites such as Franchthi have turned up only very fragmentary human remains, mainly teeth and bone fragments. A heavily mineralized occipital from a human skull, now in the archaeological museum of Volos, was found on the banks of the Peneios River in the 1970s. It may date between 50 and 30,000 B.P., but it has not been studied and published.[36] The fact remains that we have very little fossil evidence for the Palaeolithic period.

Other interesting questions are connected with the Upper Palaeolithic. After 30 years of research it is clear that some puzzling gaps remain in the archaeological record, even if we allow for the small number of systematic excavations, and the absence of early Upper Palaeolithic remains is striking. The sequences tested in cave excavations are all younger than 28,000 B.P., yet the earliest Upper Palaeolithic (Aurignacian) was established in the Balkans by 38,000 B.P.[37] There is evidently a hiatus of as much as 10,000 years between the beginning of the Upper Palaeolithic in the Balkans and the Upper Palaeolithic in some parts of Greece. A related problem is the apparent discontinuity in the distribution of Upper Palaeolithic sites in Greece during the last glacial. Cave sites are known in Epirus, Boeotia, and the Argolid, but are curiously rare in the western Peloponnese, Thessaly, Macedonia, and Thrace. This patchiness of settlement is typical of Palaeolithic Europe as a whole, and is not adequately explained.[38] The rarity of Upper Palaeolithic open-air sites, as opposed to caves and rock shelters, is puzzling, especially as the number of intensive surface surveys has increased in the past decade. We may add to this list of questions the apparent abandonment of almost all the known Upper Palaeolithic sites before the end of the Pleistocene, producing a significant hiatus in occupation between about 13,000 and 10,000 B.P.

Yet another major area of research concerns the origins and significance of the Mesolithic period in Greece. The rarity of Mesolithic sites is remarkable: at present there are 12 sites considered to be Mesolithic in the entire country. At Franchthi Cave, the only site where the transition from the Palaeolithic to the Mesolithic has been tested by excavation, it is probable that there was an interruption in the cave sequence between the two periods.[39] The significance of the Mesolithic and its connection, if any, with the Palaeolithic are very difficult to evaluate when great tracts in the country appear to have been uninhabited during this period. The paucity of the Mesolithic record has a bearing on another important problem in early Greek prehistory, namely the origins of agriculture. The Neolithic emerged first in the Near East, in its broadest geographical sense, and was established only later in Europe according to our present understanding, and the details of this important revolution in economic and social organization are today a focus of debate.[40] One hypothesis regards the spread of the Neolithic as the result of demic diffusion from the Near East outward to Europe, Central Asia, and North Africa, while another holds that the Neolithic emerged as the result of local processes whereby indigenous Mesolithic communities more or less independently changed their economies from foraging to farming.[41] A growing number of archaeologists see the spread of the Neolithic as a complex process involving in some cases the physical movement of Near Eastern farmers into new lands, and in other cases a mixed and dynamic process involving the interaction of migrants with indigenous populations of Mesolithic foragers.[42] Greece is the portion of Europe that lies closest to the Near East and it is logical to assume that evidence from this first frontier will be of primary significance for the understanding of the transition from the Mesolithic to the Neolithic.

[34] C.B. Stringer et al., "The Significance of the Fossil Hominid Skull from Petralona, Greece," *JAS* 6 (1979) 295–98; C. Stringer, "The Dating of European Middle Pleistocene Hominids and the Existence of *Homo erectus* in Europe," *Anthropologie* 19 (1981) 2–14; M.H. Day, *Guide to Fossil Man*,[4] (Chicago 1986) 91–98; C.B. Stringer, personal communication, 1994.

[35] G. Hennig et al., "ESR-dating of the Fossil Hominid Cranium from Petralona Cave, Greece," *Nature* 292 (1981) 533–36; A.G. Wintle and J.A. Jacobs, "A Critical Review of the Dating Evidence for Petralona Cave," *JAS* 9 (1982) 39–47; A. Poulianos et al., "Petralona Cave Dating Controversy," *Nature* 299 (1982) 280–82; A.G. Latham and H.P. Schwarcz, "The Petralona Hominid Site: Uranium-series Re-analysis of 'Layer 10' Calcite and Associated Palaeomagnetic Analyses," *Archaeometry* 34 (1992) 135–40.

[36] For Franchthi human bone, see T. Cullen, "Mesolithic Mortuary Ritual at Franchthi Cave, Greece," *Antiquity* 69 (1995) 270–89. For the Thessalian skull fragment, see Theocharis 1967 (supra n. 17) 32–33, pl. V, where the heavily mineralized calvaria is pictured: L. Angel is quoted as saying that the fossil "should not be classified as Neanderthal in the classic sense of the term."

[37] Mellars (supra n. 29).

[38] Gamble (supra n. 26) 367–78; and Runnels (supra n. 13).

[39] C. Perlès, "Long-Term Trends at Franchthi: A Synthetic and Comparative Approach," in Bailey et al. (supra n. 23).

[40] See van Andel and Runnels (supra n. 10).

[41] A.J. Ammerman, "On the Neolithic Transition in Europe: A Comment on Zvelebil & Zvelebil (1988)," *Antiquity* 63 (1989) 162–65. R. Dennell, *European Economic Prehistory* (London 1983) 152–68 offers one view of the "indigenist" hypothesis.

[42] For a discussion of demic diffusion, see A. Ammerman and L.L. Cavalli-Sforza, *The Neolithic Transition and the Genetics of Populations in Europe* (Princeton 1984); and C. Renfrew, *Archaeology and Language* (New York 1987) 145–59.

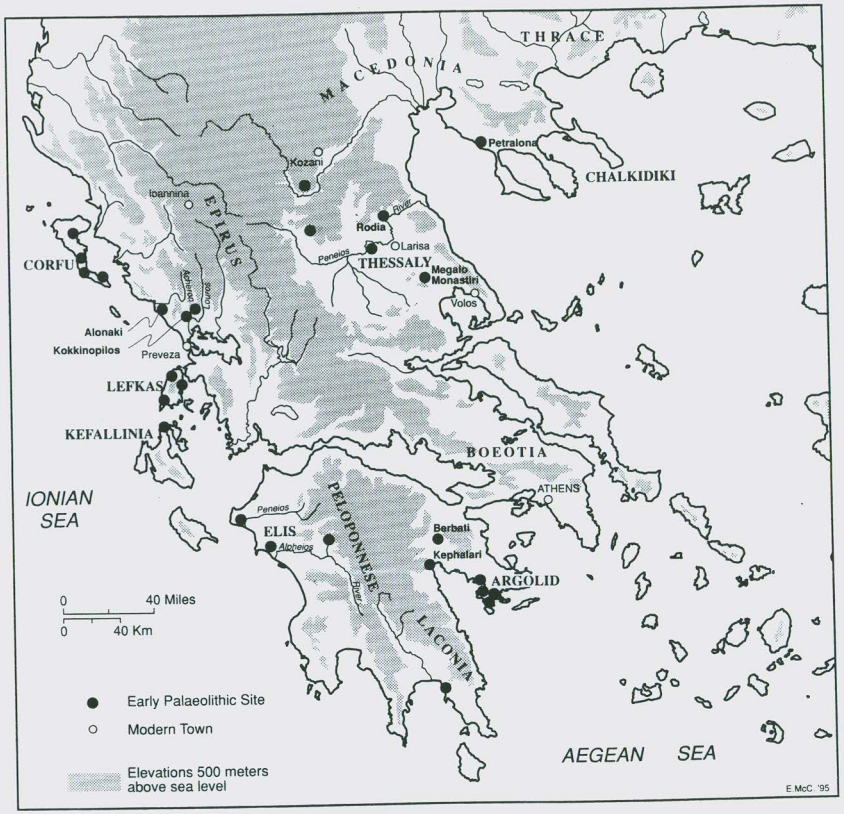

Fig. 1. Map showing locations of principal Early Palaeolithic sites. This map shows sites assigned traditionally to the Lower and Middle Palaeolithic (300,000–30,000 B.P.). Thessaly, Epirus, and Elis have numerous small scatters of lithic artifacts, chiefly of Middle Palaeolithic type (100,000–30,000 B.P.), which are not indicated individually on this map.

AN OVERVIEW OF EARLY GREEK PREHISTORY

The Early Palaeolithic

The Palaeolithic in Greece is divided roughly into two periods. The division between the two periods

Fig. 2. View of the Thessalian plain. The Peneios River is visible in the plain. Early Palaeolithic findspot 30 (Rodia) is located in the center of the picture, along the horizontal white line.

is based chiefly on chronology and the dominant stone tool industries. The Early Palaeolithic is a long period (300,000–30,000 B.P.) that includes the traditional periods of the Lower and Middle Palaeolithic, terms often applied arbitrarily to cultural phenomena that may overlap in time and space. The archaeological cultures of the Early Palaeolithic were once associated with fossil human forms, either *Homo erectus* or archaic *Homo sapiens* (e.g., Neanderthals). The Upper Palaeolithic (30,000–10,000 B.P.) period is usually correlated with early forms of anatomically modern *Homo sapiens*. Even this two-part division is open to question, because specific forms of early humans can no longer be identified as the makers of particular stone tool industries, and it is used here only as a rough indication of chronological position in the cultural sequence.

The earliest Palaeolithic finds are found in northern Greece (fig. 1). The Petralona cranium when it was first discovered was classified as a Neanderthal, and Mousterian artifacts in Thessaly, the Argolid, and Epirus were once thought to provide the archaeological background for the fossil. After a careful reexamination of the fossil in the 1970s, its classification was changed and its date was pushed back to 200,000 B.P. or earlier, evidence that an earlier Palaeolithic horizon was to be expected in Greece.[43]

Until recently, however, the only archaeological find belonging to the time of the Petralona cranium was a handaxe found by Eric Higgs near Kozani in 1962 and classified as belonging to the Acheulean, a stone tool industry of the Lower Palaeolithic.[44] Since Higgs's time claims have been made for early stone tools in the Petralona cavern, and amateurs have reported Early Palaeolithic implements in many parts of Greece. On the basis of the reports, the majority of these objects are without secure stratigraphic or geologic contexts and in some cases are not certainly of human manufacture.[45] Until these artifacts have been published in the professional literature it is not possible to evaluate them further. Even the Kozani handaxe remains an isolated chance find with no context or date.

The first published Early Palaeolithic materials from a datable context were found in the southern Peloponnese, where Ludwig Reisch found a non-Mousterian flake assemblage in Laconia associated with a raised beach level that may belong to the last interglacial (ca. 125,000 B.P.) or earlier, and in eastern Thessaly, where my colleagues and I identified six sites with a chopper/flake tool industry near Larisa and the village of Megalo Monastiri.[46] The Thessalian site near the village of Rodia (fig. 2), north of Larisa, can be dated by its geologic context to approximately 300–400,000 B.P. The distinctive chopper/flake tools belong to a pebble tool tradition where quartz pebbles were flaked to produce large, simple bifacial cores (classified as choppers or chopping tools) and flakes. The cores are flaked along one side to form a long cutting edge. The technique of prepared flake removals from flat cores, which is called the Levallois technique, is absent. This technique, common in Middle Palaeolithic industries, is rare in chopper/flake tool traditions. The Thessalian cores were worked instead by direct hard hammer percussion. The resulting flakes were typically retouched on the edges, and often more than one edge has been modified to create scrapers, piercing tools, and knives (fig. 3). The characteristic feature of the industry is the frequent occurrence of large notches manufactured by the removal of a single flake by direct percussion (the so-called Clactonian technique). These notches may occur singly or be grouped on a flake to create a denticulate. No complete handaxes have yet been found with this industry, but some fragmentary bifacial pieces could be from handaxes. The Thessalian pebble tool complex has similarities with the Clactonian industry, which belongs, like the Acheulean, to the Lower Palaeolithic in Europe.

In Epirus a number of Lower Palaeolithic sites have been identified in the course of a joint American-Greek survey of the Nome of Preveza. A handaxe and other artifacts were discovered in a secure geologic context at the site of Kokkinopilos near Preveza.[47] The handaxe is a pointed type occurring throughout Europe in the late Acheulean and not unknown in the early Middle Palaeolithic (fig. 4). It, and associated artifacts, are made from flint cobbles rather than quartz pebbles. Other sites in the Preveza survey produced chopper/flake tools using techniques similar to the Clactonian, and it is probable that both Acheulean and chopper/flake industries are present in western Greece.

Many reports of possible Lower Palaeolithic artifacts from other parts of Greece were made at the First Palaeolithic Conference in Ioannina, and it is certain that new finds will follow.[48] The increased rate of discovery of Lower Palaeolithic sites has been made possible by our growing understanding of Pleistocene deposits and their associated geologic fea-

[43] Stringer et al. (supra n. 34).

[44] E.S. Higgs, "A Hand Axe from Greece," *Antiquity* 38 (1964) 54–55.

[45] E.g., E. Sarantea, *Προϊστορικά ευρήματα Νέας Αρτάκης ΕυΒοίας* (Athens 1986); A. Andreikos, *Οι κατώτερες παλαιολιθικές λιθοτεχνίες της Δυτικής Ηπείρου και του Ιονίου* (Athens 1993); Poulianos (supra n. 14).

[46] Reisch 1980 and 1982 (supra n. 18); C. Runnels and T.H. van Andel, "The Lower and Middle Paleolithic of Thessaly, Greece," *JFA* 20 (1993) 299–317.

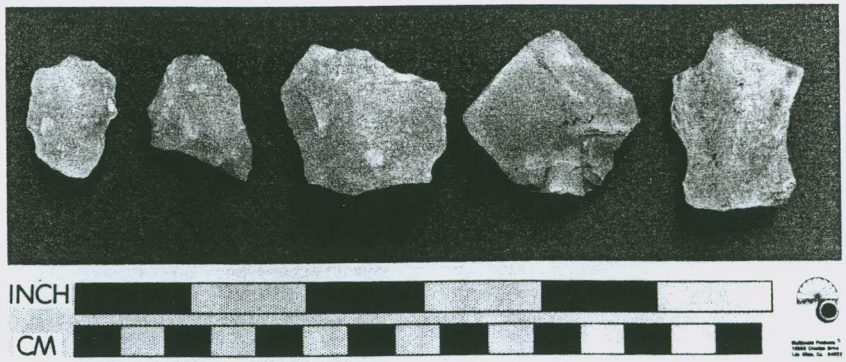

Fig. 3. Early Palaeolithic artifacts from findspot 30 (Rodia) in Thessaly. Typical notched pieces are visible on the left and right. The raw material is massive quartz or fine-grained quartzite.

[47] Runnels et al., "Human Settlement and Landscape in the Preveza Region, Epirus, in the Pleistocene and Early Holocene," in Bailey et al. (supra n. 23); C. Runnels and T.H. van Andel, "A Handaxe from Kokkinopilos, Epirus, and Its Implications for the Paleolithic of Greece," *JFA* 20 (1993) 191–203.

[48] There are many reports of poorly dated chance finds in Bailey et al. (supra n. 23), but they are an indication that the rate of discovery and reporting is increasing. Kourtessi-Philippakis reports a possible stone tool from a geologic context in Corfu that could be as much as 750,000 B.P. in age. The implement is an isolated find, and even if it is not intrusive, or a naturally fractured stone, the dating of the context, which is based on palaeomagnetism, remains open to question. In light of the Early Palaeolithic artifacts discovered on the mainland opposite Corfu, however, further research on Corfu should be encouraged: see G. Kourtessi-Philippakis, "Les plus anciennes occupations humaines dans le territoire épirote et aux confins de l'Illyrie méridionale," in P. Cabanes ed., *L'Illyrie méridionale et l'Épire dans l'antiquité* II (Paris 1993) 11–16.

Fig. 4. Early Palaeolithic handaxe (biface) from Kokkinopilos, Epirus. (Photo J.R. Wiseman)

tures, permitting us to pinpoint the places where archaeological materials of a particular age are likely to be best preserved, and by the growing number of regional surveys that include specialists trained in the recognition of Palaeolithic artifacts.

The limited array of Early Palaeolithic finds can only be interpreted with caution because they are widely scattered in space and time and any conclusions are certain to require major modifications as new finds appear. Nevertheless it is possible to draw a few simple inferences. There is as yet no evidence for humans in Greece before 400,000 B.P., and this fact supports those who postulate a late entry of humans into Europe. It is always difficult to base an argument on negative evidence, and we cannot rule out an earlier human presence that may have been small, tentative, and short-lived, leaving few traces. If humans entered Greece and the rest of Europe relatively late in the Pleistocene, it is likely that these early humans were not *Homo erectus* but were an archaic form of *Homo sapiens*. Once humans were established in Greece, they appear to have left more than one lithic industry. In Thessaly we see a chopper/flake tool industry, made chiefly from quartz pebbles, and evidently without handaxes. In Epirus there are materials belonging to a chopper/flake tool tradition, but there are also handaxes and other artifacts that may belong to the Acheulean. There is nothing unusual about finding chopper and handaxe industries in close proximity, and both traditions are widely attested throughout Europe. A recent summary has evaluated the different hypotheses that account for these two traditions and found that there can be no definite conclusion made at this time, but some evidence suggests that two industries, the Acheulean and Clactonian, are at least partly contemporary.[49]

Early human sites show a marked preference for the availability of water. In Epirus, sites are closely connected with karstic features such as poljes, which are depressions created by tectonic faulting that become plugged with erosional sediments and fill with water on a seasonal basis to form swamps or shallow lakes.[50] The Thessalian landscape is not karstic, and sites are situated instead on the interfluves between the channels of a braided river system.[51] This distribution of sites suggests a pattern of foraging that had a seasonal basis. Larger base camps or aggregation sites may exist on the now submerged coastal plains, and early humans probably moved to the interior only in the spring and summer when melting snow filled the lakes and rivers with water. The presence of water and new vegetation attracted animals to the lakes and rivers, providing the hunters

[49] N. Ashton et al., "Contemporaneity of Clactonian and Acheulian Flint Industries at Barnham, Suffolk," *Antiquity* 68 (1994) 585–89.

[50] Runnels and van Andel (supra n. 47).

[51] Runnels and van Andel (supra n. 46).

with concentrated and predictable resources. Camps on the banks of the river channels or the margins of lakes were ephemeral working sites where raw materials were worked to produce weapons and tools for processing animal and plant food. This is the reason for the many cores and retouched tools still to be found in these places. The small number of sites makes further interpretation very risky. The destruction of sites and the dispersal of artifacts have certainly removed large portions of the record. One last observation is possible. Even if we allow for post-depositional disturbance and destruction of sites, the quantity of artifacts found on the surviving sites is very small when compared with the concentrations of thousands of handaxes and other artifacts on sites in Africa or the Near East. The poverty of the Greek sites may be in part a function of the relative brevity of the Greek Palaeolithic, a period of 0.3 million years versus 1.6 million years in Africa, and the possibility that we have mainly the seasonal hunting stands of highly mobile foragers.

The later Early Palaeolithic (100,000–30,000 B.P.), also known as the Middle Palaeolithic in traditional terms, produced much evidence of human activity. The Middle Palaeolithic is marked by the flake tool industry called the Mousterian (after a French type site), and the Mousterian is found from western Europe in a continuous band through the Balkans to the Near East and beyond.[52] The Greek Mousterian is sometimes found with a few small handaxes, and usually contains large numbers of scrapers, points, and other tools. The use of cores prepared in the Levallois fashion in order to remove large flat flakes for blanks that will be retouched to create different tool types is the most conspicuous feature of the industry. Another feature of the Greek Mousterian is the presence of distinctive bifacially flaked foliates ("leafpoints") made by direct percussion on large flakes (fig. 5).[53] The chronology of the Middle Palaeolithic in Greece is uncertain. The beginning of the period is marked by the transition from the Acheulean to the Mousterian, which is poorly understood and nowhere well dated. Some authorities believe that the "transition" is more a

Fig. 5. Early Palaeolithic bifacial foliate ("leafpoint") from Galatas, Epirus. (Photo M. Hamilton)

product of archaeological classification than a real boundary. It is clear in any case that flake tool industries of broadly Mousterian character are already present in the Near East as early as 200,000 B.P., and somewhat later in some parts of western Europe.[54] The earliest Mousterian in Greece is considerably later than that from neighboring regions. A thermoluminescence determination of ca. 100,000 B.P. for the Mousterian industry in the lowest levels of the stratified sequence from the Asprochaliko Cave in Epirus suggests that the Mousterian was established in Greece only after the last interglacial.[55] Other dates for the Greek Mousterian are younger. An in situ Mousterian site in the southern Argolid was

[52] Stringer and Gamble (supra n. 31) 143–77.

[53] See Runnels (supra n. 13) for a listing of bifacial foliates in Greece.

[54] See Stringer and Gamble (supra n. 31) 143–77; R. Grün, P. Mellars, and H. Laville, "ESR Chronology of a 100,000-Year Archaeological Sequence at Pech de l'Azé II, France," *Antiquity* 65 (1991) 544–51, have the late Acheulean at ca. 190,000 B.P.; J.L. Bischoff et al., "Uranium-series Isochron Dating of El Castillo Cave (Cantabria, Spain): The 'Acheulean'/'Mousterian' Question," *JAS* 19 (1992) 49–62 place the boundary between 100,000 and 200,000 B.P. See also Mercier and Valladas (supra n. 30) and Schwarcz (supra n. 30).

[55] J. Huxtable et al., "Thermoluminescence Dates and New Analysis of the Early Mousterian from Asprochaliko," *CurrAnthr* 33 (1992) 109–14; G. Bailey, V. Papaconstantinou, and D. Sturdy, "Asprochaliko and Kokkinopilos: TL Dating and Reinterpretation of Middle Palaeolithic Sites in Epirus, North-west Greece," *Cambridge Archaeological Journal* 2 (1992) 136–44.

dated to ca. 52,000 B.P. by a uranium/thorium (U/Th) assay of pedogenic calcium carbonate crusts that covered the artifacts.[56] Mousterian sites in Thessaly are stratified in deposits being exposed by the downcutting of the Peneios river and are bracketed by radiocarbon and U/Th dates that range from ca. 45,000 to 30,000 B.P.[57] The Mousterian vanishes from the Greek record before 30,000 B.P., as it does throughout Europe.

Who was responsible for the Mousterian in Europe and Greece? For decades it was thought that the Mousterian people were Neanderthals, but this comfortable assumption has been destroyed by recent evidence from Israel and France showing that remains of modern *Homo sapiens* are found with Mousterian tools and Neanderthals with tools of Upper Palaeolithic type.[58] It is difficult to determine the identity of the stone tool makers as few fossil hominids have been found in direct association with tools. In the absence of such associations in Greece, the identity of the Mousterian people must be a matter of speculation. There are sufficient finds, however, of Neanderthals with Mousterian sites in Europe and Israel to make the association between the two the most probable hypothesis, and in this paper I will assume that the Greek Mousterian was produced by Neanderthals.[59] The location and dating of the origins of the Neanderthals is also a mystery, but the present consensus is that Neanderthals are derived from European populations of archaic *Homo sapiens* (or perhaps *Homo heidelbergensis*) represented by fossils such as Petralona, Steinheim, Swanscombe, and Arago.[60] Some authorities accept a controversial date for a Neanderthal in Israel of 220,000 B.P., but others place the first appearance of Neanderthals much later, between 160,000 and 125,000 B.P.[61] When did Neanderthals enter Greece? The evidence from Asprochaliko shows that the Mousterian was already present early in the last glacial, and the coincidence of the appearance of the Mousterian in Greece and the Near East has suggested to some scholars that Neanderthals may have taken refuge in the Mediterranean region to escape severe glacial conditions in Europe.[62] If this hypothesis is correct, parts of central and northern Europe were intermittently abandoned by Neanderthals who moved south after ca. 60,000 B.P., pushing into Spain, Italy, Greece, Turkey, and perhaps to the Near East.[63]

An early glacial migration of Neanderthals into Greece explains the otherwise puzzling abundance of Middle Palaeolithic sites in Greece, which mark a horizon of intense activity between 100,000 and 30,000 B.P. European Neanderthals were attracted no doubt by the vast coastal plains on the continental shelf exposed by lower sea levels. The broad plains available around Greece were not simple extensions of existing environments, but were habitats that have entirely vanished from the present-day Mediterranean. They were areas of low-lying land with a relatively mild climate during glacial winters. Free from snow, and with abundant water, they provided refuges for trees and other plants and supported herds of grazing animals.[64] The Neanderthals would have frequented these plains in glacial winters and would penetrate the interior during the spring and summer when melting snow supplied lakes and rivers with water and the new vegetation attracted large herbivores. The rivers and lakes would have been especially attractive in the high summer and early fall as surface water dwindled, and remaining water sources served to concentrate plant and animal resources, which the Neanderthals no doubt found to be predictable and dependable as they made their way down to winter encampments on the coastal plain.

The distribution of Mousterian sites in Greece reveals the importance of water to the Neanderthals. The greatest concentrations of sites are located along the Peneios River in Thessaly, the rivers and numerous lakes of southern Epirus, and the Alpheios and Peneios rivers in Elis. Sites are rare in the arid lands of central Greece and the eastern Peloponnese, at least in those areas that have been searched in a reasonably systematic manner. In the dry interior valley of Berbati, a Swedish-American survey identified only one certain Middle Palaeolithic site and no more than a dozen stone tools in an area of 60 km^2.[65] In the arid southern Argolid an intensive

[56] Jameson et al. (supra n. 2) 326–35.
[57] Runnels (supra n. 13); Runnels and van Andel (supra n. 46).
[58] Stringer and Gamble (supra n. 31) 195–217.
[59] For a summary of evidence for Neanderthal associations with the Mousterian, see Harrold (supra n. 33).
[60] Stringer and Gamble (supra n. 31) 64–69.
[61] See Mercier and Valladas (supra n. 30) for an early dating of Neanderthals.
[62] Huxtable et al. (supra n. 55).
[63] Stringer and Gamble (supra n. 31) 143–77.
[64] J.C. Shackleton et al., "Coastal Paleogeography of the Central and Western Mediterranean during the Last 125,000 Years and Its Archaeological Implications," *JFA* 11 (1984) 307–14; T.H. van Andel, "Late Quaternary Sea-level Changes and Archaeology," *Antiquity* 63 (1989) 733–45.
[65] B. Wells et al., "The Berbati-Limnes Archaeological Survey: The 1988 Season," *OpAth* 18 (1990) 207–38.

American survey produced no more than five sites and a few dozen artifacts in an area of 250 km^2.[66] By way of contrast, more than 30 sites with hundreds of stone tools were discovered along one small segment (8 km) of the Peneios River in Thessaly.[67] Epirus offers a very clear illustration of the connection between Middle Palaeolithic sites and water. Sites are very numerous in the region west of a line from Ioannina to Preveza down to the Ionian Sea. This area has perennial streams and rivers and is dotted with lakes, many of which are filled karstic poljes. Mousterian sites are found here in abundance. The site of Kokkinopilos alone yielded 5,000 artifacts to Higgs's collecting teams, and thousands more have eroded from the site in the intervening years. My survey of the district of Preveza added as many as 20 findspots to those discovered by Higgs and his colleagues farther north. Some of these findspots are as rich as Kokkinopilos. Alonaki, near the mouth of the Acheron River, is littered with artifacts over an area of more than a square kilometer. More than 150,000 stone tools were counted on the surface at Alonaki, chiefly belonging to the Early Palaeolithic or the early Upper Palaeolithic. This figure serves as a useful contrast with the paucity of lithics from the Argolid.[68]

The association of Mousterian sites with water suggests that the Neanderthals used more planning and scheduling than is sometimes thought. Stringer and Gamble have assembled the evidence for the unplanned and unstructured foraging activities of Neanderthals, but Jameson and his colleagues contend that late Mousterian sites in the southern Argolid show some evidence of logistical or strategic planning.[69] They point to the pattern of small sites distributed around Franchthi Cave, which they postulate was a base camp, or at least a home base that supported the smaller satellite foraging and supply sites discovered by their survey, some of which were located near supplies of flint and water, while others were located at strategic points in the landscape suitable for hunting stands. The excavations in Franchthi did not penetrate below the Upper Palaeolithic layers, and the evidence for the Mousterian consists of a dozen artifacts that appear to have been "kicked-up" from lower levels, and as a consequence the hypothesis that this was a base camp remains unconfirmed.[70] The still unpublished Kephalari Cave near Argos has a long sequence of layers rich in Mousterian and is a better candidate for a home base, perhaps serving the entire Argolid.[71] A distinct pattern in the distribution of Palaeolithic finds was identified in the Argolid and Berbati surveys. Assuming that Franchthi and Kephalari served as base camps, specialized flintworking camps and hunting stands are located at less than a day's walk from each cave. Isolated finds of spearpoints and similar artifacts that probably represent hunting losses are found at distances requiring more than a day's walk from the base camp, often at elevations of 700 or 1,000 m.[72] This three-level distribution pattern is suggestive of logistical foraging activity centered upon a base camp.

The concentration of Mousterian artifacts near seasonal lakes in southern Epirus also offers evidence of logistical planning in the Middle Palaeolithic. The large numbers of artifacts at sites where water, flint, and other resources were concentrated suggest repeated visits by small numbers of Neanderthals over large periods of time. The repetitive seasonal use of the same sites along the line of movement from the interior hills to the coastal plains is a form of logistical foraging normally thought to have been introduced in the Upper Palaeolithic by modern *Homo sapiens*. Here too, however, the hypothetical base camps are missing. The excavations by Higgs in Asprochaliko demonstrated that this shelter was too small, and the deposits too shallow, to qualify as a base camp, and we must look again to the vanished coastal plains as the most likely place to find the home bases.[73]

If the timing of the Neanderthal origins and their entry into Greece is open to question, the ultimate fate of the Neanderthals is even more puzzling. The only excavated sites where the transition from the Middle to the Upper Palaeolithic can be traced remain unpublished, but the preliminary reports suggest that there is an apparent hiatus between the latest Middle Palaeolithic and the earliest Upper Palaeolithic. Kephalari Cave may preserve evidence

[66] Jameson et al. (supra n. 2) 326–35.
[67] Runnels and van Andel (supra n. 46).
[68] Runnels et al. (supra n. 47). See also Higgs and Vita-Finzi (supra n. 15) to gain an idea of the richness of the Epirote sites.
[69] Stringer and Gamble (supra n. 31) 143–77; Jameson et al. (supra n. 2) 326–35.
[70] Perlès (supra n. 13) 49–51.
[71] Reisch 1980 (supra n. 18).
[72] Isolated finds of Mousterian tools at high interior elevations are documented in Wells et al. (supra n. 65) and Jameson et al. (supra n. 2) 329.
[73] See discussion in Bailey (supra n. 22).

of the transition, but the layers in question are thin and have very few artifacts, a difficulty complicated by a lack of dates for the sequence and full publication. In Thessaly the latest Middle Palaeolithic sites are associated with a dated stratigraphic sequence. The recent investigations of these sites demonstrate that they overlap in time the earliest Upper Palaeolithic Aurignacian industry in the Balkans, and show evidence of what is called acculturation.[74] The specific Aurignacian elements are blades, often retouched along one edge, burins, and a variety of end scrapers made on small flakes. These tool types are found with Mousterian sidescrapers and Levallois flakes on the same site, and are made of the same raw materials. The presence of typical Mousterian artifacts and tool types usually associated with the Aurignacian on the same sites in Thessaly is interpreted as evidence for cultural borrowings by late Neanderthals who had some kind of contact with modern humans. The most significant feature of the Thessalian sites is that they disappear from the record before 30,000 B.P., and after this time there are no more Mousterian sites anywhere in Greece or the rest of Europe.[75] In Greece the Mousterian is not immediately replaced by Upper Palaeolithic, and large areas of Thessaly, the Peloponnese, and Epirus appear to have been uninhabited or infrequently visited for several millennia. I believe that this is evidence for the disappearance of the Neanderthals, whose home ranges were not immediately taken over by modern humans. There is at present no consensus on the fate of the Neanderthals, but it is widely accepted that they were replaced by modern humans who migrated from the Near East through the Balkans into western Europe between 40,000 and 30,000 B.P.

One curious and unexplained phenomenon is why Middle Palaeolithic sites appear to be concentrated in the west, chiefly in Epirus, while Thessaly and the Peloponnese were only occupied by Mousterian people for a short interval at the end of the period (ca. 45,000–30,000 B.P.). One explanation may be that Neanderthals were displaced from Epirus as Aurignacian peoples spread down from the central Balkans into northwestern Greece. Another, perhaps related, possibility is that the movement of Mousterian people south into the interior was encouraged by the reduction in size of the northwestern coastal plains in the period 45,000–30,000 B.P. when the climate was often warmer.[76]

The Upper Palaeolithic

Greece was sparsely occupied in the millennia following the disappearance of the Neanderthals. The earliest Upper Palaeolithic culture in Europe, the Aurignacian (ca. 40,000–25,000 B.P.), is extremely rare in Greece. The Aurignacian industry is based on blades (*sensu stricto*) with many carinated end scrapers and burins, and, where preservation is good, distinctive bone points with split bases. It is an industry that can be distinguished from the Mousterian, although in Greece it appears to be everywhere mixed with Mousterian elements, such as sidescrapers and Levallois flakes.[77] The Aurignacian may be present in the lowest Upper Palaeolithic layers at Franchthi Cave and Kephalari Cave, but it is in such small quantities that its very identification is open to question. There are two surface sites in Achaia that may be Aurignacian, as is the recently discovered open-air site of Spilaion in Epirus (fig. 6).[78]

The scarcity of stratified and dated sites requires an explanation. It is possible that the expansion of the Aurignacian coincided with a relatively warm interstadial phase when Greece's coastal plains contracted, or the Aurignacian people were few in number and could concentrate on areas with rich and dependable resources with no pressure to occupy districts of marginal productivity.

Evidence of wider occupation in Greece comes only after the Aurignacian, sometime after 25,000 B.P. The coincidence of the expansion of Upper Palaeolithic occupation with the beginning of the last major cold phase of the glacial period draws attention once more to the coastal plains, which reached their greatest extent ca. 20,000 to 18,000 B.P. The new archaeological cultures are known as Gravettian or Epigravettian and are characterized by an abundance of small blades, many of which are

[74] See discussion in Runnels (supra n. 13).

[75] For the end of the Middle Palaeolithic in Greece, see Runnels (supra n. 13).

[76] Priscilla Murray is credited with the suggestion that the late dispersal of Middle Palaeolithic sites in Greece could be the result of the displacement of Neanderthals by the makers of the Aurignacian. See Mellars (supra n. 29) for possible movements of Aurignacian peoples in the Balkans.

[77] Runnels (supra n. 13).

[78] See Mellars (supra n. 29) for the Aurignacian. Aurignacian sites in Achaia are described by A. Darlas, "Η Ωρινιάκια λιθοτεχνία του Ελαιοχωρίου Αχαΐας," *ArchEph* 128 (1989) 137–59; see Runnels (supra n. 13) for a summary of the Greek Aurignacian. A new Aurignacian site was discovered in 1992 at Spilaion, near Preveza, Epirus, as part of the Nikopolis Survey (Runnels et al. [supra n. 47]), but it has not yet been studied in detail.

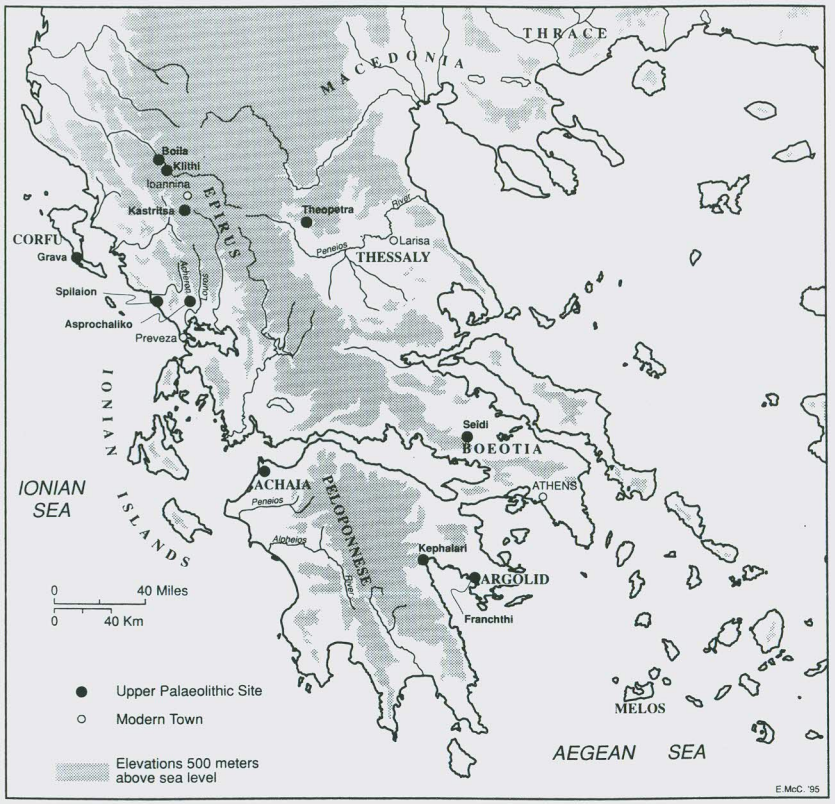

Fig. 6. Map showing locations of principal Upper Palaeolithic sites

no more than 1 or 2 cm in length. These "bladelets" have been steeply retouched along one or both edges to form small points, and these "backed" bladelets were mounted in the grooves of wooden, bone, or antler points to create spears and arrows.[79] The other tool types in these industries reflect the emphasis on small-scale hunting implements, and include geometric microliths (also used to arm projectiles) and a wide variety of steep end scrapers on blades and flakes used to work wood and hides. The Epigravettian is known almost entirely from cave sites, and appears to be very rarely found on open-air sites.[80] Several caves have been excavated, providing us for the first time with more than one well-stratified and well-dated sample.

The most important site is Franchthi Cave, where there is a sequence of Palaeolithic deposits ranging from 25,000 to 11,000 B.P. The Palaeolithic occupation of the cave was not continuous. Several distinct gaps, or hiatuses, have been detected in the stratification of the cave representing periods when there was no deposition of sediments or when sediments were eroded away. A large hiatus in the occupation of the cave occurred at the end of the last glacial maximum between 18,000 and 13,000 B.P. The cave deposits are nevertheless rich in artifacts. The lithic in-

[79] G. Bailey reports that the microscopic study of backed bladelets from Klithi shows that they were used as projectile points and hide working awls: G. Bailey et al., "Active Tectonics and Land-use Strategies: A Palaeolithic Example from Northwest Greece," *Antiquity* 67 (1993) 292–312.

[80] Bailey et al. (supra n. 15).

dustries have been published by Catherine Perlès and she recognizes six distinct lithic phases at Franchthi, which are characterized by fluctuations over time in the frequency of certain common tool types and by changes in the knapping techniques employed to manufacture them.[81] The chief tool types are backed bladelets and microliths, the latter typically small geometric tools in the form of triangles and trapezes that served as inserts in wooden or bone hafts to make knives and points. They were made by snapping blades into small segments, usually retouching the margins to give them their final forms.

The thick stratification at Franchthi is not the result of continuous habitation, but represents episodes of use by small bands that visited the site on a periodic, seasonal basis. Because the rate of sedimentation was very slow in the cold, dry conditions of the last glacial, the length of these intervals or of the interruptions between them is difficult to compute. Nevertheless, the Palaeolithic occupation of Franchthi is remarkable because of the few signs of change from top to bottom in the sequence. After a short phase at the base of the sequence with some possible Aurignacian, the successive lithic phases recognized by Perlès are all dominated by the same types, e.g., backed bladelets, end scrapers, and microliths, which vary in percentage and type from one phase to another.[82]

The cave is at present directly on the coastline, but it was up to 7 km inland during the last glacial maximum.[83] The rich grazing provided by the vast coastal plain attracted a diverse fauna, both ungulates and the predators that preyed upon them. Faunal remains from the excavations include a number of large herd ungulates such as bison and ass that are characteristic species of the plains, and the excellent hunting was presumably the chief attraction of the cave. Very few plant remains have survived from the Palaeolithic levels, but these suggest that plant collecting played a relatively small role in the economy of the site. Fish and shellfish remains are conspicuous by their rarity, and the sea was undoubtedly too distant to be of much use.[84]

The picture we have is one of a very conservative, even simple, pattern of exploitation. The picture of a simple hunting camp is reinforced by the lack of art, ornament, or permanent burial. A recent study of the human remains from the cave reported seven human bones and teeth from Palaeolithic levels at the site. These were found scattered in the deposits, probably dispersed by carnivores, rodents, and later human activities at the site. It is interesting to note the presence of two shed milk teeth in this small sample, a clear indication that children accompanied adults at the Franchthi encampment.[85] A complete group, including adults and children, is evidence that the cave served as a base camp at times. Considering that this way of life endured for as much as 25,000 years, we can also say that it was a successful adaptation.

We have more excavated sites for this period than for any other. Other sites, both published and unpublished, include Theopetra Cave in Thessaly, Seidi Cave in Boeotia, Kephalari Cave in the Argolid, Grava Cave in Corfu, and Asprochaliko, Kastritsa, Klithi, and Boila in Epirus.[86] With the possible exception of the large cavern at Kephalari, these sites are small, perhaps better classified as rock shelters or overhangs than caves (fig. 7). The majority of these sites do not show any evidence of Upper Palaeolithic occupation until after 20,000 B.P. Only Kephalari and Asprochaliko have Middle Palaeolithic components. Both sites are unpublished, but preliminary reports suggest that there is a hiatus at each between the Middle and Upper Palaeolithic.

Bailey has recently noted that it is clear from the scattered state of the evidence and the small size and thin deposits at these sites that we are dealing with a small part of the extended range of the human groups that occupied them.[87] Ranging over hundreds of square kilometers, from the coastal plains to the high elevations of the interior mountain valleys, small bands of humans utilized extensive tracts of land in a highly specialized version of a logistical foraging pattern. Klithi Cave in northern Epirus gives the best picture of one of these specialized hunting camps (fig. 8).[88] The cave was excavated between 1983 and 1988, reaching a depth of 2.9 m below surface. Ten major stratigraphic units were recognized and have been dated to between 16,000 and 13,000 B.P. The cave was occupied briefly after the last glacial maximum when the interior mountain valleys were free of glaciers. Located in the steep-sided valley of the Voïdomatis River just above the Konitsa plain, this area was probably inaccessible in the winter because of the snow pack and nearby glaciers. Visited only in the warmest months, it was used for the specialized hunting of chamois and ibex. This is demonstrated by the bones and horns of these animals in the site, which are very numerous. The horizontal excavation of the deposits revealed a very small area that was occupied in the cave. The occupation debris is nevertheless abundant. There are hundreds of thousands of tools, many of them backed bladelets and shouldered points used for projectiles and end scrapers useful for making and repairing weapons and processing of meat and hides from animals. Analysis of the abundant stone tools and bone fragments, which show little sign of weathering or abrasion, suggests that the site was occupied only infrequently, and probably by very small groups of people, perhaps no more than 5–10 persons. Klithi

Fig. 7. Grava Cave (Corfu), an example of a typical small rock shelter utilized in the later Upper Palaeolithic

[81] The Franchthi Cave stratigraphic sequence is marked by a number of gaps, or unconformities, that range in length from 200 to more than 8,500 years. These gaps occur when deposits are not being laid down or later erosion has removed them. For the Franchthi discontinuities, see W.R. Farrand, "Discontinuity in the Stratigraphic Record: Snapshots from Franchthi Cave," in P. Goldberg, D.T. Nash, and M.D. Petraglia eds., *Formation Processes in Archaeological Context* (Madison 1993) 85–96. The lithic phases are discussed in Perlès (supra n. 13).

[82] Perlès (supra n. 13).

[83] T.H. van Andel and S.B. Sutton, *Landscape and People of the Franchthi Region* (*Franchthi* 2, Bloomington 1987); Jameson et al. (supra n. 2) 195–210.

[84] For Franchthi plant remains, see J.M. Hansen, *The Palaeoethnobotany of Franchthi Cave* (*Franchthi* 7, Bloomington 1991). For shellfish, see J.C. Shackleton, *Marine Molluscan Remains from Franchthi Cave* (*Franchthi* 4, Bloomington 1988). For fauna, see S. Payne, "Faunal Evidence for Environmental/Climatic Change at Franchthi Cave (Southern Argolid, Greece) 25,000 B.P.–5000 B.P.: Preliminary Results," in J.L. Bintliff and W. van Zeist eds., *Palaeoclimates, Palaeoenvironments, and Human Communities in the Eastern Mediterranean Region in Later Prehistory* (*BAR-IS* 133, Oxford 1982) 133–37.

[85] Cullen (supra n. 36) 274.

[86] The results of these excavations are summarized in Kourtessi-Philappakis (supra n. 19); Bailey (supra n. 22); Reisch 1980 (supra n. 18); and Bailey et al. (supra n. 23). Many small test excavations have taken place in caves and rock shelters that have been reported in the popular press, but have not been published (e.g., T. Spyropoulos, "Εἰσαγωγή εἰς τὴν μελέτην τοῦ Κοπαϊδικοῦ χώρου," *AAA* 6 [1973] 201–14). The descriptions suggest that backed bladelet industries are the usual finds, and that some late Palaeolithic sites are yet to be intensively investigated in regions such as Boeotia.

[87] Bailey (supra n. 22).

[88] Bailey (supra n. 22) summarizes the excavations and gives a complete list of publications.

Fig. 8. View of Klithi Cave, Epirus. The shallow rock shelter is visible in the center of the photograph, in the side of the gorge cut by the Voïdomatis River. (Photo G. Bailey)

was occupied during a relatively brief period and was abandoned as soon as there was a significant return to colder, dryer conditions.[89]

The foregoing model of seasonal movement over a large territory was originally proposed by Eric Higgs in the 1960s, and was in turn based on the concept of Site Catchment Analysis developed by Higgs and Claudio Vita-Finzi. In a series of influential papers Higgs and his colleagues argued for a pattern of seasonal movement in the Upper Palaeolithic that in some ways resembled the transhumant pattern of the modern Sarakatsani and other pastoralists who move their flocks of sheep and goats from summer fields in the mountains to winter pasture near the present coast.[90] Higgs considered the different positions of Kastritsa and Asprochaliko, including their suitability for summer or winter habitation (based on mean daytime temperatures in different seasons as measured by buried thermometers), as indications that these caves were stopping places along a path of seasonal movement followed by red deer during the glacial period. In this model humans closely followed the herds of deer much as the Sarakatsani followed their flocks of sheep. Higgs pointed to the existence of modern transhumant routes that passed the caves, more as examples of a similar pattern than as a claim for the continuity of this behavior.

In the 1980s, Geoffrey Bailey and his colleagues challenged this simple but compelling model, and proposed a subtle but significantly different model to replace it.[91] They noted that the two caves used by Higgs to construct his model, Kastritsa and

[89] Bailey (supra n. 22) 27.

[90] Higgs and Vita-Finzi (supra n. 15); Higgs et al. (supra n. 15).

[91] Bailey (supra n. 22); Bailey et al. (supra n. 79) 302; Bailey et al. (supra n. 15); Bailey et al., "Epirus Revisited: Seasonality and Inter-site Variation in the Upper Palaeolithic of North-West Greece," in G. Bailey ed., *Hunter-Gatherer Economy in Prehistory: A European Perspective* (Cambridge 1983) 64–78.

Asprochaliko, were very different from each other. Kastritsa was used in a much more intensive manner (as measured by the density of artifacts and bones in the sediments) than Asprochaliko, despite its much smaller size. There are also significant differences in the species of animals available to the inhabitants of the two caves. They draw attention also to the rather careful selection of the small shelters such as Kastritsa, Asprochaliko, and Klithi, which are on the margins of areas where the bedrock tends to control the type of vegetation available for browsing herbivores. The pockets of suitable grazing pasture for the animals are often small and rather circumscribed by rugged ridges that create topographic barriers. From their hidden shelters, just out of sight of the circumscribed areas supporting herds of grazing animals, small parties of human hunters were able to cull their quarry from their preferred habitats and to ambush them as they passed through narrow defiles between one area of grazing and another. This very carefully thought out pattern of foraging was successful as long as the colder drier climate of the last glacial encouraged growth of shrubby vegetation ideal for the support of large herbivores.

In this model, seasonal mobility of animals such as red deer, horse, cattle, ibex, and chamois is still assumed and hunters certainly shifted their settlements to take advantage of these movements. A different perspective is offered, however, by the revised model. The hunters do not follow the herds, like modern transhumants, but shift their camps on a seasonal basis within a very large territory to take maximum advantage of the circumscribed animal habitats. The known sites (Klithi, Kastritsa, and Asprochaliko) are not the base camps, but seasonal encampments that are part of a complex and hierarchical settlement pattern that included major base camps, perhaps open-air sites, on the coastal plains.

This well-balanced existence apparently did not include the intense ritualistic and artistic activities that are well known from the densely inhabited regions of southwestern France and northeastern Spain. Cave art and mobilary art are unknown from the Greek Palaeolithic, except for small quantities of pierced animal teeth and marine shells that evidently served as ornaments.[92] Burials are unknown, and the only stratified human remains known are the scattered finds of teeth and bone fragments in the Franchthi sediments.[93] Perhaps if the putative base camps and aggregation sites on the coastal plains are located and explored, we shall learn something of the intellectual life of the Palaeolithic people.

The last glacial began to break up by 16,000 B.P., and by 10,000 B.P. the global climatic conditions that characterize the Holocene were established. Sometime during this period of transition from the Pleistocene to the Holocene, most of the Palaeolithic sites in Greece were abandoned.

The Mesolithic

In 1865 Sir John Lubbock divided prehistory into two great periods: the Palaeolithic and the Neolithic. This simple classification was based chiefly on the predominant type of edged stone tools in common use: flaked tools in the Palaeolithic and polished implements in the Neolithic.[94] Other criteria have been added over the years, but the basic classification has survived. After its introduction an unconformity between the two periods was noticed. When climatic and economic factors were added to the other criteria for the definition of the terms, the "Palaeolithic" turns out to correspond to hunters and foragers who lived in the Pleistocene epoch and the "Neolithic" to village farming peoples in the Holocene. Excavations in Europe, however, revealed the existence of foragers who continued to hunt and gather in the early Holocene until they were replaced by Neolithic farmers. Some scholars considered that the logic of climatic and economic factors of definition required a separate designation for Holocene foragers, and the term "Mesolithic" was proposed.[95]

The concept of the "Mesolithic" has been debated since its introduction. The term has been retained by some archaeologists working in Europe, but it has lost ground in other regions. Archaeologists in closely neighboring areas such as the Balkans or the Near East sometimes use the term "Epipalaeolithic" instead of Mesolithic. The term "Epipalaeolithic" suggests that this phase is regarded as a continuation of the Palaeolithic into the Holocene, with a hint that it is a kind of Palaeolithic twilight where foragers attempted to adjust to the new climatic conditions of the present age, and in this sense it is often justified.[96] Whether "degenerate" or merely "transi-

[92] For Palaeolithic shell ornaments from Franchthi, see Shackleton (supra n. 84) 49–53; for ornaments made from animal teeth, see Higgs et al. (supra n. 15) 24.

[93] Cullen (supra n. 36) 274 n. 6.

[94] Sir J. Lubbock, *Pre-Historic Times* (London 1865).

[95] The first use of "Mesolithic" was by the Irish archaeologist H. Westropp in 1866: see B. Gräslund, *The Birth of Prehistoric Chronology* (Cambridge 1987) 38; and G. Clark, *Mesolithic Prelude: The Palaeolithic–Neolithic Transition in Old World Prehistory* (Edinburgh 1980) 1–7.

[96] Clark (supra n. 95) 4.

tional," the Mesolithic is often thought of as the tail end of the Palaeolithic, a slightly uncomfortable term to cover an awkward segment of prehistory that does not fit well in the sequence. There have been attempts in recent years, most notably by Grahame Clark, to reevaluate the Mesolithic and to depict it as a formative era standing apart from the other prehistoric periods, but this effort has not been altogether successful.[97] Despite these reservations, the evidence from Greece suggests that the Mesolithic is a period stratigraphically, chronologically, and economically distinct from the Palaeolithic and Neolithic.

The Mesolithic period belongs to the early Holocene, an era of rapid changes in global climate as the result of the change from cold, dry glacial conditions to the warmer, wetter regime of the modern climate. The exact effects of this climatic change on Greece are difficult to measure, because the proxy data used to reconstruct past climates, such as pollen from cores, tree rings, and biological remains from excavations, are few and far between in Greece for the late Pleistocene and early Holocene. The general consensus, however, is that the rise in temperature and precipitation encouraged the expansion of arboreal species, chiefly pine and deciduous oak. The change in vegetation was accompanied by changes in the fauna, with the disappearance of many large herbivores and an increase of woodland species such as red deer and pig. These changes were more dramatic in coastal areas where marine transgression submerged the coastal plains.[98]

Until the 1960s the existence of a Mesolithic period in Greece was uncertain. Although Perlès has demonstrated that the caves explored by Markovits in the 1920s and 1930s were probably Mesolithic, Markovits's findings were ignored for a long time.[99] The first definitive evidence for the Mesolithic came in 1964 with the excavations at Sidari in Corfu and in 1967 at Franchthi Cave in the Argolid (fig. 9). These two sites are the only Mesolithic sites yet tested by modern excavation methods. In the last five years the picture of the Mesolithic has changed rapidly as the result of substantial new finds from surface surveys. It is necessary to review the results of the two excavations before turning to the new finds.

The Franchthi Cave excavations were carried out in four areas within the cave, which were tested with a series of deep trenches. The long sequence of Mesolithic layers, up to 4 m thick in some areas, has been divided by the excavators into two phases dated by conventional uncalibrated radiocarbon determinations: the Lower Mesolithic (ca. 9500–9000 B.P.) and the Upper Mesolithic (ca. 9000–8000 B.P.). Perlès uses the lithics to distinguish a third phase, the Final Mesolithic, but she stresses the essential continuity that connects the phases. In this paper, I will consider the Upper Mesolithic as including Perlès's Final Mesolithic. The latest Palaeolithic levels are separated from the Lower Mesolithic by a hiatus of approximately 300–600 years.[100] In addition to the stratigraphic break that separates the Mesolithic from the Palaeolithic, the Mesolithic at Franchthi has many novel features. The lithic assemblage of the Lower Mesolithic lacks the geometric microliths and backed bladelets of the Final Palaeolithic and is made up instead of simple flakes, often with multiple retouched edges formed by a small nibbling retouch. Notches and denticulates are the most common tool types, and the entire assemblage is remarkable more for the many types that it does not have than for any definite character. Melian obsidian, present in the Upper Palaeolithic, is definitely part of the Mesolithic assemblage, although very rare (ca. 1%). It is evidence nevertheless of maritime contact with the obsidian sources of Melos. The faunal remains, although they have not been published in detail, also reflect a break with the Palaeolithic pattern. Most of the great herbivores disappear and are replaced by red deer with smaller numbers of pig. There is more evidence of plant collecting in this phase, and carbonized remains of wild barley, oats, and nuts such as almonds and pistachios are common. An increase in fish bones and changes in the species of marine shell reinforce our view that the cave inhabitants had a familiarity with the sea, albeit with fish found chiefly in coastal lagoons and estuar-

[97] Clark (supra n. 95) 101–103.

[98] The evidence for the manifold changes in early Holocene climate and environment is summarized in Jameson et al. (supra n. 2) 165–68, 194–213, 335–38.

[99] Perlès (supra n. 7) 120–22.

[100] The exact length of the Mesolithic period at Franchthi is unknown, but may be as much as 1,500 radiocarbon years. Deposition of Mesolithic deposits may have begun as early as 10,500 B.P. in some parts of the cave, but the generally accepted beginning of the Mesolithic is placed later, ca. 9500 B.P. For a discussion of the Franchthi chronology, see Hansen (supra n. 84) 119–20, 129, 135. Perlès (supra n. 7) 107–15 discusses the differences in lithics from phase VI (latest Palaeolithic) to phase VII (Lower Mesolithic). The stratigraphic break between the Palaeolithic and Mesolithic is documented in Farrand (supra n. 81) 92–94.

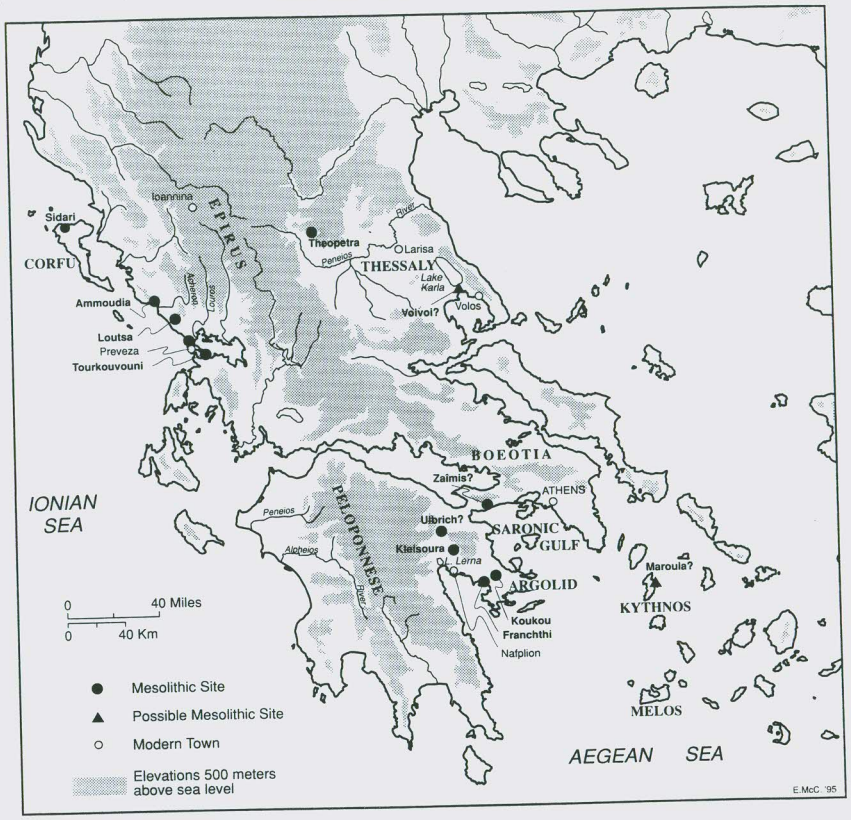

Fig. 9. Map showing locations of principal Mesolithic sites. Voivoi and Maroula are generally not considered to be Mesolithic, but are shown for reference. The precise locations of Zaïmis and Ulbrich are unknown.

ies.[101] Fragments of andesite querns imported from the Saronic Gulf were probably used to crush plant materials as well as to shape shell and stone ornaments and perform other tasks.[102]

The most spectacular recent discovery from the Lower Mesolithic is a cemetery near the mouth of the cave. One intact burial had been excavated earlier, the flexed inhumation of a young man at the mouth of the cave, at that time the earliest human burial recorded in Greece. Reanalysis of the human bone remains by Tracey Cullen and Della Cook has shown that this well-known burial lay above a small community cemetery, with five inhumations, two cremations, and the scattered remains from another two to five individuals.[103] At least one other burial (Upper Mesolithic) can be reconstructed from another area and six to 25 individuals are represented by the *disiecta membra* collected from Mesolithic levels

[101] For the changes in plants, fauna, and shellfish, see Hansen, Payne, and Shackleton (supra n. 84). For Melian obsidian, see Perlès (supra n. 7) 30. The important and interesting remains of pelagic fish are discussed by M. Rose, *With Line and Glittering Bronze Hook: Fishing in the Aegean Bronze Age* (Diss. Indiana Univ. 1994) 429–45; and Rose, "Fishing at Franchthi Cave, Greece: Changing Environments and Patterns of Exploitation," *OWAN* 18:3 (1995) 21–26.

[102] C.N. Runnels, *A Diachronic Study and Economic Analysis of Millstones from the Argolid, Greece* (Diss. Indiana Univ. 1981) 100–101.

[103] Cullen (supra n. 36).

throughout the cave. The human remains reveal that adults, adolescents, infants, and neonates were present in the group that occupied the cave. The interpretation of the Franchthi community is significantly altered by discovery of adult men and women of different ages and of children among the dead. The conclusion is inescapable that we are dealing with a permanent settlement with the full spectrum of the social group. The sophistication and complexity of thought revealed by the different treatment of the dead, some of whom were inhumed while others were cremated, is mirrored by the richness of the material culture evident from the profusion of artifacts, particularly in the Upper Mesolithic phase, from the rest of the cave during the 1,500 (radiocarbon) years of the settlement's history.

The Upper Mesolithic is evidently a continuation of the culture established in the Lower Mesolithic. The lithic assemblage is marked by a return of microlithic geometrics and backed bladelets, with an increase in the percentage of Melian obsidian to ca. 3%, evidence of an increased contact with the Cycladic islands. Other finds, which are present throughout the Mesolithic sequence, suggest a permanent settlement with a complex economy. Andesite continued to be imported from the Saronic Gulf, and the presence of carbonized remains is an indication that wild cereals were being collected. Stone and shell ornaments are present, and bone was used to fashion fishing tackle and possibly parts of clothing (buckles or toggles). An increased interest in the sea is supported by the occurrence for the first time of pelagic fish, including remains of large tunny, which were taken in the open sea. The presence of pelagic fish at Franchthi coincides with the increase in the quantity of imported Melian obsidian.[104]

The excavators are still in the process of publishing their finds, but several inferences are possible for the Mesolithic at Franchthi as a whole. The presence of tunny, when put beside the imported obsidian and andesite, underscores an emphasis on marine resources and long distance trade and communication. The thickness of the deposits, the density of the finds, and wide range of new kinds of tools and artifacts (such as the querns), together with the human burials, suggest a more sustained human exploitation of the cave and its environs.

Is the precocious settlement at Franchthi Cave, with its resemblance to the Natufian of the Near East, indicative of developments elsewhere in Greece during the Mesolithic period? There is no way to know. Our data are too few. The site of Sidari is the only other Mesolithic site to be excavated in recent times, and it is a small, shallow tell on the north coast of the island of Corfu later in date and considerably less rich in finds (fig. 10). It was excavated in 1964 by Augustus Sordinas and has three major units: Mesolithic, Neolithic, and Early Bronze Age.[105] The Mesolithic deposits are on virgin soil. The lowest deposit consists chiefly of charcoal, marine shells, flints, and bones of animals and fish in an anthropogenic soil rich in carbon and ash. Finds of some interest not reported by Sordinas, but present in the collections housed in the Corfu Archaeological Museum, are large pieces of burned daub that may be from simple structures or shelters. The deposit is dated to ca. 5870 ± 340 B.C. (i.e., 7820 ± 340 B.P. in uncalibrated radiocarbon years). On the basis of the lithics the Mesolithic component at Sidari (level D) belongs to the Upper Mesolithic, if we compare it with the Franchthi Cave sequence, but the date indicates that the site is at least partly contemporary with Early Neolithic sites in eastern Greece and Crete. The lithics from Sidari closely resemble those from Franchthi, particularly in the small scale of the artifacts and presence of geometric microliths, which are made by simple retouch on fragments of flakes or blades and not by the microburin technique. Obsidian is completely absent. Sordinas noted the apparent importation of the distinctive flint used to make the tools, and from this and the coastal location of the site, he concluded that the Mesolithic people are unrelated to the former Palaeolithic inhabitants of the island and had an economy focused on the exploitation of marine resources.

The only other Mesolithic sites tested by excavation are the Ulbrich Cave in the Argolid and Zaïmis Cave in the Megarid investigated by Markovits between 1928 and 1933. The finds from these excavations are lost and the locations of the caves themselves are no longer certain. The Ulbrich Cave is said to be midway between Nemea and Nafplion, and Zaïmis was evidently along the line of the modern highway between Megara and Corinth, and may have been destroyed in its construction. Markovits's reports have been closely examined by Perlès who believes that Markovits was correct in attributing the pre-ceramic layers to the early Holocene, and hence to the Mesolithic. As Perlès notes, it is interesting that Markovits considered the evidence to show that the inhabitants of Zaïmis and Ulbrich were primarily fishers.[106] He compared the lithics to the Tardenoisian of France. In the absence of further evidence, nothing more can be said about these sites.

Other sites mentioned in the literature as possible candidates for the Mesolithic include Theopetra Cave and Voivoi in Thessaly and Maroula in Kythnos. Theopetra Cave in western Thessaly near Kalambaka is currently being excavated and is not yet published, but reportedly has a Mesolithic component. The site of Voivoi in Thessaly on the shore of the former Lake Karla was once considered as a possible Mesolithic site by Theocharis, but he changed his mind when it was possible to compare the finds with the material from Franchthi Cave, and Voivoi is now regarded as Neolithic.[107] The site of Maroula on the island of Kythnos is something of a puzzle. It was initially described as a Mesolithic site in a brief report, but a later analysis suggested a Neolithic or Bronze Age attribution for the site.[108] Until the site is excavated our questions may not be answered, but the discovery of a probable early Holocene site at Aetokremnos in Cyprus is a stimulus to reexamine any island site that may belong to the late Pleistocene or early Holocene.[109]

A number of new Mesolithic sites have been identified recently. A small cave (F35, Koukou Cave) in the Fournoi Valley, about 5 km from Franchthi Cave, was discovered by an American team in the 1970s. The simple flint implements from the surface of the

[104] T.W. Jacobsen, "17,000 Years of Greek Prehistory," *Scientific American* 234:6 (1976) 76–87 illustrates Mesolithic artifacts and fish remains. The appearance of pelagic fish in the Upper Mesolithic is documented by Rose 1995 (supra n. 101). The increase in obsidian is discussed in T.W. Jacobsen and D.M. Van Horn, "The Franchthi Cave Flint Survey: Some Preliminary Results (1974)," *JFA* 1 (1974) 305–308.

[105] Sordinas 1970 (supra n. 16).

[106] Perlès (supra n. 7) 120–22.

[107] Perlès (supra n. 7) 120 for a summary of Voivoi. Theopetra Cave is being excavated by N. Kyparissi-Apostolika for the Ephoreia of Palaeoanthropology and Speleology: see report in Bailey et al. (supra n. 23).

[108] The curious site of Maroula is discussed in detail by Perlès (supra n. 7) 125–26; and J.F. Cherry, "Four Problems in Cycladic Prehistory," in J.L. Davis and J.F. Cherry eds., *Papers in Cycladic Prehistory* (Los Angeles 1979) 26–32.

[109] A.H. Simmons, "Humans, Island Colonization and Pleistocene Extinctions in the Mediterranean: The View from Akrotiri *Aetokremnos*, Cyprus," *Antiquity* 65 (1991) 857–69; and A.H. Simmons and P.E. Wigand, "Assessing the Radiocarbon Determinations from Akrotiri *Aetokremnos*, Cyprus," in Bar-Yosef and Kra (supra n. 30) 247–64.

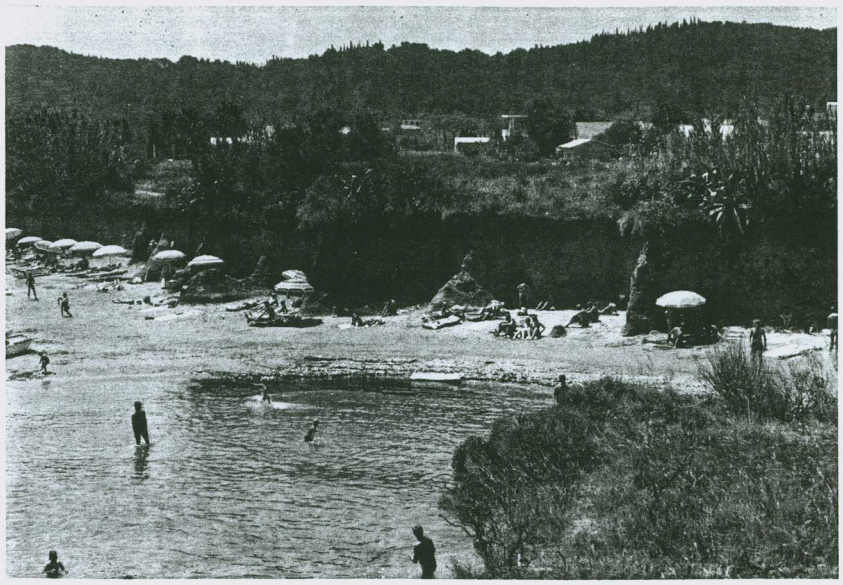

Fig. 10. View of the Mesolithic site of Sidari, Corfu. The low mound is in the center of the photograph, and the stratification is visible in the sea scarp.

site, chiefly simple flakes with notches and multiple retouched edges, and the lack of ceramics suggest comparison with the Lower Mesolithic at Franchthi, but the sample is too small to be conclusive. Several lithic scatters in the same region may be Mesolithic, but are too small and too disturbed to support definitive identification.[110]

A reconnaissance of the Berbati and Limnes valleys on the northern edge of the Argive plain by a Swedish-American team identified two open-air sites in the Kleisoura Gorge, which together produced a collection of nearly 1,000 flint artifacts.[111] The two sites (findspots 200 and 201) are only a few hundred meters apart, and there is no apparent difference between the collections made at the sites, which may be contemporary (fig. 11). A close analysis of the lithics shows them to be very similar to the Lower Mesolithic industry at Franchthi, and a radiocarbon date of 10,000 B.P. from one of them shows that they belong to the beginning of the Holocene.[112] A pollen core from nearby Lake Lerna shows that the region supported a deciduous oak forest and must have been well watered.[113] A reconstruction of the Argive Plain as the result of a detailed geological study can be used to show that the Kleisoura Mesolithic sites were about 18 km from the coast in the early Holocene.[114] It is probable that there are other Mesolithic sites in the region, and one of the Kleisoura sites could possibly be Markovits's Ulbrich Cave (one of the findspots is close to a mostly collapsed rock shelter that could loosely be described as a cave), but there is no way to confirm this hypothesis.

A survey in southern Epirus (the Nomos Prevezas) has produced evidence of six possible Mesolithic sites on the Ionian Sea littoral.[115] Three sites are found in paleosols in a dune field west of the town of Preveza. The dune field lies directly on the present shoreline and consists of fossil dunes with stratified deposits of paleosols capping them (fig. 12). Both fossil dunes and paleosols are overlain today by active dunes. The sites consist of dense concentrations of flint implements embedded in the paleosols. Their distribution is governed by modern building activity and they are also uncovered by shifting dunes, exposing the relatively hard and stable surfaces of the paleosols. Geological study shows that the coastal

Fig. 11. View of Mesolithic site at findspot 201 (Kleisoura) in Berbati, Argolid. The shallow shelter is visible in the right center of the photograph, on the line of the cultivated field. The stratified deposits are found in front of the projecting rocks.

environment between Preveza and the Acheron River was a complex and rapidly changing network of lagoons, swamps, estuaries, and braided streams separated by dunes and small rises, which were sometimes stable for periods long enough for shallow soils to form. The sites are thought to be campsites situated among the dunes in protected swales or on dunes stabilized by vegetation that overlooked estuaries and streams. The lithics are rich in trapezoidal microliths (used as arrowheads) and other projectile points. The industry is made up otherwise of very small flake tools with multiple retouched edges fashioned with tiny nibbling retouch. Blades are rare, and there are many notches and denticulates. No ceramics have been found and only one piece of ob-

[110] Jameson et al. (supra n. 2) 335–40.

[111] B. Wells, C.N. Runnels, and E. Zangger, "In the Shadow of Mycenae," *Archaeology* 46:1 (1993) 54–63; C. Runnels, "The Palaeolithic and Mesolithic Remains from the Berbati-Limnes Survey," in B. Wells and C. Runnels eds., *The Berbati-Limnes Archaeological Survey 1988–1990* (Stockholm, in press).

[112] J. Kozlowski, personal communication, 1994.

[113] S. Jahns, "On the Holocene Vegetation History of the Argive Plain (Peloponnese, Southern Greece)," *Vegetation History and Archaeobotany* 2 (1993) 187–203.

[114] Zangger (supra n. 2).

[115] Runnels et al. (supra n. 47).

Fig. 12. View of one of the possible Mesolithic sites on the Ionian coast west of Preveza, Epirus. Microlithic artifacts are found in the paleosol in the foreground, exposed by the removal of sand from a dune for construction purposes.

sidian, evidently not of Melian origin. A fourth site similar to these three is located near the mouth of the Acheron River, near the village of Ammoudia. Two other sites are located on limestone spurs with commanding views of the sea at Loutsa near the Acheron valley and on the headland of Tourkovouni at the end of the Ayios Thomas peninsula east of Preveza. Burned daub was noted at the Loutsa site suggesting the presence of a structure or structures at some sites.

Until these sites are fully published it is possible to draw only very preliminary conclusions, but it is notable that the sites are located with a clear orientation to the present coastline and in positions where they would have had access to marine and estuarine resources. The small scale of the flint industries is another feature of the traditional picture of Mesolithic exploitation patterns, which were focused on a mixed economy of hunting and fishing.

The presence of Mesolithic sites chiefly in Epirus and the Argolid suggests that the Mesolithic has a rather discontinuous distribution in Greece. It is clear that large areas were uninhabited during the Mesolithic, particularly areas such as eastern Thessaly that have substantial numbers of Neolithic sites beginning about 9,000 years ago. From this we can conclude that any hypothesis of experimentation with domestication in the Mesolithic leading to the indigenous and independent development of the Neolithic village farming economy must be abandoned.[116] There is a considerable body of evidence to demonstrate that the earliest Neolithic cultures reached Greece in the seventh millennium B.C. as the result of demic diffusion from the Near East, and the distribution of Mesolithic sites suggests that there may have been an earlier wave of migration that paved the way for Neolithic settlers to follow.

In my view, the Greek Mesolithic may be unconnected with the Palaeolithic, but is separated from it by a hiatus of unknown length. As a working hypothesis, I consider the presently available evidence to point to the introduction of the Mesolithic by seafaring people who are unrelated to the Pleistocene inhabitants of Greece. The Mesolithic represents the first stage or wave of demic diffusion that culminated in the establishment of the Neolithic farming village way of life in Greece.

An early Holocene site in Cyprus, and perhaps another in Kythnos, point to a passage by sea, with travelers perhaps attracted by the isolated large islands with indigenous fauna unprepared for human predation. When these stocks were exhausted, the seafarers worked their way through the islands to the mainland where they established themselves either permanently, or on a seasonal basis, to carry out a mixed economy based on hunting, fishing, and

[116] See van Andel and Runnels (supra n. 10).

collecting. The distribution of sites is significant because the earliest Mesolithic sites (Franchthi, Koukou, Kleisoura sites) are found in southern Greece and later Mesolithic sites (Sidari, Preveza sites, Acheron sites) are in northwestern Greece—all with a coastal location suggesting an east to west settlement by seafarers.

One factor indicating an intrusive Mesolithic is the similarity of the cultural materials at all of the Greek sites, particularly of the lithic assemblages. It should also be noted that the Mesolithic features are completely different from those of the preceding Palaeolithic, but resemble those found at contemporary sites in the eastern Mediterranean. The presence of formal burials, with evidence of ritual activity, is perhaps one of the chief features that connects Franchthi with contemporary sites in the Near East.[117] Other shared features include increased use of marine and riverine resources, a special emphasis on the hunting of red deer or some other cervid, the use of wild cereals and querns to grind them, and the use of exotic raw materials such as obsidian to manufacture stone tools.

EARLY GREEK PREHISTORY IN BROAD PERSPECTIVE

It is possible only to sketch the relationships between the existing evidence and the questions proposed earlier in this paper to guide research. The archaeological record does not show a steady occupation of the region after an initial settlement, but reveals a complicated picture of renewed human settlement separated by sometimes long periods with little evidence of human activity. The entry of early humans into Greece occurred as the result of two separate movements of people. The first, ca. 300,000 B.P., brought archaic *Homo sapiens* into Greece, perhaps filling a void left by an earlier pioneering movement of *Homo erectus* from Africa into Europe that failed to take hold. If supported by future research, this finding will require modification of the multiregional hypothesis for the origins of modern humans, adding weight to the hypothesis that *Homo erectus* may not have reached Europe at all, and that the colonization of Europe was carried out by a later hominid of generalized *Homo sapiens* type. The evidence also indicates that a separate and later movement ca. 100,000 B.P. brought Neanderthals or other archaic *Homo sapiens* into Greece from central and southeastern Europe. It is an open question whether Greece was inhabited continuously during this period.

Another influx of immigrants into the Balkans took place between 40,000 and 30,000 B.P., bringing anatomically modern *Homo sapiens* into contact with resident Neanderthal populations, and which, for unknown reasons, was followed by the disappearance of the Neanderthals. Yet another hiatus appears to interrupt the record at this point, and it is not until after 28,000 B.P. that moderns appear to have established themselves more or less permanently in Greece, although on a limited and patchy basis. If this reconstruction is correct, the evidence supports the replacement theory for the origins of modern humans, although suggesting that it must be seen as a complex process of discontinuous regional movements. The central tenet of the replacement theory is that modern humans evolved in Africa between 200,000 and 100,000 B.P., and migrated into the Near East by 100,000 B.P. where they overlapped with archaic humans for nearly 60,000 years. The archaic humans in their turn may have encountered modern humans moving northward from Africa as they themselves moved southward into the Balkans and southwest Asia. In the Near East, where the overlap between the two human groups is seen most clearly, it is not yet clear whether the archaic and modern humans were in the same region at the same time, or if they alternated in their movements in and out of the area.[118] Modern humans appear to have been confined to the Near East until 40,000 B.P. or even later. Only after the transition from the Middle Palaeolithic to the Upper Palaeolithic is registered in the Near East does the earliest Upper Palaeolithic, the Aurignacian, appear in the Balkans before 40,000, reaching western Europe later still. From this we can conclude that modern humans began a new expansion into Europe after a long period in the Near East that ultimately resulted in the extinction of the Neanderthals and other archaic humans for unknown reasons.

The Upper Palaeolithic in Greece is separated from what comes before and after by breaks in the stratigraphic record. There is no evidence that the Upper Palaeolithic settlement of Greece involved all parts of the country. The islands were not inhabited, although the presence of obsidian at Franchthi in the final Upper Palaeolithic indicates a knowledge of and access to the resources of some islands.[119] There are many unsettled questions about this period, but I think that the most likely hypothesis is that modern humans entered Greece in the Upper Palaeolithic as the result of numerous small movements of people, probably entering the region at separate times and from different directions. The Epirote Palaeolithic may be the result of movements of small bands across the Adriatic plain from Italy or the northwestern Balkans, while separate groups may have found their way into the Peloponnese by following the coastal plains southward along the east coast.

The nature of Upper Palaeolithic inhabitation of Greece and the rest of Europe is discontinuous in both space and time. This fact has been discussed before, but there is no good explanation for it, and we are unlikely to make progress without more evidence. I suspect that there are at least two factors that must be considered. There were undoubtedly very small numbers of humans in this period and in the absence of population pressure many areas would simply have been passed over for better habitats. We are hampered in discussing the merits of different regions by the lack of detailed proxy evidence for reconstructing palaeoenvironments for small areas and within reasonably narrow chronological limits. If we could do this, we would possibly find that some regions were too dry, were glaciated, or were otherwise unsuitable for habitation in the late Pleistocene. Another factor in Greece is the effect of marine transgression and other geologic processes on the preservation of the archaeological record. The Upper Palaeolithic settlement took place during the last glacial when sea levels were depressed by as much as 120 m, exposing large coastal plains, which were lost again with the rapid rise of the sea in the late Pleistocene. In Greece this had a major impact on the preservation of sites. In a country with a long coastline and a mountainous interior the loss of the plains meant the loss of 40–70% of the land most likely to have been occupied.[120] This factor had a greater impact in the Upper Palaeolithic than in the Middle Palaeolithic or the Mesolithic when sea levels were lower by only 40 m, making the proportional losses of coastal plains much less. It is also a remarkable fact that most of the Upper Palaeolithic sites in Greece are found in caves or rock shelters, and that open sites are rare. The open Upper Palaeolithic sites that have been found by surveys often are no more than small scatters of stone tools on bare rock or on thin relict soils, and it is possible that many such sites were removed altogether by post-Pleistocene erosion.

When we turn to the Mesolithic, it is clear that the most recent evidence contributes to a revised understanding of the period. The Mesolithic of Greece can be attributed to the movements of people by sea that ultimately brought people from the Near East to Greece in the Neolithic period when the pattern of the Greek economic and social structure for all subsequent periods was established. A review of the Neolithic as a whole is not necessary here, and it is sufficient to note that the evidence from Greece confirms Childe's hypothesis that the earliest Neolithic of southeastern Europe was the result of diffusion of agriculturalists from the Near East, even if the process of diffusion is more complicated than he originally thought.

CONCLUSION

When we regard the great sweep of Greek prehistory before the Bronze Age, it is clear that much progress has been made in our understanding of the earliest periods. A few decades ago almost nothing was known of early Greek prehistory, and someone writing of it in 1960 may have said something very like what Dr. Johnson said of British prehistory more than two centuries ago: "All that is really *known* of the ancient state of Britain is contained in a few pages. We *can* know no more than what old writers have told us; yet what large books have we upon it, the whole of which, excepting such parts as are taken from those old writers, is all dream. . . ."[121] The prospects of writing a reasonably coherent prehistory of Greece have tolerably improved. It must be admitted, however, that the gaps in our knowledge are equally apparent. We do not know whether Greece was settled during the first migration of early humans from Africa, and we still have no good idea of the identity of the hominids who first penetrated

[117] A comprehensive study of the structural features of the Mediterranean Mesolithic is found in Clark (supra n. 95) 59–100.

[118] O. Bar-Yosef and R.S. Kra, "Dating Eastern Mediterranean Sequences: Introductory Remarks," in Bar-Yosef and Kra (supra n. 30) 1–12.

[119] Evidence for habitation of the Mediterranean islands is summarized by J.F. Cherry, "The First Colonization of the Mediterranean Islands: A Review of Recent Research," *JMA* 3 (1990) 145–221. For Mesolithic obsidian, see C. Renfrew and A. Aspinall, "Aegean Obsidian and Franchthi Cave," in Perlès (supra n. 7) 257–70.

[120] See van Andel, in Jameson et al. (supra n. 2) 203, table 3.8, and fig. 3.27, for a graphic illustration of the impact of marine transgression on the Franchthi coastal plains.

[121] J. Boswell, *The Life of Samuel Johnson, LL. D.*,[3] (London 1799) 356. Emphasis is Dr. Johnson's.

the fastnesses of the Greek mountains or wandered its now lost and forgotten shores.

The rarity of human fossils in the Palaeolithic is a major impediment to further progress, and for all periods and areas complete inventories of existing sites are lacking. The small number of excavations is simply unacceptable. It is humbling to acknowledge that large regions, such as Macedonia, Thrace, and much of central Greece and the Peloponnese, remain to be explored. The finds from existing excavations and surveys are inadequately published, and in the case of Asprochaliko, Kastritsa, Kephalari, and some other sites, it seems that the results of the excavations are unlikely ever to be published. When the loss of information from Markovits's and Stampfuss's excavations is added to the list of unfinished work, I sometimes feel as if we are doomed to repeat, like Sisyphus, the labors of basic research.

Finally, there are some areas about which little can be said. The existence of obsidian in Mesolithic and Upper Palaeolithic layers at Franchthi Cave is an indication that we will eventually find evidence for activity during these periods on the Cycladic islands. An early Holocene site in Cyprus is a harbinger of what is to be found on some of the larger Mediterranean islands, and Crete is likely to have played an important role in the transmission of Mesolithic and Neolithic culture to the mainland. No reliable report of pre-Neolithic antiquity exists for Crete, but the Mesolithic seafarers could not have overlooked this island with its strategic position in the Aegean and its abundance of untapped natural resources.[122] After due adjustments are made for geologic and geomorphic changes that serve to mask early sites and control their discovery, Crete will no doubt yield many secrets to persistent investigators.

The most important conclusion is that Greece is no longer on the fringe, but is a central part of the prehistoric world that stretched without boundary from western Europe to the Near East. In early prehistoric times people moved in both directions on this great east–west axis as on a highway, now seeking new lands, now retreating in the face of global climatic changes, and sometimes, in moments that we can only dimly imagine, meeting others who were like themselves and yet different. The prehistory of Greece is not the story of continuous development beginning from an initial settlement, or enduring inhabitation by a stable population, but is a patchwork of migrations and new settlements followed by long periods of adaptation, interruption, and abandonment: a cultural pattern that endured for three thousand centuries and set its stamp upon the cultural history of this country.

DEPARTMENT OF ARCHAEOLOGY
BOSTON UNIVERSITY
BOSTON, MASSACHUSETTS 02215
RUNNELS@BU.EDU

[122] The lack of existing or published evidence for pre-Neolithic habitation of Crete is summarized in Cherry (supra n. 119) 158–65. An interesting argument for the visitation of Crete in the early Holocene is the evidence for faunal extinctions discussed in E. Lax and T.F. Strasser, "Early Holocene Extinctions on Crete: The Search for the Cause," *JMA* 5 (1992) 203–24.

Sterling Dow, 1903–1995

EMILY VERMEULE

Sterling Dow, Professor of History and John E. Hudson Professor of Archaeology Emeritus at Harvard University, President of the Archaeological Institute of America from 1946 to 1949, Chairman of the Institute's Centennial Committee in 1977, and founder of *Archaeology* and of the American Research Center in Egypt, died in Cambridge, Massachusetts, on 9 January 1995.

Dow was born on 19 November 1903, in Portland, Maine, son of Sterling Tucker Dow and Alice Verrill Dow. He was educated at Kennebunk High School, with a final year at Phillips Exeter Academy, and then Harvard College, class of 1925. He won the Fiske Scholarship to Trinity College, Cambridge, and then took a Master's degree at Harvard in 1928. He spent the years 1931–1936 at the American School of Classical Studies at Athens, with his wife Elizabeth (Libby) Sanderson Flagg, whom he married in 1931. He received the Ph.D. degree from Harvard in 1936.

Dow returned to Harvard as Tutor and Instructor, 1936–1941, and as Associate Professor, 1941–1946. Some of those years were spent doing war intelligence work in Cairo along with friends like Rodney Stuart Young, and of those years' mysterious incidents and international complications he was a hilarious raconteur. He was appointed Professor of History and Greek at Harvard in 1946, serving in both departments, and in 1949 he became the John E. Hudson Professor of Archaeology, the position that he held until his retirement in 1970. The marble bust of the chair's donor was a familiar sight to the many generations of students and friends who went to tap on the door of his study in Widener Library.

Numbers of students first experienced Sterling Dow in a famed course on Greek history, History 106. The lectures had been prepared no doubt over many years, beautifully organized, but each seemed fresh, and alive with contemporary allusions, insights, and jokes. Here was a course that took the Bronze Age seriously, unlike most Harvard Classics courses, and Bronze Age habits of writing and script storage. Dow felt, early, that Linear B might well be a form of Greek, and taught it as such before the Ventris-Chadwick decipherment of the script was publicly announced. He also took Homer seriously, as poetry and as history, and every student had a set paper requiring him or her to imagine a set of circumstances that would allow Archaic singers and written texts to flow from Bronze Age history.

That course moved, perhaps predictably, but memorably and impressively, through the tyrants, Cleisthenes, the Persian and the Peloponnesian Wars ("did Pericles want the war because he was short of grain?"), Jason of Pherai, Epaminondas, events in Macedon, and Roman ambitions in the East, and each lecture was crafted as a complete episode, and was a masterpiece. It might seem old-fashioned now, resolutely not "trendy," but in the early '50s it was a revelation of how interesting the past could be, and what a self-effacing style of scholarship could offer to ignorant students. That the lectures were condensations in expert form of vast literatures still closed to us, we did not doubt, and knew we could never match the Dow mastery, yet the exciting glimpses of what was still waiting for us to learn were made the more intriguing because they were never put forth dully, or with ego or self-satisfaction.

Advanced students might take the famous seminar on the rubrics of the Athenian sacred calendar, and be taught the Dow methods of making paper squeezes of inscriptions; this personal art indeed was periodically demonstrated decades after Dow's retirement from Harvard in 1970, because he was constantly called in to show groups of graduate students the technique, Harvard having had no Greek epigraphist during his absence in retirement.

Although generally a reserved person, Dow took an active and helpful interest in the careers of students. He took them to working lunches, and for walks, and brought them home to hospitality whether on Scott Street or, later, in the famous historical house on Brattle Street. He introduced them to senior scholars of many ages and countries. He found extraordinary dissertation topics for them, and maintained lists of questions to which the world needed to have answers, if the right bright young person came along and could be interested. Many of these topics derived from his own interests in later Athens, the ephebes, earnings, wages and prices, the adoption of foreign cults like that of Bendis in Athens and the arrangement of a priestly hierarchy for each, the use of foreign mercenaries and their weaponry, the composition of the metic class, the prosopography of Athens from the fourth century B.C. to the third century A.D.,

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