SCIENZE DELL’ANTICHITÀ
STORIA ARCHEOLOGIA ANTROPOLOGIA
12
(2004-2005)
INDICE

POPOLONIA. SCAVI E RICERCHE DAL 1998 AL 2004

Premessa di G. Bartoloni ................................................................. Pag. 11
A. Camilli, Introduzione: sulle ricerche in corso a Populonia (e dintorni) ................ » 13
L. Botarelli – F. Cambi, Il territorio di Populonia fra il periodo etrusco tardo e il periodo romano. Ambiente, viabilità, insediamenti ........................................ » 23
G. Bartoloni, Considerazioni sull’inizio del processo di formazione urbana emerse dalle ricerche in corso a Poggio del Telegrafo e nel golfo di Baratti .......... » 45
M. Bonamici, Recent indagini nel quartiere industriale di Populonia ................ » 89
C. Chiaramonte Treré, Nuove ricerche nella necropoli popoloniense di Bueche delle Fate .......................................................... » 133
E. Zanini, Il Vignale in età romana e tardoantica: avvio di un progetto di ricerca ... » 171
L. Dallai, Le indagini sul promontorio di Piombino: topografia e diacronia di un territorio e di una città .......................................................... » 185
F. Redi – A. Forgione, San Cerbone vecchio ......................................... » 203

UN LUOGO DI CULTO AL CENTRO DEL MEDITERRANEO: IL SANTUARIO DI TAS SİLĠ A MALTA DALLA PREistoria ALL’ETÀ BIZANTINA

Premessa di M.G. Amadasi Guzzo – A. Cazzella ................................ » 231
G. Recchia, Il tempio e l’area sacra megalitica di Tas Silġ: le nuove scoperte dagli scavi nei livelli del III e II millennio a.C. ........................................... » 233
A. Cazzella – M. Moscoloni, Gli sviluppi culturali del III e II millennio a.C. a Tas Silg: analisi preliminare dei materiali degli scavi 1963-70 e della loro distribuzione spaziale .................................................. » 263
M.G. Amadasi Guzzo, Tas Silg – Le iscrizioni fenicie nel santuario di Astarte .................................................. » 285
F. Scaglia, Tas Silg – Recipienti del santuario .................................................. » 301
G. Semeraro, Nuove ricerche nel santuario di Astarte a Tas Silg: l'area Nord .................................................. » 309
B. Pecere, Applicazione GIS ai dati di scavo. Uno strumento per la gestione delle ricerche a Tas Silg .................. » 325
A. Quercia, La ceramica punico-maltese del santuario di Tas Silg: analisi tipologica e funzionale .................. » 335
M.P. Rossi, Il santuario in età tardo-ellenistica .................................................. » 355
C. Perassi, Rinvenimenti monetali da Tas Silg .................................................. » 371

LA MISSIONE ITALO-LIBICA NEL JEBEL GHARBI (LIBIA)
B.E. Barich, Il progetto nel Jebel Gharbi (Libia): l'ambiente e le culture .................................................. » 389
C. Giraudi, L'evoluzione ambientale del Jebel Gharbi nel tardo-pliocene e nell'olocene e le variazioni climatiche in area nord-africana e mediterranea .................................................. » 395
E.A.A. Garcea, Il Jebel Gharbi nel Pleistocene superiore: strategie di adattamento tra il Sahara e il Mediterraneo .................................................. » 399
B.E. Barich – G. Lucarini, Gli ultimi cacciatori e l'origine dei siti pastorali nel Jebel Gharbi (Libia) .................. » 405
M. Massussi – C. Lemorini, I siti ateriani del Jebel Gharbi: caratterizzazione delle catene di produzione e definizione tecnico-funzionale dei peuplements .................................................. » 415
G. Mutri, Late Pleistocene complexes in the Jado area (Jebel Gharbi, Lybia): two comparative case studies .................................................. » 427
M. Munzi – F. Felici – G. Cifani – G. Lucarini, Leptis Magna: città e campagna dall'origine alla scomparsa del sistema sedentario antico .................................................. » 433
A. Bouzouggar – R.N.E. Barton – M. De Araújo Igreja, A brief overview of recent research into the Aterian and Upper Palaeolithic of northern and eastern Morocco .................................................. » 473
A. Ciattini, Un modello etnografico per lo studio delle società pastorali preistoriche del Jebel Gharbi .................................................. » 489
A. Palombini, The reconstruction of Jebel Gharbi rainfall history through a mathematical simulation model .................................................. » 497

IL TEATRO ROMANO DI TERRACINA E IL TEATRO ROMANO NELL'ANTICITÀ
Premessa di F. Mannino .................................................. » 505
Saluto del Comune di Terracina di M.R. Saccucci .................................................. » 507
N. Cassier, Le indagini nel complesso del teatro-portico di Terracina .................................................. » 509
X. Dupré Raventós, *Il teatro tardorepubblicano di Tusculum. Cronologia e trasformazioni* .................................................. » 527
G. Ortolani, *Teatri antichi: riuso e valorizzazione* .................................................. » 545
L. Migliorati, *Teatro e città* ............................................................................. » 555
G.L. Gregori, *I protagonisti della scena teatrale nella documentazione epigrafica di Roma* ................................................................. » 575
P.C. Innico, *Il teatro romano di Terracina nella forma della città antica* ........ » 591
P. Longo, *Per un nuovo inquadramento cronologico del Foro Emiliano e del suo impianto sostruttivo* ................................................................. » 613
P. Pensabene, *Edifici scenici e marmi nei teatri di Ostia e di Cassino* ........... » 623
G. Mesolella, *La decorazione architettonica del teatro romano di Minturnae: un contributo alla conoscenza dell’edificio* ........................................ » 635
S. Evangelisti, *Testimonianze epigrafiche relative ad attori e a spettacoli scenici nel Latium adiectum* ................................................................. » 655
E. Laurenzi, *Il “teatro” nelle residenze private* .................................................... » 669
M. Tornese, *Il riuso degli edifici per spettacolo nel medioevo: alcuni casi in Abruzzo* ........................................................................ » 677
F. Mannino, *Un esempio di spoliazione medioevale di un Teatro romano* .... » 705
M. Mannino, *I graffiti del complesso Teatro-Portico di Terracina* .................. » 713

**Recenti scoperte e conferenze di Dipartimento**

L. Nigro, *Un pithos dipinto dalla Fortezza Occidentale di Mozia* .................... » 727
I. Strøm, *Il Pittore di Pozzuolo* ..................................................................... » 739
ABDEJJALIL BOUZOUUGGAR – R. NICK E. BARTON – MARINA DE ARAÚJO IGREJA

A BRIEF OVERVIEW OF RECENT RESEARCH INTO THE ATERIAN AND UPPER PALAEOLITHIC OF NORTHERN AND EASTERN MOROCCO

GEOGRAPHICAL CONTEXT AND OBJECTIVES

Despite the acknowledged wealth of evidence for the Middle and Upper Palaeolithic in Morocco surprisingly little is known about the chronology of these periods or of the palaeoenvironmental background to human occupation in the Upper Pleistocene in this region. To redress this imbalance a new project was begun in northern and eastern Morocco in 2000\(^1\) with the express intention of collecting chronological and environmental data from known sites as well as surveying promising new areas with high potential for further research. The work has focused entirely on cave sites (fig. 1) because they currently offer the best opportunities for studying long stratified records of human activity and are locations in which datable organic materials and other cultural residues are often well preserved. Two major related themes of this work involve 1) the investigation of the Aterian, a Middle Palaeolithic technology which is still inadequately understood in terms of its nature, dating or palaeoenvironmental context, and 2) the question of the origins and timing of the Upper Palaeolithic and its relationship with earlier industries in North Africa.

THE ATERIAN PROBLEM

In the nineteenth century the first pedunculate Aterian lithic artefacts were discovered at Eckmuhl Cave\(^2\) in the Oran region of Algeria. Since then many other Aterian sites have come to light\(^3\), but so far little has been published on any of the associated human fossils or their

---

\(^{1}\) NERC/EFCHED project (UK) and PROTARS P32/09 (Morocco).


stratigraphic relationship with clearly diagnostic Aterian finds. A relevant example is that of El Aliya Cave in NW Morocco in which both Aterian lithics and human remains have been recovered. However while it seems probable that a juvenile maxillary fragment originated from layer 5 with tanged points, the stratigraphic position of a worn adult molar is ambiguous, and it is possible that it derived from a lower layer with an industry in which tanged pieces were absent.

A point that also needs emphasizing is that up until now the majority of Aterian human remains have come from western Morocco in a restricted area of the coastal zone between Rabat (Dar es Soltane 2) and Temara (Contrebandiers Cave and El Harboura 1 Cave). This is almost certainly connected with a focus of fieldwork in this area over the past fifty years. It does not detract from the view that human remains in Aterian contexts are relatively scarce and that the understanding of their evolutionary relationship with human fossils found in the Middle Palaeolithic and Upper Palaeolithic is still problematic and controversial.

The earliest definitions and sub-divisions of the Aterian in Morocco were based on lithic typology. The most widely accepted classificatory scheme is still that of J. Tixier, which de-

---


scribes the Aterian as being made up of Levallois blades, endscrapers and a high proportion of tanged pieces (around 25%). Other authors would include as Aterian a variant with pebble tools\(^7\). Bordes divided the Aterian into three major sub-stages on typological criteria\(^8\). An almost identical scheme was adopted by J. Roche for Pigeons Cave at Taforalt where he identified an Upper Aterian in layer D, a Middle Aterian in layer F and a rich Aterian with Mousterian tradition without pedunculate pieces in layer H\(^9\). Twenty four years later, the same subdivisions were employed for Rhafas Cave\(^10\) (tab. 1).

In Northwest Africa, connections between the Aterian and a local Mousterian have been suggested\(^11\) but are difficult to substantiate. Another idea is that the Aterian originated in Nubia\(^12\) but this hypothesis has been challenged by recent and updated technological and stratigraphic studies in the same region\(^13\) and it now appears that lithic technologies with tanged points are absent in Nubia. In other areas such as Egypt the exact relationship between the Kharga and the Aterian is even now unclear\(^14\) since the archaeological finds derive largely from unstratified surface collections.

A persistent problem also concerns the age of the Aterian. Originally estimated as spanning the period 40,000 BP to 20,000 BP\(^15\), new dates from Egypt\(^16\), Libya\(^17\) and Morocco\(^18\) suggest a considerably longer chronology extending back well beyond 40,000 BP. Recent research

---


in the Libyan Sahara provides one of the earliest ages for the Aterian in the North Africa at Tadrart Acacus which has been dated by OSL (Optically Stimulated Luminescence) to 73,000 years BP.  

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer D</td>
<td>Typical Aterian</td>
<td>Layer 2</td>
</tr>
<tr>
<td>Typical Aterian</td>
<td></td>
<td>Aterian</td>
</tr>
<tr>
<td>Layer F</td>
<td>Proto Aterian</td>
<td>Layer 3a</td>
</tr>
<tr>
<td>Middle Aterian</td>
<td></td>
<td>Proto Aterian</td>
</tr>
<tr>
<td>Layer H</td>
<td>Aterian with high proportion of Mousterian</td>
<td>Layer 3b</td>
</tr>
<tr>
<td>Aterian (?)</td>
<td>Mousterian lithic types</td>
<td>Late Mousterian</td>
</tr>
</tbody>
</table>

Tab. 1. - Subdivisions of the Aterian.

The Iberomaurusian and its relationship with the Upper Palaeolithic

The earliest published dates for the Upper Palaeolithic in Northwest African come from Tamar Hat in Algeria - 20,000 BP and in Morocco at Taforalt - 22,000 BP. However many of the key sites are poorly dated. More recently, further dates have been published from Afalou Bou Rhummel, Ifri n’Ammar, Ifri el Baroud and Kehf el Hammam, none of which are older than Taforalt.

An overriding problem in considering the Upper Palaeolithic in Morocco is how this should be defined. Our present view, based on the analysis of finds from Northern and Eastern caves, is that it might consist of an early and later facies. The later facies can be described as being synonymous with the Iberomaurusian but this raises the important question of appropriate nomenclature. The term Iberomaurusian implies trans-Mediterranean cultural links.
that have not yet been formally demonstrated. Alternative terms for this technology have included: Oranian, Mouilllarian and Eastern Iberomaurusian or Eastern Oranian, but none of them has been applied consistently or has gained common acceptance. To avoid such terminological confusion we propose instead the label Late Upper Palaeolithic as a formal subcategory of the Upper Palaeolithic.

A related theme in our project concerns the origin of the Late Upper Palaeolithic Iberomaurusian. Various source areas have been proposed for this cultural grouping. Based upon technological similarities a potential dispersal route from Northeast Africa was put forward many years ago. However, at an early stage this was challenged because the ^14C dating evidence from layer XII at Haua Fteah showed that the Iberomaurusian lithic technology was younger at this site than at locations in Algeria and Morocco. There are even less convincing connections with the Nile Valley.

In Northwest Africa, the most important collections of Iberomaurusian human remains are from Taforalt, Meheb el-Arbi, Afalou and Columbata and some similarities have been noted with human fossils in Egypt and Libya. While it seems that the human types associated with the Late Upper Palaeolithic Iberomaurusian are all modern Homo sapiens, there are no obvious reasons for seeking links with Egypt and Sudan because the lithic technologies from Wadi Halfa, Gebel Silsila and Deir el Fakhouri are quite different from those of Morocco and Algeria. No less controversial are the proposed cultural links with Southern Europe during the Last Maximum Glaciation particularly since the palaeoenvironmental

---

32 C.B.M. McBurney, op. cit. (at n. 31).
33 D. Ferembach, La Nécropole Epipaléolithique de Taforalt (Maroc Oriental), Etude des squelettes humains, CNRS, Paris 1962.
and chronological sources on which these are based have not yet been adequately established\(^2\).

**Microwear analysis of Aterian pedunculate tools**

New data are available from a microwear study of pedunculate pieces from Aterian layers of Rfasas Cave and recent excavations in the Pigeons Cave at Taforalt (fig. 1). Rfasas Cave is around 900 m above the sea level in the south of Jebel Aourir. This site was discovered by J. Marion in 1950. The cave was excavated from 1979 to 1986 by L. Wengler and by a moroccan-french team from 1995 to 1998\(^4\). Like Taforalt, Rfasas Cave has a deep sequence of 71 layers corresponding to at least four sedimentary subdivisions.

Twenty six pedunculate pieces from Aterian layers (2 and 3a) were submitted for a microwear analysis. This test was conducted in the UMR 6636-CNRS (Aix-en Provence, France) with respect to the methods established by A. Semenov\(^4\) and developed by L.H. Keeley\(^3\) and H. Plisson\(^4\). The analysis consisted of observing and interpreting the macroscopic and micrscopic traces in comparison with experimental ones.

The broken pedunculate tools from Rfasas Cave showed fractures that could be related to use. According to the typology of macroscopic fractures\(^5\), three types were identified (tab. 2) though it is unclear whether they are diagnostic of breakages found on projectiles. Unlike the original idea that Aterian pedunculates were used as projectiles\(^6\), our preliminary work on macro and microwear traces demonstrated formally that only a very few of them were used as such tools (fig. 3). Some of the pieces were used on unknown material (fig. 4), on hard animal material (bones?) (fig. 6) or to work soft materials (fig. 7). To verify this hypothesis, we submitted for the same test, pedunculates pieces from Contredandiers Cave which is on

---


the Atlantic coast and about 600 km from Rhafas Cave (fig. 1). Here also it was clear that they were not always used as projectiles (fig. 5).

<table>
<thead>
<tr>
<th>Fractures (Fischer et alii 1984)</th>
<th>Types</th>
<th>Fractures of pedunculate tools in Aterian layers of Rhafas Cave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cone fracture</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Bending fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feather terminating bending fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hinge terminating bending fracture</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Step terminating bending fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snap fracture</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Embryonic bending fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>«Spin-off»</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2. – Types of fractures identified in broken pedunculate tools according to the typology of Fischer et alii 1984.

**Recent excavations at Pigeons Cave, Taforalt**

We are currently undertaking new excavations and sampling in the Pigeons Cave at Taforalt. The site lies at around 720 m above sea level. During previous excavations claims were made of more than 180 burials in an Upper Palaeolithic layer\(^47\). The cave was discovered in 1908 by Dr. Pinchon and excavated from 1944 to 1947 by A. Ruhlmann and from 1950 to 1977 by J. Roche.

Aterian lithic products were identified in the previous excavations\(^48\). However we have not been able to confirm this presence yet in the very small area so far examined since our layers have produced mainly side scrapers and some rare foliates, but no clear examples of pedunculate pieces.


\(^{48}\) Id., *Les industries paléolithiques de la grotte de Taforalt (Maroc Oriental), Méthodes, étude, évolution technique et typologique*, in *Quaternaria* 11, Roma 1996, 89-100.
Fig. 3. – Pedunculate with cone fracture.

Fig. 4. – Longitudinal movement on unknown material.

Fig. 5. – Transversal movement on dry skin.
Fig. 6. – Transversal movement on hard animal material (bones ?).

Fig. 7. – Transversal movement on soft materials.
The *Ibéromaurusian* was identified and described at Taforalt by J. Roche in a sequence that could be sub-divided into 17 layers. In our own excavations we have noted greater complexity in the stratigraphy which falls within two major units known as the «grey series» and the «yellow series».

From the 2003-2004 excavations ten range-finder AMS radiocarbon dates were obtained on identified single charcoals from stratified contexts (tab. 3).

<table>
<thead>
<tr>
<th>Units</th>
<th>Lab reference</th>
<th>Layers</th>
<th>Material</th>
<th>$^{13}$C</th>
<th>$^{13}$C Ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>OxA-13479</td>
<td>G88-200</td>
<td><em>Pinus sp.</em></td>
<td>-23.8</td>
<td>10,935 ± 40</td>
</tr>
<tr>
<td>G</td>
<td>OxA-13480</td>
<td>G89-202</td>
<td><em>Pinus sp.</em></td>
<td>-23.3</td>
<td>10,950 ± 45</td>
</tr>
<tr>
<td>G</td>
<td>OxA-13516</td>
<td>G89-203</td>
<td><em>Pinus sp.</em></td>
<td>-23.9</td>
<td>11,065 ± 45</td>
</tr>
<tr>
<td>E</td>
<td>OxA-13517</td>
<td>G90-204</td>
<td><em>Dicotyledonous</em></td>
<td>-26.8</td>
<td>10,990 ± 45</td>
</tr>
<tr>
<td>E</td>
<td>OxA-13477</td>
<td>G97-36</td>
<td><em>Conifer</em></td>
<td>-21.4</td>
<td>12,675 ± 50</td>
</tr>
<tr>
<td>Y</td>
<td>OxA-13478</td>
<td>G99-90</td>
<td><em>Juniperus/Thuja</em></td>
<td>-21.2</td>
<td>12,495 ± 50</td>
</tr>
<tr>
<td>Y</td>
<td>OxA-13519</td>
<td>TAF03/317</td>
<td><em>Juniperus/Thuja</em></td>
<td>-20.9</td>
<td>13,905 ± 55</td>
</tr>
<tr>
<td>E</td>
<td>OxA-13519</td>
<td>TAF03/316</td>
<td><em>Quercus sp.</em></td>
<td>-20.8</td>
<td>17,085 ± 65</td>
</tr>
<tr>
<td>E</td>
<td>OxA-13607</td>
<td>TAF03/315</td>
<td><em>Taxus sp.</em></td>
<td>-25.0</td>
<td>22,200 ± 90</td>
</tr>
<tr>
<td>O</td>
<td>OxA-13556</td>
<td>TAF03/314</td>
<td><em>Quercus sp.</em></td>
<td>-23.0</td>
<td>25,700 ± 40</td>
</tr>
</tbody>
</table>

Tab. 3. - AMS $^{14}$C determinations for the Pigeons Cave at Taforalt.

In contrast to the general uniformity of lithic types in the grey series, some degree of variation can be seen in tool typology and raw material types for individual occupation horizons of the underlying yellow series. The finds at the top of the yellow series (YS) are however very similar to those in the sequence above. In YS occupation horizon 1 (=13,905 ± 55 BP) in addition to abundant backed bladelets (fig. 8), the bladelet cores are predominantly on small pebbles and correspond to raw material types found in the local Zegzel river gravels. In this occupation horizon was also discovered a perforated marine shell of *Littorina obtusata* in. Although the morphology of bladelets remains broadly unchanged in YS occupation horizon 2 (=17,085±65 BP) cores are very often totally exploited and there are more flakes present. The raw material is exclusively a good quality flint probably not from local sources. YS occupation horizon 3 (=22,200±200 BP) contains an assemblage predominantly of laminar quartzite flakes and a thick bifacial tool (possibly an adze or axe roughout) in the same material. It does not resemble the overlying *Ibéromaurusian* but neither does it show obvious similarities with any of the Middle Palaeolithic artefacts reported in the earlier collections. In YS occupation horizon 4 (=25,760±140 BP) there is a return to the use of fine-grained cherts similar to those found in the upper levels. The few flame scrapers so far recovered from this horizon indicate the use of stepped and scaled retouch but otherwise offer no direct clues as to whether they belong to a Middle Palaeolithic technology.
Recent excavations in Northern Morocco

This region of Morocco, known locally as the western Rif, is part of a discontinuous band of upland massifs that extends eastwards from Morocco into Tunisia and Libya and forms what is widely referred to as the Maghreb\textsuperscript{52}. During the Last Glacial Maximum (LGM) the Maghreb is believed by some to have been largely depopulated ca. 20,000-18,000 $^{14}$C BP\textsuperscript{53}. Climatic conditions in the western Maghreb for this period have been described as cool and arid with a vegetation dominated by open steppe and little tree cover, and a projected mean annual precipitation of $<$500 mm per year\textsuperscript{34}. Conventionally, the end of the LGM has been recognised at ca. 15,000-14,000 $^{14}$C BP by a rise in overall humidity levels as indicated by an increase in tree and shrub pollen in marine and terrestrial profiles\textsuperscript{55}. We present below initial results from two of the sites in our sample: Ghar Cahal and Kehf el Hammar.

\textsuperscript{52} J. Blondel - J. Aronson, Biology and Wildlife of the Mediterranean Region, Oxford 1999.
\textsuperscript{53} A.E. Close - F. Wendt, art. cit. (at n. 22), 41-57.
\textsuperscript{54} D. Lubell, art. cit. (at n. 31), 129-149.
\textsuperscript{55} Id., ibid., 129-149.
Ghar Cahal was discovered in 1953 by Apffel. This Cave is located in Jebel Fahies (near the village of Belyounenah), it is at an altitude of 320 m and the cave entrance faces Northwest/Southeast. It was excavated for the first time in 1954 by M. Tarradell and further work was carried out by the former "Mission Préhistorique et Paléontologique Française au Maroc" (MPPFM) but has not yet been fully published. In 2001 we visited the cave and made a stratigraphic study of the deposits as part of a wider survey of caves in the Talem-bote and Sebta areas. Fifteen (15) units were recognised and described. Although previous researchers at Ghar Cahal have identified mainly Neolithic occupation, we were able to recognise two units beneath the Neolithic sequence which can be attributed to the Upper Palaeolithic. Unlike the overlying deposits, the finds from units 10 and 12 are aceramic and the lithic technology is dominated by blades and backed bladelets (fig. 9).

The results of AMS $^{14}$C dating on charcoals are consistent with a Late Upper Palaeolithic Iberomauritanian presence, especially for the unit 12 (tab. 4).

<table>
<thead>
<tr>
<th>Lab reference</th>
<th>Code site</th>
<th>Material</th>
<th>$\delta ^{13}$C</th>
<th>$^{14}$C Ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ox-A-11321</td>
<td>GC01/4/context10</td>
<td>Phillyrea Rhamnus</td>
<td>-24.0</td>
<td>9470 ± 55</td>
</tr>
<tr>
<td>Ox-A-11322</td>
<td>GC01/4/context12</td>
<td>Phillyrea Rhamnus</td>
<td>-25.5</td>
<td>11180 ± 65</td>
</tr>
<tr>
<td>Ox-A-11323</td>
<td>GC01/4/context12</td>
<td>Phillyrea Rhamnus</td>
<td>-24.9</td>
<td>11125 ± 65</td>
</tr>
</tbody>
</table>

Fig. 9. – Lithic typology of Ghar Cahal. A. Unit 10 (1: flake; 2: bladelet); B. Unit 12 (3-5: backed bladelets).

Tab. 4. – AMS $^{14}$C determinations for Ghar Cahal.

Kehf el Hammar

Kehf el Hammar is a cave occupying a small lateral valley of the River Oued Laou, in the Northwestern Rif of Morocco. It lies some 10 km inland from the present Mediterranean coast (fig. 1). The cave is at an altitude of 97 m and is situated near the base of cliffs above talus cones that slope sharply down to the terrace of the tributary about 20 m below. The cave entrance

faces southeast with good views in the up-valley direction of the tributary. The cave itself is roomy and well-lit, measuring some 10 m wide by 20 m deep, and 8 m high above the present ground surface. The local bedrock appears to be a massive calcilitite (calc-mudstone) with slightly wrinkled schistosity and calcite veining, implying low-grade metamorphism. The cave is developed along prominent fault zones and seems to have been formed by structural collapse of blocks, although there are also signs of earlier phreatic activity in the form of tubes now completely filled with cemented angular limestone grits («breccia»).

Palaeoenvironmental and chronological data were discussed in detail in a recent publication\(^{58}\) so only a brief overview will be presented here.

Previous test excavations undertaken by the Mission Maroco-Espagnole (MME) in 1992\(^{59}\) confirmed the presence of multiple Later Upper Palaeolithic occupation layers, very rich in artefactual and organic remains, and extending over a depth of more than 2 m. Fragmentary human skeletal remains were also reported from the uppermost layers\(^{60}\). In 2001, as part of an extensive survey of caves and rock shelters in the Talembote area of northern Morocco we decided to re-examine the site by opening the backfilled trenches of the earlier excavation\(^{61}\). Apart from the advantage of a well-stratified sequence, the cave is extremely dry and conditions are exceptionally favorable for the preservation of bone, charcoal and palaeobotanical evidence. The cave contains human skeletal remains of adults and children, which are so far undated.

All the Late Upper Palaeolithic layers at Kehf el Hammar are dominated by small backed blades some made using the microburin technique. Layer 11 seems to be the earliest occupation in the Cave since it was dated by OSL to 21,400 ± 1200 years BP and by \(^{14}\)C AMS to 21,920 ± 110 years BP. The artefacts consist of a few undiagnostic flakes but there is a multiple burin on a concave truncation, which appears to be of Upper Palaeolithic type. The burin is on a blade (16 mm width), fractured proximally and with the truncation at the distal end. Multiple burin facets are present down one edge and are stopped by retouch (not a notch) near the distal end.

The main Late Upper Palaeolithic Ibéromaurussian finds occur in layers 6-3. The artefacts in layer 5 are associated with cut-marked bones of barbaric sheep (Ammotragus lervia) and the lithics include bladelet cores, backed bladelets and scrapers. Similarities exist with layer 6 but this layer contains more retouched pieces and there are burnt flakes. Layer 7 is different since the lithic typology corresponds to retouched blades, notches and endscrapers. In layer 4 the artefacts include bladelet cores, backed bladelets and evidence of knapping activities comes from the presence of crested pieces and other debitage. Layer 3 is dominated by backed bladelets and notched bladelets. At top of the sequence, the artefacts of layer 2 display high frequencies of bladelets and backed bladelets but it is likely that these deposits have been partly disturbed by more recent anthropogenic activity (fig. 10).

58 R.N.E. Barton \emph{et alii}, \emph{art. cit.} (at n. 26).
60 N. Slouï, \emph{ibid.}
Fig. 10. – Lithic typology of Kehf el Hammar 1 and 2 (layer 4): 1: crest; 2: backed bladelet; 3 and 4 backed bladelets (layer 5); 5: quartzite flake (layer 6).

A series of six range-finder AMS radiocarbon dates was obtained on identified single charcoals from stratified contexts (tab. 5).

<table>
<thead>
<tr>
<th>Layer/Depth</th>
<th>Age Code</th>
<th>Site Code</th>
<th>Material</th>
<th>Δ¹³C</th>
<th>¹⁴C age ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>OxA-11926</td>
<td>KEH 5/H8/3</td>
<td>Pinus</td>
<td>-24.1</td>
<td>13 345 ± 50</td>
</tr>
<tr>
<td>4a</td>
<td>OxA-11927</td>
<td>KEH 2A/H8/4a</td>
<td>Pinus</td>
<td>-21.9</td>
<td>13 805 ± 55</td>
</tr>
<tr>
<td>5</td>
<td>OxA-11929</td>
<td>KEH 59/H8/5</td>
<td>Juniperus/Tetradinus</td>
<td>-21.0</td>
<td>14 110 ± 60</td>
</tr>
<tr>
<td>6</td>
<td>OxA-11928</td>
<td>KEH 56/H8/6</td>
<td>Pinus</td>
<td>-23.4</td>
<td>14 005 ± 55</td>
</tr>
<tr>
<td>63-72 cm</td>
<td>OxA-11417</td>
<td>KEH 23/63-72</td>
<td>Leguminosae</td>
<td>-22.9</td>
<td>15 940 ± 80</td>
</tr>
<tr>
<td>9</td>
<td>OxA-11872</td>
<td>KEH 76/H8/9</td>
<td>Quercus</td>
<td>-24.7</td>
<td>21 920 ± 110</td>
</tr>
</tbody>
</table>

Tab. 5. – AMS ¹⁴C determinations for Kehf el Hammar.

An overlapping set of four luminescence dates on sediments and burnt lithic artefacts (tab. 6) provides complimentary information from the same excavated sequence. The lack of bone collagen in any of the collected specimens meant that none of the osseous material could be dated.

<table>
<thead>
<tr>
<th>Layer/Depth</th>
<th>Lab Code</th>
<th>Site Code</th>
<th>D_e (Gy)</th>
<th>Dose rate (mGy/a)</th>
<th>Age Code</th>
<th>Age yrs before 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-19 cm</td>
<td>X565</td>
<td>KEH 0-19°</td>
<td>41.8 ± 1.4</td>
<td>1.79 ± 0.07</td>
<td>OxA-1412</td>
<td>23 400 ± 1,200</td>
</tr>
<tr>
<td>124-129 cm</td>
<td>X566</td>
<td>KEH 124-129°</td>
<td>36.9 ± 0.8</td>
<td>2.03 ± 0.07</td>
<td>OxA-1413</td>
<td>18 200 ± 800</td>
</tr>
<tr>
<td>2</td>
<td>X993</td>
<td>KEH 81/H8-9/2°°</td>
<td>9.61 ± 0.54</td>
<td>0.95 ± 0.03</td>
<td>OxA-1414</td>
<td>10 100 ± 600</td>
</tr>
<tr>
<td>4</td>
<td>X994</td>
<td>KEH 82/H8-9/4°°</td>
<td>14.5 ± 2.0</td>
<td>1.08 ± 0.03</td>
<td>OxA-1415</td>
<td>13 400 ± 1,900</td>
</tr>
</tbody>
</table>

Tab. 6. – Luminescence results of Kehf el Hammar (° : OSL; °° : TL)
(X565 and X566 are on samples recovered in 2001 and have depth measurements only).

**CONCLUDING DISCUSSION**

Any scope for discussing the Aterian of Morocco is still severely limited by the paucity of secure dating evidence. Although well-known Aterian sites, including those with human
fossils, have been recorded on the Atlantic coast at Dar es Soltane 1 and 2, Contrebandiers, El Harhoura and El Mnasra (fig. 1), very little dating evidence exists for the sequences in these caves. This is a major gap in our knowledge which we are hoping to rectify with new stratigraphic studies that are now in progress. So far one of the best dated localities for the Aterian is that of El Aliya Cave in Northern Morocco but here too there may be uncertainties due to the fact that the samples came from earlier excavations. Nonetheless if we accept the dating from this cave it is clear that the very late record of the Aterian in Morocco of 40-20,000 BP\(^62\) can certainly now be extended back as far as 50,000 BP\(^63\), if not earlier.

Another area for discussion concerns the whole question of the nature and identity of the Aterian technology which we feel is urgently in need of review and redefinition. Up until now it has largely been accepted that the Aterian lithic technology is characterised by a dominance of flake tools and the Upper Palaeolithic by a dominance of tools on blades and bladelets. This definition, which was already questioned by early researchers\(^64\), has now come under renewed challenge after recent studies of finds from Rhafas Cave in Eastern Morocco\(^65\) and El Aliya Cave\(^66\). In consequence, it is now increasingly clear that the Aterian represents a very flexible technology, which in addition to flake tools includes evidence for the use of «Middle Palaeolithic» blades and flakes tools\(^67\) and even occasionally pebble tools\(^68\). It is also apparent from an examination of the core morphology that Aterian knappers were capable of producing real blades but for some reason did not consistently choose to do so. Equally, much of the existing interest in the Aterian has tended to concentrate on the very narrow issue of pedunculate tools, rather than considering a wider set of variables such as the presence of small Levallois cores\(^69\). And while it remains true that pedunculates can form an important component of the tool assemblages\(^70\), it should not be forgotten that the same technique of making tangs is not unknown in the Upper Palaeolithic\(^71\) or the Neolithic\(^72\). A contributory factor to the confusion, as we see it, is in the underlying assumption that Aterian pedunculates were all made as projectile points\(^73\). In fact as our preliminary macro and microwear analyses have shown pedunculates appear to have been used for a range of tasks including scraping and butchery. Finally, we feel that more consideration should be given to non-lithic aspects of the technology such as the manufacture and use of beads\(^74\).

\(^{62}\) A. Debénath et alii, art. cit. (at n. 15); L. Wengler, op. cit. (at n. 10).

\(^{63}\) L. Wengler, op. cit. (at n. 10).


\(^{65}\) J. Tixier, art. cit. (at n. 6), 771-820.

\(^{66}\) L. Wengler, op. cit. (at n. 10).


\(^{68}\) J. Tixier, art. cit. (at n. 6).

\(^{69}\) J.-P. Texier, art. cit. (at n. 7); A. Debénath, art. cit. (at n. 15); Id, art. cit. (at n. 7).

\(^{70}\) A. Bouzouggar, Économie des matières premières et gestion du débitage dans la séquence atérienne de la grotte des Contrebandiers à Témasa (Maroc), in Préhistoire, Anthropologie Méditerranéenne, tome 6, 1997, 35-51.

\(^{71}\) J. Tixier, art. cit. (at n. 46).

\(^{72}\) J. Roche, L’Epipaléolithique marocain, in Libya, tomes 6-7, 1958-1959, 189.

\(^{73}\) G. Camps, op. cit. (at n. 28), 285 fig. 84; 288 fig. 87 and 307 fig. 91.

\(^{74}\) J. Tixier, art. cit. (at n. 46), 127-158.
In terms of the Upper Palaeolithic, our new work is also beginning to yield some interesting results. At Pigeons Cave, Taforalt, we now have a well-stratified series of AMS ¹⁴C dates for the «grey series» which implies a more or less continuous occupation of the cave from 11-13,000 BP. Beneath this, in the «yellow series», there are signs of a more punctuated occupation from 13-25,000 BP. At the very least the «Yellow series» sequence now provides potentially the oldest evidence for the Upper Palaeolithic in NW Africa. However, the difficulty in interpreting these data at present are twofold: firstly, it remains to be demonstrated whether the Upper Palaeolithic can be viewed as a single unit, or if, as we believe, there was a pre- Iberomaurusian Upper Palaeolithic occupation of the cave, and secondly, that much of the finer detail for understanding environmental change in relation to these occupations is still in the course of study.

Nevertheless, initial efforts to correlate the human record of occupation at Taforalt and Kef el Hammar with globally registered climatic events in the western Mediterranean sea cores have met with some success. In particular we have been able to recognise a plausible link between the dated layers in the caves and so-called Heinrich Events. The latter are thought to be associated with strong surface-water cooling throughout the Atlantic and this seems to be associated with increased aridity on the adjacent continent shelves. In particular, records from the Gulf of Cadiz (M39-008) core suggest that polar waters entered the Mediterranean during Heinrich 1 and significant cooling can be inferred from modeled Sea Surface Temperatures based on data from the Alboran sea core (MD95-2043). Such external events must have had a major effect on the terrestrial environments and the people living in them and we have suggested that increased aridification of the interior might have led to a concentration of resources and populations at the coast. Judging from the dating of occupation layers in the «yellow series» at Taforalt it is also possible to suggest an overlap in human presence in the cave during Heinrich events 2 and 3.

ACKNOWLEDGEMENTS

We thank the British Academy for funding the early stages of this project and acknowledge the continuing support of a major NERC award under the EFCHED programme and the National Institute of Archaeological Sciences and Heritage (INSAP, Morocco). We would also like to thank Professor Barbara Barich for inviting us to the Seminar «Tra il Sahara e il Mediterraneo: il Jebel Gharbi (Libia) e l’Archeologia del Maghreb».

76 R.N.E. Barton et alii, art. cit. (at n. 26).