THE EDITORS

1. INTRODUCTION

1.1 SETTING THE SCENE

Grotte des Pigeons or Taforalt Cave is situated in northeastern Morocco near the border with Algeria. It is a key site for the study of the Late Stone Age (LSA) culture known as the Iberomaurusian, because of the exceptional degree of finds preservation and the long stratified sequence of deposits that cover major phases of this cultural complex from around 23,000 to 12,500 cal BP (calibrated years before present). One of the immediately striking features of the cave is the common occurrence of *escargotière* lenses, distinctively white/grey ashy deposits that contain an abundance of land snails (Pond/Chapuis/Romer/Baker 1938; Lubell 2001; 2004b; Lubell/Hassan/Gautier/Ballais 1976; Fernández-López de Pablo/Gómez Puche/Martínez-Ortí 2011; Saafi/Aouadi/Dupont/Belhouchet 2013); indeed, at Taforalt, we estimate that there would have been a minimum of some 60 million shells in the upper three to four metres of deposits. Another term that has sometimes been applied is *rammadiya* (Balout 1955; Lubell 2001; Lubell/Feathers/Schwenninger 2009) from the Standard Arabic *ramad* (ash). As well as shell and ash, the thick midden-like deposits at Taforalt also contain huge numbers of charred organic remains, animal bone fragments, stone artefacts and generally burnt objects of all kinds, including masses of burnt/heated carbonate rocks. Thus the range of activities, and the dominant activity in any given location within the cave sequence, require analysis and interpretation. Similar cultural accumulations are also known from numerous open-air locations elsewhere in North Africa. Yet, despite the widespread recognition of middens in caves, often with conspicuous shell content, they have rarely received the same attention as their open-air counterparts, for example in the Capsian of Tunisia. These are generally younger in age, found in lowland open-air situations and include coastal sites. Taforalt, which lies far inland in an upland location, therefore offers a clear contrast to these later archaeological examples. An additional factor that identifies Taforalt as a site of special importance is the preservation of human burials that occur within the ashy sediments at the back of the cave. There is also a sequence of underlying deposits with occupation layers – also Iberomaurusian – that is strikingly different from the ashy deposits. The cave thus has a long and continual, in later stages potentially continuous, record of human occupation, spanning a lengthy period of the Iberomaurusian. During this time, the site arguably served a diversity of purposes, for shelter, living and storage, but also at some point it became an important burial location. Taforalt thus provides an excellent case study for examining variation in past patterns of human behaviour amongst hunter-gatherers and for investigating how these changed through time.

In the present volume, we describe our research upon the LSA levels at Taforalt; some information is already judged reliable from our latest (2017) season but other aspects of our recent work require further analysis and will therefore be reported at a later date. Of course, Taforalt is also well known for its Middle Stone Age (MSA) archaeology, occurring deeper in the stratigraphy; except where it is necessary to mention such material in the context of stratigraphic questions and the 'MSA/LSA transition' within the cave, we intend that these earlier assemblages should be the subject of a second major publication in due course.

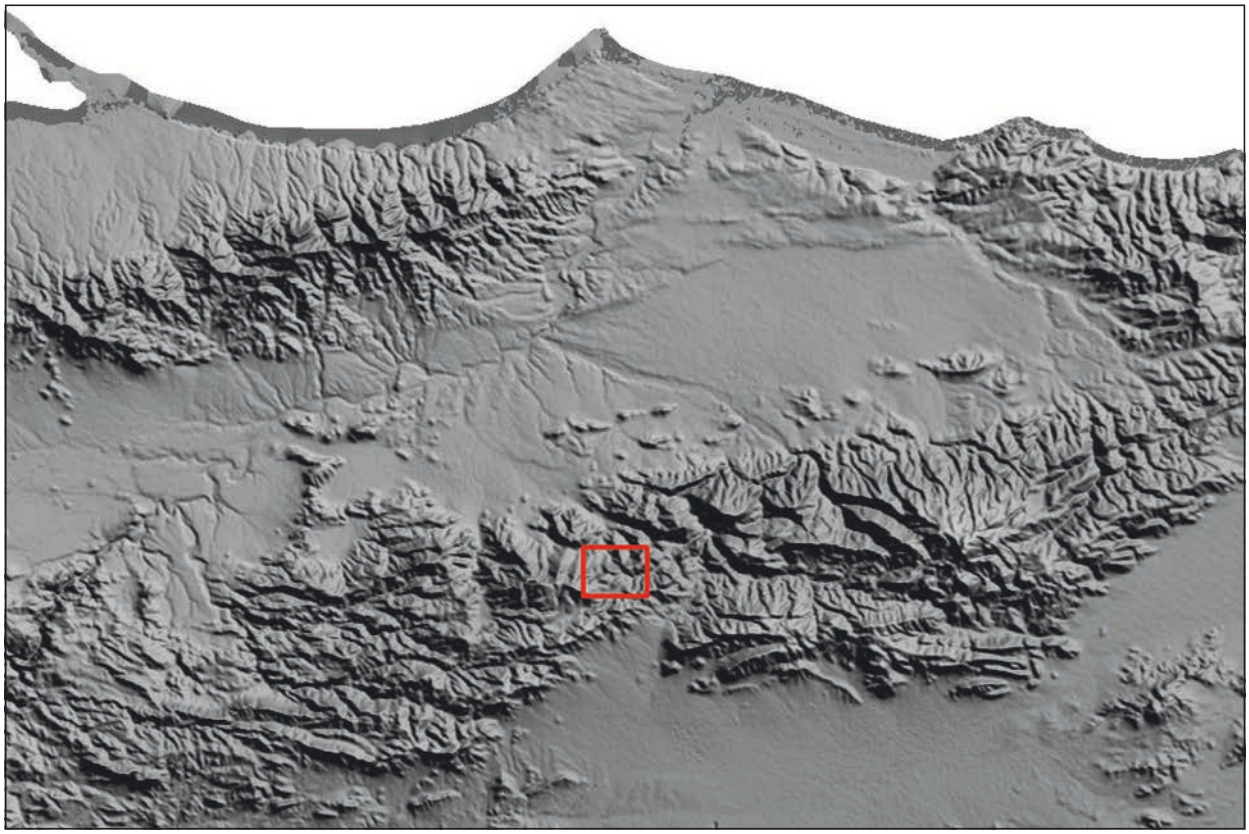


Fig. 1.1 Topographic mapping (courtesy of NASA, SRTM) (area of **fig. 1.6** boxed). – (After Tabyaoui et al. 2009).

1.2 HISTORICAL AND GEOGRAPHICAL BACKGROUND

History and geography are so often inextricably bound together, and Morocco is certainly no exception. In the present study, mention of some, relatively recent, historical aspects of the northeast of the country is necessary, even in order to understand the place names.

The site lies within the Beni Snassen mountains, geographically the eastern extremity of the Middle Atlas but now physically divided from the remainder by the Oued Moulouya, a major river running from the interior northeastwards across the coastal plain (Triffa) to the coast just west of Saïdia (**fig. 1.1**). The mountains rise to some 1500 m above mean sea level at Ras Foughal. Immediately to the south lie the Angad plains and the Oued Isly.

Many place names in the region are now given in their Arabised forms and we will usually follow this convention. However, it should be noted that the name "Beni Snassen" is derived from the Tamazight (Amazighe[1] language group, including Iznassni) for the people of the area, the *Bni Iznassen*. The groupings have related languages and related scripts, known as *Tifinagh* (and increasingly standardised for printing as Neo-Tifinagh), a set of consonantal symbols helping to accommodate regional and dialectic vowel variations.

[1] The terms Amazighe (singular) and Imazighen (plural) are the correct names – albeit not as widely known as they should be – for the peoples often referred to in Europe as the "Berbers" (a distortion of the Greek '*barbaroi*').

Fig. 1.2 Cave from opposite valley side. – (TAF05_MISC_025.tif Ian R. Cartwright).

This combination of diversity and unity amongst the Imazighen proved difficult for the European powers, including France. Of particular interest in the present context, by the middle of the 19th century, the French felt obliged to pursue their interests by moving out from their bases along the coast of Algeria and penetrating into the Beni Snassen region. In October 1859, the campaign ended in the battle of the "*Col d'Aïn Taforalt*" – a phrase with a French topographical element, followed by the transliteration of an Arabic element and of the *Bni Iznassen* village name. The people of this village were at least initially displaced and the French military set up a series of camps and then a stone fort, eventually (1907) occupied by the *Légion étrangère*.

Not surprisingly, the cave which is our study site has been known under several names. It is reported that there was once a local name, given by subsequent French authors as "Kef en-nejjar" (Ruhlmann 1945a) or "Kef el-Nejjar" (Roche 1963); the first element ('cave') is a form of Arabic but the second is thought to derive from the Iznassni word for 'carpenter'. The cave was first referenced in the European literature as the cave "at Aïn Taforalt" (Pinchon 1908), from the Arabic for the local spring (see below). Following investigations at the cave in the 1940s, it rose to prominence under the names "*Grotte aux Pigeons*" (unpublished reports) and "*Grotte des Pigeons*" (a bird which was frequently hunted in the recent past, large numbers of which still nest in roof cavities) or simply "Taforalt" and this is how it is widely referred to today. However,

after independence from the French Protectorate (1912-1956), the village name is now written (in Roman script) as "Tafoughalt", as it is pronounced in Amazighe.

The cave (34° 48′ 50" N, 2° 24′ 14" W)[2] is situated about 500 m east of, and below, the 'plateau/col' village of Tafoughalt (**figs 1.2** and **1.3**), at an altitude of around 720 m above mean sea level. Its relative position, approximately 40 km inland from the Mediterranean coast, has probably not altered much since the time it was occupied in the Iberomaurusian; even at lower sea levels, very little additional coastal shelf would have been exposed. Today, the area has a broadly Mediterranean climate (arid summers, wetter winters with peaks in late autumn and spring, but always showing high variability at various timescales and the continual possibility of influence from the Sahara [cf. Laouina 1990]), with altitude generally lowering temperatures and increasing precipitation (at least, on the northern slopes facing the sea). For instance, at Tafoughalt (810 m amsl), the mean annual temperature is 15.4°C with a mean range of 15.9°C and average monthly precipitation varies from 2 mm (summer) to 52 mm (winter, sometimes with snow), whilst Berkane (148 m amsl but only 15 km away to the northeast) has a mean annual temperature of 18.2°C with a mean range of 13.2°C and average monthly precipitation from 1 mm (summer) to 45 mm (winter)[3]. Even with the increased precipitation at higher altitude, the cave still lies in a generally arid zone; thus Laouina (1990, 36) reports that, just above Tafoughalt at an altitude of 850 m, there is an annual rainfall of 538 mm but a potential evaporation rate of 1000 mm, indicating a most significant water deficit. There is every reason to think that, at most times in the past, this general climatic pattern would have been present (albeit within differing meteorological ranges), as well as the altitudinal contrasts between mountain plateaux, valleys and the surrounding plains. It is of general interest here that Laouina (1990, 218) remarks upon the absence in the region (even higher and further south into the 'continental' zone) of geomorphological/sedimentological evidence of either cold periods (cf. lack of periglacial and nival forms) or persistently wet periods (cf. survival of ancient superficial carbonate crusts and lack of strongly weathered minerals), at any point in the Pleistocene sequences.

Taforalt is a karstic (solutional) cave formed in steeply folded dolomitic limestone (see **Chapter 2** for more detail). Most of the Beni Snassen have outcrops of various carbonate rocks, hard limestones in particular, but the northern slopes of the mountains show beds from the Palaeozoic to the Miocene, together with igneous intrusions, overall with quite a wide range of lithologies in a relatively small geographical area (see **Chapters 2** and **12** for archaeological interest). The broadly WNW-ESE principal anticlinal axis of the mountains is crossed by major near-vertical faults and thrust faults, trending dominantly NNW-to-SSE (but with secondary structures roughly at right angles and also a number of scarp-slip faults), making the outcrops even more varied and influencing the regional geomorphology and hydrology.

As has been noted, this is dominantly limestone country, and, other things being equal, water does not flow at a limestone surface but, rather, tends to descend through structural and solution features until some barrier is reached at depth. However, the combined facts that these mountains are still rising (plate margin orogeny), that they are deeply faulted and that this has probably been an area with torrential storm rainfall for much of the Quaternary, mean that the landscape is deeply incised with steep-sided valleys (cf. Laouina 1990). The principal valley immediately north of the cave now carries the "*Route de Zegzel*", the main road (agricultural and touristic) through the mountains at this point, and this valley (cf. **fig. 1.4**) is normally referred to today as the Zegzel (although it is probable that this name was first applied to a broader area of the catchment). The massif to the north of this stretch of the valley is named the Jbel Israne (reaching over 850 m amsl), that to the southeast, the Jbel Achaoun (reaching over 990 m amsl). The French (cf. Roche

[2] Unfortunately, in some previous publications, we have given the position of the village of Tafoughalt in error; the co-ordinates given here are correct for the cave itself.

[3] 1982-2012 figures from the Climate-Data.org model.

Fig. 1.3 High view of cave and escarpment, looking south, Tafoughalt village behind. – (TAF05_MISC_029.tif Ian R. Cartwright).

1963; 1969) referred to the valley below the cave as the "Oued Trasrout" (from the village of Tghasroutte, a couple of kilometres further down-valley). This valley has certainly always been known as the Zegzel beyond the confluence with the Oueds Ferrouj and Moulay Idriss, whilst, at Berkane, it gathers further tributaries taking on the name Oued Cherraa, this, after a further 7 km, becoming a right-bank tributary of the Oued Moulouya (the Moulouya catchment overall being the second largest in North Africa).

Actual water flow is complex. From the very head of the "Trasrout" section of the valley down to a point almost directly below the cave (at c. 670 m amsl), there is now no stream at all, with water only present temporarily under conditions of torrential rain (often localised depressions penetrating from the NE). There is only one spring that is considered to be 'perennially' feeding this upper part of the catchment, the Aïn Safsaf (Dakki 2003, 10), lying (at 34° 48′ 48″ N, 2° 24′ 24″ W, at 835 m amsl, at the foot of the northern slope of the Jbel Islane which rises to 1040 m amsl) immediately SSE of the village of Tafoughalt (hence the earliest French name for the village and cave). We are not aware of any detailed research into the question but it seems likely that this resurgence is associated with impermeable/impervious beds (see **Chapter 2**); it has certainly been reported (Tabyaoui et al. 2009) how the location is associated with a local synclinal fold where it is crossed by a major fault in a set that is active in this Plio-Quaternary compression zone. The spring is thus likely to have been comparatively stable over recent geological timescales. It is known that French military engineers constructed a basin to improve the spring just before the beginning of the Protectorate; photographs then began to appear of the spectacular waterfall plunging over the cliff-top only a few tens

Fig. 1.4 View down the valley from the cave. – (TAF04-69.tif Ian R. Cartwright).

of metres southwest (up-valley) of the cave (**fig**. **1.5**). However, during his visit in 1907 (see below), Pinchon (1908) stated that one reached the cave from the village 'by following the left bank of the *oued* formed by the spring rising just below the military camp' (then on the higher ground south of the village); this suggests that the 'natural' line of the spring water was at that time down the side valley, immediately east of the cave (which lies on the right bank of the main valley) (**fig**. **1.6**). Indeed, today there are seeps at the head of this side valley which have recently been dammed to supply water by a pipe to facilities near the cave. Furthermore, local informants have suggested that, before the French engineering, there were 'points' with water all around the recent village (Ismail Ziani, pers. comm.). In the 1950s, the waterfall was recognised (Roche 1963) as being fed by a *seguia* (from the Arabic for an irrigation canal), thus probably an entirely artificial channel, designed to provision the new fort (almost directly above the cave) and possibly to improve agriculture immediately around the village. By the 1950s, a small amount of water was led aside from the waterfall to a minor basin (now dry) to the right of the cave mouth and then, by buried pipe, further east. In any case, once in the main valley, apart from a few pools at certain seasons, water today immediately disappears underground

Fig. 1.5 1908 postcard, showing cave and waterfall. – (Source S. N. Collcutt).

down-valley below the cave and only surfaces again (under the local name of "Oued Tafoghalt") just before the Zegzel-Ferrouj-Moulay Idriss confluence. It follows that we do not know exactly where water would have been available in the Later Stone Age but it is nevertheless reasonable to conclude that there would have been one or more persistent springs in close proximity to the cave. There is no other significant surface water for 5 km in any direction around the site and only a couple more springs even within 10 km.

One must not think that the area is (or ever was) geomorphologically inactive, however, the steep slopes and the unpredictable and extremely variable/irregular (orographic) precipitation regime occasionally combining in a spectacular manner. For instance, one may cite the case of the 10th May 1968, when rainfall equal to two-thirds of the mean annual total fell at Tafoughalt in the single day; the resulting flood along the Zegzel transported very coarse sediment and blocks that destroyed most human constructions along the route, including the bridge at Berkane (Laouina 1987). The flash flood in question was exacerbated by agricultural over-exploitation of the catchment earlier in the century but climatically-controlled periods of less dense vegetation cover in the past would probably have included similar extreme events and more common intermediate ones. It should also be noted that the Eastern Atlas is the most seismically active area in Morocco; structurally, the Beni Snassen are part of the Rif foreland, since the Rif is being compressed 'backwards' (southwards) onto the African plate.

By the end of the 19th century, much of the Beni Snassen had become deforested. Replanting at Tafoughalt, with Aleppo Pine and other tree species, started in earnest in 1942 within the col around the village. By 1999, a SIBE (*site d'intérêt biologique et écologique*) had been established across this part of the mountains, within which as many native species as possible have been encouraged. Of particular interest in the present context was the re-introduction (from surviving Atlas populations after their disappearance in the early

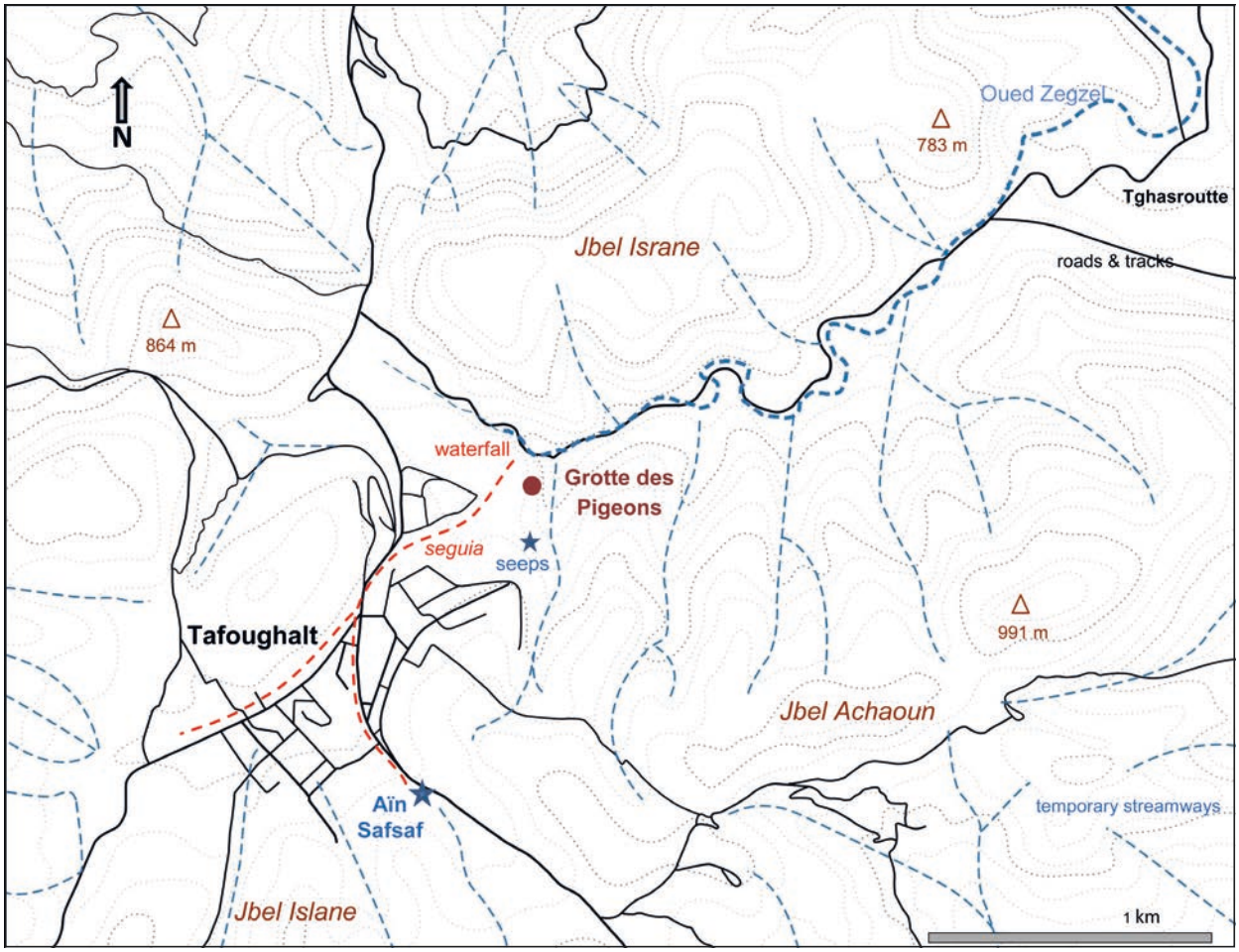


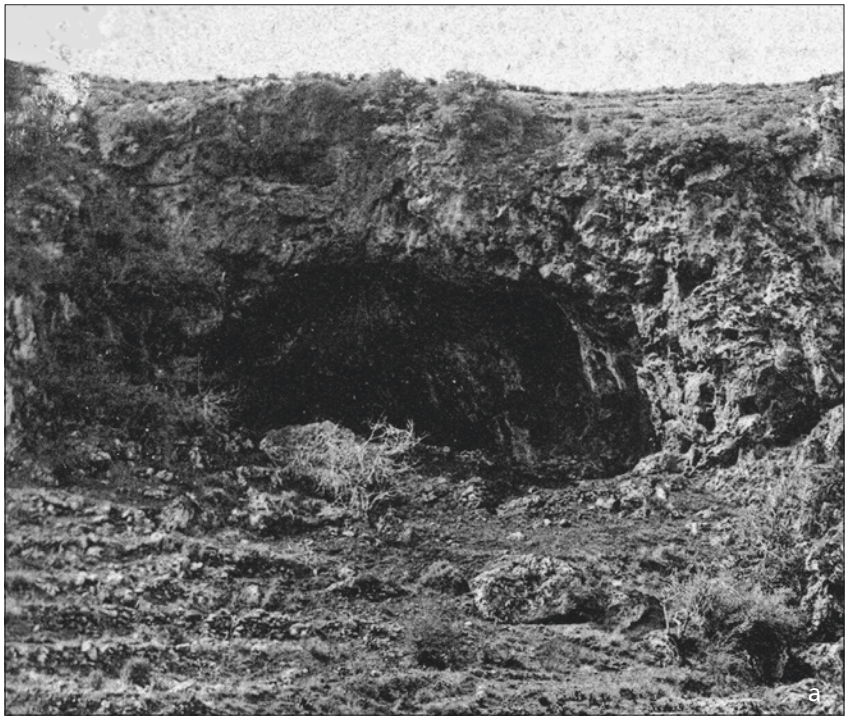
Fig. 1.6 Map of local area.

1970s from the Beni Snassen) of Barbary sheep (*Ammotragus lervia*), now regularly visible in their reserve across the valley from the mouth of the cave.

1.3 EARLIER EXCAVATIONS

Following a number of geological and archaeological surveys in Algeria and eastern Morocco in the early 20th century by Pallary and others, further reconnaissance was conducted by Dr. Pinchon[4]. During one of his trips to the Beni Snassen mountains in 1907, he found a large cave near Aïn Taforalt. In this site, he noted: "*Le sol est formé d'une terre noirâtre* […]. *A part un nucléus pyramidal trouvé à une dizaine de mètres de l'entrée, je n'ai rien pu découvrir à la surface du sol*" [The cave floor is formed of a blackish sediment […]. Apart from a pyramidal core found ten metres or so from the entrance, I discovered nothing on the ground surface] (Pinchon 1908, 435). He also discovered two nearby caves within a small side

4 Dr. D. M. Pinchon, a military medical man garrisoned for a time in Oujda; he was accompanied on his visit to the Beni Snassen by the antiquarian and botanist, Alexandre Joly; in 1909, he was listed as a member of the *Société préhistorique française*, with the address: *Direction du Service de Santé de la Division d'Oran (Algérie)*. An explanation of why Pinchon did not tarry at the cave may lie in the fact that the *Bni Iznassen*, again 'in revolt', did not submit that time until the Spring of 1908.



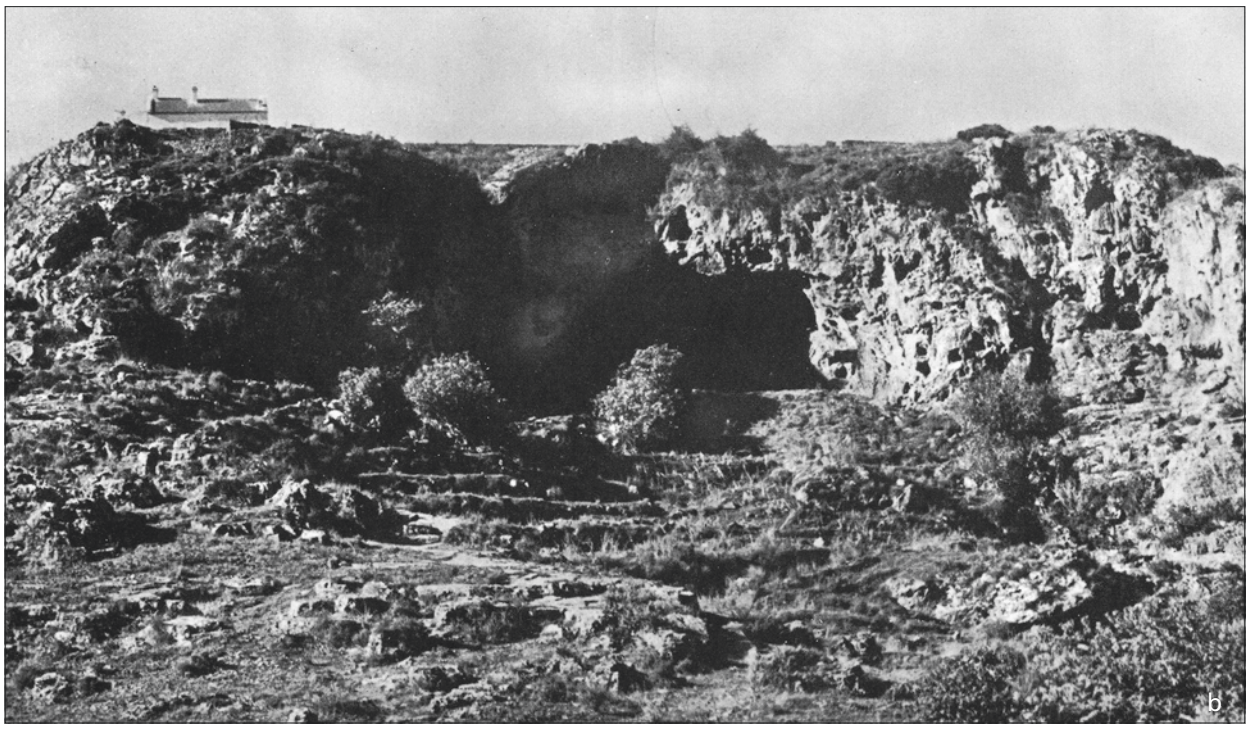


Fig. 1.7 **a** Excerpt from 1908 postcard (**fig. 1.5**); alongside **b** photo of cave mouth in the 1950s. – (b from Roche 1963).

valley (apparently further down the main valley on the left bank), where he found teeth of large carnivores but nothing to compare with the pyramidal core from the main cave. **Figure 1.5** shows the cave mouth in about 1908.

Perhaps surprisingly, given its prominent position and large size (30 m wide at the entrance and equally deep), the cave attracted little attention for another three decades and was left mostly undisturbed apart

Fig. 1.8 1951; looking southwards across the top of Ruhlmann's southern trench; Roche stands in the centre; note the start of Roche's transverse trench, which would link the two Ruhlmann ones; walls (1939 military) to form mule stalls against the south wall. – (Source Archives du Centre Camille Jullian, Aix).

from some small "*sondages*" [test pits], dug first by Bienvenu Blondeau[5] probably in 1932 (Roche 1952; 1953), then by J. Marion[6], which established the existence of Iberomaurusian finds in stratigraphic position (Ruhlmann 1945b, 81).

5 Le Révérend Père Bienvenu (André Marcel) Blondeau (1890-1965), of the Franciscan Order, arrived in Morocco in May 1931; he was in contact with the first substantial excavations, by Ruhlmann, and became the custodian of a significant portion of the latter's papers (cf. the posthumous publication in *Hésperis* 1949 by Bienvenu Blondeau of Ruhlmann's overview of fossil human remains from Morocco); he created in 1947 and (with Madame Dolorès Salvador) managed from 1948 to 1961 the *Home d'Enfants St-Joseph* (taking both French and Moroccan children) at Tafoughalt; he became a member of the *Société préhistorique française* (*Compte rendu*, 23rd November 1950, p. 494); he appears to have been the "*curé de Taforalt*" [village priest] by 1951 (Roche 1963); he rescued, with the help, amongst others, of Mme Andrée Samuel (later to become the *correspondente* for NE Morocco to Georges Souville), Jean Marion (see below) and Charles Bossler (director of the *Société des Chemins de Fer du Maroc* in Oujda and amateur archaeologist, sponsored for membership of the SPF in 1947 by Ruhlmann just before his death), endangered human remains from an unstable section in the cave in the Spring of 1952; later in 1952, he organised the visit to the cave of the participants in the Second Pan-African Congress on Prehistory, eliciting the comment: "At the Mission School near Taforalt the Father in charge allowed us to inspect a huge collection of implements from this and other sites in eastern Morocco. […]" (Cole/Clark/Davis 1952, 150); he was host to Roche during his campaigns of 1951-56 and clearly formed an important link between the campaigns of the two main excavators; he was reportedly still working in the cave in 1959. Blondeau retired to the Villa St. Thérèse, La Sèbe, Digne (France), in July 1961. In 1962, he agreed the transfer to France of his collections (lithic and bone artefacts) and also the documentation from Ruhlmann's work; with the assistance of Georges Souville and Mme Samuel, continuing even after Blondeau's death in June 1965, this material eventually reached Professor Lionel Balout in Paris, where it was distributed between the *Institut de Paléontologie humaine* and the *Musée de l'Homme*. These events are described in various correspondence held in the Georges Souville Archive (at *la Maison Méditerranéenne des Sciences de l'Homme, Centre Camille Jullian (UMR7299-CNRS) à Aix-en-Provence, Université d'Aix-Marseille*).

6 Jean Marion (1905-1976); during 1931-1957, he was a teacher of French and Latin in the *Lycée d'Oujda* [boys secondary school]; 1959-1964, *Inspecteur du Service des Antiquités du Maroc*; he was again a schoolmaster, in Digne (Provence), in 1966, when he was contacted by the Moroccan authorities concerning the Bienvenu Blondeau collection, then being held by the bishopric of Digne; he was best known for his work in later prehistory and classical studies; cf. the obituary by Souville (1978).

Fig. 1.9 1951; looking westwards, towards the cave interior; both Ruhlmann's southern and northern trenches are visible; the northern trench (right) actually burrowed underneath the wall and large rock against which the workmen are leaning; mule stalls and building (1939 military) in the background. – (Source Archives du Centre Camille Jullian, Aix).

However, in 1939 during mobilisation, the large cave came to the attention of the French military authorities as a site of strategic importance and the floor was artificially levelled to accommodate soldiers and their mules. It was during this phase that a significant volume of the grey ashy deposits ("*terre noirâtre*") must have been stripped away and dumped on the slopes outside (Roche 1963). Fortunately for later archaeologists, a capping of lime mortar was then laid inside the cave to dampen the effects of dust, thus helping to stabilise the top of later excavation trenches; even today, the ashy sediments on the south side of the cave owe their survival largely to this capping. It is assumed that this installation was abandoned in 1940 as Vichy France was forced to reduce its North African forces.

Armand Ruhlmann (1896-1948) was a career archaeologist trained in Mulhouse (Alsace). He arrived to join the *Service des Antiquités du Maroc* in 1931, at the request of Louis Chatelain, the founder and first Director (Thouvenot 1954). Although Ruhlmann worked in most periods of Moroccan archaeology (for instance, at the classical city of Volubilis), his preference was for the Palaeolithic, excavating in several now famous sites, such as Sidi Abderrahman, El Khenzira (the site upon which his doctorate was based) and Dar es-Soltan (published posthumously). After demobilisation in 1940, Ruhlmann became an *Inspecteur des Antiquités préhistoriques marocaines* and it was decided by the central administration in Rabat that he should excavate at Taforalt[7] (Ruhlmann 1945a; 1945b; see also 1947). Work continued over three seasons, each approximately one month long, in 1944, 1945 and 1947, during which two major longitudinal trenches were dug into the deposits, always to depths over 4 m and in places reaching over 7 m. Unfortunately, this

[7] We do not know why but it is possible that Bienvenu Blondeau brought the site to the administration's attention.

Fig. 1.10 1951; looking northwards from a vantage point outside the cave, across the tops of both Ruhlmann's southern and northern trenches; note the dry walling intended to support the crumbling far section. – (Source Archives du Centre Camille Jullian, Aix).

work was never published and all the photographs and section drawings (recorded as having been made), detailed commentary or finds catalogues (were any such indeed compiled) seem to have disappeared, although there must be some chance that primary material survives in Paris museum collections.

The circumstances of Ruhlmann's work are not very clear. He drew on the help of local French enthusiasts and technical experts (a draftsman and a photographer) from the Oujda area but no comments were published by professional visitors (if any). The excavations were conducted quickly, even perhaps too hurriedly, but under difficult conditions – Ruhlmann complained of the constant dust and the need to smash through large limestone blocks in these narrow and deep trenches. It is only thanks to the continuing interest of Bienvenu Blondeau that the 1944-47 field notes, basic as these are[8], were later passed on[9]. Plans to continue to excavate the site were brought to a premature halt when Ruhlmann died (at the age of 52) on May 15th 1948 as a result of a fall from a section at his rock-shelter excavation at El Aïoun in Eastern Morocco[10]. All that now remains in the Taforalt cave of these early excavations are the outlines of deeper parts of the two trenches (cf. **figs 1.12-1.13** and **2.10**). Nonetheless, Ruhlmann was the first to provide an insight into the nature of the cave deposits, which he subdivided into "*terres grises*" [grey (ashy) deposits], upper units with LSA (Iberomaurusian), and "*terres jaunes*" [yellow (loamy) deposits], lower levels with traces of LSA in places and MSA (variously attributed to the 'Aterian' and 'Mousterian').

8 Termed mere "*éphémérides*" by Ruhlmann himself, bound to be tantalising yet ultimately disappointing in their lack of detail from a modern reader's viewpoint.

9 "[…] *une partie du journal de fouilles d'Armand Ruhlmann qu'avez bien voulu me communiquer le R. P. Bienvenu Blondeau*" [… a part of the excavation diary of Armand Ruhlmann which Father Bienvenu Blondeau had been good enough to communicate to me] (Souville 1973, 11). In fact, Georges Souville had a photocopy of all three years of the field notes.

10 Cf. Terrasse (1949), Lantier (1952) & Souville (1961).

Fig. 1.11 1951; looking eastwards during the clearance of the eastern end of Ruhlmann's northern trench; the workmen had still some way to go downwards before all the collapse material had been removed. – (Source Archives du Centre Camille Jullian, Aix).

Two surviving communications[11] are of interest at this point. First, there is a letter (dated the 20th November 1951) from l'Abbé Jean Roche to Maurice Antoine (who had succeeded Ruhlmann in the post of *Inspecteur des Antiquités préhistoriques* and who, in turn, would be succeeded by Roche himself in 1953), in which Roche noted his arrival at Taforalt and remarked upon the broad findings of the excavations, together with their importance – but without mentioning Ruhlmann. Then, on the 25th November, Antoine wrote to Lionel Balout at the Bardo Museum (Algiers):

> "*Grotte de Taforalt.*
> *Cette grotte très intéressante, a été fouillée par Ruhlmann. Etant donné mes anciennes relations – plus que tendues, vous avez dû en lire les échos – avec ce dernier, je me suis absolument interdit de contrôler ses fouilles. Mais l'Abbé Roche a bien voulu, à ma demande, s'y rendre* […]. […] *il y est depuis 15 jours et m'en a confirmé le gros intérêt.*"
>
> [Taforalt Cave.
> This most interesting cave has been excavated by Ruhlmann. Given my previous relations with the latter – more than strained, as you must have heard[12] – I have altogether refrained from checking on his dig. But, upon my request, l'Abbé Roche has been good enough to go there […]. […] he has been on site for a fortnight and has confirmed to me its substantial interest.]

11 Letters (the first manuscript and the second a typed copy) held in the Georges Souville Archives at *la Maison Méditerranéenne des Sciences de l'Homme, Centre Camille Jullian (UMR7299-CNRS) à Aix-en-Provence, Université d'Aix-Marseille*.

12 Deep disagreements had grown, from the later 1930s onwards, between Ruhlmann and Antoine, concerning the nature and subdivision of the Aterian. Bizarrely, the argument reached white heat in an exchange in print, (Ruhlmann 1951) and (Antoine 1952), after Ruhlmann's death, in which choice phrases (hardly needing translation here) such as "*en opposition formelle avec la réalité des faits*" and "*le caractère antiscientifique du procédé*" were traded. The 'Sidi Abderrahman affair', in which Antoine was taken to task (Neuville 1951) for blaming his predecessor for failing to push for full protection of that complex of sites from developers, also came to a head at this time.

Fig. 1.12 c. 1955-62; looking westwards, towards the cave interior, with the remaining 'study section' of the "*terres grises*" [grey (ashy) deposits] on the left and the bases of the two Ruhlmann trenches beyond, cut into the "*terres jaunes*" [yellow (loamy) deposits]. – (Source Archives du Centre Camille Jullian, Aix).

Jean Roche (1913-2008)[13] was a catholic priest who had gained his *Licence ès Lettres* [B.A.] at the Sorbonne in 1946 and then trained in prehistory and ethnology at the *Musée de l'Homme* in Paris. After early fieldwork in Portugal (which he was to pursue throughout his career), he recorded that he was invited in 1950 to Morocco by Henri Terrasse, *Directeur de l'Institut des Hautes Etudes Marocaines* [IHEM], where his first significant excavation assignment seems to have been at Taforalt.

The first season on site, in late 1951, was taken up mostly with cleaning out the Ruhlmann trenches, although a new cross-trench between the two was also started. In December, Roche submitted a short site report[14], summarising Ruhlmann's findings. A number of publications followed rapidly (Roche 1952; 1953a;

13 Cf. (Debénath 2009).

14 Typescript held in the Georges Souville Archives (at *la Maison Méditerranéenne des Sciences de l'Homme, Centre Camille Jullian (UMR7299-CNRS) à Aix-en-Provence, Université d'Aix-Marseille*).

Fig. 1.13 c. 1955-62; looking eastward, with the remaining 'study section' of the "*terres grises*" [grey (ashy) deposits] on the south (right) and the base of Ruhlmann's southern trench cut into the "*terres jaunes*" [yellow (loamy) deposits]. – (Source Archives du Centre Camille Jullian, Aix).

1953b), with quantified artefact analyses and illustrations – a most important contribution from Roche – but all based almost completely upon Ruhlmann's stratigraphic scheme and excavated collections[15], although Roche neglected to make this explicit[16].

The photographs in **figures 1.8-1.11** show the cave in 1951, with the traces of the 1939 military installations including the level floor, during cleaning of Ruhlmann's trenches.

15 The initial finds of human remains in 1951-52 being the most notable additions.

16 It was not until later (Roche 1963, 17) that he included in his 'Acknowledgements' a note: "[…] *le R. P. B. Blondeau qui m'a reçu à Taforalt et m'a remis la copie du journal de fouilles d'A. Ruhlmann,* […]" [… Father Blondeau who took me in at Taforalt and who provided me with the copy of Ruhlmann's excavation diary, …]. This 'diary' (cf. Ruhlmann 1945a-b; 1947) has never been published.

Fig. 1.14 c. 1955-62 photo montage (unrectified); looking southward, with the remaining 'study section' of the "*terres grises*" [grey (ashy) deposits] beyond the base of Ruhlmann's southern trench cut into the "*terres jaunes*" [yellow (loamy) deposits]; this montage is comparable in detail to that published, inadvertently reversed, in Roche 1963. – (Source Archives du Centre Camille Jullian, Aix).

The cave had been open and unprotected in 1951, and the sections were crumbling, but Roche provided for a fence by October 1952; we assume that the military walling inside the cave had been removed by this date. For four further field seasons in the period 1952-55, Roche continued to work under the auspices of the *Institut des Hautes Etudes Marocaines*, excavating an enormous volume of sediment from the cave, nearly exclusively from the "*terres grises*" [grey (ashy) deposits], including the area of related burials found at the back of the cave, a "*véritable ossuaire ibéromaurusien*" (Roche 1953b, 114). He later estimated (Roche 1973-1975) that the grey deposits had produced over 400,000 struck lithic artefacts. Work from the centre of the cave inwards also involved the removal of very large blocks of rock, one weighing up to 50 tonnes (Roche/Souville 1956). Roche recognised the complexity of the burial area and waited until the 1954 and 1955 seasons, when excavation of the human remains was resumed under the immediate direction of A. Jodin[17]. The photographs in **figures 1.9-1.11** show the cave at some point in the period c. 1955-62[18], after the bulk of the "*terres grises*" [grey (ashy) deposits] had been removed. It was at the beginning of this period that a stone hut was constructed outside the cave intended for a permanent guardian and a small museum (Roche/Souville 1956, 164), along with the access track, structures which remain today. Following the 1955 season, "*les travaux ayant été brusquement interrompus*" [work having been suddenly interrupted] (Roche 1963, 48), a more lasting suspension of the excavations was occasioned by the end of the French Protectorate in 1956.

Roche wrote up his research on the "Epipalaeolithic" (LSA) of Morocco, dominated by his work at Taforalt, in 1957 and submitted the work for his doctorate at *la Faculté des Lettres* in Paris, research later published in full (Roche 1963)[19]. The human remains were also described (Ferembach 1962). Charcoals collected before

17 André Jodin (1921-2003), *Service des Antiquités du Maroc*, editor of Vols 1-7 (1956-67) of the *Bulletin d'Archéologie marocaine*, best known for his later excavations in protohistoric and classical sites in Morocco and Spain but also an excavator in various Holocene cave deposits. With respect to Taforalt, see the 1954-55 excavation notebooks, plans & photographs held in the *Musée archéologique* in Rabat.

18 The photographs themselves are not marked with a date. This 'c. 1955-62' date (i. e. towards or after the end of the first phase of Roche's work) is deduced from the fact that none of the deep excavations into the "*terres jaunes*" undertaken by Roche during the second phase of his work (before 1972) have been commenced in the photographs; because nothing substantial is known to have been done in the cave during the long gap in Roche's work, it is nevertheless possible that the photographs date from as late as 1969, at the very start of the second phase. However, Plate I in Roche (1963) (which presumably dates from around 1955) shows a long section in the unstable ashy deposits that is similar in fine detail to that in **fig. 1.14** (below), suggesting that no great degree of erosion/collapse could have intervened. Furthermore, colour slides taken by Serge Kostomaroff (photographer for the *Service des Antiquités du Maroc*) and labelled "1962" (one of which is reproduced in the present volume as **fig. 15.2**) seem to show the wooden survey structure already/still in place.

19 Unfortunately, Roche's own notebooks for the 1951-55 period appear to have been lost: that covering at least the period 1952 even before c. 1959, according to a note by Roche himself (Rabat archive), all his other site notebooks having been left in Morocco after his retirement and never since coming to light (pers. comm. reported by Aoudia-Chouakri 2013, 129). Roche certainly retained his own archive of his work from 1969 onwards (mentioned in a 1982 letter to J.-P. Raynal, held in the Rabat archive) but the current whereabouts of this material are unknown. The

the interruption were submitted to Gif-sur-Yvette and provided some of the first radiocarbon dates using this technique from Morocco (Roche 1958; 1959).
Roche was able to resume excavations at Taforalt, as *Directeur de la Mission archéologique française au Maroc* in collaboration with the *Service marocain de l'Archéologie*, in 1969 (Roche 1976; Delibrias/Roche 1976).
This time, Roche worked on the "*terres jaunes*" [yellow (loamy) deposits] and deeper units, the latter proving extremely difficult to penetrate (rocks and cementation), let alone to understand. Fieldwork continued until 1976, although no detailed publication ever materialised and the whereabouts of any field notebooks are unknown; indeed, all Roche's substantive publications on the MSA material from the cave seem to have concerned the Ruhlmann collections, with occasional additions from section cleaning, despite the fact that he was certainly reporting new artefact finds in his fieldwork summaries (cf. Roche 1973-1975). Four sections were described, one longitudinal and three transversal (Roche 1973-1975); copies of the section drawings exist and are preserved in the corpus of documents held by the Archaeological Museum in Rabat. During this phase of excavation, further charcoal samples were submitted for radiocarbon dating at Gif-sur-Yvette and the results published (Delibrias/Roche 1976; Roche 1976).
In the latest stages of the Moroccan-French collaboration (1973-77), J.-P. Raynal[20] undertook a full survey of the cave in 1977 and recorded stratigraphic sections (Raynal 1980). His detailed description of the sequence in Squares M21 and N21 (towards the back of the cave), a sequence which survives largely intact today, has provided us with the main geological 'reference-section' for this part of the cave. Roche may have visited the site again in 1977 to liaise with Raynal but, due to a stratigraphic error by Roche (see **Chapter 2**), the MSA/LSA boundary was incorrectly located; unbeknown to him, all Raynal's work, and that derived from his sampling (probably continuing until 1982), involved MSA levels only.

1.4 HISTORY OF THE CURRENT PROJECT

The new investigations at Taforalt grew out of a collaboration between the two co-directors (Bouzouggar and Barton) that had started in 1999 and was part of a wider INSAP[21]/University of Oxford project to examine the equivalent of the Middle to Upper Palaeolithic transition in North Africa and its relationship with the early human occupation of southwest Europe (see Barton/Bouzouggar/Stringer 2001). The new project's immediate objectives were to locate and obtain high precision dating and palaeoenvironmental evidence from caves in northwest Morocco but it soon became apparent that Taforalt, with its exceptionally thick sequence of cultural and environmental deposits, offered the best potential for such work and therefore the major focus of effort was turned to this site.
When work began in 2003, the main aims were to identify and date occupation levels belonging to the Aterian (Middle Stone Age, MSA) and Iberomaurusian (Later Stone Age, LSA), and to examine deposits spanning the local transition between these two archaeological technocomplexes. If the deposits were rich enough, it was intended also to compare the way in which the different cultural groupings had utilized the cave, under diverse climatic and environmental conditions in the equivalent of the last glacial period (Marine Isotope Stages 4-2, approximately 75-10 thousand years ago). For this new phase of work, existing standing

present team wrote to Roche in March 2008, requesting an interview, but his friend and colleague, André Debénath, counselled against such a meeting given the poor state of Roche's health. Sadly, the Abbé passed away in December of that year.

20 Jean-Paul Raynal (1949-), University of Bordeaux.
21 *Institut national des Sciences de l'Archéologie et du Patrimoine*.

profiles left inside the cave by Roche and Ruhlmann were first cleaned (where safe to do so). The immediate goal was to re-describe the deposits, collect fresh dating samples and to investigate the archaeological sequence. This had previously been reported by Roche as covering a combined depth of over 10 m, and made up of rich Aterian hearth layers overlain by a 4-metre thick sequence of Iberomaurusian deposits. The latter included a major accumulation of grey deposits (which we were immediately able to confirm as related to *escargotières* and *rammadiyats* from their high content of mollusc shells and ash) and, at the back of the cave, initial clearing suggested that significant portions of the "*nécropole*" [cemetery] recognised by Roche remained intact. Except in the area of the burials, where the edges of the earlier excavations were heavily eroded, a small number of new excavation squares were arranged contiguously with the old trenches. To ease identification, each of the old sections here studied and the new areas of excavation have been designated as separate 'Sectors' within the cave (see fig. 2.10).

An early result of these studies was the publication of a first coherent set of AMS[22] radiocarbon dates for the Iberomaurusian (Barton et al. 2007). It was also possible to show that there was a much more complex sequence of sedimentary units that went well beyond the original subdivisions by Roche of the 'grey (ashy) deposits', that we have labelled the "Grey Series". Similarly, we identified a sequence relevant to the Iberomaurusian at the top of the 'yellow (loamy) deposits' that we have labelled the "Yellow Series", although this sequence is not the same as that identified by previous researchers in their publications. In the first instance, we concentrated upon a zone on the central-south side of the cave (called by us "Sector 8") which has the most complete exposure of the relevant sediments but we have subsequently been able to identify less complete exposures in other parts of the cave. Intriguingly, immediately below the levels described in detail in the present volume, we came across evidence of an older flake industry, that appeared to pre-date the Iberomaurusian but did not fit the description of any previously documented lithic industries in NW Africa. In addition, and following discovery of *in situ* human remains at the back of the cave in 2004, parallel work was begun (in the area called by us "Sector 10" in a sequence referable to part of the Grey Series), with further members of the Natural History Museum (London) joining the team and co-directing (Humphrey) excavations from 2005 onwards.

1.5 MAIN RESEARCH QUESTIONS

Linked to the research of reinvestigating the nature of the cave's stratigraphy and the chronology of the Iberomaurusian were a series of related longer term goals and objectives. These were encapsulated in two successive projects: EFCHED (Environmental Factors in Human Evolution and Dispersals in the Upper Pleistocene of the Western Mediterranean) funded by the Natural Environment and Research Council (UK) from 2003, and a second project entitled "Cemeteries and Sedentism in the Epipalaeolithic of North Africa" supported by the Leverhulme Trust from 2008. The latter was explicitly concerned with the Iberomaurusian and dealt with integrating the long occupational sequence of the cave with the human burial evidence. The Calleva Foundation have assisted in carrying the whole project forward since 2012. The research has benefitted throughout from the support of INSAP and the PROTARS project (*Programme thématique d'Appui à la Recherche scientifique*). Amongst the major research questions arising from these projects were:

22 Accelerator Mass Spectrometry (AMS).

What was the climatic and environmental background to the Iberomaurusian (23,000 to 12,500 cal BP)?

The period covered by the Iberomaurusian occupation is known in the northern hemisphere to be one of dramatic climate change characterised by sharp oscillations in temperature and precipitation. However, at the beginning of our research there were few detailed terrestrial records available from Morocco on which to test these ideas. Exceptional preservation of deposits within the cave allowed the sampling of the sequence, both Grey and Yellow Series units, for palaeontological remains including snail shell, charcoals, charred plant remains, bones of birds, larger vertebrates and small mammals, etc. One of the aims was to collect environmental evidence as proxies for climatic changes through time. For example, was it possible to detect periods of greater or lesser humidity through the analysis of environmental remains in these units?

Was there evidence of continuity of occupation or were there significant breaks in the Taforalt sequence?

One of the themes for investigation was to test whether there were any significant discontinuities in the Iberomaurusian stratigraphic sequence? What might be the nature of these temporal gaps and would it be possible to compare them (if any) with deduced changes in the rates of sedimentation? This question also interacted with our first (above), in that, if discontinuities were identified from the sediments, could these be matched by other lines of supporting evidence and did they coincide with specific regional or global shifts in the climate?

Was there evidence for cultural variability within the Iberomaurusian?

Intra-site variation in the lithic artefact assemblages between different stratigraphic units had already been noted by Roche (1963). But questions remained about the stratigraphic detail of the previous work and renewed excavations afforded the possibility of much higher precision studies thanks to systematic use of sieving and reliance on multiple AMS radiocarbon dates. The potential was also recognised for integrating the results on the bone artefact technology and adding further observations on subsistence and other cultural behaviours. If there was evidence for major variability, did this represent overall cultural changes through time or could it have been due to locally fluctuating functional objectives?

In what periods was Taforalt used for burials? What was the nature of the human burial evidence?

Lack of information concerning the chronology and context of human remains in the cave could be addressed by fresh excavations at the back of the cave, combined with direct dating of human bone from the burial layers. Questions that had arisen from the initial re-discovery in 2004 were related to whether any unexcavated burials were preserved, were they buried sequentially, what was the nature of the funerary behaviour (were the skeletons buried whole or introduced as disarticulated body parts), what age groups were represented and whether funerary behaviour varied according to age or sex of the deceased? We were also interested in cultural characteristics during life, such as the prevalence of dental evulsion (the *pre-mortem* deliberate extraction of the incisors) in the Iberomaurusian population.

What were the subsistence strategies of the Iberomaurusian humans at Taforalt?

This was the starting point of our enquiries. Our aim was to examine a variety of evidence ranging from the study of the large fauna, terrestrial molluscs and charred plant remains to anthropological analysis of the human skeletal remains. Integrated within the Leverhulme project were specific questions relating to changes in subsistence patterns through time that could be inferred from analysis of the charred plant

and molluscan finds and the human dental evidence (oral health and dental modification) which all had a bearing on dietary behaviour.

Did behavioural changes in the Iberomaurusian amount to early evidence of broad-spectrum subsistence patterns, economic intensification and increased sedentism?

One of the meta-questions to emerge arose out of an increasing impression that the Iberomaurusians did not fit the traditional pattern of mobile hunter-gatherers but were more sedentary in their lifestyles. Examples from the Levant indicated that precocious development of broad spectrum behaviour and sedentism had occurred long before the advent of the Neolithic. The question here therefore was whether the evidence from Taforalt suggested a similar trajectory of development to that seen in the eastern Mediterranean (with similar causality) or whether the changes in the Iberomaurusian arose out of differing processes and sets of constraints.