

Barbara E. Barich

The Archaeology of Jebel Gharbi - Contributions to the Knowledge of the Pleistocene-Holocene Transition in Northern Libya

Introduction

All the Libyan region has produced meaningful documents testifying the presence of human settlements since the early phases of prehistory, how it is clearly shown by the Acheulians and Levallois industries found in several Libyan areas. Yet the knowledge of the whole country is not complete and, although many regions have been fully explored through systematic research, there are others about which we only possess scanty information. For this same reason the last phase of the Pleistocene could only be reconstructed thanks to a few important sites located in northern Libya, near the coast, which were discovered and dug around the half of the last century and they still have to be further investigated.

The cave of Haua Fteah in Cyrenaica is of paramount importance among the above mentioned sites: it was excavated by Ch. McBurney from 1951 to 1955 and it has produced a very long stratigraphic sequence that covers all the phases of the Late Pleistocene (starting from OIS 5, before 130.000 years ago, McBurney 1967). The sequence of Haua, between 40 to 34,000 bp, bears evidence of the 'Dabban'— an industry named after the cave of Hagfet et Dabba (McBurney & Hey 1955). Such industry marks the beginning of the Late Stone Age (or Late Palaeolithic) and it is characterized by burins, small backed blades, truncations and chamfered burins. The Dabban industry, similar to the first blade-burin industries of the Nile Valley (i.e. Nazlet Khater, Vermeersch 2000), was certainly developed by anatomically modern man and it strictly pivoted around the Jebel Akhdar.

About the 16,000 bp a new industry appeared within the sequence of Haua and within the nearby site of Hagfet et Tera (Petrocchi 1940). Because of its similarity to the Iberomaurusian culture (namely the ex-Oranian culture), McBurney called it 'Eastern Oranian' industry. As a matter of fact the above industries have techno-typological similarities, such as the great importance that both attached to backed blades, which sometimes have microlithic size and are the 98% of a whole tool set.

During the Oranian the climate underwent a remarkable change: the temperature lowered and the aridity increased; both phenomena brought about the depopulation of the territories. On the coast, instead, the settlement took place without interruptions. Human groups probably hunted *Ammotragus*, while in areas that were closer to the desert, such as Hagfet et Tera, they hunted gazelle. Other hunted animals were equides (i.e. *Equus zebra*), cattle, rabbits and terrestrial mollusks.

This horizon is followed by the complex that McBurney called 'Lybico-Capsian', which probably led to the next Neolithic production-based economy. Such kind of economy has been identified in the VIII and VII layers of the sequence. Nonetheless there are still many uncertainties due to the particularly circumscribed research carried out in the past. This kind of research was too limited to answer all the interrogatives about such a critical phase of the prehistoric development (i.e. about the relationship with the previous layers, the chronology and the origin of domesticates).

From the early nineties of the last century, the University of Rome 'La Sapienza', began to carry out a research project directed by the author. Our project's aim is to widen the knowledge of the Jebel Gharbi region, located in the subcoastal belt south-west of Tripoli. After an initial phase aimed at defining the geomorphological characteristics and the main episodes of the cultural sequence (Barich et al. 1995; 1996), in 1997 the project has undertaken a new research cycle actually meant to bring to light the occupation model between the end of the Pleistocene and the Holocene.

Jebel Gharbi means 'western mountain' and its name bears an implicit reference to its eastern counterpart, the Jebel Akhdar (the green mountain), where the cave of Haua Fteah is located. Although information related to the prehistory of the Jebel was very limited¹, the aim of the project was to establish its relations with the Haua sequence. After over fifteen years we have been successful despite

¹ McBurney and Hey (1955) were the authors of a preliminary geomorphological reconnaissance of some areas of the Jebel. Later, during the eighties of the last century, a project sponsored by the UNESCO was carried out by Barker and collaborators in the southern sector of the mountain (Barker et al. [eds] 1996).

all the difficulties we have come across in rebuilding a sequence made of data scattered over a wide area.

The Jebel Gharbi lies between the southern boundary of the Gefara (i.e. the coastal plain), and the northern boundary of the Tripolitanian Plateau (Fig. 1). In particular, the Jebel ends with an escarpment cut by a network of deep valleys draining towards the Gefara. Our investigation has followed a territorial approach and has been carried out along the Ghan and Ain Zargha *widian*, that is the two main water streams, namely two strategic communication routes within the Jebel.

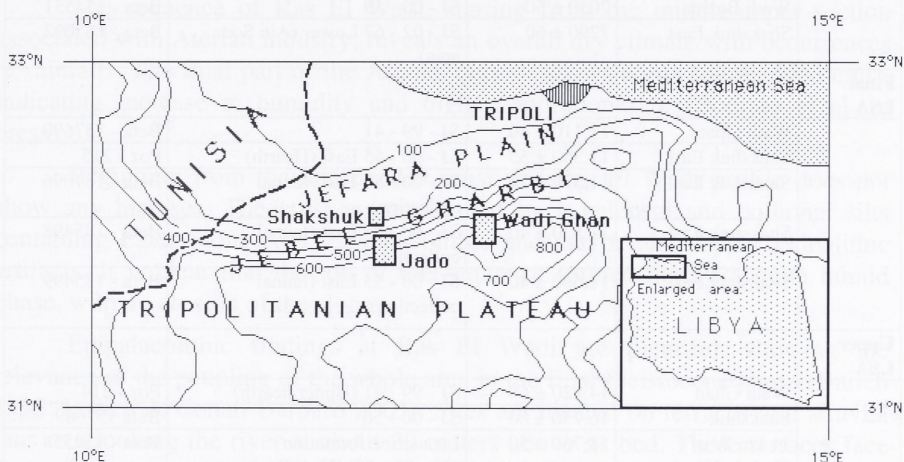


Fig. 1. Location map of Jebel Gharbi.

One of the best achievements in the Jebel Gharbi Mission is a chart of absolute chronology based on forty datings which were obtained through radiometric methods, either using charcoal samples, or carbonate formations and aeolian sands.² They have allowed for highlighting the different phases of the sequence and to clear up the Mousterian/Aterian relation. Furthermore they match the above-mentioned Cyrenaic sequence as well as the wider horizon of the Maghrebi history (Tab. 1).

The most ancient human occupation documents of the Jebel go back to the Early Stone Age. They are Acheulian artefacts –bifacial handaxes and spheroids– found on the Wadi Ain Zargha terraces at Ginnaun (Barich et al. 1995; 1996).

² They have been analyzed through the Radiocarbon, Uranium/Thorium (U/Th) and Optically Stimulated Luminescence (OSL) methods.

Table 1: Jebel Gharbi (Libya) – ^{14}C chronology of the main occupation phases.

Phase	Location	^{14}C dating	Site	Sample
Neolithic				
	Wadi Ghan	3670 ± 50	Lower Terrace	Beta - 154550
	Shakshuk East	5400 ± 40	SJ - 02 - 67 High (Ain Soda area)	Beta - 167092
	Shakshuk West	6120 ± 100	SJ - 00 - 58	Beta - 154540
	Wadi Bazina	6370 ± 40	SJ - 00 - 59	Beta - 154552
	Wadi Bazina	7030 ± 50	SJ - 00 - 59	Beta - 154551
	Shakshuk East	7290 ± 60	SJ - 02 - 67 Lower (Ain Soda area)	Beta - 167093
Final LSA				
	Wadi Ghan	11,110 ± 40	SJ - 99 - 41	Beta - 157690
	Shakshuk East	11,360 ± 55	SJ - 00 - 55 East (Hearth)	Poz - 215
	Shakshuk East	11,570 ± 70	SJ - 00 - 55 East (faunal collection)	Beta - 167096
	Shakshuk East	11,570 ± 40	SJ - 00 - 55 East (faunal collection)	Beta - 185498
	Shakshuk East	11,690 ± 40	SJ - 00 - 55 East (faunal collection)	Beta - 185499
Upper LSA				
	Wadi Ghan	14,820 ± 60	SJ - 99 - 41 (Upper hearth)	Poz - 214
	Shakshuk	16,750 ± 60	SJ - 00 - 56	Beta 157689
	11 km W of Shakshuk, (upper series)	18,760 ± 50	Lacustrine formation (55 - 00 - 59) Wadi Bazina	Beta - 154554
	11 km W of Shakshuk, (upper series)	26,330 ± 80	Lacustrine formation (55 - 00 - 59) Wadi Bazina	Beta - 154555
Lower LSA				
	Jado – Ras El Wadi	27,310 ± 320	SJ - 98 - 12 (upper calcareous crust)	Beta - 154576
	Shakshuk	25,410 ± 150	SJ - 00 - 56 Extension 2 (below Aterian tools)	Beta - 185497
	Shakshuk	27,800 ± 430	SJ - 00 - 56 Extension (Base)	Gda - 196
	Shakshuk	24,620 ± 400	Ain Soda	Beta - 167094
	Shakshuk	24,740 ± 140	SJ - 00 - 55 West (test 2)	Beta - 157687
	Shakshuk	25,480 ± 400	SJ - 00 - 55 West (test 2)	Beta - 167099
	Shakshuk	30,870 ± 200	SJ - 00 - 55 West (test 2)	Beta - 157688
MSA				
	Shakshuk West	43,520 ± 2110	Road	Beta - 167098
	Shakshuk West	44,580 ± 2430	SJ - 02 - 68 Test 4	Beta - 167097

Also prominent are the remainings of the Final Pleistocene, showing epipaleolithic hunter-gatherer situations, while the presence of a true Late Paleolithic is not to be excluded (Garcea & Giraudi in press). The same Wadi Ain Zargha region is also one of the main areas of epipaleolithic settlement. From the headwater – Ras El Wadi – to the mouth, located in the Gefara plain, more than twelve sites have been identified.

Ras El Wadi

The sequence of Ras El Wadi, starting from the middle-upper section associated with Aterian industry, reveals an overall dry climate with occurrences of rainfalls. The final part of the Aterian deposit shows a thin interbedded crust, indicating increase in humidity and high evaporation rate (Boдрato et al. in press).

Beginning from the interbedded crust, the Ras El Wadi profile does not show any hiatuses. The crust is surmounted by a paleosol and colluvial silts containing Later Stone Age, Epipalaeolithic and maybe also Upper Paleolithic artifacts. It is clear that the top of the sequence formed during a quite humid phase, with no erosion of the slopes.

Epipalaeolithic findings at Ras El Wadi are plentiful, showing the relevance of the peupling of the whole area in the final Pleistocene phase (Barich 1995; Barich & Conati Barbaro 2003). Sites are located on terraces and alluvial fans overlooking the river at about 20 meters above its bed. These terraces face East and represent a strategic location from which the access to the water sources could easily be controlled. The plateau could be reached quite easily from the Gefara plain, which starts directly from the foothills, only a few kilometres away.

The area is currently characterised by a quite scattered shrub vegetation, excepting rare grass cultivations and olive and fig trees. In the past, the zone may have been, instead, much in demand for its vicinity to the main source of water, the Wadi Ain Zargha, which runs a few tens of meters lower, and to other less important springs. Archaeological sites can most likely be attributed to repeated occupations in the area by nomadic groups, hunter-gatherers, possessing microlithic-sized debitage and blade tools. Although mainly exposed on surface, the artefacts showed fracture and retouch that were still quite fresh. Therefore, one might think that they reflected the original situation nearly enough, and that they had only undergone dislocations and horizontal shifting as an effect of the erosion of the soil that contained them. Because of the lack of charcoal remains no radiocarbon dating is available so far for this area.

On the whole the lithic assemblage can be compared with the Haua Fteah Epipalaeolithic horizon, from the so-called Eastern Oranian layers (XV-XI) to the Libyco-Capsian one (X). In particular, while SJ-90-13 and SJ-00-26A

collections easily correlate the Iberomausian contexts, site SJ-00-26 can be better compared with the Capsian examples. However, in light of what was already argued by Close (1986) and Lubell et al. (1992) about a possible Iberomausian-Capsian continuity, distances among the assemblages could be better explained with a change of emphasis in the subsistence economy, than with a replacement in population.

As for the main technological traits, the average between debitage products and cores is always high and cores show an almost constant presence of preparation. This evidence, and the high presence of core-trimming elements, together with the high number of primary flakes, denote a marked manufacturing activity in loco (Barich & Conati Barbaro 2003). Among tools, endscrapers and burins have an equal importance within the various lithic complexes, with generally very low percentages; truncations occur twice as much as burins and geometrics (ca.8.7%) and the straight form prevails with a rather accurate manufacture. Backed bladelets are the most characteristic component (with the arch-backed type – Tixier Type 056 – as the most documented one) (Tixier 1963), but their absolute percentages show discrepancies among the various assemblages. In fact, some of the sites (e.g. SJ-90-13, SJ-98-26A, SJ-98-31) have a very high backed index (more than 80%), but at Site-98-26 it reaches only 16.6%. Backing is preferentially obverse, while only a few examples exhibit inverse backing generally obtained with abrupt deep retouch. The recorded geometric microliths are exclusively crescent-shaped products, and in a limited quantity within the various assemblages. The manufacture is quite accurate with a prevailing use of *sur enclume* pressure retouch. Notches and denticulates, if on one hand represent a relatively amorphous group, in some of the assemblages are one of the most numerous classes (up to more than 20%).

Ain Shakshuk

One more settlement area has been identified at the foothills of the Jebel, near the modern town of Shakshuk. The area is located between the Gefara plain and the alluvial fan belt. It shows a lower terrace as well as aeolian sediments. The aeolian deposit presently appears deeply cut by gullies that probably developed during the second half of the Holocene. Shakshuk is next to a series of perennial water sources springing from the bedrock with such a considerable flow that they can sustain extensive cultivations of palm trees. The geological setting and the characteristics of water-bearing strata in the area between the Jebel Gharbi and the Gefara plain (Kruseman & Floeghel 1980; Singh 1980), show that such water sources in the bedrock could be connected to subterranean waters fed hundreds of kilometres south of the Jebel Gharbi.

Site SJ-00-56, which has been discovered near one of the above mentioned areas of water deposits, seems very interesting. Being located near a permanent spring, close to the Sel river mouth, in view of the Gefara plain, the site must have benefited from a very favourable microclimate. The destination of the site hasn't been completely understood, so far. It could have been a hunting camp-site with abundant stone implements, fauna and charcoal remains. However, the great amount of debris collected from the relatively small area of the excavation, and the almost unique presence of debitage products among the lithic artefacts, could indicate a specialized use of the site as a workshop. In the faunal remains, an equid, probably a wild ass, seems to dominate. Regarding this fact, it seems noteworthy that in Haua, both in the early and the late Eastern Oranian layers, equids are among the most represented species together with *Ammotragus*, gazelle, hartebeest and bovids.

Site SJ-00-56 has revealed quite an important stratification belonging to a single phase of occupation. The soil is made up of very dark organic sediments containing a large quantity of charcoals and ashes. A sample collected from the soil gave the date of $16,750 \pm 60$ bp. All the collected materials belong to a clear Epipalaeolithic horizon: the blade index is very high and the microliths (i.e. little cores, blades, bladelets), which are numerous, are especially made of chert. On the other hand larger artefacts are made of quartzitic sandstone or sandstone.

Neolithic documents in the Gefara

The question of the neolithization of the Libyan coast belt hasn't been well investigated yet, and this is where the future efforts of the Jebel Gharbi mission are being directed. Even in the case of the neolithization the Haua Fteah Cave is to us a most certain testimony and a starting point for interpretation. The layers from VIII to VII of the above mentioned sequence testify for a shift towards a Neolithic tradition dating back to between 6800 and 4800 bp. This tradition shows traits of pottery technology and lithic industry that have been related to the Neolithic of Capsian Tradition (McBurney 1967) which is also well-known in the western region of Algeria. Nonetheless the above attribution must be confirmed, because the very same presence of a Capsian tradition within Haua stratigraphy has been questioned. In fact scholars have interpreted it as a local development of the Iberomaurusian Epipalaeolithic tradition.

Anyway, even accepting the idea of continuity in the territory occupation, there are still many elements to explain. A major one is the remarkable transformation of the economic pattern, which, at Haua Fteah, testifies the presence of domestic sheep, goat and probably cattle, all of which are intrusive elements in that area. All things considered, an update of the data about the Neolithic of northern Libya is strictly necessary. Under this respect, the

hypothesis of cultural exchange, along the northern coast, formulated by McBurney (McBurney & Hey 1955: 268), and recently reaffirmed by Barker (2003: 151-62), needs to be evaluated together with the hypothesis of possible interactions with the Neolithic contexts of Merimde and Fayum, which were the first cultures in North Africa to know the Asian domesticated prototypes. Let us not forget that McBurney precisely compared various ceramics appearing at Haua Fteah and those illustrated by Caton Thompson (Caton Thompson & Gardner 1934) for the Fayum A culture.

During the last field campaigns in the Jebel Gharbi, several deposits from the Holocene have been surveyed close to the southern boundaries of the Gefara plain, not far from the Plateau slopes where the analysis of satellite images had pointed out the presence of water deposits, sometimes associated with 'playa' fossil mud formations. One of these water reservoirs is the Uadi Basina, which flows near the Jebel foot and shows several terraces. On top of the highest one there are many dune formations covering Neolithic deposits that embed remains of hut foundations, grinding stones and ostrich egg-shell sherds. Apart from grinding stones, which show the presence of plant exploitation practices, many other tools found seem not to have a clear functional purpose. Site SJ-03-83 is a plain area of about 65,000 square meters within which twenty-five fireplaces associated with lithic artefacts have been found. No charcoals have been collected, but at the moment a C14 dating is being carried out on the ostrich egg-sherds.

There are two other types of documents that can be associated with the late Neolithic occupation: the tumulus structures, which allow us to establish a connection with the Mediterranean Europe, and the many specimens of rock art, known both in the Tarhuna and in the Nalut regions. The best known sites are Ataf Ben Dalala (Jelinek 1977-82) and Abiar Miggi (Jelinek 1982; Neuville 1956). Other rock art engravings, still unpublished, have been identified by means of the surveys carried out during our field campaign in El Auenia (the Roman town known as Auro) and during the one on the hill slopes near the town of Nalut. Some of these images, mostly engraved on the upper part of calcareous blocks, show animal-like subjects which can be easily associated to the pastoral Neolithic, whereas others could be related to an even older occupation.

The C14 results obtained from Uadi Basina and from Shakshuk (Tab. 1) show that the Neolithic horizon of this Jebel area spanned from 7000 to 5000 radiocarbon years bp. At El Aouitia, not far from Sabratha, a Holocene horizon has been pinpointed under aeolian deposits. Several areas of the Gefara are indeed characterized by the presence of mobile dunes which took shape during the dry intervals of the Middle and Late Holocene. The same phenomenon has been observed in the region located west of Bir Ghanam, where the valley, which was a likely setting for Neolithic occupations, appears filled with aeolian sands.

The formation of such sands is to be related to the Jebel Gharbi last known arid oscillation. This phase has been first acknowledged by Giraudi (2005) and it spans from the late Holocene up to the Roman age. Both the surface sand deposits and the scattered traces of occupation during the aridity period could explain the difficulty our team has come across in finding out the Holocene occupation. It has appeared, indeed, that the economic model that developed then, suitable for an arid climate, was mainly of pastoral type. Nonetheless several Egyptian sources make us think that the breeding of animals was sided by the cultivation of cereals and grain (Mitchell 2005: 56). A correct evaluation of the role played by the botanic species of that area allows us to imagine the type of world the Romans came in touch with.

Seemingly the Neolithic of the northern Libyan area was mainly agropastoral. Its sites were scattered between the Gefara plain, where base-camps and cultivations were located, and the valleys within the plateau where animals grazed. There must have been some seasonal kind of exchange along occasional paths that later became established routes along the most important rivers: the Ain Zargha, the Uadi Sel, the Basina and the Uadi Ghan.

Conclusions

The Epipalaeolithic occupation of Jebel Gharbi was based on hunting and on the exploitation of plants. It took place between two arid periods, namely the second and third phase out of the four recognized by Giraudi in his paleoclimatic reconstruction (Giraudi 2005). In particular the third phase, after 13,000 years ago and in relation with the *Younger Dryas*, might have caused the rarefaction of the occupation, forcing it within the limits of areas in which water sources could be found (i.e. Shakshuk and Josh). As a result of this fact, the following agropastoral Neolithic occupation doesn't show any connection with the previous settlement pattern at the moment; on the contrary it shows innovative traits – pottery and domesticates – which require further investigation.

Acknowledgements

The Italian-Libyan Joint Mission in the Jebel Gharbi is directed by Barbara E. Barich, of the University of Rome “La Sapienza” and supported by grants from the same University, the Ministry of University and Scientific Research, and the Ministry of Foreign Affairs. Carlo Giraudi, Enea, Rome, is in charge of the geomorphological and palaeoclimatic study; Elena A.A. Garcea, University of Cassino, recently appointed as co-director of the mission, is in charge of the study of the MSA/LSA; Giulio Lucarini and Giuseppina Mutri, University “La Sapienza”, are involved in the study of the Epipalaeolithic sites. We would like to thank the President of the Libyan Antiquities, Dr. Giuma Anag,

the Superintendent of the Sabratha Department, Mabrouk Zinati, and the governmental authorities of Jebel Gharbi for their kind hospitality and support.

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