LIBYA

Current research on the prehistory of the Tadrart Acacus (Libyan Sahara). Survey and excavations 1991-1995

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Introduction

In Libya, prehistoric research has centered on the Fezzan region, the southern area of the country which is characterised by the Tadrart Acacus and Messak Settafet massifs. The Italo-Libyan Joint Mission, directed by Prof. Mori, has been carrying out research on ancient cultures and environments of central Sahara since the end of the 1950s (e.g. Mori 1965; Barich 1987). Besides the analysis of rock art, the last field seasons have provided new knowledge of Saharan prehistory, specifically about the prehistoric societies of the Holocene (Lupacciolu 1992; Garcea 1993; Cremaschi and Di Lernia 1995 in press; Di Lernia 1996 in press; Cremaschi in press).

Geological Features of Fezzan (Southern Libya)

The Fezzan marks a large cuvette of Nubian sandstone resting on the Palaeozoic. The general structure is relatively simple (Goudarzi 1970). Two large divisions can be distinguished: a southern synclinal zone (extending from the covering of the Hoggar and the Tibesti) and a northern zone formed by the Cretaceous Hamada de Tinghert in the west and the Eocene in the east. Slope gradient is generally modest some hundreds of metres above sea level, but it rises and exceeds 1300 m a.s.l. in the Tadrart Acacus. The western Fezzan is bounded to the north by a Cretaceous plateau, the Hamada el Homra, and to the south by the Tassilis des Ajjer and plateaus bordering the Hoggar. The Messak Cliffs furnish a section of the Nubian Sandstone; they are characterised by clays and sandstone containing silicified wood. The Nubian Sandstone complex of Messak covers the Murzuk cuvette whose raised margin forms the Messak, Djebel Ati and Djebel Ben Guénéma. On the southern side, the Cretaceous Nubian Sandstone outcrops, forming the Murzuk Cuvette and extending far to the south. The "Murzuk Limestone" forms a series of limestone plateaus locally sandy and of lake origin.

To sum up, sedimentary rocks prevail in the western Fezzan area, which roughly corresponds to the study area. They are mainly composed of sandstone, whereas in the eastern area magmatic rocks predominate, which are Triassic volcanites with a great extension also during the Tertiary (Figure 1).

Researches 1991-1995

For the first time, surveys were carried out in a regional-scale perspective, covering large areas. Field research was performed by means of surveys, test trenches, and excavations, in a multidimensional project still in progress. Five areas were surveyed, with different geomorphologic features and related strategy of sampling (Figure 2).

Area 1: Central Tadrart Acacus

Area 2: Erg Uan Kasa

Area 3: Central Messak Settafet

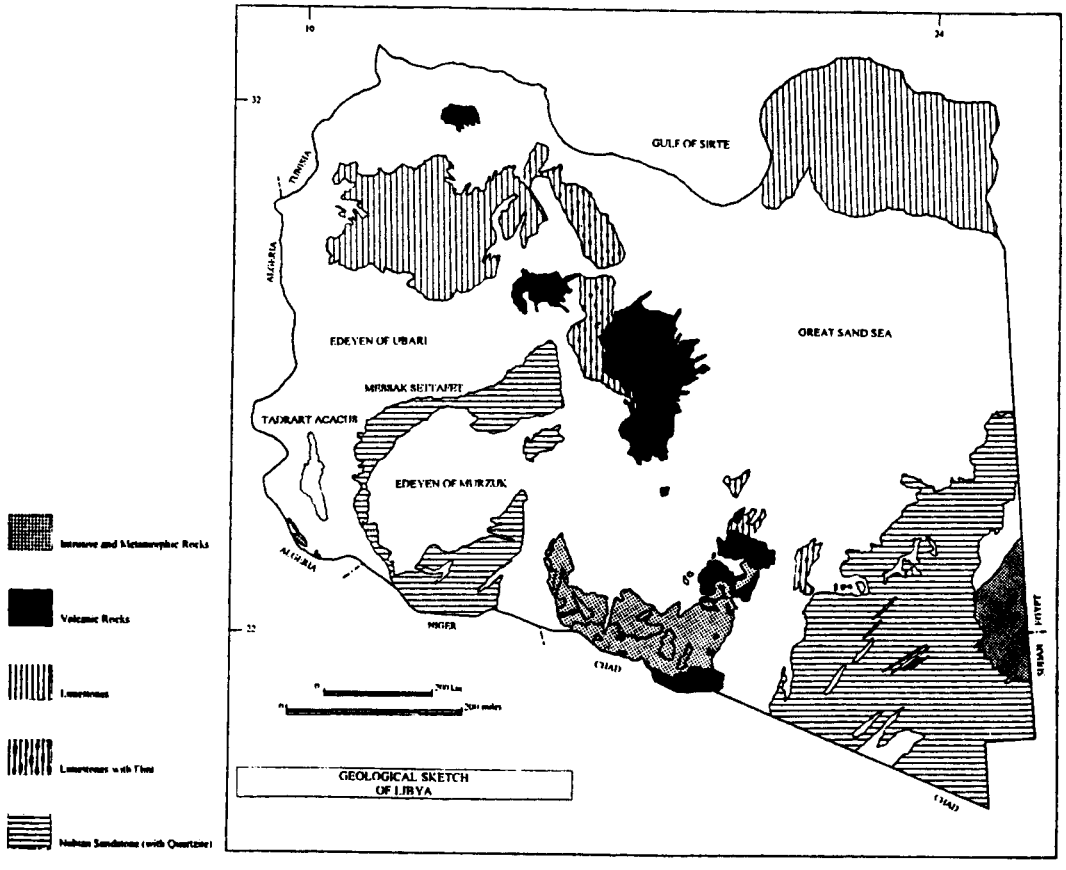
Area 4: Edeyen of Murzuk

Area 5: Wadi Tanezzuf (Tahala)

More than 200 sites have been located, with different chronological, cultural and functional features. Many radiocarbon dates were obtained (Figure 3): the cultural sequence has been roughly split in 4 main phases, related to diversified palaeoclimatic and paleoenvironmental context (Table 1).

This paper will deal mainly with the climatic changes and cultural sequence of the Holocene in areas 1 and 2. In area 3, systematic surveys indicate a long-term human presence, since the Early

Figure 1: Geolithogical sketch of Libya



Stone Age, with lithic assemblages related to Late Acheulean complexes. Probabilistic sampling in the Wadi Tilizzaghen reveals an average frequency of artifacts to stones of between 50 and 80% within 1 m². In several cases, these artifacts are completely Acheulean, with marked concentration of handaxes. A test sample in site ß revealed the presence of a *gilgai* palaeosol associated with a lithic industry, probably Acheulean. The Mousterian is widely present, but the Aterian is rarer. No Upper Palaeolithic artifacts were discovered. Several OSL dates on Pleistocene sands are being processed. In the Hamada area, Epipalaeolithic and "Mesolithic" sites are absent; some Late Pastoral Neolithic sites were identified, characterized by few lithics. Many quartzite quarries were also located, usually Neolithic in age.

Pastoral Neolithic sites are generally more frequent along the wadi ridges, as is the extraordinary rock art (Van Albada 1994; Lutz 1995). Some relationships between specialised sites for quarrying, seasonal occupations of the Hamada and production of rock art have been claimed (Di Lernia and Cremaschi 1995, in press). Ritual structures are represented during the Middle-Late Pastoral Neolithic by a 5,000 year old (B.P.) tumulus for burial and megalithic structures. A 5,200 year B.P. votive stele with ritual burial of domestic cattle was excavated at In Habeter III A (Cremaschi 1994; Di Lernia and Cremaschi 1995 in press). These sites should be related to a more articulated settlement pattern, which fits better with the evidence of groups with pastoral economy. Surveys in the inter-dunar corridors (area 4: Edeyen of Murzuk) revealed extensive lacustrine formations, characterised by fresh-water molluscs. Radiometric dates led us to define a well-refined climatic curve for the Holocene, based on changes in lake levels. The many sites located belong to different cultural phases, including the Acheulean, and Epipalaeolithic until the Late Pastoral Neolithic. The size of sites, their structures, organisation of technology, faunal remains and palaeoclimatic information indicate different modalities in the Holocene settlement pattern, which are very similar (see below) to the cultural dynamics present in survey areas 1 and 2.

Generally speaking, it is interesting to observe a diversified exploitation of the territory, between mountain sites and plain sites in the

Figure 2: Map of the Tadrart Acacus and Messak Settafet massifs, showing the survey areas (15)

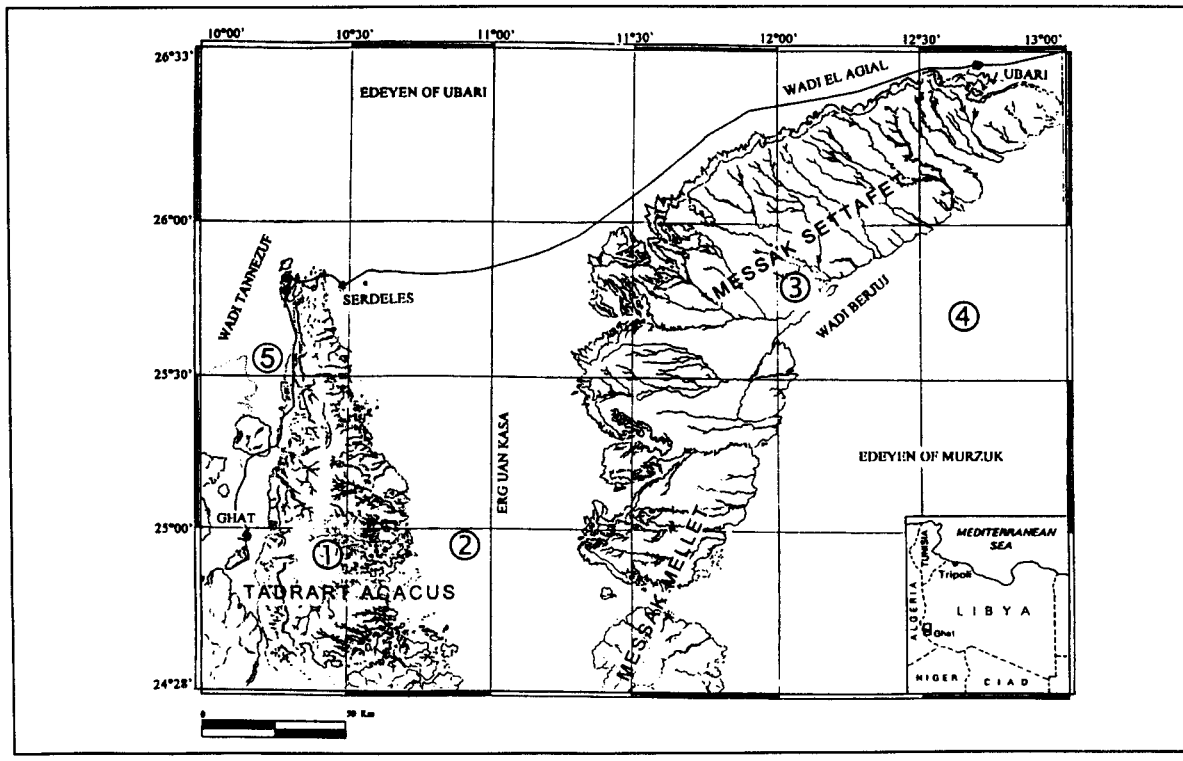
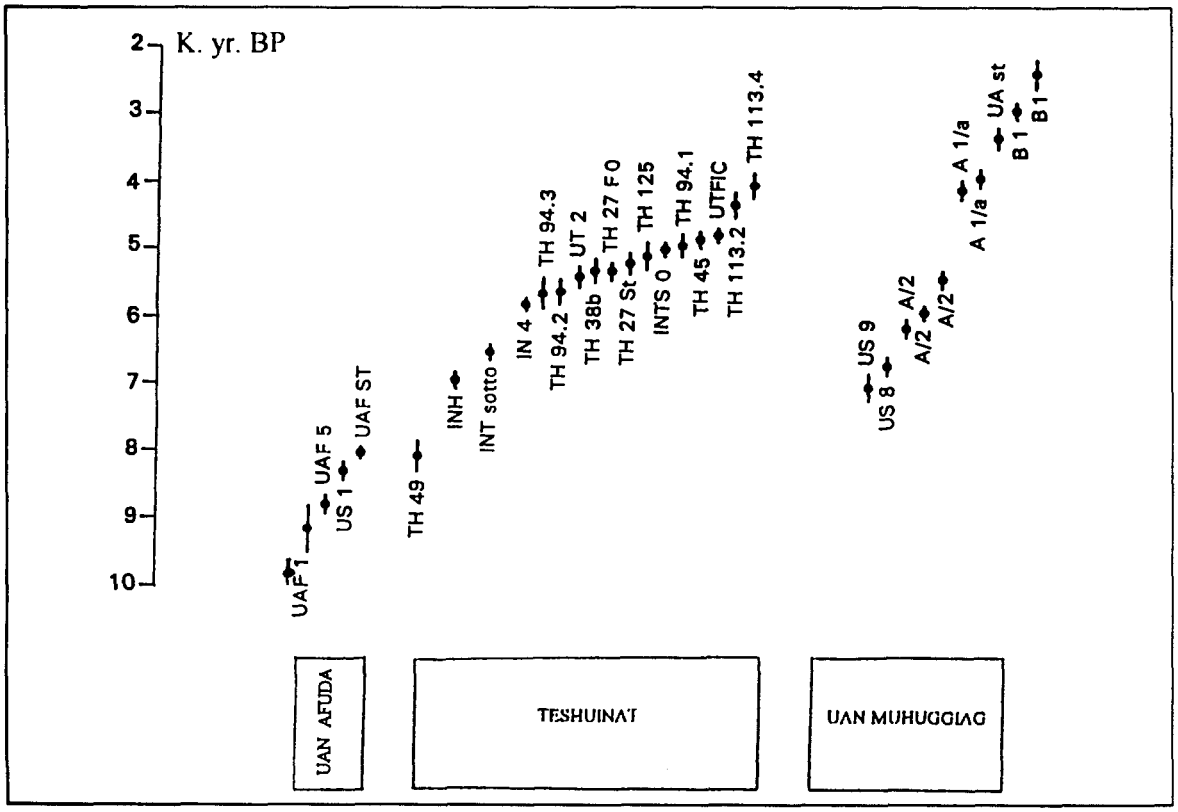


Figure 3: Some radiocarbon dates from Southwestern Libya (various sources)



proximity of the lake basins. The areas to the west of the Tadrart Acacus (Wadi Tanezzuf: survey area 5) seem to have different territorial contexts. We have almost exclusively evidence for Middle and Late Pastoral Neolithic, strengthening the impression of a marked change in settlement pattern and mobility during the period of dramatic desertification after 5,000 years B.P.

A Case-study: Central Tadrart Acacus and surroundings (Areas 1- 2)

Since the beginning of the investigations in the Tadrart Acacus, the central area of this massif showed exceptional features for both richness and quality of the archaeological record. It is not by chance that archaeological research has concentrated on this area, and new intensive and systematic surveys are also directed toward the central regions. The real shift in the fieldwork has been the integration of the mountain range with the surrounding ergs, in order to analyse the settlement pattern and the exploitation of the environment and then to overtake the simple site-perspective.

(a) Epipalaeolithic (around 10,000-8,800 B.P.)

About 4000 years after the onset of the wet period, at the beginning of the Xth Millennium B.P., we register the presence of Epipalaeolithic human groups, with an extractive economy, characterised by hypermicrolithic tool kits and aceramic in nature. Mountain Epipalaeolithic sites are usually restricted to rockshelters or caves; plains and lakes are represented by small open sites. The economic strategies are mainly founded on specialised hunting of *Ammotragus*, but one can also observe the exploitation of water resources. This phase is characterised by semi-residential sites in the mountain environment, with some unusual features, such as the structural aspects of the settlements (see Uan Afuda; Cremaschi and Di Lernia 1995) and the organisation of technology. Unlike the mountain sites, specialised sites in the plain show a logistical exploitation of territory (*sensu* Binford 1980). We observe the preferential exploitation of local raw materials in respect of the considered environments: silicified sandstone, silcrete, quartz and

Figure 4: Lithic tools from Epipalaeolithic lake sites (above) and mountain sites (below)

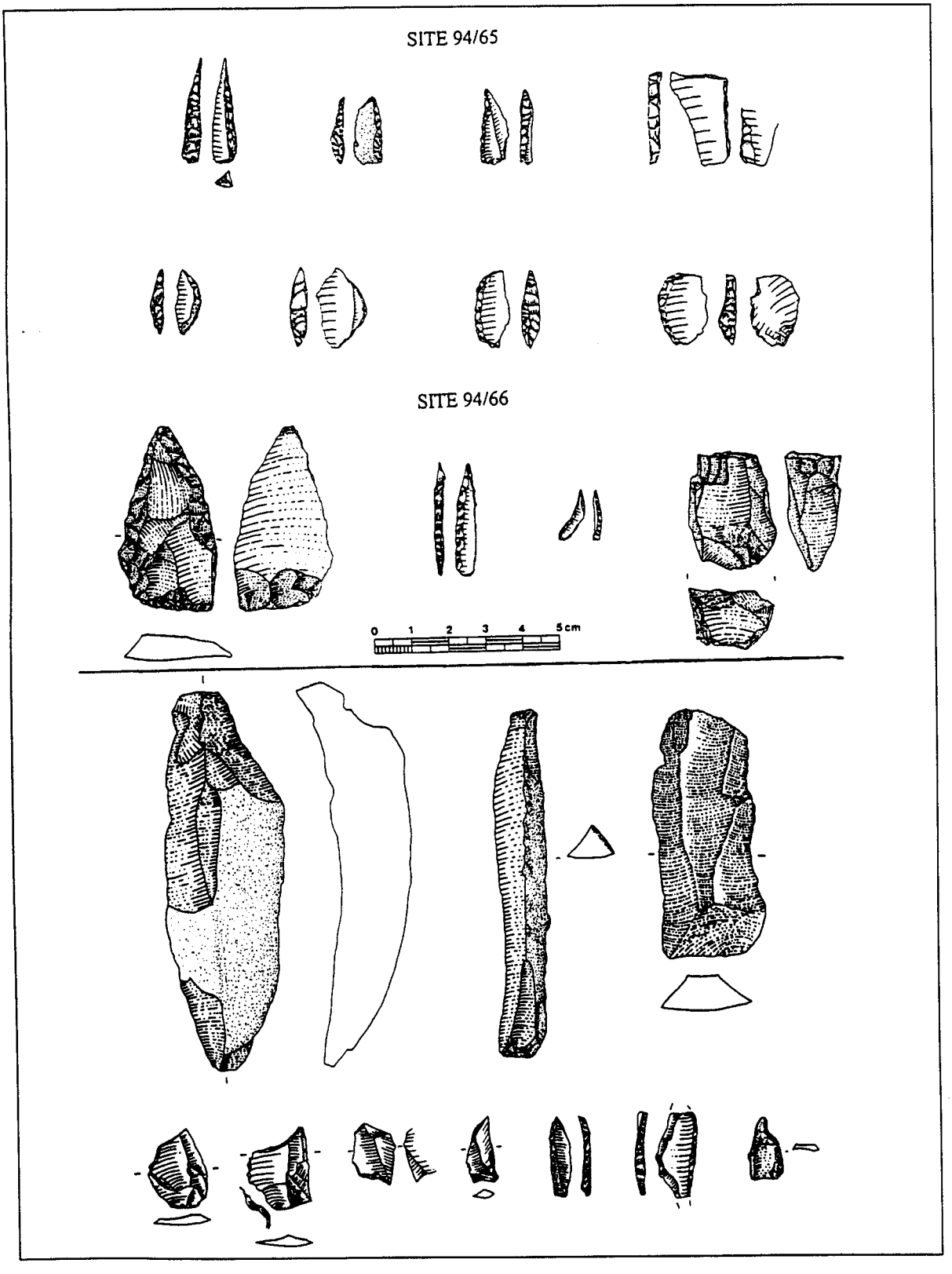
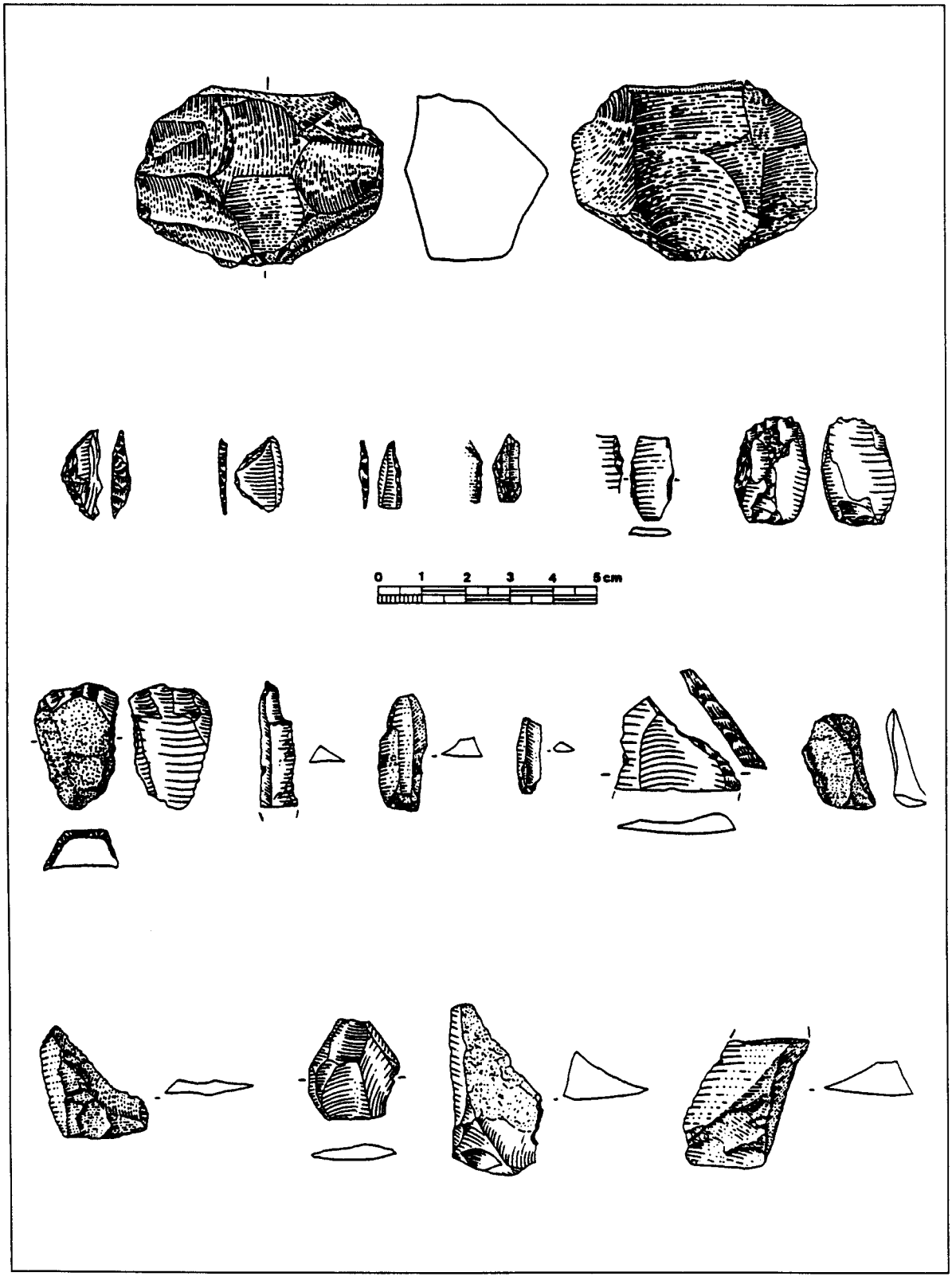


Figure 5: "Mesolithic" industry from Uan Afuda (Central Acacus)



quartzite. In the lithic complexes of the mountains sites, the silicified sandstone is very common, with only a 20% average of other good-quality raw materials. The lake sites are characterised by the use of single, local raw materials, mainly quartz and/or silcrete, directed toward specialised tool-kits (Figure 4). *Chaine operatoire* and tool-kits are quite different in the two environments, according to: 1) available raw material; 2) site function. As regards the distribution of raw material, it has to be stressed that in many mountain Epipalaeolithic sites the presence of lake raw material is attested, but the contrary never happens.

(b) "Mesolithic" (around 8,800-7,500 B.P.)

The increase of aridity during this period, already started at the end of the Xth Millennium B.P. in the mountains, seems to be expressed on the archaeological side by an important shift toward the exploitation of vegetable resources, with straw and grass heaps in the rockshelters, linked to animal management, which was interpreted as probable taming of *Ammotragus* (Cremaschi et al. 1996 in press). The "Mesolithic" settlement pattern is exclusive of the mountain environment; the lake zones in the ergs are almost completely abandoned, in favour of the intensive use of the mountain areas. The subsistence strategy is marked by an extractive economy, which is less specialised than in the Epipalaeolithic phase: in the Acacus sites we have evidence of Barbary sheep, hartebeest, North African porcupine, golden jackal, desert hedgehog, fish and birds (Corridi in press). Economic strategies are directed toward the diversification of the resources exploited, with an increase in wild cereal consumption, and hunting directed toward various animal species. The broadening of the economic basis is a classic adaptive strategy adopted by any predator under conditions of high population density or declining resources (e.g. Cohen 1985: 102). This strategy seems to be related to more permanent settlements, with a foraging radius of less than 5 km, and a broad spectrum of the resource selectivity.

In some sites of the Acacus, like Grub, Uan Afuda, and Fozzigiaren, archaic pottery is found, beginning around 8800 years b.p., decorated by means of rocker technique, with some decorative motifs, as, for instance, Dotted Wavy Line. Finally, the existence of an individual burial outside the area of the shelter at Uan Muhuggiag (radiocarbon dated to 7800 yr. B.P.) seems to reveal a elaborate funerary cult (Di Lernia and Manzi 1993). The shift toward the exploitation of vegetable resources should explain the change of the lithic industry, already characterised by a large component of macro flakes, mainly on silicified sandstone (Figure 5): also in this case, organisation of lithic technology, as well as the presence of large grinding slabs and pottery point to increased sedentism.

(c) Early and Middle Pastoral Neolithic (around 7,500-5,000 B.P.)

At the end of the VIIIth Millennium B.P., in conjunction with a new climatic amelioration and consequent rising of lake levels, we see the affirmation of a pastoral productive economy (Gautier 1987). One can observe a deep homogeneity in the material culture, but significant differences in economic strategies and settlement patterns. In Early Pastoral phase mountain sites, we note a growing in the use silicified sandstone, with a very rough flake industry. Some exotic raw materials have been recorded, especially flint (from several hundreds of kilometers away). This contrasts with the lake sites, where the primarily used raw material is quartzite, and some other local rocks also appear. The quartzite is procured by means of extensive quarrying along the outcrops of the wadies in the Messak (Di Lernia and Cremaschi 1995 in press). The general use of local raw material is the most significant aspect: in the Tadrart Acacus, the exotic raw materials, namely quartzite and flint, seem mainly widespread in the eastern fringes of the massif (Di Lernia et al. 1995 in press). It is possible to observe a clean change in the procurement forms and circulation of raw materials, according the different environments. At a preliminary stage of the settlement pattern analysis, one can distinguish a distribution of very early Pastoral Neolithic sites in the more internal portions of the Acacus, and only in the middle Pastoral Neolithic phase we observe the clear development of lake sites, with probable subsequent eastward moving of the sites linked to them (transhumance).

A tentative, alternative settlement model could be proposed for these Pastoral phases, characterised by semi-residential sites localised along the lake shores, with composite economy, mainly founded on cattle and sheep herding and gather-

Table 1: Culture history

Cultural Phases	Radiocarbon dates	Climate
Epipalaeolithic	c. 10,000 to 8,800 B.P.	from wet to moderately dry
"Mesolithic"	c. 8,800 to 7,500 B.P.	increasing aridity
Early and Middle Pastoral Neolithic	c. 7,500 to 5,000 B.P.	wet to arid
Late Pastoral Neolithic	c. 5,000 to 2,800 B.P.	arid

ing. During the dry seasons, probably only small transhumant groups of shepherds inhabited the mountain rockshelters, with a different kind of subsistence, in which the hunting contribution is very important.

(d) Late Pastoral Neolithic (around 5,000-2,800 B.P.)

At the end of the Vth Millennium B.P., with increasing aridity, we still observe a high human density in the mountains. Many rockshelters contain dung layers, linked to sheep/goats herding, which indicate an adaptation of the pastoral communities to a dry environment. The surrounding plains remain completely uninhabited. By this time, in fact, lakes dried out and the area was almost completely abandoned, and the settlement pattern was directed toward the seasonal use of mountain rockshelters and the development of the sites near the oases. Sheep and goats are the most important component in herding, given the deterioration of the climatic conditions and the scarcity of water (Gautier 1987; Corridi in press). As far as material culture is concerned, we can observe an increase in undecorated pottery, as well the large use of grinding stones. In the lithic industry, numerous factors indicate a deep change in the mobility based on long-range movements and imply a highly specialised pastoral economy (Cremaschi et al. 1996 in press); we recall the presence of exotic pieces as "predynastic knifes" or the increasing of non-local raw materials, namely volcanic and metamorphic rocks (Di Lernia et al. 1995 in press). Many eroded rockshelters have been again inhabited, as testified by the presence of sites with dung layers to direct contact with the bedrock, and scattered early Pastoral Neolithic finds in the neighbouring areas.

Researches in the Central Sahara, and namely in the Tadrart Acacus region, have been always directed to the mountain environment, analysing in great detail the cultural dynamics but losing the general outlook of the territory. We would like to stress the main points emerging from the new extensive research in the Acacus region: (a) a well defined climatic curve from the end of the Pleistocene (XV Millenium B.P.) to the Holocene (III Millenium B.P.); (b) the division of the "Prepastoral" phase in two different, well-recognizable socio-cultural systems, based on settlement system, mobility pattern, economic strategies and material culture: Epipalaeolithic phase (circa 10,000 to 9,000 B.P.) and the preliminary labelled "Mesolithic" plase (circa 9,000 to 7,400 B.P.); (c) the strict relationships between mountain and plains, with different strategies of environmental exploitation, since the Epipalaeolithic until the Late Pastoral Neolithic.

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