OCCUPATION AND MOBILITY IN HIGH-MOUNTAIN AGROPASTORAL SOCIETIES: A PROPOSAL FOR AN ETHNOARCHAEOLOGICAL STUDY IN THE JBEL SIRWA (ANTI-ATLAS, MOROCCO)

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Abstract

Since the first days of domestication, high mountain agropastoral societies have provided an exceptional example of adaptation and resilience to inhospitable territories, as the maintenance of population groups requires a delicate balance between transhumance and cultivation activities. Archaeological research into these societies has left numerous questions about the relationship between humans and the mountain environment unresolved. These questions have motivated the authors to explore the materiality of the daily life of the agropastoral populations of the Jbel Sirwa. Thus, with this proposal, the ARCHEOMOBAS project outlines an interdisciplinary methodological approach intended to carry out ethnoarchaeological studies of this kind of community in mountainous territories.

Keywords: Ethnoarchaeology, High Mountain, Territorial Archaeology, Domestic Archaeology, Archaeobotany, Geoarchaeology, Gender Archaeology, Biomechanics.

OCUPACIÓN Y MOVILIDAD DE LAS SOCIEDADES AGROPASTORILES DE ALTA MONTAÑA: UNA PROPUESTA DE ESTUDIO ETNOARQUEOLÓGICO EN EL JBEL SIRWA (ANTI-ATLAS, MARRUECOS)

Resumen

Desde los orígenes de la domesticación, las sociedades agropastoriles de alta montaña han sido un ejemplo excepcional de adaptación y resiliencia a territorios inhóspitos, ya que requieren de un delicado equilibrio entre las actividades de trashumancia y cultivo para poder asegurar la continuidad del grupo. Los trabajos arqueológicos sobre estas sociedades han dejado tras de sí numerosas preguntas sobre la relación entre los humanos y el medio de montaña. Todos estos interrogantes nos han llevado a estudiar la materialidad de la vida cotidiana de las poblaciones agropastoriles del Jbel Sirwa. Así pues, desde el proyecto ARCHEOMOBAS, ofrecemos esta propuesta metodológica interdisciplinar para llevar a cabo estudios etnoarqueológicos de este tipo de comunidades en territorios montañosos.

Palabras clave: Etnoarqueología, Alta Montaña, Arqueología del Territorio, Arqueología Doméstica, Arqueobotánica, Geoarqueología, Arqueología de Género, Biomecánica.

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1. INTRODUCTION

1.1. Vagaries and unanswered questions of high mountain archaeology

Among the principal challenges faced by the archaeology of high mountain territories we find the ability to understand the occupation, production and communication patterns of agropastoral societies in areas where survey and excavation work is frequently scarce, due to orographic and climatological difficulties (Gassiot Ballbè, 2014: 14-17). To this, other factors must be added, such as the insubstantiality of the structures of ancient transhumant communities, their frequent movements and the fact that they carried little equipment with them. All of these factors increase the difficulty of understanding settlements in these contexts (Égüez *et al.*, 2018: 180-193). Furthermore, research of this kind is significant not only for the characterisation it makes of the material remains present in the high mountains, but also because it represents an attempt to better understand the adaptation and resilience mechanisms used by human communities in these remote territories. Thus, archaeological research into such societies has raised numerous questions concerning a range of issues: the transhumance routes used by the population, the domestic or productive functionality of the structures found, the degree of complexity of production systems and even relations between humans and the animal and plant environment evidenced by organic remains (Schroeder, 2014: 36-40; Stirn, 2014: 7-10; Arnay *et al.*, 2019).

1.2. Why turn to Ethno-Archaeology?

Taking as a starting point the challenges that researchers interested in exploring past ways of life have faced, it should be recalled that as far back as the 1970s, interest began to turn to the ethnographic present in order to uncover clues to help recognise and interpret archaeological sites associated with transhumant societies (Robertshaw, 1978: 29-31; Hole, 1979: 192-218; Smith, 1980: 467-487). Since its inception, ethnoarchaeology has been seen as a discipline that studies contemporary communities from a primarily archaeological perspective. To this end, it attempts to construct referents to aid understanding of the technological traditions and operational chains of the past (Stiles, 1977: 88-103). The combination of archaeological and ethnographic parameters provides a broader understanding

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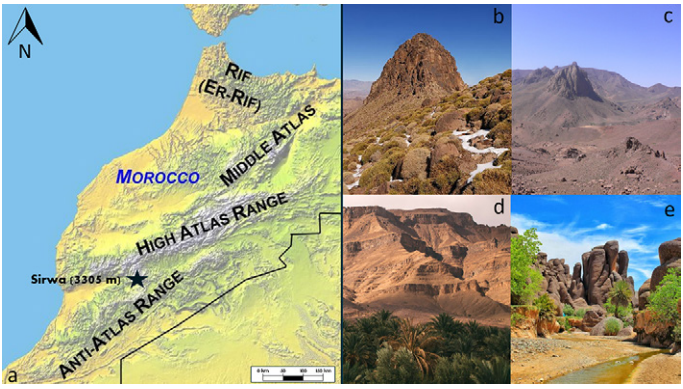

Figure 1. A) Map with the location of Jbel Sirwa in Morocco (edited by J. Carballo) and composition of images with various bioclimatic landscapes in the region: the peak of Jbel Sirwa (b), the high mountain on its southern slope (c), the southern mountains with irrigated valleys (d), the Tislit wadi (e).

of the social dimension that lies behind material finds. As a result, methodological avenues have been opened up that aid in understanding how archaeological traceability and human behaviour yielding material remains converge and diverge. It goes without saying that ethnoarchaeology does not in itself consist of a direct extrapolation of ethnographic observations of archaeological contexts. Rather, it is a tool for reflecting on the ontological relations between human practice and the archaeological record (González, 2003: 9-21; Henry, 2011: 36).

1.3. The Jbel Sirwa region as an area of research

The questions posed by high mountain archaeology, plus the techniques and methods of ethnoarchaeology used to approach them, led us to look for a research area that met the ideal conditions for studying agropastoralist societies in mountainous regions. The area opted for has a series of unique aspects that lend it great ethnoarchaeological potential.

The Jbel Sirwa promontory (3305 m.a.s.l.) is a mountainous area in the central Anti-Atlas, which connects with the High Atlas. It dominates the region to the south-west of the Ouarzazate basin and the Drâa valley (Martínez Freiría *et al.*, 2017: 103). From a tectonic point of view, the Jbel Sirwa has its origins in a Late Miocene volcanic eruption (Thomas *et al.*, 2002: 1-57; Admou and Soulaimani, 2011: 83-104). The complex bioclimatic reality produced by humid westerly winds and the influence exerted by the Sahara to the south east (fig. 1) must be added to these circumstances. The varied geomorphology of the peripheral Atlantic regions, which has been affected by Alpine thrusts since the Tertiary (Teixell *et al.*, 2007), plays a key role in the area. The same can be said for hydrology, whose complex patterns are affected by altitudinal and lithological variations that produce both

endorheic wetlands dependent on rainfall and areas of impermeable terrain underlain by subterranean karst streams (López-Lara *et al.*, 2007).

These contrasting geographical structures consisting of cultivated northern slopes and arid southern mountains were originally occupied by ancient semi-nomadic communities that arrived from the desert in several waves (Maurer, 1996: 48-50). Most of the current inhabitants of the Sirwa massif belong to a number of Berber tribes, which in turn form part of the well-known *Aït Ouaouzguite* confederation (Tribes du Maroc, 2020). These are ethnic *Chleuh* groups that speak the Tashelhit (or Chilha) language, which is the main variant of Berber spoken in southern Morocco. Although these peoples were initially nomadic, from the 12th century onwards they began a gradual process of sedentarisation in the Anti-Atlas and participated in the population movements that occurred during the Almoravid and Almohad periods. The origins of these peoples remain little understood and, due to the inaccessibility of the region, they remained outside the control of dynasties such as the Almohad or Bani Yaddar dynasties (Gandini, 2014) for most of the period.

The choice of focusing our research on these communities was made despite the fact that one of the principal transport routes between Ouarzazate and Taroudant currently passes through the region. Even today accessing some areas presents difficulty and has allowed a large number of agropastoralist groups to maintain their traditional practices, albeit adapted to new socio-economic realities. This relative inaccessibility, the distribution of water and agricultural resources, and semi-nomadism, have influenced the strong sense of territorial identity displayed by these Berber groups, some of which compete over resources found in the same valley or wadi. Similarly, it should be remembered that these groups were not incorporated into the Moroccan state until 1934 (and even then only partially) and that this state of affairs has influenced the survival of their traditional ways of life (André, 1951). It should be noted that agro-pastoralism is a complex socio-economic phenomenon, involving the interweaving of a whole series of intrinsic activities (Maurer, 1996: 48-50). The perpetuation of a given practice by a group necessarily responds to changes over time to techniques, cultural values and behaviour (Bonfiglioli, 1990: 256-263). However, the fragile balance between the two traditions is fundamental to ensuring the continuity of the community (Berque, 1955: 121-141). Transhumance and mobile pastoralism are common across the different regions of the Atlas; their practice requires knowledge of natural resources and of the methods required to manage them, all of which have their roots in Berber culture (Domínguez, 2013: 92-93). Thus, resilience based on different methods of water and soil management in the different bioclimatic areas is a key characteristic of the Anti-Atlas communities. Their lifestyles have evolved in step with their capacity to adapt to the water management techniques required to engage in agriculture and raise livestock (Parish and Don-Funnell, 1996). Climate variables therefore have a strong influence on the agro-pastoral strategies of these communities, which are capable of adjusting their behaviour to cycles of scarcity or abundance.

It is clear that in the Sirwa, agropastoralism is part of a complex mountain system, whose foundations lie in the vertical relationship between activities carried out at different bioclimatic levels, and in the complementary nature of other

important traditional socio-economic practices, such as textile production (Mahdi, 1999: 71-72). However, the opening up of the commercial life of Ouarzazate and Tazenakht and the recent effects of globalisation have provoked some changes in the socio-economic dynamics of these communities. These factors, in addition to other phenomena including rural exodus, have led certain populations with a long tradition of textile production to move towards more centralised forms of commerce and tourism. Some have even partially abandoned certain models of human habitat such as dwelling in ephemeral huts. It is therefore essential, as early as possible, to document not only the material life of the agropastoral communities of the Jbel Sirwa region, but also to make an effort to step up ethnoarchaeological studies in order to protect expressions of intangible heritage that are in danger of dying out in different parts of the world (Politis, 2014: 83-88).

2. RESEARCH OBJECTIVES: OCCUPATION AND MOBILITY IN THE HIGH MOUNTAINS

This paper, which was prepared for the international conference Circulations during the Holocene around the Maghreb (held at the University of La Laguna, 2020), is intended to develop an ethnoarchaeological proposal for the study of high mountain agropastoral communities, which will be incorporated within a larger framework of long-term anthropological, ethnographic, archaeological and bioclimatic research.

A considerable amount of earlier research has addressed the habitat patterns and current socio-economic dynamics of neighbouring high mountain regions of the Atlas. However, their methodological focus has been principally anthropological or ethnographic. Accordingly, the ARCHEOMOBAS Project (*Archaeology and Ethnography of the Occupation and Mobility of Agropastoral Societies in Jbel Sirwa*), is committed in its research to combining archaeological and ethnographic aspects of the methods derived from Topography, Architecture, Botany, Geochemistry, Biomechanics and Gender Studies.

Accordingly, the overall objectives of this paper are enshrined within a framework that combines the methods of ethnoarchaeology with the analysis of the materiality and structures of high mountain settlements. This enables us to approach the models of occupation and mobility practised by agropastoral societies with complex production systems. The project involves five different but complementary lines of research, each of which is organised around a particular perspective that addresses what we consider the defining elements of the agropastoral societies of the Jbel Sirwa. We use the Berber language, *tashelhit*, to define each of these expressions: mountain (*adrar*), house (*tigemmi*), plants (*ûzzû*), sheep (*izimer*) and working with wool (*tadût*).

The specific objectives of each of the lines of research are described below:

– The *Adrar* perspective: employs a regional focus to explore the anthropisation of the mountain landscape, the use of water resources, vegetation cover, and the distribution of settlements.

– The *Tigemmi* perspective: characterises domestic cycles and daily life through an examination of the architecture and spatial functionality of dwellings, which, among an array of other aspects, may reflect possible socio-economic differences between temporary settlements and permanent villages.
– The *Ûzzû* perspective: involves the creation of a repertoire of current behaviours linked to the collection of wood, fuel resource management and the selection of plants according to the function they perform in traditional agro-pastoral practices.
– The *Izimer* perspective: revolves around an understanding of different grazing strategies based on microscopic and geochemical analysis of stabling spaces.
– The *Tadût* perspective: focuses on the construction of current references to the materiality of women's textile work and the transformation of women's bodies as a result of the burden of these daily activities.

The implementation of these objectives will permit us to: 1) characterise different subsistence practices, 2) estimate population densities, and 3) use macro-spatial, microscopic and molecular scales to analyse the material record in order to identify territorial behaviours. In addition, the construction of these ethnoarchaeological references will ensure the preservation of an endangered heritage for the future.

3. LINES OF RESEARCH: FIVE ETHNOARCHAEOLOGICAL VARIANTS

3.1. The *Adrar* perspective: transhumance between valleys and mountains

One of the most characteristic aspects of the Jbel Sirwa is the way in which its inhabitants interact with the landscape, adapting it to their needs. However, the human capacity for transformation depends on the bioclimatic and hydrological conditions of the area. A week-long preliminary exploration was carried out in 2019, to examine the ethnoarchaeological potential of the region. Two types of temporary occupation were identified (Carballo *et al.*, 2020). In the first, categorised as "medium altitude" (1,500-2,000 m.a.s.l.), permanent settlements (*douars*) are occupied during the coldest months (October-May). These range vertically up the slopes of the valleys, with irrigated crops distributed across terraces on the lower slopes, sometimes with a fortified granary (*agadir*) in their upper parts. These settlements tend to be characterised by dry conditions with less fertile croplands and pastures than those found higher up, as they are more affected by the winds of the Sahara. In the 'high mountain' area (+2,000 m.a.s.l.), the pastoralist population moves to high mountain villages (*azibs*) in the warmer months of the year (June-October). Given the greater fertility and the presence of wild vegetation caused by the humid winds from the north and the snow-fed streams, summer grazing conditions are much more favourable here. In these more temporary settlements, fenced gardens, areas for penning livestock and communal ovens are located beside the grazing reserves

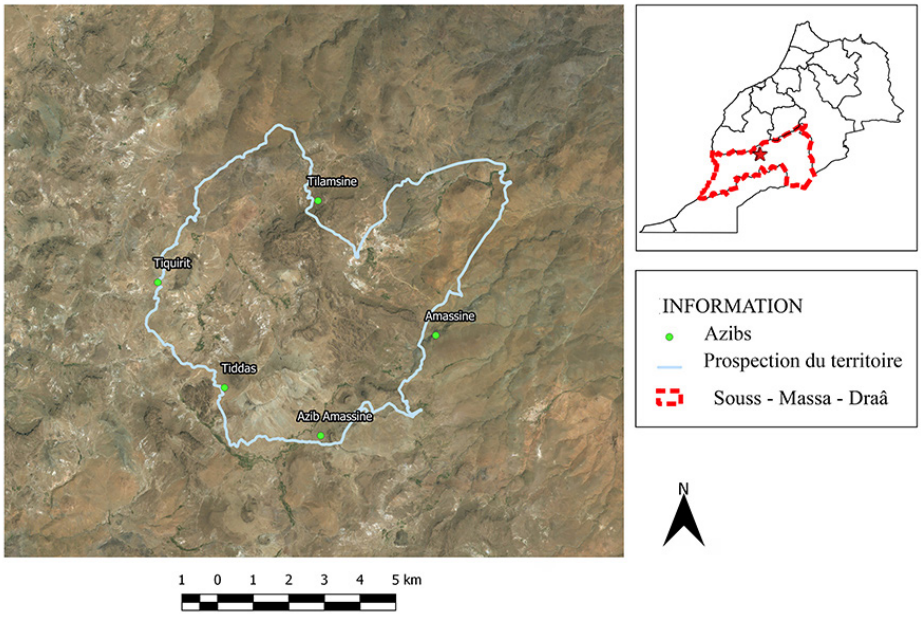

Figure 2. Map with the study area and the survey area delimited around the temporary settlements (azibs) and the Amassine douar.

(*agdals*). As the principal social units found in the communities are the family (*takat*) and the village (Amahan, 1998: 19-20), when summer comes, families associated with the pastoral activities of a particular *douar* go to the same high mountain *azib*. Although there is no single model of occupation of the Atlas Mountains, similar patterns have been found on the slopes of Beni Mellal and in Imeguizz in the High Atlas (Crépeau and Tamin, 1986; Costa and Batista, 2018: 392).

By taking advantage of the relative proximity between the *douar* of Amassine and its "mirror" *azib*, we have opted to focus our research on the north-eastern part of the Jbel Sirwa. In this area of rural communities located between Taliouine and Amergane, we will examine four *azibs* found in the higher parts of the valleys of the Tamanart, Amsalane and Tighouni tributaries, as well as the *douar* of Amassine mentioned above (fig. 2). This will allow us to develop a broader view of the processes of short transhumance, and of the differences between permanent and temporary habitats.

Using the methods proper to territorial archaeology, two teams will conduct surveys in the selected valleys. Each will be equipped with GPS surveying equipment to record the georeferenced points and the typological information that corresponds to them (Gassiot Ballbè *et al.*, 2016: 1-11). The resulting geospatial data on the distribution of settlements will be integrated into GIS platforms. These will subsequently serve as ground references for analyses using free satellite

data (e.g. ALOS DEM, Sentinel-2) to monitor the terrain and to generate maps on anthropogenic impacts across the region, land use dynamics and the seasonal evolution of the hydrological network and vegetation cover (Biagetti *et al.*, 2017: 1-21). This will provide a better understanding of the territoriality of the communities by making it possible to observe the different forms of occupation of the bioclimatic floors addressed in this work.

3.2. The *Tigemmi* perspective: the expression of domestic life

In this mountainous territory, the houses (*tigemmi*) the shepherds inhabit clearly reflect their way of life. For example, in the case of the *azibs*, the shepherds live in square houses each with a large outdoor courtyard, around which a series of multifunctional structures associated with agropastoral and maintenance activities are located (Laoust, 1983: 367-370). Thus, employing the principal methods of household archaeology, we propose to carry out an exhaustive study of the articulation between living spaces, the distribution of activity areas (production, storage, consumption and waste), and construction techniques (Kent, 1984; Pfälzner, 2015: 26-29). The habitats of Jbel Sirwa have also been constructed in response to the material realities of the mountainous environment, as the architectural materials are drawn from nearby. For example, in the medium altitude *douars* a combination of mud and mortared stone predominates, while in the *azibs* and snowy areas, dry stone tends to be more common. It is then clear, that in many cases, construction systems are adapted to the bioclimatic realities because indigenous building materials tend to seek energy efficiency through low-cost thermal improvements (Bali, 2020). As other authors have previously argued, traditional habitats are also products of physical and natural factors. Nonetheless, these endogenous characteristics have been losing out to exogenous factors imposed by the globalisation process and market dynamics (López-Lara and Obda, 2011).

The methodology used in the analysis will proceed by providing a morphological description of the groups of domestic buildings and their internal spaces based on the material reality of each (movable and permanent items). This information will be complemented by a thorough visual record (plans, photogrammetry, computer graphics, etc.) of at least 5 *tigumma* from each of the settlements selected in the *Adrar* perspective. The entire corpus of information will be used to create plans to illustrate circulation patterns, visualise features and demonstrate the distribution of the functions of the domestic spaces. This process will make it easier to understand family groups, uncovering their composition and structure and the ways in which they function. All the documentation produced in connection with the cases described will be recorded systematically in a database, which will be ready for a subsequent comparative study, that will make it possible to characterise the domestic cycle of each *tigemmi* (Lamotta and Schiffer, 1999: 19-29) (construction, occupation, abandonment and reoccupation). The complete corpus of all the houses will be used to determine the overall trends in habitat patterns (fig. 3). The ultimate aim will be to determine the socio-economic differences

Figure 3. Example of house typology in the douar of Amassine (left), and in the azib of Tiquirit (right).

between *azibs* and *douars* located in different environmental units (López-Lara and Obda, 2011), which will provide evidence of the patterns of daily life characterising these communities.

3.3. The *Ûzzû* perspective: wood for building and firewood for burning

Plant resources are among the most commonly found in the domestic environment of the Sirwa communities. Despite the absence of large forests, wood is omnipresent in daily life. It is often purchased in the weekly *souks* organised cyclically in different villages, or even in the urban market of the nearby town of Tazenakht. Other smaller elements (such as reeds) are acquired in more proximate areas. It is therefore important to understand current behaviour associated with traditional practices of wood collection and the management of vegetation cover and fuel (Moutarde, 2006: 207). Taking into account the importance of the communal ovens in the *azibs* (fig. 4), and the kitchens in the *douars*, a typometric study will be conducted of the hearths and ovens (*tannur/tabun*) of the *azibs* and houses selected during the *Adrar* and *Tigemmi* perspectives. Subsequently, samples will be taken of the charcoals found in these locations and in empty areas, following standard anthracological methods for treating archaeobotanical samples (Chabal, 1997; Joly *et al.*, 2009: 46). Finally, reflected light microscopy will be used to carry out botanical identification and taphonomic studies. These data will be brought together and it is hoped that, combined with oral interviews, they will help to

Figure 4. Case of a collective oven (left), and a roof with a wooden structure (right) in the Tiquirit azib.

improve understanding of the criteria used for collecting firewood –such as the fuel supply radius or the state of the wood collected (green, dry, healthy, dead, etc.) (Vidal Matutano, 2013: 67-77).

In addition, the study of the Sirwa communities provides an opportunity to approach the study of a material that is difficult to preserve in archaeological contexts: wood used in construction. Given that the dry-stone walling in the *azibs* often suggests patterns of mixed architecture, we propose conducting a xylological study of the structures selected for the *Tigemmi* perspective. Combining microscopic and macroscopic analysis of the wood (Vidal Matutano *et al.*, 2020: 473-475) will produce a source of information that is complementary to the ethnographic data. As other studies have demonstrated the influence of climate on the vegetation cover surrounding the buildings in the mountains of Morocco (Taïqui *et al.*, 2005), this will help to understand the means of collection, selection and treatment of wood used in construction.

This double botanical aspect will thus permit us to examine whether there are different behaviours associated with harvesting, depending on the territory analysed, and this will enable us to assess the influence of the bioclimatic environment on the presence of certain plant species.

Figure 5. Spaces for housing livestock and accumulation of excrement in the Tilamsine azib (left) and in the Tachachkte douar (right).

3.4. The *Izimer* Perspective: the stratigraphy of pastoralism

The mere fact that *azibs* are a part of the short transhumance processes is, per se, evidence of the importance of extensive livestock farming for these groups. In addition to donkeys, cows and goats, special attention is afforded to *Sirwa* sheep breed, whose black and white wool is of particular importance economically (Ezzahiri, 1981: 79-85). As mentioned above, most dwellings have a series of enclosed outdoor courtyards with structures dedicated to multiple functions, such as the penning of livestock (Gandini, 2014: 41) and the storage of manure (fig. 5). It is precisely these latter spaces that provide valuable information on the management of animal resources. Given that geoarchaeology has played a key role in understanding the archaeological deposits of transhumant societies (Brochier, 1991: 302-322), we believe that a micro-scale study of a series of *manures* from the *azibs* and *douars* should be conducted and included in this study. This method consists of taking several samples (free sediments and excrement), which are then subjected to lipid analysis (*n-alkanes*, fatty acids, sterols, and isotopic values of δ13C and δD). In addition, laminate samples will be taken from a number of blocks of sediment that will be used to examine micromorphological changes, using a light transmitting polarising petrographic microscope. As earlier research has shown, a combination of these methods can provide archaeometric indicators of the seasonality and livestock feeding patterns in temporary and permanent settlements located in the different environmental units. These results will be complemented by ethnographic information gathered in the field (Égüez *et al.*, 2018: 180-184).

Figure 6. Biomechanical analysis of the video taken of a woman weaving on a horizontal loom in the Tislit douar.

3.5. The *Tadūt* Perspective: the female trace in carpets

Although men have principal charge of the outdoor activities linked to livestock rearing (Maurer, 1996: 48-50), it should be remembered that in processes of short transhumance it is the whole family that moves. Both in the temporary settlements examined here and in their original *douars*, women's work is still limited to household tasks, a fact that has generally been interpreted as evidence of subordination to male power (Aignesberger, 1996: 117). However, although the economic control of activities is generally in the hands of men, women are clearly the protagonists of textile production. As well as being a markedly domestic, collective and female activity (Naji, 2009: 52-53), textile production is of great economic significance, as practically all households produce a range of textiles (principally carpets) throughout the year. As merchants come to Tazenakht to purchase them, these products even reach the international market. By taking advantage of the theoretical and methodological convergence between archaeology of gender and biomechanics (fig. 6), we seek to characterise the material and physical aspects of women's textile work, which is difficult to trace in archaeological sources. Adhering to the methodology used in the preliminary research (Carballo and Moreno, 2019), we will examine, on the one hand, the vertical high-warp loom and the tools used alongside it in weaving. We will place particular emphasis on its associated technical and socio-cultural dimensions, and on the aspects inherent to its location in the domestic environment. On the other hand, videos will be taken during the fieldwork of the women performing their tasks throughout the different phases of the textile

production chain. This visual documentation will be analysed using Kinovea 8.15 software (Cândido *et al.*, 2012: 2506-2509), in order to analyse the principal muscular chains associated with each phase (fig. 6). A thorough holistic study will make it possible to obtain an interpretative frame of reference with which to understand the possible occupational associations of physical activity markers. These markers will be identified in sufficiently representative osteoarchaeological remains and, through a comparison of sexes that infer a series of gendered occupational roles (Sofaer, 2006: 89-116). Finally, we will examine whether productive textile activity differs by altitude.

4. THE ETHNOGRAPHIC COMPONENT: A CONTEMPORARY COMMON DENOMINATOR

This methodological approach would be without meaning without an understanding of the human actions behind the materiality analysed. The ethnographic techniques used will be similar to those of earlier research conducted in the Jbel Sirwa area. The fieldwork will begin at the Tamallakout mountain lodge, run by the shepherd Abdellah Mezine, who in turn will act as guide and interpreter from Tashelhit into Arabic and French. From this starting point, a range of contacts will be established in the study areas that have been selected in the mid-range and high mountains, with particular emphasis on families that engage in textile activities, because of their strong links with pastoralism. Access in the mid-range mountains will principally be by car, while for particularly inaccessible areas in the high mountains, pre-established survey routes will be used.

Two ethnographic data collection techniques will be employed for each of the five perspectives. In order to reconstruct the technical dimensions from an external perspective (etic), participant observation will be conducted using note-taking and audiovisual documentation in the field. The restitution of the social dimensions of the subjects of the study, on the other hand (emic), will be carried out using structured interviews, with questions previously prepared in accordance with the objectives of the different perspectives, in the hope of facilitating interaction between the observer and the subject (Garfinkel, 1991). The interviews will last between 10 and 20 minutes. The interviews will be classified according to the activity of the respondent in question (shepherd, farmer, trader, guard, etc.) and by age range and gender. In accordance with the ethical criteria of ethnoarchaeology (David and Kramer, 2001: 63-90), the appropriate permissions will be sought to conduct interviews and reproduce images, which will be collected purely for scientific and dissemination purposes. Transcriptions from Berber will require the assistance of a person with experience in translation and ethno-linguistics in order to reduce interpretative bias. Finally, the data collected in the interviews and during participant observation will have to be cross-checked and classified according to the analytical priorities of the five research perspectives. This is essential in order to ensure a nuanced understanding of the biases in the data obtained using both of the ethnographic techniques employed, as findings or observations are frequently

subjectivised to a greater or lesser extent by observers and/or respondents. Abductive reasoning (Patton, 2015) will be used to generate substantive concepts that make sense of the reality described by the protagonists of this study: the elderly people, adults and children of the agro-pastoral communities of Jbel Sirwa.

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REFERENCES

Amahan, A. (1998): *Mutations sociales dans le Haut Atlas. Les Ghoujdama*. Paris. Éditions de la Maison des sciences de l'homme. Méditerranée-Sud 2: 350.

Admou, H. & Soulaimani, A. (2011): "Massif du Siroua: Socle panafricain, dépôts crétacés discordants et volcan néogène". *Notes et Mémoires Du Service Géologique de Maroc*, *563*: 83-104.

Aignesberger, E. (1996): "La vida cotidiana de las mujeres en el Atlas". *El Vigía de la Tierra*, *2-3*, 115-129.

Arnay, M., Carballo, J., Marrero, E., C. Ordóñez, A., Fregel, R., Vidal, P. [...] Gonzalez, E. (2019): "Les Guanches dans les montagnes de Tenerife: l'étude interdisciplinaire d'une population de substrat amazigh aux Îles Canaries". *Bulletin d'Archéologie Marocaine*. Artículo entregado para publicación.

Berque, J. (1955): *Structures sociales du Haut-Atlas*. Paris. Presses universitaires de France.

Biagetti, S., Merlo, S., Adam, E., Lobo, A., Conesa, F.C., Knight, J. [...] Madella, M. (2017): "High and Medium Resolution Satellite Imagery to Evaluate Late Holocene Human–Environment Interactions in Arid Lands: A Case Study from the Central Sahara". *Remote Sensing*, *9*(351): 1-21.

Bonfiglioli, A.M. (1990): "Pastoralisme, agro-pastoralisme et retour: itinéraires sahéliens". *Cahiers de Sciences Humaines*, *26*(1-2): 255-266.

Brochier, J.E., (1991): "Geoarchéologie du monde agropastoral", in Guilaine, J. (ed.): *Pour une Archéologie agraire*. A. Colin, Paris: 303-322.

Carballo, J., Marrero, E., Moreno, J.M., Sánchez, E. & Ruiz, H. (2019): "Une approche aux études de haute montagne: entre le Jbel Sirwa (Anti-Atlas, Maroc) et les Îles Canaries". *Bulletin d'Archéologie Marocaine*. Artículo entregado para publicación.

Carballo, J. & Moreno, J.M. (2019): "Las huellas del trabajo textil en las mujeres: una aproximación etnoarqueológica entre Marruecos y Portugal". *Cadernos de Arqueoloxía e Patrimonio*, 17. Artículo entregado para publicación.

Chabal, L. (1997): "Forêts et sociétés en Languedoc (Néolithique Final, Antiquité tardive). L'anthracologie, méthode et paléoécologie". *Documents d'Archeologie Francaise*, *63*. Eds. de la Maison des Sciences de L'Home-CNRS. Paris.

Costa, M.R. & Batista, D. (2018): "Architecture traditionnelle dans les zones de montagne: contribution à l'étude de la typologie des habitations dans le Haut Atlas au Maroc", in Conceiçao Lopes, M., Bentaleb, A. y Bouaouinate, A. (eds.), *L'économie du patrimoine et développement durable dans les oasis et les zones vulnérables*. Digitar, 1: 373-393.

Crépeau, C. & Tamin, M. (1986): *Communautés pastorales et systèmes d'habitat dans le Haut-Atlas de Beni-Mellal (Maroc)*. Annuaire de l'Afrique du Nord, tomo xxv.

David, N. & Kramer, C. (2001): "Fieldwork and ethics", in *Ethnoarchaeology in Action* (Cambridge World Archaeology, pp. 63-90). Cambridge: Cambridge University Press.

Dominguez, P. (2013): "L'agro-pastoralisme mobile des agdals du Haut Atlas". *Perifèria. Revista de recerca i formació en Antropologia*, *18*(2): 91-103.

Égüez, N., Zerboni, A. & Biagetti, S. (2018): "Microstratigraphic analysis on a modern central Saharan pastoral campsite. Ovicaprine pellets and stabling floors as ethnographic and archaeological referential data". *Quaternary International*, *483*: 180-193.

Ezzahiri, A. (1981): "La race Siroua: mouton à laine". *Hommes, Terres et Eaux*, *49*: 79-85.

Gandini, J. & Ahalfi, H. (2014): *Le Jebel Siroua et le pays Ouaouzguit*. Pistes du Maroc à travers l'histoire. Serre Editeur.

Garfinkel, H. (1991): *Ethnomethodology and the human sciences*. Cambridge, U.K., Cambridge University Press.

Gassiot Ballbè, E. (2014): *Arqueología del pastoralismo en el Parque Nacional d'Aigüestortes i Estany de Sant Maurici. Montañas humanizadas*. Red de Parques Nacionales.

Gassiot Ballbè, E., Clemente Conte, I., Mazzuco, N., Garcia Casas, D., Gómez, L.O. & Rodríguez Antón, D. (2016): "Surface surveying in high mountain areas, is it possible? Some methodological considerations". *Quaternary International*, *1*: 1-11.

González Ruibal, A. (2003): *La experiencia del otro. Una introducción a la Etnoarqueología*. Akal Arqueología 3. Madrid.

Henry, A. (2011): *Paléoenvironnements et gestion des combustibles au Mésolithique dans le sud de la France: anthracologie, ethnoarchéologie et expérimentation*. Université Nice Sophia Antipolis. Tesis doctoral.

Hole, F. (1979): "Rediscovering the past in the present: ethnoarchaeology in Luristan, Iran", in Kramer, C. (ed.): *Ethnoarchaeology: Implications of Ethnography for Archaeology*. Columbia University Press, New York: 192-218.

Joly, D., March, R., Marguerie, D. & Yacobaccio, H. (2009): "Gestion des combustibles dans la province de Jujuy (Puna, Argentine) depuis l'Holocène ancien: croisement des résultats ethnologiques et anthracologiques)", in Théry-Parisot, I., Costamagno, S. & Henry, A. *Fuel management during the Palaeolithic and Mesolithic period. New tools, new interpretations*. Proceedings of the XV World Congress. Oxford, Archaeopress.

Kent, S. (1984): *Analyzing Activity Areas. An ethnoarchaeological study of the Use of Space*. México: University of New Mexico Press.

Lamotta, V. & Schiffer, M.B. (1999): "Formation processes of house floor assemblages", in Allison, P.M. (ed.), *The Archaeology of Household Activities* (pp. 19-29). London: Routledge.

Laoust, E. (1983): *Mots et choses berbères. Notes de linguistique et d'ethnographie*. Dialectes du Maroc, Paris, Challamel, Rabat, Société Marocaine d'Édition, coll. "Calques".

Mahdi, M. (1999): *Pasteurs de l'Atlas. Production pastorale, droit et rituel*. Casablanca. Fondation Adenauer.

Maurer, G. (1996): "L'homme et les montagnes atlasiques au Maghreb". *Annales de Géographie*, 587 (Janvier-Février): 47-72.

Moutarde, F. (2006): "L'évolution du couvert ligneux et de son exploitation par l'homme dans la vallée du Lurin (côte centrale du Pérou), de l'Horizon Ancien (900-100 av. J.-C.) à l'Horizon Tardif (1460-1532 ap. J.-C.). Approche anthracologique)". Tesis doctoral.

Naji, M. (2009): "Le fil de la pensée tisserande". *Techniques & Culture 52-53*: 68-69.

Pfälzner, P. (2015): "Activity-area Analysis: A Comprehensive Theoretical Model", in Müller, M. (ed.), *Household Studies in Complex Societies. (Micro)Archaeological and Textual Approaches* (pp. 29-60). Chicago: The Oriental Institute of Chicago.

Patton, M.Q. (2015): *Qualitative research & evaluation methods: integrating theory and practice*. 4th, Kindle edn. Thousand Oaks, CA: Sage Publications, Inc.

Politis, P.P. (2014): "Ethnoarchaeology: Approaches to Fieldwork", in Carver, M., Gaydarska, B. & Montón Subías, S. (eds.), *Field Archaeology from Around the World*. SpringerBriefs in Archaeology. Springer, Cham.

Robertshaw, P.T. (1978): "The archaeology of an abandoned pastoralist campsite". *South African Journal of Science*, *74*: 29-31.

Schroeder, B. (2014): "How Much difference is in a Thousand Meters? The Inconvenience of High Altitude on Local Residential Patterns". *The SAA Archaeological Record*, *14*(2): 36-40.

Sofaer, J.R. (2006): *The Body as Material Culture: A Theoretical Osteoarchaeology* (First). Cambridge.

Stiles, D. (1977): "Ethnoarchaeology: A Discussion of Methods and Applications". *Man, New Series*, *12*(1): 88-103.

Stirn, M. (2014): "Why All the Way Up There? Mountain and High-Altitude Archaeology". *The SAA Archaeological Record*, *14*(2): 7-10.

Thomas, R.J., Chevallier, L.P., Gresse, P.G., Harmer, R.E., Eglington, B.M., Armstrong, R.A. [...] Ingram, B.A. (2002): "Precambrian evolution of the Sirwa Window, Anti-Atlas Orogen, Morocco". *Precambrian Research*, *118*(1-2): 1-57.

Tribus du Maroc (2020): "La Tribu Ait Ouaouzguit)". Les Tribus du Maroc. Recuperado de http://tribusdumaroc.free.fr/ouaouzguite.php (02/04/2020).

Vidal Matutano, P. (2013): "Combustible vegetal y Etnografía: Estudio de un horno de pan en Ghuala (Argelia)". *Revista Arkeogazte*, *3*: 63-79.

Vidal Matutano, P., Morales Mateos, J., Henríquez Valido, P., Marchante Ortega, A., Moreno Benítez, M.A. & Rodríguez, A. (2020): "El uso de la madera en espacios de almacenamiento colectivos: análisis xilológico y antracológico de los silos prehispánicos (ca. 500-1500 d.C.) de La Fortaleza (Santa Lucía de Tirajana, Gran Canaria)". *Revista Vegueta*, *20*: 469-489.