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On wedges and bones: Archaeological studies of use-wear and residue analysis from Late Holocene occupations in the Southern Pampean Hills (Alero Deodoro Roca, Córdoba, Argentina)

Roxana Cattáneo[a,*], Marisa Martinelli[b], Andrés Darío Izeta[a], José María Caminoa[c], Thiago Costa[a], Andrés Robledo[a]

[a] Instituto de Antropología de Córdoba (IDACOR), CONICET-Universidad Nacional de Córdoba y Museo de Antropología, Facultad de Filosofía y Humanidades, Universidad Nacional de Córdoba, Avenida Hipólito Yrigoyen 174, 5000 Córdoba, Argentina
[b] Departamento Química Orgánica, IMBIV – CONICET, Facultad de Ciencias Químicas, UNC, Edificio de Ciencias II, Ciudad Universitaria, 5000 Córdoba, Argentina
[c] Departamento de Antropología, Facultad de Filosofía y Humanidades, Universidad Nacional de Córdoba, 5000 Córdoba, Argentina

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ABSTRACT

The aim of this paper is to present the results of complementary studies on a type of lithic tool: the small wedge, trying to understand their use and, particularly, the kind of worked material during Late Holocene times in the central region of Argentina (ADR archaeological site). FT-IR spectroscopy on residue recovered from tools edge surfaces and functional analysis of microwear were used as a crosscheck methodology for integrated analysis, including some experimental data. According with the analytical results, we propose that this type of instrument was used either as a controlled way to split camelid phalanges to use them as raw material for tool manufacture or marrow extraction.

1. Introduction

In a previous paper, one of the authors of this work (RC) used the potential of physicochemical studies as a generator of primary data oriented to investigate the relationship between people and objects in the past (Cattáneo, 2009). Methods like FT-IR (Fourier Transformed Infrared spectroscopy) offer the possibility of characterizing bulk chemical compositions that have proved advantageous in 'fingerprinting' the sources of certain classes of organic residue, such as ambers and resins and their derivatives (e.g. Beck et al., 1965; Lambert et al., 1985). Evershed (2008) described an archaeological biomarker revolution in agreement with the excellent results obtained in the characterization of the origin and nature of organic remains attached to archaeological objects. The archaeological information contained in organic residues is represented by the biomolecular components of the natural products that contribute to the formation of a given residue. In that sense, during the last decades the study of tool function has been accompanied by the development and use of other techniques, helping to support results with a crosscheck methodology and integrated results (e.g. Fredengren, 2013; Babot et al., 2013).

Following van Gijn (2014), we understand that the interconnectivity of tools and objects in a larger technological and hence cultural system potentially generates an extraordinary degree of complexity and variation. Hodder (2014) has defined this kind of relationship, that entangles people and things in a post humanist approach, "…as the sum of four types of relationships between humans and things: humans depend on things, things depend on other things, things depend on humans, and humans depend on humans". In this definition, it is accepted that humans and things are relationally produced. Then, studying "things", defined as tools, would allow us to understand these four types of relationships and thus gain greater insights into the role of the human actors and their actions situated in time and space. In this sense, actions are delimited by defining the basic motion of use through a mixture of variables, such as tool's edge morphology, polish distribution, and linear features or striations (Lozny, 2005). Yet, they are also delimited by the study of ancient residue remains.

In view of this, the aim of this paper is to present the results derived from exploring the relationship between a particular type of tool (the small wedge, which contained archaeological residues) and the probable worked material (bone), mediated by the actions and gestures produced by human behavior. Thus, we have attempted to understand the use of the quartz small wedge (made from bipolar cores in most cases) recovered from the Late Holocene archaeological components of

* Corresponding author.
E-mail addresses: rcattaneo@ffyh.unc.edu.ar (R. Cattáneo), mmartinelli@fcq.unc.edu.ar (M. Martinelli).

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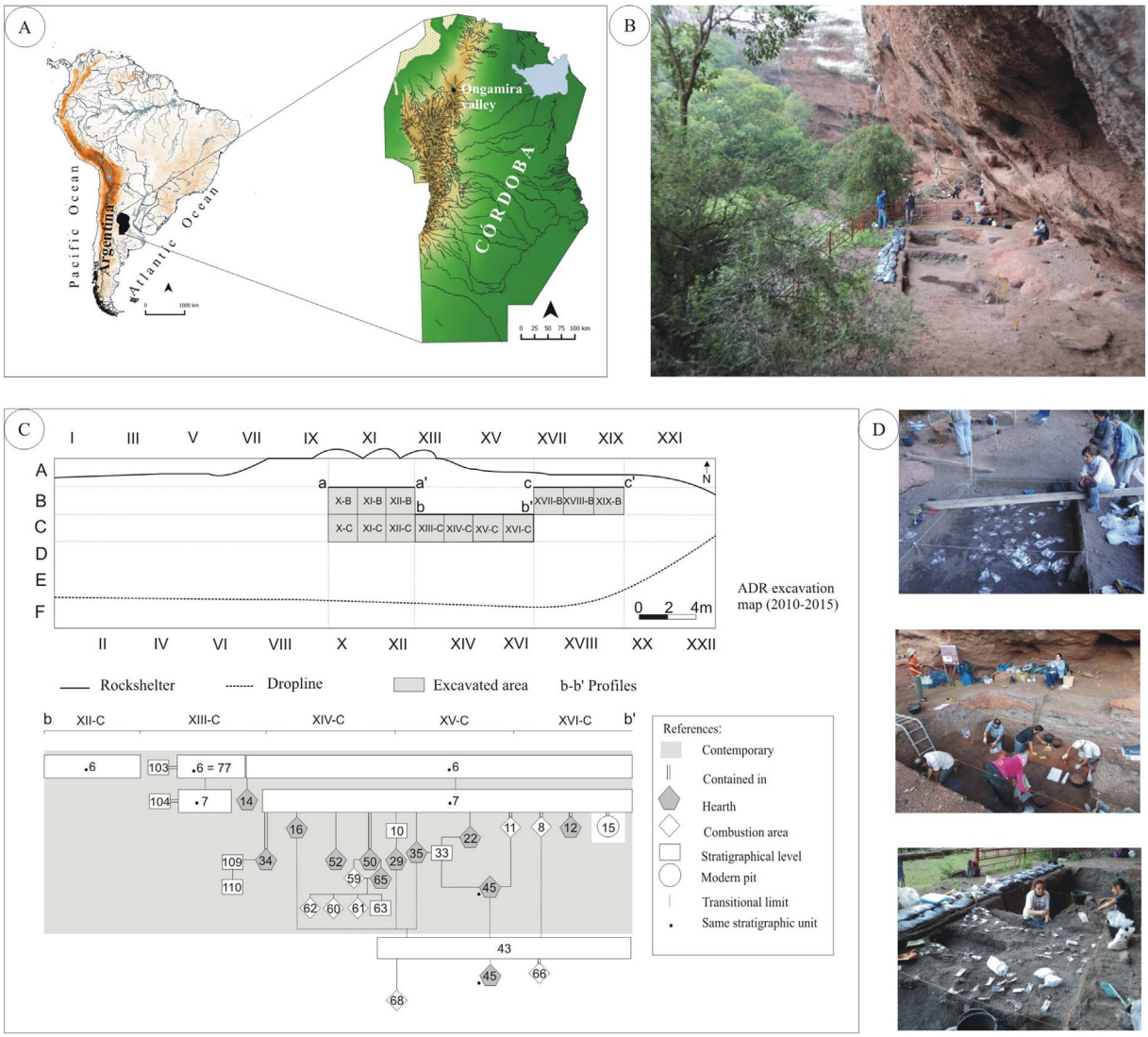

Fig. 1. A). Location of the study area. B). Deodoro Roca Rockshelter (ADR): general view of the site/general view of Deodoro Roca Rockshelter site. C). Scheme of stratigraphic excavations. Provenience of the archaeological samples (tools and bones) located in a Harris Matrix with the interpretations of the sequence of the stratigraphic units of ADR. D). Excavation process at the site.

Table 1
Radiocarbon dates from the excavations of ADR. From Units 7 and associated, and 43 are the tools and bones studied in this work. Calibrated with OxCal v4.2 Bronk Ramsey (2009); r: 5; SHCal13 southern hemisphere atmospheric curve (Hogg et al., 2013).

Lab. I.D.	^{14}C date (BP)	Calibrated age (cal BP) 1 sigma	Calibrated age (cal BP) 2 sigma	d$^{13}C_{PDB}$ (‰)	Square	Stratigraphic unit	Material
YU-2293	2942 ± 25	3201–3191; 3162–3068	3210–3002	− 26.77 ± 0.5	XIII-C	50	Charcoal
YU-2291	2944 ± 24	3075–2967	3159–2950	− 26.09 ± 0.43	XIV-C	7	Charcoal
YU-2290	2952 ± 21	3138–3130; 3107–3095; 3078–2991	3158–2959	− 25.72 ± 0.3	XIV-C	34	Charcoal
MTC-15144	3043 ± 41	3319–3310; 3245–3138; 3129–3107; 3095–3078	3345–3056; 3051–3030; 3014–3007	− 27.18 ± 0.3	XIV-C	65	Charcoal
YU-2292	3620 ± 27	3922–3835	3979–3823; 3792–3765; 3748–3728	− 24.75 ± 0.8	XVI-C	43	Charcoal

Alero Deodoro Roca, a hunter-gatherer multicomponent archaeological site dated between ca. 5000 and 2000 years BP (Cattáneo et al., 2013; Cattáneo and Izeta, 2016a,b) and located in the Southern Pampean Hills in Argentina.

This type of artifact has been traditionally characterized as a splitting tool used in different kinds of materials, specially wood (e.g. Ranere, 1975). In addition, in some cases the production methods of wedges were studied in relation to bone, antler and wood wedging (e.g. McPherson Smith, 2004). Also a discussion on this topic is available in e.g. Shott, 1989, Leblanc, 1992, and cited bibliography, and the association between wedges and bone working was questioned. This situation challenged us to discriminate the potential use of this particular tool for working different materials through a multiproxy approach, including an experimental program. Especially we were interested in exploring the use of the small wedges in materials such as *Lama guanicoe* ("guanaco") phalanges. This bone element was recovered from different stratigraphic units and found split in longitudinal halves. We understand this situation to be a practice directed towards two possible scenarios. The first, is obtaining raw material to produce bone artifacts that apparently occurred under different occupations in the site during the Late Holocene (Menghin and González, 1954; Costa, 2015). The second, related to the splitting as a result from bone marrow extraction