

SOUTHBOUND

Late Pleistocene Peopling of Latin America

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SOUTHBOUND

Late Pleistocene Peopling of Latin America

Editors

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of the First Americans**
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SOUTHBOUND: LATE PLEISTOCENE PEOPLING OF LATIN AMERICA

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Part 2
Archaeology of Early South Americans

PART
2

The Use of the Form: Functional Analysis of Lower Component Artifacts from Piedra Museo (Santa Cruz, Argentina)

Virginia Lynch¹, Darío Hermo¹, and Myrian Álvarez²

► **Keywords:** Microwear analysis, lithic technology, Piedra Museo

Determining the use of different archaeological tools has been a principal goal of archaeologists since the beginning of our discipline. In Argentina, especially in Patagonia, microscopic lithic analysis was launched in 1983 by the innovative work of Mansur, who focused on applying this methodology to artifacts from early contexts (Cardich et al. 1973). These studies as well as the work of Castro (1994) pioneered intensive research in regional archaeology.

Because the way tools are used reflects a complex set of social behaviors, their study reveals the social dynamics of past cultures (Álvarez 2003; Keeley 1980; Mansur-Franchomme 1983; Semenov 1964). Thus the aim of this paper is to present the results of our analysis of the processing activities of hunter-gatherers who inhabited the Deseado Massif during the Pleistocene-Holocene transition. This was done by applying use-wear analysis to lithic artifacts from the lower component of the Piedra Museo archaeological site. Another aim of this paper is to identify the degree of conservation of use traces and to determine whether differences detected by other techno-morphological and archaeofaunal analyses between stratigraphic units (U) 4/5 and 6 reveal changes in the use of tools.

Archaeological Evidence

The analysis of Piedra Museo has shown a significant difference between U4/5 and U6

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(Cattáneo 2002; Miotti 1995; Miotti and Cattáneo 1997). U4/5 is part of the soil horizon IIB32 and IIB31 with clay loam texture. The occupation of this unit dates to the late Pleistocene ($10,400 \pm 80$ and 9230 ± 105 RCYBP) and has been associated with hunting and processing relatively few Pleistocene fauna. Flakes may have also have been resharpened during this occupation (Alberdi et al. 2001a; Cattáneo 2002; Miotti 1995). Whereas U6 occupies the soil profile (IIIC horizon with sandy loam texture) corresponding to the older occupation pulse of the site ($10,470 \pm 65$ to $12,890 \pm 90$ RCYBP), it may be evidence of a short-lived occupation characterized by a differential pattern of discard and working areas related to opportunistic hunting principally of extinct taxa (Miotti et al. 1999). Techniques used to process prey in U6 (by opportunistic hunting) and U4/5 (by scheduled hunting) can be inferred from the kinds of tools and the use of lithic raw materials. Differences in the chemical composition of the stratigraphic units account for varying degrees of preservation of use traces.

Materials and Methods

Piedra Museo has been frequently studied from different perspectives (e.g., Miotti 1995; Miotti and Cattáneo 1997; Miotti et al. 1999); the functional determination of lithic artifacts, developed as part of an unpublished doctoral thesis (Cattáneo 2002), operated under a different theoretical framework from the one used here. Because of a discontinuity in traceological studies, we focus our attention on a new line of research that views stone-tool use as an integral part of the activities and technological knowledge of prehistoric societies (Álvarez 2003). The analysis presented here consisted of microscopic examination of lithic artifacts from the lower component (U4/5 and U6) of Piedra Museo. These materials were recovered from systematic excavations carried out during the period 1990–97 by L. Miotti.

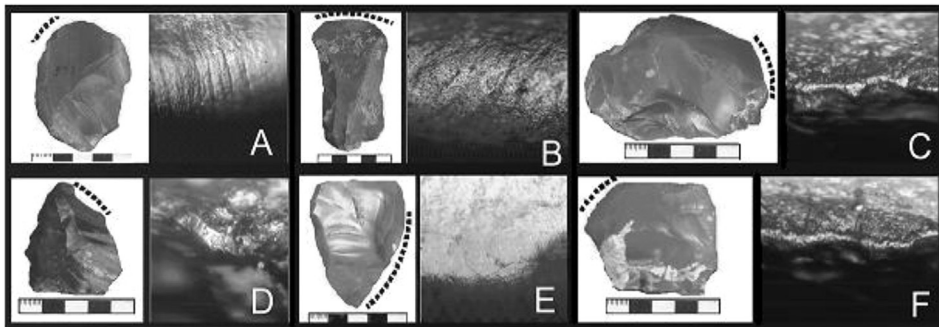
In our use-wear analysis, a Nikon Epiphoto 200 reflective light microscope with bright field illumination (from 50X to 500X) was used to inspect micropolish. Edge damage was observed under a Nikon SMZ800 stereomicroscope (10X to 63X), using the criteria established by Mansur-Francomme (1983). To analyze lithic-artifact designs, variables related to edge morphology were considered, based on the descriptive proposal of Aschero (1975, 1983).

Design and Functional Analysis

The results of our analysis confirmed artifactual integrity. Of 18 edges observed from U6, only 37% of micropolish features were caused by hard worked material (Figure 1 and Table 1). A high percentage (58%) were not determined by alteration (NDA) owing to the high degree of post-depositional surface alteration (glossy patina and rounding [Mansur-Francomme

Table 1. Artifacts from Piedra Museo included in the microwear analysis.

Stratigraphic unit	Typological Group				
	Scraper	Sidescraper	Rabot	Retouched notch	Projectile point
U 4/5 F:15 NF:6	6	6	1	–	2
U6 F: 3 NF: 8	–	3	–	1	–
Total	6	9	1	1	2



Use/edge	Position (%)			Secondary edge form (%)			Edge angle (degrees)			Length (mm)		
	SE	FE	SC	S	CX	SC	Mean	SD	Mode	Mean	SD	Mode
U4/5 n=25 SM n=7	29	71	-	17	83	-	35.7	13.36	30	54.43	16.48	-
HM n=13	33	50	17	33	50	17	36	13.3	45	33.4	22.3	22
U6 n=18 HM n=13	75	25	-	100	-	-	32	15.5	-	30.5	16.4	-
SM HM SE	soft material hard material side edge			FE S	front edge straight		CX SC	convex semicircular				

Figure 1. Results of microwear analysis of the Piedra Museo artifacts. **A–B**, hide micropolish with transversal motion, artifact numbers 621 and 642, at 200X; **C**, micropolish of hard material, artifact number 670, at 200X; **D**, micropolish of hard worked material on retouched notch, artifact number 59, at 200X; **E**, post-depositional damage, glossy patina, artifact number 135, at 200X; **F**, micropolish of hard worked material, artifact number 724, at 200X.

1983, 1999]). The remaining 5% include artifacts whose traces of use wear were not sufficiently developed to assign them to some kind of worked material (ND).

Of 25 edges observed from U4/5, 52% had micropolish identified as caused by hard material (bone or wood) and soft material (hide), 28% were not determined, probably because duration of use was not sufficient to produce distinguishable wear. The rest of the edges (20%) exhibited clear evidence of surface alteration that prevented our identifying traces.

The analysis of lithic-artifact design in U4/5 showed that edges used on soft materials were mostly frontal normal edges (50%), convexly extended, with a mean angle of 35° and mean length of 54.43 mm. In contrast, artifacts used to work hard material showed a greater variability of edge morphology; there were equal proportions of denticulated, spurred, and normal edges (30%). We also observed a higher percentage of frontal edges, with a simultaneous increase in use wear observed on lateral edges.

The micropolish identified in U6 only was caused by hard material worked mostly with natural rectilinear edges, located in lateral position.³

³Primary and secondary form of the edge (Aschero 1975, 1983).

Discussion and Conclusions

The results presented above bear three interpretations. First, the uneven textural composition of stratigraphic units and probably different taphonomic histories are responsible for differential preservation of microscopic traces of use wear. Second, a relatively low percentage of the tools from U4/5 show post-depositional damage, and morphological variability of edges is associated with different kinematics (transverse and longitudinal actions [Álvarez 2003]) and worked materials (wood, hide, and bone). Third, a higher percentage of the tools from U6 show post-depositional damage (glossy patina and rounding), and the tools only bear evidence of hard worked materials (wood or bone).

Few tools of the Pleistocene-Holocene transition period exhibit diagnostic use-wear traces, and most show signs of post-depositional alteration. In tools from U6 these alterations (glossy patina and rounding) prevented our detecting use traces except those caused by working hard material (which may be wood or bone). Our results differ from those obtained by Cattáneo (2002), who detected microwear polish and striations on lithic artifacts associated with cutting meat. The uniformity detected in the manufacture and use of lithic artifacts in U6, together with radiocarbon dating results and archaeofaunal studies indicating the presence of Pleistocene fauna with cutmarks (Miotti 1996, 2000), nonetheless support the overall function proposed for this archaeological site in the early moments of human colonization of this southern area.

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