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Patagonia: a paradox for building images of the first Americans during the Pleistocene/Holocene Transition

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“Y no es esto pura imaginación: La naturaleza está pintada aquí en (Patagonia) colores bien reales. Tal es la contienda en que se embarca el colono, llena de grandes e inesperadas vicisitudes, y que requiere la mayor vigilancia y la más sutil estrategia de su parte.” - William Hudson: “Días de Ocio en la Patagonia”, 1997: 82. Ed. El Elefante Blanco, Bs.As.

Abstract

South America appears as a paradox for building the images of the New World's human colonization. It is a paradox, because according to the models of the Peopling of America, it was the last part of the continent to be occupied by humans, but in spite of that sites as old as or older than the “Clovis” sites from North America, started to be discovered since the last century. It is a laboratory, because the amount of the Pleistocene archaeological sites is as great as their variability. In this way, since the last two decades, the hemi-continent is placed in a privileged situation for questioning and reconstructing theories concerning the first Americans, and also for answering questions as when did they arrive, how did they arrive, what strategies (social, ecological and economic) did they develop for the colonization of such different environments, which were their ideas for achieving this colonization, and how does their use of space and resources reflect in the archaeological record. The model “Clovis the first”, brings an image of unidirectional migration of the first people, from the great North American plains to southern Patagonia. For a decade, this model showed itself insufficient for explaining the great archaeological variability of America and especially for referring those South American contexts directly to a Clovis migration. The new findings in South America are creating more anomalies for this model, which predicts that the arrival of Pleistocene hunter-gatherers should be around 10,000 years in Patagonia. The object of this paper is to discuss these models in view of South American archaeological evidence, and thus propose answers for removing the paradox. The axes which are considered are: the geographical and chronological distribution of the main localities of Patagonia and South America; the function of the sites within regional mobility systems; the use of subsistence resources; the differences in the circulation of lithic raw materials; and the different taphonomical histories. These characteristics will be compared with models of social network among mobile peoples and American paleolandscapes at the Pleistocene/Holocene transition and a new alternative route of peopling in South America will be presented. In this sense, the data of Patagonia are highly relevant.

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1. Introduction

South America appears a paradox and at the same time, a very well equipped laboratory for building images of the New World's human colonization. Paradox, because according to the models of the American peopling, it was the last sector of the continent occupied by humans, and despite that assumption, sites with the same antiquity or older than the North American ones, have been discovered since the last century. Laboratory, because although there are plenty of Pleistocene archaeological sites in the Southern Cone,

the last two decades place this hemi-continent in a privileged situation for dismantling and rearranging the previous ideas about who the first Americans were, when they came, how they came, what strategies they developed in the colonization of such different environments, what ideas they had to achieve this colonization, and how their ways of using space and resources are manifested in the archaeological record.

Southern Patagonia does not escape from this dual characteristic, with critical and challenging sites for the standard models. In this sense, it has been identified since the 16th century, as a landscape where the social and natural changes were extremely slow or did not occur, so that the first chroniclers, as well as the 19th

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century naturalists, Darwin among them, described the hunter–gatherers of Patagonia as “*the last living exponents of Stone Age*” or as “*the missing link*”. Caves such as Fell (Bird, 1938, 1988) and Los Toldos since the Toldense occupation (de Aparicio, 1933/35; Menghin, 1952) and then the “Unifacial Nivel 11 Industry” (Cardich et al., 1973), have been frequently taken as strong referents that sustain the Clovis migration model from the great North American plains (Martin, 1973; Haynes, 1984; Lynch, 1990; Dincauze, 1993, among the main defenders of the model). However, in the case of the “Nivel 11 Industry”, the defenders of “Clovis: The First Americans” paradigm reject it plainly (see Lynch, 1991, p. 350). This model considers the manifestations involved in the mentioned “cultural complex” or “Megafauna Hunter’s Horizon” as the oldest and most reliable evidence of the human occupation in the New World (Haynes, 1967, 1974, 1984; Martin, 1973, 1984; Lynch, 1990, 1991; Dincauze, 1993, among others). However, and although from other perspectives this model appeared insufficient to explain the great archaeological variability of North and South America (Adovasio et al., 1978; Bryan, 1978, 1986, 1995; Fladmark, 1983; Dillehay, 1984, 1997; Gruhn, 1986, 1989; Borrero, 1990, 1996; Frison, 1990; Ardila Calderón and Politis, 1991; Bonnichsen, 1991; Stanford, 1991; Adovasio, 1993; Meltzer, 1993; Núñez Atencio et al., 1994; Gnecco, 1995, 1998; Roosevelt et al., 1996; Driver, 1998; Aldenderfer, 1999), and especially to refer those contexts with stemmed projectile points, known as “fishtail points” (FTP) directly to Clovis migration from the Great North American Plains to the Magellan Strait (Borrero, 1983; Miotti, 1990, 1994, in press; Miotti and Cattáneo, 1997a; Politis, 1991; Nami, 1997), during the last 10 years new finds from the Patagonian and other South American contexts have generated anomalies to the mentioned model, whose expectations of Pleistocene hunter–gatherer contexts, should place them around 10,000 years age in the Patagonian region. Sites such as Monte Verde (Dillehay, 1997); Tres Arroyos (Massone, 1984; Borrero et al., 1998); Cueva Lago Sofía I (Prieto, 1991); Cerro Tres Tetras Cueva I (C1C3T) (Paunero, 1993–94, 1996) and Piedra Museo (Miotti, 1992, 1993, 1994, 1996, in press; Miotti et al., 1999a, b; Miotti and Cattáneo, 1997a) challenge this position, since all these, in addition to having radiocarbon dates which equal and even exceed the oldest dates considered for Clovis in North America (ca. 11.6–10.8 ky BP, according to Bonnichsen, 1991) (Table 1), differ from it mainly in the function inferred for them within the regional mobility systems, in the different associated faunistic species, in the different availability of lithic raw material, and of course, in the different taphonomic histories of each site. However, they share the reliability of representing first or initial colonization contexts of American hunter–gatherers (Miotti [1989]

1998, 1994; Miotti and Salemme, 1999, in press) assigned to the Exploration stage (Borrero, 1990), and the same author later considered that the peopling processes involved three different phases: exploration, colonization, and full occupation (Borrero, 1995).

An intermediate position to the Clovis paradigm is used by Morrow and Morrow (1999, p. 215), who state that “*All data make us conclude that the South American fishtail points evolved from the fluted projectile points*”. They also suggest that previous Clovis populations could have existed, but both populations did not compete with each other because of the different subsistence strategies, allowing the Clovis groups to reach the south of the continent without human or environmental interruptions.

While we are proposing that the spread of fluted point technology across North and South America resulted from the expansion of a migratory human population, this does not necessarily invoke the often challenged ‘Clovis First’ model of the peopling of the New World ... Even if people did inhabit parts of North and South America prior to Clovis times, their populations were probably small and perhaps localized. As such, pre-Clovis groups may have presented no serious impediment to the spread of Clovis bands and their descendants, especially if these antecedent populations practiced a generalized subsistence economy and Clovis and Clovis-derived groups focused on large mammal hunting so that the two populations were not in direct competition with each other (Morrow and Morrow, 1999, p. 228).

In this article the authors, not critically analyzing the archaeological variability, even more strongly marked for the South American contexts, state that the Clovis points were only used for hunting megafauna. However, according to information over more than the last decade, there are Clovis contexts that fall within the temporal rank of the late Pleistocene/early Holocene with not only megamammals, but also medium and small mammals, and even birds, reptiles, and amphibians (Frison, 1990; Bonnichsen, 1991; Goebel et al., 1991; Stanford, 1991; Driver, 1996, 1998). The same happens in South America, where fishtail points (FTP) do not necessary appear with megafauna (Table 1b, Fig. 1; Miotti, 1992, 1996; Nami and Menegaz, 1991; Martínez, 1997) but instead are associated with faunistic assemblages where the most abundant species are guanaco (South American camelid), big flightless birds (South American ostrich), with megamammals appearing in lesser proportions (Miotti et al., 1988; Politis et al., 1995; Miotti and Salemme, 1999). In other South American cases, as shown in Table 1b, sites such as Taima–Taima, Alice Boër, Monte Verde, and Lago Sofía 1 C3T, are associated with megafauna, but the projectile points are not fishtailed, or they lack points.

Table 1
Radiocarbon dates and contextual characteristics of the main sites quoted in the text

| Name of the site | No. in map | ¹⁴ C datings in kyr BP | Main tools and technology | Associated fauna | Inferred activities | Contextual evaluation |
|--|------------|-----------------------------------|--|---|---------------------------------------|--|
| (A) Main North American sites <i>clovis</i> age | | | | | | |
| Bluefish cave | 1 | 16–13 | Burils, bifaces, (Pre-Clovis) | Extinct and present fauna | Primary processing | Cinq-Mars (1979) |
| Batza Tenna (Nennana complex) | 2 | 11.6–11 | Non-fluted points, Clovis aged blades | Caribou | Several kinds of sites | Clark (1991) |
| Nennana complex | 3 | 11.7–10.6 | Tear-shaped bifaces, without microblades | Caribou | Several kinds of sites | Goebel et al. (1991) |
| Dry Creek, Denali Complex | 4 | 11–10.5 | Knives, points, microblades | bison, horse, mammoth and caribou | Campsites | Clark (1991) |
| Walker Road, Broken Mammoth and Mesa site | 5 | 11.8–11 | Knives, points and instruments over big nodular flakes | waterfowl remains, fish, otter, beaver in mixed economies (aquatic/terrestrial) | Specific activity sites and campsites | Goebel et al. (1991), Goebel (1999) |
| Cactus Hill | 6 | 15–10.3 | Similar to the Cantabrian Solutrean, with blades. Fluted Clovis points | ? | ? | Goodyear (1999), Johnson (1997) ^a |
| Meadowcroft | 7 | 17–14.5 | Bifaces, flakes, Pre-clovis/Clovis fluted points | Present Fauna | Campsites | Adovasio (1993) |
| Lubbock lake | 8 | 11–10 | Hammers, anvils, Pre-Clovis flakes | Mammoth, horse, bison, camel | Processing | Johnson (1991) |
| Charlie Lake Cave | 9 | 10.8–10.1 | Fluted points, Flakes with marginal retouch and instruments on cores | Bisons, medium fowl and small mammals | Bison hunting event | Carlson (1991), Driver (1996, 1998) |
| Clovis, Lubbock | 10 | 11.5–11 | Fluted points, knives and scrapers | Extinct and present fauna | Multiple activities | Johnson (1991) |
| Blackwater draw | 11 | 11.2–10.5 | Clovis fluted points, knives | Bison, Horse, Mammoths, Camels | Base Camp | Johnson (1991) |
| Lindenmeier | 12 | 10.8 | Folsom fluted points, side scrapers | Extinct bison | Idem previous | Johnson (1991) and ref. quoted there |
| Guila Naquitz Lago Alajuela | 14 | 10.8–8.8 | Points, side scrapers | Present fauna | Seasonal Camp. | Flannery (1983) |
| | 15 | No ¹⁴ C dating | Clovis points and FTP. Low resolution site | Without association | Surface Workshop | Bryan (1978) |
| Los Tapiales- | 16 | No ¹⁴ C dating | Clovis fluted points | Without assignment | Workshop-Camp | Bird and Cooke (1979) |
| (B) South American sites | | | | | | |
| Taima–Taima | 1 | 13.2 | “El Jobo” points, bifaces and flakes retouched | Mastodons | Killing site | Bryan (1978) |
| Early Vegas | 2 | 10.8–8 | Flakes | Present fauna | Burial camp | Stoertgen (1985) |
| El Inga | 3 | 9.5–9.3 | FTP, burils, blades and flakes | Without association | Multiple activities | Mayer Oakes (1986) |
| El Abra | 4 | 12.4–7.2 | Used flakes | Horses, mastodon | Workshop-Camp | Correal Urrego (1986) |
| Tibito | 5 | 11.7 (only one date) | Scrapers on cores, flakes, etc. | Extinct Mega fauna | Killing and processing site | Correal Urrego (1986) |
| San Isidro and Peña Roja | 6 | 10 | Grinding tools useful plants | Allopatric palms, mate | Agriolocality | Gnecco (1998) |

Table 1 (continued)

| Name of the site | No. in map | ¹⁴ C datings in kyr BP | Main tools and technology | Associated fauna | Inferred activities | Contextual evaluation |
|---|------------|-----------------------------------|---|--------------------------------------|---------------------------------|--|
| Pedra Pintada | 7 | 11 | Stemmed points | Present fauna | Multiple activities | Roosevelt et al. (1996) |
| Pedra Furada | 8 | 33–17 | Flakes–scrapers | Without association | Non-assigned | Guidon (1986), Guidon and Delebrías (1986) |
| Touro Passos | 9 | 23.3–10.4 | Choppers, flakes | Worn bones from extinct fauna | Non-formulated | Prous and Fogaça (1999) |
| Go Ja 01 Paranaíba | 10 | 10.7–9.1 | Flakes | Without association | Camp | Prous and Fogaça (1999) |
| Lagoa Santa | 11 | 14.5–12 | Flakes and choppers | Present and extinct fauna | Human burials | Prous and Fogaça (1999) |
| Alice Boer | 12 | 14.2–10.7 | Eared points | Without association | Non-assigned | Gruhn (1989) |
| Cerca Grande | 13 | 10.4–9.7 | Flakes, scrapers, point, axe | Not quoted | Human burials | Prous and Fogaça (1999) |
| Lapa Vermhela IV | 14 | 11.7–10.2 | Human female bones | Scelidothorio Bones, coprolites | Human burial | Prous and Fogaça (1999) |
| Talara | 15 | 11.2–10.2 | Unifacial tool tradition | N/d | camps | Aldenderfer (1999) |
| La Cumbre, Quirihuaic, Pampa de los Fósiles | 16 | | Flakes, plants, Unifacial tool tradition | Extinct megafauna | camps | Richardson III (1978), Chauchat (1988) |
| Cumbe | 17 | 10, 5 | Small Flakes used Heart? | Cervids and rodents | N/D | Cardich (1991) |
| Quebrada Tacahuay | 18 | 10–8 | Lanceolated points | fish, shellfish, and seabird remains | Camp | Aldenderfer (1999) |
| Quebrada de los Burros | 19 | 10–9.5 | Hearths, midden | Marine mollusks | Midden of campsite | Lavallée et al. (1999) |
| Telarmachay | 20 | 12–8 | Hearth, midden | Deers and camels | Base camp | Lavallée (1985) |
| Lauricocha 1 | 21 | 9.5–8 | Puntas lanceoladas raspadores, etc. | Deers and camels | Multiple activities and burials | Cardich (1980) |
| Pachamachay | 22 | 11.8 | Bifacial technology | Present fauna | campsite | Riek (1988) |
| San Lorenzo-Tuina | 23 | 11–8 | Lanceolated points | Deers, camels, rodents | Camp and seasonal workshop | Santoro (1989) |
| Quebrada Seca III | 24 | 10.4 | choppers, etc. | Present fauna | Brief camp | Aschero (1988) |
| Tagua–Tagua | 25 | 11.8 | Bifaces, choppers | Guanacos, mastodons | Killing site | Núñez et al. (1994) |
| Agua de La Cueva | 26 | 10.2–9.2 | Fishtail points and unifacial technology | guanacos | Seasonal camps | García (1995) |
| Monte Verde | 27 | 13.2–11 | Unifacial and bifacial technology, lanceolated points | Mastodons and “Paleo-lama” | Village camp | Dillehay (1984, 1997) |
| Arroyo Malo 3 | 28 | 10 | Flakes, hearts | Present fauna | Seasonal camp | Neme (2001) |
| Gruta del Indio Lower level | 29 | + 8.5 | Flakes, bifaces, hearts. | Present and extinet fauna | Campsite | Lagiglia and García (1999) |
| Arroyo del Tigre | 30 | 11.2–10.4 | Flakes and bifaces | N/D | Multiple activities, workshop | Suárez and López Mass (this volume) |
| Pay Paso 1 | 31 | 10–8.6 | Unifacial tools, abundant charcoal, FTPs | Extinct and present | Multiple activities, workshop | Suárez and López Mass (this volume) |
| Cerro La China 2 | 32 | 11.1–10.6 | FTP, awls, core, flakes | Without association | Activities related to hunting | Flegenheimer (1987, 1994) |

| | | | | | | |
|--|----|-----------------------------------|--|--|--------------------------------------|--|
| Cerro La China 1 | 33 | 10.8–10.5 | FTP, different stages of confection, use and resharpening | Glyptodont | Multiple activities | Flegenheimer (1987, 1994) |
| Cerro La China 3 | 34 | 10.6 | Artifacts with marginal retouch, no points, great typological diversity | Without association | Multiple activities, workshop | Flegenheimer (1987, 1994) |
| Co. El Sombrero cima y Abriño 1 | 35 | 10.7–8 | Bifacial technology, FTP, cores, ochre, | Without fauna data | Equipment Watching site, cache | Flegenheimer (1987, 1994) |
| Los Pinos | 36 | 10.5–8.8 | Flake technology, FTP | Local and extinct fauna | Workshop and camp | Mazzanti (1997a, b, 1999) |
| Cueva Tixi | 37 | 10.4–10 | Flake technology, FTP | Local and extinct | Workshop and camp | Mazzanti (1997a, b) |
| Paso Otero 5 | 38 | 10.2–9.5 | Flake technology, FTP | Armadillos, Horse, guanaco | Killing and butchering | Martínez (1997) |
| Arroyo Seco 2 | 39 | 9–8.5 | Flakes, bifaces | Extinct and present | Camp, burial site. | Politis et al. (1995) |
| La Moderna | 40 | 10–7.5 | Flakes and natural edges knives | Gliptodonts, and guanaco | Kill site | Politis and Gutiérrez (1998) |
| Piedra Museo AEP1 | 41 | 12.9–9.3 | FTP and associated bifacial thinning flakes, unifacial tools on large flakes | Extinct and present | Primary processing | Miotti (1992, 1996) |
| Los Toldos Cueva 3, Nivel 11 | 42 | 12.6 (only one date) | Knives, side-scraper | Extinct and present | Residential camp site | Cardich et al. (1973) |
| Cueva 1 Cerro Tres Tetas (C1 C3T) | 43 | 11.6–10.3 | Unifacial technology on large flakes | Guanacos | Without data | Paunero (1993/94, 1996) |
| Cueva Casa del Minero 1 | 44 | 11–10 | Unifacial tools on large flakes and slimmed bifacial flakes used | <i>Hemiauchenia Paradoxa</i> , <i>Lama gracilis</i> and present fauna | | Paunero, in press |
| Los Toldos C3, "Toldense Industry" | 45 | 8.7 for the end of the occupation | Bifacial points, flake technology | Extinct and present | Locus of limited activities | Cardich et al. (1973) |
| Río Pinturas I: Arroyo Feo, de las Manos caves | 46 | 9.3–8.5 | Bifacial and triangular points, flakes, rock art. | Guanaco and present fauna | Multiple activities | Gradín (1980) |
| CCP7 | 47 | 9.7–9.1 | Rock art, flakes, combustion structures | Guanaco and present fauna | Domestic activities | Aschero (1996), Civalero and Franco (2003) |
| Chorrillo Malo | 48 | 9.2 | Expeditive tools | Present fauna | N/d | Civalero and Franco (2003) |
| Cva del Medio | 49 | 10.5–10.2 | FTP, hearths, flake technology | Extinct and present | Base camp | Nami (1987) |
| Fell, Pali Aike | 50 | 11–10 | FTP, hearths, flake technology | Extinct and present | Camp, burial | Bird (1988) |
| Cva. Lago Sofía 1 | 51 | 11.5 | Without points, flakes | Extinct and present | Without data | Prieto (1991) |
| Tres Arroyos | 52 | 11.9–10.3 | Points, scrapers, bipolar technology | Extinct and present | Base camp | Massone (1984) |

^aPart of this information was taken from the article "The First Americans". From News Week, 26/4/1999.

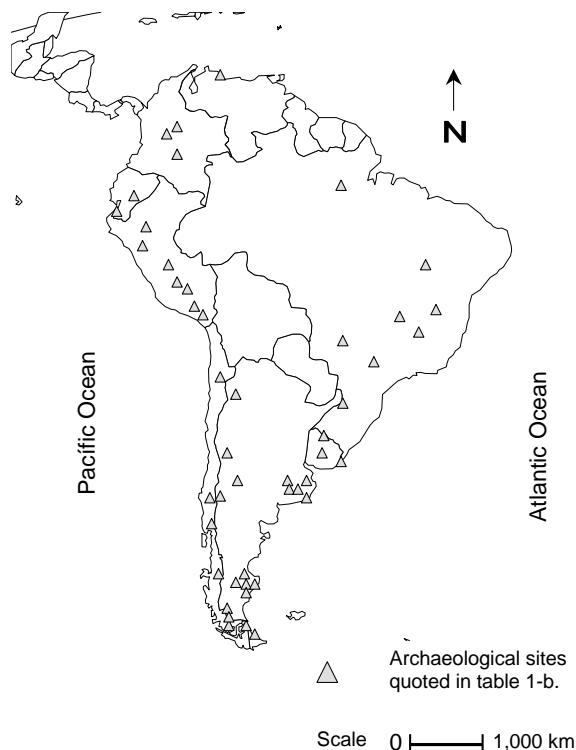


Fig. 1. Map of South America and the main archaeological sites quoted in Table 1b.

Based on these statements on the questions up to the moment, the goals of this article are firstly, to introduce a summary of our own works in the Central Plateau of Santa Cruz; and secondly, to discuss the latest archaeological regional models about the peopling in Patagonia during the Pleistocene/Holocene transition (ca. 13–8.5ky BP). Finally, these data are compared with information from the other Pleistocene sites in the Southern Cone in order to build an alternative more complex model about human space occupation.

2. Piedra Museo and the region of gullies and residual basins of the Deseado Massif

The research that we have carried out since 1988 in Santa Cruz Central Plateau, specifically in the sector known as Deseado Mesocóton or Massif (Figs. 1 and 2), is generating reliable information about the spatial chronological structure of the human occupation in Patagonia, as well as about the Pleistocene peopling of the continent. This allows us to review the answers to questions such as which, when and where the occupation and colonization was produced critically. The Deseado Massif was until recently accepted as just one more sector of the homogeneous and arid steppe, according to the distribution and quality of resources

and to the area's human settlement. The available information that comes from archaeology, ecology and paleoenvironments has introduced a different panorama since such homogeneity is only apparent. It may be in this part of the Patagonian Plateau where the geomorphologic differences, as well as the differences in resource structures, and in the natural landmarks, so important for the late Pleistocene and early Holocene successful colonization of space, are more conspicuous than today.

From a geological point of view, the Massif is a structural block which differs from the Andean block, from the southern Magellan Basin, from Comodoro Rivadavia Basin, and even from the steppe area between the rivers Chalia and Santa Cruz, which is an ecotone between the Deseado Massif, to the north, and the volcanic basin of rivers Chico and Gallegos, to the south (Panza, 1982; Panza and Genini, 1998; Miotti, [1989] 1998 and the geological bibliography quoted there). In this way, the volcanic landscape of hills, plateaus, valleys and endorheic basins with lagoons, with good and abundant lithic raw materials; places for sightseeing and wide panoramic views; vegetation; rockshelters and concentration of fresh water for the development of an important fauna including mammals and birds with gregarious behavior such as camelids (*Lama gracilis* and *Lama guanicoe*), Pleistocene horses (*Hippidion saldiasi*) and two species of ñandúes (Rheidae), as well as birds of smaller size but also gregarious and associated with lagoon environments, such as great wild geese (*Chloephaga*) and others from the Anatidae family (ducks and swans), which must have constituted excellent places for the hunter-gatherers to modelize a colonization landscape. In this area the specific places for ambush and kill are alternated with transit and residential places; *locus* for obtaining pigments and minerals for working hides, cosmetics and rock art; quarries for the provision of lithic raw materials; places for celebrating ceremonies; and even those empty spaces, steep and strategic enough to observe the movements of animals, and perhaps other human groups. This hierarchy of use of different microenvironments during Pleistocene/Holocene transition is being detected from archaeology and can be read as differential ways of use of spaces (i.e. domestic and sacred places, between places of generalized social access and those restricted to certain social segments by sex or age categories, or others). The reasons which are inherent to the human group, such as the risk at an unknown and not peopled space, or the seasonality of resources (Rowley, 1985; Soffer, 1985; Gamble, 1993b, 1994; Soffer and Praslov, 1993; among others) or the minimum risk which exists in a region where the human occupation is becoming consolidated and where the availability as well as the concentration of resources, are already known, and also by other exterior reasons such

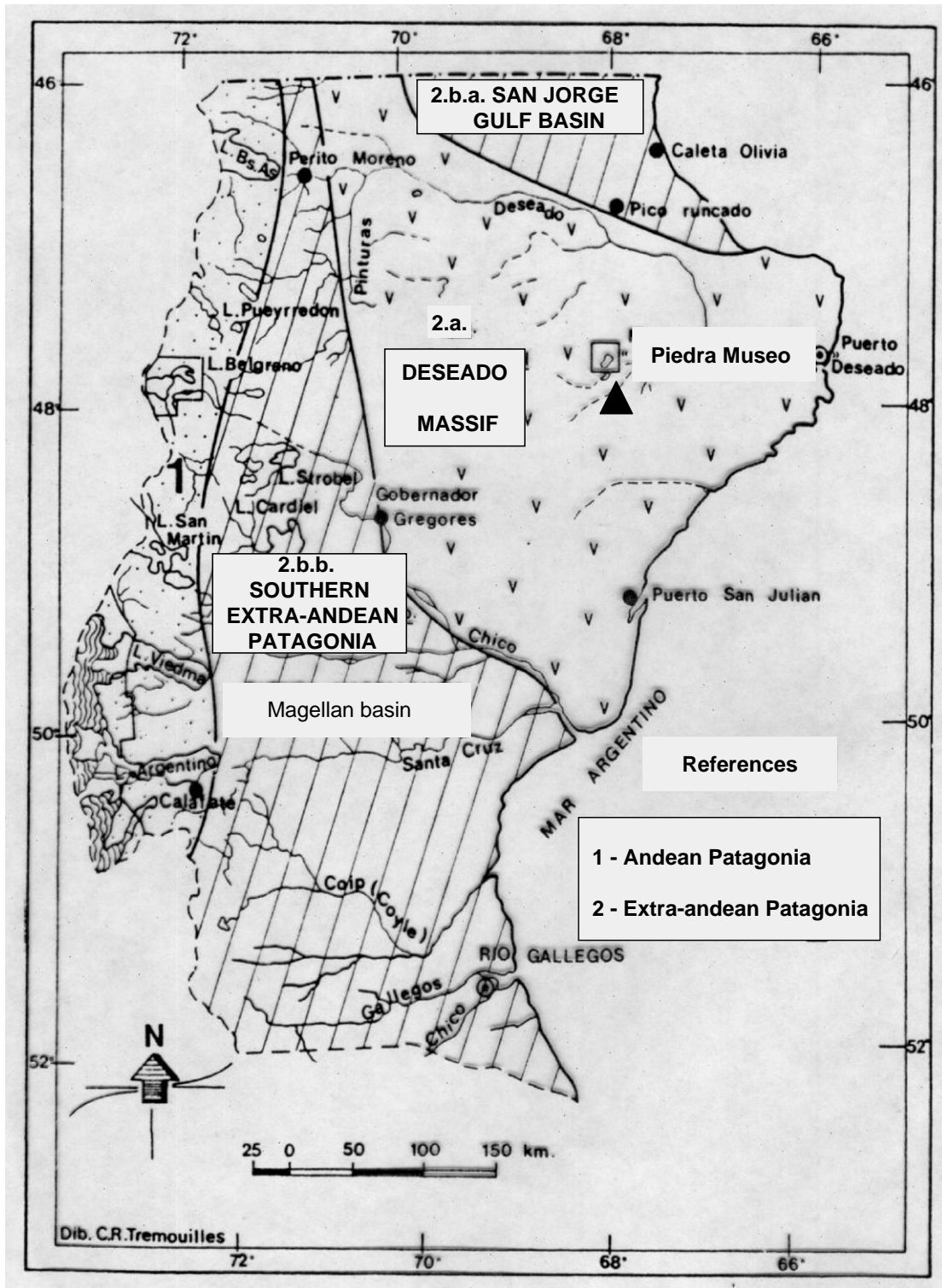


Fig. 2. Map of Santa Cruz with the geological structural blocks.

as the ecological potential of the region which is being colonized (Miotti, 1995, for this region), can fit the model of the “traveler-processor” continuum stated by Bettinger and Baumhoff (1982, 1983) based on a theoretical sophistication of Binford’s model (1980)

about the “forager-collector” continuum, and also with Marshall’s model (1993) about hunter-gatherer societies who develop strategies of immediate benefit or strategies that differ from the resources in order to minimize the environmental risk.

With these basic assumptions, the relation between hunter and gatherer people and environment can provide us with more and better ideas in order to start to discover in the geographical space to be studied the ancient social landscapes and the different material and symbolic ways in which the different rationalities of the ancient inhabitants were expressed. This way of perceiving and researching a region, both archaeologically and environmentally, allows us to interpret the ways of colonization and consolidation of spaces relating the mobility, ecology, economy, technology, symbology and social networks of hunter–gatherers where goods and material objects circulate (Ingold, 1986, 1993; Gamble and Soffer, 1990; Vicent García, 1991; Criado Boado, 1993, among others).

According to the palaeoenvironmental indicators from different archaeological localities (Borromei, 1998; Páez et al., 1999); to the spatial analysis (intra and intersite) developed in this sector of the Central Plateau (Miotti, [1989]1998, 1990, 1992, 1993a; Miotti et al., 1999a), which is related to studies of the use of animal resources in Piedra Museo and in the nearby localities (see Fig. 10.1 in Miotti, [1989]1998) and to the palaeoenvironmental studies of the Patagonian region (Heusser and Rabassa, 1987; Rabassa, 1987; Clapperton, 1992, 1993; Heusser, 1993; Mancini et al., 1993; Borrero et al., 1998; Miotti and Salemme, 1999; Páez et al., 1999; Stern, 1999) it is now suggested that in the extra-Andean steppe, located between the rivers Deseado and Santa Cruz, the microenvironmental differences are very strong at present, and must have been even stronger in the interval between 13 and 8.5 ky BP. Furthermore, it can also be stated that these places are more than those considered up to the moment, and it is inferred, based on the palaeoenvironmental information, that they were more abundant during the Pleistocene–Holocene transition than at present. However, and according to Gamble (1993b), these are not understood as “Gardens of Eden”, as they were understood in another frame, where people did not need to move because they had all the necessary elements to develop a sedentary life. This nationalist vision, which was applied to the Patagonian archaeology by the cultural-historical European point of view of the 1930s decade, and which was readapted in recent years in different parts of the world (Trigger, 1992) does not yield any alternative for the interpretation of the archaeological variability and cultural change, and at the same time is contradictory to explain the human migration at long distance and in the long term. Instead of this, it seems more proper to refer to the differential use of spaces by colonizing societies in new continents following Beaton’s concepts (1991, pp. 222–223), of “Estate Settlers” and “Transient Explorers”.

The excavation carried on in Piedra Museo AEP1 rock shelter covered ca. 48 m², and followed the natural

microlayers of a soil. In addition, surficial open-air sites are also being analyzed, because lithic raw material of Pleistocene/Holocene transition in AEP1 came from outcrops and quarries of Cerros Colorados, Pedrero Blanco, 17 de Enero (Miotti, 1996), El Fortín, La Porfiada, Laguna D (Hermo and Vázquez, 1999; Miotti and Hermo, in press) and La Matilde Formation of Laguna Grande (Miotti and Cattáneo, 1997a, b). Radiocarbon dates place the archaeological contexts of Piedra Museo between 12,890 and 7470 years BP (Miotti et al., in press; Miotti and Salemme, 2003).

AEP-1 rock shelter is up to the moment the only site in the Argentinean Patagonia where fragments of FTP and extinct Pleistocene fauna such as *Hippidion saldiasi*, and *Lama (V.) gracilis* have been found in reliable stratigraphical association. Similar associations have been found in the Magellan region at Fell Cave and Cueva del Medio, as well as at Tagua–Tagua open camp site in central Chile (Núñez Atencio et al., 1994), and sites from the Pampean region such as Cerro El Sombrero and La China (Flegenheimer, 1987), Cueva Tixi, Los Pinos (Mazzanti, 1997a, b, 1999), and Paso Otero 5 (Martínez, 1997, 1999), illustrated in Fig. 1.

2.1. Lithic materials

The lithic materials include bifacial and unifacial artifacts from the first occupation of the site (Miotti, 1992; Miotti and Cattáneo, 1997a, in press; Cattáneo, 1999). Although in previous papers the materials from the Pleistocene or Paleoindian Component have been mainly characterized, there was not any fundamental technological difference registered between the contexts with Clovis points from North and Central America, and the FTP contexts from South America. The difference, which shall be detailed as follows, suggests for Piedra Museo, a greater technological relationship with other sites from the Pampean–Patagonian region than with the Paleoindian contexts from North America, during the Pleistocene/Holocene transition (13–9.3 ky BP). This difference refers to the “technological conceptions” within which the FTP from southern South America were generated and to the “technological conception” of the Clovis toolkits from North America. According to Politis’ proposal (1991), it is observed that one of the main causes of the variability of sizes and shapes of the South American FTP is the reshaping and continuous use of these formal instruments (see Andrefsky, 1991, 1994). Meanwhile, another cause to explain the great size variability observed in Pampean FTP could be the manufacture of children’s toys (in the sense of Politis, 1998). If this hypothesis is confirmed, it could be suggested that FTP might be considered items of symbolic/cultural significance beyond the purely utilitarian idea for societies of the Pleistocene/Holocene transition. This difference in the possible use and

maintenance of these lithic artifacts is manifested in the more constant size recorded in the Clovis points (see Table 2). This can be suggest that the use and conservation of both tools were different because of the greater degree of reutilization of the FTP until elimination of the functional utility of the instrument active cutting edges, and the possibility that these forms were reproduced in toys, in contrast to a shorter use regarding the fracture or damage in the Clovis points. In this way, and contrasting with North America, where most of the Clovis points are in killing sites and “caches”, in the Humid Pampas (Argentina) and Ultima Esperanza Region (Chile), workshop and quarry sites, or sites for the primary shaping of the first hunter-gatherer’s toolkit have been found, as well as equipment sites (Flegenheimer, 1991, 1994; Mazzanti, 1997a, 1999; Nami, 1987), multiple activity sites, and killing sites for the primary processing of prey (Núñez Atencio et al., 1994; Miotti, 1992, 1993, 1996).

However, the two fragments of FTP found in Piedra Museo associated to unifacial technology for the manufacture of scrapers and knives (Fig. 3) represent an assemblage that belongs to the same technical conception. The detailed study of the largest fragment of FTP shows that it was made with a very homogeneous red silex, of an excellent quality for knapping and retouching by pressure, but with evidence of having been exposed to a thermal treatment to improve the rock knapping qualities. On the other hand, this instrument does not have both faces slimmed by retouch, but in both penetrating flakings can be seen in several directions; a marginal squamous retouch is only circumscribed to the contour of the piece, from what it can be inferred that, as in the big unifacial side-scrapers from the site, the technical conception of retouch is limited to the marginal regularization of blades. In none of these faces does the retouch penetrates more than 5 mm from the border. This same concept of marginal retouch over large flakes with prominent bulbs and with a greater width than length,

appears in the associated materials of this and other lithic early assemblages from the Southern Cone, where although the raw materials change, the conception of the FTP is the same: the production of big flakes, which are thin enough and which are slimmed by a bifacial retouch and later retouched in the borders to achieve the final shape. These FTP can be fluted or not, in Piedra Museo they are fluted on both faces, but some points from other sites like Fell, Cueva del Medio, Tagua–Tagua, Cerros La China and El Sombrero, Cueva Tixi and Abrigo Los Pinos do not have a fluted stem. Moreover, in the early human occupations from C3T, Lago Sofía 1, Tres Arroyos and Los Toldos, no projectile points belonging to the technical conception of the FTP appeared, but at Los Toldos (Nivel 11) as well as at C3T, the instrumental assemblage suggests the same technological conception as the materials associated to Piedra Museo FTP.

Analyzing the contexts of Clovis points in the same way, it can be noticed that this technical conception is different. There have been very few primary shaping sites or quarry-workshop sites detected for Clovis, up to the present. Most of the Clovis contexts are caches or killing sites for the primary processing of prey. The production sequences of these points cannot be found in any of them, and in the few base camps or multiple activity sites associated with the Clovis cultural systems, the associated artifacts correspond to formal instruments related to a conception which is directed to the formation of the pieces with penetrating retouches on both faces (Frison, 1990; Bradley, 1993). This conception also appears in the rest of the artifacts associated with the Clovis points.

At Piedra Museo, the context associated to the first occupational event, recovered from the stratigraphical unit 6, lacks FTP, but contains large flakes of bifacial reduction, approximately 8 cm long, which belong to an advanced stage of a biface (Fig. 1 in Miotti and Cattáneo, 1997a). The two fragments of FTP were recovered in the latter occupations, belonging to units 4/5.

Table 2
Technological characteristics of the Clovis technology and assemblages associated to FTP

| FISH TAIL POINTS From the Southern Cone | Technological characteristics of the assemblages on a regional scale | CLOVIS of North America (Following Bradley, 1993; Frison, 1990, 1993) |
|--|--|---|
| Big to very big flakes Unifacial over big and wide flakes, and discoidal polished tools Between 36 and 120 mm Slimming in several directions that do not cross the whole surface of the face (from one border to the other) | Blanks of formal tools Associated tools Size ^a Re-knapping | Bifaces and blades Bifacials or over flakes resulting from a bifacial reduction process (pièce esquillée) Between 70 and 160 mm Slimming flakings with prepared platforms for obtaining thin blades. They cross both faces of the piece (starting in one border and ending in the other) |
| Marginal, it does not penetrate in the piece face | Retouch | Parallel to subparallel kind. It regularizes the whole surface of the face/faces |

^aWithout considering the FTP and Clovis miniature reproductions found in some sites (Storck, 1991; Politis, 1991).

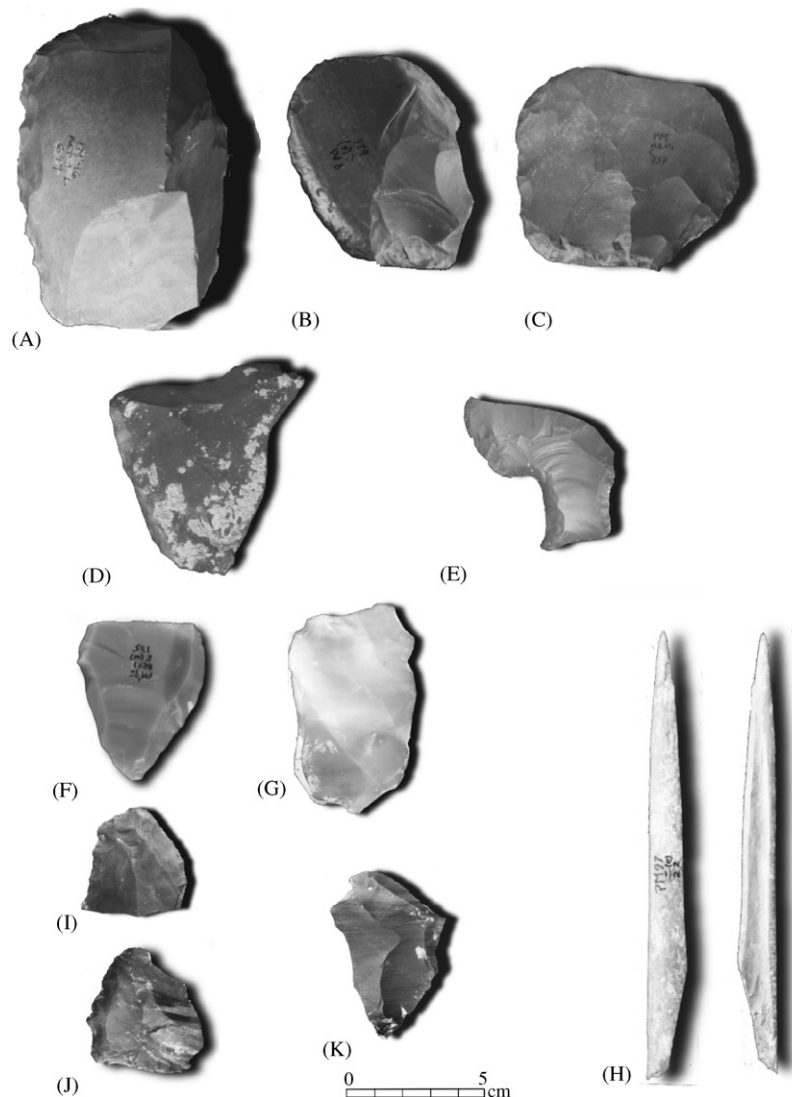


Fig. 3. Lithic materials and bone artifacts with FTP.

However, the few associated instruments (see Table 3) were made on large flakes with prominent bulbs in which only the active blades were re-sharpened by marginal retouch. Most of these instruments are broken (Fig. 3). This special context with a few cutting tools shows an expediency aspect; all of them are broken and associated with two broken FTP as well; it was interpreted as a toss zone of killing and butchering locus (Miotti, 1995; Miotti et al., 1999a).

At Piedra Museo, there are lithic materials with thermal alteration. In many cases they show a damage that is probably related to a long permanency at very high temperatures within the hearths. Although there are not many in the occupations belonging to the Pleistocene/Holocene transition, they are abundant in the Holocene Component. In other cases, such as in some bifaces and even in the red FTP (Fig. 3), the features indicate thermal treatment for improving the

Table 3
Lithic Materials from AEP-1

| Temporal block | Lithic artifacts | | | |
|---------------------------------|------------------|-----------------|----------|-------|
| | Cores | Tools | Debitage | Total |
| Holocene | 22 | 83 | 5107 | 5.212 |
| Pleistocene/holocene transition | 3 | 22 ^a | 69 | 94 |
| Total | 25 | 105 | 4.976 | 5.306 |

^aTwo belong to FTP fragments.

knapping quality of the raw materials. These characteristics of the lithic materials were also observed in the materials of the workshops and quarries located between 3 and 8 km from AEP1, and in the quarry-workshop of El Sargento and 17 de Enero. The raw material for the large FTP was obtained at the quarry-workshop “17 de Enero”, 3 km southeast from AEP1.

The other fragment, belonging to the stem base of another FTP, is made on a pink chalcedony (Miotti, 1992, 1995, 1996; Miotti and Cattáneo, 1997a) and fluting can be observed on both faces of the piece. The source of this last raw material has not been detected yet, but can be found as nodules, in the tuffs belonging to La Matilde and Chön Aike Formations, in the rock exposure of El Museo Formation and in the deposits of ancient beaches and littoral lacustrine bars that surround the present low land, at the border of which the shelters and caves are placed (Panza and Genini, 1998).

The bipolar technique was not developed in Piedra Museo, but it is present in the bony artifacts (Fig. 1 of Miotti and Cattáneo, 1997a). A very polished awl appears in the transition between units 5 and 6 and more formal tools of greater variety than in the Lower Component were found in the Holocene occupations. The dating of both occupations is detailed in Miotti and Salemme (2003). This reduction technique of the rocks is manifested in Pampean sites associated to FTP (Flegenheimer, 1991).

As the characteristics of the raw materials have been detailed in previous publications (Miotti and Cattáneo 1997a, b, in press; Cattáneo, 1999; Miotti and Hermo, in press), the quantity of lithic materials recovered in both components, as well as the lithic raw materials from the First Colonization or Pleistocene context to the context of Effective Occupation of Space (Early and Middle Holocene), are briefly summarized in Tables 3–5.

According to these results, it is suggested that in both temporal blocks the raw materials were of local origin, and the only case that could be considered as foreign is the obsidian from the Andean Range. Although Stern (1999) shows that it may well come from the Hudson volcano eruption, these analysis are not conclusive and, furthermore, there are several sources of obsidian

in the area which are not farther than a 30 km radius from the site.

2.2. Taphonomy and faunal analysis

To evaluate the depositional and post-depositional processes from the Lower Component of the site, not only the parameters coming from the modifications of the bone surfaces were used, but also other parameters of concordance such as geoarchaeological and palynological analyses, and those of intrasite spatial distribution (Miotti and Salemme, in press). For the study of disarticulation, fractures and cut marks, a sample of long bones was used, since they are considered as the most diagnostic for this kind of analysis. The results obtained from the degrees of meteorization, articulation, fracture and modifications of bone surfaces are introduced in Figs. 8–11. Most of the long bones were recovered complete (Fig. 3, in Miotti et al., 1999a) and the degree of fragmentation is also low, since most fragments of long bones correspond to the measures of more than 10 cm (Fig. 4). The most common kind of fracture is the helicoidal and some flakes correspond to the refuses of this fracture. Also the cut marks, although scarce (approx. 5% in the Pleistocene occupations) show a concordance with that expected for sites where the primary processing activities, as well as the piling up of big anatomical units, and the extraction and/or consumption of small quantities of bone marrow were carried out.

According to the analysis of horizontal and vertical distributional skeletal parts and to the faunistic structures introduced in previous works (Miotti, 1993, 1996; Miotti et al., 1999a) the distribution of faunistic materials is concentrated in piles within lower occupations of the site (Miotti, 1991, 1992, 1993, 1996) or First

Table 4
Use of lithic raw materials in each temporal block from Piedra Museo

| Temporal block | Raw material | | | | | Total artifacts by Temporal Block |
|---------------------------------|--------------|------------|----------------|-----------------|----------|--------------------------------------|
| | Silica | Chalcedony | Petrified Wood | Silicified Tuff | Obsidian | |
| Holocene | 3055 | 1350 | 416 | 220 | 171 | 5212 |
| Pleistocene/holocene transition | 50 | 20 | 16 | 8 | 0 | 94 |
| Total | 3105 | 1370 | 432 | 228 | 171 | 5306 |

Table 5
Use of lithic raw materials % from Piedra Museo

| | Raw material | | | | |
|-------------|--------------|----------------|--------------------|---------------------|--------------|
| | Silica (%) | Chalcedony (%) | Petrified wood (%) | Silicified tuff (%) | Obsidian (%) |
| Holocene | 59 | 26 | 8 | 4 | 3 |
| Pleistocene | 53 | 21 | 17 | 9 | 0 |
| Total | 59 | 26 | 8 | 4 | 3 |

Colonization Context (Miotti, 1994, 1995; Miotti and Salemme, 1999). Piles from units 4 and 5 could belong to the same occupational event, or to short events, since in both units anatomical and articular refitted could be achieved. However, the pile belonging to unit 6 could represent another event separated by hundreds of years and previous to the other two units. Based on the analysis of taxonomical abundance and skeletal parts (MNE, Survival Index, MAU, %MAU, and correlations between indexes MGUI%/DO, and MGUI/%MAU%) of guanacos, it is suggested that from the beginning of the human occupation until the Early Holocene, the site was used for watching, hunting nearby the palaeolake shore, and piling up the guanacos carcasses (main prey since the first human occupation during the Late Pleistocene until the Middle Holocene occupations) in the rock shelter (Miotti et al., 1999a; Miotti and Salemme, in press).

The archaeological resolution is good and the integrity of the context is greater in the medium part of the piles than in their extremes, where the action of post-depositional agents, such as rodent teeth marks and roots prints have modified the bone surfaces more intensively; the action of carnivores is in this sense very

low (less than 2%, see Fig. 5a). This integrity can be explained because the major quantity of the sample falls within the Berhensmeyer's 1–2 stages, in other words, it is low (Fig. 5b). It can be inferred that the bones were briefly exposed to the meteorization agents. However, this integrity and high resolution could have also been favored by post-depositional processes, such as the illuviation of pedogenetic carbonates. The analysis of correlations for the different indexes of economic utility, for bone density and the index of survival, according to Spearman's coefficient, are coherent with the interpretation expressed above about the bone piles as a result of human activities of selection and discard (Miotti, 1992, 1993, 1996; Miotti et al., 1999a). In this sense, the first hunter-gatherer Pleistocene occupations in the site would have been specific, referred to the processing of carcasses.

The refitting of skeletal parts and the analysis of bone surface modification, as well as the distributional and taxonomic analysis suggest that during the Pleistocene/Holocene transition (13–9.3 ky BP) AEP1, at least in two occupations temporally separated by hundreds of years, was used as a locus of activities related to the primary processing of big mammals and large flightless

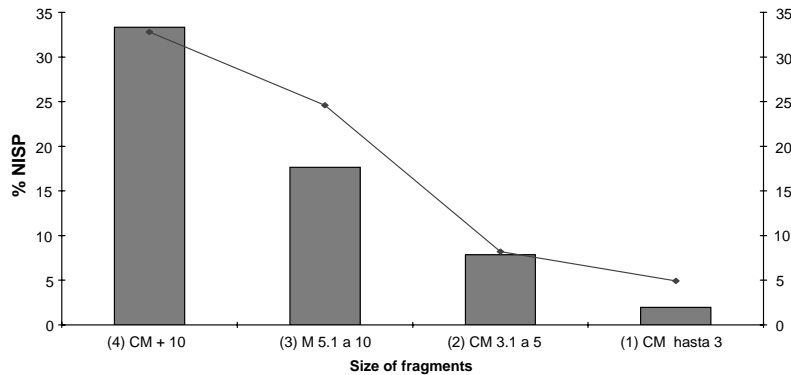


Fig. 4. Fracture pattern in long bones: (a) sizes of fragments from u6 and u4/5, and (b) comparison of fracture degree.

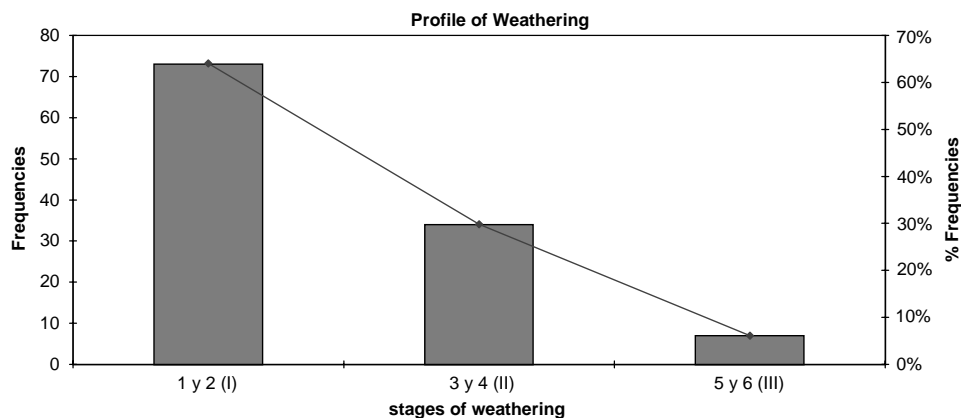


Fig. 5. Weathering profile of AEP-1.

birds. The first event with a radiocarbon dating of 13–11 ky BP, corresponds to the stratigraphical unit 6; the second occupation corresponds to other events of prey butchering that were developed between 10.5 and 9.3 ky. BP, and is placed in the stratigraphical units 4 and 5. These butchering events could have been produced by hunting nearby the rock shelter and by the palaeolake shore (50 m south the shelter). Therefore, during the colonization moments at the Late Pleistocene/Early Holocene transition, this rock shelter was used redundantly, at least during two opportunities (Miotti and Salemme, in press).

The surrounding geomorphologic features show that this locality—rock shelters, pathways, mounts, terraces, lake in the depression, high pampas—would have been an excellent place for the cinegetical watching practices, as well as for the killing, butchering and meat preparation (or preparation of other resources extracted from the prey) practices. It can also be suggested that the anatomical parts with a high meat content found in the site would be the product of the removal of flesh and abandonment of bones without marrow consumption, or the product of the piling up of certain anatomical parts for the immediate or future provision of meat. In this sense, the idea that the site would have been frequently visited by hunters is supported. The relationship with open campsites and isolated findings by the surroundings, allow us to infer that this locality could constitute, within a radius of 3–9 km, a situational complex that was redundantly occupied towards the end of the Pleistocene and the beginning of the Holocene.

3. The intersite relationships in the regional and multiregional scales

In the region of the Central Massif of Santa Cruz there are other localities with sites and components that belong to the same temporal block as Piedra Museo (Table 1b), the Pleistocene/Holocene transition. These are: Depositional Unit 5, “Nivel 11 Component” of C1C3T (Paunero, 1996); Casa del Minero cave (Paunero, in press); the “Nivel 11” and “Toldense” Industries of Cueva 3 at Los Toldos (Cardich et al., 1973) and possibly, although without radiocarbon dates, the archaeological context of Level 12, assigned by Cardich (1987) to the “Nivel 11 Industry” at El Ceibo.

In the Río Pinturas basin the earliest occupations were recorded in layer 11b of Cueva Grande at Arroyo Feo and in layer 6b of Cueva de las Manos Pintadas, both assigned to the Phase I of the regional “Río Pinturas” tradition (Gradin, 1980). For the Andean basins of Río Belgrano and Lago Posadas, which according to Aschero, are related to the Río Pinturas basin or are an extension of the same, “*la base de la secuencia de*

ocupación de CCP7 (ca. 9700/9100 AP) representaría un momento temprano de exploración y lo ‘colonization’... of the ARBLP area” (Aschero, 1996, p. 19). The remark in the text is mine, since the categories stated by Aschero are taken from Borrero (1990, 1991) and both would fit in the evolution stage of Exploration and Colonization which the author considered in the same way as Borrero Miotti (1989) 1998, p. 528]. However, later, exploration and colonization would be integrated into only one stage of colonization, although the hypothesis of the exploration stage in a new environment is not discarded at a theoretical level. However, the sites belonging to this stage lack clear characteristics at a regional scale (Miotti, 1994, p. 39).

In regards to these sites, the interpretation is that these caves contain evidence of “... *espacios de actividad doméstica es conclusiva; sumado al hecho de una marcada redundancia de ocupación en CCP7 ...*” (Aschero, 1996, p. 18 and Table 1). However, these localities, located between 120 and 400 km from Piedra Museo towards the west, are different in several aspects. The main features are:

- (a) the resolution of the contexts is very coarse at Los Toldos and El Ceibo although both have good archaeological integrity; medium or high coarse at the sites from C3T, Casa del Minero, Río Pinturas and ARBLP;
- (b) the geoforms where the sites are situated differ: a not very deep canyon at Los Toldos, with the excavated caves located at the bottom of it or in a very direct relationship with the present valley, while Río Pinturas is a canyon of great depth and the excavated caves are in intermediate and high points of the slopes that form the valley, far from the present basin of the river and far from the plateau that borders this valley; and
- (c) the panoramic views from each site are also very varied, which implies very different situations for hunting, different distances from water sources and from the rest of the resources. However, and in spite of these differences of location, the authors inferred multiple functions for each of the sites, except El Ceibo, that was considered as an occupation of limited activities by the end of the Pleistocene. C3T, Casa del Minero and El Ceibo are related to lacustrine basins and the panoramic view from three sites is wide over the depression, but (except in the second) restricted respect the high surrounding plateaus.

The projectile point found by Paunero at C3T does not belong to the FTP type, but the lithic artifacts from this occupation are techno-morphologically similar to those from Nivel 11 at Los Toldos and El Ceibo (Paunero, 1993–94), Casa del Minero, and also similar to most artifacts associated to the first Pleistocene

occupations from Piedra Museo. The sources of origin of the raw materials used in these sites, taking each site as a central point, do not exceed in any case the microregional scale.

In the Magellan Basin the sites with reliable occupations within this period are Fell, Pali Aike, Las Buitreras, Cueva Lago Sofia 1 and Cueva del Medio although the archaeological resolutions of the sites are also different here. FTP was found only in Fell, Pali Aike and Cueva del Medio. These were interpreted as multiple activity sites (Bird, 1988; Nami, 1987; Prieto, 1991). Regarding Fell Cave, not all the points from the Lower or Fell 1 component ($n = 15$) belong to the FTP, since one of them ($n = 1$) is triangular with a concave base (Bird, 1988, Fig. 57), similar to that from C3T and to those from the initial Toldense (see Cardich, 1977). The resolutions from Cueva del Medio and Cueva Lago Sofia 1 are high, while at Fell, Pali Aike and Las Buitreras they are low and there is diversity in the integrity of the contexts. A site that should be outlined for this period is Tres Arroyos (Massone, 1984), in Isla Grande of Tierra del Fuego. In this sense, it could be inferred that projectile points have not been found in this site, whereas, cutting tools on larger flakes and some bipolar tools were found. The geomorphologic and contextual characteristics of this small rock shelter, placed on a cliff from which a wide sector of the surrounding plain can be seen, suggest that there was a brief occupation more than 11,000 years ago. There is evidence of extinct fauna processing (Mengoni, 1988; Borrero, 1991, *this volume*), and the processing of some prey inside the rock shelter was suggested. The archaeological resolution for this site is good and it was defined as a site of multiple activities, although without a redundant occupation.

All these occupations in the Patagonian southern extreme, of equal or earlier chronology than the North American Clovis Technologies suggest:

- The presence of projectile points, whether they are FTP or large subtriangular points (6 cm long or more), with or without fluting, are not the only evidence of a human colonizer component in the Central Plateau, nor in other regions of far Southern Patagonia.
- The presence or absence of points in the colonizer contexts of the area is related, on one hand, to the site formation processes according to the zones of low or high (sedimentary traps) depositional rates in which the materials are found, and on the other hand to the differential use of the Andean foothill region and the plateau (which implies different geomorphologic landscapes) by the first colonizer societies. Therefore, it is more possible to find points in those sites directly related to hunting practices, such as Piedra Museo, where the broken lithic points could have been discarded and replaced by new ones, or Fell, interpreted as a site of equipment and change of lithic points. Points are not expected at places where limited activities which are not related to hunting nor to the equipment of projectile points have been inferred; this is the case of El Ceibo Cueva 7, considered as a small hide leather workshop. It showed the edge resharpening of scrapers and side-scrapers (Mansur-Francomme, 1983) and also was considered as a place in which the consumption of meat and marrow of certain transported guanaco anatomical parts was held Miotti ([1989] 1998). Lithic points are neither expected in sites of multiple activities and short duration, such as residential bases within a forager mobility system, but with enough indicators of specific situations which would show a logistic strategy; that is the case of Nivel 11 at Los Toldos Cueva 3, an area of domestic activities related to Piedra Museo, 100 km southeast from this locality, where, as mentioned, specific killing activities and the primary processing of prey was conducted (Miotti [1989] 1998, 1993).
- The site formation processes are not excluded as a reason of the absence of projectile points, for example in places of low resolution, where the possibility of the palimpsest effect has not been controlled or was minimized in the interpretations. Typical cases are layers 11b and 10 at Los Toldos Cueva 3, with the “Nivel 11 Industry” and the consecutive “Initial Toldense Industry” (see Cardich et al., 1973); and in places that were reoccupied during a long term, producing the reutilization of the abandoned points in previous occupations. In the last case the reused points would be associated with more modern contexts than those in which they were produced and used. In this site, the medium subtriangular projectile points were found within the “Toldense Industry” context, while in the previous “Nivel 11 Industry”, characterized by Cardich as unifacial technological system, no points and no bifacial technique were found (Cardich et al., 1973; Cardich, 1987). This argument, based on the technological characteristics described, was interpreted as completely different from the “Toldense Industry” of the same site. Therefore, the Toldense should be considered a new technique, developed by a new migration of peoples (Cardich et al., 1973; Cardich, 1987). However, our analysis leads to the idea that the 47 artifacts (Mansur-Francomme, 1983) belonging to Los Toldos “Nivel 11 industry” have a technological conception very similar to those found by us at Piedra Museo, and to those found in the region at C3T, Casa del Minero 1 and El Ceibo. The main difference between these sites and Piedra Museo is that in the latter site, in addition to large side-scrapers made on flakes with prominent bulbs,

fluted FTP as well as a bone instrument with a high degree of polish were found (Fig. 3, and Tables 3–5; see Miotti et al., 1999a). The only date obtained from “Nivel 11” at Los Toldos, which has lower archaeological resolution than this one, should be tested, because a reliable technological division between “Nivel 11 industry” and “Toldense industry” does not exist. I believe both are part of the same technological conception applied to different functions of the tools. On the other hand, no intermediate dating exists that allow us to suggest the end of the “Nivel 11” occupation and the beginning of a second occupation by 11 ky BP, such as Cardich expresses for the beginning of the Toldense at this site. Moreover, against Cardich’s hypothesis, artifacts of “Nivel 11” technology were also found in several Pleistocene/Holocene transition sites: Fell, Pali Aike, Cueva del Medio (Nami, 1995), Arroyo Feo, Cueva de las Manos, La Martita, Casa del Minero, C3T, as well as in the Pampean sites and Tagua–Tagua (Chile), containing FTP. Another argument to allow us to support the antiquity and lack of independence—as a technological system—of Nivel 11 is its occurrence in El Ceibo Cueva 7, where a phalange of *Hippidion saldiasi* was dated by AMS ca. 9500 ¹⁴C years BP (Cardich, pers. comm. 1997). The greatest difference is not found in the technological concepts of their artifactual assemblages, but in the kind of raw materials that were used, which although of good quality and remarkable selection, are always found within the region of the sites, related to the supply sources at a regional scale. The datings of the Pampean sites are relatively more recent than those from the Patagonian area. A case which could clearly exemplify and demonstrate why one should not make general statements about technological and socio-cultural changes, is that from Tagua–Tagua, indicating the extent to which there has been an abuse of the term “industry” that, further from implying ethnic connotations, is transferred to a wider theoretical level to explain the cultural change by replacement of “industries”. This interpretation of changes does not end here, but on the contrary, it is a tacit indication of the significance of major categories that imply the replacement of human populations (see discussion in Scheinsohn, 1998). In this sense, it is convenient to have a background of regional information fairly calibrated respecting time and variability of the archaeological record, in order to allow generalizations about the use and circulation of raw materials and lithic artifacts at a regional level. The example from Tagua–Tagua is focused in the history of the investigations that were carried on. It was initially excavated during the 1960s by the archaeologist Julio Montané and its context was frequently correlated to “Nivel 11 Industry” from Los Toldos

by different authors. The relationship was based on the presence, in both sites, of an unifacial technology (rough industry) made on large flakes, with marginal retouches, without projectile points and with an extinct fauna, mainly of Pleistocene horses and camelids. However, despite Menghin’s (1952) report about a FTP found on surface at Los Toldos creek, nobody paid much attention to this reference. Although Cardich, in different papers, makes reference to this point, he does not stimulate a discussion by assigning it to any of the “lithic industries” defined for this locality; but reading his publications, it can be thought that he would have assigned it to the Toldense, the industry that he considered equivalent to Fell 1 of the Magallanes sequence. This outline was thus reinforced by the sequence of Los Toldos and its relationship with Tagua–Tagua. The unifacial technologies, typical from the first peopling of the Southern Cone and related in some way to the European Mousterian (according to the resemblance of both American and European industries), would have led to the development of bifacial technologies as the product of new populations that occupied these two regions of the Southern Cone. Most of the authors have sustained this hypothesis during the seventies. It means that “Nivel 11”, strictly unifacial and with Mousterian characteristics (Cardich, 1977) would represent the first groups that peopled Patagonia, and according to the inventory of formal items from Tagua–Tagua, it would also represent the first people who occupied less extreme latitudes. However, the last findings made by Lautaro Núñez Atencio in another section of the ancient Tagua–Tagua lagoon, demonstrated that the previous information was only partial, since in his excavations, Núñez and collaborators (Núñez Atencio et al., 1994) recovered ca. 20 m from Montané’s excavation, almost a complete mastodon carcass in an unquestionable association with FTP and to other instruments made on large flakes such as those that Montané had found 3 decades ago, where Núñez named Tagua–Tagua I. The new dating of Tagua–Tagua II (Núñez Atencio et al., 1994) places this occupation from the Central Chilean Basin at 11.8 ky BP. This site is interpreted as a *locus* of restricted activities, where the killing of some proboscideans, horses and camelids was developed, as well as the primary processing of prey by the paleolagoon shores. Here, as in Piedra Museo, the unifacial cutting artifacts were associated with bifacial artifacts, the FTPs. So the question is: Why should we keep the unilineal sequence of the “Unifacial Industries” that are replaced by “Bifacial Industries” in the Southern Cone, and in some extent accept that a replacement of population is necessary for the development of this technological change? This argument seems to be

completely insufficient against the present evidence, and the great intersite variability detected for transitional Pleistocene/Holocene occupations certainly does not fit with it.

- Although the last example kept us away from the regional scale, there are several considerations to emphasize if we return to this scale. The variability of the archaeological materials from the southern Magellan Basin and Tierra del Fuego can be checked in sites such as Fell, Pali Aike, Cueva del Medio, Lago Sofía 1 and Tres Arroyos (Fig. 1) which represent colonization contexts. There is as much variability detected in the use of space as in the Central Plateau. Although most of them were considered as places of multiple activities, in some cases such as Cueva del Medio and Fell, the first and last sequences of projectile point production can be observed, while in others such as Pali Aike, the presence of a FTP associated to human burials turns the grain of archaeological resolution coarser, due to the complexity of human burial and thus, the site formation processes and participant agents. In this case, remains of extinct fauna are added to the human burial. In this context, the interpretation of only one use within the cave becomes difficult. Cueva Sofía 1, unlike the rest of the sites, only contains a Pleistocene occupation (unicomponent site). Therefore, it also contributes to the great variability in the site formation processes respecting the short-term redundancy of occupation, which increases the intersite variability and concomitantly, the differences in the reoccupation of places.
- At a supraregional scale, involving Patagonia, Pampa and Central Chile, we observe that the archaeological variability of the colonization continues to be large, with sites of instrumental equipment (El Sombrero top hill), killing, primary and secondary processing sites (Paso Otero 5, Tagua–Tagua), watching sites, ochre caches and lithic workshops (Cerro La China 1 and 2), multiple activity and reoccupation sites (Monte Verde, Cueva Tixi, Abrigo Los Pinos, Arroyo Seco 2). At this spatial scale, the chronological location becomes important, because excepting Monte Verde II and Arroyo Seco, the rest are places in which FTP have been found associated with instruments made on large flakes with marginal retouch and in some cases with bipolar knapping. They are placed within the North American Clovis–Folsom temporal ranks. Even Monte Verde II is a stratigraphical context that lacks projectile points, in Río Bueno site, 250 km north from Monte Verde, Dillehay found a fluted point in a test pit which he compared with the Clovis points from North America and to which he assigned an age of 10.5–9.5 ky BP (Dillehay, 1997, p. 50).
- Finally, and at a hemi-continental scale, a great variability of Clovis and Preclavis contexts were found. However, the problem of the first humans in the Southern Cone cannot be reduced to the presence/absence of Clovis markers. They have a medium to high resolution and they are geographically located in very different landscapes (savannas, plains, hills, rain forest, arid valleys, Fig. 1 and Table 1b). I assume that FTPs are formal tools, of a technological development exclusively from Southernmost South America. Thus, it is not a technology derived from Clovis (Miotti, in press; see Politis, 1991 and references cited there). Among the main sites with non-FTP projectile points older than 11.5 ky BP can be mentioned Taima–Taima (Ochsenius and Gruhn, 1979), El Abra, Tibitó 1 (Correal Urrego, 1986), Caverna de Pedra Pintada (Roosevelt et al., 1996), Alice Boër (Gruhn, 1986, 1989), and Tuina-San Lorenzo (Núñez Atencio and Grosjean, 1994) see Table 1b and Fig. 1. The unique site with FTP in the stratigraphy north of 33°S is El Inga (Bell, 1965; Mayer-Oakes, 1986), but all the dates obtained show ages of 9.5 ky BP on average. Furthermore, the resolution degree of this context is low, and the cultural sequence was established according to the shape modification of lithic materials recovered in the successive artificial excavation levels. These levels are contained within an only stratigraphical block with a thickness of 40–50 cm. El Inga is up to the present the most questionable site to defend the hypothesis of a Clovis groups' advance or at least their technologies from north to south. If we have some clue, at the moment it seems more parsimonious to explain the presence of FTP at El Inga as: (a) an independent center, (b) as a product of the population dispersion, or (c) from the circulation of technological ideas which might come from farther south with a production that could have been developed in the Patagonian and Pampean areas, in the Southern Cone. On the other hand, it is important to emphasize the great variability of environments, with their varied archaeological representations in the Southern Cone by 13–11.5 ky BP. It would imply that peopling of South America was advanced and the populations had just reached the knowledge of availability and access to resources in each one of these environs. That means an ample social network. At this time, the caves were frequently occupied in South America for different uses, while in the great North American plains this phenomenon is not manifested, since most stratified Clovis sites are open air sites. So, the selection of stone tools during 12–10.5 ky BP is so high in Pampean and Patagonian regions, that it implies the human populations knew those territories absolutely, and this frame does not seem reflect a phase of

exploration, but instead a colonization stage. This difference makes the panorama of the first New World colonizers even more complex, a fact that will be discussed later. In this summary I believe to have found the arguments to discuss Clovis as a phenomenon of first pan-continental colonization, since it cannot explain the great variability of life styles that existed at the same time in South America. Likewise, this problem should be discussed adding information on ancient shorelines and bioanthropological data, as well as the earliest contexts from Atlantic rim and the drainage basins linked to it.

4. The bioanthropological evidence: searching for the transgressor chromosome

Returning to the continental scale, but now from the bioanthropological indicators, at present there are 2 theories in conflict about the first Americans: one that suggests 3 migrations (Turner, 1983, 1992) which fits perfectly to the “Clovis, the first American colonizers” paradigm. This theory is based on the morphodontal characteristics of the American Indians and the Asian groups. Therefore, for this author and his collaborators, it is difficult to accept one non-mongoloid migration older and more successful than that from Asia to Alaska, and produced earlier than 15 ky BP.

The second anthropological theory is based on the morphological characteristics of the cranium. With that aim, the present populations from America and Siberia were sampled and the craniums from different archaeological sites such as Lagoa Santa and other South American collections were measured (Neves and Pucciarelli, 1991; Pucciarelli et al., this volume). In this sense, the authors suggest that migrations of different biological modern humans (as the last explanation, coming from Asia through Beringia and the Pacific rim) would have been the colonizers of the New World. This proposal used a much deeper chronological frame than the other, which extends from 30 to 40 ky BP, in order to explain why in South America the oldest bioanthropological patterns have been recorded with dates older than 11.5 ky BP. Although this theory adds anthropological and ethnic variability to the peopling process, the information generated during recent years by genetics studies is readdressing the theories for the American Peopling towards an even greater spectrum of ethnic groups which, since at least 40 ky ago must have started to enter the New World (Bianchi et al., 1997; Bianchi, 1999). This theory, however, uses the same entrance gate for the colonizers as the two previous ones, that is Beringia and the Pacific coast. In this sense, and based on purely archaeological data, it had already been promoted as the safest route since the 1970s, when Alan Bryan supported his circumpacific perspective

(Bryan, 1978) and Müller Beck (1969) stated the entrance of the “first elephant hunters” from the Urals to America.

Based on the archaeological, genetics, linguistic (Greenberg et al., 1986) and biological evidence, it is now suggested that the colonization, for the Southern Cone, was a long and complex process that started towards the end of the Pleistocene. At that time huge environmental and social changes, occurred simultaneously at a worldwide scale, with the massive receding of the glaciers, the massive extinction of large mammals that proliferated during the whole Pleistocene, and the human colonization of the last wild continent. Not only Bering and the Pacific rim, as it was thought until a short time ago, were the unique ways of entry. Especially for South America, the Atlantic and its ample littoral border that emerged, as presently, ca. 35 ky BP ago, could have been another gate for people that were coming to America from the Old World with a long adaptive history to the rough and pure glacial and periglacial environments from this old continent (Gamble and Soffer, 1990).

5. Atlantic façade: its the role in the colonization of South America

Up to now, the South American Atlantic Façade was not considered significant for the peopling of South America. Perhaps, archaeologists underestimated its importance in the processes of human colonization. However, we now must pay more attention due to: (a) The maximum lateral movements of coastlines during the last 20 ky BP have varied from as much as 1000 km in some areas to less 1 km in others (Erlandson, 2001 and references quoted there), as the major part of the South Atlantic rim are vast plains; (b) The availability of territories risen was greater than on the Pacific rim, for the same age; (c) the largest basins such as Orinoco, Amazonas, Paraná and Uruguay, including the Colorado, Negro, Chubut, Deseado, Chalia, Santa Cruz and Chico rivers drain into this littoral; (d) the Pacific Façade has several transversal rivers but they are short because they drain across a narrow band of land between the littoral and the Andean cordillera; and (e) rivers always were interesting ways used to explore new terrains hinterland, and probably they could have helped in social communication.

Knowledge about navigation and flexible complex instrumental equipment as well could allow a variety of uses in different situations (Erlandson, 2001). With these assumptions and the archaeological evidence presented above, I will discuss some aspects of the technological organization of the first Patagonian inhabitants, as well as the archaeological map of the Pleistocene/Holocene transition, in order to understand the archaeological

South American variability, the context of the first American peopling and the socio-natural landscape in which this process took place, in diverse environments.

Up to now, many archaeologists feel that “the great American gate” through Beringia and the North Pacific rim was the best chance, but when the first populations entered the interior of the continent, the pathways and routes should have multiplied. Later on, the main route of Circum-Pacific coast could have continued southwards, meanwhile in narrow territory of Central America other route could have bordered. In this term, the Caribbean coast could have been part of a short exploration. Nowadays, there is evidence (see Fig. 1 and Table 1) along this coast that demonstrates different terrestrial and aquatic adaptations (Erlandson, 2001 and references there quoted). Then, the huge territories available in northern South America could offer a diversity of attractive environments along the Atlantic rim towards the south. Several extensive fluvial basins drain from the heart of the continent to the Atlantic, such as the Magdalena, Orinoco, Amazonas, Del Plata basin, Colorado, Negro, and Deseado. In this sense, we might pay more attention to several sites (Fig. 1) belonging to this rim or related to it in relationship with the great rivers, such as Taima–Taima (Ochsenius and Gruhn, 1979); Monte Alegre (Roosevelt et al., 1996), Lagoa Santa, Lapa Vermelha, Santa Elina, Alice Boër (Prous and Fogaça, 1999), Uruguayan and Pampean localities (Suárez and López Mass, in press; Flegenheimer et al., 2003), and also, the localities of Extra-Andean Patagonia: Los Toldos, Piedra Museo, El Ceibo, C 3 T, Casa del Minero, Fell, and Tres Arroyos.

6. Discussion and conclusions

Based on our own results and those obtained by other researchers and introduced in this article, we are able to answer the first questions, keeping in mind the temporal scale 13–8.5 ky BP, and adding details to the three first geographical and geomorphological scales from the southern section of South America, with the scope of approaching a hypothesis of the peopling at the last level of data integration.

- (1) At a microregional scale, it corresponds to the basin of the low eastern gullies and to the residual basins such as Piedra Museo paleolake and the Laguna Grande at the Petrified Woods Natural Monument near Jaramillo, where the mentioned temporary streams end.
- (2) At the regional scale, it includes the Deseado Massif, which includes several residual and active basins, ending in the large collectors that constitute the northern and southern limits of this geological structure, such as Deseado, Chafía and Coyle rivers.
- (3) At a multiregional scale, it includes the cordilleran ridges, the southern Magellan Basin together with the basins of Santa Cruz and Chico-Gallegos rivers, the sections from the Atlantic Coast and what is nowadays Tierra del Fuego and Última Esperanza areas, as well as the Pampean Region and the southern and central Chilean valleys.

The three main aspects selected to assess the use of space are: the intersite and intrasite variability, the area for supply of lithic raw materials, and the archaeofaunistic assemblages. These will guide us in the interpretation of the degree of human knowledge and settlement in the different regions.

The record of colonization sites with a temporal interval controlled by radiocarbon dating is low. Only Piedra Museo yielded a Paleoindian context which contains, at least, two occupational pulses, the first one between 12.9 and 11 ky BP with dates which are closer to 11 ky AP, and the second one between 10.5 and 9.2 ky BP (Miotti et al., in press). Although the complete geological report about the microscopic mineral composition of the materials from the quarries and workshops and those from the site is not available yet, at a macroscopic level it can be sustained that the raw material of the artifacts from these occupations come from places around the site, at a radius that does not go beyond 20 km (Cattáneo and Carrasquero, pers. comm. 2000). With respect to its function within the regional and microregional settlement system, Piedra Museo had a strategic role in the synergetic framework, as well as for the activities of initial and primary butchering of prey. Although the outcropping in which the site is placed is low and has a low visibility from the hills and plateaus that surround the depression at a radius of 15 km, from its top the main heights of the landscape, such as Cerro Madre e Hija and Cerros Colorados, can be seen. Both hills contain the largest outcrops of excellent quality silica and petrified wood that were used by earliest people of these occupations. In this sense, and assuming that there was a low demography during the colonization (ca. 13–11 and 10.5–8.5 ky BP), the panoramic view of access ways such as the gullies and the most prominent landscape points implies an optimal localization to maintain an inclusive social communication (Gamble, 1993b) and a knowledge of the mobility pathways, as essential requirements to minimize risk for societies who are initially occupying an unknown and uninhabited space. Madre e Hija Volcano is the highest point of a hillock formed by columnar basalts. This natural monument, as well as representing a place for supplying lithic and fossil raw materials, could be symbolizing a sacred place far from the domestic space, as was revealed by the finding of a secondary burial. Besides, at the foothills of the same volcano, there is a field of “chenques” that allow it to be considered as an

area redundantly used as a mortuary space. Although the burials probably belong to late moments of the Indian occupations in the area, the emphasis and high visualization of Cerro Madre e Hija are remarkable in the plateau landscape.

Two groups of localities are also complementary references to Piedra Museo and its microregion: (a) The basins of Río Seco where C3T, Casa del Minero, La María and El Ceibo are placed, which temporal resolution is given by the two radiocarbon dates belonging to the second site (ca. 11.5–9.5 ka BP); and (b) Zanjón del Pescado, flowing towards the Deseado river, where Los Toldos locality is located with the sites Cueva 2 and Cueva 3. In this case, the archaeological resolution is coarser. The temporal block 12.6–8.7 ka BP is sustained by only two radiocarbon dates available for both sites (Table 1). This group of sites in the Deseado Massif allows us to infer a great intersite variability during this period of colonization. Residential bases occupied repeatedly and the places of specific activities, such as the hide workshops and watching sites, are usually near sources of drinking water. On the other hand, the use of raw materials has a microregional rank or is linked to the immediate landscape to the sites, and thus a logistical mobility strategy seems to be shown. An example is El Ceibo, where the raw materials of the artifacts recovered from the stratigraphy of the small rock shelter, came from the top of the rock formation in which the site is placed. In that quarry of silica nodules, the first stages in the elaboration of bifacial and unifacial pieces are reflected (Mansur-Francomme, 1983).

In this way, the integration of these sites to Piedra Museo, as part of the same sociocultural system that colonized the Central Massif region during the period 13–8.5 ky BP is suggested. Although there is not a strict correspondence of dating, the techno-morphological information, as well as the raw materials used, do not contradict the two occupational pulses suggested for Piedra Museo microregion. In the same way, it must be emphasized that from the top of Los Toldos Canyon, Cerro Madre e Hija, as well as the group of depressions that integrate the basin of the Blanco and Elornia gullies to the east, can be seen.

On the other hand, there is a recurrence at a micro- and macroregional level, during the lapse of colonization, through the use of raw materials in certain assemblages of lithic artifacts, which are usually projectile points. Such selection of excellent quality rocks for knapping and for pressure can be interpreted as a search of perfection at a limited assemblage of instruments that constitute a conservative instrumental equipment (see for example, Flegenheimer, 1994; Núñez Atencio et al., 1994, among others). However, it is worth to note that in the region of the Deseado Massif, unlike other regions, the availability of lithic raw

materials of good to excellent quality for knapping is nowadays abundant and has a high visibility. Therefore, it is assumed that these raw materials were even more available during the first occupational advance. In these terms, it is suggested that the attractiveness of the Central Massif could have generated for the first hunter-gatherers must have been enormous, since it is important to notice that even in other regions (Flegenheimer, 1994; Núñez et al., 1994; Frison, 1990) at the same time, people selected different raw materials for the confection of the most sophisticated and/or conservative instrumental, whether they were available within or outside the region. This rich availability is one of the possible reasons for the absence of places for storing raw materials in the Patagonian region, such as those of the Pampean Region, or like the “caches” from the North American Great Plains.

The cordilleran foothills, in the Río Pinturas and Río Belgrano—Lago Posadas basins contain early colonization sites, but evidently towards the end of the Pleistocene, when the first occupations took place in the Deseado Massif, this Andean region still remained without signs of human occupation. It would probably have still been under the influence of a glacial environment. Therefore, the first effective explorations and occupations would have started ca. 9700 years BP, corresponding to the second pulse of colonization and territorial consolidation of the Central Massif, and could likely show the expansion of this sociocultural system to the western habitats of foothill, cordillera, and high plateaus (ca. 1000 ma.s.l.). The raw materials from this region also show the management of local resources. So, it is possible to maintain the hypothesis that these first occupations are the result of the expansion and consolidation of the groups from the Central Plateau with the same technologies, which share the unifacial and bifacial techniques for different purposes, and the selection of the best quality raw materials for the highly conservative instruments. However, here the intersite variability seems to be lower than in the other region, which supports the assumption that here the trend of the settlement system goes towards the residential forager segment, with multiple activity and aggregation sites, repeatedly occupied over short and long terms. On the other hand, this evidence is coherent with a peopling exploration and dispersion strategy from a region where the effective colonization has already started. It must also be noticed that in this western region, neither FTP nor associations with extinct fauna exist, which strengthens the idea of an area that was explored and selected later than the Central Plateau, when the Pleistocene megamammals had already disappeared. Although the resources from this region are good and varied by the times of the first occupations, the altitude and the cordilleran effect generated in these places a more seasonal occupation than in the eastern lowlands.

In Magellan and Ultima Esperanza region, other colonization sites have been found, in two cases associated with the FTP technology. The dates here are not older than 11,000 years BP, except for the case of Lago Sofia 1 and Cueva del Medio, in which dating from each site yielded an age older than 12.5 ky BP. However, in the first case the authors are not sure of the contextual anthropic association (Prieto, 1991), and in the second case, the author rejects it because it is the only date that goes beyond the rank of 10.7–10.2 ky BP (Nami, 1995). Here, the intersite variation is greater than in the latter area described and all the raw materials are of local origin, although, as in the other two regions, the selection of those with better conditions for knapping, at least for some groups of artifacts as the projectile points, continued being a constant. Another difference with the Central Massif is that in Magellan area the excellent quality silica is much more restricted and there is a greater difference between the areas. Basalt was the most popular raw material used in Fell during the Pleistocene, and silica the most popular from Cueva del Medio.

There is a site with colonization characteristics for 11,300 years BP, in the island zone. The occupation of Tres Arroyos could be a product of the expansion of the groups that were peopling the Magellan zone, since at that moment Tierra del Fuego Island was still attached to the continent. According to the technological characteristics it is assumed that this site would belong to the same colonizer system in expansion. Due to the lower availability of raw materials in this region, the use of bipolar technique as a strategy to maximize it in the instrument manufacture could explain this difference.

The Atlantic coast does not show cultural manifestations from the first colonization during the late Pleistocene/early Holocene Transition. It is true that if it had occurred by the Atlantic rim, the sites could be under the sea, in the continental platform, due to its sinking during the Holocene. But it is also certain that the present search for specific landforms, such as paleobasins or paleolagoons, has not been systematically developed in this ambit. It must be remembered that Ameghino (1918) described the paleobasin from the Gulf of San Jorge, mentioning an association of fauna similar to that of Lujanense (Pleistocene) stage of Buenos Aires province.

This compact presentation of the main Patagonian sites as well as the Pampean sites and those from the Central and Southern Chilean basins (Fig. 1 and Table 1) related in the last point, allows to formulate that the mobility, subsistence and technology strategies had low diversity but were widespread at a microregional and regional level, with a differential use of spaces and an occupational redundancy at a short and long term in strategic places related to the water critical resource, and probably to lithic raw materials and

faunistic resources. At this scale, we find that the segments of technologies found in each of those sites: assemblages according to my concept and “industries” (see Menghin, 1952; Cardich et al., 1973; Cardich, 1977, among many others) are answering questions of landscape hierarchy and its differential use and not questions of ethnical identity nor different peopling waves. Therefore, it is at the regional level where we first find the complementarity of the technological non-excluding and non-territorial wide mobility systems of the first colonizers.

In these terms, and although there is not a correspondence between the landforms and the site function, a preferential use of positive topographies can be argued for this interval. Assuming that between 13 and 11 ky BP demography was low (see Miotti and Salemme, 2003), not only in the region but also all over the Southern Cone of America, this hypothesis of the hierarchical use of landscapes is quite relevant since it suggests a deep knowledge of the space and possibilities offered, regarding the economical resources and communication networks among the first human groups. It is also outlined, as in previous contributions (Miotti, 1994, 1995) that the present evidence reinforces the idea of an inclusive communication among these populations. The information networks among the pioneers could have been a way of minimize risks in environments that are being explored and/or colonized.

At a multiregional scale the variability sensitively increases respecting what is found at a regional scale, but it can be suggested that the first colonizer groups could have reached the southern end of the continent, not only through its interior, but also along the Atlantic and Pacific coasts, penetrating the hinterland or through different sections (see Table 1 and Fig. 1). In Central and Southern Patagonia, they could be spreading from the Central Deseado Massif towards other areas such as southern Magellan Basin, and later on to the Cordilleran area with the same strategy that shows more logistical segments in the Central Plateau and Magellan area, and more residential segments in the Andes. However, the combination between sites of specific activities and small sites of multiple activities gives us an idea of the great knowledge that these people had about these regions, at least 12 ka BP. If this is accepted, then we should ask: How long did the first human groups that arrived in the Southern Cone take to get to know deeply the locations of the raw materials for the instruments, the locations of water, and the locations of shelters? Maybe this learning had such speed that it cannot be recorded at an archaeological scale, as Miotti and Flegenheimer (1994) expressed. But these aspects of the hierarchization of the geomorphologic landscapes suggest that during the end of the Pleistocene in the entire Pampean and Patagonian regions the hunter-gatherer societies were consolidated and spreading to

new environments, such as the cordilleran, that would not have been available until the early Holocene.

So, what do the dates of 12.5 and 11.4 ky BP from the Chilean sites of northern Patagonia and Central Chile Basin, respectively, show? They accurately guarantee the use of different strategies with an important knowledge of the mentioned regions, and probably the wide knowledge among the different colonizer groups at a long distance, which would imply a non-excluding communication strategy, as well as different gates of entry to the continent. But, until more bioanthropological information is available, we will not be able to state if these groups belonged to different societies or to fissioned groups from the same initial population that, due to a greater geographical isolation (because of the Andean Range), evolved independently from the populations of the eastern side of the Andes.

As we increase our geographical scale, the archaeological variability, as well as the ecological and environmental variability, also increases. The variability of the archaeological assemblages is due to several reasons, i.e. methodologies according to the different disciplinary matrices from which the research was carried on in each site, the range of visibility, and the taphonomical history. However, the main reason might be related with the different ways the human groups co-constructing the colonization landscapes. This process, that by 11.5ky BP is achieved in the whole continent, suggests that by that time the populations settled all over America would have left behind the risk implied in the exploration of an unknown place, empty of human population. At that moment, populations of the New World knew perfectly the territory they inhabited. In this sense is manifested the hierarchy of spaces (sacred places, domestic places and places of transit).

Based on the differences mentioned above about their technological conceptions, the North American Clovis assemblages and the South American FTP assemblages should be kept separated, since we interpreted them as different in their shapes (conserved, formal or of prestige) and in the technological conception of their associated artifacts. The idea of the cultural Drift recently recreated by [Morrow and Morrow \(1999\)](#) from [Gamble's \(1993a\)](#) concept of Drift is not accurate enough to derive the FTP from the Clovis points, neither to derive the South American FTP from only one human group. If, on the contrary, we understand the concept of "Cultural Drift" ([Gamble, 1993b](#), pp. 314–315) as a random phenomenon, it could be reasonable to think about independent invention phenomenon in North and South America without the necessity of using the underlying concept of Cultural Drift that comes from the Model of Center and Periphery discussed by [Hrdlicka](#) in 1909 (taken from [Gamble, 1993a](#), p. 314). If the Clovis conception was

adopted in North America, it seems to be a later phenomenon that could involve contexts from the Early and Middle Holocene, corresponding to the end of the colonization and to the beginning of the territorial consolidation stage of hunter–gatherer societies. The sites with lithic assemblages with most artifacts made on blades, and the so-called "Casapedrense", "Fell 2 and 3" or "Río Pinturas a and b", in Patagonia, can be mentioned as examples. But they have no resemblance with the previous technological conceptions developed by the colonizer groups from the late Pleistocene, who share with Clovis, only partially, the same temporal scale. However, both technologies have a high degree of sophistication in their most conservative assemblages of artifacts, such as the Clovis points and their formal associated tools in North America, and the FTP in South America.

The high mobility strategies of the small human groups or microbands (between 10 and 25 people) could have been a good strategy of movement and knowledge of ample geographical spaces. Learning about the dangers and potentials of the region will lead the groups to a process of control and colonization of landscapes. On the other hand, the choice that a hunter–gatherer group makes on certain spatial sectors to use them for different purposes during a relatively long time (including their reoccupation), shows that these groups had already been colonizing this place, but their wide dispersion does not mean that these had been occupations of people passing by with great speed through a whole continent as was suggested decades ago by [Martin \(1973\)](#). The initial flow of population must have been more complex than archaeologists have imagined up to now, and I suggest that it should not be interpreted as unidirectional (constant advance from north to south), but on the contrary, in multiple directions, exploring and colonizing region by region and at the same time from different parts of the Old World (Eurasia, Africa, Oceania). In these terms, some highly conserved artifacts such as the FTP of the Southern Cone or the Clovis points from North America, can be interpreted as playing an important role in the social communication during the colonization moments. Therefore, it can be thought that there was not only one direction of this peopling from north to south, but assuming the entrance points of different populations to America would be the Atlantic rim, the Pacific rim, and Beringia, it can be suggested that these groups whose technologies are found in the Southern Cone, could have had a continental dispersion, not only from north to south, but in multiple directions.

If it is assumed that not only one group, coming through the interior from the north, would have arrived in Patagonia by the end of the Pleistocene, it is then suggested that the Southern Cone was an important place from which the population dispersal could also

have started towards different parts of the continent even to the north. This could have the strongest evidence in the sites from Ecuador and their dates and all the other sites from South America related to Clovis or Pre Clovis ages (Fig. 1).

The social landscape of the region south of 33° changed from the end of the Pleistocene to the beginning of the Holocene and it is suggested that the relationships among the colonizer groups were kept through alliances and exchanges of goods considered as material objects, as well as symbolic, communication and identity objects, and not only as efficient technological items. Artifacts such as FTP and marine mollusc shells, for example, are special candidates to suggest directions or flows of communication among the hunter–gatherers. These could be indicating the circulation of ideas, material goods, and people in the different territories, that towards the Pleistocene/Holocene transition had not yet been consolidated; consolidation seems to be achieved in southern sector of Patagonia during Middle Holocene, as it is shown through a growing number of archaeological sites all over the American continent.

The concept of colonization as synonymous with hunter–gatherer or generalist economies, and high mobility populations with a simple band organization is, in fact, our present vision to modeling the process of the American peopling, but it is not satisfying. Based on the great cultural and ecological South American diversity (i.e. Monte Verde, San Isidro and Peña Roja, Paiján, Monte Alegre; Las Vegas, localities in Fig. 1), it is suggested that colonization was a complex process of mobile societies, complex in their exploration and in the appropriation of nature mechanisms of very different environments. To conquer this New World, complex social systems had to be developed. Until now, we have simplified the explanations due to the traditional description and interpretation of exclusively technological aspects, leaving behind aspects of their comprehension of the New World, which are important, but difficult to determine.

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