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ARCHAEOFAUNAL STUDIES IN ARGENTINA: A HISTORICAL OVERVIEW

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RESUMEN

Durante los últimos 30 años, los estudios arqueofaunísticos han ocupado de modo gradual un rol prevalente en la arqueología argentina. Hacia fines del siglo XIX, los huesos de animales fueron considerados como una fuente importante de información cultural. Sin embargo, durante las siete décadas siguientes los arqueólogos abandonaron el estudio de este tipo de materiales. Este cambio de actitud se encuentra enraizado en la dependencia cultural que caracterizó y dominó al medio académico en ese momento.

Dos factores que han activado y fortalecido el desarrollo reciente de la zooarqueología son, por un lado, el cambio de paradigma de una perspectiva histórico-cultural a una procesual, ocurrido hacia fines de los años '70 y comienzos de los '80 y, por el otro, la interacción dinámica con colegas extranjeros. Aunque esta transformación fue esencial, también tuvo sus limitaciones. En tal sentido, es importante y necesario valorar el avance reciente desde una perspectiva más general. Esto es particularmente revelador si deseamos contribuir con ideas nuevas y datos originales a un ya bien establecido campo del conocimiento.

Por lo tanto, este artículo considerará los aspectos teóricos y metodológicos que se relacionan con el actual desarrollo de las investigaciones arqueofaunísticas en Argentina. Se analizan las principales tendencias desde una perspectiva comparativa y se evalúa la información disponible considerando tanto nuestro actual conocimiento como los vacíos de información aún existentes.

ABSTRACT

During the last three decades, archaeofaunal studies have gradually occupied a prevalent role in Argentine archaeology. By the end of the XIX century, animal bones were considered an important source of human behavioral information. Nevertheless, during the succeeding seven decades archaeologists resigned the study of this kind of materials. This change in attitude was rooted in the cultural dependence that characterized and dominated the local academic milieu at that time.

Two of the factors that triggered and strengthened the recent growth of zooarchaeology are the change in paradigm from a culture-historical to a processual perspective during the late 70´s and 80´s, and the dynamic interaction with foreign colleagues. However, even though this transformation was essential, it also had its theoretical limitations. In this sense, it is important and necessary to evaluate the recent advances from a general perspective. This is particularly important if we wish to contribute new ideas and data to this already established field of inquiry.

Therefore, this paper will consider the theoretical and methodological aspects related to the current growth in Argentine archaeofaunal research. I will analyse current trends from a comparative perspective and evaluate the data available considering both our present knowledge and the gaps of information that still exist.

A BRIEF INTRODUCTION

Under certain environmental and archaeological contextual conditions, animal bones may be rather ubiquitous, abundant, and quite diverse. Although exceptions always exist, most archaeologists would agree that faunal remains are a common find in archaeological sites. Nevertheless, their significance as a source of archaeological evidence has been fairly varied, especially if we consider this issue from a historical perspective.

The historical outline that follows is based on a compilation of the bibliography published during the last 50 years in Argentina, with the addition of some early publications from the end of the XIX and first half of the XX century. The articles included appeared in journals, books, national and international meetings, either published by local researchers

or foreign authors who have worked in our country. In some cases, local authors have also contributed to the analysis of materials from other countries, particularly Chile and Perú. In addition, I have included graduate and doctoral dissertations, since academic formation constitutes an important marker of the significance of archaeofaunal studies for archaeology, and therefore provides a measure of what archaeologists consider relevant in their research agendas. I have also considered both zooarchaeological and taphonomic papers, since I conceive these two disciplines as complementary (Mengoni Goñalons 1988a).

However, what I wish to distinguish are two prevalent approaches towards animal remains coming from archaeological sites. One highlights the cultural relevance and meaning of the faunal remains, whereas the other emphasizes their biological importance. The former approach stresses an anthropological perspective -*i.e.*, human use and attitude towards animals along time-, and corresponds to what is generally called "zooarchaeology" (*e.g.*, Mengoni Goñalons 1988a) and also sometimes "archaeozoology" as in the title of the ICAZ (Olson 1982; see also Reitz and Wing 1998). In the late 70´s and early 80´s some local researchers used the term "paleoetnozoología" (*e.g.*, Salemme and Tonni 1983; Tonni and Laza 1976) but by the end of the 80´s the name "zooarqueología" became of regular use.

On the other hand, Tonni (1984) has referred to the other approach as "arqueología biológica", a term originally coined by Olson (1982). This last approach is centered mostly on comparisons between past and present distributions of animal taxa and on making paleoecological inferences from changes in the structure of faunal data. Both approaches are definitely important and compatible (Reitz and Wing 1998). Humans should be seen as another natural component of ecosystems, and their uniqueness lies on the emphasis and perspective of the theoretical approach.

The initial question we can reasonably ask is when archaeofaunal studies started in Argentina. To answer this properly we need to know when animal bones were first considered as a source of archaeological data for addressing problems related to the human past, what the consequences of this approach were, and who were those in charge of the analysis of this particular kind of materials.

EARLY STUDIES IN PERSPECTIVE (1880-1950)

Seventy years is quite a long period. This segment of time includes two different and contrasting periods in the history of archaeological studies in Argentina. The first is related to the European scientific atmosphere that dominated the intellectual milieu around the end of the XIX century. For this "Generation of the 80´s" the cultural model was Europe -France in particular-, and the dominant ideas were progress, development and evolution (Babot 1998). The second period started at the beginning of the XIX century and was characterized by a reaction to the XIX century evolutionism (Politis 1992).

For the first period the most outstanding scientific figure is the naturalist Florentino Ameghino. He was the first Argentine researcher in using animal bones to provide hard evidence to prove his ideas concerning the antiquity of man in the Pampas. His detailed accounts and observations were published many times in France, such as the catalogue produced for the Exposition Universelle de Paris of 1878 (Ameghino 1880) or his famous two volume *magnum opus* "*La antigüedad del hombre en el Plata*" (Ameghino 1918 [1880]). In this last study he presented and discussed the evidence coming from several Pampean localities where he documented the coexistence of humans with extinct and modern fauna.

He used several indicative categories of bone modifications with descriptive terms familiar to most of contemporary zooarchaeologists. Some of the categories employed were: "bones with traces of percussion", "bones longitudinally broken", "bones with incisions", among others (Ameghino 1918:238-242; my translation). Quite good quality drawings were also provided to illustrate his descriptions and support his interpretations. He accordingly interpreted them as a proof that the animal bones were found in an interactive context, in most of the cases associated with charcoal and burned earth (Mercante and Ambrosetti 1913).

By the end of the XIX century, the discovery of Pleistocene animal remains in Patagonia offered new evidence to reinforce the idea of their coexistence with humans and the antiquity of human peopling of the Americas. These remains consisted of surprisingly well-preserved hides, bones and other organic materials belonging to a giant sloth, an American horse and other extinct and extant species at Ultima Esperanza, in southern Chile. By this time the Museo de La Plata, officially founded in 1888, offered the institutional background for preeminent European immigrant scientists such as Robert Lehmann-Nistche (anthropologist), Santiago Roth (paleontologist) and Rodolfo Hauthal (geologist), who studied some of the materials discovered at Mylodon Cave.

In several articles they wrote detailed accounts of their findings and analyses, providing ground-breaking (*e.g.*, human inflicted damage on bones) and imaginative (*e.g.*, giant sloth domestication) interpretations. For the purpose of this historical account, the most relevant papers are those by Lehman-Nitsche (1899, 1902). With terms such as "cuts", "impacts", and "fractures" he described the alterations observed on the surface of the animal bones. Most of the modifications identified, if not all, were attributed to early humans. This proved their coexistence with extinct fauna and, therefore, challenged the scientific ideas of the time about the dating of the human presence in South America.

Phrases such as “there is no doubt that we are dealing with the remains of a feast» (Lehmann Nitsche 1899:50; my translation) are powerful enough to illustrate and reinforce the meaning given to those marks and related traces.

The reaction against evolutionism during the first part of the XX century was undoubtedly negative for archaeofaunal studies. The impact of Alex Hrdlicka’s (1912) critiques concerning the antiquity attributed to early man in South America was decisive. The decades that followed (1910-1950) were characterised by a lack of interest in temporality. Historicism and diffusionism were the main paradigms. Historical texts from the time of the Conquest were used to interpret cultural materials (González 1985; Politis 1992). By 1930, the Culture-Historical school of thought was introduced in our country and promptly became the dominant paradigm for the next 50 years (Politis 1988). Under this general spell, the study of animal bones had no place in archaeology and so became meaningless.

Some isolated articles appeared during this period, but always emphasising the paleontological significance of animal bones and, in some cases, making anthropological comments. Some papers of this period are those produced by C. Rusconi and L. Kraglievich (1931) on the camelid remains found at some archaeological mounds in Santiago del Estero (Rusconi 1933). Rusconi (1932) also published the study of modified bones of extinct fauna, some of the modifications being attributed to human action.

THE TRANSITION PERIOD (1950-1975)

This rather short period is characterized by a reappraisal of bone remains and also for some methodological advances. Stratigraphic excavations, almost forgotten since the early excavations of Juan B. Ambrosetti in N.W. Argentina, were again undertaken in Sierras Centrales, Patagonia and the Pampas, and also at this time the first radiocarbon dating results were obtained (González 1985).

The excavation of two caves -Ongamira and Intihuasi-, located in the Sierras Centrales, provided bones that were the subject of an analysis carried out by Rosendo Pascual, a leading paleontologist from the Museo de La Plata. Both reports (Pascual 1954, 1960) contained basically lists of species with no further analysis beyond some remarks concerning past and present distribution of those taxa found at those localities. Nevertheless, that was the first time animal bones were analysed in this way and were incorporated in an archaeological publication. Additionally, during the early 50´s, Osvaldo Menghin worked at Los Toldos locality in Central-Southern Patagonia. The excavation of several caves involved the retrieval of the first collections of faunal remains with clear stratigraphic provenience from continental Argentine Patagonia. And, although these particular animal bones were not reported, they were curated and, subsequently, studied during the late 70´s (Mengoni Goñalons 1976-1980).

During the early 70´s some paleontologists started to work jointly with archaeologists and geologists, and, therefore, animal bones started to be considered once again as an important source of information. Some of the papers produced at this stage are an important antecedent of the changes that characterized the second part of the 70´s (Fidalgo *et al.* 1971; Zetti 1973; Zetti *et al.* 1972).

THE LAST THREE DECADES: SOME BRIEF TRENDS

These last decades were characterized by two clear trends. Firstly, the increasing number of publications dedicated to faunal remains. And secondly, a steady growth in the number of researchers (authors) that studied this kind of evidence. By “authors” I only mean those researchers who have analysed bones. Therefore, co-authors who participated in the publication -whether they were the director of the project or the excavator- are not taken into account in my calculations.

In figure 1 we can visualize the increase in the number of papers devoted to the analysis of faunal bone materials per lustrum. This number has risen gradually, but more than a 50% of the whole production is concentrated in the 90´s. Furthermore, the late 90´s can be considered a particularly

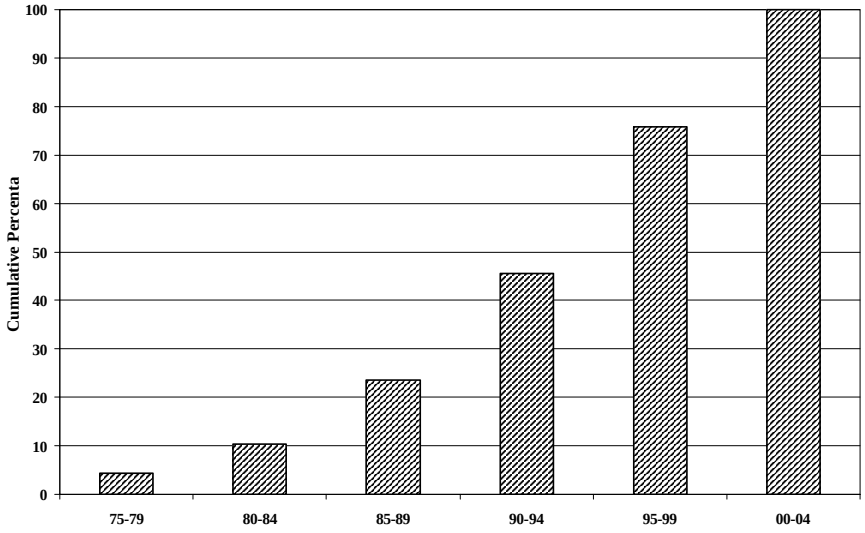

Figure 1. Number of publications by lustrum.

productive period with nearly a 30% of the production of the last three decades. This fact is coincident with a progressive increase in the number of researchers.

These two trends run parallel and show a remarkable growth of the discipline. In the following sections I will comment on and summarise the main topics and approaches developed during each decade.

THE 70´S: THE START OF ZOOARCHAEOLOGY

The archaeologists' awareness of the importance of animal bones increased during the 70's, and so this period was critical for the development of zooarchaeological studies. In this sense, the ideas of Eduardo P. Tonni -a renowned paleontologist from Museo de La Plata (MLP)- were fundamental to give the analysis of archaeofaunas the direction it took in the late 70´s and early 80´s. Although his studies of archaeofaunal materials were carried out from a biological perspective (Tonni 1984), in several occasions he worked in cooperation with archaeologists. His viewpoint was very important and influential on some of the senior archaeologist of that generation, highlighting the need for developing archaeofaunal studies. It should be mentioned that in some cases he worked jointly with Alberto L. Cione (MLP), a palaeontologist specialized in ictiology, who still cooperates on archaeological projects and works with fish bone collecions.

Some of these early papers focussed on animal bones coming from hunter-gatherer sites, while others included the first discussions on the presence of domesticated camelids in agro-pastoral contexts of N.W. Argentina and their adaptation to the lowlands of our country (Cione *et al.* 1979; Cione *et al.* 1977; Raffino *et al.* 1977; Tonni and Laza 1976). Eduardo Tonni was particularly instrumental in aiding the flourishing of zooarchaelogical studies since he not only assisted and adviced recent graduates and students of archaeology who were initiating bone studies on their own, but also encouraged them to develop an anthropological approach.

The first papers produced at this initial stage discussed different topics from diverse geographical areas, exhibiting the interest young researchers had for this new field of inquiry (Borrero 1976-1980, 1977; Caviglia and Figuerero Torres 1976; Kristcautzky *et al.* 1977-1978; Mengoni Goñalons 1976-1980, 1979; Mengoni Goñalons and Silveira 1976; Palanca and Politis 1979; Silveira 1979).

The visit to Argentina in 1975-1976 of Earl C. Saxon, who had studied with Eric S. Higgs at the University of Cambridge, was also influential. His innovative analyses of two Fuego-Patagonian archaeological sites, Packewuaia and Mylodon Cave (Saxon 1976, 1979), were certainly inspiring. Although these visits did not have a generalized impact on the whole community, it is true that from that moment on, there was a regular contact with other foreign researchers. This was the general attitude and constituted an important turning point for the field, as it allowed us to move one step forward towards the development of archaeofaunal studies; the encouragement and support given by researchers from abroad were also of great help.

THE 80´S: THE ZOOARCHAEOLOGIST BOOM

During the early 80´s several issues led to the consolidation of zooarchaeological studies in Argentina. One of them was a noticeable theoretical change from a Culture-Historical paradigm to a research approach greatly influenced by the processual archaeology of the 70´s. Another was our active participation in international meetings (*e.g.*, UISPP 1981; ICAZ 1982).

The incorporation of an ecological-systemic approach in hunter-gatherers studies was the natural outcome of the influence of processual archaeology in our country (Politis 1988, 2003). This theoretical twist was also envisaged for more complex societies in N.W. Argentina (*e.g.*, Tarragó and Nuñez Regueiro 1972). Anyhow, faunal remains became definitely vital in hunter-gatherer contexts as they were related to subsistence-settlement studies, a trend that became very popular among the archaeologists working in the Pampas and Patagonia. In N.W. Argentina, after the initial efforts already mentioned leaded by E. Tonni almost nothing was done during this period concerning animal bones at agro-pastoral contexts (Mengoni Goñalons 1979), mainly due to the lack of continuity of processual lines of research.

In 1982, in London (United Kingdom), our country participated for the first time in one of the conferences organized by the International Council for Archaeozoology, ICAZ (Mengoni Goñalons 1983). Until that moment, Latin America had never been represented by a local researcher. This continued at the Bordeaux (France) meeting in 1986 (Borrero 1989a); and then, at the 1990 Washington D.C. (USA) meeting, several presentations showed the results of ongoing research in different fields of inquiry that included camelids and marine mollusc studies, Pleistocene extinctions and regional synthesis. Our country participated with several contributors (L. Borrero, D. Elkin, M. J. Figuerero Torres, and G. Mengoni Goñalons). Unfortunately, the proceedings of this conference were not published.

During the 80´s two research topics were consolidated and developed. One concerned methods of analysis, including identification and quantification criteria (Mengoni Goñalons 1981, 1988a; Salemme *et al.* 1988), bone fracturing techniques (Mengoni Goñalons 1982; Miotti and Salemme 1988), bone

surface modifications produced by humans (Mengoni Goñalons 1988b), and alterations induced by animals (Politis and Madrid 1988; Silveira and Fernández 1988). In most cases these studies included the collection of reference specimens and experimentation. Both low magnification studies and high resolution images (SEM) were used for distinguishing processing marks from animal gnawing (Caviglia *et al.* 1986; Mengoni Goñalons 1987, 1988b), showing the complementary character of both approaches. Economic anatomy studies were also initiated during this period (Borrero 1989b), a line of research that would grow significantly in the next decade.

The other was related to the need for standardizing the methods of analysis. The explicitation of identification criteria and quantification procedures was also considered an important issue and a necessary step for the future development of the discipline (Menegaz *et al.* 1988; Mengoni Goñalons 1981, 1988a; Salemme *et al.* 1988; Yacobaccio 1988). Most of these articles appeared in a special volume that compiled the papers presented at the first seminar on faunal analysis organized in our country by the Universidad de Buenos Aires with the participation of colleagues from the Universidad Nacional de La Plata (Ratto and Haber 1988).

By the end of the 80´s there was a serious concern about conducting taphonomic studies in a systematic way, and about using different scales of analysis (Borrero 1988). It was also recognized that working under a taphonomic approach would allow us to learn about the variety of agents and the complexity of the processes that generally contribute to the accumulation and modification of bone deposits (Mengoni Goñalons 1988a). In this sense, a taphonomic approach provided the necessary criteria for establishing integrity and comparability between samples. These general considerations triggered most of the taphonomic research undertaken during the succeeding decade.

The archaeofaunal database created during the late 70´s in Patagonia and the Pampas led to the writing of the first papers summarizing and discussing several trends suggested by the available evidence. In some cases, basic ideas taken from evolutionary ecology, as championed by E. Pianka, were used to interpret the observed patterning (Mengoni Goñalons 1983). In others, adaptation models concordant with the processual paradigm were employed to discuss the faunal changes observed in the Pampas (Politis and Salemme 1989; Salemme and Tonni 1983). Among other things, both approaches used a nominal scale in conjunction with a long temporal scale. By the end of this decade new regional synthesis were produced (Mengoni Goñalons 1988c; Miotti *et al.* 1988), each emphasizing different aspects of hunter-gatherer's behaviour, their adaptation strategies and relationship with environmental changes documented during the Pleistocene-Holocene transition until present times.

The extinction of the megafauna, its timing and the nature of the interaction with humans are subjects that have always attracted researchers of the Pampas and Patagonia. The evidence produced at that moment was evaluated and discussed both at a local (Borrero *et al.* 1988; Fidalgo *et al.* 1986) and regional scale (Borrero 1984, 1986a; Mengoni Goñalons 1986a, 1988c; Miotti *et al.* 1988), offering a renewed view of this important process. Today, it can be said that those inferences about the role of humans as agents of extinction of the Pleistocene fauna were reasonably linked to the scanty evidence available, which in only few cases was conclusive on the nature of the association between cultural materials and the megafauna (*e.g.*, Fidalgo *et al.* 1986).

Archaeofaunal site reports on different research areas and time periods both in the Pampas and Patagonia (Borrero 1981; Borrero *et al.* 1985; Cardich and Miotti 1983; Salemme 1983) were published, showing the development and increasing interest in this kind of studies. Zooarchaeological studies were also initiated in the Central-West or Cuyo region (Bárcena *et al.* 1985) and in the Puna of N.W. Argentina (Mengoni Goñalons 1986b; Yacobaccio 1986). The latter was a research area on which our knowledge was going to expand notably in the following decade. Although the study of terrestrial animal resources predominated, some authors also started to discuss maritime adaptations and the role of marine resources, such as molluscs (Figuerero Torres 1986, 1987) and pinnipeds (Lanata and Winograd 1988).

During the 80´s some doctoral dissertations which used animal bones as an important source of evidence for discussing settlement and subsistence models were presented (Borrero 1986b; Politis 1984). However, the first two theses that focussed exclusively on faunal analysis were those of M. Salemme (1987) and L. Miotti (1989). Their research was based on the study of important bone collections coming from traditional localities and their results became a benchmark for future studies. The end of this decade also witnessed the appearance of a second generation of faunal analysts, whose production would continue in the following decade (see next section).

All this progress was certainly positive. Nevertheless, in order to provide a more balanced view, it is necessary to highlight some facts that were negative for the development of our field of research. Two promising lines of research were also initiated during the 80´s: shell midden analysis (*e.g.*, Figuerero Torres 1986, 1987) and bone technology studies (*e.g.*, Casiraghi 1984). Unfortunately, during the early 80´s these subjects were considered too specialized by some contemporary funding agencies decision makers due to an incomprehension of their potential contribution. These innovative research lines were therefore almost completely discontinued even though today they are deemed basic research lines worldwide. Nevertheless, they constituted the first attempts to analyse mollusc remains and bone

artefacts systematically, and should be considered relevant antecedents for more recent studies.

THE 90´S: AN ESTABLISHED FIELD OF INQUIRY

This decade was characterised by an overwhelming growth of archaeofaunal studies on a national scale. The scenario that can be visualised is that of an already established and expanding field of inquiry. This development is coincident with the appearance of a new generation of archaeofaunal analysts who graduated during this period (*e.g.*, A. Acosta and F. Savanti in 1993; M. De Nigris, D. Loponte, and S. Muñoz in 1994; M. Mondini in 1995; P. Fernández in 1997; C. Kaufmann, J. Merlo, and P. Messineo in 1999). In most of the cases, the information presented in their dissertations was published in local publications (see references included in this section). Also in this decade, some researchers undertook postgraduate studies abroad (*e.g.*, M. Gutiérrez 1998; C. Rodríguez Loredo 1991), while others completed their doctorates in our country (D. Elkin 1996a; G. Mengoni Goñalons 1996a; V. Scheinsohn 1997; H. Yacobaccio 1991).

As it has been noted above, many of our local research projects benefited from the exchange and cooperation with foreign colleagues and institutions. During the 90´s several graduates conducted predoctoral and postdoctoral studies abroad under fellowship programs, in some cases leading to the development of joint research projects. As in the 80's, the continuous contact with foreign colleagues had two additional outcomes. Several locally produced papers, although written in Spanish, appeared commented in general manuals, such as those by Lyman (1994), Reitz and Wing (1998), and O´Connor (2000). This was particularly the case for articles discussing methodological issues or contributing with new frames of reference. Furthermore, there was a growing interest on the part of local zooarchaeologists in participating in international meetings and publishing the results of their research abroad. In the ICAZ meetings organized at Constance (Germany) in 1994 and Victoria (Canada) in 1998, Argentina was also present (*e.g.*, Borrero, 1997). All this was fundamental as it contributed to the comprehension and appreciation of what was being produced here.

One encouraging result of this international integration was the recognition in 1995 of the Grupo Zooarqueología de Camélidos -originally formed in 1993- as an official working group of the ICAZ. The organization of international workshops and the subsequent publishing of their results (Elkin *et al.* 1994, 1996; Mengoni Goñalons *et al.* 2001) gave continuity to this endeavour and contributed to the exchange of ideas and information with other colleagues interested in the study of South American camelids.

The number and variety of subjects investigated also increased during this period. Study problems were diverse in theme and focus. The first edited volumes entirely dedicated to faunal issues were published during this decade (Elkin *et al.* 1994, 1996; Lanata 1993).

During the 90´s, methodological aspects were also an important issue. Bone modification studies were expanded and accompanied methodological developments worldwide, particularly for documenting, recording, and analysing different kinds of marks. Cut, percussion, scraping, and chopping marks, as well as natural traces, were identified, described, illustrated and discussed in several papers and books (Mengoni Goñalons 1999; Miotti 1990-1992, 1998; Muñoz 1996a).

In the Pampas and Patagonia, both in the hinterland and coastal areas, new analyses provided a vast body of data at a local and regional scale. In both regions zooarchaeological reports centered their attention mostly on subsistence practices. Recently, an overview of the data available for the Pampas and Patagonia was provided by Miotti and Salemme (1999). There they discussed the trends in the use of faunal resources based on richness and diversity indices. Several contributions were also made concerning the application of methodological studies on Patagonian hunter-gatherer localities (*e.g.*, De Nigris 1999; Mengoni Goñalons 1995, 1999; Mengoni Goñalons and De Nigris 1999; Miotti 1998).

The archaeofaunal information now available has modified some of our views. For example, interpretations on the role of the megafauna in the human diet have also changed in the last years. At least some species, especially the native horse, are now considered to have been a more important resource (Alberdi *et al.* 2001), in agreement with the evidence coming from Chile (Nami and Menegaz 1991). Nevertheless, the role of humans in the extinction of the Pleistocene fauna is still under debate. On the one hand, the disappearance of the different species seems to have taken several millennia, especially if we consider the contrasting timing of these events in the Pampas and Patagonia (Borrero 1997; Politis and Gutiérrez 1998). And on the other, the evidence from several South American sites including some of Argentina suggested that humans probably gave a "coup de grace" to an already diminished fauna (Politis *et al.* 1995).

Alongside these studies, new reports for several hunter-gatherer pre-contact localities were published during the 90´s, mainly located in the N.W. Puna (*e.g.*, Elkin 1995), Cuyo (*e.g.*, Neme *et al.* 1995; Neme *et al.* 1999), the Pampas (*e.g.*, Acosta 1995; González de Bonaveri 1997; Gutiérrez *et al.* 1999; Lezcano 1991; Loponte and Santis 1995), and northern and southern Patagonia (*e.g.*, Aguerre 1994; Estévez Escalera 1996; Fernández 1997; Mengoni Goñalons 1999; Miotti *et al.* 1999; Moreno *et al.* 1998; Muñoz 1997; Neme and Gil 1996). In addition, summaries were produced for certain regions, such as the Pampas (Salemme 1990, 1993).

During the 90´s several historical sites were also excavated and their faunal remains analysed (*e.g.*, Acosta and Rodríguez 1998; Merlo 1997; Silveira and Lanza 1998; Silveira and Lanza 1999).

Besides the archaeofaunal studies already mentioned, analyses of coastal sites -located along the coast of the continent and Tierra del Fuego- were also undertaken. Pinnipeds received special attention (Muñoz 1996b; Schiavini 1993), though birds and other animals were also studied (Campán 1992; Izeta 1999; Jiggings 1999; Lefèvre 1997; Savanti,1994). Bone artefacts were also given the attention they deserved (Scheinsohn 1993-1994, 1997; Scheinsohn and Ferretti 1995).

Although some forerunners researchers on camelid domestication have already been mentioned, this kind of research basically started in this decade. Several studies focussed on the origins of domestication and early husbandry using archaeofaunal indicators (Olivera and Elkin 1994; Yacobaccio *et al.* 1994). Faunal analyses were conducted in different sites or areas, from Archaic and Formative sites (*e.g.*, Elkin 1996a, 1996b; Haber 1993; Madero 1992; Olivera 1997; Yacobaccio and Madero 1992; Yacobaccio *et al.* 1997, 1997-1998) to Late Period or Inca times (Madero 1991-1992, 1993, 1993-1994; Rodríguez Loredo 1997-1998). In addition to animal bone studies, fiber analyses were also initiated during this period (Reigadas 1994a, 1994b), offering an independent marker for discussing the domestication process.

This decade has also witnessed the development of actualistic studies applied to archaeofaunal analysis. Most of these studies have concentrated on camelids, as both wild and domesticated species have constituted an important economic resource for the people who lived along the Andes, included most of Patagonia and some areas of the Pampas. For the guanaco -one of the wild species-, a general utility index was calculated and utilised for discussing bone frequencies in Patagonia (Borrero 1989b). More recently, a marrow index of long bones was published and used for discussing different strategies for appendicular bone procurement and exploitation in Patagonia (Mengoni Goñalons and De Nigris 1999). For the llama, the first utility indices calculated emphasised the effects of domestication on their economic anatomy, particularly the increase in the relative yield of certain body parts, and body fat considerations (Mengoni Goñalons 1991, 1996b). Recently, economic anatomy studies were carried out on another ungulate -the Patagonian huemul (Belardi and Gómez Otero 1998)-, contributing in this way with a new frame of reference for a species that was important in certain areas.

As the documentation of taphonomic processes and analytical procedures was standardised (see also the following section) the development of densitometric studies of some South American animals (*eg.*, Elkin 1995) became another key contribution to zooarchaeology. Experimentation has also been an important contribution, although some subjects still need further research, such as bone fracturing and cooking techniques. Bone fracturing studies have proven to be crucial, as almost all bone assemblages retrieved from Patagonia and other regions show that carcass butchering and long bone utilization are generally the result of particularly intensive processes (Mengoni Goñalons 1999; Mengoni Goñalons and De Nigris 1999; Miotti 1990-1992, 1998; Muñoz 1997; Muñoz and Belardi 1998). Cooking practices is also a promising line of research as it considers several aspects -such as consumption patterns and technology- related to food preparation (*e.g.*, De Nigris 1999).

Another essential line of research has been ethnoarchaeological studies, which were basically focussed on camelid pastoralists from the Puna of Argentina (Haber 1995-1996; Yacobaccio and Madero 1994; see particularly, Yacobaccio *et al.* 1998), and on research on tropical forest hunter-gatherers (Politis and Martínez 1996; see also the following section). All these studies have been extremely important bridging archaeofaunal patterning and human behaviour, ranging from slaughtering strategies to food preferences. They have also indicated that other factors -either social or ideational- were important and meaningful in decision making and bone patterning. Hopefully, this new insights will contribute to expand our theoretical perspective and methodological framework in the near future.

During this decade, taphonomic studies have grown significantly. Some papers have summarised the general approaches that have been followed (Cruz *et al.* 1994) and have commented on recent contributions (Mondini and Muñoz 1996). Disarticulation studies were undertaken both in temperate and high latitude environments (Borrero 1990) and in high altitude deserts (Nasti 1994-1995). Our knowledge of other regions, such as the Pampas, has expanded greatly, particularly as regards the interhighlands (*e.g.*, Gutiérrez 1998; Gutiérrez *et al.* 1999; Johnson *et al.* 1997) and the wetlands (Acosta 1997; Acosta and Loponte 1992). Data on carnivore activity, their action on carcasses and transportation capacity was recorded for foxes (Mameli and Estevez 1999-2001; Martín 1998; Mondini 1998) and pumas (Martín and Borrero 1997). Taphonomic studies of cetaceans remains were also developed (*e.g.*, Borella 1996), as well as for birds (Belardi 1999). The role of rodents and other microvertebrates as taphonomic agents and their taphonomy has also been studied (Durán 1991; Gómez *et al.* 1999; Kligmann *et al.* 1994; Pardiñas 1998).

Although several of these papers were preliminary, all of them have certainly contributed to the understanding of formation processes at different spatial scales. However, it was evident then that more integration between taphonomic and zooarchaeological studies was urgently needed. By

integration, I mean applying actualistic information to the analysis of archaeozoological case studies, thereby contributing to the discussion of archaeological research problems. Some recent articles clearly point in that direction (see next section).

THE DAWN OF THE THIRD MILLENNIUM: PROSPECTS FOR THE FUTURE

Time has gone by since the first zooarchaeology papers were produced. In all these years we have learned a lot and increased our experience and knowledge. From a methodological point of view, great efforts have been made to produce zooarchaeological data following international standards. In this sense, many contributions have been pioneer and are comparable with developments undertaken abroad, providing different approaches to solve common research problems.

During the last years several graduate (*e.g.*, P. Catá, G. López, F. Martin, P. Mercolli G. Pratolongo, D. Rindel, and S. Rosenfeld) and doctoral dissertations were presented, some dealing with zooarchaeology (De Nigris 2003; Izeta 2004; Moreno 2002; Muñoz 2002; Reigadas 2001) and others with applied taphonomy (Borella 2002; Cruz 2003; Gómez 2000; Gutiérrez 2004; Mondini 2002a). This fact should be considered as a very promising marker for the future of our discipline, as it evidence the presence of a competent new generation of young researchers.

In recent years new publications have been devoted to faunal analysis, discussing the nature of the evidence and the character of the different species present in various archaeological settings. Among them we can mention several papers on sites where camelids are dominant (*e.g.*, Bonomo and Massigoge 2004; De Nigris and Mengoni Goñalons 2000; Gómez Otero *et al.* 2002; Izeta and Scattolin 2001; Neme and Gil 2002; López 2002, 2003; Nasif and Cardozo 2001; Rindel 2004). Other ungulates have also been studied, such as extinct horses (Alberdi *et al.* 2001), Pampean deers (Loponte *et al.* 2004) and the Patagonian huemul (De Nigris 2004). Rodents have also received special attention (Gómez 2000; Santiago 2004). Marine mammals, both cetacean and pinnipeds were studied too from a taphonomic and zooarchaeological perspective (Borella 2004; Borrero 2004; Muñoz 2004a). The complementary of marine and terrestrial faunal resources was examined at different scales (Barberena *et al.* 2004). Some site reports have provided detailed information about their faunal assemblages (*e.g.*, Mazzanti and Quintana 2001). Archaeofaunal samples retrieved from several historic sites have also been analysed and evaluated (Merlo 2002; Muñoz 2000; Silveira 2002).

The intensification in the exploitation of faunal resources has been a concept recently applied to other geographical areas beyond the Andean region, such as the Pampas (Quintana *et al.* 2002; Loponte and Acosta 2004; Martínez and Gutiérrez 2004). The changes in the intensity of use of the guanaco as a food resource, culinary practices and delayed consumption in Patagonia are new topics under discussion (De Nigris 2000, 2004a, 2004b; De Nigris and Mengoni Goñalons 2000, 2004).

The study of marine molluscs was finally restarted (Orquera and Piana 2000, 2001). And fish remains, from both marine and freshwater species, have also received special attention in recent publications (*e.g.*, Acosta and Musali 2002; González de Bonaveri *et al.* 2003; Zangrando 2003). Bird remains have been analysed too from a renewed perspective (*e.g.*, Cruz 2001; Fernández 2000; González *et al.* 2004). This has been also the case with the study of lizard species as a subsistence resource and their role together with that of other lesser fauna in the overall exploitation strategy (Quintana *et al.* 2002). In addition, some papers on bone modification were recently published, either discussing marks not previously considered, such as human gnawing (Elkin and Mondini 2001) or presenting different type cases (Acosta 2000; Valverde 2001).

Actualistic studies have offered an important research venue. New economic anatomy studies for both the llama and the guanaco have been produced. These include comparisons between the utility indices for wild and domesticated species (Mengoni Goñalons 2001); age variability in utility indices (Olivera 2001; Olivera and Nasti 2001); and new utility indices (De Nigris and Mengoni Goñalons 2004, 2005). Studies on the criteria for constructing age profiles for the guanaco based on fusion stages have also been initiated (Kaufmann 2004). A manual on the osteology of a native deer species with excellent illustrations has also been recently published (Loponte 2004). Densitometry studies have been carried out on the lesser rhea and applied to natural and archaeological assemblages (Cruz and Elkin 2003; Fernández *et al.* 2001). Diagenetic studies (Gutiérrez 2001; Gutiérrez *et al.* 2001) have proved to be of primary importance in certain areas, and their development should be considered as a fundamental methodological step for the overall understanding of formational processes in all situations. Recent papers on taphonomy have offered summaries of data collected during years of field work (*e.g.*, Borrero 2000, 2001; Estevez and Mameli 2000; L'Heureux and Borrero 2002; Nasti 2000; Savanti 2002), and have also discussed new tools for measuring integrity and resolution (*e.g.*, Acosta *et al.* 2004; Kaufmann and Messineo 2002; Messineo and Kaufmann 2001; Kaufmann and Gutiérrez 2004; Mondini 2001, 2002). Curation issues have also been considered (Peretti and Baxevanis 2004).

A new volume focusing on South American camelids has recently been published (Mengoni Goñalons *et al.* 2001). This book includes papers originally presented at the second international workshop organized by the Grupo Zooarqueología de Camélidos with contributors from Argentina, Chile, France, Germany, Peru, and the USA. Several papers included present zooarchaeological analyses from Patagonia and Northwest Argentina that deal with different aspects of past and present camelid use (De Nigris 2001; Elkin and Rosenfeld 2001; Fernández 2001; Mengoni Goñalons 2001; Muñoz, 2001; Olivera 2001; Pagano and Aguerre 2001; Yacobaccio 2001a).

Another recently edited volume collects several original papers on South American archaeofaunal analysis (Mengoni Goñalons 2004a); it includes several articles from our country dealing with: camelid husbandry during the Late and Inca Period in N.W. Argentina (Madero 2004), Late Pleistocene and Holocene faunal utilization in the Pampas (Loponte and Acosta 2004; Martínez and Gutiérrez 2004) and the hinterland of continental Patagonia (De Nigris 2004a), and mammal exploitation in Tierra del Fuego (Muñoz 2004b).

Several researchers were able to attend the last ICAZ 2002 meeting at Durham in spite of the severe economic crisis we were suffering. In most of the cases, the organizers of the conference were willing to assist those attendants that applied in time for financial support. At this meeting Argentina was the most represented country among all South America, with seven attendants (L. Borrero, A. Korstanje, M. De Nigris, D. Loponte, G. Mengoni Goñalons, M. Mondini and S. Muñoz). All these presentations will be published in peer reviewed thematic volumes edited by the organizers of each symposium (*e.g.*, Mondini *et al.* 2004).

Despite this important progress, there are still several limitations on the development of our discipline that need to be overcome if we wish to advance our comprehension of human and animal interactions in the past. Although this problem is not privative of our country, it is important to be aware of how constrains of different nature may condition the progress of our field of research. Although economic restrictions, social instability and other factors (see Mengoni Goñalons 2004b; Politis 2003) are certainly decisive in Latin America, some other related aspects have to be considered as well. One of them is theoretical dependency and the other is paradigm hegemony. Both aspects have characterised our mother discipline, Archaeology, during the recent past. Besides being ways of exercising intellectual dominance, they may influence decisions during the evaluation of research projects. Unfortunately, paradigm hegemony affects the overall creative process, as it favours replication instead of innovative production.

From a theoretical point of view, the ecologic-systemic approach has been a dominant paradigm in the last 20 years in Argentina, particularly in the Pampas and Patagonia. Therefore, the study of social and ideological aspects, for example, has been precluded from the research agendas until very recently. On the contrary, the link between resource intensification, social complexity and the advent of camelid domestication has already been considered in N.W. Argentina, based on the evidence coming from the South-Central Andes (*e.g.*, Mengoni Goñalons and Yacobaccio 2006; Yacobaccio 2001a, 2001b). New ethnoarchaeological investigations concerning hunter-gatherers have also shown the importance of food taboos and their implications for archaeological patterning (Politis and Saunders 2002).

Hopefully, these new insights will expand our understanding of the diversity of human-animal interactions that took place in this portion of the southern hemisphere. However, a change in the scope of the topics studied and the theoretical perspectives taken is urgently needed if we want to keep the pace of our production in a worldwide context (Mengoni Goñalons 2004b). In this sense, local methodological developments have been an important contribution to Zooarchaeology in general. But this is not enough.

SOME FINAL CONSIDERATIONS

In most contemporary archaeofaunal studies a taphonomic approach is followed as the standard procedure (Chaix and Méniel 1996; O´Connor 2000; Reitz and Wing 1998). This approach is based on the assumption that other agents, besides humans and cultural processes, can contribute to the formation of the archaeological bone record.

I personally advocate, as most other local colleagues do, a taphonomic approach in zooarchaeological analysis. Through this approach we can learn about the variety of agents and the complexity of processes that can contribute to the accumulation and modification of bone deposits. In this sense, a taphonomic approach provides useful criteria for establishing the integrity, resolution, and comparability between samples. A similar methodological approach is followed in biological studies (*e.g.*, Behrensmeyer *et al.* 1992).

Some authors have extended the meaning of taphonomy to include also the presentation of results (O'Connor 2000). Although I prefer to assume a more conservative position, it is very important to consider these aspects too. Actually, they are also formational in nature. In this sense, I think that formation processes offer a much broader general concept that includes both cultural and natural phenomena (agents and processes), that can contribute to the configuration of bone archaeofaunal records and their documentation.

I would like to point out some differences that exist between zooarchaeological and taphonomic studies devoted to the understanding of archaeofaunal remains. For those taphonomists who are biologists (*e.g.*, paleontologists),

humans are just another unique species. Zooarchaeologists, even when adopting a taphonomic approach, usually emphasize the anthropological dimension of archaeofaunal deposits (*e.g.*, Reitz and Wing 1998). From a methodological point of view, taphonomic studies are of key importance to zooarchaeological research as they can contribute to structure research designs, as well as provide instruments for isolating potential biases. Nevertheless, zooarchaeology is not just taphonomy, it goes far beyond. Consequently, I deeply believe that more energy and resources should be devoted to answer questions on the peculiarities of the long-term relationship between humans and other animals from a zooarchaeological perspective.

Just to illustrate my viewpoint I will comment briefly on the different subjects that were covered during the last ICAZ meeting in 2002 at Durham. If we consider the programme of this last international meeting as an example of what archeozoologists / zooarchaeologists are interested in, what is most striking is the sheer diversity of subjects, approaches and perspectives that motivate research goals. The sessions were devoted to subjects as diverse as general taphonomy, animal ageing and sexing, palaeopathologies, fats and oils, milking and dairying, domestication, diet and management, human and animal migration, colonisation, marginal areas, and coastal adaptations (including sessions for sea mammals and malacology). Besides these interesting topics other sessions were organised to discuss identity, status and social differentiation, ritual and religion. The relationship between zooarchaeology and heritage management, and zooarchaeology and wildlife conservation was also taken into account. And also a whole session was devoted to the integration of bone studies to other sources of contextual information. The announced sessions for the next ICAZ meeting at México D.F. (2006) also look promising (see ICAZ Newsletter, Spring 2005) and clearly point to a tendency towards a more varied range of themes and topics. This is certainly extremely positive. Therefore, it would be encouraging if the future growth of the discipline in our country accompanied this broadening in the scope of research themes.

The agenda of most zooarchaeologists is centred on behavioural aspects: identifying human or animal activities, understanding the different processes involved and their effects on properties of the bone assemblages or on properties of the bone specimens themselves. As stated before, the agenda should be expanded to include other considerations, as they may well be meaningful and fundamental for our understanding of the archaeofaunal accumulations. Besides the more traditional aspects (*e.g.*, subsistence), other factors need to be considered, for example, the social and symbolic aspects. Recent papers have shown that even political issues can be addressed, based on archaeofaunal remains.

Here my concern has been both theoretical and methodological as I truly believe that our ultimate goal as zooarchaeologists is to increase our knowledge of human attitudes and behaviour towards animals in different economic, social, symbolic and historical contexts.

Acknowledgments

Although I have intended this article as an exhaustive bibliographical survey, it is reasonable to suppose that it may have some involuntary omissions. Therefore, I apologise for any lapses here included, which are my entire responsibility.

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