On the extremes of hunter-fisher-gatherers of America’s Pacific Rim

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ABSTRACT

The paper explores the feasibility of a comparative analysis of the elements related to the social reproduction of hunter-gatherer-fisher societies. Those living on both extremes of the Pacific coast of America have been used to discuss the Evolutionist approach. There are common traits in the evolution of the societies in both extremes. Their evolution began to diverge only after a particular point. The impacts of some sudden changes and mismatches show up as hiatuses in the respective developments. In Tierra del Fuego people manage to control and adjust their own reproduction, whilst the NWC entered into a spiral development that led to the complex societies described in the ethnographic record.

These parallel developments and the recurrences in social organization in completely independent places have also been useful for deconstructing some assumptions about prehistoric Art, derived from modern concepts. The analysis of Pictures-Drawings-Engravings-Stencils must be situated in its historical context to show that there are also complex series of hierarchized traits in the systems of social relationships that can be effectively reflected archaeologically.

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1. Introduction

This paper returns to the topic of prehistoric art, which was discussed nearly 30 years ago (Estévez, 1981). During those 30 years, the authors have worked on the archaeology of hunting and gathering societies in Spain, France and different South American countries. Research has focused on the ethnoarchaeology of Tierra del Fuego since 1986, and since 2008 (starting during a sabbatical leave in British Columbia), studying the societies of the North West Coast (NWC) of British Columbia in Canada to try to understand the variation in strategies of exploitation of littoral resources. As a result, there is first hand information about the two geographic extremes of the Pacific Rim and, at the same time, about the two extremes of the supposed variation in hunter-gatherer societies. These studies compare and contrast these societies, and especially to think about the relative social importance of their similarities and differences. This paper will try to highlight common trends in the evolution of societies that can explain their different histories including such elusive issue as rock art. Very different societies in similar settings can be seen as the outcome of divergent developments, triggered by the social—e.g. gender based—organization of labor (still difficult to verify archaeologically, as is the case with most explanatory social theories).

2. Setting out the problem

2.1. Ethnographic record of both extremes and its epistemological context

The comparative analysis began with a critical analysis of the ethnographic evidence about both groups of societies, and constructed a picture from the available archaeology evidence in both situations (Piana, 1984; Estévez and Vila, 1995, 1998; Orquera and Piana, 1999; Vila and Estévez, 2010a, 2010b). The main ethnographic evidence from the extremes of the Pacific Rim, aside from a few initial records from sailors and various other travellers, was recorded after the epidemics that decimated their populations and the collapse of the original social organization.

The motivation of the two principal ethnographers, Martin Gusinde and Franz Boas, both raised in the context of German scholarship, was to fight against evolutionism and to emphasize the issues of the historical particularistic school of anthropological thinking. Father Martin Gusinde sought to show that the people Darwin had described as “the most primitive people on Earth” had very advanced beliefs and even believed in a superior being. According to Gusinde, physical appearance, subsistence strategies, technology and social organization were unconnected from the spiritual. As a result, he tried to deny the existence of evolution in the ideological realm of humanity.

Franz Boas, too, in studying the hunter-gatherer groups of the North West Coast of the Americas, sought to show the inadequacy
of an evolutionary approach. They were, in his view, groups of hunter-gatherers, with a social and demographic structure, which did not correspond to the level of simplicity expected at the technological and economic level of hunter-gatherers. So, he questioned the idea of a linear evolution from simple to complex in the social as well.

Boas's proposition was important in underlining the complexity of the organisation of societies of the NW Coast who were simply hunter-gatherers. Gusinde's proposal served to demonstrate the opposite: the complexity of spiritual thought, in the most primitive society, that of Tierra del Fuego. At the same time, a simplistic picture emerged that, of the two hunter-gatherer societies, the Fuegians were culturally simplest, with no art and no other sort of sophistication, while the people of the NW Coast were the most complex from a social perspective as well as excellent artists and sculptors of totem poles.

2.2. Focussing on an issue: the meaning of art

Is the presence of what has been called 'Art' really a mark of social complexity? Is there really a correlation between the presence or absence of 'artistic' expressions and the differences among the social structures of the inhabitants of the NW Coast and those of Tierra del Fuego? The answers to such questions are relevant because such issues have been used to reinforce different aprioristic positions.

The first question is related precisely to the subjectivity of the concept of 'Art'. Historically, this concept has distinguished between two types of goods: those that are utilitarian and consumed directly; and those that are refined, with added subjective value, of restricted access and loaded with higher spiritual values.

It is no coincidence that the acceptance of European Cave Art by academics occurred at the same time as the development of anti-evolutionist thought in reaction to the first scientific interpretive-nomothetic approach to the evolution of societies. Cartailhac's change of mind about Palaeolithic Art in 1902 was a result of a general intellectual movement towards idealist positions that sought to use the existence of 'Quaternary Cave Art' as the proof of the presence of a 'superior' intellect from the first moment of human existence (that is, of God's Creation). Nor is it a coincidence that a priest like the Abbé Breuil devoted his main effort to the study of 'Prehistoric art'. Prehistoric 'Art' was tied up with mystical experiences, Shamanism, belief in a supernatural world, and, above all with religions and their rituals (see developed criticism in: Estévez and Vila, 1999; Moro and González-Morales, 2004). The 'spiritual life' was separated from the 'material', from biology, and also from the economic and the social. Overall, according to this theoretical position, the analysis of 'ritual' could be separated from the analysis of all other human activities (Estévez and Vila, 1999, 2006a,b). This particularistic approach, moreover, denied the possibility of generalizations and emphasized the unique character of every cultural manifestation.

2.3. Setting out theory and a methodological background for analysis: art is a social product and nothing but a social product: trying to objectivise the production of art

Archaeologists have to stick to the material evidence (in broad terms and without being restrictive or mechanistic about it). They should study the archaeological record by treating prehistoric societies as a whole: both the social relations of production and those of reproduction (which include and refer particularly to the transmission of knowledge and ideas, and the maintenance of social order), as well as the interaction between production and reproduction and the dominance of one kind of relationship over others.

It is impossible to produce significant new knowledge or to make cross-cultural comparisons based on the archaeological record without first subjecting idealist positions to critical analysis. Objective concepts are needed that can be used cross-culturally, without extrapolating preconceptions that are a result of subjective analysis of one's own society. However, a perspective from within the past society cannot be adopted, and a modern 'emic' perspective cannot be carried into the prehistoric past. Societies described by ethnographers were not fossil societies.

The societies of both the Fuegians and the people of the North West Coast had just as much history as any contemporary society. The changes that each society has undergone in its history, as shown in demography, the diversity of work or social position of each individual, the energy invested in the reproduction of society, the society's efficiency, its capacity to transform the environment—these are variables that can be measured objectively and to some extent are correlated with changes in the production of the components of the ideology.

Extreme or apparently anomalous cases do not prevent a scientific or nomothetic interpretation but they often require researchers to go back to the archaeological record using a different approach for interpreting the evidence and a review of the social and historical context. To disentangle such obvious examples is the need to review what has been said about 'Prehistoric Art' in Europe because it has affected all studies of prehistoric art. First of all, numerical dates for the cave art are needed. The chronological sequence was worked out on pseudo-evolutionist assumptions about a development from simple to more complex or sophisticated. As a result there has been dispute about any evidence which does not fit into this pre-ordained scheme (the most well-known example is the dispute about the direct dates for the images in Chauvet Cave in SE France) (Cloettes, 2001; Pettit and Bahn, 2003).

Among academics, such prehistoric evidence is classified as 'Art', following a modern and fuzzy concept of what is Art. 'Art' was derived from the Latin word ‘Ars’ that is equivalent of the Greek 'techne', Art as activity. The subjectiveness of the meaning of this concept is derived from its history and the bourgeois conception of art as opposed to craft that began in the XV Century. It has been also defined as a system of expressing emotions and ideas through intellectual and use items or as 'Activity made with the intention of stimulating thoughts and emotions'; ‘a special human faculty together with religion and science emphasizing formal elements’. As it is very difficult to enter into another person’s mind, even by doing direct analysis of behavior or interviews, it is probably an illusion to search for prehistoric intentions and (altered) states of mind, without projecting personal fantasies and extrapolating from modern behaviour. It would be more useful to describe such phenomena from the starting point of what is known, that is to say the processes involved in the production of the marks that are classified as art: thus, it might be more appropriate to use the acronym PEDS to refer to paintings, engravings, drawings and stencils (as suggested by Davidson, 1997).

Only identification of repeated patterns will allow which categorization can be assign to those phenomena in their different chronological and social contexts, how they can be grouped together and on what basis. This research is more interested in relating PEDS to the development of social relationships, in particular the organisation of production and reproduction, than in archaeological aspects of psychology or neuro-psychology, or in getting into the minds of prehistoric people: that is to say, in the translation of the archaeological record of PEDS into theory about the development of social relations. Interest is focused on the social characteristics of the activities that resulted in the production of PEDS.

There is little doubt that most such materials were produced in a social context, as is true for most human activity that is not strictly...
neuro-physiological or mechanical, and that many are clearly associated with communal activities (e.g. Arias, 2009). They are yet another example of a social product, the result of the need for society to continue from generation to generation and to manage their resources. The PEDS are social responses. They represent the use of particular tools (figures of animals, humans or geometrics) produced to reinforce realities or to communicate or pass on knowledge, and/or to reinforce and normalize particular social categorizations or social roles and rules that might not be accepted spontaneously.

The most productive study of PEDS should begin by putting them into context and integrating them with the other evidence, within the whole set of strategies and processes of production and of social reproduction (Estévez, 1981). The goal is to analyse the processes that produced those PEDS together with those that produced all sorts of activities and artefacts involved in maintenance and reproduction of social relations including thoughts and ideas. That means that some things must be included that others do not normally understand as art, such as architecture, performances and displays—including the movement of bodies and objects—the production of sounds and also painting and modification of the human body.

This means that, as for any study of social activities, researchers have to look at who were the producers and how was the object produced, distributed and consumed (in what context of consumption) rather than concentrating on the form or on the style of the product itself (as in the classical approach of Leroi-Gourhan, 1965), which would be much closer to the classic definition of Art and as is the main aim of Art History. Although this seems possible, it may not be easy to achieve because of the long tradition of studying the products for maintenance, reproduction and ideology separately from other products like tools, weapons and some utensils.

In many cases, they have been explained in isolation, searching for significance in their own terms, without analyzing the social process that (perhaps) provided them with that significance. The greatest analytical effort is generally put into studying prehistoric tools and implements. Those things studied in the traditional category of Art have, above all, been described in formal or stylistic terms, and sometimes only in those terms (e.g. Apellániz, 1990, 2002). The study of PEDS in an integrated way, that is to say by analyzing the role they played in the whole effort invested by the society in the maintenance and reproduction of the social system, has often been sidelined. By advocating caution in interpretation the way has been left open to subjective (intuitive and phenomenological) interpretations instead of analysis of PEDS as main elements of the social structure.

However, the culture-historical approach found itself up against impossible explanations, for example, hand stencils are found at the very ends of the ranges colonized by hunter-gatherers: in Tasmania and other parts of Australia, in the extreme southwest of the European peninsula and in the most remote painted rockshelter on the Strait of Magellan, but not always in the points in between on the routes to those ‘uttermost parts of the earth’. Some motifs are shared by societies which are known with certainty to have developed independently: for example, the double-headed serpent can be found from classical Greece to Asia through the North West Coast ethnographic societies of America as far as Maya society in the maintenance and reproduction of the social system, has often been sidelined. By advocating caution in interpretation the way has been left open to subjective (intuitive and phenomenological) interpretations instead of analysis of PEDS as main elements of the social structure.

3. Setting the empirical context in change through time: social development in Tierra del Fuego and in the North West Coast

As an illustration of the way this approach could be applied in future research, this section summarizes the historical trajectories in the two regions, the North West Coast and the coastal strip between Chiloé and Cape Horn (in Chile), as they can be derived from the existing archaeological evidence (Fig. 1). Despite the local variation within each region, there are common denominators among the pre-contact populations that allow the definition of
a ‘NWC pattern’ in the north (Matson and Coupland, 1995; Ames and Maschner, 1999), and ‘Magellan-Fuegian canoers’ in the south.

In the far south, the archaeologically best-known zones are the east coast of the Beagle Channel (Orquera and Piana, 1999; Ocampo and Rivas, 2000) and the western part of coasts of the Strait of Magellan and to the north, the island of Chiloé, although the southern regions are less well known (Massone and Prieto, 2004; Ocampo and Rivas, 2005). In the NWC, the region with the greatest tradition of research is the Gulf of Georgia and the north of British Columbia (Matson and Coupland, 1995; Moss, 2011).

Even allowing for the limitations of the existing archaeological record, the societies at the two extremes of America had a parallel evolution up to a particular moment when their development began to diverge (Fig. 2). In these two vast regions the first occupations that are well-documented date to the final moments of the last deglaciation.

There is, still, no complete consensus about the occupation of the Pacific coast of the Americas before the Last Glacial Maximum (see Carlson and Dalla Bona, 1996). The dates of some American archaeological sites are not consistent with a passage through an ice-free corridor in Alberta at the beginning of the post-glacial. However, there is also no consensus about a late glacial presence of people along the NWC, which would support the hypothesis of a late glacial coastal colonisation as was proposed by Fladmark (1979). Great geomorphological transformations (erosion and periglacial till, catastrophic breakouts of glacial lakes (Blaise et al., 1990; Blais-Stevens et al., 2003) transgression of the coast line, etc) as well as the problems of undertaking surveys (Fedje et al., 2011; Mackie et al., 2011) in such regions could easily explain the absence of better evidence of occupation or much earlier migration which would be consistent with the most ancient southern evidence.

The state of the question of the first peopling of the two regions, and of the Americas in general, is reminiscent of the state of the discussion of the first peopling of western Europe during the 1980s: Peopling earlier than 700,000 years ago was not the majority view and was discussed by questioning the artefactual nature of flaked cobbles on river terraces and doubting the chronology of stratified sites. The discovery of hominin remains clearly outside the range of erectus/heidelbergensis at Dmanisi, Atapuerca and probably Orce has cleared up that question, only to raise other questions, such as why a stone industry based on flaked cobbles appeared/arrived a million years later than it did in east Africa, or about the continuity and evolution of the first people, or else their replacement by a second wave of Out of Africa.

Leaving the oldest sites to one side, for the moment, in both regions there are clear signs of peopling before the beginning of the Holocene. In the north of the Chilian fjords there is a human occupation (Monte Verde) well dated between 13,565 ± 250 and 11,290 ± 220 BP (Dillehay, 1989; Dillehay, 1997; Dillehay and...
Fig. 2. Sequence of dates in the NWC (Estévez and Vila, 2010: 187) and Tierra del Fuego (dates from; Orquera and Piana, 1999). The main hiatuses are marked with an arrow. The major social and economic trends are also indicated. Pictures of the different harpoon types in Tierra del Fuego are posted in their chronological position. In the Marpole period of the NWC there was a type of harpoon very similar to the oldest type of Tierra del Fuego.

Mañosa, 2004); in Magellanes and Tierra del Fuego the oldest dates are between 12,380 and 9505 BP (Massone and Prieto, 2004). This is similar to the situation documented for the NWC: Manis, Ayer Pond, K1 Cave (Wilson et al., 2009; Mackie et al., 2011). Dating uses a rough BP (radiocarbon years before present) approach for the periods, rather than the calibration fashion for general approaches in coastal archaeology. Calibration is a statistical algorithm applied over the top of another statistical approach. The calibration algorithms used differ and are changing. The calibration has to take into account the very variable reservoir effects of every sample, spot and time, which is not always the case. Not all the published calibrated dates explain the process used. Thus they give a false sensation of accuracy.

In the western edges that were ice-free, there is evidence of human presence, albeit tenuous, before 12,000 BP (Ward et al., 2003; Fedje and Mathewes, 2005; Fedje et al., 2008; Wilson et al., 2009; Kenady et al., 2011; Mackie et al., 2011). In both ends of the Pacific, the pre-Holocene people exploited animals that became extinct. In both regions there are important chronological gaps between the late Glacial and Holocene archaeological evidence, thus a possible reduction of population. In the extreme south, after an intriguing hiatus (Martinic, 1996) possibly associated with some catastrophic events around 9000 BP (this is a calibrated date because it is well controlled by proxies derived from these events: volcanic eruption, glacial lake outbursts, rapid changes in the landscape and rises in sea level), the Holocene environmental traits began to be established and to stabilize after the opening of the Strait of Magellan (Franco et al., 2004; Rabassa et al., 2000). Significant environmental changes documented for most climatic variations, even when reflected in sea temperature, did not make significant differences to the range of shore fauna that people exploited.

The fauna exploited in the known sites of both regions in the Holocene is very similar to the modern fauna. Some of the oldest sites on the coast of both regions share particular characteristics: both in Tierra del Fuego (Tunel I) and in the NWC (Namu, in the central coast, Glenrose, on the Fraser delta, Gbt023 in Prince Rupert, and Bear Cove, on the north of Vancouver Island) there is evidence of an initial occupation which did not involve intensive exploitation of shellfish, and does not seem to have a specialization on any particular type of resource. In the south the documented subsistence was of terrestrial animals such as guanaco and Rhea, despite the fact that the sites dated between 8000 and 6500 BP (e.g. Tunel I, Sofia I, Ponsonby) are close to the modern coast (Laming-Emperaire et al., 1972; Orquera and Piana, 1999; Legoupil, 2003). All of the sites seem to represent incursions by people who hunted terrestrial fauna, without any specialization on littoral environments (Orquera and Piana, 2006).

In the middle of the NWC there is more evidence of fishing and exploitation of marine animals (e.g. Namu before 5000 BP, Bear Cove and Glenrose before 4500 BP). This has sometimes been characterized as a specialised littoral exploitation, but it could be more easily and better interpreted as the occasional exploitation of such resources within an opportunist strategy of catching a resource that was seasonally abundant (e.g. Matson and Coupland, 1995; Matson, 2010).

In the south after a break in occupation that followed an important volcanic episode around 6980 ± 110 BP, there was a change towards intensive exploitation of littoral resources: from the island of Chiloe to Tierra del Fuego, 1500 km to the south (Legoupil, 1985–1986, 1994; Orquera and Piana, 1987; Ocampo and Rivas, 2000; San Román et al., 2002). From that time onwards, the coastal sites were based on the exploitation of littoral resources, specifically hunting pinnipeds and fishing, hunting terrestrial birds and occasionally land mammals (especially guanaco or huemul, Hippocamelus bisulcus) and the collection of crustaceans, fruits and fungi. At least in coastal areas of the Beagle Channel of Tierra del Fuego, the staple that was basic and critical to daily diet was the collection of mussels (Estévez and Vila, 1995, 1998).

In a similar fashion, there were volcanic episodes in the NWC such as the eruption of Mazama at about the same dates as the southern episode (6730 ± 40 BP or 7627 ± 150 cal BP), but the collection of molluscs began, or increased spectacularly, around 5500 to 4500 BP (Wessen, 1988; Moss et al., 2007). Collection of shellfish was a general trend in sites from the Gulf of Georgia to the north of British Columbia. In the NWC, the change towards the collection of shellfish coincided with a rapid increase in the numbers of sites (see Grier, 2003). This has been interpreted as the being the result of an intensification in the exploitation of the environment (Ames and Maschner, 1999) or as an option to support an increasing population (Croes and Hackenberger, 1988). It is interesting to note that the most commonly collected mollusc in coasts separated by such a large distance was the mussel, which is found in inter-tidal zones and is very productive in terms of the output for a unit of work.
The beginning of broad spectrum exploitation aimed specifically at littoral resources is related to the appearance of harpoons and so of a technology developed for fishing and hunting in the water, with a pattern of annual exploitation and highly mobile logistics, without permanent structures nor clearly established social inequalities (Matson and Coupland, 1995; Orquera and Plana, 1999; Estévez and Vila, 2006b). In both regions, the NWC and the TDF, bone and stone artefacts appear with engraved decoration, or even small sculpted figures in the case of the Saint Mungo period (5500–3500 BP after Matson and Coupland, 1995) at the mouth of the Fraser River.

According to the Argentinian authors Orquera and Plana (1999) and in the view of some Canadian authors (e.g. Ham et al., 1986; Fladmark et al., 1990; Carlson and Dalla Bona, 1996), from this time onwards in the Beagle Channel and in the NWC basic subsistence strategies consolidated into adjustments to local littoral resources with some local variations. In the north of the NWC the sequence is very slightly different; although the old period is very little known, the few data there are seem to indicate that the first Holocene occupation (after 10,000 BP) was already oriented towards the exploitation of littoral resources (Ackerman et al., 1989), but towards about 4500 years ago an expansion started which, 1000 years later, became an intensive exploitation of aquatic resources with emphasis on fishing, and about 1000 years ago ended up with a proliferation of fortifications (Moss and Erlandson, 1992).

Nevertheless, despite the general stability in the non-biological conditions and an identifiable continuity of occupation in some sites and in the qualitative nature of the exploited resources, there was no simple, fixed and stable adaptation to the environment from the mid-Holocene in either region.

There are obvious changes and hiatuses in the archaeological record that demonstrate that there were crises and readjustments, some of which affected a whole region. Some, but not all, times these were related to sudden changes in nature, or were due to volcanic activity or tsunami (see Fryxell and Daugherty, 1963; Borden, 1975; Darienzo and Peterson, 1990; Atwater et al., 1995; Ocampo and Rivas, 2000; Bacon and Lanphere, 2006).

In all, the record shows that there were attempts to maintain stability within a dynamic equilibrium (Butler and Campbell, 2004), but that it was not always possible to achieve this successfully. Apart from these potential natural triggers in the crises in key conditions and an identifiability of occupation in some sites and in the qualitative nature of the exploited resources, there was no simple, fixed and stable adaptation to the environment from the mid-Holocene in either region.

In the NWC there were also stratigraphic breaks in most of the sites (Mitchell, 1971; Matson, 1976; Cybulski, 2001). But a recurrent marked break occurred about 3500 BP in both the coast and the inland plateau. From this time onwards, behaviour in the two regions (north and south) diverged increasingly quickly. The chronology is out of step with respect to Tierra del Fuego to about the same extent as the difference in time for the establishment of mussel exploitation (about 6500 BP in the south and 5500 BP in the north).

In Tierra del Fuego after 3300 BP the basic features of the tools and the archaeologically documented strategies remained unchanged until the arrival of Europeans. From the first moment of coastal exploitation right through the following period, the tool set remained mainly the same; the only changes were its simplification, the disappearance of decoration on bone artefacts, and the incorporation (perhaps around 2600 BP but certainly before 1400 BP) of bows and arrows (Mameli et al., 2003). Even taking into account a possible demographic increase that happened in one part of Tierra del Fuego (Rivas and Ocampo, 2006), people used a great variety of particular strategies to adjust to the slight geographic and temporal environmental variations. A successful social control of social reproduction together with flexibility and a high supply of marine resources which flowed in from breeding grounds that were located outside the normal reach of groups, maintained the balance between resources and population until the arrival of Europeans (Vila and Ruiz, 2001; Gassiot and Estévez, 2006).

In contrast in the NWC the dynamic of change was a spiral (Estévez and Vila, 2010; Grier, 2010). Around 3500 BP there was an important change in emphasis in gathering strategies: they changed from collecting mussels (which occur in concentrated patches and could be collected easily) to collecting molluscs from sandy bottoms (which are more dispersed and often must be gathered one by one). This change is documented in many places: the north of British Columbia (Mitchell and Donald, 1988), the Gulf of Georgia (Mitchell, 1971; Matson, 1976, 2008; Coupland, 1991; Stein, 2000) and in the south of British Columbia (Butler and O’Connor, 2004). There were also changes much further south towards the coast of Santa Barbara in California (Erlandson and Moss, 1999). This has been attributed to factors such as the transformation of coasts and their stabilization and the advance of deltas, or to cultural factors of over-exploitation (Croes and Hackenberger, 1988; Wessen, 1988; Cannon, 1991).

Around the Gulf of Georgia this change was accompanied by an emphasis on fishing for large fish, and this provides the first evidence of the preservation of salmon (Butler, 1993). Almost all authors (Borden, 1970; Matson and Coupland, 1995; Matson, 2010) agree that, only 1000 or 1500 years after the change in the most abundant mollusc species, from around 2500 BP (in the Marpole period), the main elements of the distinctive NWC model are already present:

Intensive exploitation and storage of salmon and other fish species such as herring and candlefish, large/long houses, social complexity, which is related to the production of objects of great added subjective value including, for example, stone sculptures. However, not everything was changing. There was another intriguing break between 1700 BP and 1500 BP and more or less at the same time there is evidence of a war-oriented settlement pattern, defensive structures and obvious signs of conflict such as weapons of war (Angelbeck, 2009). Stone sculpture disappeared, and there was a substantive change in burial practice—from about 1300 AD the practice of burial in shell middens ceased in the coastal zone (Cybulski et al., 1992).

4. Towards an explanatory theory

The different trajectories of the histories in the NWC and Tierra del Fuego are explained from the perspective of the contradiction...
between production and reproduction (Estévez et al., 1998; Vila and Estévez, 2010a) and a difference in the management of reproduction through history in both extremes of the Pacific Rim. This difference in the management of reproduction is what marks the different trajectories. The management of reproduction is always related to the production of subsistence, but not directly derived from or caused by it, as can be concluded from the striking similarity at the starting point in both areas.

The crisis that occurred around 4000 BP in Tierra del Fuego did not get solved in the same way as the crisis about 500 years later in NWC. There were several options for intensifying the exploitation of different resources from among the large number of possible resources that were already known. Developing fishing to a greater extent was a good solution in both areas. The people had the experience and the necessary techniques on one hand and, on the other hand, fish stocks had the advantage of being difficult to over-exploit with existing technology. The traditional systems were not effective enough to deplete the stocks, and therefore people could overcome the problems of decreasing yields without recognising an immediate limit.

However, in Tierra del Fuego, fishing was probably a task performed only by women. Its intensification would require redirecting the collective efforts towards the exploitation of this kind of resources. This would demand not only an increase in work effort of women, but also would require men to participate in this ‘women’s’ activity and increase their work investment in the related tasks: improving the canoes, collective net fishing, the construction of fish traps on the coast. On the other hand the main breeding grounds of sea lions were far from easy access with the available seafaring technology and therefore the substitution of a relatively stable supply was assured. This means that continuity was assured by adjusting to the minimal daily life requirements that could be supplied sustainably by mussels.

It is assumed for this theory that the gender relationships and the division of labour and social inequality in the subjective values of labour is more conservative than other social (and political) relationships and that the division of tasks observed ethnographically was acquired long time before European contact. Of course this theory must be verified like others by archaeological research. This sets a possible agenda and new objectives for engendered research (Estévez et al., 1998; Barcelo et al., 2006; Vila and Estévez, 2010a).

In the NWC implementing a massive fish extraction system was, in principle, the least-cost solution because it did not need a great investment in new technology (fish traps were already present probably long before 3000 BP) nor did it require a spectacular increase in male work. Once the preservation techniques for fish (drying, smoking, oil extraction) were implemented, the only problem was that it would require a notable increase in the amount of female labour in processing, and preparing and maintaining the infrastructure (hearth, drying facilities, etc.). This would create a demographic trap, which could spiral out of control: more women were needed to increase production, and that would generate more reproduction and thus more demand. In these circumstances there would be a spiralling geometric increase in demand. It is probable that this system was freed of the central contradiction between production and reproduction: the more (female) labour invested in processing the fish captures, the more product was obtained because a large amount of biomass could potentially be extracted without threatening the continuity of the reproduction of the main resource. Thus the society would be transformed into an expanding system (as an agricultural system does) and would end up taking over the neighbouring societies. Setting free the power of reproduction is the dominant factor that underlies all other causes that determined or triggered all the developments in the NWC. Despite the abundance of resources exploitable with the available technology, these societies were subject to socio-economic stress.

The great potential of production (and storage) was conditioned to the availability of enough (women) labour force. This put pressure on reproduction and as a side effect on social organization that invested huge efforts into managing, controlling and capturing the labour force—ultimately including slaves (Vila and Estévez, 2010b).

Clearly the strategy followed for management of reproduction did not produce the same effect in the NWC as it did in Tierra del Fuego despite having some starting conditions, which could have been rather similar in terms of time costs and the types of resources initially exploited. Those differences are reflected in the production of PEDS.

5. And what about rock art? Returning to address the question

There was a long tradition of prehistoric PEDS on the rocks and rock shelters both of the North West and in the most southern West. The two regions share the general problem of the lack of dating but there are different styles among the paintings and among the engravings that have been used to provide a chronological sequence.

Many authors think that the first cave paintings appeared in the Patagonian plateau, east of the Andes, around 9000 BP (Aschero, 2007). They think that the majority of the figurative cave paintings started at this date and continue until 4000 BP. These are realistic, dynamic and narrative representations of hunting scenes accompanied by hand stencils. This earliest Patagonian art is associated with guanaco hunters and their strategies of managing both social reproduction and their limited resources (Fig. 3).

The second phase (from around 4500 BP) has an abundance of hand stencils of women and children and representations of guanaco that are less naturalistic and are shown in static groups.

The final phase is marked by an emphasis on abstraction and schematization, by linear anthropomorphs and by a majority of geometric shapes such as zigzags, stepped triangles, concentric circles, suns and spirals. This final phase is distributed in the valleys that cross the Andes towards the west (Aschero, 2007; Gradin, 1999; Podesta et al., 2005). This last type of motifs and style is what is found in the sites of the northern part of the Strait of Magellan (Bate, 1970, 1971; Massone, 1982, 1985). Various assessments and dating of the context suggest a chronology in the order of 2000 BP (Gallardo, 2009) in this area. In the north, in the valleys...
of the Andes, images of horses and riders suggest the tradition survived until European contact.

This art has generally been associated with terrestrial hunter-gatherers, but some art has recently been found in a cave on the island of Madre de Dios (Centre Terre, 2006), which can only be reached by boat. These are schematic paintings very similar to those in the sites of the Magellan region attributed to the final phase. It would seem, then, that the current absence of cave paintings and engravings in the coast south of the Strait of Magellan and in other islands in Tierra del Fuego could be no more than a question of luck in surveys or of bad preservation, rather than a consequence of activities exclusively performed by foot hunters.

The oldest rock art of the NWC is also found in the interior, on the Columbia Plateau and is older then 6000 BP. A naturalistic style, basically representing quadrupeds, seems to have begun in the inland Plateau and from there extended towards the coast. As for the hinterland of the NWC, there is at least one pictogram dated in the order of 2000 BP (Lundy, 1976; Keyser, 1992) in the Okanagan valley.

At more recent dates there were more and different styles of rock art in the NWC: on the coast there were conventionalized styles among which human and animal figures were very lineal and curvilinear. Some figures clearly resemble the sculptures of the Middle Period (from 6500 BP to 500 BP), and some clearly refer to the paintings and sculpture of wood or argillite of the ethnographic period. There are also representations in abstract geometric styles, one curvilinear and the other using straight lines which is thought to have originated in the inland and moved to the coast (Lundy, 1976). Finally, as in the far south, there are some engravings and depictions of European horses and riders, and boats.

So there are some very general trends in common between the two geographic extremes: from more or less realistic or conventionalized representations there was a move to more abstract images. However, the important point is not to discover the specific meaning, but the historical and social processes that led to people producing or ceasing to produce this behaviour: Why did they abandon the decoration of bone objects? Why did they stop producing stone sculptures in the NWC? Why was there no painting on rocks when Europeans arrived in the extreme south? Unfortunately, to answer such questions much more research needs to be done from survey to numerical age determination to correlate with the historic sequence.

6. Discussion: recurrences in human behaviour

It is important to analyze the circumstances in which a society made use of PEDS to respond to a social necessity that went beyond the needs of the individual. What common interest did members of societies have that they used the tools they knew (burins, pigments, fats, etc.) to make things that were completely new and different (PEDS)? When did they develop this? Their use could have been to provide support or as a mnemonic or to fix changes in their social organization. The different contexts could enable distinguishing between these different uses. And the abandonment of the production of a particular type of PEDS could be an indication of the bedding in of the function that they had had for this new tool.

Some significant repetitive patterns can be identified. The fact that societies in a similar stage of their development use similar behavioural products that are socially necessary, would reemphasize that the need was structural and not contingent or circumstantial. It is probable that throughout the evolution of societies changes can be identified in the emphasis on investment in social reproduction through the production of PEDS.

In European prehistory, for example, where the most detailed sequence is known, perhaps these changes in emphasis can be seen. At the beginning there was an attempt to enhance self knowledge and self awareness (personal ornaments are the first items associated with social reproduction). After that, there was an emphasis on the identification of women and reproduction, which goes hand in hand with aggression and power (Hahn, 1986). This emphasis translates also into the representation of carnivores and large mammals, just at the time when these large mammals began to become rare and disappear (Estévez, 2004).

In hunter-gatherer societies with appropriate technological development a higher investment in labour jeopardizes the maintenance of production. The maintenance of the system (the sustainability of the society) requires no over-exploitation (over-kill) or over-growth of population and that requires the maintenance of stable relationships between men and women to make it possible.

In sum, it would not be surprising to find an ideological reinforcement (through the use of PEDS) of the control of reproduction (that means of the bodies of women) and a brake on over-exploitation, especially of animals with a slower reproductive cycle. As some authors have repeatedly pointed out (Altuna and Barandiarán, 1969; Davidson, 1986, 1997, 2006) there is no direct relationship between the animals depicted and those on the daily menu towards the end of the Pleistocene in Europe: the ensemble of the depicted animal species usually represents a sample of animal species of larger body size than the ensemble of actually hunted animals (Estévez, 1981).

In the Mesolithic, at the beginning of the Holocene, when the system had begun to collapse, the animals that were on the main menu also began to be those most represented in the imagery, and an emphasis began to be put on scenes of everyday life involving different work done by women and men (the division of labour by sex) (Escořiza, 2002). Finally, abstract figures seem to go with the establishment of economic and political territories, and with agriculture.

This paper has described a series of common traits in the development at the two extremes of the Pacific coast of America until a certain moment in time. Similarly, a parallel sequence of the more general traits between European and American rock art can be glimpsed: from marking and depicting bodies and body parts (especially hands), selected animals larger than those actually hunted, to scenes and geometrics.

The whole sequences are probably not directly dependent on the strategies of getting food (hunting and gathering, or agriculture), but on the overall social evolution. A final consideration should take into account the instruments (the means) that contribute to the articulation of the production and reproduction of the society. That correlation with the historic sequence.
is to say, all those means (institutions, ceremonies or rituals and all related ideological features) that function to maintain traditional social relations, among which would be those that marked control of reproduction and discrimination against women (Fig. 4). This paper is only a first attempt at synthesis of those regularities that might be present in the record, but it also shows that the record is neither appropriate nor sufficient (especially as the numerical chronology is not established and because there are biases caused by taphonomy and the vagaries of research).

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References


