



## Review

# Metrical variability in ethnographic arrows from southernmost Patagonia: Comparing collections from Tierra del Fuego at European museums <sup>☆</sup>

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## ABSTRACT

Tierra del Fuego indigenous peoples (southernmost Argentinean and Chilean Patagonia) have been frequently accounted for since the 16th century; their weapons, however, were hardly described. Thus, this article aims to evaluate arrow technology variability in late 19th–early 20th century hunter-gatherer's ethnographic samples from Tierra del Fuego. This proposal rests on previous archaeological studies which suggested a pattern of north–south morphometric variation in projectile points for the last 3000 years, which follows a distribution that resembles the indigenous territories at historical times. However, a more limited chronological scale is needed to identify time-specific variations. 68 ethnographic arrows were thus surveyed at the Weltmuseum Wien (Austria), the Ethnologisches Museum (Germany) and the Musée du quai Branly (France) to test the existence of differences at the time. By means of multivariate statistics, the metrical comparison of the whole arrows, as well as the individual points and shafts, from land- and sea-resources specialized hunter-gatherers (Selk'nam/Yámana and Alacaluf, respectively) have revealed size differences. While Selk'nam arrows present longer and wider shafts, with smaller fletching and points, Alacaluf and Yámana arrows show the opposite trend. Results show that morphometric variations previously detected on archaeological projectile points are also present in the time-specific ethnographic arrows analyzed here, at least regarding size.

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## 1. Introduction

American indigenous artifacts currently present in different ethnographic collections worldwide can be a highly valuable source of information to study both spatial and chronological cultural variability.

Regarding ethnographic weapons in particular, museum collections raise a peculiar interest for archaeologists as they allow studying technical and functional traits of the complete weapon system, a feature hardly found in excavated materials due to the poor preservation of the organic parts, such as wooden bows and arrow shafts. Hence, the study of indigenous weapons and the way they were used poses a complex situation, since the only part recovered from the archaeological record tends to be just the point, typically of a lithic nature. Thus, the reconstruction of the complete weapon usually rests on the metrical measurement of the points.

Archaeology weapon variability has been mainly studied from four different perspectives: (1) by means of experimental and replication studies in simulated use situations, the most usual methodology (Flenniken and Raymond, 1986; Howard, 1974; Hunzicker, 2008; Martínez and Funes, 2011; Odell, 1988; Odell and Cowan, 1986; Peets, 1960; Raymond, 1986; Shea et al., 2001); (2) by ethnoarchaeological and ethnographic observations – either directly or using previous reports to build models (Bartram, 1997; Elkin, 1948; Ellis, 1997; Griffin, 1997; Hitchcock and Bleed, 1997); (3) by studying design variables based on mechanical physics and optimal engineering (Cotterell and Kamminga, 1990; Hughes, 1994; Knetch, 1997; Ratto, 1994, 2003); and (4) by reviewing museum collections of ethnographic weapons of known functions (Shott, 1997; Thomas, 1978, on projectile points; Bergman and McEwen, 1997; Ratto, 1988, 2003, on bows; Bushnell, 1949, on atlatls, among others). The latter view guides the present discussion, which is framed in a long-term project focused on exploring size and shape variability among different kinds of weapons.

The several works based on the study of ethnographic weapon collections in particular have contributed important information such as:

1. Detailed descriptions of several ancient weapon systems, considering manufacture techniques, functional traits, hafting types and raw materials (e.g. Borrero and Franco, 2001; Bushnell, 1949; Franco et al., 2005; Piqué, 2006; Ratto, 1988, 2003; Scheinsohn, 2010).
2. Metrical models to differentiate arrow-points from spearheads, an useful proposal to classify archaeological materials of unknown function (e.g. Thomas, 1978; Shott, 1997; Ratto, 1991a, 1991b, 1992, 1994, 2003).
3. Identification of organic resources used in the manufacture of bows and shafts, emphasizing the mechanical and physical properties of the species chosen (e.g. Caruso et al., 2011; Ratto, 1988, 2003; Ratto and Marconetto, 2011).
4. Studies of changes in spear crafting and harpoon designs, among other tools, resulting from the exchange with colonialists (e.g. Borrero and Borella, 2010; Crowne and Torrence, 1993; Harrison, 2006; Prieto and Cárdenas, 2002, 2006; Scheinsohn, 1990–1992; Torrence, 1993, 2000, 2002), among many other topics.

In the case of Tierra del Fuego, a large number of ethnographic observations and descriptions by explorers, scientists, priests and

ethnologists since the 16th century may be cited (Beauvoir, 2005 [1915]; Bove, 2005 [1883]; Bougainville, 1921 [1771–1772]; Bridges, 1952; Chapman, 1986 [1982]; Chapman, 2002 [1990]; Chapman, 2008 [2002]; Cook, 1921–1922 [1772–1775]; Darwin, 1945 [1839]; De Agostini, 2005 [1956]; Fitz Roy, 2009 [1839]; Gallardo, 1910; Gusinde, 1982 [1931]; Hyades and Deniker, 1891; Lista, 1998 [1887]; Lothrop, 1928; Martial, 2005 [1888]; Nordenskjöld, 2004 [1904]; Sarmiento de Gamboa, 1768; Skottsberg, 2004 [1911], among others. For a review of European expeditions to Tierra del Fuego, see Hyades and Deniker, 1891 and Salerno and Tagliacozzo, 2006). Despite their interest in indigenous weapons, only a few reports describe them in detail (Fitz Roy, 2009 [1839]; Gallardo, 1910; Gusinde, 1982 [1931]; Hyades and Deniker, 1891; Lothrop, 1928. See Ratto (2003) for an analysis of the description of indigenous weapons in these original sources). Furthermore, as European expansionist and colonial policies encouraged ethnographic collection in the new territories, a number of materials are currently curated in European museums, providing the framework for further studies like the one presented here.

Tierra del Fuego is particularly interesting in this issue due to the many different subsistence and settlement strategies developed in a relatively small territory, which represent distinctive adaptation strategies to the environment, also implying variations in technologies and home-ranges. While to the northern and northeastern area of the island the inhabitants (i.e. Selk'nam or Ona) were hunter-gatherers specialized in land resources, mainly guanaco meat (*Lama guanicoe*), their southern counterparts, on the Beagle Channel and southernmost islands (known as Yámana or Yahgan) as well as the ones inhabiting the western regions (Alacaluf or Kaweskar) developed a sea-related strategy, including mollusks, fish, pinnipeds, and whales (Fig. 1). That is why traditional literature usually identifies them as “foot Indians” and “canoe Indians” (Bird, 1946; Chapman, 1986 [1982]; Chapman and Hester, 1973; Fitz Roy, 2009 [1839]; Lothrop, 1928, among others).

The nature of a fourth group who occupied the southeastern area of the island (Mitre Peninsula), known as Haush (also Aush) or Mannekenk, is still unclear, though. Borrero (2001a) points out that they may have been a relatively recent group segregated from a larger organization due to cultural transformations in historical times. At the time of Gusinde's fieldwork (1918–1924) on the island, they were disappearing (Gusinde, 1982 [1931]), although still Chapman (1986 [1982]) located 11 Haush territories previous to 1880, when the modern colonization of the island began. Nowadays, from the pioneering archaeological works by Chapman and Hester (1973), an extensive research project is in progress to understand the history and way of life of this group (Zangrando et al., 2011).

The present study introduces an analysis of the metrical and raw material data of a sample of 68 Fuegian arrows from the late 19th–early 20th century analyzed at the Weltmuseum Wien (Vienna, Austria), the Ethnologisches Museum (Berlin, Germany) and the Musée du quai Branly (Paris, France). The focus is to assess the existence of variability in ethnographic arrow technologies throughout Tierra del Fuego. The interest in evaluating the possibility of such differences among the arrows manufactured by the several ethnographic groups (who are clustered here by economic strategy, see below) rests on the results from previous spatial archaeological analyses. Such studies yielded a long-term pattern of spatially constrained morphometric variation in projectile points following a north–south distribution which seems to

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