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# Using regional chemical comparisons of European copper to examine its trade to and among Indigenous groups in late 16th and early 17th century Canada: A case study from Nova Scotia and Ontario

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ABSTRACT

Basque kettles and distinctive fragments from them have been found in archeological sites dating from the end of the 16th and the beginning of the 17th centuries C.E. all the way from the Canadian Maritimes to the lower Great Lakes. Both kettles and their fragments, as well as tools and ornaments made from them, were extensively traded among the Aboriginal communities, following trade routes established long before the arrival of Europeans. Little is known, however, about how these European copper objects were actually exchanged and distributed among the different Aboriginal communities. In this paper we argue that the establishment of metal chemical groups using instrumental neutron activation analysis (INAA) data can allow us to define groups of artifacts that had been produced using similar raw materials and manufacturing techniques and, thus, provide a refined way to trace similar objects through space and time. The spatial and temporal patterning of group chemistries could then illuminate the nature of the exchange and trade of European copper items, by allowing archeologists to examine which communities were linked through which metal chemistries. In the present study we determine whether or not the same metal chemistries are shared among 59 Basque copper kettle samples found in three burial sites in Nova Scotia and 204 European copper artifacts found at the contemporaneous Ball site, a late 16th century Wendat village. We then explore the implications of the strong chemical connections among these materials for trade among Europeans and the various coastal Aboriginal communities, as well as that between the Wendat of the Ball site and their allies to the east.



## 1. Introduction

Smelted copper metals appeared in northeastern North America for the first time in the late 16th century of the current era,[1] brought by European fishermen, whalers, and, after 1580, traders. Prized among the contents of the European ship cargoes were kettles, made of copper and brass (Bradley, 1987a: 130–131; Ehrhardt, 2005: 72; Fitzgerald et al., 1993; Martin, 1975; Turgeon, 1990, 1997, 1998, 2001; Trigger, 1987: 360; Van Dongen, 1996). Copper kettles, specifically, were technologically elaborate, made of 'red copper,[2] often with robust iron banding, patterned battery work, and a folded lip or shelf that made them visually distinctive (Fitzgerald

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[1] All dates mentioned in this paper are of the current era, unless otherwise indicated in the text.

[2] There is considerable confusion in the literature when it comes to how archeologists refer to the raw materials from which European kettles were made. In the past, 'copper' was often used archeologically to describe metals that were not gray or white in color (i.e., they were not iron, tin or zinc), so the word encompassed both copper and brass metals. By the mid-1990s, Hancock et al. (1994) had defined four different name groups for copper-based metal samples found at archeological sites in northeastern North America: 'native copper', 'European copper', 'brassy copper' and 'brass'. Yet again, by the late 1990s, Hancock et al. (1999) were using the names 'red brass' to replace 'brassy copper' (higher-tin [Sn], lower zinc [Zn]) and 'yellow brass' to replace 'brass' (low-Sn, higher Zn). In informal communications, it is still common to refer to 'red copper' and 'yellow copper,' with an understanding that 'red copper' means European copper and 'yellow copper' means brass. Notarial records in Bordeaux also mention kettles made of 'red copper' when referring to what archeologically we call 'Basque kettles'. In the present paper we focus only on kettles made of *European copper* (=Cu), rather than on *brass* (*red brass* = Zn < 20% ± 2% and Sn > 1–2%, or *yellow brass* = Zn > 20% ± 2% and Sn < 1%.

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et al., 1993: 50–54). They are known as 'Basque kettles' and were the first to appear on the Atlantic coast of what is modern Canada, between about 1580 and 1600. Similar kettles can be found still in homes and museums in the Landes region and the Basque Country in Europe (Turgeon, 1997: 7). In North America, their spatial and chronological distribution is well understood (Fitzgerald and Ramsden, 1988; Fitzgerald et al., 1993, 1995). Europeans, presumably Basques, traded them directly with Aboriginal groups living along the Atlantic coast of modern day Canada, around the Gulf of St. Lawrence, and along the St. Lawrence River. From there, kettles reached Aboriginal communities westward in southern Ontario, following distribution networks that had been established long before the arrival of Europeans, based on long-term sociopolitical and economic alliances (Fitzgerald et al., 1993:49; Hamell, 1987: 73; Trigger, 1985, 1987:213–214; Turgeon, 1997; Van Dongen, 1996).

Intact copper kettles have been recovered from burial sites in Nova Scotia, New Brunswick, and Ontario. Often, however, kettles would be broken down into individual fragments without having ever been used as kettles. Both whole kettles and their fragments would be traded extensively among Aboriginal communities and used for the production of both utilitarian and ornamental items (Fitzgerald et al., 1993: 55; Bradley, 1987a: 130; Turgeon, 1997: 10; Moreau and Langevin, 1992: 42). As a result of this process, a large percentage of metal objects recovered from late 16th century, northeastern North American archeological sites are actually scrap pieces with no stylistically identifying characteristics. For example, at the Ball site in southern Ontario, only 20 out of an estimated 400–500 copper samples were identified stylistically as Basque (Fitzgerald et al., 1993: 52, Table 4). Although it is probable that all of the copper artifacts belonged to Basque kettles originally, based on the archeologically established chronological and spatial distribution of the kettles (Fitzgerald et al., 1993: 45), this assumption has not yet been confirmed archeometrically.

Basque kettles and their disarticulated fragments spread rapidly and widely from the Atlantic coast into Ontario. After about 1600 only 'heirloom' Basque kettles are found in Ontario cemeteries, while very few, small fragments have been recovered from settlement debris. By the end of the second quarter of the 17th century Basque kettles and their fragments had all but disappeared from the Northeast. (Fitzgerald et al., 1993: 49).

Although our current understanding of the timing, distribution, and use of Basque kettles and their fragments appears to be extensive, a lot remains unclear about the production of the kettles themselves, the people who were bringing them to the Northeast coast, and the particular ways in which these kettles and their fragments were traded among the various Aboriginal communities.

A number of scholars have described the basic manufacturing steps in the production of Basque kettles (e.g. Bradley, 1987a: 197–199; Fitzgerald et al., 1993: 50–54, Van Dongen, 1996), yet little detail is available about how many workshops were making them, where these workshops were located and from where they procured their raw materials, what specific techniques and operational sequences each workshop was employing, and how standardized these techniques were within individual workshops and across entire regions (Westermann, 1981). A number of large copper mines were active in Central Europe and Sweden in the 16th century (Fitzgerald et al., 1993; Turgeon, 1997; Ehrhardt, 2005: 73, Van Dongen, 1996; Westermann, 1981), and notarial records show that Basque merchants were ordering both central European and Swedish copper (Fitzgerald et al., 1993: 48; Turgeon, 1990: 85). Similarly, it seems that workshops outside the Basque territories were also producing and helping distribute Basque style kettles. Turgeon (1997:6) for example, mentions that "merchants in Bordeaux often had to call on coppersmiths in outlying areas, in the Garonne and even the Dordogne, during the 1580s" unable to fill the great demands on the North American trade (see also Turgeon, 1998: 593–594 for numbers of Basque vessels outfitted in Bordeaux). Furthermore, archeometric evidence (e.g. Whitehead et al., 1998: 290) indicates that different parts of kettles occasionally have different copper chemistries, a pattern that may suggest kettles were sometimes circulating only partly finished. In fact, archival evidence from the mid-17th century shows that kettles were sometimes sold as basins, to be finished by local copper-smiths who would add wrought iron, copper, or brass rims, lugs, and/or handles (Van Dongen, 1996: 125).

It is highly unlikely that the production of Basque kettles, and thus their chemical composition, would have been homogeneous. By focusing only on samples recovered in North America we cannot disentangle the intricacies of Basque kettle production in Europe. As long as the European side of the kettle story is not understood, it should be clear that the term 'Basque kettle' refers to a kettle style (both morphological and, as we establish in this paper, chemical). Archeologists encountering Basque kettles in North America should not assume they were made by or brought over by Basques, unless corroborating archeological evidence supports this interpretation.

By examining how many Basque kettle chemical groups were available in northeastern North America, we could get insights into the chemical diversity of copper that was produced for North America, which could be an indication of the diversity of production techniques in Europe. Furthermore, by examining the spatial and temporal distribution of these chemical groups, we could also explore how exactly these kettles and their parts were then distributed among different Aboriginal groups and communities.

Complicating the story of copper kettles is the fact that we do not know whether there were clear and consistent economic links between particular workshops and ports where ships bound for North America were outfitted. For example, it is not clear whether at the port of Bordeaux one could only find kettles made in the local workshops and, thus, whether chemically we could distinguish a ship outfitted in Bordeaux from one outfitted in St. Jean de Luz, La Rochelle, or St. Malo. Similarly, we do not know what the links were between particular ships and ports. Would a ship use the same port for every trip? It is not clear what factors determined which ports outfitted which ships. Between 1580 and 1600, Dutch, French (Breton, Malouin, and Norman [Turgeon, 1998: 593–598]), and Basque ships (mostly from the French province of Lapurdi, but possibly also from the Spanish provinces of Gipúzkoa and Biskaya during the first half of the 1580s), as well as a few English ones, were all sailing to the Gulf of St. Lawrence (Fitzgerald et al., 1993: 45, Turgeon, 1998: 609, Loewen and Delmas, 2012: 234–240). Would all the ships use the same ports interchangeably, or would broader geo-political factors have influenced which ports a Malouin versus a Biskayan ship could use, for example? Chemical analyses of kettles from the European ports and known workshops might help address these questions. Answers to these questions could then help us understand with greater nuance who exactly – besides the French Basques –

**Table 1**
Summary of samples used in the present study.

| Sample category | Ball | Hopps (Pictou) | Northport[a] | Avonport |
|---|---|---|---|---|
| Rings | 6 | – | – | – |
| Beads | 6 | – | – | – |
| Ornaments | 2 | – | 1 | – |
| Rods | 1 | – | – | – |
| Projectile points | 3 | – | – | – |
| Discs | 2 | – | – | – |
| Hooks | 1 | – | – | – |
| Sheets/fragments | 183 | – | – | – |
| Kettle parts | – | 48[b] | 1 | 2 |
| Whole Kettles | – | 1 | 2 | – |
| Armlet fragments | – | – | 4 | – |
| Total | 204 | | 8 | 2 |

[a] The Northport samples used in this study include all the samples published in Whitehead et al. (1998) as well as one sample that was analyzed along material from the Ball site and published in Michelaki et al. (2013).

[b] These samples do not represent individual kettle fragments. Multiple samples were taken from various parts of the same large kettle fragments.