Copper on the Northwest Coast: A Material Investigation of Cultural Entanglements During the Fur Trade and Colonial Periods

By:

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Abstract

Here the processes and implications of cultural interactions occurring on the Northwest Coast of North America between the 18th and 20th centuries, ranging from brief entanglements to colonial settlement, are investigated. This is achieved by analysing assemblages of Indigenous artefacts created using copper throughout this period. These items were made and used across a period of upheaval and change punctuated by the arrival of European, Russian, and American interests, disease, the fur trade, and mounting colonial pressure. Copper is chosen as the vehicle to observe shifts in past choices as Indigenous oral histories, ethnographic records, and archaeological research show that copper was a culturally significant and powerful material within Indigenous ontologies. Its ownership could directly affect health, wealth, and social status. Through this time copper continued to be important to Indigenous lives, however the large amounts of manufactured trade metal introduced in the last 18th century changed the landscape of Indigenous copper metal procurement, value, and use forever.

To investigate changes in Indigenous material choice, technological strategies, and artefact design, copper objects are analysed using a multifaceted biographical approach. A corpus of material, including daggers, bracelets, masks, beads, and the shield-shaped 'Coppers' are subject to a close physical inspection, documenting individual syntax of creation and use, or *chaîne opératoire*. Additionally, non-destructive chemical characterisation using X-ray fluorescence spectroscopy facilitates interpretation of the material origins. This is possible because Indigenous metallurgists did not smelt or melt metal, and prior to the introduction of manufactured metals Indigenous resources were largely limited to geological sources of native copper, material from shipwrecks, or Indigenous trade.

Here material culture is used to look beyond established histories, revealing nuanced decisions that have contributed to the formation of political power structures in place today. This research suggests that the Northwest Coast is connected by shared traditions and values spanning generations. Furthermore, a detectable patchwork of discrete personal interests and choices suggests that people were making decisions geared towards personal success. This thesis works to both acknowledge our colonised histories and argue for nuanced perspectives that contribute to the decolonisation of our past, present, and future.

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Chapter 1 Copper on the Northwest Coast: A Material Investigation of Cultural Entanglements During the Fur Trade and Colonial Period

1.1 An Introduction to the Research

This thesis investigates the processes and impacts of cultural entanglement and colonialism that occurred between the 18th and 20th centuries on the Northwest Coast of North America. This is done from an ethnoarchaeological standpoint, where 323 Indigenous artefacts created and used throughout the study period are analysed with the goal of allowing the material culture to speak for itself by privileging the objects over already established viewpoints that are potentially biased (Iles & Childs 2014; David & Kramer 2001). In order to allow some comparison between artefacts analysed in this study this research focuses specifically on the changing Indigenous use of a single material, specifically copper, which was valued and utilised by Indigenous people prior to and throughout the colonial period (Boas 1916, 305; de Laguna & McClellan 1981, 645; de Laguna 1972, 899-900; Suttles 1990b). The reasoning behind focusing on copper in particular is that this metal was and is considered important, powerful, valuable, able to communicate individual status (Boas & Hunt 1906, 70-82; McIlwraith 1948, 317; Hoover 2002; McMillan 1999; Goldman 1975, 82; Jopling 1989; King 1999), and has been used in the creation of a wide range of objects that are involved in many aspects of Indigenous life. For example, copper is used to create arrow heads, daggers and fish hooks, but is also used as rivets and wire bindings in the construction of composite objects such as horn spoons and carved wooden feast fishes. The metal is found adorning ceremonial wooden dance masks and labrets, is used to construct bracelets, and to create conspicuous objects designed to display status and wealth such as the 'Copper' (Figure 1.2; Figure 1.3; Figure 1.4; Jopling 1989; Wayman *et al.* 1992). Thus, a detailed study of the changing ways in which Indigenous communities on the Northwest Coast engaged with copper can reveal details about how people chose to navigate various nuanced colonial situations that were anything but binary oppositions of dominance and oppression (Oliver 2013; Martindale 2009, 77; Lutz 2008, 64). New perspectives on these past relations can inform decisions regarding how we interpret our past and the application of these interpretations in future decisions (see Todd 2016; Classen & Howes 2006, 200-216; Couture 2014, 2238; Dawn 2008, 43). In this way this research, which is situated specifically within a material culture study, aims to explore a more decolonised perspective of cultural developments in the colonial era through materials analysis.

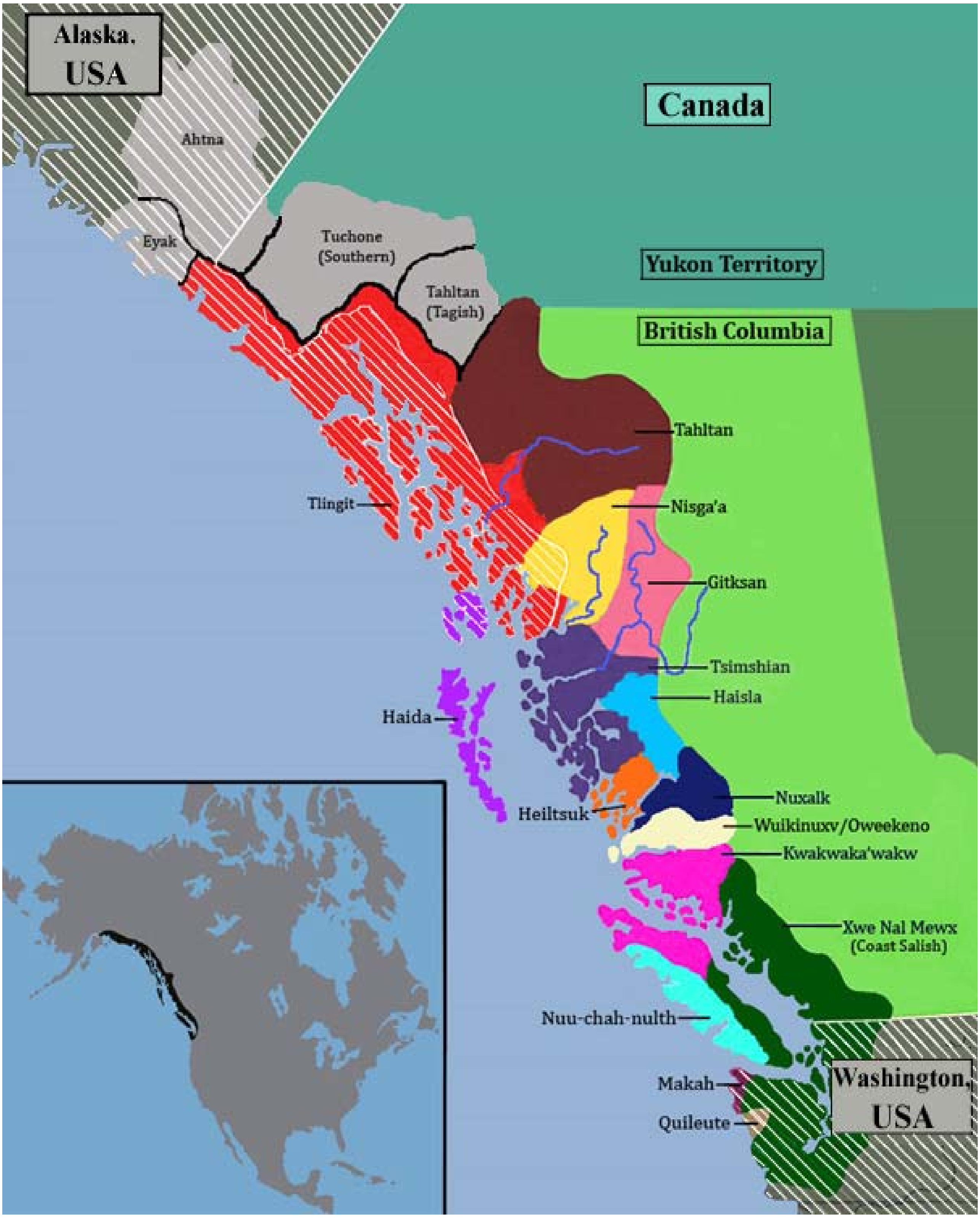


Figure 1.1. A map of the First Nations language families that comprise the Northwest Coast culture area, which stretches from the Tlingit of Yakutat Bay in Alaska, to the Xwe Nal Mewx (Coast Salish) residing North of the Columbia River on the border of Washington and Oregon state. Northern groups, shown in grey, who traded with Indigenous communities in the Northwest Coast region are included for context (Thompson & Doonan 2018).

1.2 The Northwest Coast Study Region

The Northwest Coast of North America as defined in this study stretches from Tlingit territory in south west Alaska to the Coast Salish residing in what is now Washington State. Each of the groups labelled in Figure 1.1 represents a language family, which are composed of groups of people speaking languages that have been shown to be genetically related using comparative linguistics techniques (Suttles 1990b, 30). These language groups share ethnic traits such as common descent, kinship and household patterns, origin stories, artistic styles, languages, and a traditional territory. People within these groups organised themselves into villages and camps that could operate as collaborative communities, and in some cases meetings and cooperative interactions took place between language groups (Boas 1921; Sapir & Swadesh 1955, 299-300; Suttles 1990b, 12-13). There is no one specific trait, or set of traits, that can be used to characterise all the culture groups of the Northwest Coast, nor are any of the traits used to define the region exclusive to this culture area. However, as Donald (2003), Kroeber (1939), Drucker (1955) and Matson & Coupland (1995) argue, there exists a collection of traits that typify the region and set it apart from its neighbours.

The extent of the Northwest Coast region is largely based on the work of Kroeber (1939) and Drucker (1955) and has changed very little since. However, defining a cultural region is a tricky and often frustrating business. As Kroeber noted, the most conspicuous and weakest part of outlining a cultural region is the border itself (1939, 5), as cultural regions shift and change over time. This means that any 'map' of the cultural groups residing on the Northwest Coast as they lived in the protohistoric and early colonial period will always only represent a snapshot of Indigenous peoples as they were understood to have organised themselves at a fixed period in time. The borders of this region should not be considered rigid; communities within the language families of the Northwest Coast interacted, traded, and sometimes intermarried with people residing outside their own cultural lines (Donald 2003; Matson & Coupland 1995). For example, at the point of contact, Tlingit motifs and cultural practices were being transmitted north and west into Eyak and other Athabaskan territories due to cultural intermingling, a process Donald describes as 'Tlingitizing' (2003, 301-319). The southern and eastern 'borders' of the region were also porous. Matson and Coupland define the southern boundaries of the region based on the Palmrose site, the furthest south known archaeological site deemed to fit under the Northwest Coast cultural umbrella (Matson & Coupland 1995, 228-242).

To the east, connections with culture groups considered outside of the region are found along large salmon-bearing rivers where the inland and coastal people shared in subsistence strategies (Suttles 1990b). Due to the porous nature of the region's border, some Indigenous copper artefacts created and used by culture groups residing adjacent to the Northwest Coast study area are included in this study.

The people of the Northwest Coast region focused heavily on marine and riverine subsistence activities that encompassed salmon fishing, marine mammal hunting, and harvesting shellfish and other marine invertebrates (Donald 2003, 290; 290-1; Mathews & Turner 2017). They were broad spectrum foragers, and also included hunting and gathering in their practices (de Laguna & McClellan 1981; Suttles 1990b). Ontologically, the world was alive in an animistic sense, and certain materials and objects were acknowledged as retaining a specific social status and power (King 1999; Blackman 1990, 248; Swanton 1905, 12; Boas 1916, 57). Woodworking technologies in the region were also highly developed, as attested in the creation of large wooden sheds or long houses (Mobley & Eldridge 1992), dugout canoes (Steward 1995, 48), clothing made from bark fibre (Stewart 1984, 123-5), and elaborately carved and painted objects used conspicuously in ceremonies and festivals (Steward 1995, 104-7). There was also an emphasis on property in both physical and non-corporeal forms, and the control of any type of wealth was considered a primary condition of social success and import (Ames 1995). As such there was a well-developed system of social stratification that included an elite class, commoners and in some cases slaves. However, despite this system, there was also no real inter-language group political organisation, and though some individual villages collaborated on specific goals among and between language families, there were no over-arching structures of government (Hajda 1984, 123-32; Suttles 1990b).

1.2.1 Copper on the Northwest Coast

The way that Northwest Coast peoples engaged with copper is one trait that has been used to define the region's extent. Throughout the region animistic ontologies meant that copper was considered alive and active in its social roles (Boas 1916, 57; Boas & Hunt 1906). Copper was also considered a valuable and powerful material in the region, involved with the supernatural world, and able to reward or punish those who attempt to wield it (Bird-David 1999; Cooper 2011; King 1999, Swanton 1905, 12). Access to both procurement sites and metallurgical knowledge was controlled, sometimes resulting in metal smiths living outside of communities in order to maintain this control (Kari & Fall

2003, 111; Reckord 1983, 49; Shinkwin 1979; McClellan 1975b). Additionally, ownership of the material was reserved for elites in the hierarchical social system (Boas 1975; Suttles 1991; Acheson 2003). This structure of value persisted throughout the study region, but is not known to have spread beyond in any meaningful way (de Laguna 1972; Acheson 2003; Lepofsky *et al.* 2000; Cooper 2011; Hunt 2015). For example, communities located to the south and west of the Pacific Northwest are not known to have extensively worked copper prior to the colonial period (Cooper *et al.* 2015a; Silliman 2005), and northern communities who created many copper tools did not share the same ontological perception of the metal's power and importance (de Laguna 1972; de Laguna & McClellan; Farnell *et al.* 2004).

Figure 1.2. Left: A Kwagu'l Kwakwaka'wakw Copper, Record 205 (Photo by author ©MOA); Right: Haida Copper, Record 66 (Photo by author ©MOV). Coppers could range in size from a few centimetres to approximately a metre in length and, while often decorated in singular ways, all Coppers roughly conform to the shield shaped design with the central T ridge as presented here.

It is important to note that Northwest Coast Indigenous engagement with copper was not homogenous, and discrete communities created different styles and types of objects that embodied a variety of meanings, values, and applications (Acheson 2003;

Blake 2004; Hunt 2015; de Laguna *et al.* 1964). For example, the iconic 'Coppers' of the Northwest Coast, shield-shaped objects used in ceremonial and festival contexts to display wealth, status, and social power (Figure 1.2; Chapter 2), were created and used by the Tlingit, Haida, Nisga'a, Tsimshian, Nuxalk, Haisla, Heiltsuk, Wuikinuxv, and Kwakwaka'wakw culture groups. Alternatively, while the Nuu-chah-nulth, Coast Salish, Makah, and Quileut did not create Coppers, objects such as necklaces and arm bands, copper rattles, and dance masks are found across the entire Northwest Coast, created among all ethno-linguistic families. These objects were made in a variety of ways and for a variety of purposes, though all carry the power and value of copper with them. (Ames 1994; de Laguna 1972; de Laguna *et al.* 1964; Donald 1997; Matson & Coupland 1995, 259; Harkin 1998, 1997; Figure 1.1). As such, this research endeavours to include the analysis of a broad spectrum of objects that reveal the multifaceted lives copper led in the region through the colonial period.

1.2.2 Copper Procurement Prior to European and Russian Contact

Prior to contact with European and Russian traders, native copper was collected from a range of discrete procurement sources spread across the Pacific Northwest (Acheson 2003, 223-4, 1998; Hunt 2015, 56-61). The metal was often found in nugget or cobble form, or as a spongy dendritic mass of a similar size (Cooper 2011; Cooper *et al.* 2016). Prior to physical contact, manufactured metals also found a way to the Pacific Northwest as salvage from shipwrecks (Keddie 1990; de Laguna *et al.* 1964; Callaghan 2003), and through a Eurasian connection across the Bering Strait that was bringing copper and iron into North America by 1000 AD (Cooper *et al*. 2016, 181).

A relatively large geological deposit of native copper is located in the traditional territories of the Eyak, Ahtna, Southern Tutchone, and Tanana First Nations residing to the north and west of the Northwest Coast region (Franklin *et al*. 1981; Cooper 2006; Cooper *et al.* 2008; Dall 1877; Holm 1982, 67; Figure 1.1). This material became available at approximately 500 AD following the retreat of ice from the gravelly riverbed drainages in the Wrangell St. Elias Mountain Range where the metal is commonly found (Calkins *et al.* 2001; Barclay *et al.* 2001; Dixon *et al.* 2005). However, it is not until 1200-1100 AD, in the late prehistoric period, that this copper is recorded moving south as trade goods and raw material (de Laguna *et al.* 1964; Morrison 1984, 195-6; Cooper 2012; Miller 1968; Gordon 1977, Workman 1978; Shinkwin 1979, Leblank 1983; Martindale 2001).

Known procurement sites across the Northwest coast are not as productive in terms of yield of metal when compared with those to the north of the region. However, these southern sites were utilised earlier, a factor that may be related to the relative ease of accessibility in ice-free areas. Regardless of the cause, copper personal adornments and burial items are found in archaeological contexts dating to notably earlier timeframes in the southern portion of the study area. For example, mortuary goods dating to 500-600 AD have been excavated from Coast Salish sites in the south (Burley & Knüsel 1989; Lepofsky *et al.* 2000, 407; Hunt 2015; Blake 2004). Additionally, wire that was potentially part of a pendant has been excavated from a Haida village and contextually dated to 1150-1400 AD (Acheson 2003, 223-4; Acheson 1998). This suggests that traditions of collecting and working copper initially began in discrete areas and times in prehistory on the Northwest Coast, and that it had become an incipient tradition across the region by the late prehistoric/early proto-historic period.

1.2.3 Indigenous Metallurgy

In the Northwest Coast region, and among its metal-using neighbours, there is no known Indigenous pyrometallurgical tradition prior to the colonial period (Wayman *et al.* 1992; Franklin *et al.* 1981; Acheson 2003). Though a range of metallurgical techniques, styles, and tool kits are documented in ethnographies, primary accounts, and oral traditions among Indigenous communities across the Pacific Northwest (see de Laguna 1972; McIlwraith 1948, 253; McClellan 1981, 662; Hearne 1958, 113; Rainey 1939; Deans 1885, 15-16; Holm 1982), all metallurgical work in the region includes the processes of hammering and annealing with no mention of melting, smelting or casting (Keddie 1990, 18; Acheson 2003, 213; Wayman *et al.* 1992, 2). This is confirmed macroscopically and microscopically in multiple discrete metallographic studies conducted on Northwest Coast materials (Tylecote 1992; Wayman *et al.* 1992; Wayman 1989a, 32; Whitthof & Eyman 1969; Acheson 2003, 223; Cooper 2007, 122-4; Cooper *et al.* 2008), and by the known physical characteristics of the native metal (Franklin *et al.* 1981, 26; Scott 1991). For example, consolidating small sheets of copper in a folding process gives the metal a laminar quality that is visible macroscopically (Figure 1.3). Furthermore, if the laminar metal is not heavily cracked and friable the use of an annealing process is assumed, as the metal will fracture apart if folded repeatedly using only cold hammering (Franklin *et al.* 1981, 26). This is a process that can be determined using microscopy to identify the presence of annealing twins visible in the grain structure

(Craddock 1995, 95; Scott 1991, 1; Wayman 1989a, 32). Microstructural, chemical, and physical analysis of precolonial native copper artefacts from Western and Subarctic archaeological sites (Franklin *et al.* 1981), Old Copper Phase industry sites in the Great Lakes region, and experimentally worked native copper pieces (Vernon 1990), suggest that flattening the metal and folding it repeatedly while also heat treating or annealing between periods of work is a primary strategy used to consolidate and build up multiple small native copper pieces into a single formed artefact. Though these studies were conducted on material outside of the Northwest Coast, there are strong parallels with the production practices used to create artefacts found within the study region.

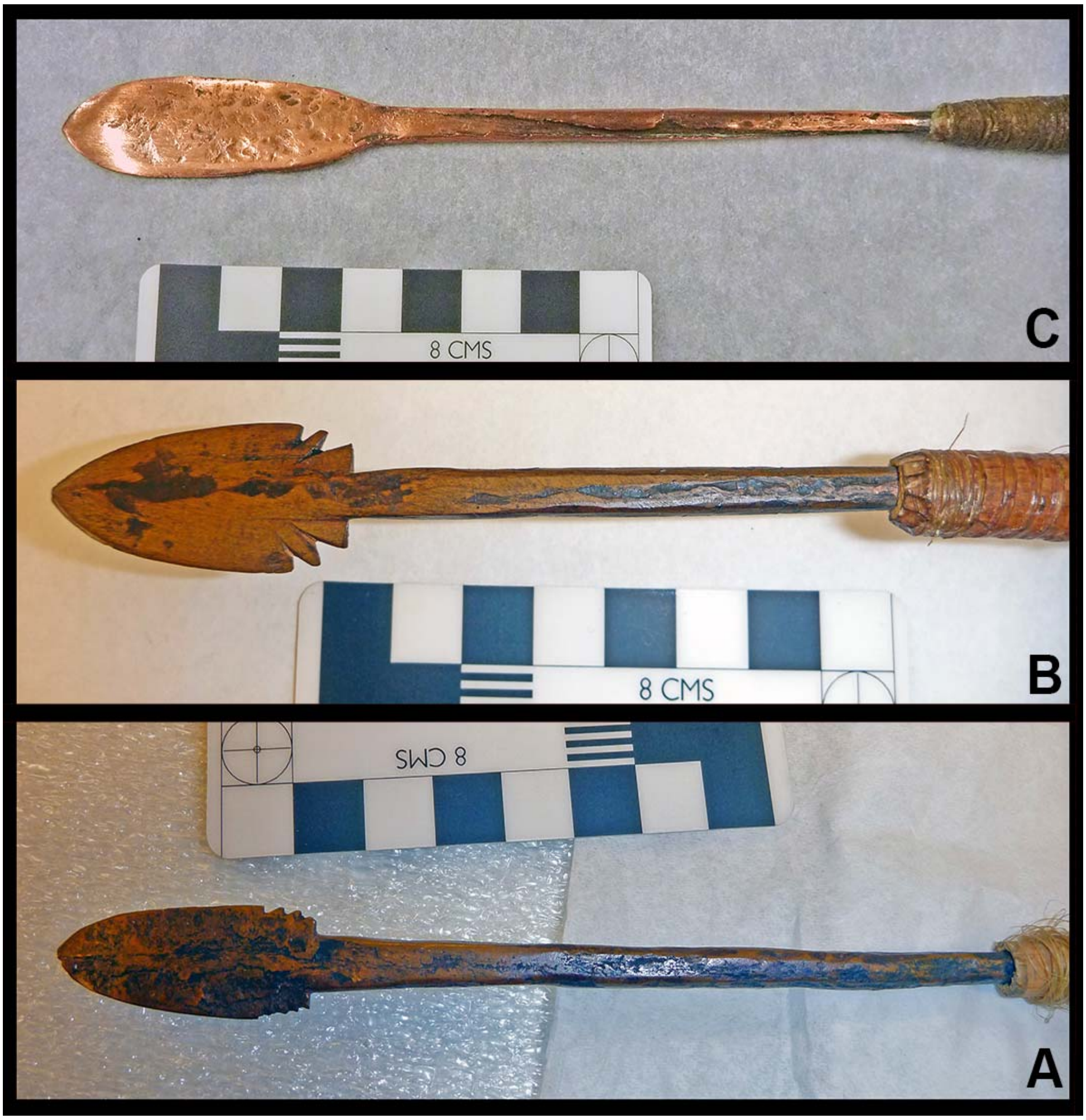


Figure 1.3. Three arrows collected from A) Coast Salish territory (Record 36), B) Tlingit territory (Record 48), and C) Netsilik Inuit territory (Record 346), all showing signs of a repeated folding process used during creation that caused the laminar surface texture visible on the heads and stems of each arrow (Photo by author, ©MOA; ©National Maritime Museum, Greenwich, London).

Significantly, there is some consistency in metallurgical practices and styles of making among the various language groups and between connected networks of communities that straddle group boundaries across the study region (Wayman *et al.* 1992; Franklin *et al.* 1981; Jopling 1989). These practices appear to have been in use prior to initial colonial meetings in the late 18th century and remained so throughout the colonial period. Although Indigenous people did trade for copper and iron objects manufactured and forged by foreign metallurgists (Acheson & Delgado 2004; Jewitt 1815), styles of metallurgy including smelting, melting, and casting are not known to have been adopted by Indigenous craftspeople in the Pacific Northwest. The maintained persistence in Indigenous metallurgical practices suggests that these actions are taught and practiced parts of a traditional skill which is visible in the repeated bodily movements of making (after Lemonnier 1992, 4-5; Mauss 1979[1935]; Roux 2016, 102). As Roux argues, these 'embodied' skills are learned through repetitive practice that causes the individual to create mental representations about how specific tasks should be carried out, making it difficult for the learner of the skill to perceive of the task as possible in alternative ways (Roux 2016, 102; Dobres 2000; Ingold 2001). As such, the persistence in Indigenous metallurgical practices suggests that these actions are traditional, practiced, and inherited, and potentially consciously chosen over new colonial technologies.

1.2.4 Cultural Entanglements and the Influx of Trade Copper

The period in which the active presence of European and Russian explorers, traders, and later settlers, was experienced on the Northwest Coast was a time of stress among its Indigenous communities. The era is punctuated with extreme changes such as massive population loss due to new diseases like smallpox and the interactions and conflicts brought by colonial entanglements and colonising activities (Boyd 1999, 1991; Jordan 2009). This meant that substantial amounts of cultural knowledge preserved in the form of oral histories were also lost, and many hereditary positions were left with no obvious successors (Suttles 1991; U'mista News 1996). Restrictions were quickly placed on the physical movement of Indigenous communities, making traditional resource procurement and subsistence hunting difficult, if not impossible (Kan 2016; Loo 1992; U'mista News 1996; de Laguna 1972; Plewes 1997; Jordan 2009, 35). Furthermore, as the processes of colonialism continued, colonising acts such as the forced removal of children to 'residential schools' beginning the 1860's and the banning of Indigenous ceremonies and festivals starting in the 1880's were carried out with a view to assimilation (Cole & Chaikin 1990; Halliday & Halliday 1922a, b).

While processes of cultural entanglement were developing in various ways through the maritime and land-based fur trade period a massive amount of goods, including copper, were being traded to coastal communities by explorers and colonists. Captains Cook, Strange, Dixon, and Colnett who all arrived between 1778 and 1787, returned to Europe reporting that copper metal was a popular trade material for the region (Fisher & Bumsted 1982, 43; Beaglehole 1929; Beresford & Dixon 1968, 237-46; Fisher 1977). In fact, Colnett wrote that copper sheets seemed 'similar to legal tender' among the Nuu-chah-nulth (Colnett 1940, 202; Figure 1.1). By 1791 multiple vessels were arriving with as much as 267 extra sheets of copper weighing close to 1,600kg amongst their trade goods, significantly changing the landscape of Indigenous resource procurement (Acheson 1995; Hoskins 1941).

The repertoire of Indigenous copper artefacts, and their specific use and value, is tied to the social and political frameworks that defined the metal's importance. As such, a close study of the specific changes occurring in and around copper objects reveals deeper issues regarding social status, an individual's legitimate place in society, personal and communal wealth, and political power structures. For example, a sharp increase in the amount of metal personal adornments worn by Indigenous individuals is noted in several communities shortly after the arrival of Europeans and Russians (Colnett 1786-88; Birket-Smith & de Laguna 1938; McClellan 1975b, 319; Menzies 1923, 82; Osgood 1937). Jacinto Caamaño wrote of a population that appeared 'in fetters' when describing the amount of metal decoration worn by the Haida in the 1790's (Wagner & Newcombe 1938, 205-6; Figure 1.4). This increase in visible signs of wealth and power suggests more material was available. However, it also could be interpreted as being representative of potential social anxieties surrounding status and power and the way in which this was communicated to the broader public. It is within these details that the specific object biographies of copper artefacts work to reveal the broader Indigenous experiences occurring at this time of upheaval.

Figure 1.4. Three copper armlets or bracelets from the Northwest Coast. Left: Haida armlet, Record 296, Accession No. AM1898,1020.39 (Photo by author, ©Friends of the British Museum); Middle: A Northwest Coast bracelet, Record 1, Accession No. 54.106.336 (Photo by author, ©Liverpool World Museum); Right: Kwikwasut'inuxw Kwakwaka'wakw bracelet, Record 52, Accession No. A3826 (Photo by author, ©MOA).

1.3 Artefact Biographies as the Theoretical Approach

A variety of materials and objects, including things fashioned from obsidian and dentalium shell, were important to the peoples of the Pacific Northwest. Within this research the focus lies on shifts and changes in Indigenous copper material procurement practices, artefact production strategies, and material use patterns through the 18th to 20th centuries to investigate the diverse ways communities in the region navigated this colonial period. Prior to contact, copper had become socially and politically important among the Indigenous communities living in the study area (King 1999; de Laguna 1972; Swanton 1909; Damon 2017). The metal was considered powerful, sentient, and active within Indigenous ontological views, involved in the supernatural world (King 1999, 160; Swanton 1909; Boas & Hunt 1906) and able to bring prestige and notoriety to those who could own and invoke it (Acheson 2003; Damon 2017; McClellan 1975a; Cameron 1986, 2002). Oral histories and early ethnographic accounts describe the collection, working, possession, and use of copper as regulated in the region, with the metal associated with the value systems, social roles, protocols, and hereditary rights that were central to Indigenous communities in the proto-historic period (Wolf 1999a; Damon 2017; Cameron 2002; Emmons 1991).

Recognised patterns of Indigenous copper material culture use were transformed by the impacts of the colonial process as large quantities of manufactured metal began to arrive in the region making copper available to those who wished to trade for the material (Cook 1967; Meares 1790). This change meant that established protocols surrounding the collection and use of the native metal would require reconsideration as the arrival of European and Russian trade goods allowed the Indigenous people of the Pacific

Northwest, who in the 18th century had a long history of shrewd trade dealings with other culture groups (Ames 2005; Trosper 2013, 3; Lepofsky & Caldwell 2013; Donald 2003; de Laguna 1972), to expand their repertoire of prestige goods and tools. This influx of material allowed for other outcomes as well. For example, individuals who previously did not have access to copper could circumvent established systems, create counterfeit items, and make illegitimate claims regarding their status and wealth (Codere 1990; Loo 1992; Wolf 1999b; Plewes 1997, 60-61; Jonaitis 1991).

The biographical approach adopted in this study centres on artefact biographies (Kopytoff 1986; Gosden & Marshall 1999) of over 300 Indigenous copper artefacts created and used in the Northwest Coast region prior to and throughout the European and Russian colonial period. The *chaîne opératoire* of the metal pieces used to create each object is also assessed, as the sequences of making and use applied to this material culture are an integral part of each object's biography (after Leroi-Gourhan 1964; Lemonnier 1992; Schlanger 2005). In contrast to archaeological approaches which seek to situate individual objects within typological categories (Lechtman 1977), the biographical approach used here focuses very much on the individual copper artefacts and strives to understand the broad array of conditions under which the artefacts have been created, (re)used, and discarded (deposited). While typological analysis locates an object in a particular time and space through the identification of *essential* characteristics, biographies look towards understanding the *relational* aspects of these artefacts, what Igor Kopytoff refers to as the object's social life (1986). This approach also attaches significance to things through both their relations as objects to other objects, and to people as subjects, with a corresponding asymmetrical privilege given to the living subject, social relations, and society (Miller 2005; Hamilakis & Jones 2017; Barrett 2016, Ingold 2014).

The copper objects of the Northwest Coast are considered as dynamic things, whose significance is contextual, relational and fundamental to human action (Gosden & Marshall 1999, 169; Joy 2009; Swanton 1905). The technological, material, and functional aspects of each object co-exist, are central to the study, and cannot be considered in isolation or divorced from their specific social and cultural contexts Appadurai 1986; Chapman 2000; Gosden & Marshall 1999, 170, 172; Weiner 1992; Whitely 2002; Jones 2002). As such, object biographies offer a useful way of thinking about how these objects circulate among Northwest Coast communities, especially those objects that show complex patterns of production (particularly composite fabrication), use, wear and tear, repair, and re-use as they are caught up in life (Ingold 2010). Additionally, by including an analysis of the *chaîne opératoire* of the metal used to create the objects an appreciation is developed for the raw material, energy, physical and environmental possibilities, knowledge, and tools required in the planning of material culture production and reproduction. This is important as these actions and the objects produced from them are symbolic representations of value that embody social frameworks of everyday life (Schlanger 2005, 29). The specific syntax of fabrication and use becomes a part of the palimpsest of evidence on the bodies of each object, and comparative biographies tell stories of specific processes of making, tools used, and engagement practices, that could be spread across entire assemblages of copper artefacts and people as they mutually transform each other over time (Barad 2007, 2003; Gell 1998). The overall effect is that biographies allow an energetic and multifaceted analysis of objects, people and community rather than becoming fixed in time and space by ascribing a thing to a standardised typology.

1.3.1 Relevant Literature

This thesis is brought together through the combination of multiple streams of thought and research. From the outset it is recognised that research methods do not just describe social realities, but also are involved in creating them. As such, methods of interpretation are always political, and can shape the ways the colonial past is understood (Law 2004). It is important to ask what types of social realities we want to create when we approach past material culture and attempt to decolonise the approach, recognising the world as messy, fluid, elusive, and multiple. To focus on the nuanced cultural entanglements and changes that occurred during the colonial period, and to avoid simplistic discussions of domination and oppression, ethnographic and primary accounts and archaeological research is considered with perspectives offered by thinkers such as Robin Fisher (1977), Susan Neylan (2000), Jeff Oliver (2010, 2013, 2014), Craig Cipolla and Katherine Hayes (Cipolla & Hayes 2015). These approaches recognise that the colonial period on the Northwest Coast was a changing mix of entanglements through periods of maritime and land-based fur trading and increasing colonial pressures as things such as colonies, cash economies, reserves, and missions of various faiths were established. Over time people across the Northwest coast became involved in a variety of colonial relationships that were a combination of acts of resistance, domination, collaboration, manipulation, acquiescence and so on, as specific people chose how to navigate their contingent realities.

In order to avoid old perception of colonialism as a binary situation involving only the oppressor and the oppressed, the work of Kurt Jordan is consulted as he argues that colonialism is a process that is much more nuanced than simply the establishment of colonies; not all encounters are necessarily ‘colonialism’ and power balances within discreet and prolonged interactions need to be considered (Jordan 2009). Stephen Silliman similarly explores the terminology of colonialism and the potential impact of conflating terms such as ‘culture contact’ with ‘colonialism’. Specifically, the severity of the interactions that occurred in the colonial period and the radically different levels of political power that structured those interactions can be downplayed through a suggestion of simple short-lived ‘contact’ (Silliman 2005). Rodney Harrison also explores colonial terminology surrounding the coloniser-colonised relationship, arguing that we create shared histories together that are anything but binary in nature (Harrison 2014). Issues of cultural hybridity during colonialism are also considered through the work of Homi Bhabha (1994), Bruce Miller (2007) and Alexandria Harmon (2007), where cultural collisions, interchanges, and entanglements have the possibility of creating something different. However, as Silliman argues, colonialism should be thought of as a type of continuum in order to avoid creating hybrid cultures that lack ties to their past (Silliman 2005, 67).

The biographical approach applied in the study of Indigenous artefacts created using copper metals on the Northwest coast seeks to identify relationships between the objects and the people who procured the materials, produced, and used the objects (see Gosden & Marshall 1999). In this way the roles of objects in social relations are revealed, providing insight into how and why people did things in the past and how those decisions are still impacting the present. The biographical approach created in this study is formed from the work of a number of thinkers on the topic. Igor Kopytoff suggested in 1986 that it is possible to write the biographies of objects similarly to biographies of people. Additionally, as Karen Dannehl argues, to counter some of the problems posed by the segmented histories of objects in fields such as archaeology, it is possible to ‘idealise’ the life of a particular type of artefact, or segmented elements of an artefact, in order to add context to artefacts that very little may be known about (2009). As such, this work brings together assemblages of objects such as copper bracelets, Coppers, and decorated dance masks to create a more wholistic story of their generic lives. Furthermore, through the understood life history of an artefacts' species, specific object trajectories and contingent elements of a single object can be highlighted based on what did or did not happen throughout their lives (Kopytoff 1986; Dannehl 2009; Knappett 2004). Though as Nanouschka Burström warns, without care it is possible to risk rooting biographies in essentialist perceptions of objects that give the impression that specific object types remain the same over time (Burström 2014). Researchers focused on material culture must also be careful not to overemphasise specific objects as this can risk creating misleading hagiographies that can manipulate our understandings of the past (Burström 2014).

The life cycles of objects are also considered, as objects have the potential to 'outlive' the people who initially created and used them. To this end Karen Dannehl (2009), Roberta Gilchrist (2000), and Robert Miller (2000b) discuss the tensions between 'life cycles' and 'biographies', and what this means about people and objects through time. The objects included in this study have been created with materials procured from both local sources on the Northwest coast and colonial sources and have been involved in multiple interactions that include moving into entirely different ontological spheres of value. For example, this occurred when European trade copper was attained by Indigenous groups and used to construct socially significant objects that indicate wealth and status (Boas 1916, 305; de Laguna & McClellan 1981, 645; Cooper 2007, 197; King 1999, 160). This also happened when artefacts passed from Indigenous to colonial ownership as ethnographic researchers collected 'exotic' objects to be placed in far flung museums (Swan 1883, n.d.; MacDonald 1973, 43; Pöhl 2008; Whitehead 2010, 216).

In considering the value of copper and the artefacts made from it in this biographical framework, Arjun Appadurai argues that exchange creates value, which is embodied in the commodities involved (1986). Additionally, the specific political frameworks in which value is assessed and applied create the link between exchange and value; objects only have the value that we assign them, and it is dynamic and changeable (Appadurai 1986). This is developed further by Robert Foster, who examines the changing value of commodities that are moving globally between culture groups and provides some perspective on the changing value of copper as it moved from European trade markets to Indigenous possession (Foster 2006). Igor Kopytoff also focuses on the concept of commodification, suggesting this could be understood by investigating objects at the moment of exchange. This argument is applied in this study where the fragmented biographies of multiple objects, linked together through their copper components, are brought together to create biographies that emphasise specific moments in time in order to comment on societal organisation and human processes. Chris Gosden and Yvonne Marshall develop these arguments by exploring how the perception and meaning of an object is transformed through exchange or performance (Gosden & Marshall 1999). They are interested in exploring the multiple and simultaneous entangled lives and relationships of objects and people.

Within this study the biographical approach includes the concept of *chaîne opératoire* as understood through the thinking of Leroi-Gourhan (1964), Pierre Lemonnier (1992), Marcos Martinón-Torres (2002), Nathan Schlanger (2005), Valentine Roux (2016), Marcia-Anne Dobres (1995, 1999, 2000), and Christopher Hoffman (Dobres & Hoffman 1994). This is because documenting the socially informed technological choices used to create an object, and breaking them down into sequences of making that consider the specific actions taken by actors as they are involved in the creation, consumption, discard, deposition, and post deposition of their material world around them, reveals social relationships that are defined and reaffirmed through these technological acts. By creating objects and transforming material, people are essentially creating and transforming themselves at the same time (Schalnger 2005; Mauss 1990[1954]). As Hoskins argues, sequences of making and use are important in this study because people can express their identities through their possessions and can use objects to construct their own narrative about themselves and others (1998). This makes archaeological material culture not just a form of history but a form of material memory that is nonlinear and multitemporal, and records both the conscious and unconscious actions of the people who made and used them (Olivier 2011).

Throughout the project, each object is thought of as a process rather than a bounded physical object fixed in time and space, acknowledging the ever-changing and shifting quality of people and culture, after Vesa-Pekka Herva & Risto Nurmi (2009). Herva and Nurmi, along with Astrid Van Oyen also stress the importance of acknowledging that we cannot assume to know the apparently obvious functions of objects made by people from different cultures and time. The wear, repair, and re-use visible on the body of an object may not be driven by what the researcher considers straightforward choices (Herva & Nurmi 2009; Van Oyen 2013)

The agency of material culture is also addressed in this study as it is worth moving away from a completely anthropocentric approach to consider the power of objects within their environment, informed by the work of Carl Knappett and Lambros Malafouris (2008). This work attempts to demonstrate how agency is a distributed property within heterogeneous agent networks, and how a relational approach to agency that incorporates humans and artefacts can broaden our understanding of material culture use and the actions of past peoples. They also argue that by uncoupling 'consciousness' and 'intentionality' the internal agencies of the people who made and used the objects can be detected. This work that tends towards the idea of symmetry is based in part on the Actor-Network Theory (ANT) approach developed by Bruno Latour (1999, 2005), John Law (1999, 2004), and Michel Callon (Callon 1986; Callon & Latour 1992; Callon & Law 1995), as well as the theory of agency within art discussed by Alfred Gell (1998). Gell makes an eloquent argument for object to be seen as agents, but struggles to describe how art objects extend their user or maker's agency. It is useful to consider object agency, however it is important to note that within this research the symmetrical approach is not applied and human and living agency are privileged over that of material things, after John Barrett (2016) and Graham Harman (2009). Here objects are considered able to materialise, embody, and carry intra-human relations which can potentially affect the way people act and mediate relations (see Hoskins 1998; Gosden & Marshall 1999; Olsen 2003). However, agency cannot be located in people and objects separately, as humans need things to make their world but these things are imbued with the contingent meaning and power that humans choose to give them (after Sillar 2009).

In order to use the theoretical framework developed here to study Indigenous artefacts constructed with native and trade copper and copper alloys, a detailed understanding of the metal and its uses on the Northwest Coast also need clarifying. It is ethnographic and primary accounts, and oral histories that first confirmed that Indigenous people living in the region did not smelt or melt metal. Instead people collected naturally occurring copper in its metallic form and worked it through cyclical acts of hammering and annealing in an open fire (for example John Dunn as cited in Holm 1982, 67; Lepofsky *et al.* 2000; Blake 2004; Lisiansky 1814; McClellan 1975b; Reckord 1983, 49; Kari & Fall 2003, 111; Krause 1885, 148; Rainey 1939). In support of these accounts, material analysis that involves the experimental recreation of accepted Indigenous metallurgical techniques and subsequent microstructural analysis reveals that the crystal structure of Indigenous worked copper is consistent with metal that has been hammered and annealed, not melted (see Franklin *et al.* 1981; Verson 1990; Acheson 2003, 223; Cooper 2007, 122-4). The introduction of metals initially manufactured through smelted and melted techniques in European, Asian, and Russian contexts brought copper metal and alloys that contained a range of elements such as zinc, lead, tin, arsenic, and bismuth to the Pacific Northwest (Stapp 1983, 1984; Cooper *et al.* 2015a, 147; Howay 1990[1941]). This is supported through the elemental analysis of copper in multiple contexts within and adjacent to the study region (see Cooper *et al.* 2008; Waymen *et al.* 1992, 7-15; Cooper *et al.* 2016, 179-80; Cooper & Bowen 2013, 11; Jopling 1989, 79-97; Duff 1981, 153; De Widerspach-Thor 1981, 125;). By understanding the differences in the materials procured by Indigenous metallurgists and subsequently used to create conspicuous artefacts through the colonial period, changes in technological strategies and traditions of making can be detected and used to contextualise a biographical framework to this material culture study.

1.4 The Structure of the Study

To explore the biographies of Northwest Coast artefacts and the changing use of copper in the region through the colonial period, this research brings together diverse data to contextualise individual Indigenous artefacts. This includes known information about the artefacts, characterisation data concerning the copper or copper alloy used to create the object, and the physical processes applied to the metal during the object's creation and subsequent use. As such, a desk-based study that includes multiple ethnographic, academic, historical, and Indigenous records and focuses on Indigenous engagement with copper throughout the colonial period is compiled in Chapters two and three. Chapter Two deals with the Indigenous peoples of the Northwest Coast, exploring the ways in which the different culture groups and communities of the region lived and engaged with copper. Chapter Three follows a timeline of European and Russian colonial interactions in the region beginning in the late 18th century. This chapter explores the changing ways in which Indigenous people across the Pacific Northwest used copper metal through a time of upheaval characterised by processes such as resistance, collaboration, accommodation, and domination as people of different cultures came together and created shared histories (Silliman 2005, 60; Murray 2004, 8). This work is combined to provide a contextual backdrop upon which to interpret information gathered in a material culture study of 323 Indigenous artefact created using copper or copper alloy metal, the results of which are presented in Chapters Five and Six.

This thesis follows a biographical approach to material culture analysis, and Chapter Four provides a detailed methodological framework for this research. This includes the ways in which a wide variety of Indigenous artefacts are physically examined and chemically characterised using a Hand-Held portable X-ray Fluorescence device (HHpXRF). Each artefact included in this study is catalogued in a File-Maker Pro database and assigned an individual ‘Record Number’. Additionally, as some artefacts are composed of multiple pieces of metal, each piece of copper or copper alloy metal chemically characterised is assigned an individual ‘Analysis Unit Number’ or AUN. Each record in the database contains known details regarding the artefact’s provenance and any known history, along with a comprehensive description, physical metrics, a variety of images, and a record of the specific sampling areas on each artefact. Each record also includes a determination of production processes related to each piece of metal worked to create the artefact, and what each metal piece is considered chemically consistent with. The database is located in Appendix A (see USB Drive). A Microsoft Excel spreadsheet of the elemental characterisation data for each piece of metal sampled using the HHpXRF can be found in Appendix B (see USB Drive). The health and safety plan followed for this device can be found in Appendix E.

For comparative purposes that further contextualise the material culture analysis, a selection of European copper and copper alloy maritime materials created and used throughout the colonial period on the Northwest Coast is also included in this study. Museum reports related to this analysis and a File-Maker Pro database of the characterised material can be found in Appendix C (see USB Drive). Additionally, a history of European copper and copper alloy development and use from the 18th to 20th century can be found in Appendix D, including patented alloy recipes.

Chapter Five discusses the primary data gathered from the artefact analysis portion of this research. A breakdown of the physical and chemical elements of the object is presented, discussing broad trends in construction processes and materials used on the Northwest Coast. Chapter Six utilises the information provided by Chapters Two, Three, Four and Five to follow biographies of assemblages and diverse groups of artefacts through the copper material used in their creation. Chapter Seven is the culmination of the thesis that begins here, bringing together the multiple lines of research and addressing the impacts and entanglements of colonial relationships identified on the Northwest Coast through the changing Indigenous use of copper metal.

This thesis ultimately works to show that the Northwest Coast is occupied by a diverse population of people, bound together through shared and similar ontologies, traditions, and practices. This suggests that the Indigenous people in the region had a deep connection with the area and their neighbours prior to the late 18th century. Additionally, this research reinforces arguments for individual agency, as discrete people and communities chose different strategies to navigate the challenges of entanglement and colonialism based on the best option in specific circumstances. Following copper through this study provides a way to comment on these changing social situations and explore how their interpretation has and can impact how we understand our past in the modern day.

Chapter 2 Contextualising Copper and Indigenous Communities on the Northwest Coast

This thesis focuses on the impacts of European, Russian, and later American, cultural entanglements and colonialism on the Northwest Coast region of North America, beginning in the late 18th century. This is done by examining the changing Indigenous use of copper metal, a socially significant material, through this time of upheaval (de Laguna 1972; Suttles 1990b; Jopling 1989). To conduct this study a multifaceted approach is used, combining desk-based and material culture analysis. Chapter 2 is a portion of the desk-based analysis, and includes archaeological, ethnographic, historic and primary sources, and Indigenous oral histories, to discuss the ways in which the different cultural groups in the region organised themselves, and their specific and contingent access to, and use of, copper materials. The information discussed here, coupled with the partial colonial timeline presented in Chapter 3, contextualises the people residing in the study region and their known relationship with copper, creating a foundation upon which material culture interpretations can be developed (after Gosden & Marshall 1999, 169; Kopytoff 1986, see Chapters 5, 6, 7). This context is established at the outset within this research, as the lives of people and objects exist relative to each other and constitute each other through social interactions (Joy 2009, 544). Thus, how the changing ways in which the metal was used are interpreted, work to influence how people understand their past, and shape their future (Iles & Childs 2014).

To avoid thinking of people and things in the Northwest Coast in isolation within this study, this chapter endeavours to analyse the contingent cultural organisations of the region, and the ways that copper was used within them. To accomplish this, the chapter is divided into two parts. Part I sets the stage with discussion regarding the social structures of the region while Part II places copper into these social contexts and examines the how, when, and why the metal was used.

2.1 Part I: Defining A Region

This research relies, to some extent, on the regional definition of the Northwest Coast to discuss the changing use of copper metal in the area. However, it also recognises the perils of forgetting that peoples and cultures are fluid and dynamic (Gosden & Marshall 1999), and that laying down rigid borders and strictly defining culture areas is a powerful colonial tool that has been used to control and delegitimise Indigenous populations (Harley 2009). Maps created in collaboration with Indigenous communities that follow the asserted territories of discreet culture groups have resulted in a patchwork of overlapping existence that reveals a much more complicated reality (Figure 2.1). To deal with this complexity the material culture analysis portion of this thesis includes a number of Indigenous copper artefacts created and used outside of the study area. These objects not only help contextualise the collection, use, and movement of copper in the Northwest Coast, their inclusion also acknowledges that this region is tangled up with its neighbours and does not exist in a cultural vacuum.

The Northwest Coast is a region comprised of communities of Indigenous people that stretch from the Tlingit language family in and around Yakutat Bay in Alaska to the Coast Salish language family located in what is now Washington State and southwest British Columbia (Drucker 1951; Jorgensen 1980; Kroeber 1939; Suttles 1990b; Chapter 1, Figure 1.1). Each of these language families are comprised of groups of languages that are considered genetically related (Suttles 1990b, 30). This includes multiple villages and camps that share common ethnic identities that can include a combination of shared language patterns, biological lineage, territorial considerations, household organisational strategies, artistic style, and origin stories (Suttles 1990b; Donald 2003; Miller 2007, 17). As Harmon and Nash argue, a shared history 'gives the sense of shared struggles, shared fate, common purpose, and the implication that personal and group fate are one and the same' (Nash 1989, 5; Harmon 2007, 30), creating the idea of a single cohesive 'people' that have a distinct part to play in the world. Though it is important to acknowledge that people could belong to multiple communities simultaneously and that these affiliations could change with circumstance and time (Harmon 2007, 34).

Though each language family is discrete to some extent, there is much overlap throughout the region, with groups encountering each other for multiple reasons including established kin ties, and to protect, share, or trade resources (Hajda 1984, 123-32; Suttles 1990b; Figure 2.1). As such, prehistoric trade routes moving high status goods such as dentalia, obsidian (Donald 2003, 316), copper, iron (Swan n.d.; Acheson 2003), and eulachon oil (Carlson 1994, 338-345; Ames 2008, 142) laced the region, and certainly did not stop at the borders of language groups within the Northwest Coast, nor at the boundaries of the region's assumed extent. The definition of this region is based predominantly on the work of Kroeber in 1939 and Drucker in 1955, who attempted to define distinct cultural areas as they existed just prior to the arrival of colonial interests (Suttles 1990b, 30). From this point, small changes have been made to the exact borders to the north and south (Matson & Coupland 1995; Donald 2003), but the region largely remained conceptually the same. Work carried out since this time has revealed a more nuanced and overlapping world, which will be in part addressed here.

The difference in the use and value of copper between Northwest Coast communities and those residing in the Sub Arctic and Arctic plays a part in defining the northern extent of the region. Northern communities did perceive the metal as an important material, collecting and using native copper prior to the late 18th century (Cameron 2011). The majority of artefacts recovered thus far take the form of tools such as knives, awls, and projectile points, though beads, bracelets, and unidentified scrap has also been found, but to a lesser extent (Cooper *et al.* 2016, 181; Cooper 2012, 569; Franklin *et al.* 1981). Excavations at some northern sites have also revealed elaborate grave offerings that include both iron and copper (Mason 1998; McCartney 1988). Recent research has also shown that both iron and copper were being transported across from Siberia by the beginning of the second century CE and being incorporated into Indigenous arctic usage (Cooper *et al.* 2016). However, within known northern oral histories the same mythology surrounding copper that is found on the Northwest Coast has not been noted within known northern oral histories (Moodie *et al.* 1992, 154-6). For example, conspicuous display of copper, and the invocation of copper artefacts at important ceremonies and events to elevate an individual's social standing, appears to be a Northwest Coast trait (Matson & Coupland 1995; Suttles 1990b; Donald 2003).

The Eyak, classified as a branch of the Eyak-Athapaskan language family, reside to the north of the Tlingit culture group. This group share many traits with the Tlingit, along with some traits of their other arctic and subarctic neighbours. As such, Donald argues that it is possible that the Eyak would have been included in the Northwest Coast region as defined by Drucker, however it is likely that Drucker had no knowledge of the Eyak while plotting his maps (Donald 2003, 318). The Tahltan are also part of the Eyak-Athabaskan language group. In the 18th century, prior to the arrival of Russian colonial interests, Tlingit cultural practices and language had been spreading north and east to the Eyak, Tutchone, and Tahltan (Campbell 1997, 110; Swanton 1911, 159; McClellan 1981, 469). For example, Bill Holm was able to trace Tlingit artistic motifs that had been integrated into arctic and subarctic traditions from the proto-historic period (1988, 281), and work by Jordan and Knecht (Jordan & Knecht 1988; Knecht 1995) suggests that prehistoric antecedents of Tlingit motifs are present in Alutiiq traditions for several hundred years prior to the fur trade and colonial period discussed here (Fisher 1977). This is a process that Donald refers to as ‘Tlingitizing’ (2003, 319).

The Tlingit language family is found to be rather homogenous, and throughout the large area they occupy only mild dialect diversity has been found. Suttles argues that this cohesion suggests that the spread of Tlingit cultural traits to adjacent groups occurred in the relatively recent past (Suttles 1990b, 31). The people residing on Haida Gwaii however, have considerable dialect diversity within the language family found across the islands. This suggest that the Haida population had lived on Haida Gwaii for a considerable amount of time spread among multiple communities (Suttles 1990b, 31). The Tsimshian language family is composed of a two, possibly three, languages, specifically the Nass-Gitskan and Coast Tsimshian (Suttles 1990b, 31-2), which can be found in the central portion of the study region. The Wakashan language family is located to the south of the Tsimshian and is divided between the Northern and Southern Wakashan languages. The Northern languages include Kwak’Wala, Haisla, and Heiltsuk-Oowekyala. The Southern languages include Nuu-chah-nulth, Ditidaht and Makah (Suttles 1990b, 39). The Salishan language family, located south of the Wakashan speakers, also covers a large area with 16 languages spoken on the coast and seven by interior Salishan groups (Suttles 1990b, 33; Harmon 2007, 31). The borders of these language families overlap at some points, and Campbell River and Cape Mudge located within a Kwak’Wala speaking area offer good examples. Here, place names from a Salishan language family origin are used by Kwak’Wala speakers, suggesting that a previous population of Salishan speakers had either been absorbed into the Kwak‘Wala group in some fashion, or pushed out of the area (Suttles 1990b, 36; Boas 1887; Taylor & Duff 1956). The Quileute language group, residing in the northwest of Washington State on the Olympic Peninsula, are part of the Chimakuan language family, alongside Chemakum which is now considered extinct. These related language groups occupied non-continuous areas separated by the Olympic Mountains and the territory of the Klallam in the late 18th century. By the 1890’s when Boas was conducting work in the region, he thought that Chemakum had largely been overtaken by Klallam or Northern Lushootseed Salishan people (Suttles 1990b, 40).

The mountains that bracket the Northwest Coast to the east do not truly bind the region. Salishan languages from the southern portion of the study region, for example, are also found in the Plateau culture area located on the high plateau between the coastal mountains and the Rocky Mountains (Jorgensen 1969, 62-69; Donald 2003, 311; Hayden 1992). Furthermore, Northwest Coast influences, in the form of some motifs and tool traditions, are found inland along rivers such as the Fraser and Mackenzie (Donald & Michell 1975; Matson & Coupland 1995, 22).

The southern border of the Northwest Coast region seems to have been based largely on a lack of knowledge about the people who lived on the Oregon coast. An early demographic collapse from disease and conflict has created a knowledge gap in this area (Donald 2003, 312). Boyd estimates that the Wapato Valley, along the Columbia River, experienced a population decline of over 90% between the end of the 18th century and 1832 (Boyd 1999). Based on what is known, there is no evidence suggesting elite ranking was present prehistorically to the south of the Northwest Coast, and any assumptions regarding elite management of resources are currently unsupported (Erlandson *et al.* 1997). Resource procurement also begins to differ to the south, as can be seen in the utilisation of a wider range of river estuary fish species for subsistence (Erlandson *et al.*1997, 230). The southern extent of the Northwest Coast region has largely been decided based on the Palmrose archaeological site located near the mouth of the Columbia River on the Oregon side. Matson and Coupland identify features here that are consistent with the Northwest Coast, including a salmon-based economy, toggling harpoon valves, multifamily plank houses, and motifs on decorated objects such as zoomorphic figurines (1995, 229). However, they do not specifically address why they have chosen this site as region defining. Their argument is complicated by the presence of known sites further south that also display some of these 'Northwest Coast' traits (Matson & Coupland 1995).

The use of copper also helps define the region's southern boundary. The metal has been found at southern archaeological sites such as Meier and Cathlapotle, located in the Wapato Valley. In these cases, the metal was found distributed throughout the living area without regard for social status, unlike Indigenous practices in the Northwest Coast region discussed in this research (Cooper *et al.* 2015a, 146; Ames *et al.* 2008; Banach 2002). However, all of the copper recovered from that area thus far has been assessed as trade material (Cooper *et al.* 2015a, 147-150). Cooper *et al.* (2015a, 155-6) has suggested that the collection and use of native copper was rare if not absent from Indigenous use immediately prior to European arrival, in both the region south of the Northwest Coast and upriver in the interior Plateau. It is further suggested that copper was very quickly incorporated into Indigenous repertoires once European and Russian trade goods had been introduced, though Cooper *et al.*'s research reveals distinct differences in the social arrangements surrounding the material that are not consistent with those found on the Northwest Coast (Cooper *et al.* 2015a).

Definitions of ethno-linguistic groups of Indigenous people and their associated territories, esoterically perceived by largely non-Indigenous scholars, is a topic that Indigenous scholars have found disagreeable and to some extent colonising (Miller 1998, 102; Harmon 2007, 33). Indeed, much of the research surrounding the establishment of regional and cultural boundaries and the drawing of geographical maps has been conducted by cultural outsiders and can easily fall foul of simplifying and essentialising Indigenous people to a single point in time (Miller 2007, 19). Furthermore, the point in time being considered to establish this region was being impacted by colonial processes affecting communities in various ways. For example, groups could be pushed into creating formalised alliances that did not exist previously or have to deal with barriers created by colonial governments such as the Canadian-American border established in 1846 (Miller 2007, 16; Miller & Boxberger 1994). The bounded terminology of 'bands' and 'Nations' was later developed to define Indigenous groups and is used in colonial policies such as the Indian Act of 1867 in Canada, which was developed to manage Indigenous populations (Flannagan *et al.* 2010). Indigenous communities strategically navigated these challenges by asserting specific affiliations, rights, and privileges as required in their contingent experiences (Harmon 2007, 41; Goldberg-Ambrose 1994, 1123-4; Barman 1999). However, Harmon argues that in some instances colonial impacts related to things such as who was and is counted as an 'Indian', and whether Indigenous people had privileges and rights to government services. This meant that the ways in which Indigenous communities organised their identity altered significantly, and often ignored that these social groups were once more connected (Harmon 1998; Miller 2007, 6).

There is an argument to be made for incorporating research defining the Northwest Coast study region into projects such as this. As Miller contends, contemporary patterns of Indigenous identity and organisation are heavily influenced by

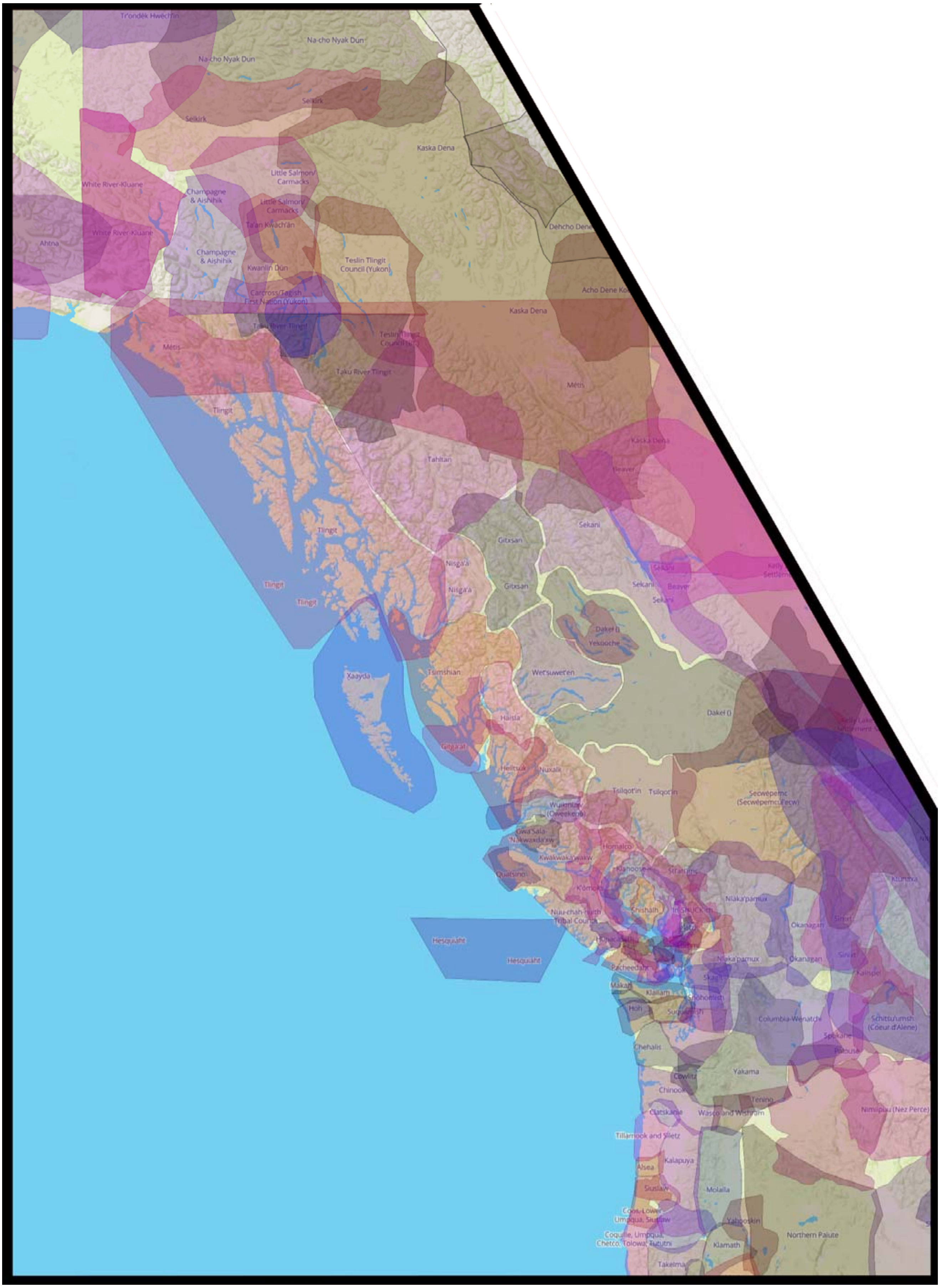


Figure 2.1. This map shows a mosaic of numerous overlapping traditional territories of multiple culture groups living on the Northwest Coast. These groups reside alongside and interact with each other across cultural boundaries (Native Land 2018).

these earlier patterns, and thus are worth investigating (Miller 2007, 19). Additionally, these ethno-linguistic family taxonomies are based on significant historical facts gathered from early written records of explorers and traders, Indigenous oral histories, and ethnographic and archaeological evidence of customs which allowed anthropologists to argue for a region-wide system of intercommunity relations (Harmon 2007, 33).

Networks and entanglements of intermarriages, economic activity, and ceremonial practices among neighbouring communities, regardless of language, transforms the region into a kind of social continuum (Suttles 1990b, 15). As Harmon argues, the fact that the related and connected groups residing on the Northwest Coast did not disappear as soon as colonists arrived suggests a deeply established shared history (Harmon 2007, 33). Thus, to conduct this study, the people residing on the Northwest Coast need be considered within a depth of time that includes the life cycles of individuals and the social and political changes that come with them. The focus needs to not only be placed on instances of oppression and resistance, but also on how people managed colonial relationships, discarding or down playing some practices while enhancing others and often developing entirely new ways of being (Miller 2007, 22-5; Oliver 2010, 2013, 2014; Silliman 2005; Jordan 2009).

2.1.1 Social Organisation on the Northwest Coast

2.1.1.1 The Chief

There is little evidence for a formal position of 'Chief' that presided over several villages or towns at once prior to the arrival of European and Russian interests (Mitchell 1983; Miller & Boxberger 1994), and Ames argues that the Chief's duties lay first and foremost with the household (Ames 1995, 173). The class structure found among the communities in the region is not homogenous and, though Chiefs were important among some groups, there were roles for more than one type of Chief. For example, among the Tsimshian there was a separate over-arching role for a Chief who represented a cluster of communities. However, this does not necessarily mean that the clan Chief had more power than the village Chief in any practical terms (Ames 1995, 169). The Haida maintained a village Chief, however this person also owned the site that the village resided on. Nuu-chah-nulth peoples, meanwhile, organised themselves into confederacies, and the highest ranked of the Chiefs within the village was considered the confederacy Chief. In the central and north coast, there is more evidence of a chiefly position with powers outside of their local village or town, though this power is not thought to have been far-reaching (Ames 1995, 169; Matson & Coupland 1995, 5). The chiefly title could be gained due to inheritance and kin ties, but maintaining power and respect within the household and community as a whole required the Chief to demonstrate abilities as a skilled speaker, trader, hunter, collaborator, and negotiator with the supernatural world (Ames 1995, 171; Ames 2001; de Laguna & McClellan 1981; Donald 1997; Fall 1987; Matson 2003; McClellan & Denniston 1981; McKennan 1959; Reckord 1983; Townsend 1980; VanStone 1974). The focus on inheritance for the transfer of wealth, titles, power and prestige is found among northern communities in the region such as the Haida, Tsimshian, and Tlingit, while a focus on respected skill sets was important among the Nuu-chah-nulth, Kwakwaka'wakw, and Salish (Ames 1995, 171-3).

A Chief in any of the Northwest Coast groups had some limited power within their community. For example, Tsimshian chiefs had the power to control the young men of the village, even commanding them to war (Garfield 1939). Within ethno-linguistic groups that chose to keep slaves, such as the Coast Salish (Suttles 1990a, 465), Nuxalk (Kennedy & Bouchard 1990a, 336), Tlingit (de Laguna 1990, 209), and Haida (Blackman 1990, 240), the Chief held absolute power over the life and death of each slave (Ames 1995, 171). However, in a great many things the Chief had little real power over the free people in the community (Emmons 1991; Ames 1995, 171; Garfield 1939). Additionally, regardless of a Chief's power and status, all had to seek advice from councils often composed of community elders (Ames 1995, 171).

Social structures such as gendered descent patterns and inherited lineage also influenced the role and rights of the Chief. The Tlingit (de Laguna 1990, 217), Haida (Blackman 1990, 248), Tsimshian, Gitxsan, Nisga'a (Halpin & Seguin 1990, 274), Haisla (Hamori-Torok 1990, 308), and Heiltsuk (Hilton 1990, 317) for example, followed a matrilineal descent structure, though each to varying degrees. Meanwhile, the Nuxalk (Kennedy & Bouchard 1990a, 329) followed an ambilineal descent, and the Wuikinuxv (Hilton 1990, 317), Kwakwaka'wakw (Codere 1990, 366-367), Makah (Renker & Gunther 1990, 423), and Quileute (Powell 1990, 432-3) practised a bilineal descent favouring patrilineal inheritance. The Coast Salish predominantly followed patrilineal descent (Kennedy & Bouchard 1990b, 447). Gendered power structures varied greatly across the region, influencing how high-status objects, materials, powers, and responsibilities could be used or passed down through generations.

2.1.1.2 The Household

Figure 2.2. A Coast Salish single pitch plank house at Comiaken Village on the Cowichan River in 1869. (Dally 1869).

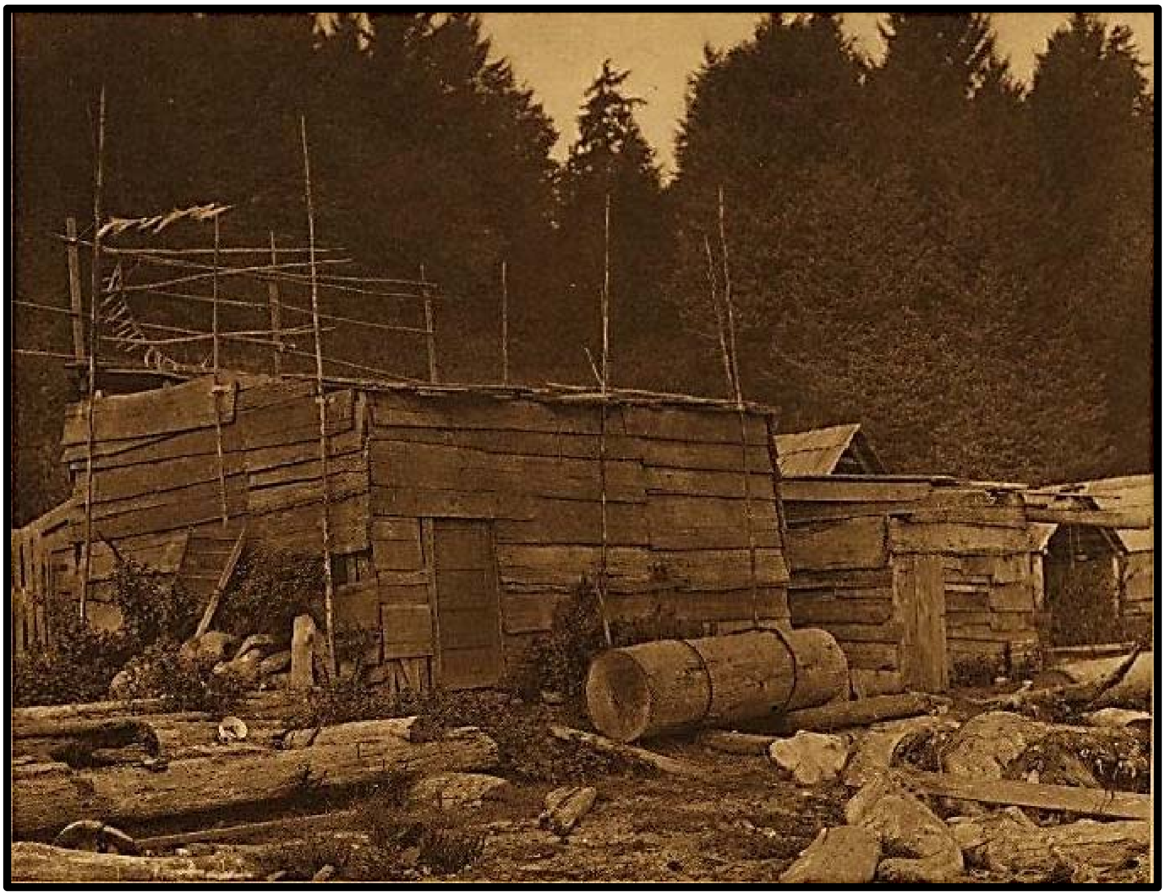


Figure 2.3. A view of a single-pitch shed roof style plank house constructed by the Makah at Neah Bay (Curtis 1916e).

Across the Northwest Coast the villages and camps that made up each community were comprised of anywhere from tens to hundreds and occasionally thousands of people. Collaborative extended family units of approximately 10-50 people generally resided together in large square or rectangular wooden houses (Matson 2003; Suttles 1990b; Nabokov & Easton 1989). Across the region the house styles differ but are typically defined by their large size and a preference for cedar plank construction in the proto-historic period. Single-pitch plank houses or gable roofed houses were the common design styles, though there were many variations. The Coast Salish created single-pitch plank houses utilising a post and beam construction style that allowed the building to be modular and expandable, based on the number of family members needing to be housed (Nabokov & Easton 1989; Suttles 1990b; Figure 2.2; Figure 2.3). The Nuu-chah-nulth created single-pitched or shed-style houses that were known for their enormous size (Nabokov & Easton 1989). The Kwakwaka'wakw built both single-pitch plank houses and the gabled house style that was most prominent throughout the rest of the Northwest Coast (Codere 1990; de Laguna 1990; Hamori-Torok 1990; Figure 2.4).

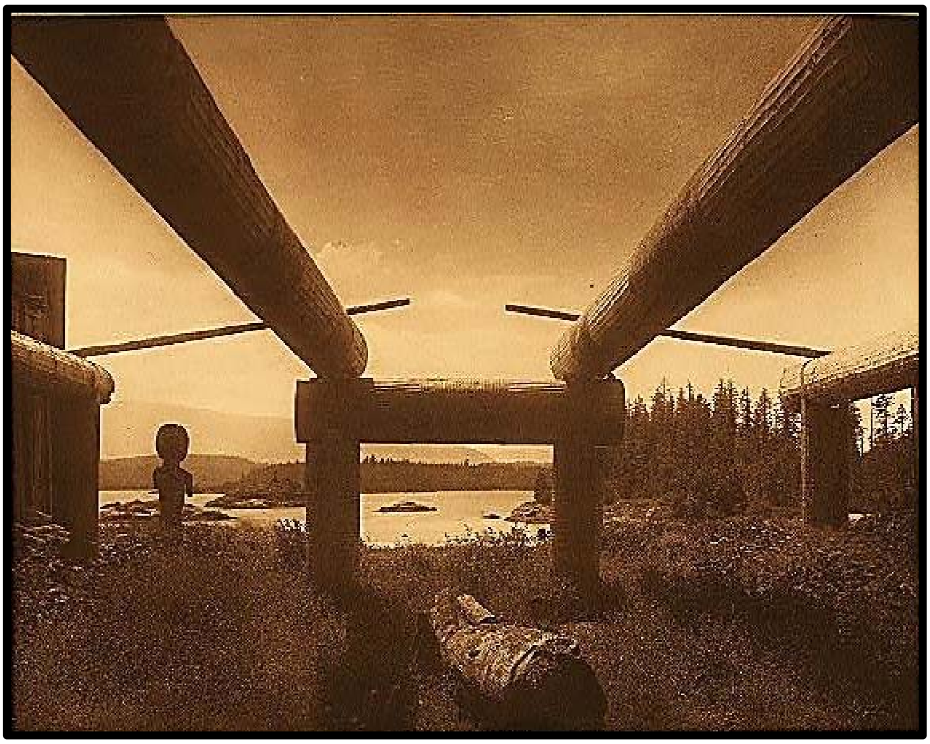


Figure 2.4. A Kwakiutl gable house-frame with two roof beams located at the village of Memkumlis (Curtis 1916c).

The precise details of a Northwest Coast house, including the location of the house within the village, which house and in what location within the house the Chief would reside, and the location of the smoke hole and fire pit, are specific to each culture group. Ames argues that higher status families occupied the larger houses in villages and thus should be distinguishable (Ames 2001, 8). Although this reduces a complex culture area into a neat social order, it is often described as a commonality throughout the region. For example, slaves among both the Tlingit and Coast Salish often slept in the outer peripheries of the houses where it is coldest, while high status families resided nearest the head of the household (Matson & Coupland 1995, 6; Moss 1993; Ames 1994, 210; Wilk & Rathje 1982; Matson 2003, 9).

Construction strategies of the gable houses varied throughout the region, for example the number of roof beams ranged between two and six (Swanton 1909; Vastokas 1966; Figure 2.5), and the extent that the outside walls were tied into the beam framework to keep the weather out differed significantly (Inglis *et al.* 1990; Dunn & Booth 1990; Stewart 1984). Houses were slightly smaller in Tlingit territory, which was potentially due to a combination of reducing the amount of space to heat up in colder temperatures, and the relative scarcity of cedar trees in the more northern latitudes. As such, the Tlingit traded for the material with the Haida and Tsimshian prior to the fur trade era (Stewart 1984, de Laguna 1990).

Figure 2.5. Six beam gable roof cedar plank houses at the Haida village of Cumshewa (Dawson 1878).

2.1.1.3 Resource Management and Procurement

The Pacific Northwest is a rich and diverse landscape; a temperate boreal rainforest of cedar and hemlock with access to a wide range of seasonably available terrestrial and marine resources throughout the year (Ames 1993, 1994; Kelly 1991; Matson 2003, 3; Schalk 1981; Suttles 1990b, 1968). Prior to the fur trade, Indigenous people living in the region were semi-nomadic broad-spectrum foragers, obtaining resources through hunting, fishing, and gathering (Ackerman *et al.* 1985; Ames 1994, Borden 1975; Cannon 1991; Carlson 1979; Cressman *et al.* 1960; Matson 1976). Salmon was a major source of sustenance and became a continually exploited resource from approximately 3000-3500 BP (Matson 1992). Coastal shellfish, herring, halibut, rockfish, marine mammals, waterfowl, deer, caribou, moose, mountain sheep and goat, and small mammals such as marmot, made up the additional varied seasonal protein (de Laguna & McClellan 1981; McClellan & Denniston 1981; VanStone 1974). This was supplemented by tubers such as wapato, berries, and other sometimes semi-domesticated vegetables and grains (Matson 2003; Wenstob 2011, 138; McDonald 2005, 252-3). Procurement patterns and management strategies within the region were influenced by the specific timing and location of foods, highlighting the intimate knowledge and manipulation of a wide-ranging geographical area, including changing environmental cycles, migratory faunal patterns, and seasonal flora (McClellan & Denniston 1981; Ridington 1988; 1982).

To make the most of the goods available on the Northwest Coast, the Chief and other elite members of the village worked to provide the coordination and specialism required for intensification of resources. This is typical of villages and towns throughout the region, and with good management a rich and varied diet was harvested (Suttles 1990b; Ames 1993). Resources were carefully managed and shared within groups, and occasionally between them, requiring a limited amount of collaboration. For example, multiple villages harvested salmon every year for subsistence throughout the Northwest Coast, sharing the banks of salmon bearing rivers and streams during key parts of the year. To maintain a sustainable resource for each group as the salmon ran inland, collaboration and management was required. In some instances, communication occurred across the boundaries of ethnolinguistic groups, and with people residing outside of the region (Lepofsky & Caldwell 2013; Trosper 2003, 3). This considered and intentional management reveals a population that is not only well-aware of its neighbours, but willing to collaborate.

Chiefs and elites also coordinated strategic meetings with other communities, both inside and outside of the territorial extent of their language families, for trade and activities such as marriages and Potlatch events (Matson 2003; Ames 1994). In some cases, such as between the Eyak and Tlingit, the fluid membership between culture groups allowed social and material movement across ethnic boundaries (Donald 2003; Osgood 1937; de Laguna 1972; Suttles 1990b). Considering material culture, these meetings mean that goods which are shared and gifted at coordinated events can move into new cultural spheres that may view and value the objects in entirely different ways. This has strong implications concerning the interpretations of copper artefacts included in this research because the liminal spaces that objects pass through as they move across social boundaries between people, related communities, and different ethno-linguistic families are important to the biography of an object including how they were valued and utilised in new environments.

2.1.2 The Potlatch & Other Events

All of the culture groups residing in the Pacific Northwest took part in reciprocal gift giving events known as the Potlatch, where property and prestige were re/distributed, along with other events such as feasts and dances. These events occurred at planned times throughout the year (Figure 2.6). Events such as the Potlatch allowed elites to distribute accumulated wealth and resources on a large scale, while simultaneously accruing social prestige, notoriety, and community obligations in return (Carlson 1990; Carlson & Hobler 1993; Tybjerg 1977). Although the sharing of resources seems to run counter to wealth accumulation, it has been argued that this strategy has contributed to the long-term success of the Indigenous populations on the Northwest Coast. Thus, competition and cooperation existed in a dialectic relationship and physical objects were often regarded as transient (Lane 1981; McClellan 1975b; McKennan 1959; Reckord 1983; Savishinsky & Hara 1981; Simeone 1995, xviii).

Potlatch events were perpetuated, in part, due to a common social understanding among Northwest Coast communities in the proto-historic period. Specifically, that status, wealth, and privilege were related to the ownership of ceremonial names and titles accumulated through years of inheritance and savvy social manoeuvring (Cooper 2011; de Laguna & McClellan 1981; Boas 1935; Boas & Hunt 1906; Donald 1997). There is no standardised format for these gatherings across the region, as they are created in-line with each community's traditions. Neither were these events static and "there is ample evidence to show that both specific ritual acts and whole concepts were moving from group to group during the early historic period and, according to native tradition, for generations before that" (Holm 1990, 378).

In the proto-historic period a Potlatch or other event might be thrown for several reasons. Mortuary Potlatches marked the deaths of high-ranking individuals, and often served as a venue for the transfer of titles, rights, and names to heirs. This type of ceremony might also involve the raising of a memorial pole (de Laguna 1990, 220). Property distribution, feasts, dances and other ceremonies and may also be held in response to a perceived insult, to repair a damaged reputation, and to mark a birth or marriage, or honour a high-ranking guest (Blackman 1990, 252; de Laguna 1990, 220). House Chiefs were expected to host such affairs frequently in order to maintain status within the community (Blackman 1990, 252; Ames 1995).

Figure 2.6. A view of a Kwakwaka'wakw winter ceremony as photographed by Edward Curtis in 1915. The Chief who is hosting the dance is standing on the left holding a speaker's staff and wearing a cedar bark neck-ring and headbands. To the very left the painted panels of the entrance way are visible. The central pole in the image, placed between two house posts, is a part of the dance and two of the five open mouths the dancers pass through are visible (Curtis 1915).

Although there were rough standard prices for subsistence goods, many items on the Northwest Coast fluctuated in price based on their current social standing (Drucker 1951, 110; Voutsakis 1997, 36). Exclusive categories of prestige goods were used for exchanges that took place on a regular basis prior to the fur trade and subsequent colonial era. During the ceremony, goods were assigned an exchange order rather than a strict price, and objects involved in the activity gained value from participating. Essentially, the object's own status and cost was directly related to its rich history of use and interaction, and it was able to gain notoriety over time, which could then be shared with individuals who came to possess it (Drucker 1951; de Laguna 1972; Legros 2007; Suttles 1963).

Within a Potlatch, protocol required that each gift given by the host was of equal or greater value than gifts previously received at past events, highlighting the importance of the accrued value of things (Mauss 1990[1954]). Individuals were assigned positions of prestige within the ceremony, related to their own status in the cycle. Those who had travelled a long distance or who had access to rare or important resources were given preference, as value and rank were linked directly to the ability to possess powerful and culturally restricted objects (Cooper 2006, 154; de Laguna & McClellan 1981; Grinev 1993; Kari 1986; Pratt 1998; Tybjerg 1977). This practice of reciprocal exchange was carried on throughout the fur trade period, leaving multiple ethnographic accounts of European traders obliged to participate in lengthy Indigenous ceremonies, with varying levels of enthusiasm, prior to an exchange of goods (Grinev 1993; Kari 1986; de Laguna & McClellan 1981; Pratt 1998).

2.1.2.1 Mortuary Practices

By the proto-historic period, mortuary practices reflecting social status had been long-established throughout the Pacific Northwest, although this looked very different among and between different culture groups (Ames 2001; Ames & Maschner 1999; Cybulsky 1992; Murray 1981; Severs 1974, 1973). The Tlingit and Nuxalk utilised elevated mortuary boxes suspended on constructed scaffolds or in trees (Niblack 1890, 351-61; de Laguna 1972, 539-545; Hobler 1990, 300). Among the Tlingit, bones or ashes could subsequently be placed in niches carved into a mortuary pole. After the body had been dealt with there was a memorial Potlatch where the ceremonial names and titles of the deceased were passed on in what is seen as reincarnation (de Laguna 1972, 978).

Throughout the central portion of the region, mortuary boxes were sometimes placed on the ground and covered by a small tent or house (McIlwraith 1948, 449-450; Hobler 1990, 300). Bodies of elites and shamen were sometimes left in caves or rock shelters as well (Halpin & Seguin 1990, 277-8). Presumably, these are the burials that Captain James Swan was disrupting on Haida Gwaii while collecting copper bracelets and artefacts for museums in the 19th century (Swan 1874, 13). Among the Tsimshian, Nisga'a, Gitxsan, and Nuxalk, cremation and the burning of mortuary goods followed by mortuary Potlatches and feasts were a common theme (Halpin & Seguin 1990, 277-8;

Prince 2002, 56). The Haida created subterranean grave houses and erected memorial poles (Blackman 1990, 254).

In the south a mix of cremation, memorial poles, and occasionally suspended mortuary boxes can be found (Arima & Dewhirst 1990, 407). The practice of creating stone burial cairns or mounds is also found in the south, a practice that seems virtually absent from the north (Hajda 1990, 512; Kew 1990, 479). The practice appears from approximately 4-500 AD and is much different from the midden burials that had previously been common (Ames & Maschner 1999). Cairns were generally used to house a single burial while mounds could be used for one or multiple people (Thom 1995, 19; Mathews 2006; Hunt 2015, 36). Based on her work at Scowlitz site (DhRi-16) Lepofsky noted that it appeared that grave goods and particularly those that suggest status are predominantly restricted to the largest mounds (Lepofsky *et al.* 2000).

Burials of both men and women across the regions show evidence of ascribed as well as earned status by the 'Middle Pacific period', between 1850 BC and 500 AD. This is based on a combination of body placement and whether grave goods were included (Ames 1994, 2005; Ames & Maschner 1999; Cybulsky 1992, 167; Brown 2003, 154; Archer 1996). However, a study reported by Burchell in 2006 found no difference overall in the likelihood of grave goods being placed with males or females across the defined region (Burchell 2006, 251-4). At the same time, she also notes that there are significantly more grave goods found in the south. Burchell, alongside Matson & Coupland (1995, 242), warn against the possibility of making any assumptions based on the available data on mortuary goods, as the picture remains too sparse. This is a direct challenge to studies that have asserted such things as a strong gender or age bias (Ames & Maschner 1999).

Within Coast Salish territory in the prehistoric period, the status of the individual generally coincided with the size, location, or elaboration of the burial mound or cairn, or the number, type, and value of the grave offerings throughout the region (Lepofsky *et al.* 2000; Hunt 2015; Hill-Tout 1930; Blake & Brown 1998). Burial goods could range from labrets and beads to weaponry and ceremonial goods, constructed from prestige materials such as copper, and abalone (Ames 2001; Cybulsky 1992; Murray 1981). Evidence from Coast Salish midden burials, such as standardised body placement, grave goods, and burial effects suggest that wealth and status differentiation was in place at least 2400 B.P.

(Lepofsky *et al.* 2000; Mitchell 1971; Matson & Coupland 1995; Burley & Knüsel 1989; Hunt 2015).

2.1.2.2 Changes to Social Organisation in the Colonial Period

The impacts of colonialism to the social organisation of the Northwest Coast can be seen in the changes in Indigenous practices that occurred throughout the region. Colonialism is not a single event, and a range of influences, stresses, and other factors contributed to the changes stemming from the introduction or development of new materials, technologies, political and social structures, and disease. Some of these impacts are readily visible and suggest a world of negotiation and change (Neylan 2000, 51; Oliver 2013, 2014; Jordan 2009), and are explored in more detail in Chapter 3.

The impacts of intercultural relations and colonial entanglements felt on the Northwest Coast are often roughly divided into two periods. Specifically, there is the period which occurred prior to the mid nineteenth century which predominantly involved the maritime and then land-based fur trade. This was followed by the colonial period where groups of colonists began establishing physical footholds in the region (Oliver 2013, 101). During the fur trade, early encounters were more short-lived, and the Indigenous people and foreign explorers and traders were able to influence outcomes in a relatively equal way. During this time, Oliver argues, Indigenous cultural logics remained largely unaffected (Oliver 2014, 39; Turgeon 2004; Saunders 1998; Neylan 2000, 56; Fisher 1977, 27). As the fur trade came to an end, a variety of colonial regimes were established in the region which can be characterised by the local continuum of consequences resulting from the contingent choices made in each place and time. These can range from cooperation and collaboration, to dominance, oppression, and warfare, and are made by both the Indigenous people and colonists in the region (Oliver 2014, 39; Jordan 2009).

Oliver and Thom describe the social disruption that occurred in the colonial period, which began to take hold in mid-19th century, as aiding in the shaping of a situation where the coming together of different Indigenous populations and colonisers could create a ‘virtual’ form of Indigenous identity that de-emphasised older local social practices and traditions (Oliver 2013, 105; Thom 2009). During the fur trade prior to the colonial period, oral histories and ethnographic accounts commonly describe Indigenous interactions on local terms, within and between villages of people whose identity was related by kinship and other local social ties (Barnett 1975; Duff 1952; Suttles 1990b). From the mid-century onward, smaller local groups begin to consolidate. This happened for several reasons and worked to homogenise some diversity within groups, however it also created an environment for emerging forms of nationalist unity that could give Indigenous communities a more unified voice to assert rights (Lutz 2001, 64; Oliver 2013, 107).

These relationships were further complicated by the creation of new social distinctions and histories based on new shared experiences among and between Indigenous people and colonists (Oliver 2013, 105). For example, the Indigenous uptake of seasonal wage labour offered at hops farms and canneries could be interpreted as a binary opposition of colonisers employing the colonised. However, these situations brought together people from wide ranging communities on the Northwest Coast, creating opportunities for new forms of interaction that could potentially cross-cut old kinship and linguistic networks (Oliver 2013, 106; Tennant 1990, 51). Furthermore, a closer look reveals that, from another perspective, Indigenous peoples had recognised a type of relatively lucrative work that could be fit into their annual resource procurement timeline and took advantage of the situation (Carlson & Lutz 1996, 119).

The role and powers of the Chief began to change and become more structured across the Northwest Coast as the fur trade era progressed, and the idea of a 'Great Chief' developed (de Laguna 1983). This is not an Indigenous term, but one used by anthropologists to discuss this emerging level of power. The Great Chief could have influence over several villages and do things such as command tribute and organise raiding parties (Ames 1995, 170). There is some debate about this timing; Stearns (1984) and Garfield (1939) argue that this role already existed among the Haida and Tsimshian to some degree, but it is clear that power structures were shifting. Placing increasing amounts of community decisions into the hands of a singular overarching leader is more in line with a westernised power structure than Indigenous practices prior to the late 18th century. This choice could indicate various issues such as a level of uncertainty within Indigenous populations regarding the outcome of their choices, an attempt to counter colonial structures and leaders with a kind of parity, or the outcome of multiple communities coming together in the colonial period.

Changes in house construction also took place across the region through the fur trade and colonial period. Codere (1990) has suggested that the artistic decoration of the outside of Kwakwaka'wakw houses became more elaborate in the early colonial period. The Tsimshian, Gitxsan, and Nisga'a began incorporating milled lumber, hinged doors, and windows into their houses in the early 19th century. Some of these choices were potentially inspired by the western houses built at Fort Simpson, located near the Tsimshian village Lax Kw'alaams, in 1834 (Dunn & Booth 1990; Inglis *et al.* 1990; Nabokov & Easton 1989). The Tlingit also began using milled lumber, nails, and hinged doors in their construction, and started partitioning rooms within the houses. By the mid-20th century the Tlingit were building some single-family dwellings in their villages (de Laguna 1990; Stewart 1984).

Mortuary practices fluctuated significantly in the colonial era, and below ground burials that utilised a milled lumber coffin became increasingly common through the 19th century (Prince 2002, 55; Burchell 2006, 253; MacDonald 1973, 4). There are elements of colonial pressure perceptible in these actions. For example, Russian missionaries and colonisation in Tlingit territory brought Russian Orthodoxy to these northern communities, and by the 1830's between 40-50% of the Tlingit population at Sitka had accepted baptism while cremation had become largely side-lined. From another perspective, Kan suggests that Tlingit communities chose to convert for various complex reasons based on perceptions of power, prestige, and rank. This includes a bid to gain access to more Russian goods, and an uncertainty felt towards traditional healers following deaths caused by smallpox and other diseases (Kan 1987, 36). These actions are contingent to the people and circumstance however, and the Nuxalk residing at Kimsquit further down the coast appear to have experimented with a mix of burial practices as they navigated the colonial era. By the late 19th century the Kimsquit burial grounds contained a number of interments where the individual was placed in a European style box or coffin which was subsequently placed inside an Indigenous grave house and accompanied by a mix of European and Indigenous grave goods (Oliver 2014, 39; Prince 2002).

Evangelical Christian missionaries played an important role in the changing social landscape of the Northwest Coast in the colonial period. They arrived in the region during the fur trade with established European and Russian ideas of what civility looked like and how Indigenous people should be living their lives (Neylan 2000, 68-9). Russian

Orthodox missionaries had established missions in the Aleutian Islands and Alaska by the early 19th century, and on the Northwest Coast missions formally begin in 1857 when the Anglican Reverend William Duncan established his first mission at the Hudson's Bay Company's Fort Simpson, among the Tsimshian (Neylan 2000, 57; Miller 2000a, 12). Duncan's endeavours are an example of how missionaries worked with the colonial government structure to manage Indigenous people (Neylan 2000, 78-9; Work 1945, 39; Acheson & Delgado 2004, 69-70; Mackie 1993: 143-159). Missionaries often based success on the outward signs of Victorian 'civilisation' such as Indigenous involvement in industrial and commercial activities, church attendance, and moving from traditional houses into Victoria style homes designed for nuclear families (Neylan 2000, 70). To this end, the Reverend William Duncan founded the Anglican mission of Metlakatla in 1862 on the site of a recently abandoned village (Perry 2003 600-604; Duff 1997, 138). Duncan's express purpose in establishing this separate site was to consolidate and isolate converted Indigenous peoples and keep them away from traditional practices and the negative influence of the Euro-Canadian settlements (Neylan 2000, 57).

Indigenous religious conversion was a complex affair involving many negotiations, among and between Indigenous people and colonial missionaries. Neylan argues that the Tsimshian for example had a tradition of incorporating useful practices, ideas, and rituals they discovered outside of their territories into their lives, and that the authority, power, and class structure of missions echoed Tsimshian practices (Neylan 2000, 58). Missions among the Nisga'a were also established quickly as, for the first few decades of their presence the Nisga'a village life, economy, and political organisation largely remained similar to that during the fur trade except they also had access to colonial goods and power through the mission (Patterson 1992; Neylan 2000, 63). Additionally, the Tsimshian linked supernatural powers and class structures, meaning that the transformative experience of conversion paradoxically allowed high ranking people to maintain and even reaffirm their societal positions (Neylan 2000, 54; Duncan 1869, 105). As such, Indigenous people appeared to acquiesce to missionary desires, while at the same time positioning themselves to attain additional power and wealth from the colonial structure (Neylan 2000, 86). In fact, it is possible that the success of some versions of Christianity over others on the Northwest Coast is related to how compatible those religions are with established Indigenous views. As such, Methodist, Salvation Army, Roman Catholic and Anglican faiths were more successful at converting Indigenous people than Pentecostal churches such as the Seventh Day Adventists (Neylan 2000, 57-9), and these denominations had managed to convert a significant portion of the Indigenous population of the Northwest Coast by the end of the 19th century (Arima & Dewhirst 1990, 410; Canada, Dominion of 1893, 235; Canada, Dominion of 1899, 240-1; Canada, Dominion of 1901, 149). This suggests that Indigenous and colonial agents were both making decisions designed to best serve themselves in a complicated colonial negotiation of social change.

The power negotiations that occurred between missionaries and Indigenous communities affected the region significantly and can be detected in several ways. For example, while missionaries sought to civilise Indigenous people through language education that they felt would help them better understand the gospel, Indigenous people sought to learn colonial languages in order to better their position socially. Specifically, European reading and writing skills meant that Indigenous people could take more effective action in everything from trade deals to government petitions (Harris 2002, 206; Tomlinson 1885; Cole 1985, 253). To this end the Tsimshian actively demanded day schools at Metlakatla from the beginning of the mission's establishment (Neylan 2000, 73; Collison 1981[1915], 98-9). While colonial teachers were concerned with attendance, Indigenous students worried about the quality of their teachers (Neylan 2000, 75).

Colonial tensions are also detectable in the way that missions were physically organised and designed. For example, the Tsimshian at Metlakatla may have appeared to live in Victorian style structures, yet the primary demographic who held property remained. Additionally, inside the European façade of these structures Indigenous people sometimes incorporated some of the planks from their traditional houses in the construction. In fact, some houses at Metlakatla were altered to create a large central room where extended families could sit around a fire, reminiscent of traditional housing practices (Susman *et al.* 1979, 10; Garfield 1939, 280). The geographical positioning of many buildings at Metlakatla also remained spatially consistent with the class-based and ranked community geography that had previously existed at traditional Tsimshian village sites (Neylan 2000, 79; Cooper 1993, 314). Furthermore, high ranking Indigenous people had more elaborate houses with high status goods such as windows, which were virtually non-existent prior to the arrival of colonial materials (Neylan 2000, 79; Miller 2000a, 39; Perry 2003).

Conflict and tension in the colonial era were navigated in a dialect of actions that, although uneven in power distribution, did not remove Indigenous agency. People made a variety of choices often arising from direct actions, strong beliefs, and unintended outcomes. For example, matrilineal practices related to inheritance and succession did not conform to colonial civility that favoured patrilineage (Neylan 2000, 81; Susman *et al.* 1979). This issue would have been confronted often because ceremonies related to births, deaths, and the Potlatch for example, were important to Indigenous communities and were directly related to social relationships and kin ties. Missionaries attempted to alter this situation, and colonial laws were later implemented that were designed to prevent such ceremonies and encourage things like patrilineage and nuclear family dwellings (Loo 1992, 133; Wells 1987, 103; Williams 1983, 68; Blackman 1990, 256). In response, banned ceremonies went underground in some places (Alfred 2004, 123; Cole & Chaikin 1990, 143), while in others some Indigenous people chose to take up proselytising the new religions themselves (Neylan 2000, 63). Conversion also offering people who were previously socially restricted to a low or slave class access to new opportunities, privileges, and power that were previously unavailable. This worked to subvert the traditional class structure that was being reinforced in other ways (Neylan 2000, 51; Oliver 2014). Additionally, there was an unease among European missionaries concerning Indigenous people who chose to take up the work, as they could alter or challenge Euro-Canadian ideas to more comfortably align with their own established ontologies (Neylan 2000, 65-6).

The Potlatch system was also altered by colonial pressures. Prior to the influx of colonial trade materials, the Potlatch was smaller and more reserved. However, several factors caused social displays and challenges of power to become larger, more frequent, more elaborate, and more important to Indigenous people during the colonial period (Miller & Boxberger 1994; Codere 1961, 369; Loo 1992). For example, population decline from factors such as disease removed key elite Indigenous players from inheritance structures, causing disruption (Boyd 1999). Additionally, consolidated populations comprised from multiple villages and ethno-linguistic groups could bring unresolved social tensions into a shifting social landscape. These pressures worked to spur on Potlatch events designed to reaffirm old and legitimise new claims to social power (Codere 1961, 369; Harris 2004; Turner & Turner 2008).

Consolidated Indigenous settlements were often established near to colonial trading posts and forts in the 19th century (Neylan 2000, 56-7). This too is a complicated and multifaceted issue. Indigenous communities who had established themselves in such locations were positioned to take advantage of European and Russian trade opportunities and goods with minimal travel (Neylan 2000, 57). They were also strategically positioned to act as middlemen between the trading post or fort, and other Indigenous groups (Harris 2004; Harris 1997, 76-85; Fisher 1977, 27-8). These strategies added to the wealth available within the community and contributed to the seeming expansion of the Potlatch (Codere 1961, 445,464; Loo 1992, 143; Grumet 1975, 301; Cole & Darling 1990, 132; Schreiber & Newell 2006, 226). It is worth noting that the new opportunities afforded by colonial wealth extended to acts of subversion. For example, individuals who had previously been restricted from access to the Potlatch and other events could use goods attained outside of established Indigenous systems to buy their way in (Wolf 1999a; Schreiber & Newell 2006, 226). From a colonial perspective, particularly at the close of the fur trade, it was perhaps challenging but also beneficial to have a somewhat permanent Indigenous trading community nearby. Colonial power has a radius of control that only extends so far from the colony, and this was well understood in the 19th century (Jordan 2009, 35). To this end some trading posts sought to introduce the idea of 'credit' into trade in order to more firmly establish links of obligation, and debt that kept Indigenous people near (Burley & Hamilton 1991, 17; Mackie 1993, 167).

The colonial era on the Northwest Coast was a time of significant change for all of the Indigenous people living in the region. However, the wide range of events, people, actions, ideas, and objects articulate into different types of lived experiences that range from collaboration to outright warfare (Grinev 2005, 127-138; Oliver 2014; Harrison 2014, 37). It is only through an examination of these many agencies and outcomes that interpretations of the impacts of colonialism can be made, disengaged from the old binary tropes that flatten and divide, leaving us with the patchwork of humanity (Hayes & Cipolla 2015, 3).

2.2 Part II: The Use of Copper on the Northwest Coast

The Indigenous use of copper on the Northwest Coast is assessed here, against the contextualised backdrop of the area discussed in Part I. The known meaning and perception of the metal, its collection, and its use, are assessed within this region of imprecise borders. The aim is to gain an understanding of changes that occurred through the proto- and historic periods, and to use this data to inform the biography of the copper artefacts included in this study.

2.2.1 The Meaning of Copper, A Defining Feature

The perception of copper as a powerful and valuable material in the region plays an essential role in the definition of the study area. This is due, in part, to the placement of copper as an important material within the animate ontological perspectives of the Indigenous people, who considered both the natural and supernatural worlds as powerful places (Boas 1916, 305, 416; Boraas & Peter 2008; de Laguna & McClellan 1981, 645; Nelson 1983; Suttles 1990b). These worlds, physical and metaphysical, coexist in a relationship that reinforces and legitimises an object or being's power as an animate or sentient part of the universe (Cooper 2007, 197). Copper was involved with the unseen supernatural world and possessed the potential to act as a powerful contributor to an individual's social standing in both positive and negative ways as it saw fit. Specialised knowledge and religious precautions were central to successfully navigating any engagement with the metal (Bird-David 1999; Cooper 2011; Gell 1998, 22; Nelson 1983).

Multiple Indigenous oral traditions recorded across the Northwest Coast, from the arrival of European and Russian explorers and traders to the present, detailed histories and myths that describe the metal's power. For example, a Nuxalk myth recorded by McIlwraith sometime between 1914 and 1922 depicts copper as powerful, able to attract wealth, and able to protect:

> "Raven decided to lure a supernatural being to his house, and so he made some copper into bangles and tied them to his baby's cradle. Their jingling attracted *Atquntam*, who sent a tiny supernatural being in human form. Raven caught it in a blanket and kept it in a sack. It brought wealth to him so that he could give a potlatch each year. Raven's son, who was successful in killing his father's enemies, was unable to kill the villagers who lived in the west because the houses, streets, and people were made of *taitaimx*, a kind of copper, against which his salmon-canoe was powerless" (Mcllwraith 1948, 2 :688-90; Jopling 1989, 17).

Boas and Hunt (1906, 81-2) recorded multiple Kwakwaka'wakw stories at the end of the 19th and beginning of the 20th century pertaining to the importance and power of copper. For example, the Nimkish Kwakwaka'wakw informed Boas and Hunt that the sun, which is thought of as both a natural and supernatural being, is made of copper and able to impregnate mortal women with its rays. Boas and Hunt also wrote that, among the Kwakwaka'wakw, copper originates from a supernatural being who lived under the sea in a copper house with many copper possessions. This being could choose to give its copper possessions to worthy individuals, even if the recipients were not deemed so by their own village members. The metal subsequently aided in raising the recipients' social standing (Boas & Hunt 1906, 70-77). McIlwraith (1948, 317) recorded a similar story among the Nuxalk, where copper gifted by a supernatural undersea creature elevated individual standing. De Laguna found a similar sentiment among the Tlingit when she recorded an oral history in 1952 that describes a slave woman and her son who are treated very poorly until they discover copper with the help of a supernatural spirit. The mother and son carry the material back to their village and invoke it, elevating their status within their community (de Laguna 1972, 899-900; Jopling 1989, 16). At the beginning of the 20th century Swanton wrote of the Haida describing their home island Haida Gwaii as resting upon a supernatural being known as 'Sacred-One-Standing-and-Moving' who lays upon a copper box for protection (Blackman 1990, 248; Swanton 1905). This tradition persists; at the end of the 20th century the Nuu-chah-nulth describe the trickster Raven as often riding in a copper canoe, and powerful Thunderbird as living in a copper house (Hoover 2002; McMillan 1999).

Copper was also considered to have curative powers, and multiple oral histories discuss its use both on and in the body for healing. The Haida, Kwakwaka'wakw, Tlingit, and Nuu-chah-nulth were observed by early explorers and traders in the late 18th century adorning their children in copper-wrapped objects. Additionally, various copper items are included within burials, with the understood purpose of ensuring health for the living and safety for the dead (Acheson 2003, 227; McClellan 1975b; Colnett 1786-88, 136). Southern Tutchone girls would wear pieces of copper to guarantee good health during their puberty confinement and kept copper in their mouths to ensure strong and healthy teeth into old age (McClellan 1975b, 256). McIlwraith writes that, among the Nuxalk in the early 20th century, a sure way to cure disease was to scrub the metal using a rough stone and water so that the owner may ingest the metal shavings as a curative (McIlwraith 1948, 254).

Copper was also associated with other features and substances in the world thought of as powerful and linked symbolically with important aspects of life such as salmon, the sun, blood, and red cedar (Boas & Hunt 1906, 80-113; Goldman 1975, 82; Jopling 1989; King 1999; Suttles 1990b). King describes the Kwakwaka'wakw calling copper '*tlaq'*, meaning blood, and linking both materials with red cedar tree rings and the cannibal spirit 'Man Eater' (King 1999), while the Mowachaht Nuu-chah-nulth called salmon '*hita'utl'*, meaning 'bright fish', after their word for copper (King 1999, 129, 160). Boas recorded the Tsimshian as linking salmon and copper based on shared colouring, procurement location in river beds, and perceived importance, describing copper as able to transform into salmon and *vice versa* depending on the material's attitude (Boas 1916, 301-5; Jopling 1989). The first salmon caught each season is sometimes honoured in a 'First Salmon' ceremony where a copper knife is used on the fish to show respect. Subsequently the bones, and often accompanying copper objects, are returned to the water to ensure the salmon are properly respected and guaranteeing abundant future stocks. This practice is still sometimes carried out today (Gunther 1926; Johnsen 2009; King 1999). McIlwraith also writes of collecting copper in an oblique way, describing a practice of using the flesh and blood from a sacrificed slave to empower a spear that would then be used to hunt a 'salmon' in the river that was then warmed and pounded into copper (McIlwraith 1948, 253-4).

There is an inextricable sense of performance involved in First Nations' oral histories that can involve bringing people together at specific times and places and using specific material culture to engage in traditional practices. These are traditions that are often tied up in learned bodily techniques such as dance and song, and the complexity of the narrative often cannot truly be conveyed to the uninitiated or recorded two dimensionally on paper (Sommer & Quinlan 2018, 1-7). It is therefore important to note that many of these oral traditions were recorded in the 19th and early 20th centuries, by foreign ethnographers and explorers (Swanton 1909; Boas & Hunt 1906; Cook 1967). This means that a colonial and often westernised filter must immediately be considered, and it is entirely possible that stories were misunderstood or misinterpreted in a variety of ways.

Nonetheless, these recorded oral traditions regarding copper are important to the interrogation of Northwest Coast practices. These histories allude to the places where the material is collected, the power that it has, and the ways in which it should be implemented. The ubiquity of histories across the Northwest Coast that hold copper as a powerful and sentient material works to underscore a manner in which this is a unique region, while the diversity in actions and applications reveal the multiplicity of culture and the infinite possibilities of human agency.

2.2.2 Copper Procurement

Figure 2.7. A view of the sorted gravels of the Duke River in April, taken from the Alaska Highway in the Yukon Territory. This river is a drainage for the Wrangell-St. Elias mountain range and is a good example of a high potential native copper procurement environment (Picture by author).

Native copper is one of the most abundant elements found in its metallic form worldwide and can be found in rich deposits throughout the Pacific Northwest. These are primarily deposits from basaltic lavas and interbedded sedimentary rocks located throughout the region (Cooper *et al.* 2008, 1735; Wayman 1989b). The metal is formed as a precipitate or through chemical reduction of the sulphide and oxide ores present in the upper oxidation zones of this copper-rich geology. As such, native copper has a distinctly pure chemical composition (Acheson 2003, 214-5; Cooper *et al.* 2008, 1735; Cornwall 1956; MacKevett *et al.* 1997). Once formed, the metal deposits are subsequently exposed through erosional processes and spread throughout the Pacific Northwest in the gravelly riverbed drainages below the source (Cooper *et al.* 2008, 1735-6; Cornwall 1956; MacKevett *et al.* 1997; Figure 2.7). Oral histories detail the procurement of the metal using moose, caribou, elk, and deer antler digging tools to rake the river gravels and recover copper in sizes ranging from pea-sized nuggets to boulders (Brooks 1900; Sabina 1973; Schwatka 1996).

2.2.2.1 *Native Copper Sources from North of the Study Region*

Figure 2.8. A view of the Wrangell-St. Elias Mountain Range (Picture by author).

The majority of the native copper material in the Pacific Northwest originated in the river drainages of the Wrangell-St. Elias mountain range in Alaska. This is in the territories of Athabaskan and Eyak communities (Figure 2.8; Figure 2.9). Copper nuggets, boulders, slabs, and spongy dendritic masses have been recovered from areas including Kletsan Creek, White River, Copper River, Nizina River, Nebesna River, Chisana River, and Chitina River (Brooks 1900; Cooper 2006; Dall 1877, 34; Dunn 1844, 293; Franklin *et al.* 1981, 5-6; Hayes 1892; MacFie 1865, 152-3; McClellan 1981; McKennan 1959; Moffit & Knopf 1910; Paulsen 1976, 3-5; Reckord 1983; Figure 2.9; Figure 2.10). There was enough copper in the environment that Tutchone Athabascan peoples local to the area described the bases of mountains as containing 'boulders of copper' that provided the community with all the material they needed (Glave 1892, 877). The Ahtna were called '*?iqka* or *?iqkaha* (copper diggers) by their Tlingit trading partners to the south, who also described the Ahtna as the first to discover the metal and the knowledge to work it (Cooper *et al.* 2008; de Laguna & McClellan 1981, 662; Legros 1984; Swanton 1905).

While the copper rich areas of the north had been visited for at least 8000 years to hunt caribou, there was little to no occupation of the lowland areas of the Copper River basin prior to approximately 1500 BP when the ice sheets receded (Barclay *et al.* 2001; Calkins *et al.* 2001; Cooper 2012, 579; Dixon *et al.* 2005; Farnell *et al.* 2004; Hare *et al.* 2004; Harritt 1998; Potter 1997; Workman 1977). Ahtna, Athabaskan, Eyak, and Tlingit oral histories describe copper being brought to the northern Northwest Coast at approximately 1400 AD. The account describes an Ahtna group migrating approximately 300 miles from the copper-rich confluence of the Chitina and Copper Rivers to Yakutat Bay. The length of time of the journey is ambiguous within the oral histories, however while traveling the Ahtna encountered and intermarried with Eyak and Tlingit speaking

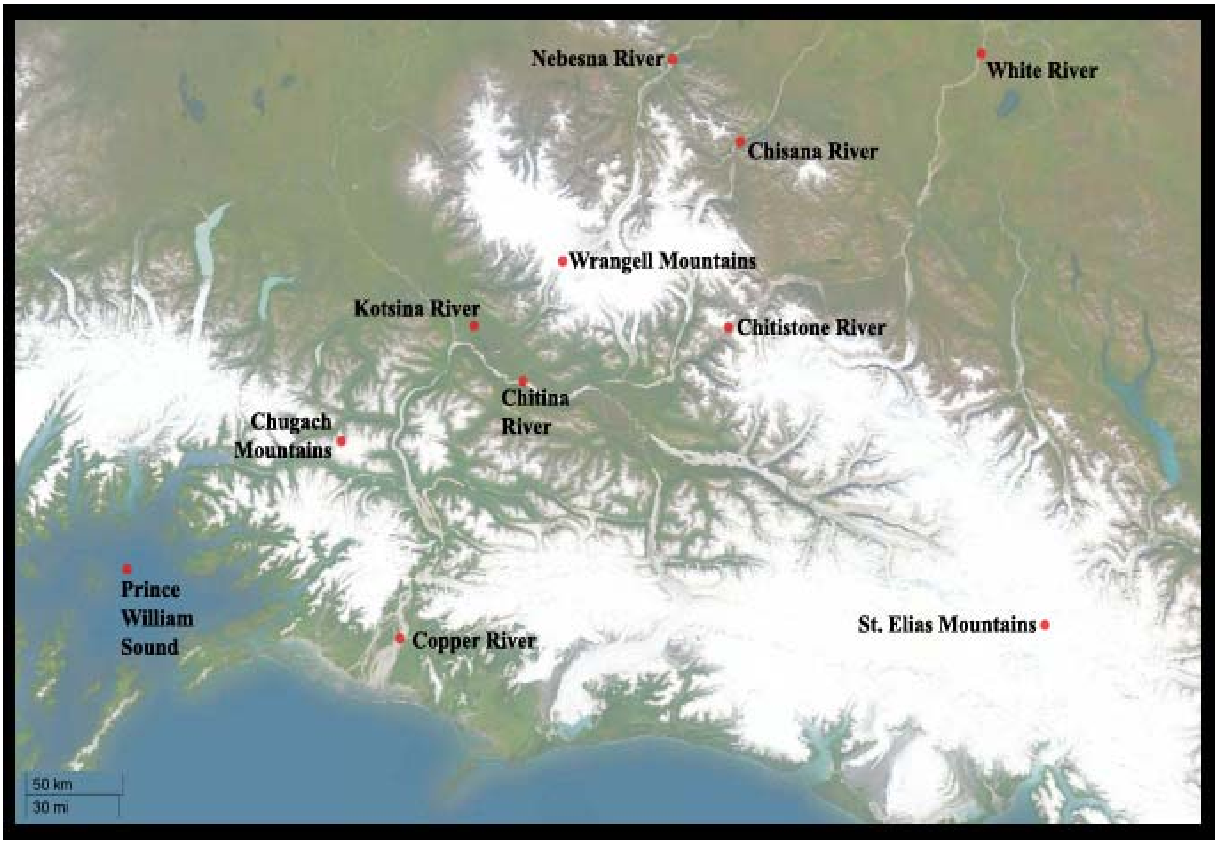


Figure 2.9. The view of the copper rich river drainages located in Eyak and Athabaskan Territory (Adapted from Palladio, Stanford).

groups. Following these interactions, the somewhat changed group arrived at Yakutat Bay around approximately 1400 AD, and discovered the area occupied by other Athabascan First Nations who mainly reside in the Alaskan interior north and west of the Eyak and Ahtna. The migrants purchased the area from the Athabaskans with high status *tináa's* (Copper shields) brought from the Copper River and then settled in the area (Crowell 2018; de Laguna 1972; de Laguna *et al.* 1964; Barclay *et al.* 2001; Thornton 2012). Donald's argument concerning the porous borders of the Northwest Coast and 'Tlingitizing' process occurring in the pro-historic period is supported by this history. Indeed migration, intermarriage, and trade are key features in this oral history (Donald 2003, 318-9). Additionally, this history further demonstrates that copper was being brought into the study region from northern communities (Cooper *et al.* 2016, 182).

Figure 2.10. A native copper slab recovered from the White River, displayed by the MacBride Museum, Whitehorse, Yukon Territory. The slab, weighing 1175 kg, was discovered in 1905 by prospectors (Pictures by author).

The Eyak, Ahtna and Athabaskan communities had a near monopoly on the trade in native copper moving into the Northwest Coast from northern areas. Heads of communities could become famous for collecting and possessing copper, thus procurement areas that were especially productive were kept profoundly secret (Shinkwin 1979, 27). Due to the importance of the material, there are a number of recorded place names describing copper in the landscape (Table 2.1). In some cases, these names can be interpreted as a claim of ownership (Cooper 2006, 2011; Vine de Loria 1981 in Basso 1996, 156; Kari 1986, 445). Cooper recorded the location of fifty-four distinct copper sources throughout Alaska and the Yukon Territory, many of which are known to be described in oral histories (Cooper 2012; Batement & McLaughlin 1920; Capps 1916;

Cooper *et al.* 2008, 1736; Kindle 1953; McConnell 1905; Mendenhall & Schrader 1903; Moffit & Maddren 1909; Rohn 1900; Schrader & Spencer 1901; Wayland 1943).

Table 2.1. Athabaskan Indigenous place names detailing copper procurement areas (based on Cooper 2011, 257).

Place Name	Translation	Cultural Group	Reference
Tsedi Na	copper river	Ahtna	Kari 2008
Tsedi Cae'e	copper mouth	Ahtna	Kari 2008
Tsedi Tu'	copper water	Ahtna	Kari 2008
Tsedi Ts'ese' Na'	copper stone creek	Ahtna	Kari 2008
Tsedi Ts'ese' Cae'e	copper stone mouth	Ahtna	Kari 2008
Tsedi Ts'ese'	copper stone	Ahtna	Kari 2008
Tsedi Ts'ese' Tates	copper stone pass	Ahtna	Kari 2008
Tsedi Tl'aa	copper headwaters	Ahtna	Kari 2008
Tsedi Na' Ngge'	copper river uplands (entire drainage)	Ahtna	Kari 2008
Tsedi Na' Luu' (Łuu)	copper river uplands (Chitina Glacier)	Ahtna	Kari 2008
Tsedi Ggalaaye'	copper mountain	Ahtna	Kari 2008
Tsedi Kulaenden	where copper exists	Ahtna	Kari 2008
Tsedi Kulaen Na'	where copper exists creek	Ahtna	Kari 2008
Tsetsaan' Na'	copper river (Chisana)	Upper Tanana	Kari 2008
Tsetsaan' Na' Tates	copper river pass	Upper Tanana	Kari 2008
Tsetsaan' Na' Luu'	copper river glacier	Upper Tanana	Kari 2008
Kelt-san-dek (Tsetsaan-digh)	copper creek	Upper Tanana/ Tutchone/ Ahtna	Orth 1967; de Laguna 1972
Eark-heene-nee	copper river	Tutchone/Tlingit	Glave 1892
Tsedi Bak'ilani	the one in which there is copper	Dena'ina	Kari & Fall 2003
Tsedi Bak'ilanitnu	creek in which there is copper	Dena'ina	Kari & Fall 2003
Kanawalek	copper place	Dena'ina	Birket-Smith 1953
Kanuwalem Kuiya	creek of one that has copper	Dena'ina	Bright 2004
I-oullit	copper river	Chugach	de Laguna 1972

The Yakutat Chilkat and Chilkoot Tlingit, acting as middlemen in the trade to the Pacific Northwest, travelled to the Copper River region to bring rough bars of copper back to Dry Bay and Yakutat Bay for processing and further trading to the south (Cooper *et al.* 2008; Dawson 1879; de Laguna 1972; de Laguna *et al.* 1964; de Laguna & McClellan 1981, 662; Legros 1984; Brooks 1900; Swanton 1905; Acheson 2003, 215; Kari 1986; Osgood 1937; Grinev 1993; Emmons 1991; Franklin *et al.* 1981; Swanton 1909). As copper procured in Northern areas moved southward down the coast, material attained by the Tlingit is known to have been purchased by the Tsimshian (Niblack 1890, 265) and the Haida (Swanton 1909, 160).

2.2.2.2 Native Copper Sources in the Study Region

Compared with the northern regions, native copper procurement appears to be less widespread within the study area, with evidence of these native copper sources within the Northwest Coast region remaining somewhat sparse (Hunt 2015). For example, a few ethnographic accounts describe potential copper sources within Haida territory (Acheson 2003; Couture & Edwards 1963; Gill 2009). A vein of copper was identified on the northern end of Haida Gwaii in 1862 by explorer Francis Poole (1872, 99), and a potential source in the same rough area was noted by Swan in 1883 while he travelled the island procuring artefacts for sale to museums (Acheson 2003, 215; Paulsen 1976, 3-5; Poole 1872, 99; Swan 1883, n.d.).

Matthew MacFie, while describing the precious materials available from the 'colonies' to harvest in the late 19th century, wrote of Indigenous people, presumably Tahltan, collecting native copper from Deer Island somewhere in the vicinity of Fort Rupert. He also described native nuggets being taken from the confluence of the Stikine River (MacFie 1865, 153). Unfortunately, MacFie was primarily concerned with gold and silver rather than copper, and does not describe the quantities procured, how these nuggets may have been prepared, or whom they may have been traded with. Through the 19th century multiple gold prospectors described native copper in every range of the Skeena River in Tsimshian territory (Large 1958, 59; Boas 1916; Drucker 1943, 1951). Unfortunately, these prospectors were also not very concerned with copper, and did not take detailed notes regarding Indigenous use if they witnessed it at all.

In the southern portion of the study area, copper has been recorded on Hope Island, and central and south Vancouver Island (Leaming 1973; Lincoln 1981; Paulsen

1976, 3-5). The metal is also found just east of the study area, such as the western end of Kamloops Lake, Merritt, and up the Fraser River in the British Columbia interior (Cooper *et al.* 2008; Dawson 1879, 116; Rapp *et al.* 1990, 491; Hunt 2015, 79-81).

Resource procurement sites in the Northwest Coast are known to have been managed, controlled, and to some extent kept secret (de Laguna 1972; Suttles 1990b), but it appears that copper sources in the region can be quite high-yield. For example, Haycox (1974) and Shinkwin (1975, 48) detail the story of Ahtna Chief Nicolai showing colonial explorers a copper outcrop in exchange for some provision in 1900. The site was quickly staked, and by 1906 the Kennecott Copper Corporation had been set up at the site. It is possible that the colonial and ethnographic records of copper procurement and metallurgical practices are vague due to these places and practices being purposefully kept hidden by Indigenous peoples.

2.2.2.2.1 The Implications of Copper Procurement Across a Large Region

The presence of native copper in archaeological contexts has been recorded as much as 1000 years earlier in southern portions of the study area, and potentially as early as 2500 BP in Coast Salish Territory (Ames 1994, 220). This seeming difference in the presence and use of copper between the south and north of the region may have been affected, in part, by the ice coverage in the copper rich areas of northern territories, while the south areas cleared earlier (Calkins *et al.* 2001; Barclay *et al.* 2001; Dixon *et al.* 2005). Due to this discrepancy in timing concerning the material's availability and use in different portions of the Northwest Coast, it is worth considering the implications proposed by Franklin. Specifically, either "1) widespread trade and intergroup contact allowed for the diffusion of finished artefacts and/or technology and/or raw material" or "2) Different cultural groups in different areas independently developed similar methods of working native copper obtained from local sources" (Franklin *et al.* 1981, 38). The information as it stands appears to support both of these arguments. Intergroup contact and diffusion of raw materials, technologies, and finished artefacts is known to have occurred throughout the region (Suttles 1990b). However, given the size of the region and disparities in the timeframe of copper use, it is possible that discrete metallurgical practices developed separately. These questions are important to the interrogation of copper artefacts from across the entire region. The specific fabrication strategies and materials employed provide some insight into diversity and diffusion of copper use.

2.2.2.3 *Shipwreck and Drift Metal*

Shipwrecks presented another source of material procurement, as vessels around the world were fitted with copper prior to and during the colonial period on the Northwest Coast (Acheson & Delgado 2004). The Chinese are reported to have used copper sheathing on junks in the early 17th century (Dear & Kemp 1976, 777). The Dutch were also employing copper sheathing at this time, and Dutch admiral Piet Heyn had his flagship coppered in the 1620's (Harland 1976, 1). Records also show that the Dutch East India Company had adopted the practice of sheathing their vessels in lead with a coppered sternpost, as found on the VOC *Nassau* (1606) wrecked off the coast of Malaya, VOC *Batavia* (1629), VOC *Vergulde Draeck* (1656), and VOC *Buitenzorg (1753)* (Bound 1998, 97; van Duivenvoorde 2012, 10).

In addition to copper vessel sheathing and ship fittings, exotic goods such as iron, glass, and foreign coins also found their way to the shores of the Northwest Coast (Acheson 2003, 216; de Laguna 1972; de Laguna *et al.* 1964; Keddie 1990; Swan 1870, 34-35). For example, Yorga discovered wrought iron fragments, and an assortment of drift copper artefacts, dating back to 1200AD along the western Alaskan coast (1978). Chinese coins have been found integrated into First Nations' designs and ceremonial artefacts (Keddie 1990). Indigenous individuals also acquired proto-historic trade goods such as iron and copper indirectly from Russia, Asia, and Europe through networks of Indigenous exchange with many participants (de Laguna 1972; Whitthoft & Eyman 1969; Cooper *et al.* 2016, 182).

Due to the currents in the Pacific Ocean it is possible that Japanese wrecks were being swept onto the Northwest Coast from as early as the Jomon period (Callaghan 2003, 92). However, during the Edict period that spanned from 1636 to 1867 Japan chose to limit the sailing ability of their vessels in open ocean conditions as part of a self-enforced seclusion. During this time vessels were constructed that could navigate the shores for fishing purposes but could not effectively sail on the open ocean. As such it is estimated that approximately 1800 vessels were lost (Callaghan 2003, 76; Webber 1984, 66), and it is likely that material including copper, iron, coins and glass from a significant number of these vessels arrived on the Northwest Coast during this time (Callaghan 2003, 89-92; Beattie *et al.* 2000; Ames & Maschner 1999; Quimby 1985).

Combined, this evidence suggests that copper, iron, and other materials from multiple European, Asian, and Russian sources could have been available to Indigenous people on the Northwest Coast hundreds or thousands of years prior to the 18th century (Callaghan 2003, 92; Keddie 2004; 1990, 2-4). Furthermore, copper metal can be reworked and repurposed potentially an unlimited number of times in its life (Franklin *et al.* 1981). Thus, it is impossible to know if smelted metal alloys used in the construction of Indigenous artefacts in the colonial period were made with metals that were introduced during the colonial or fur trade era or much earlier (Pernicka 1999; Craddock 1995). This complicates interpretations of the Indigenous relationship with copper somewhat. However, it is important to note that, regardless of the time in which the metal was procured, it has been incorporated into Indigenous repertoires of use following the same patterns and metallurgical techniques as applied to native metal available locally (Franklin *et al.* 1981; Hearne 1958, 113). This is supported by the creation of similar copper artefacts in similar ways through time, which suggests that these actions were taught and practiced and possibly considered traditional and historic to Indigenous communities long before Europeans and Russians physically arrived in the region (Roux 2016, 102). Additionally, in the case of the Japanese, people as well as their associated vessels came to shore in the Pacific Northwest during the Edict period, though Callaghan argues that aside from attaining some exotic goods, these events would have had little impact on Indigenous cultural practices (Callaghan 2003, 92). As such, metallurgical traditions may have been in play among different communities in the region much earlier than the late 18th century, potentially by hundreds of years. It is also possible, though there is no evidence of this, that certain skills were transported with the Japanese sailors; an avenue of research that could be further explored.

2.2.3 Copper in Mortuary Contexts

The presence of copper in mortuary contexts is somewhat varied; however, the material is found in burials across the region. Prior to the fur trade, flattened perforated discs that may be pendants appear in the archaeological record. While these are predominantly found in burials among southern communities (Smith 1899, 1900; Lepofsky *et al.* 2000; Hunt 2015, 61-72; Grey *et al.* 2010), they have also been found in Tsimshian and Haida contexts. Copper beads and longer metal tubes potentially used to create necklaces, breastplates, and bracelets have also been recovered from Northwest Coast burials (Schulting 1994, 63; Coupland *et al.* 2016, 298; Ames *et al.* 2010, 45;

Acheson 2003, 227; Ames 1995, 167; Deans 1885, 15-16; Wagner 1933, 109; Davis 1990, 200; Schulting 1994, 63; Hunt 2015, 56-61).

2.2.3.1 Metal Preservation in Mortuary Contexts

Copper recovered from archaeological sites remains rare on the Northwest Coast. Of those artefacts discovered, a large proportion of them have been found in the environments of cysts and mounds which provided the metal with increased protection from damp or acidic environments (Blake 2004, 110; Matson & Coupland 1995, 203). Trends in funerary practices mean that prior to the arrival of European and Russian colonial trade goods the majority of copper artefacts are found in the south of the region, where mounds and cairns are more common (Hajda 1990, 512; Kew 1990, 479; Ames & Maschner 1999; Thom 1995, 19; Mathews 2006; Hunt 2015, 36; Lepofsky *et al.* 2000). This is due in part to the acidic soils of the Pacific Northwest, which work to speed the corrosion and decomposition of artefacts laid directly in the ground outside of a protected location (Rousseau & Rousseau 1978, 29-30). Due to problems of preservation it has been argued that there are a growing number of archaeological sites and contexts that have been assigned to the fur trade and colonial period because of the presence of metal that should be re-examined (Acheson 2003, 227-8). Acheson suggests that copper-bearing contexts at the Boardwalk site at Prince Rupert (MacDonald 1983), Scowlitz on the Fraser River (Blake & Brown 1998), Ozette on the Washington coast, and a Chinookan site on the Lower Columbia River (Ames 1998), could all be examined with a fresh perspective in terms of the metal recovered in excavation (Acheson 2003).

2.2.3.2 Southern Communities

Among Southern and Interior Salish communities, copper pendants and ornaments have been excavated and recorded from several cairn and mound sites. For example, within a Stó:lō burial mound at the Qithyil or Scowlitz, Site DhRl-16, four flattened perforated discs or pendants and one ring were recovered from a male burial and radiocarbon dated to 1400 BP (Lepofsky *et al.* 2000). At the Xá:ytem or Hatzic site 30 km downriver from Qithyil, four flattened perforated discs or pendants were identified along with some unidentified copper objects (Hill-Tout 1930).

Work by Harlan I Smith contributed a great deal to the mapping of Indigenous territories and archaeological sites in the late 19th and early 20th century, and he recorded numerous copper artefacts discovered during his research. At least one flattened perforated disc, two copper ornaments with 'bilateral copper spirals', and some fragments of the metal were recovered from excavations on Lytton First Nation's territory at the confluence of the Thompson and Fraser rivers (Smith 1900). Smith also described two other flattened perforated copper discs or pendants excavated at Nicola Lake, in the interior Plateau region (Smith 1900, 425; Blake 2004, 109), and one from a burial cairn on Vancouver Island in North Saanich (Smith & Fowke 1975).

A number of copper objects were also excavated from the Marpole Midden, located in what is now Vancouver. Smith recovered an unidentifiable object as well as a copper disk found on the teeth of a skeleton and interpreted as a nose ornament (Smith 1903, 177-178). A single burial was found to contain 24 copper flakes and a nearby burial contained three flat wooden pieces, presumably cedar fragments, with remains of sheet copper plating on them like a veneer (Hunt 2015, 63). Three perforated discs or pendants were recovered, along with one ear spool, one pendant, one copper spiral, seven copper fragments, and 22 dentalium shells stained with copper salts (Hunt 2015, 64). This work was carried out by ethnographers and explorers such as Harlan I Smith and the members of the Jesup North Pacific Expedition quite early in the history of Indigenous anthropological research on the Northwest Coast. As such, information regarding the excavations and the artefacts recovered is somewhat limited and not clearly understood.

Senewélets, or False Narrows, is a stratified burial site located on Gabriola Island and dated to the Marpole Phase which is 2500-1000 BP. One grave yielded a perforated copper disc or pendant, and three wooden fragments covered in copper salts, reminiscent of the copper covered wood recorded from the Marpole Midden site. Within a second grave, a solid copper disc was discovered (Burley 1989). A fragment of copper was excavated from a burial dated to 1540± 70 BP at archaeological site DeRw-18, located at what is known today as Somenos Creek on South-eastern Vancouver Island (Warner 1993). Two rolled copper beads relatively dated to the Marpole phase were recovered from the burial cairn of a juvenile between 18 months and 2 years of age at Deep Bay site, DiSe-7, located on the east coast of Vancouver Island (Monks 1977, 148; Hickok *et al.* 2010, 245). Six perforated copper discs or pendants were excavated from a burial cairn within archaeological site DhRo-59. Three of these discs are fused, potentially from corrosion. Radiocarbon dates of associated fibres place these discs at 880 ± 40 BP. X-Ray micro-analysis with a scanning electron microscope has led to the conclusion that these discs are consistent with native metal (Grey *et al* .2010, 49, 130).

The oldest known site to contain copper beads is the Locarno Beach Phase site of DeRu-1, located on the Saanich Peninsula in the territory of the Coast Salish Tseycum First Nations. Of the three burials excavated during a cultural resource management assessment, one contained a juvenile with 13 copper beads placed around the neck and between the mandible and maxilla. Scanning electron microscopy and energy dispersive X-ray analysis were used to characterise the copper and establish it as being consistent with native metal. A bone sample sent for AMS returned a date of 2653 ± 57 BP (Dady 2002, 11-13). However, this calculation was conducted without taking the marine reserve effect into account. Given that a marine diet is a characteristic part of the Coast Salish culture, the calculations for this date should be revisited.

2.2.3.3 Northern Communities

Copper objects have been found in burial locations in the north of the region, however these are somewhat less prevalent in the archaeological record. The Boardwalk site, GbTo-31, in Tsimshian territory was a major winter village and contains multiple burials. A 'Warrior Cache' excavated at the site contained six copper tubes, four of which contain a wooden dowel core, that have been interpreted as body armour by MacDonald (1983, 105-6). A separate human head found in the 'Warrior Cache', which has been interpreted as a trophy, also had copper staining on the cranium, lower jaw, and across the teeth. AMS dates obtained from the trophy head and wooden dowels place the copper artefacts at approximately 1000 CE (Cybulsky 2014, 334).

A small number of copper artefacts have been found by MacDonald in three burials located around Haida Gwaii. Specifically, he recovered a cloak ornament twisted into a spiral design, and two cleats or staples that have been used to hold a mortuary box together at a cave located near Kiusta village on Parry Passage (MacDonald 1973, 43). The cave had been badly looted at the time of MacDonald's inspection, and a number of mortuary boxes and human remains are assumed to have been removed by George A. Dorsey in 1897 for the Chicago Field Museum's collections (MacDonald 1973, 43). At a mass burial of multiple mortuary boxes near Tanu, MacDonald observed a broken burial box that was decorated with ten 5"x8" copper disks. Within the box near the head of the burial were two 25cm long curved copper rods that were interpreted as hairpins. Though no dates are proposed for the burials, it is thought that this site was in use until 1879 when Tanu was abandoned due to disease. Within a Haida burial shelter located on Gust Island, MacDonald recovered iron and copper nails used for the construction of mortuary boxes.

In all of these cases MacDonald quickly states that the copper items must be from fur trade or colonial era contexts (MacDonald 1973, 56-8).

2.2.3.4 Copper Outside of Mortuary Contexts in the Archaeological Record

Archaeological contexts where copper artefacts are found outside of a burial environment are especially rare. It is more common to find evidence of corrosion, green staining from copper salts, or amorphous pieces that may or may not be leftover scrap (Hunt 2015, 79-81; Blake 2004, 110). However, there are some examples found outside of mortuary contexts. Copper wire consistent with native metal was recovered from the Haida village site *Lc!uuga* at Louscoone Point, Moresby Island, contextually dated to between AD1150-1400. The wire was found affixed to a shell fragment tentatively identified as an adornment. Metallographic analysis suggests that this wire has been cold-worked and electron microprobe analysis suggests the metal is consistent with native metal (Acheson 2003, 223-4; Acheson 1998). A tree throw site, FkUc-16, also on Haida Gwaii, revealed a single copper rod which has been assessed as a blanket pin. There is unfortunately no date associated with this artefact (Eldridge 2007, 16). A small fragment of copper was recovered from a hearth at Laxt'aa Rock shelter, contextually dated as no older than 500 BP and assessed as cold-worked (Martindale 1999, 36-40; Hunt 2015, 70).

De Laguna recovered 48 native copper fragments or artefacts from the Tlákw.aan (Old Town) site in Yakutat Bay. All of the copper is thought to be from the late prehistoric or proto-historic period and was found predominantly in house-floor and midden contexts (de Laguna *et al.* 1964; Cooper 2006, 149-151). Garett Hunt has identified 31 archaeological sites located along the coast of British Columbia and the Fraser River watershed that contain copper artefacts such as copper wrapping, wire, beads, pendants, bracelets, and metal fragments that are dated prior to the fur trade, though the majority is linked with the proto-historic period. The amount of copper objects recovered at each site is sparse, but the objects were found at multiple locations, including house floors, post holes, and in surface collection (Hunt 2015, 56-61).

2.2.4 Copper Material Culture

Copper was an important and high-status material and because of this its ownership and use were limited predominantly to the elite (Cooper 2011, 265). Many have argued that limited access to the material is associated with expressions of social inequality across the region, which served to reinforce a hierarchical system (Acheson

2003, 215; Brooks 1900; de Laguna 1972; Pratt 1998; Lattanzi 2007; Pleger 2000). Cooper (2006), Hayden (1998), and Leader (1988) have argued that limiting access to copper, whether due to distance, amounts available, or cultural regulation, is directly related to the material's place as a prestige item. Material culture created with this sought after, restricted, powerful material accesses these perceptions of copper. Additionally, these objects allow the owner or user to communicate these messages to the public, reaffirming both their own and the metal's position in society (Boas 1916, 305; de Laguna & McClellan 1981, 645; Cooper 2007, 197; Bird-David 1999).

Figure 2.11. A Dzawada'enuxw Kwakwaka'wakw dance mask embellished with copper metal, Record No. 134, Accession No. A6152 (Photo by author,©MOA).

The types of artefacts created using copper in the region are varied and striking. Objects such as bracelets, masks, beads, pendants, blanket pins, and awls are created from one or many pieces of copper. There is also a wide range of composite artefacts created using media such as wood, animal horn and hoof, and leather, that incorporate copper in a multitude of fashions. Wooden dance masks were decorated with one or many copper pieces, copper rattles were intricately formed around wooden handles, feast spoons carved from mountain sheep and goat horn were fixed together with copper rivets and inlaid with pieces of copper sheet, and copper wire, nails, and rivets were used to construct and decorate feast dishes and bentwood boxes. Copper arrowheads, knives, and fishing gear are also created using the metal (Figure 2.11; Figure 2.12; Figure 2.13; Figure 2.14; Figure 2.15).

Figure 2.12. A Nisga'a rattle constructed using copper sheet formed around a wooden handle, Record No. 210, Accession No. A1756 (Photo by author, ©MOA).

These artefacts are found to participate in a wide range of activities. Copper arrows, knives, and fish hooks are recorded in contexts of hunting, fishing, and preparing food; however, these objects could also be used alongside inlaid masks, copper rattles, and horn spoons as objects of conspicuous display in Potlatch events, dances, and feasts (Colnett 1786-88; Boas & Hunt 1906; Curtis 1916g). Copper objects of all types could be included in wedding dowries (Boas 1897; Emmons 1991; Kan 2016, 238-9), Potlatch gifts, and inheritance wealth (Suttles 1990b). The meaning of the metal is brought to bear when the artefacts are used, contributing to their social impact and lending a legitimising air to the people owning and using these objects (Bird-David 1999; Niblack 1890, 282-83, 317; de Laguna & McClellan 1981; Boas & Hunt 1906).

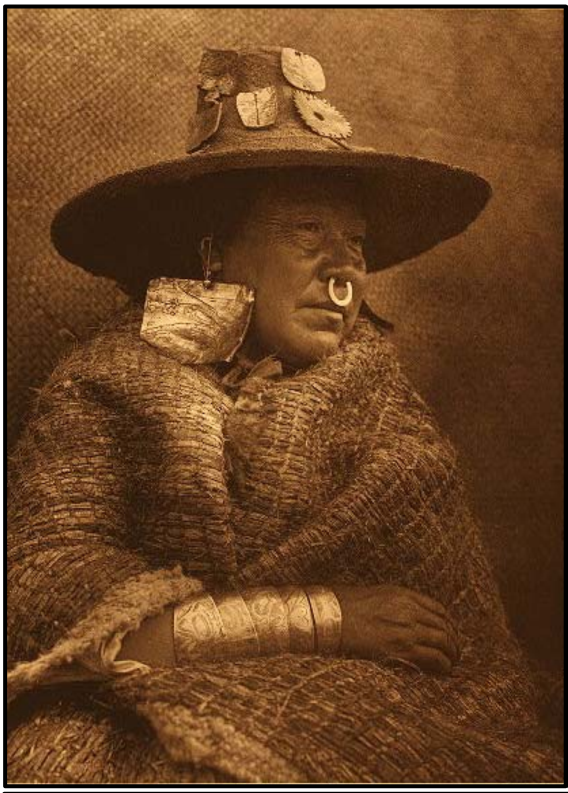
Personal adornments were often worn conspicuously by community members throughout the region to convey wealth, status, power, and group affiliation (de Laguna & McClellan 1981; Jopling 1989, 7; MacKenzie 1801, 133, Curtis 1916f, g). This could include blanket pins, bead necklaces or aprons, pendants, and copper-inlayed labrets. The emphasis on wearing metal adornments intensified during the fur trade and colonial period. Caamaño was given the impression of a population in 'fetters' while visiting the

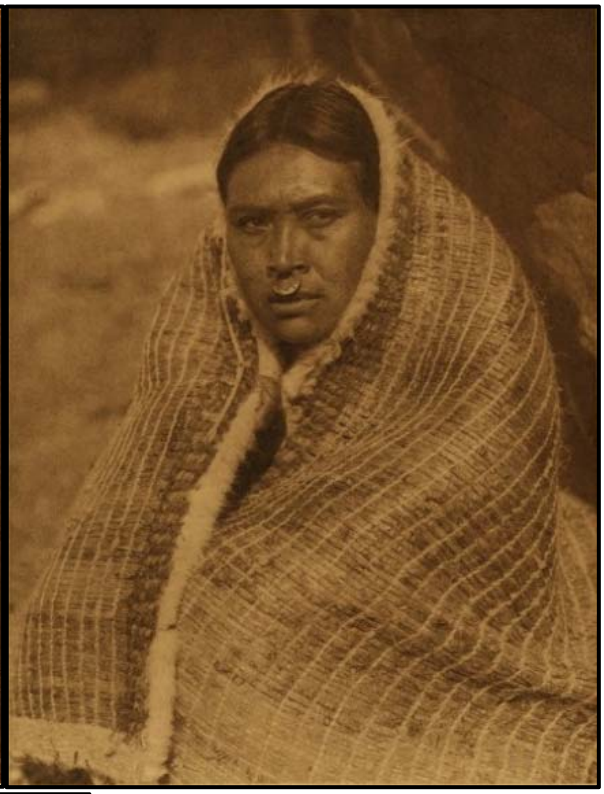
Haida, where he recorded seeing people wearing very heavy hawser-laid copper wrist, ankle, and neck adornments sometimes large enough to reach shoulder to shoulder (Wagner & Newcombe 1938, 206). Similar ornamentation was observed in varying degrees throughout the entire region (Suttles 1990b; Birket-Smith & de Laguna 1938; de Laguna & McClellan 1981; McClellan 1975b, 319; Colnett 1786-88; Menzies 1923, 82; Osgood 1937; Figure 2.15).

Figure 2.13. A Haida horn spoon, constructed from a mountain goat horn handle and mountain sheep horn bowl, riveted together with two pieces of copper alloy, Record No. 171, Accession No. 10683 (Photo by author, ©RBCM).

Aside from the social power and conspicuous notoriety that copper and copper-embellished objects may provide a person, the various other aspects of the metal also became important within the objects made from it (Acheson 2003, 227; McClellan 1975b; Colnett 1786-88, 136). The curative and protective power of the metal means that conspicuous displays of copper beads, bracelets, labrets, and pendants may also have been to ward off negative events or outcomes. Colnett observed children wearing pieces of wood measuring up to a foot in length, wrapped in thin copper sheet, affixed around their necks for what he was told was protection (Colnett 1786-88, 136). This insight puts the seeming excessive and common displays of metal adornments in the fur trade period (Wagner & Newcombe 1938, 206; McClellan 1975b, 31; Menzies 1923, 82) into a different light. Perhaps the explosion in copper artefacts had less to do with the large amounts of trade metal suddenly available, and more to do with cultural choices geared towards managing a time of high stress and uncertainty.

Figure 2.14. A Tsimshian mountain sheep horn spoon with copper inlaid into the handle, Record No. 181, Accession No. 10753 (Photo by author, ©RBCM).





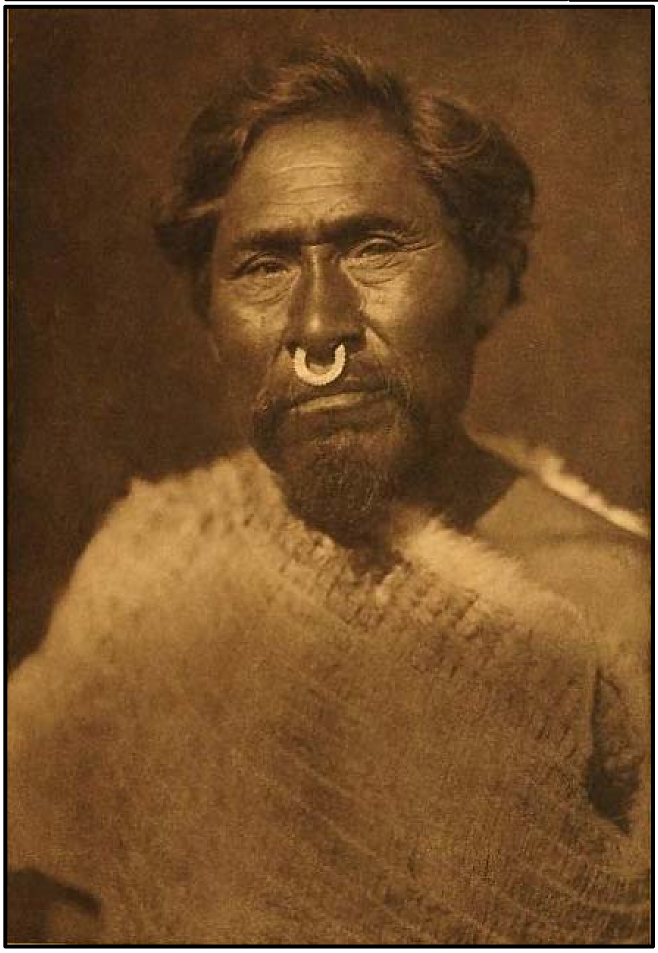


Figure 2.15. Left: A 'Nak'waxda'xw Kwakwaka'wakw Chief's Daughter wearing high status objects of adornment including a copper nose ring and bracelets and abalone shell ear and hat ornaments (Curtis 1916a). Middle: A Nootka, Nuu-chah-nulth woman wearing a copper nose ring and traditional cedar bark clothing (Curtis 1916b). Right: A Nootka, Nuu-chah-nulth man also wearing a copper nose ring and traditional cedar bark clothing (Curtis 1916f).

2.2.4.1 Defining a Copper

Figure 2.16. Top Left: an ornamental sized Northwest Coast Copper, Record No. 70, Accession No. AA1831 (Photo by author, ©MOV). Top Right: a small sized Haida Copper, Record No. 66, Accession No. AA1832 (Photo by author, ©MOV). Bottom Left: a medium sized Northwest Coast Copper, Record No. 239, Accession No. A17157 (Photo by author, ©MOA). Bottom Right: a large sized Northwest Coast Copper, Record No. 72, Accession No. AA1866 (Photo by author, ©MOV). Note, the sizes of Coppers discussed here conform to the 'ornamental', 'small', 'medium', and 'large' categories for the artefact as described by de Laguna (1972, 353-4).

The 'Copper' is an object that poignantly embodies the prestige and power of the material (Figure 2.18; Figure 2.17; Figure 2.16). The Tlingit, Haida, Nisga'a, Tsimshian, Nuxalk, Haisla, Heiltsuk, Wuikinuxv, and Kwakwaka'wakw created Coppers and, though the artefacts may cross cultural lines in trade each referred to Coppers in their own specific language and terms. For example, Kwakwaka'wakw communities called the objects *t̓ła̱kwa* (U'mista 2015), the Tlingit refer to the objects as *tináa* (de Laguna 1972; Thornton 2008, 86), while Guujaaw, President of the Haida Nation from 2000 to 2013, referred to Coppers as *t'aaguu* (Guujaaw 2016; Damon 2017, 2).

Coppers are flat, shield shaped, flared at the top, and contain a distinct central T-ridge. They can range in length from a few centimetres to over a metre and are composed entirely of metal. The artefact can be made of one, or many, pieces of metal, always conforming to this specific shape. Copper designs include being left plain or burnished, decorated using paints, charcoal, or pitch, engraved, having sections worked into a repoussé style, or any combination of these techniques. Coppers can also be divided broadly into four size categories: the smallest are one to ~13 cm (~five inches) in length and are often used to adorn people or objects, the second size is roughly a hand span in length or ~13cm to 30cm (~5 to 15 inches), the third size reaches from the fingertips to forearm or elbow or ~30cm to 51cm (~15 to 20 inches), and the fourth measures from the fingertips to outstretched chin or more at ~61cm (~24 inches) in length (de Laguna 1972, 353-54). Ethnographic reports have claimed that, prior to the arrival of European and Russian material, Coppers were generally small and created from native copper (Boas 1887; Lisiansky 1814).

The specific terms used to describe the varied parts of a Copper suggest that these objects were anthropomorphised. They have been likened to a human form reduced to its bare essentials, or as a form that conveys an animal or human ancestor (MacDonald 1981; Harkin 1997, 96-98; Kan 2016, 239). The Tlingit refer to the vertical portion of the T-ridge as the 'backbone', the horizontal portion the 'shoulders', the often painted lines on the bottom portion of the Copper represent 'ribs', and pieces cut from a Copper can be referred to as 'bones of the dead Chief' (Kan 2016, 239; de Widerspach-Thor 1981, 169; Drucker 1951, 237).

The iconic Copper shape is broadly similar throughout the Northwest Coast; however, Jopling looked at 328 Coppers and has noted that a distinction can be made in size, shape, and decoration between Northern (Tlingit, Haida, Tsimshian) and Southern (Kwakwaka'wakw, Bella Coola) communities who created and engaged with these objects (Jopling 1989, 1). For example, Jopling found that Northern Coppers were more often decorated in the characteristic stylised designs and crests of the Northwest Coast study area, while Southern Coppers more often depicted human or animal figures. Northern Coppers were more likely to have repoussé features with prominent borders, while Southern Coppers are more likely to be smaller, narrower, and constructed of thinner sheets of copper metal (Jopling 1989, 1-11). The sample set of Coppers included in the material culture study portion of this thesis will be used to further examine Jopling's assertions.

2.2.4.1.1 The Cost of a Copper

Coppers mirrored the wealth structure of the research area and accumulated worth and value with each public transaction, rather than having a consistent intrinsic worth

(Boas 1887; Jopling 1989; King 1999; McIlwraith 1948; Figure 2.17). As such, the value of a Copper can be quite inconsistent over time. Lisiansky noted that among the Tlingit the value of a Copper was 20-30 sea otter pelts in 1814 (Lisiansky 1814, 150), while Dunn noted in the mid-19th century that among the Chilkat Tlingit camped along the Stikine River a Copper was worth nine slaves (Dunn 1844, 288). The overall pattern suggests that the price of each Copper was contingent to that particular object at that specific time (Emmons 1991; Wawrpigisawi *et al.*1920).

McIlwraith (1948) noted a distinction among the Nuxalk between Coppers that had entered into the Indigenous reciprocal gift-giving network and those that had not. Specifically, '*talia',* or a Copper which had not undergone any exchanges or rituals was worth less than '*taitaimx',* a Copper which had undergone several exchanges or interactions throughout its life (McIlwraith 1948). Both de Laguna (1972) and Emmons (1991) noted that the Tlingit placed an emphasis on native float copper as more authentic and valuable than later manufactured colonial metal. Alexander McKenzie recorded that the value of a Copper among the Haida was directly related to the skill with which the central T-ridge had been created; a Copper with an inconsistent thickness and a thinned central T-ridge was considered diminished in value (MacKenzie 1891, 53).

Among Kwakwaka'wakw communities, Copper Testers were consulted to evaluate the authenticity of the artefacts moving among and within their networks of exchange (Jonaitis 1996, 10). A Copper Tester follows a prescribed procedure, beginning by scraping the top corner of the Copper with his teeth. A legitimate Copper would be soft enough to mark in this manner. Then the Copper was struck with the understanding that an authentic Copper would not produce a ringing sound. Finally, the central T-ridge would be assessed, and here the tester was looking for a shallow ridge. If the Copper met the first two qualifications but had an undesirable T-ridge it could be sent to a metal smith and adjusted. If the results of the first two tests suggested the Copper was illegitimate, it was labelled a 'Smooth faced – White Man's copper' and considered worthless in ceremony. However, these 'Smooth faced' Coppers maintained a consistent exchange value of 100 blankets within the reciprocal gift giving system and were often used to compose part of the payment for a more valuable Copper (Jonaitis 1996, 10). This description of an assessment of legitimacy and worth is valuable to this research, as it provides a guided physical assessment of the Coppers within this study and a way to understand Kwakwaka'wakw value structures in the late 19th and early 20th century.

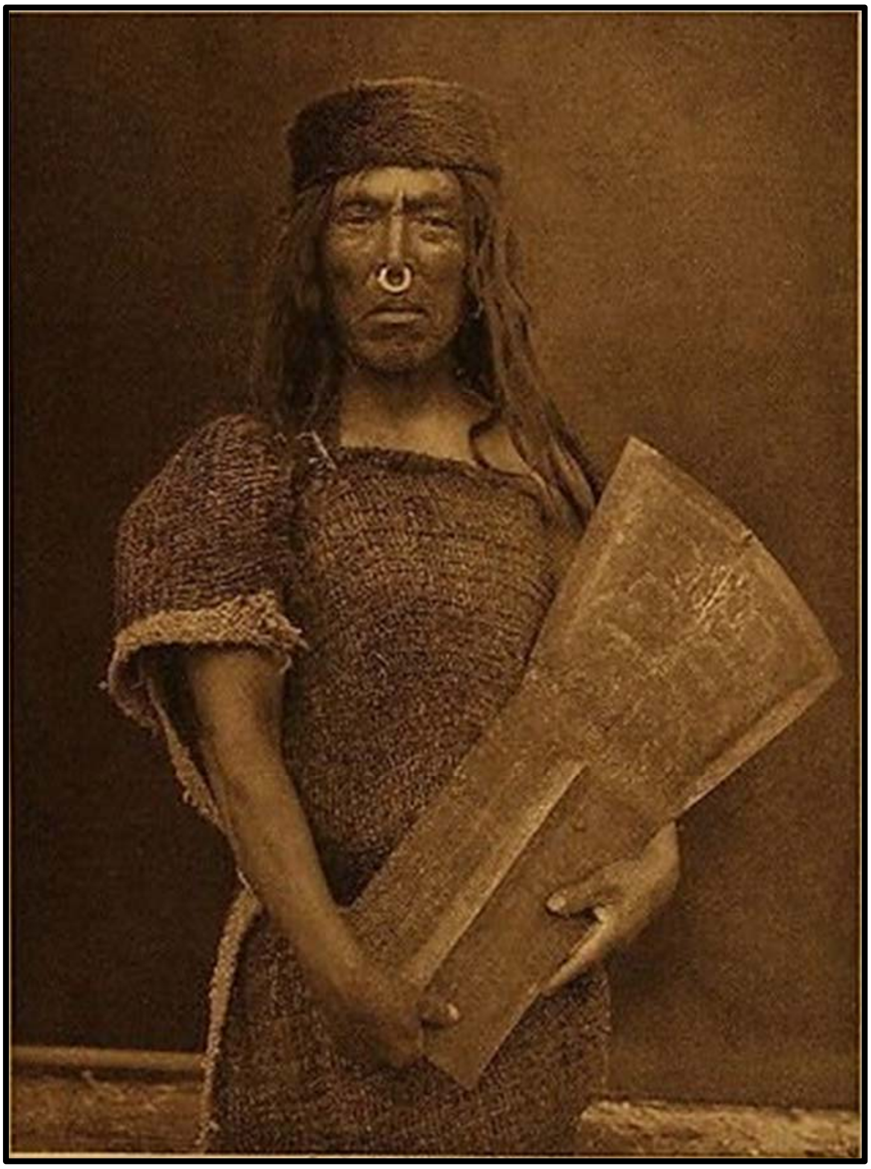


Figure 2.17. Hakalahl, a 'Nak'waxda'xw Kwakwaka'wakw Chief with his Copper Wanistakila, or 'takes everything out of the house', as photographed by Edward Curtis November 13th, 1914 (Curtis 1916d).

2.2.4.1.2 Coppers in Social Situations

Coppers were considered a mixture of an important living being and one of the most desirable currencies. As such, the objects were involved in multiple interactions and contexts. Lisiansky describes witnessing a Chief conspicuously display his Copper by having his slaves carry it and beat it like a drum (Lisiansky 1814, 150). Coppers could be used in wedding ceremonies, and brides could potentially travel to a new household with multiple Coppers as dowry (Boas 1897; Emmons 1991; Kan 2016, 238-9; Suttles 1990b). Coppers could also cross ethno-linguistic lines, potentially easing a marriage between distant groups (Kan 2016, 239; Niblack 1890, 336). The artefacts could also be involved in death or memorial ceremonies in a wide range of ways. Pieces of a deceased Chief's

Copper could be divided and shared among the funeral attendees (Drucker 1951, 237; de Widerspach-Thor 1981, 169). Alternatively, a Copper could be placed in a burial, or hung from a grave marker or mortuary pole. A likeness of a deceased individual's Copper(s) may also be carved into a mortuary pole (Drucker 1951; Jopling 1989; Wawrpigisawi *et al.* 1920). Drucker describes a photograph, taken by Newcombe at Clayoquot Sound in 1903 while he was among the Nuu-chah-nulth, which showed a mortuary pole "that appears to be sawed-timbers painted with encircling stripes, barber-pole fashion, with figures representing 'Coppers'…nailed on" (1951, 76). This is particularly interesting as the Nuu-chah-nulth were known for not engaging with Coppers and may suggest a degree of cultural diffusion.

Coppers could be invoked as instruments of peace and good will or as supplication to the spirit world. For example, to show respect and honour to visiting guests the Tlingit and Haida would throw Coppers, that were later recovered, into the water to 'drown' the object. A Chief may also 'drown' a Copper to legitimise a territorial claim or to honour a person who has passed away (Kan 2016, 242; Swanton 1909, 63). Small Coppers could be worn as adornments or affixed to other artefacts such as staffs in order to conspicuously show wealth and power, as well as allowing the owner to benefit from the perceived powers of the metal to heal, keep safe, and bring luck (de Laguna 1972, 353-54).

Coppers are also linked to elements in the world that are of particular significance, such as salmon. Boas described a ritual among the Kwakwaka'wakw which is very similar to the First Salmon ceremony and involved feeding Coppers through a fire prior to a trade. Throughout the ceremony the Copper is referred to as a salmon and the goal is to ensure that, similar to the salmon, the Copper will one day return and bring wealth to the community (Boas 1930, 185-88; Jopling 1989, 27).

The reciprocal and cyclical nature of the economy on the Northwest Coast means any removal of an object from the system through an act of sacrifice or destruction was a significant and bold endeavour. These items are considered living beings with names and history, which transforms destructive ceremonies into a very serious affair (Damon 2017, 3). At ceremonies, feasts and other meetings Coppers could be used to challenge and battle rivals. George Hunt describes a battle of pride between two Kwakwaka'wakw chiefs, whereupon being served from a dirty receptacle at a Potlatch the invited chief feels slighted and challenges the invitee with a Copper that is sacrificed in a fire. To meet this challenge, a Copper of equal or greater value is sacrificed in return by the host Chief. However, upon a second challenge with a second Copper, the host Chief is not able to respond in kind and is subsequently shamed (Hunt 1906).

Aside from the full 'destruction' of a Copper, the objects could be 'broken' into multiple pieces, with the subsequent portions of the Copper presented as a gift, offering, or challenge. Coppers, or portions of Coppers, could also stand as surrogates for slaves in certain sacrificial ceremonies throughout the Northwest Coast (Jopling 1989, 14). Due to the powerful nature of copper and the controlled and prescribed manner with which it was handled, the breaking of a Copper was often conducted by a qualified individual with a hammering tool or club sometimes referred to as a 'Copper breaker' or 'slave killer' (Vaughan & Holm 1982, 63). The 'broken' pieces of one, or many Coppers, could also be reconstructed at a later date, adding to the artefact's rich history and increasing the overall value of the object (Boas 1930; Emmons 1991; Jopling 1989; King 1999; Kan 2016, 241-2). It is unclear to what extent the Coppers created from multiple pieces of metal are constructed from pieces of previously broken Coppers or metal new to the role.

2.2.4.1.3 Antecedents to Coppers

It is possible that prior to the introduction of European and Russian trade metals Coppers were carved from wood, bone, or leather, prior to the proliferation of their metal counterparts (Korsun 2004, 290; Dzeniskevich 1992, 64-73). Accounts of early Coppers, such as the oral history describing the "copper shields" or *ti'na* the Tlingit used to purchase Yakutat Bay, are not very specific about what the Copper looks like, its size, or other physical qualities (de Laguna 1972, 231-247; Swanton 1909, 347-368 Crowell 2018). It is unclear if this description of a copper shield is a formed 'Copper' as they are known in the colonial period. However, the idea of Coppers as conspicuous objects is found in Indigenous traditional records (Boas & Hunt 1906; Boas 1887, Jopling 1989, 50, de Laguna 1972, Colnett 1786-88, Lisiansky 1814, 146).

Concerning possible antecedents to Coppers, there is tantalisingly little evidence. de Laguna documented two small whalebone amulets and one small slate amulet that have each been carved into the shape of a Copper among the Tlingit. Emmons collected the bone amulets from a shaman's grave house at Dry Bay before 1888, while Libby collected the slate amulet at Yakutat in 1886 (de Laguna 1972, 1053, 1096). It is unknown when these artefacts were created, but they were all collected a significant amount of time after the fur trade had finished and the colonial era had begun and thus provide more questions than answers.

2.2.4.1.4 Earliest Ethnographic Coppers

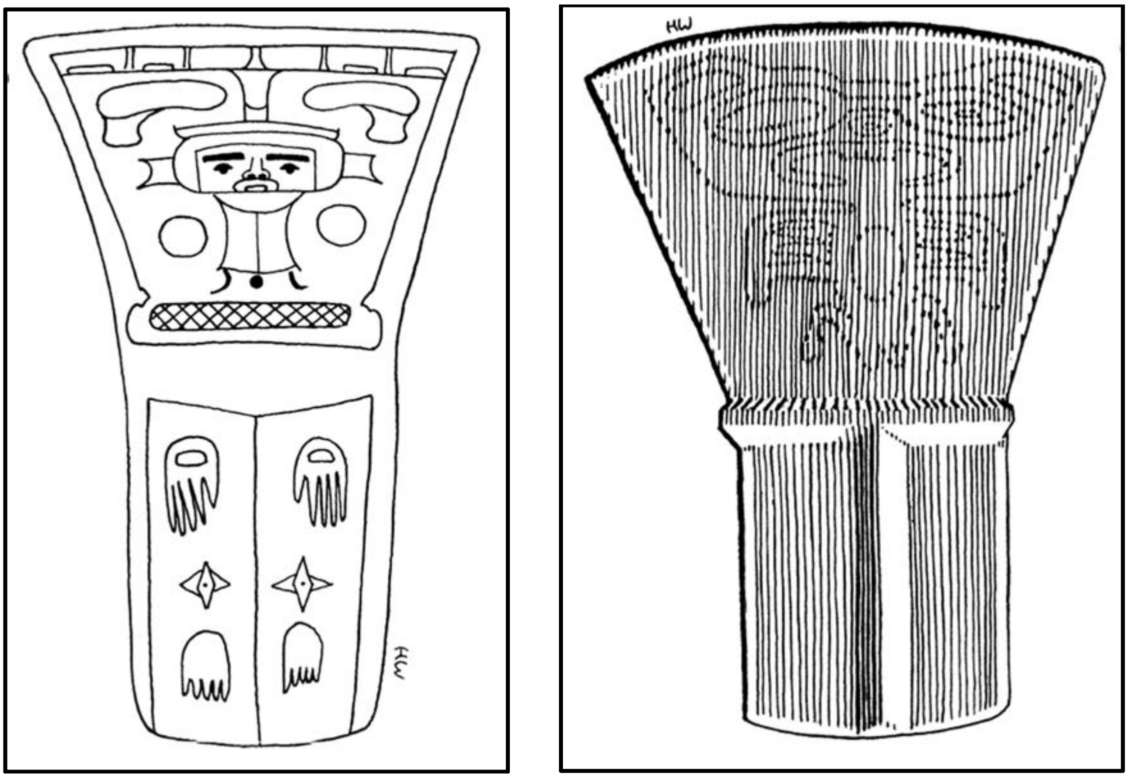


Figure 2.18. Left: A drawing of a Haida Copper by Captain James Colnett in 1787. At the time, he believed the Copper was a type of breastplate used as armour (Colnett 1786-88, 136). Right: A drawing of the Tlingit Copper that was shown to Yuri Lisiansky in 1805 (Lisiansky 1814, 146).

James Colnett, the first known European to write about a Copper, encountered the object in 1787, while on the southern end of Haida Gwaii hunting and trading for sea otter pelts (Figure 2.18). Colnett interpreted the Copper as a breastplate, drew a sketch in his log book, and made a note regarding its value stating that '…nothing would induce them to part with (these objects)' regardless of the trade item offered. (Colnett 1786-88, 136; Beresford & Dixon 1968). Colnett also noted that there was not a hint of 'any mineral' among the Haida and determined that the copper metal must have been procured 'from some distant tribe' (Colnett 1786-88, 136). Yuri Lisiansky, a commanding officer of the Russian-American Company, provided the second earliest-known ethnographic description of a Copper while visiting the Tlingit during an expedition to circumnavigate the earth between 1803 and 1806 (Figure 2.18). The Copper is described as a thin plate made from native metal procured from the Copper River, which would be engaged with at ceremonies and beaten upon. Lisiansky also makes specific note of the Indigenous value ascribed to the Copper, which seemed directly related to its materiality as native metal (Lisiansky 1814, 150). Although neither of these early explorers fully understood the meaning of copper and Coppers within Indigenous communities, both accounts attest to the entrenched importance of both material and this type of artefact by the early fur trade period. It is difficult to ascertain whether these artefacts were made from metal that has been manufactured through smelting and melting processes or native copper. However, given the reported size of the two artefacts and the assertion they were made from a single piece of metal, it is more likely that manufactured and rolled sheet copper or copper alloys were used to create these two possible Coppers. In both cases, had a detailed inspection and recording of the physical elements of the artefacts been conducted it may have been possible to make an educated inference regarding the provenance of the material based on the presence or absence of certain rolling, hammering, stamping, and cuttings marks on the surface of the metal.

2.2.4.1.5 Previous Material Analysis of Coppers

Despite the seeming deeply entrenched use of Coppers throughout the colonial period, there is currently no known evidence of any Copper constructed from native metal. Of the Coppers that have been analysed, all seem to be constructed of identifiably manufactured metals. Within this thesis manufactured metals are considered to be copper and copper alloys that are produced through smelting and melting processes and either cast or rolled into shape. Wayman, King and Craddock investigated six Coppers, including three large Coppers provenanced to Haida, Stikine, and general Northwest Coast region respectively, and three small Coppers provenanced to the Northwest Coast. A combination of X-radiography, X-ray fluorescence spectroscopy, optical microscopy, scanning electron microscopy, and atomic absorption analysis was applied to these artefacts and all were found consistent with manufactured metal (Wayman *et al.* 1992, 7-15). Jopling reports on the analysis of 14 Coppers, with analysis conducted by Heather Lechtman and Cyril Stanley Smith, of MIT. A combination of microprobe, metallographic analysis, and radiography was used to analyse the artefacts, with the conclusion that all were consistent with manufactured metals. The 14 artefacts included one large and two ornamental Kwakwaka'wakw Coppers, one large Tsimshian Copper, one large, one medium, one small, and two ornamental Tlingit Coppers, one large, one medium, and one ornamental Haida Coppers, and two large Northwest Coast Coppers (Jopling 1989, 79-97). de Widerspach-Thor (1981, 125) states that 125 Coppers held at 25 museums across the United States have been analysed, and all were found to be consistent with manufactured metal (also see Duff 1981, 153). There is little extra information provided regarding this analysis.

2.2.5 Indigenous Metallurgical Technologies

Understanding the metallurgical skill-set of the Indigenous people living on the Northwest Coast is integral to interpreting the copper material culture they created. Early explorers to the west and north of North America, along with early ethnographers and archaeologists, often assumed that either the technological practice or the finely-made copper artefacts found among Indigenous communities had Eurasian origins. Petitot (1893) thought that the technology had been introduced by the 'Phoenicians' (also see Cooper *et al.* 2015b, 3). However, a wide range of objects were created by Indigenous metallurgists throughout the Northwest Coast, and North America as a whole (Franklin *et al.* 1981; Vernon 1990; Dussubieux & Walder 2015; Ehrhardt 2005).

There is no known evidence that the Indigenous populations practiced smelting or melting techniques (Wayman *et al.* 1992; 2). Objects were created by metallurgists who employed a combination of cold working and annealing techniques to the naturally malleable metal. The hammering flattens and fractures the internal grain structure of the metal, making it harder and increasingly brittle. This is a process known as 'work hardening' (Craddock 1995, 95; Scott 1991, 1). To regain malleability the metal is heated to a temperature of at least 200-225˚ Celsius, causing the crystal structure of the grains to re-organise (Davis 2001; Wayman 1989a, 32). Metallographic analyses of grain sizes within Indigenous copper artefacts have shown that temperatures of 400-600° Celsius were often being achieved in this process, occasionally reaching as high as 700-800° Celsius (Schroeder & Ruhl 1968, 162; Untracht 1968, 246). Based on these temperatures it is possible that all Northwest Coast Indigenous metallurgical activities took place over an open hearth.

A few comprehensive studies of Indigenous metallurgical practices from North America are often referenced in the literature, providing insight into the nature of the practices used and the marks left on the objects. Experimental metalwork by Franklin *et al.* using copper nuggets was compared with Indigenous artefacts from the Ahtna to understand the potential metalworking techniques they used (Franklin *et al.* 1981). From this study, Franklin concluded that Indigenous practices involved hammering, annealing, and folding in cycles. This process allows the metallurgist to flatten irregularly sized nuggets of copper and fold them repeatedly to build up thickness to produce an artefact while avoiding brittle fractures (Franklin *et al.* 1981, 24-6). This is consistent with a statement by Rainey (1939) that the copper nuggets were worked thin enough to break with one's fingers. Franklin (*et al.* 1981, 26) also noted that this repeated folding technique is visible on the surface of the artefact, as the repeated folding process leaves laminar markings akin to stratigraphy in the surface of the metal. They also found that the pitted surface of a copper blank could be assessed to understand the direction and force of the metallurgists' hammering, and a stippled effect on the surface of the metal suggested that the artefact has been softened or even partially melted while annealing (Franklin *et al.* 1981, 33). This work assumes that, prior to the introduction of large pieces of manufactured sheet copper, only smaller copper artefacts were commonly created, potentially using multiple small pieces of metal folded together. This is based on a lack of evidence for any tools that could apply enough force to reduce large copper boulders into workable pieces (Franklin *et al.* 1981, 34-5).

Elsewhere in North America, Vernon's (1990) examination of worked copper artefacts from the east, specifically the Lake Superior region, Green Lake County in Wisconsin, and Houghton in Michigan, show evidence for the same suite of techniques described by Franklin *et al.* (1981). Based on such evidence as the laminar surface effect, Vernon concluded that hammering, annealing, and folding was also employed by Indigenous metallurgists in the east. Hot forging as a practice is dismissed based on a lack of known appropriate tools, such as tongs, for handing workpieces at elevated temperatures (Vernon 1990, 500). The analysed artefacts include fragments of copper pieces, awls, knives, arrow points, and an axe blade.

Vernon argues that there was a perceivable trend in annealing versus work hardening. Specifically, he found that objects were left in an annealed state, rather than a work hardened state, in a ratio of approximately 4:1 (1990, 510). These findings corroborate Leader (1988) and Cooper's (*et al.* 2015b, 15-16) assertions that copper artefacts could be purposefully left in an annealed state to reduce the probability of brittle fracture during use. An annealed copper arrowhead would likely bend instead of breaking, should it strike something hard; thus, the object could be worked back into shape instead of having to create a whole new artefact. While it is difficult to make sweeping statements regarding copper production based on a few small studies, this could suggest that Indigenous metallurgists were aware of the properties of the metal and utilised different strategies based on the desired outcome. However, it is also possible that Indigenous metallurgists did not understand the potential benefits of the work hardening process for objects such as knives and points. It could also suggest that they indeed understood the process and the objects were left in an annealed state due to their use for symbolic purposes that would not require work hardening, or that these artefacts are simply not yet finished (Vernon 1990, 510; Leader 1988; Putnam 1894; 126, Spier 1970, 109; Rickard 1939).

2.2.5.1 Indigenous Metallurgists

Primary records and anthropological studies have described Northwest Coast Indigenous community members who interact with copper as having a specialised skillset, particularly in northern communities (Lisiansky 1814; Shinkwin 1979). Simply collecting the metal could be viewed as a dangerous activity that was reserved for metallurgical specialists. Schwatka provides a good example of this when writing about a visit to a copper quarry with his Tutchone guides. "They allege that if one of them strikes a boulder of copper with an axe – or any other instrument, for that matter – he will die soon after. In vain I told them I did not want them to strike the copper…they seemed to be impressed with the idea that there was a great bodily danger risked at the copper mine" (Schwatka 1996, 129). Metallurgists were transformers and wielded a technology that was not reductive, like many technological practices in the region, such as the carving of wood or knapping of lithics, but instead changed, re-formed, and restored material as a shaman might (Franklin *et al.* 1981; Leader 1988; Nelson 1983). These individuals were considered so valuable that there are accounts of Indigenous metallurgists living in the woods a distance from their village, for safety in case of a raid (Kari & Fall 2003, 111; Reckord 1983, 49; Shinkwin 1979). Oral traditions describe the Chugach Alutiiq people of Prince William Sound often raiding Ahtna territory for copper and its accoutrements, including the metallurgists themselves (McClellan 1975b). Auri Krause noted that the Chilkat Tlingit kept the specifics of the metallurgical practices a strict secret (Krause 1885, 148).

Ahtna oral traditions detail that only men collected and worked with copper, and these individuals were given special societal ranking and titles such as *c'etseden*: Ahtna for 'one who hammers', or *nuk'qetset*: Dena'ina for 'they pound it' (de Laguna & McClellan 1981, 662; Kari 1990; Kari & Fall 2003; Swanton 1905). These individuals could wear special adornments that identified them within the communities, revealing their conspicuous status. Composite neck-rings constructed of wrapped cedar embellished with copper tinkers were donned by ‘Copper Breakers’ to identify themselves as individuals capable of ceremonially ‘breaking’ and cutting copper (Heckenberger, *et al*. 1990a; 1990b).

The Indigenous metallurgist’s tool kit is assumed to have included lithics of many shapes and sizes, along with various wood, antler, and bone tools for hammering, bending, shaping, sharpening, and polishing (Rainey 1939). A broad knowledge of the environment would be crucial for procuring and using effective tools for artefact production (Cushings 1894; McClellan & Denniston 1981; Rickard 1939). Unfortunately, there is very little written on the specific practices of Indigenous metallurgists, and what exists is often quite cursory. While traveling to the mouth of the Coppermine River in 1771, Hearne noted “…the Indians imagine every bit of copper they find resembles some object in nature…the largest pieces, with the fewest branches and the least dress, are the best for their use; as by the help of fire and two stones, they can beat it into any shape they wish” (Hearne 1958, 113).

Indigenous metallurgical practices allowed for a wide variety of objects to be constructed using both additive and reductive techniques. Thus, it is possible to disassociate metallurgical practices from other contemporary technologies in use on the Northwest Coast such as lithic production. However, it is possible that metallurgy and flint knapping share some thread of technological practices in the form of heat treatment. The annealing technique is very similar to heat treatments used to reduce fracture toughness and improve knapping qualities in materials such as chert during lithic production. (Vernon 1990; Wayman 1989c). Lithic heat treatment is a practice that had been established on the Northwest Coast for thousands of years (Andrefsky 2008; Domanski, Webb & Boland 1994), and could have informed some of the region’s metallurgical practices.

2.2.5.1.1 The Implications of Metallurgical Practices

Technological diffusion seems to have played a role in the spread of metallurgical skill on the Northwest Coast and among northern Athabaskan and Thule cultures. The widespread evidence of copper working in the form of forging, folding, and annealing is found across the study region and beyond. This suggests that an incipient shared knowledge existed among these culture groups and communities, cross cutting cultural and temporal boundaries in the proto-historic period (Acheson 2003, 218; Franklin *et al.* 1981, 38-41; Kari & Fall 2003; Leader 1988; McClellan 1975a&b; McKennan 1959, Rainey 1939; Tylecote 1992; Wayman *et al.* 1992; Wayman *et al.* 1985).

Iron is not well suited to 'cold' hammering and annealing given its hardness and the high temperatures required; however, among First Nations it was treated to the same technological suite as copper (de Laguna *et al.* 1964, 88-89; McIlwraith 1948, 253; Gibbs 1877; Gleeson 1980; Legros 1984). Despite contact with colonialist's pyrometallurgical technologies, it seems that the Indigenous metallurgists residing on the Northwest Coast continued to use their own suite of metal working techniques. The similarities in specific production technologies between lithic, iron, and copper production suggest intentionality and may have been an expression of traditional movements and practices (Lemonnier 1992, 4-5; Mauss 1979[1935]; Roux 2016, 102), or a specific preservation of the *a priori* value of 'native' copper.

2.3 Discussion: Contextualising Copper on the Northwest Coast

This chapter examines Indigenous copper use against a backdrop of the Northwest Coast as it is understood to have been in the proto European-historic period. Through this examination information pertinent to the broader material culture analysis within this thesis is assessed, and a number of relevant issues and details have been highlighted. For example, the borders of the Northwest Coast are understood to be somewhat porous (Drucker 1951; Donald 2003; Hajda 1984), allowing and facilitating the movement of people and things (Matson & Coupland 1995; Turner & Turner 2008). This means that copper artefacts can, through several mechanisms, be found within new spheres of value from those in which they were created (Donald 2003, 318; Matson *et al.* 2003). This certainly complicates the biographies of Northwest Coast artefacts, but the motifs, style, and specific construction practices visible on the artefact's surface may help indicate an object's movements and interactions.

Interpreting the elemental composition of the copper metal, characterised within the broader material culture study portion of this thesis, is complicated by a number of factors highlighted in this chapter. Specifically, manufactured metals were arriving in the Pacific Northwest and Arctic regions much earlier than the fur trade period, via shipwrecks and potential trade across the Bering Strait (Acheson & Delgado 2004; Dear & Kemp 1976, 777; Cooper *et al.* 2016; Callaghan 2003). It is entirely possible that this metal could be chemically similar to the materials introduced to the Northwest Coast in the fur trade and colonial period. Metal can be worked and reworked to create a wide range of objects successively over time (Wayman *et al.* 1992; Leader 1988; Cooper *et al.* 2015b, 15). Thus, it is possible that material obtained prior to the arrival of European and Russian trade came to be used in the construction of colonial era artefacts. This makes it possible to misinterpret the material as newly introduced to the region when it may have been involved in the reciprocal gift-giving wealth structures in the Northwest for some time, accumulating its own value.

There are always knowledge gaps when considering the past, often related to who exactly is recording the history. On the Northwest Coast there are unknowns due to a number of factors. For example, the massive population decline due to disease and conflict caused loss of traditional knowledge related to all aspects of life (Boyd 1999; Turner & Turner 2008). Additionally, many of the early primary records written by explorers, colonisers, missionaries, and anthropologists, often used by researchers to fill in these gaps, represent westernised perspectives and potential misinterpretations of Indigenous practices (Boas 1897; Cook 1967; Colnett 1786-88; Meares 1790; Smith 1903). As such, it is important to remember that, though ethnographic records are invaluable to understanding the fur trade and colonial periods, they are an incomplete and coloured view. Furthermore, it is possible that specific things were kept secret among Indigenous communities in the region, such as important resource procurement sites (Shinkwin 1979, 27) and specific cultural practices (Kari & Fall 2003, 111; Reckord 1983, 49), which may have been intentionally kept from the foreign gaze. This means that the sparse accounts of copper collection and metallurgical practices available today may be protecting the liminal spaces that work to reinforce the power and importance of both the material and the people involved in copper collection and fabrication by design.

Copper artefacts are found in pre-historic contexts in the south of the region, significantly earlier than in the north. This is likely due to a number of reasons. Specifically, the large amount of native copper available in the north remained covered by ice while southern areas were free (Ames 1994, 220; Barclay *et al.* 2001). Additionally, metal artefacts within archaeological sites have, in the past, been used as an indicator of a fur trade or colonial time frame (Acheson 2003, 227-8). This means that it is possible that some ancient copper artefacts have been misinterpreted as significantly more modern, confusing the archaeological record. This certainly complicates the issue of whether copper metallurgical practices developed in multiple discrete locations, or in a single place prior to diffusing across the region in the form of technological knowledge, itinerant skilled crafts people, and/or formed artefacts (Franklin *et al.* 1981, 38).

The research conducted by Franklin (*et al.* 1981), Vernon (1990), and Copper (*et al.* 2015b) on the physical qualities of copper worked in Indigenous styles has shown that several inferences can be made based on physical observations. For example, the process of flattening and folding small pieces of metal in a continuous way to build up the material and create artefacts leaves visible laminar markings on the body of the object (Franklin *et al.* 1981, 73). Additionally, any rough breaks in the metal's surface may indicate brittle fracture from a lack of annealing (Franklin *et al.* 1981, 33-38; Cooper *et al.* 2015b, 15-16; Leader 1988). The force used by the metallurgist and directionality of their blows can also be visible in the surface of the metal, as long as this detail has not been polished and removed from the object surface. The surface texture of the metal is also interesting because a stippled surface could be indicative of hot-forging on the Northwest Coast (Franklin *et al.* 1981, 33), a process that has not been confirmed in the region.

Many of the accounts written by foreign visitors in the fur trade period describe a population that is heavily adorned with metal bracelets, neck rings, anklets, ear and nose decorations, labrets and so on (Wagner & Newcombe 1938, 206; McClellan 1975b, 319; Menzies 1923, 82). Though this has often been interpreted as a desire to show prestige and power in a public setting, there may be alternative narratives involved. For example, given copper's perceived power to protect and heal, it is possible that the large amount of personal adornments seen in the region was, in part, a response to the stresses that arrived with European and Russian explorers, traders, and later settlers. This, apparent explosion in metal artefacts, coupled with the seeming Indigenous resistance to alternative production practices such as pyrometallurgy (Vernon 1990; Franklin *et al.* 1981; Cooper 2011), has significant implications for the types of manufactured copper procured in trade, and the objects created and use in the colonial era.

In conclusion, the lives and trajectories of artefacts exist relative to each other and are the sum of an accumulation of social interactions that constitute each object (Hodder 2011; Joy 2009, 544). This means that a detailed investigation of Indigenous engagement with copper can only be conducted when the technological, material, social, and functional aspects of this relationship are explored in relation to each other (Gosden & Marshall 1999, 169; Kopytoff 1986; Jones 2002). As such, this study of Indigenous copper use practices on the Northwest Coast prior to and throughout the fur trade and subsequent colonial period that began the late 18^{th} century, contextualises the material culture analysis conducted within this thesis and provides insight into biographical interpretations of social change.

Chapter 3 The Fur Trade and Colonial Period on the Northwest Coast: A Partial Timeline of Change

To study the impacts of colonial processes on the Northwest Coast between the 18th and 20th centuries, and what the changing use of copper among the Indigenous populations in the region can tell us about the period, the patchwork of Indigenous and foreign actions and experiences regarding the metal through time requires contextualisation. Colonialism did not occur, and was not experienced, in the same way by the different culture groups and individual communities spread throughout the region (see Acheson & Delgado 2004; de Laguna 1972; Oliver 2014). As a result, the applications, uses, and value of copper changed in a range of different ways that will be explored through this chapter. In order to provide a comparative for the specific way that copper was treated by Indigenous groups, the integration of other metals such as iron into Indigenous material repertoire will also be explored. To begin, key terms related to this analysis are discussed and clarified to ensure a clear discussion of the framework through which this analysis will be viewed. This information is then applied to a study considering both Indigenous and settler actions as the maritime and land-based fur trade turned into the colonial period, examining the many and varied ways that people chose to navigate a world of change.

3.1 Defining Colonialism

The idea and understanding of 'colonialism' has a long history of development. Early and more simplified readings of colonialism were often divided into binary categories of 'coloniser' vs 'colonised' and 'civilised' vs 'savage'. These models divide and parse culture groups, often implying that the balance of power is very much one-sided in favour of the coloniser and suggest that acculturation and assimilation are inevitable (Harrison 2014, 37). In the 19th and early 20th century these ideas were reinforced through "scientific analysis", such as phrenology, which helped justify this binary and any colonial acts of oppression that stemmed from it (Harris 2004, 171; Adas 1989; Headrick 1981). These old tropes enforce a dynamic of domination and resistance, leaving little room for other actions and flattening all the actors into essentialised caricatures involved in an inevitable process (Oliver 2014, 77-8; Gosden 2004). It is important to note that there are imbalances of power within any colonial interaction, and tensions do exist (Oliver 2014; Beckett 1977, 78). However, reducing the actors to simplistic stereotypes in order to facilitate discussion ignores the tangled and entwined relationships that develop.

The focus of this colonial research lies with the specific shifting issues and tensions that defined Indigenous experiences. Individual choices can be thought of as a discourse occurring through time that is entangled with social responsibilities and obligations (Oliver 2014, 81). Thus, broader shifts in Indigenous actions following the upheaval of the fur trade and subsequent colonial period can be perceived on multiple timescales. This requires considering Indigenous agency, visible as the articulation of objects, ideas, and people able to construct social and material meaning in relational rather than reactionary terms (Oliver 2014, 80-1; Harrison 2014, 37; Gosden 2004). In this way, the oppositional binary is subverted and there is space for agency within multiple original conversations, grounded in discrete sets of circumstances (Oliver 2014, 81).

One must be careful not to start viewing colonial interactions as though they are on an even playing field that suggests an ideology of harmony, nor as a steady grinding process with an inevitable outcome (Oliver 2014, 78-102; Foster 2006, 286; Jennings 2017, 14-15). However, it is difficult to explore this mixture of actions, experiences, and identities without creating 'others' that act to reinforce these old colonial tropes once again. To research colonialism, the various strategic and mundane ways that people engaged with their social worlds, expressed individual and group identities, and managed colonial relations at intersections of sovereignty, dispossession, and structural political changes, must be considered (González-Ruibal 2010; Harrison 2014, 38, 42; Silliman 2005; Silliman 2015, 216; Oliver 2014, 77; Deleuze & Guattari 1987).

With regards to cultural entanglements, different scales of structural power applied by colonial forces on subaltern populations produce a continuum of consequences (Jordan 2009, 43). On the Northwest coast these ranged from very restricted overwhelming dominance as seen in the destruction of Tlingit settlements through Russian 'gunboat diplomacy' in the battle for Sitka in the early 19th century (Lisiansky 1814), to the relative freedom of early fur trading where Indigenous peoples could experience fairly limited contact with foreign traders (Acheson & Delgado 2004; Oliver 2014, 80; Jordan 2009). Reactions to colonial processes are just as diverse. These can be defined by resistance, which can be enacted as overt political acts of dissent and violence, such as Haida attacks on trade ships in the late 18th and early 19th century (Acheson &

Delgado 2004). Responses can also be seen in personalised forms of cultural reproduction in a changing world, with the Tsimshian's continued preference to live in extended family groups by connecting the colonial row-houses they moved to at Metlakatla Village in the later 19th century for example (Oliver 2014, 85; Perry 2003, 604). Interactions could also be collaborative and constructive vehicles of social advancement or even the genesis of new communities, and no single model can cover all possibilities (Oliver 2014, 96; Cipolla 2015; Carlson 2001).

Colonialism research has been conducted on many scales, ranging from macro- to micro histories. When considered as individual scales of study, each can be critiqued as being too limited. Micro-histories provide fine-grained details of specific times and places but can be somewhat disconnected from the greater community or region. Macro -scale studies allow for some understanding of broad or regional trends but are in danger of losing the fine-grained detail important to interpretations of the Indigenous lived experience of colonialism (Hayes & Cipolla 2015, 2; Oliver 2014, 80-82). It is possible to address these issues by combining methodologies and using comparative frameworks to reveal similar and different forms of social and cultural interactions. To deal with the seeming opposition of these scales of study, it is useful to consider Latour's argument that global events only exist because they are put together on the local level (2005, 204), which brings multi-scalar analysis together as they are relevant to each-other's becoming. The tensions between practical vs theoretical, specific vs general, individual experiences vs those of the broader community, and historical vs anthropological viewpoints, should all be considered to compile more vibrant colonial histories. The tensions arising from these conflicting perspectives are explored but not resolved, allowing for a mosaic of experiences and opinions within this colonial landscape (Hayes & Cipolla 2015, 2-10). This study attempts to employ records of specific events of Indigenous copper trade and use at a fine-grained level, against a backdrop of the broad changes associated with colonialism. The overarching changes experienced by Indigenous populations include epidemics of smallpox, the introduction of settler communities, an explosion of commercial businesses geared towards taking advantage of the many natural resources of the region, and extensive ethnographic study (Boyd 1999; Harris 2002; Lightfoot 2006; Oliver 2014).

3.1.1 Culture Is Not Static

While this research is concerned with colonialism as it occurred between people indigenous to the Northwest Coast region and different European, Russian and later American groups between the 18th and 20th century, colonialism and the mixing of people and cultures in North America did not begin at this point. People were moving around North America for thousands of years prior to this specific period, collaborating, amalgamating, exchanging ideas, fighting and competing in various ways (Hayes & Cipolla 2015, 5). This unending process has been overwritten by a blunted and westernised history that defines colonialism as only beginning at the time of initial interactions and entanglements between European and Russian explorers and traders in the 18th century. This blunt definition also assumes that Indigenous populations on the Northwest Coast at this time had always been 'local' and 'Indigenous' while all westernised newcomers are 'foreign' and 'colonisers'. In reality, the idea of 'insider' and 'outsider' are changeable as the scope of peoples' geography shifts. Forgetting or omitting this level of complexity erases a long history of Indigenous' actions and movements (Hayes & Cipolla 2015, 5-6; Silliman 2015, 221) and simplifies a wide array of cultures and people into an undynamic 'other'.

Belief in the grinding inevitability of colonialism provides a fixed one-dimensional view of temporality, suggesting that all Indigenous peoples who experienced some level of colonial interaction became trapped in an unstoppable ahistoric process. Instead, as Hayes & Cipolla argue, innovation, continuity, creativity, and tradition as they occur in different places and times are not just the province of the coloniser. Instead, these can contextualise a tapestry of experiences and processes that reveal colonial processes as textured with individual choices and outcomes (Hayes & Cipolla 2015, 4).

Human relations should always be thought of as mixed and complex (Harrison 2014, 37). Colonialism is made up of many different people and stories that are not unrelated, but are also not one amorphous 'colonising force' either (Harris 2004, 179). The varied actions that occur are specific to people in their own space and time and reveal how distinct communities and individuals chose to navigate upheaval, incorporating new processes into old ones and continuing to live. (Gosden 2004; Harrison 2014, 42; Mrozowksi *et al.* 2015, 124). In daily life the tensions between old and new may bring about change. However, this does not necessarily result in a loss of cultural identity for the people living these daily negotiations between past and present, who likely did not regard all of the immediate changes in their lives in such a dramatic and long-term way (Oliver 2014, 90-101; Comeroff & Comeroff 1992, 57; Mrozowski *et al.* 2015, 137).

3.1.2 Language is Powerful

The language used to discuss colonial processes can also be treacherous and potentially colonising, leading to cultures being perceived as fixed in time and space in essentialised and flattened ways. The very use of the term 'Indigenous', if not defined and considered, can homogenise and displace a wide range of diverse peoples in the same theoretical space (Cipolla 2015, 21-22; see Chapter 2). Generalised language allows for development of false narratives and overlooks the specific colonial situations that define the varied Indigenous lived experiences that occurred across the Americas and indeed the world (Kaplan 1996, 87-88; Oliver 2014, 79). 'Traditional' is another example of a term that has been used to fix people in place, implying that certain aspects of a culture must be sustained for that culture to retain its so-called legitimacy (Mrozowksi *et al.* 2015, 122). The cultural categories assigned to Indigenous people within colonial discussions can themselves be the products of colonial interactions (Béteille 1998, Kuper 2003; Liebmann 2008). Many terms that are used to discuss both colonialism and Indigenous peoples are colonial inventions with implied power structures (Cipolla 2015, 21-22). If used uncritically, ignoring intentionality and selectivity, this language is engineered to flatten, simplify, romanticise, and manage native populations.

Acknowledging the power of colonial language is meaningful because heritage and culture are not simply passive and curated, but are lively, dynamic, and often described in terms of the elements and events that we choose to bring forward with us into the current time (Harrison 2013, 4; Hayes & Cipolla 2015, 8; Silliman 2015, 220). The ramifications of embracing the flattened understanding of traditional Indigenous culture from a romanticised era is visible in the Gitxsan-Wet'suwet'en land claims court case filed in October of 1984. This case, brought by 35 Gitxsan and 13 Wet'suwet'en hereditary chiefs who decided to work together, challenged the jurisdiction of nearly 60,000 km^2 of crown land in northern British Columbia. After years of debate between the First Nations and Canada's Federal and Provincial governments, Chief Justice Allan McEachern ruled in 1991 that the land claims, largely based on oral histories, were invalid due to his colonial understanding of what an authentic Indigenous person was. Specifically, McEachern stated that 'pre-colonised life was nasty, brutish, and short' and the authentic Indigenous people had 'no written language, no horses or wheeled vehicles' while the living Gitxsan and Wet'suwet'en people did. This ruling was later overturned in the *Delgamuukw v British Columbia* case of 1997 (Valverde 2011; Cruikshank 1992). However, this argument echoes colonial sentiments regarding the definition of an authentic Indigenous person, which in its time has been used to legitimise racist and paternalistic beliefs that have allowed colonists to appropriate land and material culture with a clear conscience (Harris 2004, 174-6; Harrison 2014).

3.2 The Fur Trade and Colonial Period: A Diversity of Experiences

There are no models that can fit the full range of experiences, actions, and reactions that can define colonialism, and the Northwest Coast is a good example of this mosaic. Beginning in the latter half of the 18th century, foreign interests such as England, Spain, and Russia shared roughly similar goals of resource extraction and geographical expansion. However, the application of colonial power and range of responses differ greatly between people and through time.

As this thesis is concerned with what copper material culture can tell us about the fur trade and colonial period, Indigenous metal use is contextualised against a backdrop of the social activities taking place across the Northwest Coast. This includes the introduction of trade metals prior to physically meeting, smallpox epidemics, a wide variety of interactions involving trade, and eventually settlement scenarios. Use of iron and other metals are also included in the study, as comparative materials that were often traded alongside copper. This information is presented intentionally as a timeline, revealing how the individual choices of people are brought forward in time, accumulating meaning and weight, to affect subsequent actions and choices with ramifications that are still felt today. This timeline is only partial, focusing on copper material culture use and the colonial actions that impacted those activities.

For clarity of discussion, events that occurred in the Northwest Coast are divided into south, central, and north coast regions at certain points in the text. For this discussion the Makah, Coast Salish, Quileute, Nuu-chah-nulth, Kwakwaka'wakw, and Wuikinuxv reside in the southern portion of the study region, the Nuxalk, Haisla, Tsimshian, Heiltsuk, Haida, and Gitxsan comprise the central portion of the study region, and the Nisga'a, Tahltan, and Tlingit make up the north. This is not a suggestion of divisions or connections between particular ethno-linguistic culture groups, merely a superficial geographical divide applied to this discussion to organise the text and discuss events occurring across a large area.

3.2.1 Foreign Metals Prior to the Fur Trade

Prior to the fur trade and colonial period examined in this thesis, foreign materials and artefacts were finding their way into the Northwest Coast. This occurred over an extended period of time and through a number of different mechanisms. Drift metal from shipwrecks is one of these known sources (Callaghan 2003; Keddie 2004). Swan noted that the Makah were practicing beach salvage in the 1860's due to the possibility of shipwreck material and was informed that this was a long-standing activity (Swan 1870, 34-5). This statement is supported by archaeological findings at the Makah village of Ozette, where a large assemblage of iron tools including chisels and assorted blades were recovered from stratigraphy dated to the early 17th century using dendrochronology. Spectrographic analysis shows that the metal is a high-carbon steel, and as such Gleeson has argued the metal was likely drift metal (Gleeson 1981, 3, 53). Keddie (2004) and Callaghan (2003) describe multiple cases where Japanese and other wrecks arrived on the shores of the west coast between California and the Aleutian Islands in the years between 1617 and 1876. Though the type and quantity of material salvaged is unknown, the potential for material and cultural diffusion from Asia is certainly possible (Keddie 2004).

Frederica de Laguna recorded a number of instances of Tlingit people coming upon drift metal prior to any direct encounter with Russian or European traders in her ethnographic work. One instance, as told by Tlingit elder Ted Vale, detailed a shipwreck that occurred near the shore by Malaspina Glacier. In this instance, there were three survivors, two men who died on the Glacier and a woman. The woman was rescued by a Tlingit hunting party and subsequently helped the Tlingit recover goods from the ship, including a selection of guns and powder. As the oral history goes, the gun powder was mistaken for tea which the people tried to brew and drink, and the guns were stripped of the hard wood and then put into the fire to be pounded into spears, knives and points (Deur *et al.* 2015, 264; de Laguna *et al.* 1964, 10). This suggests that those Tlingit either did not know about the utility of guns, or that iron was valued more for other tools. The exact point in time this event occurred is not known, but given the details of the story, a time frame anywhere from the early 18th century onward is possible.

A Tlingit informant described the recovery of drift metal and other goods from a schooner wrecked west of Icy Bay to de Laguna, detailing how the procured iron was used to make spear points and arrowheads (de Laguna 1972, 412). Here, de Laguna is told that the discovery of drift iron could make a person more important due to the superior tools that could be created (Deur *et al.* 2015, 262). Though this is one account, it seems to set a tone for the iron traded into the Northwest Coast. The value of the metal appears to be primarily focused on its usefulness to create tools such as hammers and adzes, along with some specific objects such as long daggers and spear heads. A selection of iron bracelets and other adornments have been observed in the region through the colonial period; however, these are less common than their copper counterparts (Acheson & Delgado 2004, 68). There is no evidence that the Indigenous cultures imbued iron with the supernatural significance that is attributed to copper in the Northwest Coast region.

Copper and iron were also likely arriving on the Northwest Coast through extensive northern trade networks involving many hands and multiple exchanges. This possibility has been assumed for quite some time and supporting evidence is growing. So much prehistoric metal is present among Inuit communities that Acheson argues that the Neo-Eskimo peoples around the Bering Sea region had developed an epi-metallurgical technology approximately 1500 to 2000 years prior to direct interactions with Russian explorers and traders (2003, 216-217). Yorga (1978) discovered wrought iron fragments and pieces of copper in the Yukon which were dated to approximately 1200 AD. Cooper *et al.* (2016), using XRF analysis, have confirmed the presence of manufactured copper, leaded bronze, and iron within a prehistoric Inuit context at Cape Espenberg, Alaska, dated to 1530 ± 30 BP. Larsen & Rainey identified iron engraving tools dating from between 300-600 AD in the Ipiutak site of Point Hope, located on the north-western Alaskan coast. Using spectrographic analysis, it was determined that this iron was from a terrestrial origin and had undergone refinement (Larsen & Rainey 1948, 83-84, 254; Clark 1977), further supporting the movement of material into North America from across the Bering Sea.

It is important to understand that iron, and likely all other metals such as silver, which arrived on the coast was worked in the same manner as copper (Franklin *et al.* 1981). This is supported by metallographic studies. For example, eight Tlingit and Athabaskan iron daggers were analysed with an optical microscope, a scanning electron microscope with EDX analyser, and microhardness measurements were taken by

Wayman, King, and Craddock in 1992. Their conclusions are consistent with the current understanding that Northwest Coast Indigenous metallurgists did not smelt or melt any metal. They also found that iron blade forging was carried out at 'surprisingly low temperatures, consistent with the technologies applied to copper, and asserted that with regards to iron Indigenous smiths often finished off iron blanks attained from Eurasian sources (Wayman *et al.* 1992, 59). They further suggest that the Indigenous smiths were not fully aware of the potential and properties of the iron and steel, providing examples of a lack of a martensitic structure that would indicate intentional hardening. Regardless of this, Northwest Coast Indigenous iron artefacts were finely made and as Wayman, King, and Craddock note, without accounts from early visitors to the Northwest Coast such as La Pérouse (1798, 63) and Caamaño (Wagner & Newcombe 1938, 203) describing the working process, the creation of these objects could have been attributed to Eurasian makers (Wayman *et al.* 1992, 16).

3.2.2 Early Epidemics

The Northwest Coast was deeply affected by entanglements that brought foreign diseases to virgin soils and unexposed populations with limited immunities. The first smallpox epidemic occurred either just prior too, or with, initial physical contact between Indigenous populations and foreign interests at the beginning of the maritime fur trade period. Though other diseases such as malaria, influenza, and syphilis eventually came to the region with detrimental effects (Gibson 1982, 61-2; Boyd 1999), smallpox caused significant loss of life and there were at least five epidemics prior to the 20th century (Boyd 1994, 1999). As there is no direct reference to an early smallpox outbreak in the historic texts written by explorers and traders in the region, Boyd conducted extensive research looking for descriptions of pockmarked and blinded people who spoke of extensive population losses, often in oblique terms (Boyd 1994, 1999). Using references from people like Portlock (Dixon 1789), Cook (1784), and Vancouver (1801), Boyd argues that the first epidemic began in the 1770's, and may have had a number of origins. It is possible that the Tlingit experienced a version of the disease that made its way across the Bering Strait from the Kamchatka, where it had ravaged the population in 1768 (Boyd 1994, 19; Kotar & Gessler 2013, 29; Fenn 2003, 10-14). This inference is based on observations that Tlingit from the islands located north and east of Sitka were pockmarked, while those living to the west were not (Boyd 1994, 19). However, this does not agree with Khlebnikov's previous assertions that the disease spread north from the

Stikine River to Sitka in the 1770's (1976; Boyd 1994, 21). Of the potential maritime sources for the early epidemic, Boyd points to the 1774 Spanish vessel *Santiago,* who visited Quinault River in Coast Salish territory, Haida Gwaii, and Bucareli Bay and Sea Lion Cove in Tlingit territory, potentially spreading the disease from all these points (Boyd 1994, 24). The coastal introduction argument is further supported by a proposed timeline for the disease occurring earlier on the coast and later in the interior (Boyd 1994, 19; Figure 3.1).

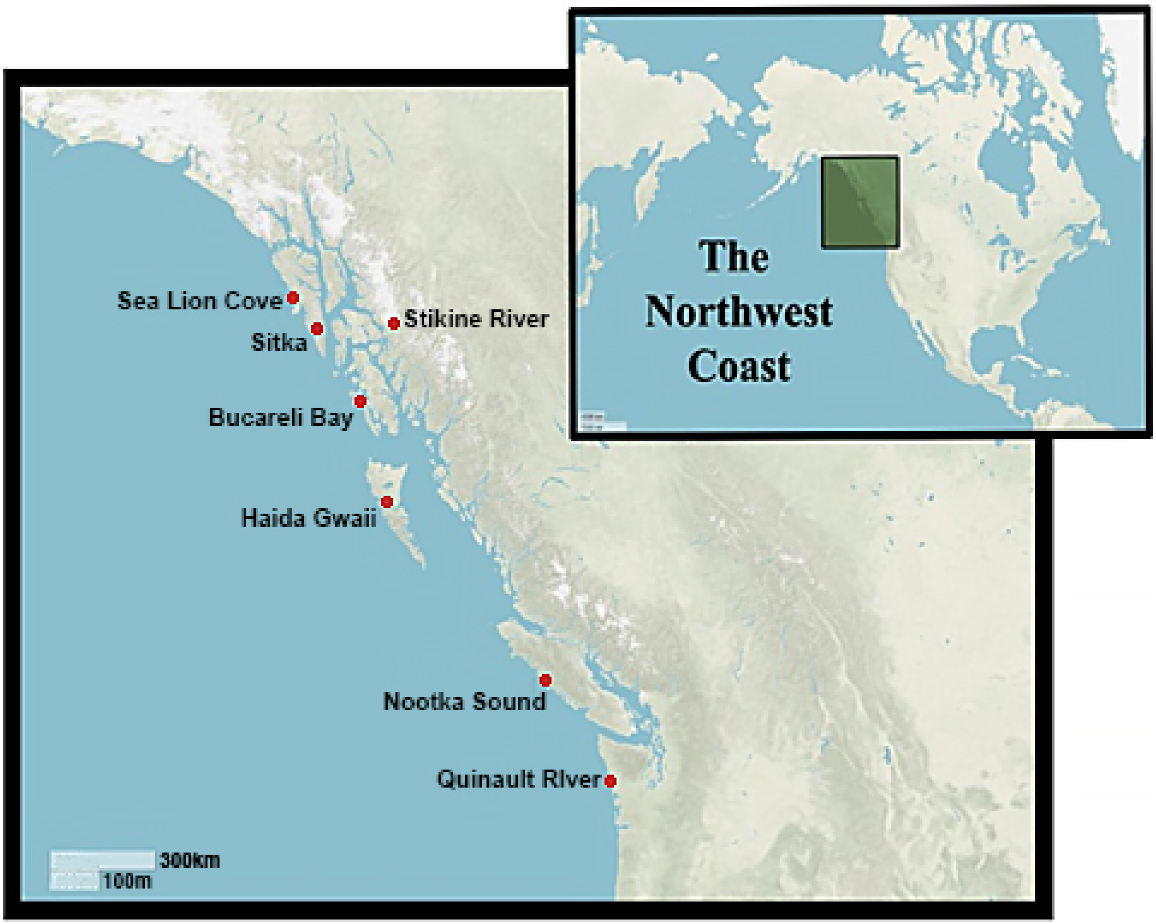


Figure 3.1. Locations on the Northwest Coast where smallpox is known to have occurred and significantly affected the population in the 1770's.

As the population of the Northwest Coast consisted of highly mobile villages and camps that attended multiple planned meetings with other groups throughout the year (Ames 1993; Matson 2003; Suttles 1990b), it is presumed that the earliest known outbreak of smallpox spread to the extent of the settlements (Boyd 1994, 18). Boyd estimates extreme population loss from this epidemic with indications that up to 2/3 of the Haida were lost, and the Tlingit described only two or three people from each family remaining (Boyd 1994, 26-7). This means that, from the point of initial meetings with Europeans and Russians, the Indigenous populations of the Northwest Coast were experiencing immense upheaval due to massive human loss. This type of decimation would translate into significant population movement as reduced groups came together as is seen in the fur trade and colonial periods when other outbreaks occur. For example, the Haida consolidated into the settlements of Skidegate and Masset regardless of the diversity of communities that had existed in Haida territory (Acheson & Delgado 2004, 60; Fisher 1977). It is possible that the consolidation of communities promoted further social tensions stemming from issues like competition over empty positions of power, and lost knowledge due to the loss of significant oral histories (Codere 1990, 369; Schreiber & Newell 2006, 226). In some ways, Indigenous peoples across the Northwest Coast region were in crisis as colonial explorers and traders arrived, however primary documents indicate that foreign visitors remained largely unaware of both this fact and the tensions in Indigenous communities as societies restructured.

3.2.3 Russian Interests and Objects Moving Towards the Northwest Coast

Initial colonial efforts focussing on the region were predominantly Russian, as explorers and traders had begun investigating the Bering Strait, Aleutian Islands, and Alaska in the late 17th and early 18th century. However, Russia did not begin establishing a presence within the Northwest Coast study region until 1795 (Anichtchenko 2013, 38-41; Tikhmenev 1978, 74). Prior to this, the Russians were heavily involved with more northern Inuit communities and the fur trade (Crowell 1997a). For Russia, the appetite for territory and new resources was keen, and from the 1740s to the end of the century over forty Russian companies and merchants sponsored voyages to the Aleutian Islands and the Alaska mainland (Gibson 1992). This would have increased the amount of Russian metal and other foreign materials present among Indigenous communities in the North American Arctic that could be traded southwards.

Russian trade and colonial efforts were somewhat different than the European approach. This is in part due to the challenges of financing and supporting a labour force that was required to cross both Siberia and the Bering Sea (Gibson 1978, 46-9). Providing supplies to outposts on the Northwest Coast was challenging and not always guaranteed. Few people were interested in living in the region long term, which made it difficult to maintain a workforce (Crowell 1997a, 31-65). Due to these issues, Russian fur traders and colonists almost immediately began recruiting Indigenous labour and the Sugpiaq and Aleut people of southwest Alaska became a large part of the Russian labour force from the mid-18th century onward (Crowell 1997b, 14). Aleut labour was transported as far as California and Hawaii when Russia attempted colonial expansion in the 19th century (Crowell 1997b, 21). Recruitment was often forced, and Indigenous workers were required to 'pay tribute' in the form of goods such as furs. There was active suppression of any Indigenous resistance to this style of colonialism, and the Russians used tactics such as taking family members hostage to force people to work (Davydov 1977, 190-191; Gideon 1989, 61-66). This strategy allowed Russia to make use of the greater hunting skills of the Indigenous people but did little to alleviate the animosity of Indigenous communities (Carpenter 2015, 230-32; Grinev 2013, 2010). Keeping Indigenous labour close, relying on them for resources and support, and setting up long term occupations meant that a creolised society was quickly formed and, instead of introducing trade materials geared towards the needs or wants of Indigenous populations, the Russians introduced the materials that they themselves viewed useful for living in settlements and enduring the Arctic.

3.2.4 Initial Interactions on the Northwest Coast

The European experience of Indigenous interactions and entanglements was somewhat different and, initially at least, much less binding than the immediate Russian exploitation of Indigenous labour. Fisher argues that the actions of European explorers and traders who arrived and subsequently initiated the maritime and land-based fur trade caused relatively minimal cultural change to the lives of Indigenous people who retained a nearly equal ability to affect the outcome of events (Fisher 1977, 27). For example, John D'Wolf found in 1805 that the Kaigani Haida with whom he was trading would actively compare prices between European ships to increase their bargaining power (Fisher 1977, 7). Indigenous leverage was increased by the fact that European traders relied on Indigenous hunting skills and often returned to the same locations and communities for trade. In some instances, traders would spend prolonged periods of time in the region gathering resources. This meant that it was in the best interests of fur trade entrepreneurs to work with Indigenous people to some extent and foster positive and productive trade relationships and there was limited demand for Indigenous people to change (Fisher 1977, 18, 42-3; Suttles 1954, 45). In fact, in some cases fur traders would try to act as arbiters in Indigenous disputes as they wish to encourage hunting and trading over conflict, even encouraging Indigenous people to see trading posts as neutral ground (Fisher 1977, 43). Fisher also points out that during the fur trade era there were only a few things, such as disease, that Indigenous people on the Northwest Coast could not choose to avoid or mould to their own ends (Fisher 1977, 23; Turgeon 2004; Oliver 2014, 39; Neylan 2000, 56; Saunders 1998).

The first known physical interaction between European interests and Indigenous populations occurred in 1774 when Juan José Pérez Hernández, Spanish captain of the frigate *Santiago*, reached Haida Gwaii. This is the expedition that Boyd points to as a likely carrier for the initial smallpox outbreak in the region (Boyd 1994, 1999; Pérez 1989). Pérez was sent from Mexico, as Spain sought to claim and secure territory in the region before British and Russian interests arrived. The captain, the ship's friars Juan Crespí and Tomás de la Peña, and crewmember José Martínez, all kept journals and letters that recorded the voyage. As such, we know that in 1774 women in both Nootka Sound and Haida Gwaii wore bracelets and rings made of iron and copper. Among the Nuu-chah-nulth on Estavan Point copper beads were worn as adornments and large fragments of iron knives were seen in the visiting canoes (Bolton 1927, 350; Griffin 1891, 203). The Nuu-chah-nulth placed an emphasis on trade copper of seemingly any quality, along with pieces of iron that were long, hard, and had a good cutting edge.

Figure 3.2. Two long iron daggers that have been embellished with copper and/or arsenic bronze sheet metal at the top of the blades. Top: Kwakwaka'wakw dagger, Record No. 101, Accession No. A4033 (photo by author, ©MOA). Bottom: Northwest Coast dagger with no greater provenance, Record No. 287, Accession No. Am.9861.a (photo by author, ©Friends of the British Museum).

Among the Haida on Langara Island near the northern tip of Haida Gwaii, pieces of an iron sword and half a bayonet were spotted among the Indigenous people (Crespí 1969; Pérez 1989, 78-79; Martínez 1989). It was thought that this metal was likely stripped from the vessel Aleksei Chirikov lost in 1741, 33 years prior to the Spanish arrival (Beals 1989, 47, 78, 228). It is unclear at what time and in what manner the iron pieces already in Haida possession arrived there, whether through the robust Indigenous trade system that spanned the Northwest Coast or as potential drift metal. However, the First Nations had a developed sense of value for iron, rejecting barrel hoops as inferior and overlooking short knives in favour of long swords and machetes (Keddie 2006, 20; de Laguna 1972, 113; Bancroft *et al*. 1886, 196; Martínez 1989; Crespí 1969; Pérez 1989; Cutter 1969, 159-161). This further suggests that the Haida had specific ideas of what they wished to use the iron for, and points towards the long daggers and spear points found among multiple Indigenous groups on the coast in the region (Figure 3.2). A year later in 1775 Fray Benito de la Sierra, while on the Spanish Hezeta Expedition, reached what is now Port Grenville on the Washington State coast and also wrote of copper adornments and women piercing their nostrils with copper rings (Sierra *et al.* 1930, 228).

When English explorer Captain James Cook reached the Northwest Coast in 1778, traveling south to north, he and his crew immediately noticed that the Indigenous communities were eager to trade with little or no hesitation (King 1999, 132; Cook 1967; Kirk 1986, 201). This is potentially due to resource procurement stresses already active on the reduced populations in the region due to smallpox (Boyd 1999); however, this assumption overlooks the long-standing and well-developed trade economy of the Northwest Coast (Matson & Coupland 1995). It is also possible that European traders were only shown objects that could be traded, and that Indigenous traders manipulated the situation through performances designed to lead their new foreign trade partners into specific negotiations.

As Cook and his crew observed, the Nuu-chah-nulth at Nootka Sound were in possession of iron tools and a few copper objects, predominantly personal adornments, prior to European arrival (Cook 1784, 329-332). Cook also observed the Nuu-chah-nulth frequently using whetstones on the surface of metal objects, presumably to keep the objects constantly lustrous (1784, 329-30). For trade the Nuu-chah-nulth were interested in iron goods but showed a distinct preference for copper and copper alloys (Beaglehole 1967, 322; Ledyard 1963, 77).

The interest in copper and brass was great enough that suits were stripped of their buttons, and ship's furniture was stripped of fittings. Everything, from copper candlesticks and kettles to halfpenny pieces was used for trade until there was 'hardly a bit of brass ...left in the ship' (Cook 1784, 279). This metal was used to create bracelets, anklets, and piercings for ears and nose, along with arrow and spear points, and blades. So much copper and copper alloy was traded that Cook's crew began calling the location 'Cheepocs Sound' after their interpretation of the local Indigenous word for copper (Beaglehole 1967, 104). Iron was traded at Nootka Sound, though Cook's crew only observed the Nuu-chah-nulth making knives, spears, and chisels from the metal. It was presumed that the iron tools facilitated the elaborate wooden carvings present in the region (Cook 1784, 269). Though elaborate and impressive wooden objects ranging from mortuary poles to cedar canoes had been carved using stone and bone tools for thousands of years, the sharp edge of an iron blade could increase precision (Suttles 1990b; Stewart 1993, 35; Fisher 1977, 21). Other metal types were also observed among the Nootka, specifically a pewter nose-ring and two silver spoons that had been crafted into a necklace (Beaglehole 1967, 303-322), though the paucity of accounts of other metals suggests that these objects were somewhat exotic.

The well-established and lively trade connections and savvy negotiation skills of the Nuu-chah-nulth became quickly evident to Cook and his crew. Immediately the Nuu-chah-nulth and a Chief named Maquinna, who would become somewhat infamous during the Nootka Crisis (Kirk 1986, 203; Mears 1790, 109), established themselves as middlemen between the *Resolution* and *Discovery* and any other group who wished to trade (King 1999, 129-30). Fisher asserts that this allowed the Nuu-chah-nulth to manipulate the market, driving down Cook's values and increasing the price as the material was traded on to other Indigenous groups (Fisher 1977, 11-12). Cook and his crew, along with subsequent traders in Nootka Sound, were made to participate in Nuu-chah-nulth trade protocols if they wished to productively interact with the Indigenous people (King 1999, 130; Jopling 1989, 45; Bancroft 1884, 310; Wolf 1982, 182-8; Von Kotzebue 1830, 22-23), emphasising the robust nature of trade activities in the region, with established rules and etiquette.

During his visit, Cook wrote that 'for a small quantity of iron or brass, I could have purchased all the gods in the place. I did not see one that was not offered to me', referencing Indigenous ceremonial masks (Cook 1784, 257). From a European perspective this seemingly suggests that the trade material that Cook had to offer was so sought after that even very special Indigenous objects were made available for trade. However, as Gosden and Marshall point out, the power and importance of the mask is found in the right to its display (Holm 1983, 29). As such the sale of these objects was not considered a great loss as new versions could be created (Gosden & Marshall 1999, 175). Improper use of masks by European traders was not a concern as the foreigners would not know how to properly use them, but the artefacts arrived in European hands 'slyly' and 'in secret (Beaglehole 1967, 1414) to avoid accidental improper display (Marshall 1999). The importance of context when attempting to understand the value of an object is significant to the biographical material culture study conducted in this thesis, providing a reminder that objects change and accumulate different meanings, powers, and histories as they are held and used in different contexts.

As Cook's expedition moved north up the coast, different material interests were noted among the varied Indigenous communities. For example, while visiting northern Haida Gwaii, Captain Cook found that the First Nations had a large amount of copper and iron, including arrows, knives and spears made of both metals, and many copper adornments (Cook 1784, 379-380). At that time the Haida traded eagerly, predominantly for large quantities of iron adze blades and only a small amount of copper. Cook wrote that the iron blades were nearly the only item bartered in this location (Cook 1784, 378-9). A preference for long pieces of iron and little interest in copper was also noted among the Tlingit at Prince William Sound (Cook 1784, 392-393).

This trend in metal preference persisted the following year when Quadra and his crew visited Haida and Tlingit territory. Copper bracelets, rings, labrets, and arrowheads were noted alongside iron bracelets, spear heads, and long knives (Riobo in Thornton (trans) 1918, 226; Tovell 2008, 42, 97). Having previously visited the northern Northwest Coast in 1775, Quadra's crew also noted that there were far fewer stone and bone tools, and far more metal ones (Maurelle 1920). Both the Haida and Tlingit preferred to trade for iron. In fact, in 1779 the Haida were willing to trade for the iron barrel hoops that were refused in 1775 (Riobo in Thornton 1918, 224).

It is unclear exactly why the Haida and Tlingit preferred iron over copper while trading with the foreign maritime interests arriving on the coast. However, it is possible that, as the Indigenous communities of these groups were already in possession of iron and copper in the late 1770's, they placed more emphasis on copper attained from established Indigenous routes and protocols than from European traders. Iron, on the other hand did not occupy the same ontological space as copper, was much more difficult to manipulate, and prior to the fur trade was much rarer on the coast (Acheson 2003; Cooper *et al.* 2016; Emmons 1991). While iron does appear to have some overlap with copper and occasionally is noted in the historic record in the form of bracelets and beads, iron appears to have occupied a different sphere of value and use within Indigenous communities.

Acknowledging that the Indigenous groups living on the Northwest Coast accepted new trade partners with seeming vigour and zeal, which Cook noted at nearly every place visited in the region (Cook 1784, 357-393), is a somewhat one-dimensional reading of the Indigenous experience of colonialism in the late 1770's. By the time Cook arrived on the coast, the first smallpox epidemic had already ravaged much of the region. Boyd estimates that 33% of the population was lost by the end of this century. Indigenous communities were under stresses that were unknown or misunderstood by many of the colonists and traders (Boyd 1999, 36). It is possible that these stresses influenced Indigenous trade decisions, pushing some communities into a type of trade dependency during a time of rapid population decline which was interpreted as an eagerness to trade with Eurasian partners.

3.2.5 The 1780's

3.2.5.1 The South Coast

Early on in this decade the social and physical landscape of the southern area of the Northwest Coast was impacted by a smallpox epidemic. This outbreak originated in Mexico and stuck the Straight of Georgia region between 1782 and 1783 (Oliver 2010, 57-8). Boyd estimates that between two-thirds and three quarters of the population in the area were lost (Boyd 1999; Harris 1997, 18). The landscape that had been previously managed in order to maintain resources such as wapato, berries, bark, and productive hunting grounds began to regenerate in this area, signifying the abrupt desocialisation of the area and hinting at new social pressures brought by this loss (Oliver 2010, 67-8).

In 1786, nearly a decade after Captain Cook traded at Nootka Sound, Captain James Strange arrived on the Northwest Coast and one of the first stops he made was with the Nuu-chah-nulth. Around Nootka Sound copper was still heavily sought by Indigenous traders and iron was also a prized material. In a similar fashion to Captain Cook's account of trade encounters among the Nuu-chah-nulth, crewmember Alexander Walker wrote that everything Indigenous was for sale if European metals were offered (Fisher &

Bumsted 1982, 43). While this is a bold statement that certainly emphasises how valuable metal was among the Nuu-chah-nulth, the lack of European understanding of Indigenous practices and life ways suggests a continued naivety about Indigenous desires, needs and values. Furthermore, the Nuu-chah-nulth refused to part with copper adornments and instruments of war such as iron spears unless compensation was lavish (Beaglehole 1929; Fisher & Bumsted 1982, 113). This indicates an intricate market system and complex value structure that was not as easily set aside as European accounts might suggest.

At this time in Nootka Sound, specific preferences seemed to lean towards unwrought iron, brass buttons and bells, and copper of almost any sort. Crewmembers observed the iron being reworked immediately in the Indigenous style to create chisels, hatchets, awls, hammers and so on (Fisher & Bumsted 1982, 40, 108-9). It is possible that unwrought iron was preferred to steel at this point due to a developing understanding of the workability of iron as compared to steel using Northwest Coast Indigenous metallurgical techniques. Strange and his crew also experienced a level of control exerted over trade markets by the Nuu-chah-nulth similar to that seen by Captain Cook and his crew in 1778. The Nuu-chah-nulth would make a show of any object that was offered to the Europeans in order to falsely inflate prices (Beaglehole 1929; King 1999, 129-30; Fisher 1977, 11-12).

The differing trade experiences that took place at Nootka Sound in the latter half of the 1780’s provide a good example of the mosaic of change that can occur within a few short years, even in the same geographical location. James Hannah and his crew aboard the *Sea Otter,* identified by Fisher as the first explicitly fur trade vessel in the region (Fisher 1977, 203), wrote that the people they encountered at Nootka Sound in 1786 wished to trade for iron and only possessed simple small crooked iron knives made of barrel hoops (Galois 1994, 85-86). Taylor, aboard Colnett’s vessel, wrote that in the same year the people encountered at Nootka Sound possessed iron and copper objects and wished to trade only for copper; no other goods were accepted (Galois 2004, 118). This is supported by Colnett’s own account of events, which stated that at this location copper sheet was similar to legal tender and he was able to trade a single sheet for three otter pelts (Colnett 1940, 202).

Two years later, in 1787, Portlock wrote that the Nuu-chah-nulth wanted green and red beads, copper, and wrought iron pieces nearly 2 feet in length, but did not wish to trade for hatchets, saws, adzes, brass pans, pewter basins, or tin kettles (Dixon 1789, 218-20.). In 1788 Robert Haswell found that copper of any type was in great demand in the Sound, but the price of iron had fallen and only formed iron tools were sought (Howay 1941, 44-45). In 1789, the price of copper seems to have fallen among the Nuu-chah-nulth in Nootka Sound, but was still very much preferred among the Ditidaht Nuu-chah-nulth who appeared to care little for iron knives (Keddie 2006, 26). Meanwhile, at Cape Scott on the northern tip of Vancouver Island, the Nuu-chah-nulth were extremely interested in iron specifically and appeared to have very little in the way of European trade materials (Ayyar *et al.* 1982, 85-91).

Captains Kendrick and Gray attempted to deal with the fluctuating Indigenous market in 1789 by constructing a blacksmith's forge on the shore of Nootka Sound in order to produce objects in preferred Indigenous styles upon demand (Howay 1941, 59, 65, 69, 82). The Nuu-chah-nulth and visiting Indigenous traders would have had opportunities to see this technology. However, there is no evidence that Eurasian metalworking technologies that ranged outside of Northwest Coast practices were adopted anywhere in the region. The adoption of technologies is not inevitable, and ideas of technological determinism are naïve, flattening, and should be avoided (Smith 1994, 2-4). The choice of whether or not to take up a new technology is tied to the social context of its use which, as Harris *et al.* (2001, 275) and Ess & Sudweeks (2001, 261) argue, is directly tied to cultural processes such as communal identity and moral standards. This strengthens the idea that traditional Indigenous metallurgical practices were consciously chosen and culturally significant.

It appears that Indigenous communities trading in Nootka Sound viewed foreign traders as a resource that would largely bend to their will. This allowed them to be fickle with acceptable trade materials. It is also possible that the wide range of trade preferences encountered in this area are due to diverse groups of Indigenous people, potentially from different ethno-linguistic culture groups, who had travelled to the area to trade for colonial material. Unfortunately, it is challenging to parse cultural differences from texts written by explorers and traders who may not have understood these variances, instead offering Eurocentric speculations.

The fluctuations in desires and valuations of trade materials among the Nuu-chah-nulth through the 1780's occurred against a backdrop of increased colonial tensions brought to the area by the British, Spanish, and to a lesser extent the Russians and Americans. Nootka Sound had become an important and well-known trading location and colonial interests were looking to establish permanent ownership and control of the area (McDowell 1998, 128; Keddie 2006, 29). Having built Fort San Miguel at Yuquot across the bay from Nootka Sound, the Spanish captain Esteban José Martínez claimed the Northwest Coast for Spain in 1789 and began to defend that claim (Skowronek 2009, 498). One instance involved the arrest and detention of British Captain Colnett and his ship *Argonaut,* appropriating 84 copper sheets Colnett had brought for trade (Kirk 1986, 204; Galois 2004, 340; Howay 1941, 51). These tensions kicked off the Nootka Crisis, an international incident that carried on into the 1790's.

Indigenous actions throughout this time suggest that the Nuu-chah-nulth had their own interests and goals that did not relate to those of the colonists attempting to establish dominion within their territory. Outside of the international incident brewing in the Sound, the Nuu-chah-nulth continued to do business with other interests as it suited them. Irish merchant Captain John Meares claimed that the Nuu-chah-nulth sold him a piece of land directly in 1788 to establish an outpost for his own trade. This occurred completely outside of, and with disregard to, any colonial claims to the area. In fact, the British John Meares flew a Portuguese flag at this location to escape scrutiny (Meares 1790, Appendix XIII, 247; Norris 1955, 570-71).

3.2.5.2 The Central Coast

Among the Tsimshian, in 1787 Colnett found that Indigenous people at every village he visited were in possession of both copper and iron goods prior to his arrival, and while trading at Estevan Sound the people were more interested in obtaining iron than copper (Swanton 1905, 93, 272-78; Galois 2004, 46, 145, 165). Again, this trend in preference could potentially be linked to the specific qualities of copper as apotropaic, and to a value structure that is tied to conspicuous use and exchange (Boas 1916, 305; de Laguna & McClellan 1981, 645; Cooper 2007, 197; Mcllwraith 1948, 2: 688-90; Jopling 1989, 17). Captain Colnett and crew were also given a glimpse of the long-distance trade networks of the Northwest Coast when he visited the Tsimshian on Pitt Island and found the First Nations there in possession of a brass weapon that resembled a New Zealand Patoo engraved with the name 'Joseph Banks Esq.'. This item was reportedly obtained from Captain Cook's vessel by the Nuu-chah-nulth while his ship visited at Nootka Sound nine years earlier in 1778, and had subsequently found its way to Pitt Island nearly 300 miles away as the crow flies (Figure 3.3; Colnett 1790, 133). This has significant implications for the study of copper artefacts in Indigenous use as this object clearly moved across ethno-linguistic lines and did so in relatively short order, supporting the continued existence of a robust Indigenous trade network at this time.

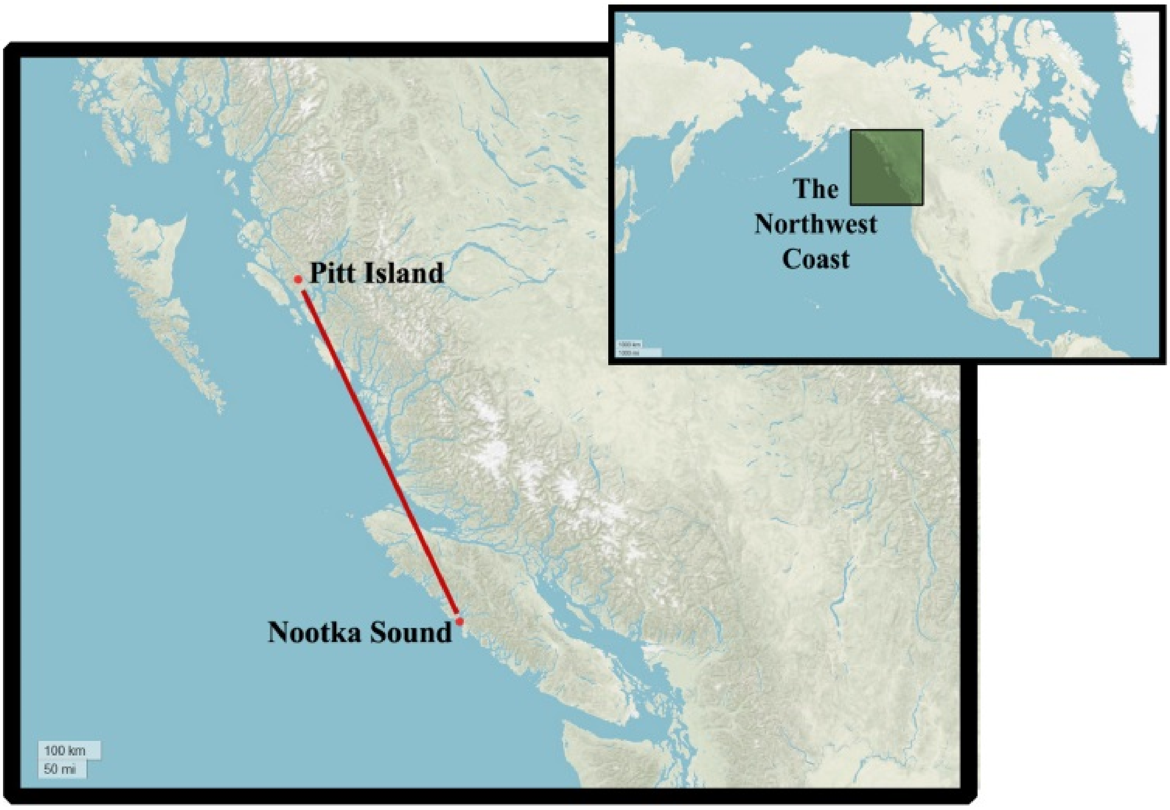


Figure 3.3. Long distance Indigenous trade on the Northwest Coast is illustrated by the distance a New Zealand Patoo, originally traded by a member of Captain Cooks crew, moved in the region. Within the space of nine years the brass Patoo travelled from the Nuu-chah-nulth of the Nootka Sound area to the Tsimshian on Pitt Island, a distance of approximately 300 miles.

As James Colnett travelled around the Northwest Coast in 1787, he found that the situation concerning trade metals amongst the communities on Haida Gwaii was similar to that which Cook had discovered in 1778. Copper and iron appeared to be available across the island, though iron and specifically adze blades were in demand for trade (Dixon 1789, 201-243). The majority of the iron already in Haida possession had been worked into long spear points and knives, which Colnett described as finely made by Indigenous crafts people (Acheson 1998, 107; Galois 2004, 129-138). Trade copper was generally not sought by the Haida (Dixon 1789, 201, 243). Accounts of the expedition also noticed that the copper the Haida did possess was being used in very specific ways. These include elaborate ceremonial dance masks bearing copper inlay, as well as collars, bracelets, and a type of necklace worn by children comprised of copper sheet wrapped around a wooden stick or strand of rope hung from the neck (Colnett 1786-88, 230).

At this time Colnett also became the first known European to document a 'Copper' (see Chapter 2, 58-9). The artefact Colnett viewed was quite large and he assumed it was a type of armour that had been made from the large sheet copper arriving on the coast for trade (Galois 2004, 134, 351-2; Emmons 1991). The early date within the colonial timeline of the Northwest Coast and the size of the Copper shows that, even if this artefact did not exist in its large metallic form prior to the introduction of colonial metals, this type of artefact was very quickly integrated into Indigenous value systems. Colnett's notes concerning the use of copper and iron on Haida Gwaii show a perceivable divide in the use and value of copper and iron, further supporting the notion that the two metals were viewed very differently by Indigenous communities across the Northwest Coast.

3.2.5.3 The North Coast

In the north of the study region, an Indigenous desire for iron was noted throughout the later 1780's. In 1785 Alexander Walker described people at Prince William Sound wanting to trade only for long pieces of iron and often carrying long iron knives suspended from their necks or waist (Fisher & Bumsted 1982, 152; Figure 3.4). In 1786 la Pérouse, while visiting the Tlingit at Lituya Bay, also noted that many people were in possession of large iron knives and spear points as well as copper-tipped arrows. At this time nothing but iron was desired for trade. la Pérouse also observed the use of whetstones to keep metal implements sharp and shining, similar to Cook's observations among the Nuu-chah-nulth in 1778 (la Pérouse 1798, 1, 269, 402-7; Cook 1784, 329-30). This adds a further dimension to the aesthetic appeal of metal in the region, as both iron and copper develop corrosion products that obscure the colour of the metal, especially when exposed to damp conditions like those found in the boreal rainforest of the Northwest Coast. The colour of copper, as related to the flesh of salmon, cedar bark, and blood, is referenced in multiple Indigenous oral traditions (Boas & Hunt 1906, 80-113; Goldman 1975, 82; Jopling 1989; King 1999, 160), and keeping the metal from turning green may have been a priority; a practice that may have been transferred to iron due to its related metallic qualities.

A year later in 1787 Dixon observed a similar trade preference for iron and the creation of long daggers among the Tlingit at Yakutat Bay, with pewter basins also seeming popular (Dixon 1789, 182-188, 244). Copper in the form of bracelets, points, and as an embellishment to other objects such as the iron daggers, was commonly observed among all northern communities visited (La Pérouse 1798, 424-7, 369; Beresford & Dixon 1968, 243). However, as before, there appears to have been little colonial trade in the material. The large amount of native copper available to Indigenous communities in and near the Wrangell St. Elias region (Glave 1892, 877; Cooper 2006, 149; Franklin *et al.* 1981, 5-6) potentially played a role in this trend. This suggests that established Indigenous procurement and use strategies relating to copper were maintained at this time, but that there was space for more novel metals. The copper embellishment on the iron dagger, as seen in Figure 3.4, demonstrates flexibility in the ways copper could be used, and potentially a wish to extend copper's perceived innate power to other objects.

Figure 3.4. An iron dagger embellished with copper, thought to be of Tlingit provenance, which was donated to the Pitt Rivers Museum in 1921. Record No. 259, Accession No. 1921.53.3. (Photo by author, ©Pitt Rivers Museum).

3.2.5.4 Trends in Trade Goods

Initially the specific desires of the Indigenous populations were difficult for Europeans to interpret, often leaving traders with a surplus of goods that were simply not desirable on the Northwest Coast (Morison 1921, 56-7). Robert Gray of the *Columbia Rediviva* complained, during his time spent on the coast in the last few years of the 1780s that instead of useful items, the First Nations wanted 'superfluous blankets, copper kettles that were displayed instead of used, and 'bunches of old keys worn like a necklace and kept bright by constant rubbing' (Morison 1921, 56). This left Gray unable to trade his rat-traps, pocket mirrors, and snuff boxes; meaningless cargo in the Pacific Northwest (Morison 1921, 56-7). However, following more than a decade of colonial trade visits to the region, a trend in material value was beginning to emerge to the colonialists.

Coast Salish communities near the Columbia River were found to give ten fur pelts for one copper sheet in 1788. At Nootka Sound the Nuu-chah-nulth would trade one fur pelt for either ten iron chisels, a six-inch square sheet of copper, or ten copper bangles (Hoskins 1941; Howay 1941, 187, 195). The more northern communities continued to favour iron to copper in colonial trade. The Tlingit seemed to only accept iron while the Haida would trade for a mixture of goods and materials (Galios 2004, 240; Howay 1941, 195; Haswell n.d.). As such, sailors like Archibald Menzies, who had acted as James Colnett's ship's surgeon during the 1787 visit, compiled lists of materials recommended for trade in the region, allowing subsequent expeditions to carry more targeted goods (Gough 1992, 150; Colnett 1786-88). Specifically, along with items such as cloth, frying pans, tin kettles, pewter basins, and fishing line, he stated that each vessel 'ought to be supplied with two black smiths and a forge together with necessary utensils for working iron, copper and brass in such forms as may best suit…the natives' (Dillon 1951, 155). This more focused approach in colonial trade promised to usher in significant changes to the evolving cultural dynamics of the Northwest Coast.

3.2.6 The 1790's

The last decade of the 18th century on the Northwest Coast was significantly different from the first. Trade with foreign interests was developing rapidly, and from this point forward began to incorporate cloth, foodstuffs, and to some extent firearms, shot, and gunpowder (Meany 1907; Moziño 1970; Colnett 1940; Acheson & Delgado 2004, 68 Wagner & Newcome 1938, 219; Vancouver 1801, 348-396). American fur traders were also becoming much more common on the coast, alongside European and Russian interests.

Though the first smallpox epidemic had ravaged the region in the 1770's, it was in the early 1790's that explorers started to note how significant the Indigenous losses from the disease were. In the first few years of this decade, Captain Vancouver and his crew noticed a number of southern villages in/near Boundary Bay and the San Juan Islands that had been abandoned (Boyd 1994, 16; Vancouver 1801). At Port Discovery, Vancouver describes human bones 'promiscuously' scattered on the beaches (Lamb 1984, 517, 538-9). The logs of Galiano and Valdez also note the tell-tale 'pimply' or rough-skinned people with the damaged eyes of smallpox survivors among the Coast Salish Halkomelem in the early 1790's (Galiano & Valdez 1930; Boyd 1994, 6-7). These macabre leavings from the disease unfortunately would contribute to the colonial idea that North America was sparsely populated and that the local Indigenous peoples were likely to disappear in the face of 'civilization' and modernity (Harris 2004, 170; Harris 2002, 108).

3.2.6.1 The South Coast

Among southern culture groups, trade interactions continued with increasing frequency at the beginning of the decade (Grumet 1975, 307-8; Acheson & Delgado 2004, 60). Francisco de Eliza arrived at Nootka Sound in 1790 carrying 10 cases of copper sheet (Archer 1973), while Captain Gray arrived in 1791 with 267 extra sheets of copper weighing close to 1,600 kg, alongside 6,755 quarter pound iron chisels (Hoskins 1941). Trade had become so common that Captain Vancouver wrote that what had at first been fortuitous exchanges, had been transformed into almost standardized affairs (1801(2), 59). However, the goods that the Nuu-chah-nulth wished to trade for were changing. From Eliza's perspective the Nuu-chah-nulth were losing their taste for copper (Archer 1973, Bishop 1967, 129), while from Bernard Magree's perspective they were losing their taste for iron material and formed artefacts like twisted collars (Magee n.d.). Two years later Captain Vancouver also noticed that the price of copper was falling across Vancouver Island (Vancouver 1801; Meany 1907; Menzies 1923), as did the Spanish on south Vancouver Island when only a single skin was attained for the best piece of copper (Espinosa 1930, 88-90).

In this decade, as an understanding of the Northwest Coast was developed, fur traders undertook a concerted effort to broaden their gains by exploring new locations and trade markets (Hoskins 1941, 235; Menzies 1923, 82). Exploration provided foreign government with an avenue for expansion in resource procurement by quantifying and mapping the coastline and claiming more territory for trade. In a quest for fruitful new markets Captain Vancouver sailed north in 1792, where crewmember Menzies wrote that the Kwakwaka'wakw they met were as keen to trade for copper and other goods as the Nuu-chah-nulth had originally been (Menzies 1923, 82). Another example can be found with Captains Gray and Kendrick aboard the *Columbia Rediviva*. In 1792 they 'discovered' the Columbia River, and during exploration upriver they found that Coast Salish communities residing there had only a small amount of metal among them. These villages both wished to trade for copper at lower prices than coastal communities and were observed working the metal into valued personal adornments reserved for societal elites (Hoskins 1941, 234; Espinosa 1930, 90). John Boit Jr., a crewmember aboard the

Columbia Rediviva, noted that Chiefs among the Columbia River communities appeared to wear twisted copper collars as a badge of distinction (Hoskins 1941, 235).

Not all trade encounters were lucrative for colonial interests. It was sometimes the case that colonial materials had already inundated an area through Indigenous trade networks. This shows that though there had been significant upheaval among Indigenous communities across the entire region due to issues such as smallpox, trade connections continued to function and a range of material was moving around the region at this time. When Francisco de Eliza and his crew arrived at the mouth of the Fraser River in 1792, they found that the Coast Salish at this location were well acquainted with colonial trade, which had been arriving on horseback from the plateau and plains areas to the east for some time (Wagner 1933, 187; Keddie 2006, 16).

3.2.6.1.1 The Nootka Crisis

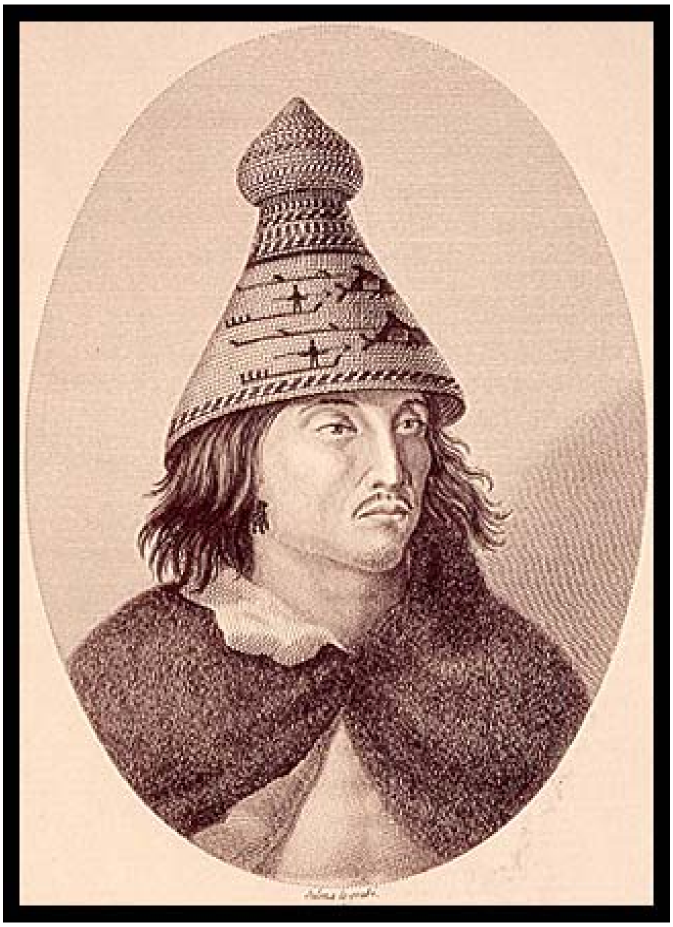


Figure 3.5. A portrait of Nuu-Chah-Nulth Chief Maquinna (Meares 1790, 109).

To consider all trade as a one-sided European affair flattens the experiences that occurred in the region. Throughout the fur trade period Indigenous communities were also working to make the most of each encounter. This is evident in the way that Nuu-chah-nulth Chief Maquinna handled the Nootka Crisis brewing in his territory. Previously, Maquinna had placed himself and his community between European traders and other Indigenous interests, acting as middlemen to control the trade market and gain wealth (Morison 1921, 50). As animosity brewed between separate European groups in the Sound, Maquinna recognised another opportunity to profit. Thus, having become skilled as a transcultural actor in his role as a translator and mediator (Hayes & Cipolla 2015, 3; Horning 2006, 2007), Maquinna invited the Spanish and

British to his house and hosted their talks (Kirk 1986, 203; Mears 1790, 109: Figure 3.6). The Chief's goal was to facilitate the Nuu-chah-nulth relationship with both groups, with the intention of increasing profitable trade regardless of how the British and Spanish handled the situation. Kirk argues that Maquinna and other Chiefs on the coast who became involved in early colonial affairs in similar ways, did not realise that their actions helped usher in massive social change as they provided a foothold for colonial social systems. However, one must be careful not to interpret this as a binary trope of opposition, ignoring the lively agencies of both Eurasian and Indigenous people who were working towards their own goals alongside each other. It is unlikely that the Nuu-chah-nulth were thinking about the long-term preservation of their culture, or that such a thing was an issue, while making decisions pertinent to their own specific circumstances in time and space.

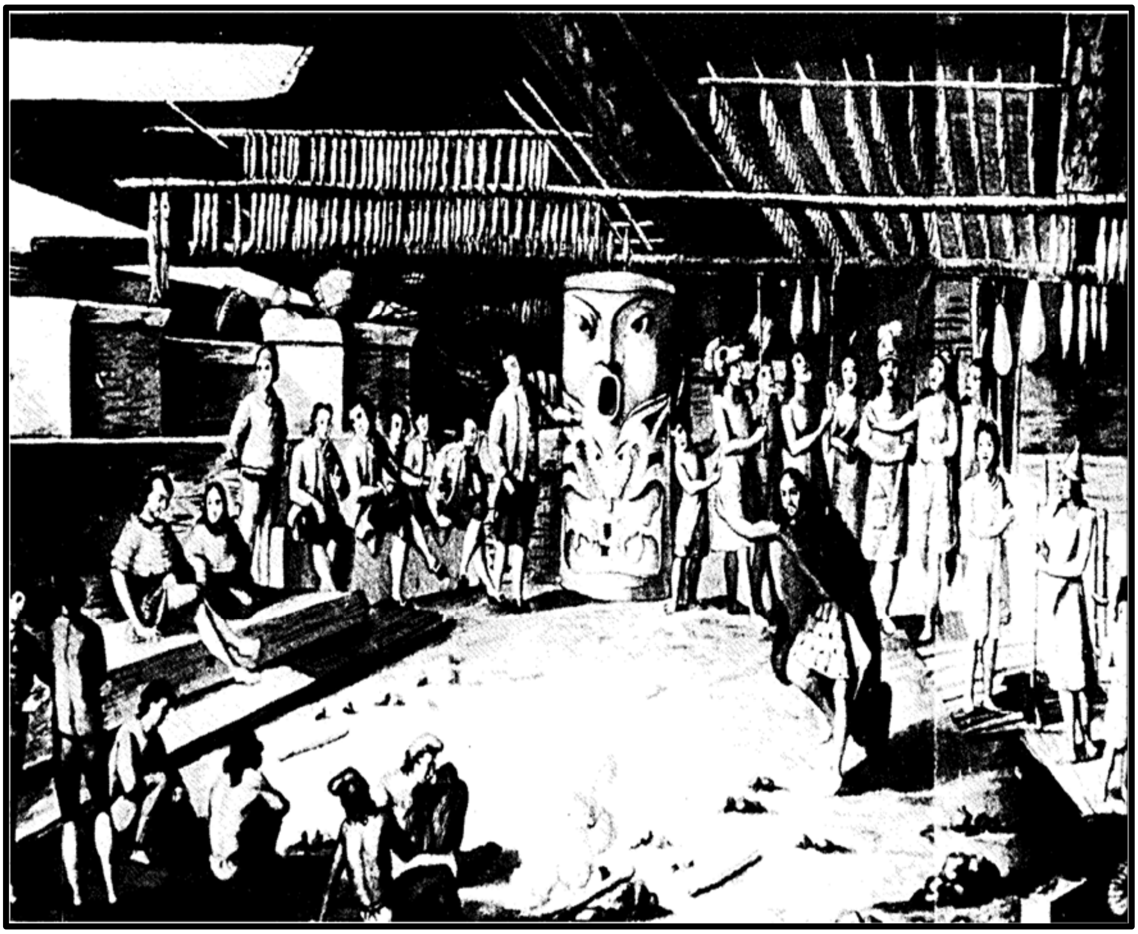


Figure 3.6. A sketch showing Chief Maquinna hosting the British and Spanish during negotiations related to the Nootka Crisis. The guests were treated to a feast in the Chief's house, followed by performances that included a dance given by Maquinna himself. The moment was recorded as a sketch by one of the Spanish crewmembers present for the event (British Columbia Provincial Museum, Ethnology Division, PN 13501; Kirk 1989, 203).

3.2.6.2 The Central Coast

European exploration of the poorly understood inland areas of the region brought Alexander Mackenzie, traveling from east to west, to Bella Coola and the Nuxalk in 1793. Here Mackenzie noted that the Indigenous people were very interested in copper and brass, using the metal to create items such as collars, arm and leg bands, earrings, and arrow and spear points (Mackenzie 1801, 133). Iron bars 18 inches long and 2 inches thick were also preferred and used to make axes, arrow points, lance spikes, and occasionally twisted collars (Sheppe 1995, 162-3, 222-227). The preference for materials was similar to that of newly contacted communities on the coast in the previous decades and may have been related to the relatively small amount of colonial trade goods that had made their way inland prior to Mackenzie's appearance. Mackenzie also wrote that there appeared to be metal cut from old copper stills among Nuxalk communities. The people from Bella Coola travelled by canoe downriver to the head of the inlet and the Bella Bella village of Waglisla to trade with the Heiltsuk and other coastal communities for all manner of goods (Mackenzie 1801, 133; Kirk 1986, 141; Figure 3.7). Trade preferences among the Nuxalk were likely much more complicated than simply wanting to attain colonial goods, which appear to have been already available to some extent through Indigenous trade networks.

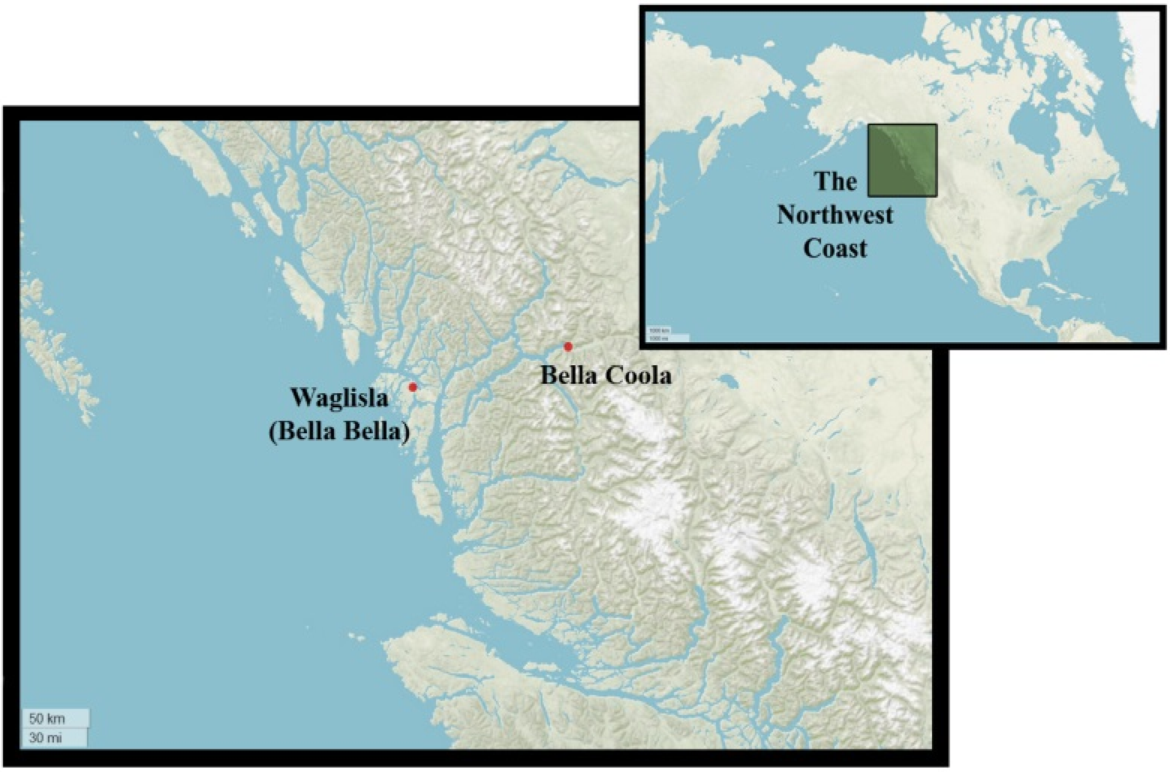


Figure 3.7. Inland communities such as the Nuxalk of Bella Coola used the river systems to travel to the coast for resources, trade, and social interactions.

Mackenzie's explorations of the Peace River, in search of a navigable route to the Pacific Ocean, lead to the establishment of the earliest mainland fur trade post, Rocky Mountain Fort, in 1794. The fort, located on the south shore of the Peace River near its confluence with the Moberly River, kicked off a trend of rapid colonial expansion with multiple forts and trade posts quickly springing up across the landscape (Keddie 2006, 15; Burley & Hamilton 1991). This allowed the North West Company to secure a foothold in what is now British Columbia, with the intent of ultimately moving westward to take advantage of coastal opportunities (Wallace 1929, 35; MacGregor 1952, 68). Archaeological excavations of the fort suggest that at the time of its use relations with the Indigenous people were amenable. There is no evidence of defensive fences or palisades, and the faunal remains suggest the fort relied on Indigenous supplies of meat and other resources to survive (Burley & Hamilton 1991, 7, 13).

The establishment and spread of forts that operated within a colonialised economic system quickly affected Indigenous lifeways across the entire region. Rocky Mountain Fort journals kept by employees describe the growing Indigenous participation in the credit system. This allowed fur traders to foster an increasing dependence upon European goods among Indigenous communities, gaining a type of power and leverage over Indigenous people as they fell into debt with the fort (Burley & Hamilton 1991, 17; Ray 1974). This strategy proved to be useful to later colonial interests that developed in the mid 19th century who accessed this debt structure when seeking to tie Indigenous people to colonial government rules and regulations (Mackie 1993, 167).

On the coast, explorers and traders who visited Haida Gwaii in the 1790s noted that metal quality had become very important and that the market was fluctuating. Trade copper and iron were inspected closely and were refused if any flaws were identified (Fleurieu 1801, 240; Ingraham 1971, 129). Bartlett found that only a few skins could be attained for a single piece of copper or iron in 1791 (Bartlett 1925, 301-2). In the same year, Hoskins wrote that copper was of no interest on Haida Gwaii, but chisels and foot-long iron bars were preferred (Howay 1941, 486). To deal with variable demand and remain flexible in trade with any Indigenous group explorers, Individuals such as Joseph Ingraham in 1792, employed blacksmiths on board their vessels who would fabricate goods in local Indigenous styles. This enabled Ingraham to cater to the specific requirements and desires of different communities as he found them (Ingraham 1971, 105). On Ingraham's first visit to Haida Gwaii iron collars were created and traded with great success, but by the time he returned later that year it was copper items that were the focus of Haida trade; both were easily provided (Ingraham 1971, 192). Ingraham and his crew noticed that both copper and iron were being used to create personal adornments, points for spears and arrows, and large 18-inch daggers that were carefully maintained (Ingraham 1971, 151).

It is possible that in the 1790's the fluctuating market on Haida Gwaii was affected, at least in part, by the accumulation of transactions with Eurasian visitors, both positive and negative. As Acheson and Delgado point out, it was sometimes impossible to know whether a trade transaction would be conducted peacefully and honestly by either the Eurasian visitors or the Haida (2004, 71), which made for some very tense exchanges. As mixture of experiences grew, so did the Indigenous social pressures to gain material wealth and potentially exact revenge, resulting in the seizure, ransacking, and sinking of multiple visiting vessels on the shores of Haida Gwaii; at least 14 vessels were attacked in the 1790's alone (Acheson & Dlegado 2004, 72-74; Walker n.d.; Sturgis 1978, 53, 62, 90).

3.2.6.3 The North Coast

Further north, French fur trader Etienne Marchand was surprised to find that the Tlingit at Sitka Bay possessed an abundance of trade goods by the beginning of the 1790s, and that this had been the case long enough for those goods to wear out. In 1791 the Tlingit at Sitka commonly owned and used iron pots, pans, hatchets, knives and chisels, copper kettles and sheet metal, as well as muskets and European clothes (Fleurieu 1801, 190). Marchand also noted an abundance of well-maintained large iron daggers and copper personal adornments among the Tlingit that were frequently polished to maintain the shine of the metal, similar to Cook's observations among the Nuu-chah-nulth in 1778 (Cook 1784, 329-30) and those of la Pérouse among the Tlingit of Lituya Bay in 1786 (la Pérouse 1798, 402-7).

In 1791, Marchand found that the Sitka Tlingit preferred copper basins and pots to all other items he could offer for trade, and that metal was immediately altered by Indigenous metallurgists (Fleurieu 1801, 190). This is quite different to past experiences of trade with the Tlingit where colonial traders had observed both iron and copper in abundance and generally only iron was preferred for trade. Ethnographic accounts show that native copper metal was still available and in use among the Tlingit in the region.

William Sturgis arrived at the Tlingit village of Klukwan on the Chilkat River aboard the *Ulysses* in 1799 and observed native copper nuggets he estimated to weigh approximately ten or eleven pounds in the river. Sturgis wrote that the metal was collected, laid against a rock, and pounded into a sheet about two feet square. Unfortunately, Sturgis does not go into greater detail about the metallurgical techniques used in this process. Sturgis claimed the metal was subsequently traded southward (Jackman 1978, 78-80). A new interest in colonial copper could suggest that native copper procurement or Indigenous trade was hindered in some way, or that Indigenous metallurgists wished to work with materials like sheet copper, causing the Tlingit to look elsewhere for the metal.

To the south of Sitka in 1792, Jacinto Caamaño found that the Tlingit of Bucareli Bay also wore large iron daggers similar to the ones described by Marchand, and used iron and copper to make spear and arrow points and personal adornments (Figure 3.2; Figure 3.4). People wore metal rings, bracelets, anklets, and hawser-laid neck rings reaching from shoulder to shoulder and appearing heavy enough to give the impression of 'fetters' (Wagner & Newcombe 1938, 205-6). Caamaño thought the Indigenous metal objects he saw must have been created by European or Russian metalsmiths, but later found that the First Nations 'make them quite easily from the metal that they obtain by barter, heating it in the fire and forging it by beating it with stones in the water' (Wagner & Newcombe 1938, 203).

At Yakutat Bay in 1791, Tomás de Suría of the Malaspina expedition noticed that the Tlingit were busily working to create lesser-valued reproductions of their significant cultural objects in order to trade these to visiting collectors (Suría 1791; Figure 3.8). It seems this practice grew over time as the fur trade and later colonial period progressed and by the end of the 19th century Indigenous curios were prevalent throughout the region. Indeed, they were increasingly produced for tourists and anthropologically focused expeditions such as the Jesup North Pacific that arrived nearly a century later in 1897.

This market in Indigenous curios is quite significant within the process of colonialism, as these objects represent several different meanings and intentions with significant consequences realised in the latter half of the century (Figure 3.8). The initial creation of curios could be interpreted as either, or both, an act of Indigenous subversion or as a savvy economic decision. Curios can also be seen as tools of self-representation that are used to address settler populations (Couture 2014, 236). However, these objects are transformed into 'collections' as they travel and used to represent stereotypes of the 'authentic' and 'legitimate' Indigenous person, working to crystallise Indigenous cultures into a flattened simplified trope of themselves that becomes frozen in time (Cassel & Maureira 2017, 7-10; Clifford 1988, 228).

Figure 3.8. Two examples of curio totem poles created on the Northwest Coast. The artefact on the left is carved from bone, Record No. 25, Accession No. F.2007.2.229. The artefact on the right is carved from wood, Record No. 28, Accession No. F.1987.3.15. Unfortunately, neither of these objects retains further provenance details (Photo by Author, ©Leeds Discovery Centre).

3.2.6.3.1 Russian and Tlingit Interactions

In 1795 Alexandr Baranov, then Chief Manager of the Shelikhov-Golikov Company that became the Russian-American Company (RAC) in 1799, arrived at Sitka Bay. Baranov was looking to expand his fur operation south from Alaska due to the depletion of more northern fur animals from prolonged intensive hunting (Grinev 2010).

Baranov paid the local Tlingit for land in Starrigavan Bay to stop other colonial trade interests from interacting with the Tlingit (Wharton 1991; Naske & Slotnick 1994; Dauenhauer *et al.* 2008). The post, "Fort Arkhangela Mikhaila", was quickly established, and the Russians began their own colonialism processes. This drew the ire of the local Tlingit, who disagreed with Russian practices such as taking Indigenous women as their wives and mistresses, desecrating graves, damming streams, and exploiting the Tlingit for labour (Grinev 2005, 107-112, 124). At the same time the Russians were beginning to think of the Indigenous population as Russian subjects to the Tsar and expected the Tlingit to offer their labour in fealty. Relationships between Russian settlers and the Tlingit became increasingly antagonistic (de Laguna *et al.* 1964, 10-12). Ultimately, these issues lead to a number of clashes which the Russian colonisers found much more difficult to suppress than the less cohesive Aleut communities they had previously

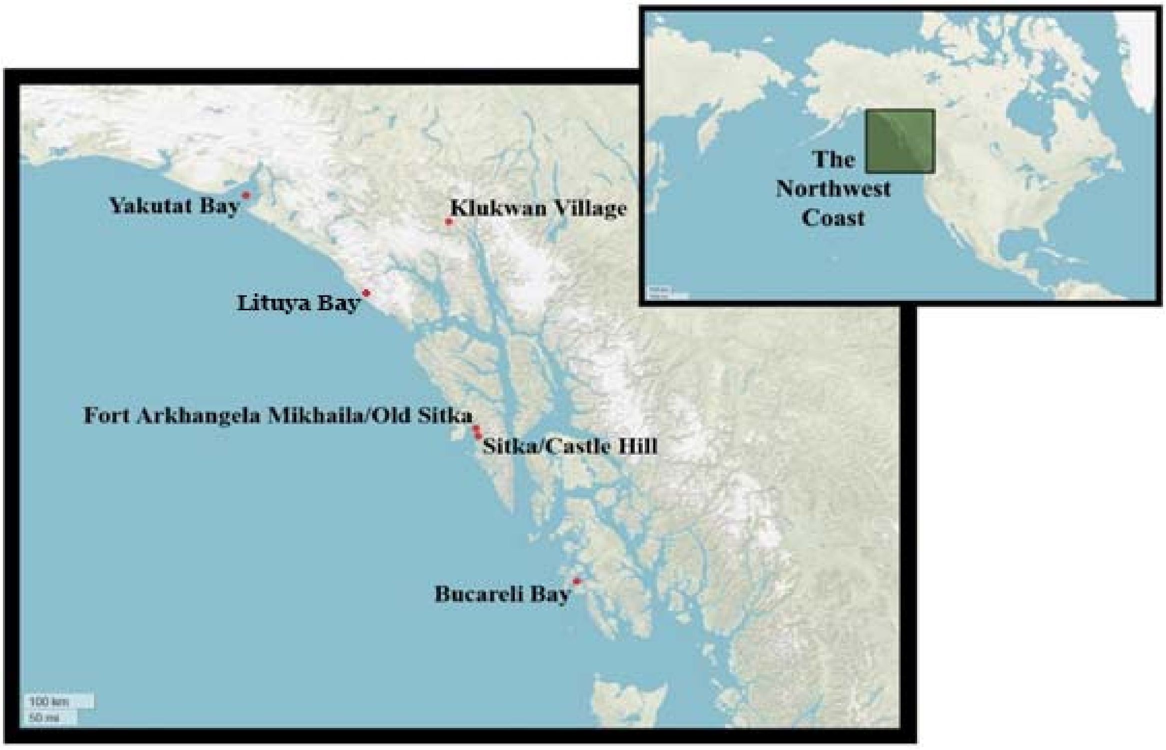


Figure 3.9. A map showing Yakutat Bay, Lituya Bay, and Bucareli Bay, popular points of Eurasian trade in Tlingit Territory. Additionally Klukwan, a Chilkat Tlingit Village, and the sites of the Russian Fort Arkangela Mikhaila and Castle Hill on what is now Sitka, Alaska are identified. Castle Hill is located upon a previous Tlingit village.

colonised in the north (Wharton 1991; Naske & Slotnick 1994; Dauenhauer *et al.* 2008; Gibson 1978, 49; de Laguna *et al.* 1964, 10-12). Animosity continued into the next century, with small skirmishes and moments of cooperation punctuating the daily interactions between the two groups (Grinev 2005, 113-5).

3.3 A New Century

A significant number of impactful changes occur on the Northwest Coast through the 19th century. The beginning of this century sees an increasing focus on resource procurement from British, America, and Russian interests as, in 1795, the Spanish relinquished any claim to their sovereignty in the region (Harris 2004, 169). The mid-19th century also sees the colonial focus shift in the Pacific Northwest from predominantly maritime and land-based fur trade, to colonial settlements largely managed by the Hudson's Bay Company (HBC) from the 1840's, and eventually to the Canadian government structure in the 1870's (Mackie 1993). The overarching colonial management that developed in the region by mid-century meant that forts hundreds of miles apart were becoming connected and could support each other. This meant that commodities and resources could be transferred or shared, and also that fur traders and later colonial agents could also made decisions that would affect Indigenous people residing in distant locations (Mackie 1993, 182).

This era also saw the creation of multiple mixed communities as Indigenous peoples, European and Russian settlers, and workers imported from the arctic, China and Japan came together, living and working in the region (Mawani 2009). Through this century Indigenous communities discreetly engaged with the fur trade and later colonial government structures and settler communities, navigating the upheaval using a wide variety of strategies. For example, as forts were being erected, some Indigenous communities took advantage of the situation and placed themselves as middlemen for trade, as in the case of the Tsimshian at Fort Simpson in the 1830's (Neylan 2000, 56-7). In cases such as the Tlingit relationship with the Russians, warfare and opposition defined a large portion of their interactions (Grinev 2005, 124). In the latter half of the century, as the colonial period was becoming firmly established, some Indigenous people chose to take part in the cash economy working in agriculture (Oliver 2013, 183), commercial fishing and canning (Mawani 2009, 43), and mining (Lutz 1992, 70; Harris 1997, 95). It will become apparent in this chapter however that Indigenous people throughout the region were acting to make their circumstances work to their benefit. Processes of colonialism visible in the region do not suggest acculturation or a linear progression, and instead provide a vivid backdrop upon which to see the contingent creative ways that people navigated an uncertain and changing landscape from their own established perspectives and ontologies.

3.3.1 The beginning of the 1800's

With the new century came another smallpox epidemic that swept through the region from 1801-2. This epidemic likely came from the Plains and predominantly affected the central and south coast regions according to Boyd (1994, 35). Boyd argues that not much is known about this specific epidemic due to the swift way the disease is likely to have progressed and a lack of written records (1994, 13-14). However, the date of the epidemic is confirmed by Coast Salish people among the Stó:lō residing in the Fraser valley (Jenness 1955, 34), as well as Coast Salish communities living on what is now the Olympic Peninsula and lower mainland (Duff 1952, 28), and Vancouver Island (Elmendorf 1960, 22), and the Interior Salish (Teit 1900, 16; 1930, 212, 315-36) who all report an epidemic in the first decade of the 19th century. Lewis and Clark also corroborate the dates of the outbreak (Moulton 1990, 285-86). Thus, thirty years after the initial epidemic, southern populations in the region again lost community members.

At the beginning of the century, the fur trade was at its peak in terms of the number of sea otter furs acquired by foreign traders (Jopling 1989, 34; Bancroft 1884, 310; Wolf 1982, 182-83). This meant a large number of European and American vessels were frequently visiting the various Bays and Sounds of the Northwest Coast. The types of goods requested for trade by Indigenous populations throughout the region seemed in constant flux, predominantly focusing on cloth, foodstuffs, and firearms (Acheson & Delgado 2004, 68). Throughout this period, trade encounters were unpredictable and there are known incidents of subterfuge, theft, and outright violence during these meetings. The colonial practice of taking an Indigenous chief or community member hostage in order to force trade negotiations is a well-documented tactic that occurred throughout the region (Bishop 1967, 96; Howay 1930, 121, 123; Sturgis 1978, 122). Captain Hill of the brig *Lydia* was found putting rope yarns in the bottoms of powder casks he traded to the Kaigani Haida in 1805 and diluting his trade molasses with seawater at the Haida village of Cumshewa in 1810 (Walker n.d.; Furgerson n.d.). On the other hand, Nuu-chah-nulth Chief Wickaninnish and his village members killed all but four of the crewmembers of the Tongquin in 1811 due to the poor treatment of an elder by colonial traders (Mackie 1993, 124). Between the late 18th and mid-19th century dozens of vessels were attacked, sacked, and wrecked by First Nations across the Northwest Coast. Acheson & Delgado (2004, 72-4) provide a detailed list of 28 separate incidents where the Haida attacked British and American vessels between 1787 and 1853, with eleven occurring in the 19th century. This speaks to a tension in the perceived roles of power between Indigenous communities and European traders, where both sides viewed their roles in the power dynamic differently.

3.3.1.1 Among the Nuu-chah-nulth

Among the Nuu-chah-nulth, who had seen the resolution of the Nootka Crisis, the new century brought austerity instead of the massive trade gains anticipated. This was, in part, due to the dwindling number of sea otter furs that could be attained on the west coast of Vancouver Island as intensive hunting continued (Kirk 1986, 212-3). Chief Maquinna, who had hosted the British and Spanish during their negotiations a few years earlier, was intent to make the most of every encounter for his village and people. When the American ship *Boston* arrived in 1803, the initially amicable trade interactions were derailed when Maquinna was insulted by the vessel's captain. This ultimately culminated in an ambush and the slaughter of everyone on board, except for the metalsmith John R. Jewitt due to his usable skills and an older man Jewitt claimed was his father. Jewitt and this crewmember were kept as slaves for two years until their rescue (Stewart 1987, 44-7; Figure 3.10).

Jewitt, who kept a journal of his time as a slave and later penned a book about his experience, wrote that Maquinna later confessed to wanting to attack the *Boston* to attain all the goods the vessel had to offer and had looked for any excuse to be offended (Stewart 1987, 61). This is one way to make the most of arriving trade vessels, and Jewitt recorded that for a long time after his capture he saw materials from the ship, including the hull's copper sheathing, used in Potlatch ceremonies with visiting Indigenous peoples (Kirk 1986, 64). However, as the Nuu-chah-nulth had attained a reputation for violence from such encounters, and with the relative sparsity of furs, Eurasian maritime traders largely avoided the area in the 19th century. Indeed, as Fisher argues, Indigenous people had to weight the pro's and con's of each encounter as they could affect future events (Fisher 1977, 16).

During his period of servitude Jewitt was made to conduct menial tasks such as fishing and water hauling, as well as production of metallurgical goods such as bracelets, anklets, finger rings, nose jewels, earrings, necklaces, fish hooks, spears, and daggers for the chief, his wives, and other elite subjects. He also recorded that common people appeared to wear adornments of similar shape and purpose, but made from fabric, wood, bone, and shell (Stewart 1987, 61-67, 82-3). The observed difference emphasizes the importance of copper, and of showing it off conspicuously. The demand for trade metal was great enough that Jewitt witnessed village members stealing copper sheets directly from the hulls of visiting vessels. Jewitt also noted, like Cook in 1778, that the Nuu-chah-nulth preferred to keep metal objects shiny, using grinding stones to polish the surface of copper and iron artefacts (Stewart 1987, 83-86).

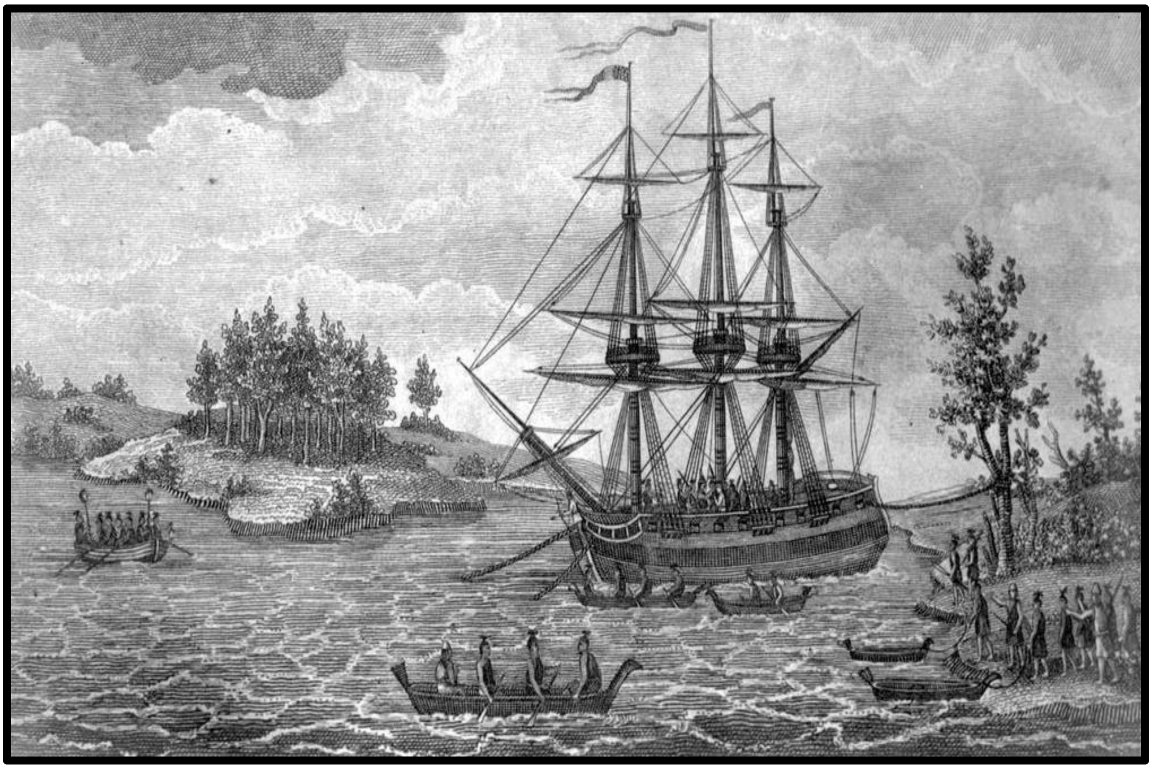


Figure 3.10. Sketch of "the Ship Boston taken by the savages at Nootka Sound, March 22, 1803". This sketch was made in 1805 by an unknown artist (RBCM, Accession No. 193501-001).

At Jewitt's request his tools were recovered from the *Boston*; however, his bellows and anvil were deemed too heavy to bring ashore (Stewart 1987, 60). Instead, Jewitt was made to work both copper and iron in an open wood fire, using a large square stone for his anvil (Stewart 1987, 34-5). As Jewitt was well-versed in European metallurgical technologies, the question of why he did not establish a forge of his own, or smelt and melt any metals, remains unanswered. However, his writings indicate that he was made to conform to Indigenous practices in nearly all things. It is possible that much of the relative 'freedom' that Jewitt describes for himself during his captivity was largely a fabrication, meant to elevate his status among the 'savages' for his retelling in civilized society. It seems unlikely that the Nuu-chah-nulth, who had been keen observers of the foreign visitors arriving in Nootka Sound to this point, were unaware of Eurasian metallurgical practices. This suggests that Indigenous metallurgy was, at least to some extent, specifically chosen, culturally prescribed, and defined in a more complex manner than first glance might indicate (Smith 1994).

3.3.1.2 Among the Tlingit

The RAC continued operating Fort Arkhangela Mikhaila at the beginning of the 19th century, at what is now the Old Sitka site. By this time Russian and Aleut settlers were exporting an average of 62,000 fur pelts from the Pacific Northwest each year (Gibson 1992). Throughout the entirety of the Russian presence on the Northwest Coast they relied heavily on Indigenous labour and trade. Most specifically they relied on the Aleut who were imported from northern colonies to work, and on the springtime trade meetings of the Tlingit where food and other resources could be obtained and replenished (Gibson 1978, 54). As previously noted, this was in part due to the difficulty of enticing Russian citizens to travel so far from home for perilous work. When he came to visit the RAC headquarters in 1814, Mikhail Lazarev wrote of his surprise at the number of Aleut people residing at Castle Hill, working and living amongst the Russians. (Lazarev 1950, 235). By 1832 nearly one third of all company employees were Aleut (Wrangell 1839, 22). This demographic persisted as Russia established forts as far flung as Hawaii (Wrangell 1839, 22).

Animosity between the Russian and Tlingit groups had not resolved over time but continued to grow. Fort Arkhangela Mikhaila was destroyed in a Tlingit attack and most of the occupants were killed in 1802 (Grinev 2005, 127). Alexandr Baranov, still acting manager for the RAC, was unimpressed and wished to make a show of punishing the Tlingit. In 1804 gunships destroyed Tlingit villages in the area with cannon fire. Recognising the danger, the Tlingit fled and the RAC was able to take over the prime Tlingit village site located on what is now Castle Hill, making it the new capital of Russian America (Wharton 1991; Naske & Slotnick 1994; Dauenhauer *et al.* 2008). The Russians maintained this outpost, their claim to these lands, and an antagonistic relationship with the Tlingit until the area was sold to the United States of America in 1867 (de Laguna *et al.* 1964, 10-12).

Captain Yuri Lisiansky, who helped Baranov in his 1804 campaign against the Tlingit, received a number of artefacts as gifts from items that Baranov looted from destroyed Tlingit houses (Lisiansky 1814, 149-50; Chapter 2, 58). Lisiansky became the second colonial individual, after Colnett among the Haida in 1787, to record a metal

‘Copper’, as it was among the goods Baranov recovered. Lisiansky describes the artefact as:

> “a thin plate, made of virgin copper, found on the Copper River, to the north of Sitca (*sic.*) it was three feet in length, and twenty-two inches in breadth at one end, and eleven inches at the other, and on one side various figures were painted. These plates are only possessed by the rich, who give for one of them from twenty to thirty sea-otter skins. They are carried by the servants before their master on different occasions of ceremony, and are beaten upon, so as to serve as a musical instrument. The value of the plate depends, it seems, in its being made of virgin copper; for the common copper ones do not bear a higher price than a single skin” (Lisiansky 1814, 150).

This account is quite compelling as, to date, no known native copper artefact of the size Lisiansky describes has been identified within modern collections. It is possible that this artefact was created from multiple pieces of native copper skilfully folded together through multiple rounds of hammering and annealing, though this would be quite challenging. However, it is also possible that Lisiansky misinterpreted heavily worked trade sheet copper for native metal. Regardless of where the metal originated, this artefact demonstrates the presence of large Coppers among the Tlingit in the early 19th century, suggesting that this type of object, or an as-yet unidentified antecedent, was important within Tlingit social spheres. This Copper was potentially being used in significant social interactions occurring among the Tlingit at the same time as they were dealing with colonial pressures from the Russian settlement in their territory. This suggests that Tlingit and settler lives were being lead irrespective of each other, while also becoming more entwined.

3.3.2 The 1820’s: The arrival of the HBC and Haida diversification

In the 1820’s the sea otter population was in serious decline across the whole north Pacific coast and both Indigenous and colonial groups began to consider their best economic options and a move was made toward land-based furs (Fisher 1977, 44). This meant coastal communities that had previously been the primary benefactors of the maritime fur trade were now receiving significantly less profits. In some instances, this pressure caused coastal Indigenous communities to diversify trade strategies (Fisher 1977, 44).

In 1821 the HBC merged with the North West Company in a bid for unchallenged access to the region and constructed Fort Vancouver on the Columbia River in 1925 (Mackie 1993, 68; Sampson 1973, xxiv-xxviii; Fisher 1977, 44). Fort Langley, located on the Fraser River, was constructed two years later. Mackie argues this was partially due to the anxiety of the possibility of losing Fort Vancouver to the Americans when the border was eventually decided (Mackie 1993, 140). At this time there was a significant disconnect between HBC employees and the Coast Salish and Makah culture groups. Early fort records describe the local Indigenous people around both settlements as lazy and difficult to entice to work (Mackie 1993, 107), demonstrating a European bias that was dismissive of Indigenous practices.

The Haida chose a different strategy. When the sea otter appeared to be disappearing, they began farming and trading potatoes to the mainland and nearby islands (Mackie 1993, 381). This became a major industry by 1825, filling at least some of the gap left by the fall in goods gained from the fur trade (Gibson 1992, 101; Scouler 1841, 191). However, it is not clear how the Haida came to farm this particular type of root vegetable. Acheson proposed an introduction by either Eurasian or American maritime traders (Acheson 1995, 294). Wenstob (2011) and Zhang *et al.* (2010) show that some potatoes on the Northwest Coast were genetically consistent with Peruvian cultivars, and that some of these had been naturalised to Mexico along the way to the Pacific Northwest. Whatever the tubers' beginnings, root vegetables were becoming a notable trade good. The Chinook people residing on the lower and middle Columbia river did not wish to take part in the farming activities conducted around Fort Vancouver. Scouler concluded that culture groups living in the south of the region viewed farming as an occupation for the lower classes or slaves (Scouler 1841). Nonetheless, the adoption of techniques that had not generally been employed previously demonstrates the increasingly necessary reliance on the colonial economy for trade.

3.3.3 The 1830's: HBC expansion, smallpox in the north, Haida communities consolidate, and the growth of the Potlatch

In the 1830's the HBC opted to become a general trading and resource development company (Ralston 1983, 42), and extended its reach northwards up the coast from Forts Vancouver and Langley (Mackie 1993, 2-4; Figure 3.12). One of the biggest challenges for the company was getting supplies to the forts; transporting goods overland from HBC offices in eastern Canada was expensive and time consuming. To remedy this situation, strategic fort locations were chosen to facilitate resource procurement and distribution (Mackie 1993, 144-5). Forts in the south would supply food stuffs and other goods to northern outposts which would then be further supplemented by trade from the local Indigenous peoples residing around the various settlements (Mackie 1993, 339-40; Dunn 1844, 246). Fort Cowlitz, a farm, was also established on the Cowlitz plains near the west bank of the Cowlitz river in 1839 to produce food for the various settlements (Mackie 1993, 179; Barry 1929, 163; Dunn 1844, 214). The northern outposts, in turn, produced cedar shingles and other lumber, along with cured and salted salmon, for export to Hawaii and Europe (Mawani 2009, 42; Muszynski 1996). These decisions helped define the movements and interactions of people throughout the 19th century as people organized themselves around these trading centres. Many of these forts are now the locations of modern towns and cities, located on the appropriated lands of Indigenous communities and the ramifications of these choices continue to affect the inhabitants of the Northwest Coast today.

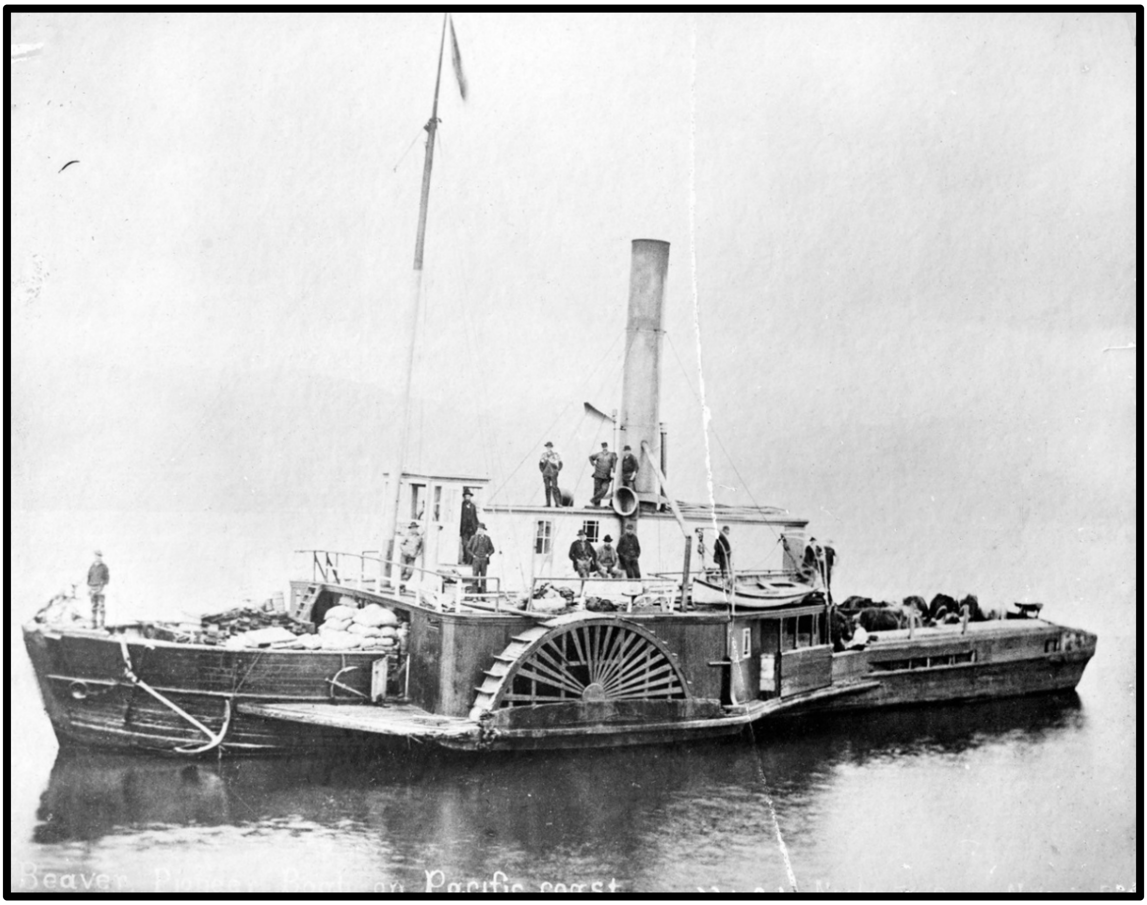


Figure 3.11. The S.S. Beaver in 1888 (Devine 1888 © City of Vancouver Archives).

Fort Simpson was erected in 1831 at the mouth of the Nass River where the Haida, Tlingit, Nuxalk, and Tsimshian congregated in the spring to fish for eulachon (Merk 1968, 300; Jopling 1989, 61). 1996). Fort Simpson's placement was specifically chosen to intercept inland Indigenous peoples who were traveling to the coast to trade (Rich 1960, 626; Work 1945, 39; Acheson & Delgado 2004, 69-70). To these same ends, Fort McLoughlin was constructed two years later on Campbell Island (Mackie 1993: 143-159). Fort Simpson was made the headquarters of the HBC's northern land-based trade, moving in 1834 to the Tsimshian peninsula, equidistant from the mouths of the Nass and Skeena rivers (Mackie 1993, 162-3). This served to help the HBC to avoid the higher prices of Indigenous middlemen on the coast and to deter competing American traders who came to the area. The HBC steamship *S.S. Beaver* came into action on the coast in 1836, allowing the company to traverse more of the shallow rivers and rocky coastlines than before and access more areas for trade (Mackie 1993, 172-3; Figure 3.11). The HBC forts also tried to out-bid American traders in an effort to push them out of the Northwest Coast market. A strategy that Indigenous communities recognised and used to their own benefit, playing rival trade interests off each other to assert control over the market and elevate prices (Fisher 1977, 27). Overall, the HBC looked to monopolise the Northwest Coast and exert control over the prices of trade and labour.

Another outbreak of smallpox occurred in the 1830's, predominantly affecting northern communities in the region. This outbreak likely arrived in Sitka from a British or American trading vessel in 1835, and by 1838 had spread north to Kodiak Island in the arctic and south to the Haida and Tsimshian (Gibson 1982, 66). The Nuxalk at Bella Coola were spared because missionaries made the newly invented smallpox vaccination available to them (Boyd 1999, 67). The disease was most prevalent from fall until spring, when people came together to live and feast through the winter months. Gibson suggests that mortality among the Tlingit was as high as 40%, while the Tsimshian lost one third of their population (1982, 72-5). This outbreak was felt at the forts as well. John Work, Chief Trader of Fort Simpson, described the fall of 1836 as 'very dull' due to the Indigenous reticence to venture out and catch the disease. In the summer of 1837 Work recorded a noticeable fall in fur pelts and food delivered by Indigenous hunters, with Fort McLoughlin also reporting a slow year (Gibson 1982, 77). While devastating for the Tlingit, Haida, and Tsimshian, the European colonists only experienced a short setback in their trade endeavours. Russian Orthodox missionaries traveling in the north managed to gain some positive notoriety from the Tlingit at this time as well through the distribution of Smallpox vaccines. The significantly improved survival rate caused some

Tlingit to question the powers of the local Shaman and promote Russian religious practices (Gibson 1982, 80-81).

Indigenous communities among every ethno-linguistic group were feeling significant social pressures as an increasing number of traders came to the region, more forts were erected, and the end of the fur trade drew near. Due to population loss from disease and conflict, the Haida were in the process of consolidating into two multilineage settlements and closing down smaller villages in 1843. The Skidegate and Masset settlements would be the only two Indigenous villages left on Haida Gwaii by the end of the 19th century (Acheson & Delgado 2004, 60). As villages consolidated across the Northwest Coast, Indigenous settlement locations were also strategically chosen near to centres of trade to benefit from the swiftly changing landscape of the economic markets (Alfred 2009, 44). Acheson and Delgado argue that the anxieties and stress among shifting Indigenous communities as this time were passed along to maritime visitors, adding to the tense exchanges and vessel attacks that kept occurring in the region (Acheson & Delgado 2004, 60).

Around this same time the Potlatch ceremony was also becoming larger and more elaborate among multiple culture groups, including the Tsimshian (Grumet 1975, 297), Kwakwaka'wakw (Codere 1990, 369), and Coast Salish (Harmon 1998, 74). This is, in part, due to the aforementioned consolidation of mixed multi-lineage villages, which did not have the established social hierarchies that had previously kept rivalries in check. The growth of the ceremony was spurred on by vacant positions of power caused by population loss, and overlapping positions and roles resulting from the amalgamation of groups (Codere 1990, 369; Schreiber & Newell 2006, 226). It is possible, as suggested by Grumet (1975, 296-7), Codere (1990, 369), and Harmon (1998, 73-6) that the Potlatch grew at this time because it was a replacement for battle, allowing opponents to avoid large human losses while still exerting social pressure and vying for powerful positions in society. Though it is impossible to know all of the rationale behind the inflation of the Potlatch, there is evidence that on some occasions elaborate social battles were handled with the use of Coppers and Potlatches (see George Hunt's 1906 recorded story of 'The Rival Chiefs'). The presence of the HBC contributed to this social phenomenon by providing Indigenous people with large amounts of goods on store credit to be used in Potlatch challenges, a colonial strategy that also worked to tie Indigenous people to the HBC and make them beholden to entrepreneurial traders (Mackie 1993, 167).

3.3.4 The 1840's: The HBC continues to develop and minerals become a focus

The 1840's saw an explosion in fort construction as the HBC worked to solidify its hold on the trade of the Northwest Coast in a multi-pronged approach. For example, the HBC had brokered a deal with the RAC to create more trading outposts in territories occupied by the Russians. In 1840 the HBC Fort Taku was constructed and the Russian Fort Wrangell was purchased and renamed Fort Stikine (Mackie 1993, 182; Figure 3.12). The HBC agreed to pay dividends to the RAC in the form of 5% to 10% of the earnings from this northern fort annually for ten years beginning in 1844 (Mackie 1993, 338). A few years later, in 1843, the farming outpost of Fort Nisqually was established on arable land on the Puget Sound to increase the amount of supplies that could be made available to the various northern forts.

Fort Victoria was also established in that year, which was a useful port location and allowed people to more readily access the inland resources of Vancouver Island while remaining open to maritime trade (Figure 3.12). Fort Victoria also signalled the increasing British interest in the area, in response to anxieties about the American expansion and border placement continued to grow (Wolf 1999b, 74; Mackie 1993, 179; Keddie 2003, 20). This was resolved in 1846 (Harris 2004, 169); however, the HBC lost some southern forts such as Vancouver, Nisqually, and Cowlitz to American occupation.

In 1840, James Douglas travelled up the Taku River for reconnaissance, and wrote of the people from a Chilkat Tlingit village at the head of Lynn Channel asking him to build a trading post in their area, though he was unable to at the time (Douglas 1840, 77-99). It appears that Europeans, Russians, and Indigenous people were clear about their own economic situations at this time, and what steps could be taken to achieve greater personal gains in the early 1840's. Indeed, at this point in the fur trade social pressures were evident, but Indigenous people were involved because they chose to be. This is apparent when considering communities such as the Chilcotin, who drove the HBC to abandon a post in their area by refusing to engage with trade at this location (Fisher 1977, 35). This access to relative freedom begins to shift significantly at the end of this decade. During this period the Haida continued to intensively farm potatoes and by the 1840's HBC records describe 'no less than 48' large Haida canoes arriving at Fort Simpson in Tsimshian territory to trade 1119 bushels of potatoes (HBC, n.d.; Work 1945, 39; Scouler 1841, 219).

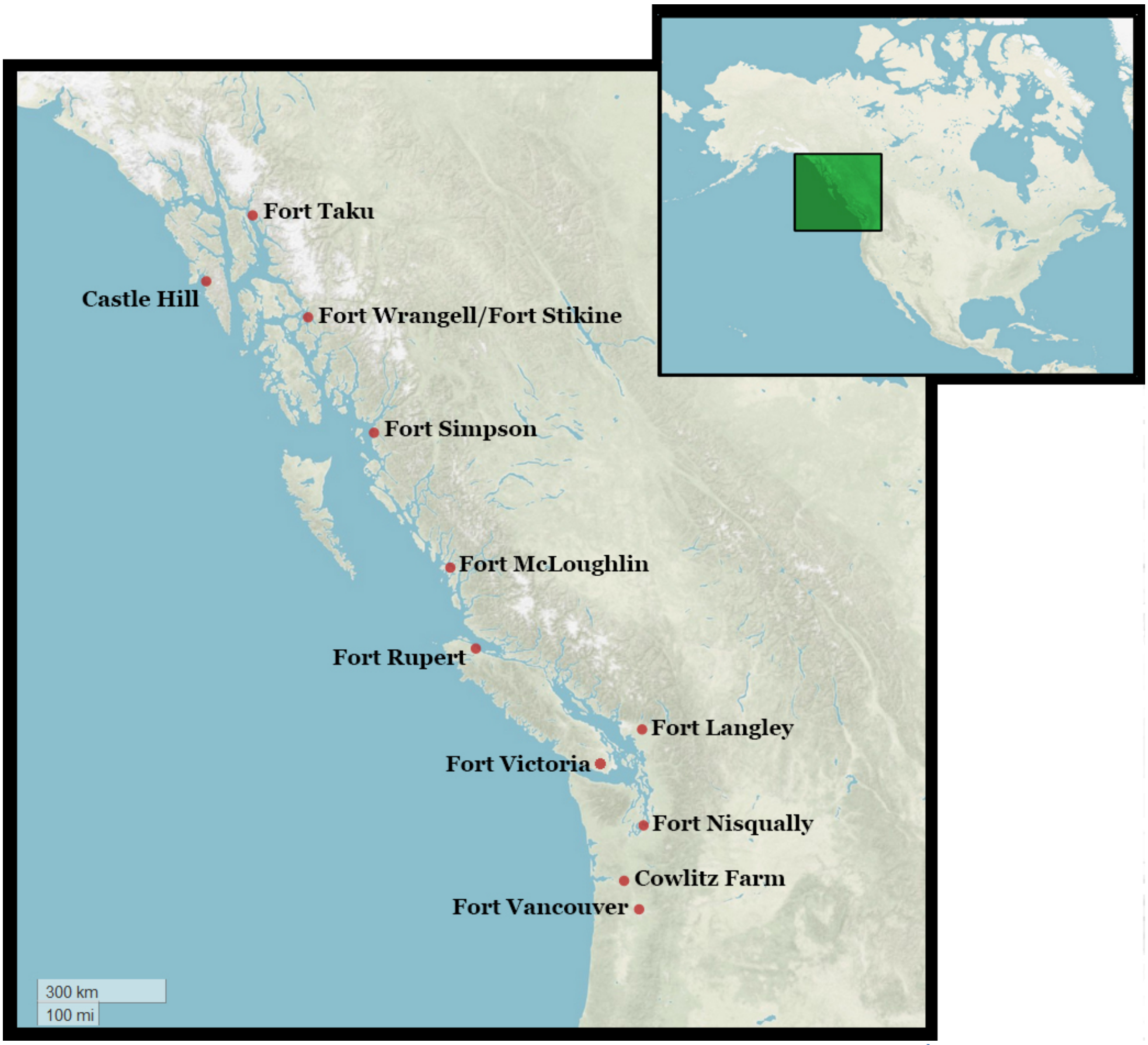


Figure 3.12. The location of HBC Forts constructed across the Northwest Coast through the 19th Century.

The years between 1849 and 1858 were transitional years in the region, as the fur trade came to an end and the colonial period began. In 1849 British colonial policy makers decided to establish the colony of Vancouver Island at Fort Victoria. For a brief period, Richard Blanshard served as governor of the colony, but he proved a brutal administrator who met out violet acts of revenge that degraded colonial-Indigenous relations (Fisher 1977, 49). Subsequently Chief Factor James Douglas, who had held the highest possible field rank in the HBC at the beginning of the decade became governor of the new colony (Fisher 1977, 49). Fisher argues that Douglas was chosen by the British government due to his extensive experience working with Indigenous communities in the region, and their hope that his experience keeping the HBC profitable could translate into keeping the colony self-funded so that the Northwest Coast would not become a burden to the new colonial government (Harris 2004, 169-170). However, at the same time Douglas's tenure symbolises a transitional phase between the end of the fur trade and beginning of the colonial era because of his apparent sympathies and respect for Indigenous communities (Fisher 1977, 71-2). Douglas was criticised throughout his tenure for not being more progressive in his actions to deal with Indigenous people, and he was certainly restrained in comparison to his governing predecessors such as Joseph Trutch (Fisher 1977, 72).

The changes brought by the colonial era were felt quickly as the resources of Vancouver Island were opened to settler populations for economic gain. For example, a mill was opened at Fort Victoria in 1848 to process lumber that was then shipped to San Francisco, California, and Hawaii (Lutz 1992, 70; Cox 1974). Fort Rupert was established in 1849 at the north end of Vancouver Island to take advantage of a known coal seam (Mackie 1993, 179). Indigenous and imported Chinese labour was heavily relied upon for these tasks, and most other undertakings, in the latter half of the 19th century (Lutz 1992, 76). Fort Rupert was also constructed atop the Kwakwaka'wakw Kwagu'ł village site of Tsa̱xis, which archaeological deposits indicate had been occupied for as much as 6000 years by the mid-19th century (Galois 1994, Sewid-Smith 1991, 22-3). The colonial presence was jarring to the Kwakwaka'wakw and elders of the time could not believe the foreigners would attempt to build on their traditional sites (Sewid-Smith 1991, 22-23).

It is possible that this stress may have been a contributing factor to the expansion of the Potlatch at this location. Cole and Darling (1990, 132) argue that the use of the Potlatch as a proxy battle was occurring at Fort Rupert, similar to what was recorded in the previous decade among the Tsimshian, Kwakwaka'wakw, and Coast Salish at other locations (Grumet 1975, 297; Codere 1990, 369; Harmon 1998, 74). Cole and Darling (1990, 132) also argue that the development of more commercial industries such as fishing at Fort Rupert contributed to the expanded size of the Potlatch as the Kwakwaka'wakw could earn wages from commercial endeavours that allowed them to purchase more Potlatch material from the HBC.

3.3.5 The 1850's: The Douglas Treaties, Haida diversification, and a gold rush on Haida Gwaii

The 1850's saw the development and application of the reserve system as Governor Douglas, who was now in charge of the crown colony, began considering how to make room for arriving settlers. Between 1850 and 1854 Douglas worked hard to formalize treaties with fourteen Indigenous groups on Vancouver Island, which were geared toward purchasing the land and clearing it for settler use (Gough 1984, 71; McKee

2000, 13-17). In total, 930 square kilometres were purchased from Kwakwaka'wakw and Coast Salish groups, with the promise that Indigenous communities would retain existing village lands and be allowed to hunt and fish on surrendered lands (Raibmon 2005, 21). These were the last treaties drawn up in what was soon to be the colony of British Columbia until the Nisga'a Treaty in 1998 (McKee 2000, 98-101), and were signed on blank pages to be later formalised by colony officials (Harring 1998, 191). It is due to this type of practice and circumstances that culture groups in British Columbia state that their land has never truly been ceded (McKee 2000, 112). These treaties, created in the transition period between the fur trade and colonial settler era, signal that the lives of Indigenous people in the region were going to be subjected to significant changes regardless of their own desires and opinions from this point.

The Haida continued to take advantage of developing trade opportunities at this time, creating curios to be sold to foreigners looking for the exotic. By the 1850's the Haida were producing elaborately carved argillite pipes that depicted European motifs designed to appeal to the colonial market (Mullins & Paynter 2000, 77-78). Prior to the 19th century, argillite had not been a material the Haida typically worked with; however, Mullins and Paynter argue that the proliferation of iron tools (Vaughan & Holm 1982, 64-7; Acheson 2003, 220) made the rock a significant material source (Mullins & Paynter 2000, 77; Wyatt 1984, 60). Iron tools had been available on Haida Gwaii for multiple decades at this point and it is perhaps more likely that a potential demand for the argillite, based on aesthetic interests from foreign collectors, led to the proliferation of these curios rather than the inability to previously carve the stone. The nature of these objects is significant; instead of freezing and essentialising Haida culture, a deeper consideration reveals how truly flexible cultures and traditions are, as new materials are manipulated in familiar ways to create objects suited to changing opportunities.

Amid these changes, gold had been discovered on Moresby Island in 1849 and 1850 (HBC 1852) kicking off the short-lived gold rush to Haida Gwaii (Galois 2017/18, 17-18). In 1851 a mixture of HBC and American vessels arrived to take advantage of the mineral, but this gold rush had mostly petered out by 1853. The British had been working hard to keep American competition out of the Northwest Coast, and this event prompted the British government, in collaboration with the HBC, to establish the colony of Queen Charlotte Islands in 1853 (Mullins & Paynter 2000, 79). The British hoped to reinforce their asserted colonial territories and take advantage of any valuable mineral while doing so (Galois 2017/18, 19). This sentiment is visible when the coal seam discovered at Tsaxis (Fort Rupert) was mined out in 1851. It was decided that the fort would be maintained as the location had proven useful for people traveling south to trade (Ralston 1983), and a new coal seam located near the Nanaimo area was opened and mined until the end of the century using Chinese and Indigenous labour (Lutz 1992, 77-78).

The Haida Gwaii gold rush reveals another aspect of colonial interaction on the Northwest coast as relationships evolved. Instead of purchasing furs from Indigenous traders, who were the ones doing the work on the land, now prospectors arrived to undertake the work themselves, assuming their own rights of unhindered access to the land (Galois 2017/18, 17). The colonial viewpoint was that Indigenous people were obstacles, not partners, and the Haida as middlemen were removed from the equation. This type of interaction exposes a disconnect in the ways that Indigenous groups viewed the treaties crafted by Douglas, when compared to the viewpoint of the colonial agents. For example, Galois (2017/18, 37) argues that the Haida interpreted the Douglas Treaties as an agreement and plan for how to live together peacefully, while sharing some resources and allowing a limited number of settlers to reside in their territory. Colonial agents, on the other hand, viewed the treaties as keys to lands and resources that were considered poorly managed by Indigenous people (Harris 2004, 170). By the end of the 1850's the reserve system had taken hold, and within a few short decades the majority of the Indigenous people in British Columbia were consigned to slightly more than 1% of the land in the province (Harris 2004, 167; Figure 3.13).

The colonial drive to procure resources such as coal, salmon, lumber, and gold on a commercial level meant that Indigenous people were regarded as both a hindrance and a resource by settlers. For example, Kwakwaka'wakw members living near Fort Rupert were considered lazy and not deserving of their land, as well as a source of free or cheap labour by colonists (Mackie 1993, 107; Raibmon 2005, 36-8). At the same time, Indigenous communities were not ignorant to the value that settlers and prospectors ascribed to resources such as land and gold. In some cases, they even tried to impose taxes on settlers (Fisher 1977, 98-100). There were clashes and both settlers and Indigenous people claimed the other group has stolen things, destroyed crops or villages, or even killed, but settlers had come to re-create the metropolis not to accommodate the frontier (Fisher 1977, 96). Through this time Douglas sought to maintain order, doing so by staying out of Indigenous affairs, and punishing only those involved in crimes concerning the settler community while not holding entire Indigenous communities responsible (Fisher 1977, 148).

Douglas had also been working to steadily improve the maps of the region originally created by Vancouver throughout his tenure with the HBC and now, with the parsing of land into reserves, colonial control was beginning to be reframed in wholly Eurocentric terms (Harris 2004, 175; Clayton 2003, 236). As such, the Indigenous people of Vancouver Island were dispossessed from their land which was reshaped and renamed. The Kwakwaka'wakw living on the north end of Vancouver Island for example, now live at Fort Rupert not Tsax̱is, and there was a population of European and Asian labours residing in the area (Lutz 1992, 77-8; Ralston 1983).

In 1858 the mainland colony of British Columbia was created. This occurred partly to mitigate anxieties of American expansion caused by an influx of prospectors in this decade (Oliver 2010, 117). Fisher argues that this is the date when the fur trade truly came to a close and the settler frontier opened (Fisher 1977, xxviii). At this time settlers and Indigenous people were coming into direct competition with one another and problems arose. Clearing land for European style farming destroyed Indigenous cultivation and hunting areas, and in cases where Indigenous people decided to farm in a colonial style they came into direct competition with settlers for arable land (Oliver 2010, 143-4; Fisher 1977, 66). While this was going on, in 1858 a government motion was passed to sever ties with the HBC. This action was taken so that the colonial government could protect its economic interests in the region, but also meant that Douglas would no longer be able to use his leverage with the company to control clashes between different groups.

The late 1850's saw the development of Christian missions. Missionaries had been traveling the coast prior to this period, however the goals of missionaries and fur traders do not coexist easily. Fur traders, interested in extracting resources for their own gain, were not interested in altering the ways that Indigenous people lived as this could interfere with profit (Neylan 2000, 57; Fisher 1977, 119; Miller 2000a, 12). Missions were more successful in some places than other, and this is likely related to each community's specific situation. Fisher argues the more ready acceptance of missionaries and conversion in some places was a sign that those Indigenous people felt they needed more and new information to deal with the changing situations (Fisher 1977, 136). The first

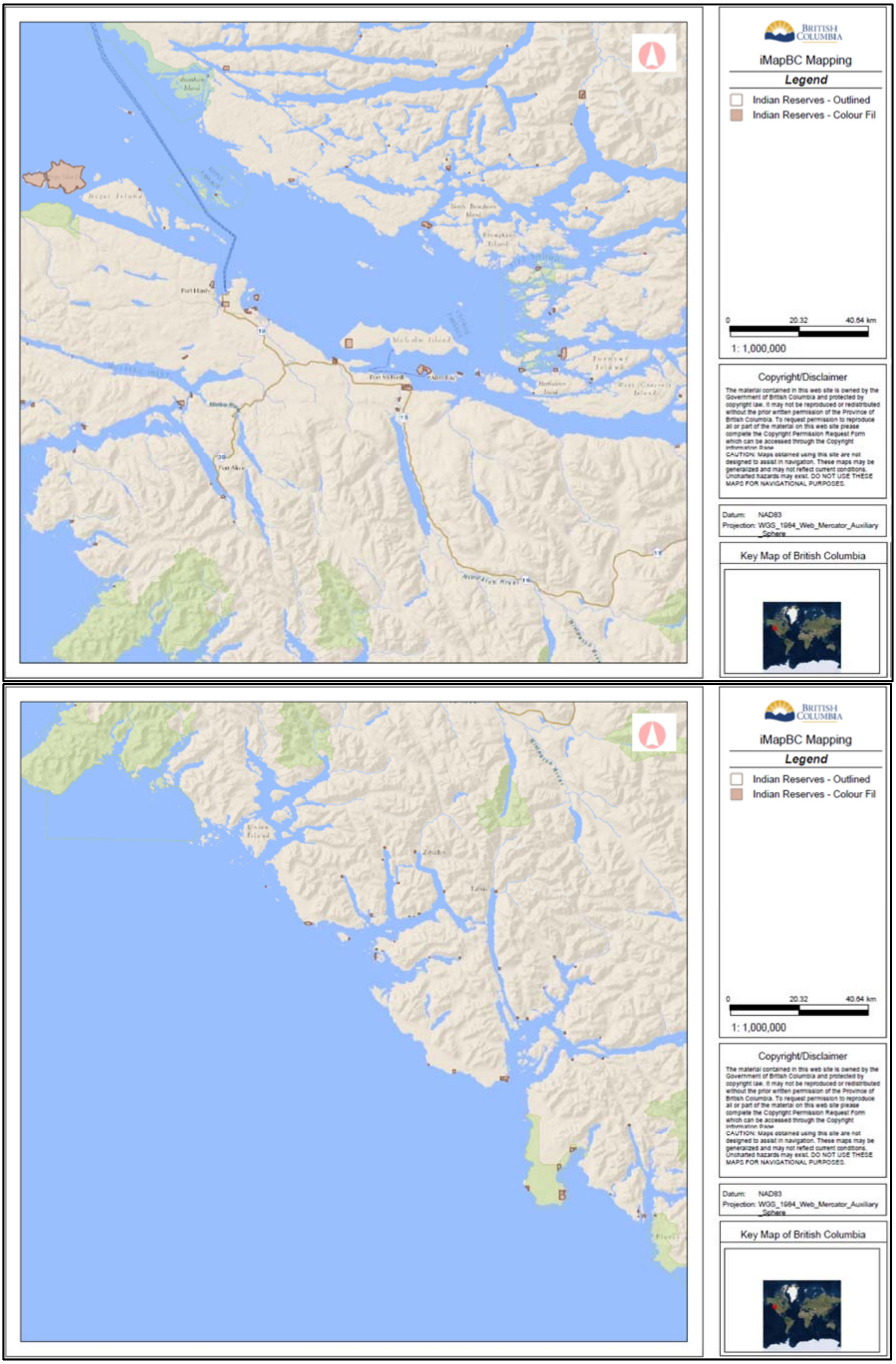


Figure 3.13. Two images from IMap BC which show locations of different Indigenous reserves on northern Vancouver Island (top) and Nootka Sound (bottom) as they are today. The reserves are the small brown parcels of land. These reserves are significantly limited in size compared to the lands encompassed in asserted traditional territories as shown in Figure 2.2, Chapter 2 (iMapBC 2018).

formal mission was established at Fort Simpson in 1857 by Anglican Reverend William Duncan among the Tsimshian, who had a history of adopting new practices they found useful (Neylan 2000, 58). The missions offered Indigenous people personal benefits that they certainly took advantage of. For example, with religious conversion came access to new types of social status, material goods, and language education that could help Indigenous people in establishing their rights and petitioning the colonial government (Neylan 2000, 86; Harris 2002, 206). Missions were not as eagerly accepted in other areas, such as Fort Rupert. However, it is arguable that a mission lifestyle would not have been as beneficial a decision for the people residing at Fort Rupert, and thus not a popular choice (Fisher 1977, 141).

3.3.6 The 1860's: Smallpox outbreak, reduction of reserve land, RAC sold to America, Indigenous metallurgists continue to use iron and copper

The 1860's saw one of the largest recorded outbreaks of smallpox on the Northwest Coast. It is difficult to gauge the magnitude of this outbreak as compared to past events, due to the lack of written records or survivors to relate the history, but Boyd estimates the death toll of this outbreak to be roughly 20,000 people in British Columbia (Boyd 1994, 28). The outbreak began in the region on March 12, 1862 when the steam ship *Brother Jonathan* arrived in Victoria. This vessel carried gold-seekers from California and stayed for one night, dropping off mail and some passengers before heading north and continuing to spread the disease. Subsequent arriving vessels also carried the disease from further down the coast (The Daily British Colonist 1862, March 13, 18, 20, 22, 25, 26). Unfortunately, the nature of the Indigenous camps that had developed near the forts facilitated the spread of the outbreak. This was due to the camps being clusters of Indigenous populations located near ports where a vessel potentially carrying the disease could easily arrive and infect the population.

Prior to this outbreak, the Indigenous camp near the Victoria colony is believed to have been between 2000 and 2500 people strong, with a mix of people coming and going while they looked for trade prospects, employment, and opportunities to socialise. A census of the camp in 1859 showed 2,235 people were present at that time, and of the two thirds of the affiliations recorded 44% were Tsimshian, 15% Tlingit, 8% Heiltsuk, 26% Haida, and 7% Kwakwaka'wakw (Boyd 1999, 176-77).

By examining the local reporting on the outbreak in the Victoria colony, aspects of settler perceptions of their indigenous neighbours are revealed. It appears the vaccine was made available to settlers weeks earlier than the Indigenous people, and the newspaper urged settlers to get vaccinated on a number of occasions through the spring and summer of 1862. The purported vaccine shortage written about by Alexander Garrett in his *Reminiscences* that left Indigenous people unprotected simply does not appear to have been the case on the ground, and no shortage of vaccine is ever reported (The Daily British Colonist 1862, March 18, 27; Boyd 1999, 178-9). The newspaper remonstrates government officials about the late action in distributing medication and warnings to the Indigenous community. However, these admonishing words are framed by a fear that the 'savages' would spread the disease to Europeans and often a sentiment of inevitability is expressed. It was bluntly argued in the local newspaper that the civilised world was no place for the Indigenous people, and it would be better for everyone if they were to simply die out (The Daily British Colonist 1862, April 29, May 24; Harris 2004, 170).

Doctors Tolmie and Helmcken had both been hired by the HBC in 1833 as company physicians, and both were very familiar with the disease and its consequences. However, their actions appear to support the idea of allowing the disease to run its course and take its toll among the Indigenous population. Both, for example, argued against taking all the possible steps to contain the disease, and instead only constructed a small smallpox hospital near Victoria for white people, and only made attendance voluntary (The Daily British Colonist 1862, March 28, April 26).

As the summer wore on, Victoria colony settlers became increasingly worried about their own health in proximity to the suffering camp. The British military was applied in the removal of Indigenous people. In some cases, canoes of people were towed to their traditional communities in order to remove them from Vancouver Island, further spreading the disease (The Daily British Colonist 1862, June 21; Boyd 1999, 173-229). Forts Rupert and Simpson suffered heavy losses (The Daily British Colonist 1862, June 13, 21), and macabre descriptions of decimated villages were reported by sailors plying the coast (Boyd 1999). The losses estimated by Boyd are extreme; he proposes that the Tlingit lost up to 60% of its population and the Haida lost 70% (Boyd 1999). It is difficult to judge the accuracy of population estimates but, regardless of exact numbers, the impacts to Indigenous life would have been unknowably profound at this time.

Also in 1862, the Reverend William Duncan established the Anglican mission of Metlakatla on a recently abandoned Tsimshian village site (Perry 2003, 600-604). This site was spatially removed from Duncan's previous mission site at Fort Simpson and reveals the multiple clashing and overlapping perspectives that were key to shaping this period in religious transition. Though in many ways the Metlakatla mission appeared to be a Victorian era village, complete with row houses, a church, and a school, beneath this superficial assessment the autonomy of Indigenous people living with ever-increasing colonial restrictions becomes visible. For example, matrilineage remained the principle descent practice. Additionally, the planks of some dismantled traditional houses were incorporated into the construction of new colonial dwellings and the internal organisation of the dwellings was sometimes altered to more closely conform to the large central sitting area found in Indigenous big houses (Neylan 2000, 81; Perry 2003, 604). The Tsimshian at Metlakatla fit European practices into their Indigenous framework in other ways as well. For example, house size, geographical placement in the village, and house adornments such as windows were used to emphasise a person's position in society, similar to the way the Tsimshian had organised their communities prior to the colonial period (Neylan 2000, 79; Oliver 2014, 85). Additionally, education at Metlakatla was viewed by missionaries as a way to acculturate Indigenous people and help them better appreciate the Bible, while the Tsimshian viewed education as a vehicle of empowerment that allowed them to make stronger arguments against certain colonial processes (Neylan 2000, 74). With regard to social standing, the Tsimshian Chief Legeex converted to Christianity, much to the pleasure of Douglas and other missionaries. However, Neylan argues that Legeex's chose to convert was not an example of acculturation, but instead the Chief wanted to gain the spiritual powers of the colonisers to compliment the supernatural powers that he already controlled (Neylan 2000, 61; Robinson 1996, 8).

Another challenging situation was presented to Indigenous communities residing on reservations across Vancouver Island and beyond in 1864 when James Douglas retired as Governor of the colony. Arthur Kennedy became Governor of Vancouver Island while Fredrick Seymour took over as Governor of the colony of Vancouver from 1864 to 1866. From 1966 to 1869 Seymour also took over the Governorship of Vancouver Island (Fisher 1977, 157). The new leadership were committed to furthering the lives of settlers and showed much less regard to Indigenous wellbeing or rights than Douglas had (Fisher 1977, 160).

Joseph Trutch was appointed Chief Commissioner of Land and Works in 1864 and expressed a firm belief that Indigenous people did not know how to utilise the land properly. He argued that the arable land reserved for Indigenous occupation should be made available for settler use. Through some manipulation and liberal interpretations of the policies set in place by Douglas, Trutch began a campaign for the readjustment and reduction of reserves and decided that attaining signatures from the Indigenous communities or purchasing the land was unnecessary (Fisher 1977, 146; British Columbia Government Gazette, 1866; Trutch 1866). People living along the Fraser River submitted written complaints about these reductions that fell on deaf ears (Fisher 1977, 154). Trutch also appears not to recognise the impacts of the recent epidemic on the groups he evaluated when reducing the amount of land he felt they were entitled to (Trutch 1866). Indeed, to Trutch, a simple equation of less people equals less land would have been a reasonable justification for reservation reduction. Wenstob argues that the policies of land reallocation initiated by Trutch make it almost impossible for Indigenous communities to practice agriculture and marked the effective end of the profusion of potatoes grown and traded by Indigenous peoples in the region (Wenstob 2011, 136). This supports Fishers argument that in the mid 1860's Indigenous people on the Northwest Coast truly begin to loose political autonomy, freedom of choice, and the ability to adapt selectively as they chose without possibly suffering extreme retribution from a colonial government that was increasingly interested in satisfying settler demands (Fisher 1977, 173-4).

Indigenous metallurgical traditions were maintained throughout this period and, although European tools and materials were incorporated into the process, traditional styles of working metal continued (Acheson 2003). James Swan, an American explorer and sometime ethnographer who lived among the Makah from 1862-66, described Indigenous metallurgists employing traditional methods of pounding iron and copper pieces after heating in an open fire, using steel hammers and anvils alongside stone tools to skilfully make blades and adornments. Swan also wrote of the Makah making the most of the local saw-mills established in their territory, acquiring the worn-out iron rasps and files from the businesses in order to form the metal into Indigenous objects (Swan 1870, 33-35).

The mid 1860s saw the sale of the Russian American Company to the United States in 1867, with the land becoming what is known today as Alaska (Gibson 1978, 64-5; de Laguna *et al.* 1964, 10-12). Russian outposts and forts were occupied by Americans or abandoned, while the Tlingit continued to occupy their traditional territory and engage in trade. Edward Fast, a United States army commander stationed at Sitka from 1867 described the continued Indigenous interest in trade focussing on metal as well as muskets, clothing, and other resources. Fast made specific note of the often-worn traditional Tlingit iron and copper daggers, stating that they were popular and carried by many members of the community (Vaughan & Holm 1982, 67).

3.3.7 The 1870's: Canada, the Indian Act, and an increase in trade copper

This decade saw a number of governmental changes, and in 1871 the colony of British Columbia joined Canada (Perry 2005, 159). Indigenous people were excluded from the debate on Confederation and legislation was passed in 1872 and 1875 that excluded Indigenous people from the vote as well (Fisher 1977, 178). Then in 1876 the Canadian Indian Act was passed, including legislation guidelines on how to manage the Indigenous population (Tennant 1990, 45). These increasing levels of management chafed, and Indigenous communities throughout the whole of British Columbia were expressing frustration with the reserve system. There are reports from an Interior Salish council meeting in 1874 in Kamloops that tell of four of seven chiefs opting for war (Powell 1874). The principal chief of the Secwepemc (Shushwap) Indigenous group at Williams Lake argued that, while war with the settlers would be their own destruction, it was a better fate than the starvation they felt faced them (Harris 2002, 206; Tomlinson 1885). Powell in fact wrote of his surprise that a war had not yet occurred (Powell 1874), suggesting an understanding of how restrictive and detrimental colonial management was to Indigenous lives.

By this time, the appropriation of Indigenous land was not a priority from a colonial standpoint, as it was felt that this job had largely been completed (Harris 2004, 170). Now more energy was directed into commercial resource harvesting. Fishing canneries joined coal mining, farming, and saw-mills as a major industrial activity in the region (Raibmon 2005, 20-22) and laws were passed restricting Indigenous people from fishing and logging to protect the settler economy (Mawani 2009, 42; Harris 2002). Harris argues that the colonial government was much more interested in Indigenous land than Indigenous labour, and therefore Chinese and Japanese labour was imported to try and phase out and fully divest Indigenous people from any claims to resources (Harris 2004, 171; Roy 2003; Mawani 2009, 43). However, Indigenous labour was still needed in this decade and, regardless of colonial efforts to separate groups, the work camps established near commercial industry centres became points of intersection between a mix of Indigenous, Eurasian, Chinese, and Japanese people, who came together to act upon and influence each other (Harris 2004, 170-3). These encounters created populations that could be thought of as mixed and perhaps creolised, forcing us to acknowledge that cultures are fluid and cannot be essentialised into 'pure' categories that deny the existence of all others (Harrison 2014, 37).

Indigenous people continued to occupy social spaces that were often in tension. For example, Indigenous women from across the Pacific Northwest and further inland had begun to travel each year to the hops farms in Puget Sound, working as seasonal labour picking hops. While doing this they were considered both useful farm hands to local industrialists, and lazy, exotic, 'vanishing Indians' to the Eurasian settlers and tourists (Raibmon 2005, 36-8), reminiscent of the manner in which Indigenous groups living in camps near the forts had been objectified since the early 19th century. (Mackie 1003, 107, Raibmon 2005, 36-8) This cognitive dissonance allowed the colony to both morally justify the reserve system, while also gaining from the commodifiable labour of Indigenous people. However, once again, these relationships are not simple and one sided. In the case of the hops workers, tourists arrived to see 'authentic Indians' and the Indigenous women would produce curios to sell and charged for pictures taken with them (Raibmon 2005, 26-38). It could be argued that Indigenous people were unknowingly complicit in their own commodification, but it can equally be argued that they were exploiting the situations available to them and making extra money.

The world price for copper began to fall in the 1860s (Radatzki 2009, 181-2). This appears to have translated into a noticeable increase in the availability of trade copper material in the region, and the increased production of large copper objects. In 1878, while working as a Hudson's Bay Company agent, Alexander Mackenzie wrote that multiple Coppers were now being used in economic exchanges, ceremonies, and mortuary ceremonies in and around Masset (Mackenzie 1891). A thicker sheet metal referred to by Jopling as 'boiler plate' similarly began to arrive on the coast in significant amounts in the 1870's, potentially also related to the fall in the metal's price in Eurasia (Jopling 1989, 63). Jopling has correlated these occurrences to the apparent increase in references to large Coppers within the historic record. She further suggests that the increase in Coppers is evidence of the expansion of Potlatch ceremonies at that time (Jopling 1989, 66). The trend of large items persisted through the remainder of the century with United States army lieutenant Frederick Schwatka also recording the presence of multiple Coppers while visiting the Chilkat Tlingit in 1890, noting the maintained emphasis on copper objects as prestige items (Schwatka 1996; Jopling 1989, 65). This has significant implications for the broader material culture study within this research, allowing chronological inferences to be made based on the physical dimensions of sheet metals, as well as about the longevity of Coppers among the Tlingit.

3.3.8 The 1880's: The Potlatch ban, colonial laws, ethnographic collection, and living in a colonised space

By the 1880's the majority of the Northwest Coast was considered part of Canada, a new country that was quickly formalising policies on how to manage its Indigenous population. The aim was ultimately to 'civilise' and 'assimilate' Indigenous people to European ways (Loo 1992, 133), and one of these strategies involved banning the Potlatch and other traditional ceremonies with an amendment to the 'Indian Act' in 1884 (Wells 1987, 103). This law came into effect January 1st 1885, and suddenly a Potlatch was considered a misdemeanour with arrests beginning in 1889 (U'mista News 1996; Williams 1983, 68).

While the HBC worked closely with the Canadian government on many of its policies, it would seem that the company had very different goals in mind when it began producing imitation Coppers to use as currency with Indigenous populations on the Northwest Coast. Jacobsen noted during his tour of the region to gather ethnological specimens that by 1881 "…traders, especially the Hudson's Bay Company, began to imitate [Coppers] and give them to the Indians instead of money. In this way they became widely distributed…" (Jacobsen 1977, 20). This was a shrewd economic choice on the company's part but also undermined the colonial efforts to diminish such cultural practices.

The laws in Canada are based on English common law, and settlers were using these laws to craft coercive colonial rules and symbolically restrain Indigenous people instead of always resorting to direct violence. As Harris (2004) and Loo (1992) argue, the law has a power that is based in the ability to make a coherent argument about current choices based on past tenets. Legal structures tend to hold on to time and take the understandings that have been gathered with it into the future (Harris 2004, 177). The moment that Indigenous people grouped together to create inter-tribal rights organisations

(Tennant 1990) or used the legal networks to register complaints regarding governmental structures such as the reserve system, they became embroiled in and beholden to laws that recognised Indigenous actions while also granting colonists unceded Indigenous land. The power structures built into the colonial systems based on these interactions were purposefully crafted to create uneven relationships that can be repeatedly reinforced through the use of further colonial laws.

While the colonial government was working hard to establish its power in this still relatively remote region of the world, salvage anthropologists began to arrive on the coast. The old trope that the Indigenous people were going to die out was an attitude at the time and was often used with legal backing as a moral justification for theft and looting from Indigenous villages, territories, and graves (Harris 2004, 170). Franz Boas, famous today for being one of these anthropologists, arrived on the coast in 1886. He became enthralled with the region and returned at least five more times before enlisting as part of the multi-year Jesup North Pacific anthropological research expedition in 1897 (Freed *et al.* 1988, 8-9; White 1963, 8-11).

In 1888 Boas found himself, and employees such as James and William Sutton, looting graves and collecting Indigenous bones on Vancouver Island. Boas defended this activity by arguing for the educational value of the material, though he did not particularly enjoy the collection of human remains (Pöhl 2008, 41-2). These so-called anthropological activities, combined with a legal system that was still formalising a position on Indigenous management, helped to crystallise the rights of both settlers and Indigenous groups. When the Cowichan Coast Salish discovered that their graves were being excavated and their ancestors stolen, the Indigenous community reported the suspected offenders, attained a warrant to search for the bones, and hired a lawyer to argue for the cessation of material theft (Cole 1985, 120-21). Ultimately it was decided that older graves of unknown persons should be made available for collection (Cole 1985, 121), a decision that both tied the Cowichan to the legal system and allowed the settler government to justify the actions of the collectors, setting a precedent for the future.

Boas, and many other social scientists of the day, spoke eloquently of preservation and education (Whitehead 2010, 216); however, as time went on the morality argument wore a bit thin for many collectors. In fact, monetary rewards seem to be as or more important, along with the notoriety of collecting. James Swan was hired in 1883 by the

Smithsonian to travel around Haida Gwaii for four months with the mandate of collecting as broad a selection of Indigenous goods as possible (Swan 1883; Cole 1985, 43). Among the objects were copper bracelets and arrows, as well as a set of five small copper human dancing figures suspended together on a cord. The figures were described as made from native copper obtained from the Ahtna (Acheson 2003, 227; Deans 1885). Swan enjoyed his salary for the job, but also sold items himself for further personal gain. Museums also vied for notoriety in this period of salvage anthropology. The Chicago Museum found itself in competition with the America museum over the number of Northwest Coast totem poles held in its collections, which was a mere 23 compared to the 27 in New York (Freed *et al.* 1988, 9; Cole 1985, 288).

The impacts of salvage anthropology on the Northwest Coast can still be felt today, and one of these effects concerns the definition of 'authentic' Indigenous people. Just as the collected material culture and purchased curios from this era can be used to flatten and essentialise Indigenous cultures (Couture 2014, 236; Harrison 2011, 61, 74-6; Bennett 2008, 3; 2010), so too can the ethnographic record. This has led to a complicated consideration of the primary ethnographic work conducted on the Northwest Coast, as it is unclear how much of an influence the presence of Boas and other social scientists had on the formalised displays of traditional items, events, and languages (Glass 2009, 233-37). As Harris observes, Boas cared little about the way Indigenous people were living their lives in the late 19th century, and instead looked for informants that could describe or re-enact past traditional practices (Harris 2004, 170). To ensue this 'authenticity' was recorded, photos were staged to remove any trace of modernity, freezing these cultures in time (Glass 2017). These issues can be further muddied in situations where Indigenous people may have taken part in this cultural staging in an attempt to preserve or revive ceremonial activities threatened by colonial processes (Edwards 2001, chapter 7; Glass 2009, 135; Zamir 2007, 638). Once again, the implications of these actions lead us back to the modern day. Examples such as the Gitxsan-Wet'suwet'en land claims case in the mid 1990's, more than a hundred years after the Potlatch ban, demonstrates how colonial laws that have been building on each other and accumulating power are used to define what is and isn't legitimate and traditional, and thus who should and shouldn't have access to the land and resources.

3.3.9 The end of the 19th and beginning of the 20th century

3.3.9.1 Constructing the colonised other

The end of the 19th and beginning of the 20th century saw a continued and intensified interest from colonial societies in Indigenous peoples living around the world. In what Pöhl refers to as the 'Copernican turn' (2008, 45-7), ethnographers were now not simply travelling to study Indigenous people but were also working to bring Indigenous communities and their material culture to the colonisers. Multi-year projects such as the Jesup North Pacific Expedition, funded by the American industrialist and philanthropist Morris Jesup, set out to create collections representing comprehensive records of Indigenous groups residing on the west and east coasts of the North Pacific between 1897 and 1902 (Freed *et al.* 1988, 12-13). The Jesup North Pacific project included Franz Boas as its director, along with a cast of now somewhat famous anthropologists and archaeologists such as George Hunt, Harlan I Smith, and James Teit among others. These individuals dutifully travelled the regions, recorded Indigenous people, and collected their material culture (Freed *et al.* 1988).

In addition to those taking part in the Jesup Expedition, there were a number of would-be anthropologists traveling to the Northwest Coast at the end of the century, drawn by the perceived mystique and exoticism of the Indigenous people (for examples see Mackenzie 1891; Newcombe 1902, 1912; Swan 1883). Charles F. Newcombe, a British physician in the mid 1880's, found himself collecting objects and botanical samples on Haida Gwaii in the late 1880's (Low 1982, 39). While collecting goods for museums, Newcombe and other explorers also recorded their accounts of Indigenous copper use, providing insight into the metal's usage more than a century after the beginning of the fur trade. Newcombe noted that both Haida men and women wore copper adornments to show status and wealth. Specifically, high-status Haida women wore a small copper needle in their lower lip while married women of high status wore large copper labrets, and both sexes wore bracelets and necklets of twisted strands of metal (Newcombe 1907, 126). He also made note of the consistent connection between copper, the supernatural world, the metal's ability to imbue composite objects with its power, and its ability to bring its owner both wealth and prestige (Newcombe 1902, 1907, 146).

Alexander Mackenzie, another explorer and collector, also found himself on Haida Gwaii in 1891 and wrote of seeing a large number of Coppers among the Haida at

Masset (Mackenzie 1891, 52). He claims that only two of the Coppers he saw were 'ancient' and created from native copper prior to the introduction of trade sheet metal. Mackenzie interprets these older Coppers as more valuable and authentic, however he also describes many additional Coppers involved in significant cultural interactions among the community. All of these Coppers, whether made of trade metal or not, appear to have been named and had value that was dictated by their own histories. The Coppers were seen nailed to carved feast or mortuary poles, given as marriage payment, used as tribute to honour, or invoked as a challenge (Mackenzie 1891, 52-3; see Chapter 2, Coppers). Mackenzie also collected a copper necklet made from three strands of twisted metal and a carved copper armlet or bracelet with abalone inlay that had been repaired at least once (Mackenzie 1891, 51-2).

The descriptions of these artefacts suggest they are very similar to items included in the material culture study portion of this thesis. This is significant, as this information provides some timeframe and context of use to objects with little associated provenance (See Database, MOA Records 51, 56, 58, 61, 62. 63, 64; RBCM Record's 182, 183, 184, 185; BM Records 295, 296). While there was a large amount of change occurring on the Northwest Coast, following the decline of the fur trade in the 1820's (Gibson 1992, 101) and short-lived gold rush in the early 1850's (Galois 2017/18, 17-18), colonial interest in the island had slowed significantly. These observations suggest that the Haida were continuing to practice traditional modes of living that had expanded to include such things as multiple large Coppers made of trade metal alongside new economic activities such as the potato farming and trade that expanded significantly from the 1820's to 1870's (Scouler 1841, 191).

The Copernican turn was completed when Indigenous people themselves began to arrive in colonial collections, alongside their material culture and the documents written about them (Pöhl 2008, 45). No longer did ethnographers need to travel to far-off and remote lands to study exotic people. In 1897 Boas wrote to his colleague Robert Peary, who was conducting fieldwork in Greenland, and requested a middle-aged specimen be sent to Chicago for study. To his, and the Museum's surprise, six Inuit from Northern Greenland arrived (Cole 1999, 210; Pöhl 2008, 45; Harper 2000). The consequences of this new type of armchair anthropology are the multiple tragic histories of the displaced Indigenous people involved as they were subject to the fickle interests of anthropologists who were capable of abandoning them with no support in foreign lands after completing their studies. A good example of this can be found in the history of the boy Minik, one of the six Northern Greenland Inuit sent by Peary (See Harper 2000). These actions have left long term impressions in Indigenous communities that can still be felt today regarding the reliability and trustworthiness of colonial authorities (Alfred 2009).

Another consequence of the Copernican turn is the development of World's Fairs and Expositions held in westernised cities that placed Indigenous people on view in displays constructed to be 'authentic' (Raibmon 2000, 198). The Chicago World's Fair in 1893 had an 'anthropological building' that was geared towards educating visitors about evolution and the superiority of modern civilisation (Freed *et al.* 1988, 9; Pöhl 2008, 42-4). This was achieved by organising the groups of Indigenous people into a manufactured order designed to lead visitors from short to tall, dark to light, savage to civilised. For their contribution, Franz Boas and George Hunt worked to bring 14 Kwakwaka'wakw people from Fort Rupert, along with a large amount of accompanying material culture. This included a complete house, and over 360 objects considered important in various events, ceremonies, and secret society activities (Cole 1985, 124; Pöhl 2008, 43; Figure 3.14). The image of constructed authenticity was considered much more important than the truth of cultures as flexible, shifting, and changing. Items in common use among Kwakwaka'wakw communities at the time of the fair, such as the Hudson's Bay Blanket, were disallowed in favour of cedar bark blankets that were considered more authentically Indigenous (Raibmon 2000, 159). This type of human spectacle was engineered again in St. Louis in 1904 and in this case involved two Nuu-chah-nulth families and their shaman (Parezo & Fowler 2007, 88-90). These fairs continued up to the mid-20th century, with the last being the Brussels World's Fair in 1958, which displayed a Congolese and a Rwandan village (Benedict 1991, 8). These displays worked as highly entertaining propaganda for colonial governments looking to legitimise and reinforce their treatment of Indigenous peoples.

Within the colonial construction of the colonised other, Indigenous communities were not simply propaganda pieces. The Kwakwaka'wakw and the Nuu-chah-nulth made a political move by placing their culture and plight on the world stage (Raibmon 2000, 158). This could be interpreted as an act of subversion towards a colonial government that was pressuring Indigenous people on the Northwest Coast to abandon traditional ways. By presenting themselves as the original peoples of the region they invoked their own legitimacy and placed their plight under a spotlight. That is how it seems Reverend Alfred J. Hall of the Anglican Missionary Society interpreted the situation, as he swiftly wrote to Canadian officials to stop the Kwakwaka'wakw spectacle in Chicago as soon as possible, asserting that displays like the Hamatsa cannibal dance was not the image of the Indigenous people that the colonial government should be presenting to prospective settlers (Raibmon 2000, 183-4; Hall 1893).

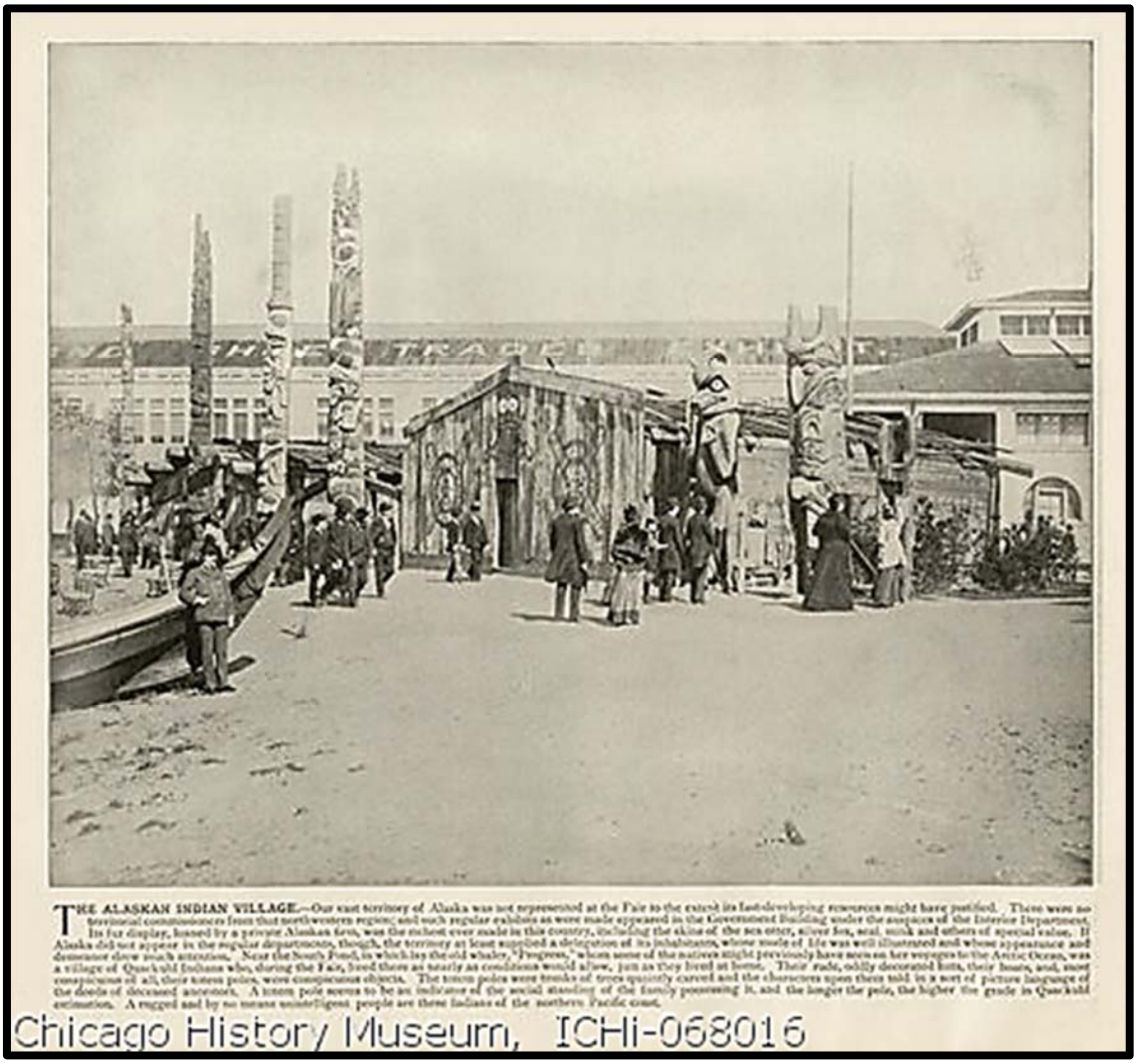


Figure 3.14. An image of the Kwakwaka'wakw village of 'Quackuhl' near the Anthropological Building at the Worlds Columbian Exposition in Chicago in 1893. (Anon 1894).

Unfortunately, the results of stepping onto the world stage and taking part in ethnographic displays are multifaceted. These actions were powerful and reaffirming; however, on a less critically considered level they also reaffirmed the colonial notions of 'legitimate' and 'authentic' that are then frozen, disallowing any variance or change within the culture over time (Cassel & Maureira 2017, 7-10; Clifford 1988, 228). There are still laws affecting Indigenous people in North America today that were created based on the colonial construction of who and what the ‘savage’ Indigenous people were perceived to be at the end of the 19th and beginning of the 20th century.

3.3.9.2 Colonial control and commodification of Indigenous peoples and things in the 20th century

Colonial policies and laws regarding Indigenous populations continued to develop and accumulate power throughout the 20th century, working to push Indigenous cultures towards the desired outcome of assimilation. An amendment to the Indian Act in 1929 prohibited Indigenous people from raising funds for land claims cases, significantly slowing any legal protest (Harris 2004, 180). At the same time, a style of colonial paternalism was becoming popular, seemingly geared towards saving Indigenous cultures while managing and controlling Indigenous people. In 1926 an amendment to the Indian Act allowed Indian Affairs officers to veto the sale of carved ceremonial poles on reserves, which slowed the large-scale removal of the items from their communities (Lohse & Sundt 1990, 92). However, this amendment also took the responsibility for these culturally significant objects out of the hands of the communities that created and used them.

These incongruous colonial approaches to Indigenous management are clearly demonstrated with the Potlatch Ban. Couture argues that increased enforcement of the ban is related to the colonial government’s realisation that performance is an effective tool for bringing people together and conveying powerful meanings (Couture 2014, 237). As such, the law needed real teeth and was reframed in the 1920’s to incorporate wording from a WWI era ‘Anti-Loafing Law’ geared to placing people in the workforce and conserving goods (Cole & Chaikin 1990, 108). This change made it much easier to arrest people and confiscate illicit items. This resulted in the largest Potlatch raid in 1922 at Alert Bay in Northern Vancouver Island, when Dan Cranmer’s ceremony was disrupted. 45 people were arrested, with 22 people ultimately jailed and 450 items confiscated including 20 Coppers and dozens of masks (Loo 1992, 128; Figure 3.15). It was believed that Indigenous people should not be allowed to retain ceremonial objects that might induce them to continue in an ‘uncivilised’ manner and as such the government extended its patriarchal hand.

At the same time that Indigenous artefacts were being seized under the colonial assertion it was helping to guide Indigenous people to appropriate living practices, these objects were being immediately commodified within the European system. Dan Cranmer's Potlatch goods were put on display in the Alert Bay parish hall as an exhibit with an admission price. Following this, they were sold to the National Museum in Ottawa and New York's Museum of the American Indian (U'mista News 1996, 2-3). Anthropologist Edward Sapir appraised and valued the items received by the Ottawa National Museum, excluding the Coppers, and sent a cheque of $1,456 to Alert Bay to be distributed to the former owners. No compensation was ever paid for the Coppers, and Indigenous efforts continue today to repatriate material that was taken (U'mista News 1996, 2-3; Isaac 2018).

Indigenous communities appealed to the Canadian government within the colonial judicial system to change laws restricting Potlatch ceremonies, further acquiescing to colonial structures by using the legal system. In 1920 the 'Namgis Kwakwaka'wakw wrote to the Federal Indian Agency. This letter expressed special concern over the confiscation of Potlatch wealth, arguing that prohibiting the reciprocal gift giving event would be detrimental to their community, specifically citing the loss of wealth faced by the owners of Coppers (Cole 1985, 253). Many believed that the law would be investigated, and once a correct understanding of the Potlatch was explained to the Canadian government the law would be reviewed, found unjust, and changed (DIA 1914). Others such as Boas and the Anglican pastor in Alert Bay Rev. C.K.K. Prosser denounced the law as well (Boas 1896; Cole & Schaikin 1990, 145; Roberson & the Kwagu'l Gix̱sa̱m Clan 2012, 525); however, it remained in place until September 4th of 1951.

As no respite to the Potlatch Ban seemed forthcoming, feelings of resentment and frustration were expressed by Indigenous community members who felt cheated and unfairly treated. Acts of subversion were carried out, much to the frustration of Indian Agents at the time (Cole & Chaikin 1990, 138). The Potlatch and other important Indigenous events continued to be practiced in more remote locations inaccessible or unknown to colonial agents. The regalia and other goods also continued to be produced for ceremonies in a clandestine fashion; Chief Willy Seaweed of Blunden Harbour famously created multiple dance masks and other objects through the 1930s and 40s while the activity was prohibited (Holm 1983, 109). George Hunt was told at Kingcome Inlet that some community members who were forced to surrender their ceremonial objects

Figure 3.15. Images of some of the items seized under the Potlatch Ban from Dan Cranmer at his Potlatch on Village Island in 1922. The top image shows twenty Coppers in various stages of use, and the bottom image shows a large number of ceremonial masks. These pictures were taken at the Anglican Church parish hall, where they were displayed for a fee prior to being sold (Halliday & Halliday 1922a, b).

had provided the government agents with false Coppers and illegitimate goods (Cole 1985, 253). Disjointed Potlatches were also developed, where dances and ceremonies were conducted separately from gift giving, skirting the wording of the law which defined the ceremonies by these combined elements (Cole & Chaikin 1990, 142). People were also creative in other ways; Moses Alfred distributed a large amount of goods in December of 1934 by wrapping the objects and tagging them as Christmas presents (Alfred 2004, 123). Another man distributed nine hundred sacks of flour at Fort Rupert in 1934, calling it 'an act of Christian charity' (DIA 1932; Cole & Chaikin 1990, 143).

These actions reveal a resilience to restrictive colonial actions; however, they also show a living culture with people acting in the best way for them at that time. It is unlikely that the people putting together clandestine Potlatch ceremonies were thinking about long term colonial impacts to their cultural lifeways. Rather, these situations were rationalised through locally mediated cultural frameworks that allowed people to carry on with their lives (Oliver 2014, 93).

Colonial paternalism can also be found in the complicated relationship and tensions between Indigenous communities and tourism. In 1938 the Canadian government began encouraging Northwest Coast Indigenous people to create objects to sell to tourists as a way of bringing revenue into Indigenous communities, at the same time that ceremonies and regalia were prohibited. This initiative was framed as a revival of Indigenous art but instead shows a colonial misunderstanding of the meaning and power of Indigenous objects (Couture 2014, 2238; Dawn 2008, 43). A carved mask instilled with history and power that had been used in battle, ceremonial dance, or a Potlatch (Lisiansky 1814, 150; Neil 1986) could be found displayed in a museum, gallery, or settler home as an art object. This strips all meaning, other than what can be understood from a static visual presentation, from the artefact. As Classen and Howes (2006, 200-216) argue, this is an overt act of conquest and victory; the artefact is colonised by the gaze of the observer who can choose how to interpret objects that are completely removed from their initial spheres of use and meaning (also see Bennett 1995). This type of colonial power allows for the seeming innocuous actions of displaying foreign objects for educational purposes to be used as propaganda machines and indeed this is evident in the previously discussed World's Fairs displays and ethnographic museums.

3.4 Summary and Discussion

Cultural entanglements, the fur trade, and the colonial period were a patchwork of widely varied interactions that occurred across the Northwest Coast, between multiple different Indigenous ethno-linguistic groups and the European, Russian, and American explorers, traders and settlers. Within this chapter, a partial timeline is used to discuss the accumulation of connections, relationships, decisions, and materials that were created and transported through time together, building upon each other through this era. These entanglements are explored on both a macro and micro scale (after Latour 2005, 204), tracking copper and other metals from the epi-historic period that occurred just prior to the arrival of Europeans and Russians, into the 20th century against the social backdrop upon which the choices surrounding the material's use are made. This work provides context and texture to the material culture study of Indigenous copper artefacts conducted within this thesis. A number of key issues have been highlighted through this chapter that have significant implications for material culture interpretation and warrant some consideration, thus these issues are discussed here.

The Indigenous use of iron is included in this study as a comparative for copper use because there are similarities between the two metals in the colonial period. Russian and European iron is traded alongside copper throughout the region and all the ethno-linguistic groups are known to have used the metal (Suttles 1990b). Iron is, thus far, only known to have been worked in the same way as copper by the Indigenous metallurgists (Franklin *et al.* 1981; Wayman *et al.* 1992). Pre-fur trade iron artefact findings, such as those at the Makah village of Ozette (Gleeson 1981, 3, 53) and accounts of drift iron given to de Laguna (de Laguna *et al.* 1964, 10; Deur *et al.* 2015, 264), show that iron was available and in use among some communities prior to the physical arrival of Europeans or Russians. In at least one recorded case among the Tlingit iron is also described as making a man rich (de Laguna 1972, 412). However, through the colonial period iron appears to occupy a space only adjacent to copper; iron is used to make prized weapons like long daggers, and some personal adornments (la Pérouse 1798, 1, 269, 402-7; Cook 1784, 329-30; Sheppe 1995, 162-3, 222-227), but it is not tied to the same ontological meanings and powers as copper (Boas 1916, 305; de Laguna & McClellan 1981, 645; Mcllwraith 1948, 2 :688-90; Boas & Hunt 1906, 81-2). In some cases iron objects like daggers are embellished with copper (Figure 3.2; Figure 3.4). When the use of copper in the region is viewed alongside iron or other metals, copper and the objects made from it are found involved in Northwest Coast Indigenous lives on multiple conspicuous levels in both the natural and supernatural world that brought owners prestige and social power (Jopling 1989, 65; Boas & Hunt 1906, 81-2; Acheson 2003, 227; Colnett 1786-88, 136; King 1999, 160).

The consistency in Indigenous metallurgical techniques on the northwest coast is also pertinent to a study of colonialism in the region. Being exposed to new types of technology does not necessarily cause social change, nor is technological development disengaged from social influences (Misa 1988, 309). There are several primary accounts that confirm that Indigenous people witnessed European, Russian, and American metalworking technologies throughout the fur trade period (see Captain's Kendrick & Gray's forge at Nootka Sound in 1789 in Howay 1941, 59-82). This suggests that hot forging, melting, and potentially smelting were known in Indigenous spheres and not chosen. Technology does not maintain its own agency, and it is technologically deterministic to assume a linear trajectory towards European metallurgical practices (Misa, 1988). This becomes evident in John Jewitt's description of captivity, where he is kept as a metallurgist but made to work in the Indigenous style (Stewart 1987, 60). Indigenous technologies were developed over thousands of years of occupation on the Northwest Coast, and these metallurgical practices appear directly tied to cultural identity.

The common binary assumptions and colonising terms used in the past to simplify and flatten Indigenous people in an apparent unstoppable colonial process are explored (Hayes & Cipolla 2015, 4). To practice Indigenous archaeology in a meaningful way, from the perspective of a settler in a settled country, requires Indigenous histories and viewpoints to be placed alongside and in conversation with academic perspectives. It is important to acknowledge from the outset that this type of study has been used in the past to repeatedly colonise and appropriate Indigenous histories, bending them to colonial advantage (Silliman 2015, 220). In truth, the multiple different communities residing on the Northwest Coast exercised choices and actions that were culturally relevant within their own spheres throughout the fur trade and colonial period (Oliver 2014; Silliman 2009, 221). It is important to recognise that the mixing of people and creolisation of cultures is an ongoing activity that does not necessarily include acculturation (Harrison 2014, 37; Mullins & Paynter 2000, 74; Lutz 2008, 161). Although social scientists often discuss specific eras, this 'process' is actually the ever-changing nature of humanity.

A number of important issues have also been identified that are worth considering on their own; however, these issues also work together to further complicate the fur trade and colonial experience on the Northwest Coast. The colonial notion that Indigenous people were not using their lands in the most effective and prosperous of ways, based on a potentially wilful misunderstanding of Indigenous semi-nomadic subsistence strategies (Suttles 1990b; Matson & Coupland 1995), provided a moral justification for land appropriation and the creation of the reserve system (Harris 2004, 170-6; Harrison 2014; Raibmon 2005, 21). This idea of morality is fed into the notion of the 'savage Indian' who could not survive within proper respectable colonial settler societies, providing further justification for the marginalisation of Indigenous peoples (Adas 1989; Headrick 1981; Harris 2004, 171). This extended to withholding smallpox treatment and allowing the disease to spread while making the argument that it might be better for everyone if the Indigenous people were not around to make trouble any longer (Boyd 1999, 173-229; The Daily British Colonist 1862, March 28, April 1, 29,30; Puget Sound Herald 1862, March 29, May 24; North-West News 1862, March 29, May 24; Overland Press 1862, April 7).

The idea of the 'vanishing Indian' was, in almost the same breath, used to justify salvage anthropology, allowing for the purchase and theft of Indigenous material culture and ransacking of burials to stock personal collections and museums. Salvage anthropology was geared towards gathering as much information about Indigenous populations as possible, and many questionable actions were justified by way of education and conservation (Pöhl 2008, 41-2; Whitehead 2010, 216). The objects that were collected, as well as the Indigenous-made curios sold to colonial explorers and settlers, were used to define Northwest Coast people and freeze their cultures in time and space (Couture 2014, 236; Cassel & Maureira 2017, 7-10). Any deviation from the colonial definitions of what authentic Indigenous culture "should be" could then be deemed inauthentic and used to justify continued appropriation of land and other resources from modern Indigenous people (Couture 2014, 236; Bennett 2008, 3; Harrison 2011, 61-76). The accumulated notions and justifications for colonialism are written into laws and drawn onto maps, which are powerful tools used to reframe the world from a Eurocentric viewpoint that is then presented as the only legitimate viewpoint (Mawani 2009, 42; Harris 2004, 171-5; Clayton 2003, 236).

This chapter provides a backdrop against which Indigenous copper material culture use on the Northwest Coast can be viewed. Furthermore, information concerning the objects created prior to and throughout the fur trade and colonial period provide context for the biographical study presented in this thesis. The intertwined issues discussed in this chapter work together to contextualise a complex picture of the fur trade and colonial period. The accumulating issues discussed within this chapter affected the people living on the coast, and the objects they created, in a reciprocal and entwined way. This impact can be seen in the changing ways materials were chosen, technologies were applied, specific objects were created, production strategies were employed, and trading partners chosen. Copper is poised at the forefront of this study and provides a vessel for interpretation of the processes of change, adaptation, resistance, and collaboration both chosen by, and thrust upon, the Indigenous peoples of the Northwest Coast.

Chapter 4 A Biographical Study of Indigenous Copper Use on the Northwest Coast: A Multifaceted Approach

This thesis is focused on the changing Indigenous use of copper metal on the Northwest Coast of North America through the fur trade and colonial period that occurred between the late 18th and 20th century. The goal is to examine the impacts of cultural entanglements and colonial processes that occurred during this time by following the introduction of foreign copper and copper alloys. In many ways these foreign metals resemble the native metal which in the 18th century had been used by Indigenous people in the region for at least hundreds of years, and was involved in established protocols of procurement, production, and consumption (Acheson 2003; Cooper *et al.* 2016; Emmons 1991). The introduction of this trade metal in large quantities allowed Indigenous metallurgists to expand on their repertoire of materials for production and the objects produced. However, the introduction of the material had a variety of effects in the region. For example, in some cases the trade materials allowed Indigenous people to circumvent previously established protocols related to individual access to procurement, production and consumption activities (Jopling 1989). Additionally, the presence of a large amount of copper meant that Indigenous metallurgists could produce more artefacts made with the metal. This in turn complicated later efforts by the colonial government at the end of the 19th and beginning of the 20th century to suppress traditional ceremonies involving these objects. In the early 20th century Kwakwaka'wakw Elders petitioned the Canadian department of Indian Affairs to allow the Potlatch to continue and for forcibly confiscated objects, particularly Coppers, to be returned to their owners. They expressed concern that the losses experienced by the owners of the Coppers and their family were too great (Cole 1985, 253).

In order to study the many and varied impacts of colonialism through Indigenous copper use, a biographical approach that advocates a multifaceted strategy incorporating multiple complementary lines of inquiry is taken, (See Gosden & Marshall 1999, 169, 174-6; Kopytoff 1986; Appadurai 1986; Hoskins 1998; Carey 1880; Miller 1997, 4). The first step is a desk-based literature assessment concerning Indigenous copper use through the fur trade and colonial period, which is contained in Chapters 2 and 3. This research is then used to contextualise a material culture study of a selection of Northwest Coast Indigenous artefacts created using copper and copper alloys from the late 18th to 20th century. The physical analysis of the objects is carried out by considering the *chaîne opératoire* of each copper piece used in the object's construction (Lemmonier 1992; Schlanger 2005; Leroi-Gourhan 1964; Roux 2016). This includes chemical characterisation of the metals used, and a close physical investigation of the markings related to production and consumption visible on the bodies of the objects. An ethnoarchaeological standpoint is also taken in order to conduct a more accountable material culture study, giving a privileged position to objects and behaviours associated with them (see Iles & Childs 2014; David & Kramer 2001).

4.1 Copper Metal on the Northwest Coast, A Multifaceted Approach to Artefact Biographies

The biographical approach is allegorical in nature. It is accepted that objects accumulate life histories alongside the people who make and use them, that people extend their social understandings and connections to the objects they interact with, and that throughout their lives objects can have a profound effect upon people in a variety of ways (Latour 1999, 198; Shanks 1998, 22-23; Carey 1880). As such, objects, people, and all other entities are considered relational and defined by their biological, social, and physical relationships, which work together to (re)constitute and (re)negotiate each other and the world around them (Ingold 2000, 77-88, 339-361; Knappett 2004, 45-47; Silliman 2009, 211).

The marks of an artefact's making, decoration, repair, and recycling represent, extend, and perpetuate the object's bonds with those around it. The techniques used to make these marks are social actions that involve specific implements, procedures, knowledge, skill, gestures, values, functional needs and goals, attitudes, power relations, material constraints, and traditions (Schlanger 2005, 27; Lemonnier 1992, 1-2; Martinón-Torres 2002, 35; Dobres 1999, 128; Conklin 1982, 16). Additionally, changes in tools and gestures can involve changes in technological knowledge, practiced traditional gestures of making, and perceptions of the material in the world in dynamic ways (Lemonnier 1992, 8). As such, following the *chaîne opératoire* of the copper in this study provides insight into both the particular technical processes and generalised patterns of technical behaviour used in these strategic tasks.

Chaîne opératoire, which literally translates to 'operational chain' or sequence, considers the sequence of the processes visible across the body of an object that were involved in its creation and use. This approach to the study of copper on the Northwest Coast is useful because there is a strong correlation between technological behaviours and social groups, and individuals tend to follow the trends their groups do. Objects can then be viewed as intrinsic and integrated parts of the social groups who created them at different stages in their biographical lives (Roux 2016, 101; Schlanger 2005, 25; Mauss 2004). Thus, the ways that people interacted with copper objects can be questioned by examining *chaîne opératoire* sequences regarding the accumulated meaning and value assigned and applied to objects through time, and how changes in these actions translate to larger social phenomena (Herva & Nurmi 2009, 175; Gell 1998, 222-226; Hicks & Horning 2006, 287-292; Schlanger 2005, 29).

Objects represent a form of non-verbal communication (Herva & Nurmi 2009, 158; Campbell 1995, 115; Scarlett 2002, Rosenthal 1995), and on the Northwest Coast copper communicated messages of power, wealth, and prestige (Mcllwraith 1948, 2 :688-90; Jonaitis 1996, 9-10; Guujaaw 2016; Hartnett 2004). Though, as Lemmonier (1992, 95) and Wiessner (1983, 1984) argue, considering only a single type of copper object does not provide much information regarding the general use of the metal. A more significant understanding of the social nuance in the region is attained by comparing similarities and differences of the making process applied by entangled and adjacent culture groups, as they are visible across the bodies of multiple copper objects (Burström 2014, 70; Dannehl 2009, 128; Lemonnier 1992, 111; Gilchrist 2000, 326; Miller 2000, 11-16; Joy 2009; Olsen *et al.* 2012, 143).

In this study a wide range of objects created with copper are assessed. This includes objects such as Coppers, rattles, and dance masks which are known to be conspicuous among Indigenous communities, alongside arrow heads and harpoon points, and wires, rivets and nails used in the construction, repair, and decoration of larger objects. This strategy of analysis acknowledges that objects do not all gain meaning and value in a straightforward way, allowing the researcher to examine the (sometimes extreme) changes in meaning and use undergone by an object or a particular material (Gosden & Marshall 1999, 176-77). For example, copper and copper alloys in the form of sheet metal, kettles, brass rivets and so on, that passed from European to Indigenous ownership underwent massive shifts in meaning and value as they were traded. Similarly, Indigenous artefacts later collected on the Northwest Coast for ethnographic collections again experienced a break in meaning, value, and use when they entered into museum settings (Harrison 2011, 74-6; Bennett 2008, 3).

It is worth keeping in mind that there is a potentially limitless combination of features, contexts, and possibilities to be investigated. However, there is a point where too many layers of data and context may serve to obscure rather than clarify (Burström 2014, 71; Dannehl 2009, 125-126; Hodder 2012, 207; Van Oyen 2013, 86). This research seeks to explore a wide range of data in order keep the focus on a broad array of material culture and its associated production and use processes. This is done in order to avoid focusing too much on a single object in a way that can create misleading hagiographies that alter how we understand past material culture (Kopytoff 1986, 66; Burström 2014 77; Stewart 1993; Cassel & Maureira 2017, 7-10). However, this analysis of Indigenous copper material culture on the Northwest Coast could be expanded in a multitude of different ways.

The material science analysis can seem ahistorical, descriptive and linear; the fragmentation and ambiguity of object biographies, and the fact that we come across objects as a fusion of chronologies, can make interpretations challenging (Burström 2014, 69; Olivier 2004, 210-11; Olivier 2011, 193-4). However, the theoretical frameworks of artefact biography and *chaîne opératoire* offer a flexible structure that allows this material culture study to move between heuristically divided fields such as society, culture, style and technology, based on reliable data (after Martinón-Torres 2002, 38). These multi-level stories can accomodate contradictions and interruptions that are a feature of real life (Schlanger 2005, 28; Herva & Nurmi 2009, 179; Law 2004; Harman 2009).

4.1.1 A Matter of Agency

Considering the agency of people and objects within networks, the ways in which material culture mediates relations with the living world cannot be properly addressed through a dualistic subject/object framework (Herva & Nurmi 2009, 161). However, in keeping with the argument that humans are situated within their own cultural understanding (Burström 2014, 67; Knappett & Malafouris 2008; Mottram 2017, 483), this research does not attempt to step into or adopt Indigenous ontologies for interpretation. (see Todd 2016, 9; Watts 2013, 31). Instead, the ways in which objects are 'loaded' with agency is addressed (Burström 2014, 667). For example, as a Copper is involved in multiple socially conspicuous events, it may acquire an extensive life history that embodies and carries its thing-human relations with it, which in turn influences the levels of human interaction it experiences through time. It is this accumulated biography that works to lend impact to the object's agency (Weiner 1992; Hoskins 1998; Gosden & Marshall 1999). Thus, in this study objects are considered as discrete things with specific attributes that distinguish them from other objects (Herva & Nurmi 2009, 174). However, it should be noted that this research acknowledges the primacy of the agency of the living over that of non-living objects and does not attempt to invoke the Indigenous perspective (Barrett 2016, Ingold 2014). It is important to state here that much of the rejuvenation of material culture theory and the developing theories of agency and entanglement owe a debt to the Indigenous groups that have been the subject of archaeological and ethnographic study and whose ontologies have inspired this research (Todd 2016, 6-7).

4.2 Literature Review: Contextualising Material Culture

A methodology that investigates all possible aspects of each object helps to mitigate the difficulties of studying objects that may have only ambiguous information associated with them. The multifaceted approach applied in this study begins with the detailed desk-based investigation of changing Indigenous copper use through the fur trade and colonial period in the region (see Chapter's 2 & 3). This research includes an exploration of the multiple Indigenous ethnolinguistic culture groups spread across the large and porous cultural region that is considered the Northwest Coast (Donald 2003; Matson & Coupland 1995), and the interactions that occurred between Indigenous and European, Russian, and later American and Canadian people throughout this period.

The literature-based portion of the research incorporates a wide range of sources. These include Indigenous oral histories (eg. Alfred 2004; Hunt 1906), archaeological research (eg. Acheson 2003; Blake 2004), accounts written by explorers, traders, ethnographers, and other contemporary entities (eg. Meares 1790; Cook 1967; Jewitt 1815; Boas 1917; 1916), museum records, government records of patents and vital statistics, and maritime shipyard documents. Ethnographic studies (eg. de Laguna 1972) are also included, which record both individual assertions made by the people under study, as well as their observed actions, providing multiple layers of data (Miller 1997, 12-13). This information is important and powerful in its interpretation, as when it is combined this data creates a picture of the fur trade and colonial era that is influential in how people understand their past and what future actions they may take based on these understandings (Iles & Childs 2014).

Though the range of written data is broad, primary and ethnographic accounts and the direct analogies derived from them are not accepted uncritically. It is important to recognise that this work is developed by individuals situated in their own social and cultural contexts and bound by their own understandings and personal knowledge (Iles & Childs 2014, 193; Haaland 2004, 11; Martinón-Torres 2002, 36; Ascher 1961, 324). It is also possible that ethnographic informants did not wish to share culturally sensitive or secret knowledge with a researcher or may not themselves be aware of certain information (Herbert 1993, 16-17). Ethnographies also can and have been used for political agendas to make "scientifically" supported statements (Iles & Childs 2014, 194-98). This becomes evident when considering the 'academic' displays of Indigenous peoples at the world's fairs held at the turn of the 20th century which promoted ideas of a linear evolution from savage to civilised (discussed in Chapter 3). As such, although many ethnographic and primary accounts written from a Eurasian perspective are consulted in this study, the information is not accepted uncritically and the context of the source is considered.

4.3 The Material in this Cultural Study

A detailed analysis of over three hundred Northwest Coast Indigenous artefacts created using copper and copper alloys are included in this study. These artefacts are often composite in nature and are composed of a wide range of materials, including multiple pieces of copper metal. The artefacts are subject to a close physical analysis that documents markings indicative of production, use, and discard. Additionally, the metal used in the construction of each artefact is chemically characterised using a Hand-Held portable X-ray fluorescence device (HHpXRF) in order to assess the material's elemental composition. All of the artefacts analysed are recorded in a Filemaker Pro Database (Appendix A) located on the USB memory stick that accompanies this thesis. Each artefact is assigned a 'Record Number', and each individual piece of copper metal is assigned an 'Analysis Unit Number' in order to account for the occurrence of multiple metals involved in the object's construction. Together, this information allows for informed judgements to be made regarding Indigenous choices in trade partners, material procurement, technological practices, specific object creation, use, and discard.

4.3.1 Artefact Selection

Artefact selection was informed by Miller's discussions of the 'unorderly diversity' of material culture (1997, 6). Indigenous communities across the Northwest Coast created a wide range of objects using copper and copper alloys, and employed them in a variety of different activities (see Chapter 2). With this diversity in mind, relevant museums and cultural offices across the UK, Canada, and the United States were selected for their collections of Indigenous artefacts created using copper or copper alloy components prior to, and throughout, the fur trade and colonial period. The goal is to assess a wide range of artefacts, which can in-turn inform on the variety of ways in which copper was used throughout this time. Indigenous copper artefacts from adjacent areas and native copper samples from the regions are also included in this study for greater context.

The majority of the artefacts included in this study do not retain any definitive date of production, and only in some cases is the collection, sale, or donation date known. This data is predominantly gathered from museum records. This issue is further complicated by the resilient and long-lasting qualities of metals, and the possibility that copper material has been reused and/or repurposed multiple times throughout its use life (Wayman *et al.* 1992; Craddock 1995; Franklin *et al.* 1981). As such, strict chronological dating of object production and use is impossible in many cases. However, the physical elements of each artefact can work to more firmly anchor the objects in time. For example, the presence of tin solder or recognisable alloys such as Muntz metal that would not be available in the region prior to the colonial era, or tell-tale half-moon shaped tool marks left in the surface of the metal during processing that are suggestive of European iron hammers, work to temporally contextualise process of artefact creation and use (Flick 1975; Muntz 1832; Appendix D). To provide an idea of the types and compositions of copper alloys being produced and used around the world at this time, the specific details of 18th, 19th, and 20th century alloys created and patented in the UK are included in Appendix D.

4.3.2 Grouping Artefacts for Analysis

This material culture study regards artefacts as dynamic things that have meanings and functions which are contingent to their cultural position in time (Wolff 1984; Pfaffenberger 1992; Shanks & Tilley 1992). Makers of material culture are considered cultural producers instead of creators. Additionally, the function of an artefact and the style with which it was made, including choices in object construction and decoration, are considered inseparably entwined (Shanks & Tilley 1992; Pfaffenberger 1992). As Shanks and Tilley argue, assigning primacy to the function of an object is flawed, and in fact function can be thought of as following style within a cultural setting (1992, 144).

Specifically, objects can achieve the same goal or serve the same function while being made in an infinite range of culturally specific shapes and designs. Furthermore, this study assumes that the styles employed in the creation and use of objects are culturally contingent and must be (re)negotiated as the object moves through space and time. In this way, objects work to mediate the social consciousness with which they are entangled and recreate social realities in material forms (Shanks & Tilley 1992, 171). However, it should not be forgotten that objects can be formed to support, subvert, or obscure certain messages and interpretations.

In order to facilitate the biographical analysis of assemblages of similar and different objects caught up in networks together, the artefacts are identified typologically (eg. bracelet, dagger etc). These classifications are based largely on assignations provided by the museums that house each object. Artefact types are considered able to cross between the boundaries of form and function however. For example, the large copper daggers often worn by Tlingit individuals through the 18th and 19th century (Acheson 2003, 220; Vaughan and Holm 1982, 64) may be considered objects of conspicuous display, personal adornments, or weapons. This is done with the knowledge that the form and function of an object cannot be so easily parsed; the 'apparent' function of an object should not be given primacy over its form, and all functions of an artefact cannot be knowable (Shanks & Tilley 1992, 144).

4.3.3 Physical Analysis

A *chaîne opératoire* approach is a useful vehicle for this research as it appreciates the tools needed, the raw materials, energy, various physical and environmental possibilities, knowledge, skill, values, and symbolic representations involved in the making and use of an artefact (Schlanger 2005, 29; Martinón-Torres 2002, 33). The concept of the sequence or 'chain' does not end with the achievement of creating the object and instead is used to follow the artefact through its biographical life (Martinón-Torres 2002, 33; Pelegrin 1990; Sellet 1993; Sillar & Tite 2000). To conduct a *chaîne opératoire* study a rigorous methodological framework is required to reconstruct processes of manufacture and use. This is important because specific technical choices have a direct effect on the future options and choices available in the creation of the artefact; early choices in the production sequence have a direct impact on the object's final form and use (Roux 2016, 102; Leroi-Gourhan 1964). Additionally, it is very difficult to pin down social changes to a single action, and thus a latitude of differences among and between materials and practices is considered (Van Oyen 2013, 87-90; Bhabha 1994, 313).

Lemonnier argues that objects and the technological actions involved in their making and use do not exist in a vacuum and are related to things and actions that already existed in at least some primary fashion (Lemonnier 1992, 84). Technologies of discrete communities are tied together by common underlying technological practices, which are transmitted through generations of teachers and students using repetitive learned movements that essentially embody the skills and traditions of making (Roux 2016, 102; Dobres 2000; Gosselain 2000; Ingold 2001; Leroi-Gourhan 1945, 344-45). As the learner develops the motor-skills and mental planning needed to achieve the task of making they become the teacher and the cycle continues, maintaining a tradition through time. This suggests that interconnection can be detected through similar technical gestures spread across the bodies of multiple different types of objects, and that objects not linked by technical gestures are produced by people or groups that are not closely connected (Roux 2016, 110; Lemonnier 1992, 64; Schlanger 2005, 28).

In this study the burden of justifying meaning and matter is left with the objects. This is with the aim of providing the artefacts themselves the space to inform on the networks of social lives with which they have been involved (Miller 1997, 11). Physical analysis identifies discrete processes of artefact construction and use through specific patterns of folding, cutting, engraving, joining, and recycling. Furthermore, the chronological syntax of these processes is traced across different and changing forms of artefacts, revealing the underlying learned and embodied ways of 'doing' within culture groups (Van Oyen 2013, 93-4; Wenger 1998; Silliman 2010, 42). Combining the study of the circulation of specific artefacts, the ways in which they were made, and in what quantities, for example, generates a way of identifying distributions of specific cultural components in operation at different scales (Roux 2016, 109). In this way, insight is gained into the ways people created their worlds around them, and how practice shifted and changed to both accommodate or exclude new materials and practices to communicate meanings and values.

As part of the physical analysis objects are photographed, using a Lumix 12-megapixel digital camera and ViTiny Pro10 microscope camera, capturing intricacies of each individual object. With regards to composite objects, specific attention was paid to the metal components. These can be viewed in the Filemaker Pro database located in Appendix A.

4.3.3.1 Physical Processes of Production and Use

To study the objects assessed within this thesis a glossary of technological processes has been developed. Particular attention is paid to the physical signs of production and use left on the bodies of objects by the metallurgists who worked the metal. These terms are used to characterise each of the individual copper metal pieces individually that are involved in the construction of each Indigenous object included in this study. Some of the artefacts are composite in nature and involve multiple pieces of copper and copper alloy along with other materials wish as wood, sinew, and iron. This means that a copper rivet involved in the composition of a dagger may be analysed discretely and that data may for example be used to study copper rivets across the entire study region or perhaps daggers created with copper rivets.

The following glossary of terms is developed based on the work of Tushingham *et al*. 1979, Untracht 1968, Lechtman 1988, and Li *et al*. 2011. An experimental program of copper manipulation was undertaken to further contextualise the behaviour of worked copper and provide insight regarding processes potentially used to create artefacts. This study can be found in Appendix F.

4.3.3.1.1 Cut (C)

The metal shows signs of having been separated from a larger piece of material in a deliberate fashion. This can be undertaken in a number of ways that each leave significantly different marks on the surface of the metal. For example, a chisel used to cut sheet or bar leaves the material thinned and pinched at the edge. The length of the chisel cutting bevel can potentially perceived from the markings left on the edge of the metal piece. Alternatively, using a saw blade to cut the metal may leave an impression of striations from the teeth of the tool. Furthermore, the consistency and directionality of the saw blade tooth marks can reveal in what direction the metal was cut, what orientation the metal may have been in while cut, and whether a consistent even sawing action or bursts of sawing were used (Untracht 1968, 69). Shears can produce sections of straight or slightly curved neat edges without burrs, and the physical evidence of the shear snip may be visible at the end of each cut stroke (Tushingham et al 1979, 10-11).

4.3.3.1.2 Split (Sp)

The metal is separate and divided to some extent, however there is no loss of any metal in the process and no pieces are removed. This can be achieved with cutting tools such as shears, chisels, and saws. Annealed copper can be split while hot or cold. Repeated bending of the metal back and forth along a fold line could also cause splitting due to localised work hardening. It is common for metal to be split for a decorative purpose (Untracht 1968, 120).

4.3.3.1.3 Hammered and Shaped (H&S)

The metal has been forge worked (worked hot) or bench worked (worked cold) during the production process, potentially leaving behind indentations indicative of the tool used. This process is used to create different shapes with the metal, including raised forms worked in relief (*repoussé*) (**H&S/R**), The *repoussé* technique involves various punches and hammers working the metal from the back to raise the materials surface. Sheet metal worked in relief requires complete support from a material (pitch and/or sandbag for example) resilient enough to yield to the blows of the tools used to shape the metal, while preventing the surface of the metal from fracturing (Untracht 1968, 93). R*epoussé* work often happens in combination with chasing (**H&S/Ch**), or modelling done from the front of the metal to refine/define *repoussé* forms. Both *repoussé* and chasing techniques involve a very similar toolkit of blunt polished punches or chisels (Untracht 1968, 97, 105). Chasing tools are typically held at a more acute angle to the surface of the metal being worked than *repoussé* tools, where the force is typically applied at a 90-degree angle to the surface of the metal (Untracht 1968, 105). Bends of acute and obtuse angles are also created by hammering and shaping the metal and can be achieved using such tools as hammers and prepared forms (**H&S/B**). The edge of a sheet of metal can be hemmed in the shaping process, meaning the metal is folded over onto itself creating a smooth edge and increasing the strength of sheet metal (**H&S/H**). The metal can also be shaped into a circular form or hollow cylindrical tubes (**H&S/Cr**) to create objects such as bracelets and beads.

4.3.3.1.4 Ground and/or Polished (G/P)

A certain amount of the surface of the metal is removed in order to manipulate the shape or appearance of the copper. For example a serrated edge can be created by grinding the lateral edges of an arrow point, burrs can be ground from the cut edge of a metal piece, or an awl can be ground into shape. Both grinding and polishing are identified by regular striations of varying depths left on the surface of the metal (Untracht 1968, 394-8). This process can be achieved through mechanical grinding, filing, and polishing using an abrasive material moved back and forth (Untracht 1968, 394). The abrasive material can be applied by hand or by using various types of objects such as files. Files can be a range of sizes and profiles, have ridges on the abrading surfaces, and typically require a reciprocating technique (Li *et al*, 2011, 493). Polishing only removes a small amount of the surface metal and is predominantly applied to smooth rough surfaces, and potentially to alter the colour and lustre of the metal. Designs can be made using grinding and polishing techniques that remove areas of the metal's surface or expose the metal beneath paint previously applied to the surface of the metal.

4.3.3.1.5 Carved (Ca)

"Carving is a process where specific parts from hard materials are removed to create a desired pattern or shape" (Li *et al.* 2011, 494). Within this study some pieces of copper, such as tubular shaped arrowheads, have been carved into shapes with multiple facets (Untracht 1968, 121).

4.3.3.1.6 Engraved (En)

The surface of the metal has been incised into to create a number of different effects. For example, the metal can be lightly scratched or deeply incised. Deep incisions can result in raised burrs that can be removed by cutting or grinding. Engraved marks of all varieties can be used to create a texture across the surface of the metal. This action leaves behind a negative impression of the shape of the tool (graver, burin, chisel) used for the process (Li *et al.* 2011, 494; Untracht 1968, 111-16).

4.3.3.1.7 Perforated (Pf)

The metal has been pierced, leaving a visible hole. Holes in the metal can occur for example, as part of a design, or while affixing the metal to another object with rivets or wire. In some cases, a stamping tool can be used as a die to perforate and cut intentional design shapes out of the metal (Untracht 1968, 78-9).

4.3.3.1.8 Painted (Pt)

The surface of the metal has been covered, at least in part, by a pigment (Untracht 1968, 416).

4.3.3.1.9 Mechanical Joining (MJ)

The process of bringing separate pieces of metal together using methods such as bending, crimping, pinning, screwing, bolting, and riveting. For example, sheets of metal can be fixed together or to other materials using rivets, staples, bolts, or wire (**MJ/F**). Pieces of metal can be joined together through coiling or twisting them together (**MJ/Co**). The metal can also be laced together to form overlapping folded joins (Tushingham *et al.* 1979, 18-20). Specific folded joins are identified when possible using the following terminology: Lap Seam (**MJ/LS**), Countersunk Lap Seam (**MJ/CLS**), and Flat Lock Seam (**MJ/FLS**) (Untracht 1968; Copper Development Association 2017; Figure 4.1).

*Note: The items employed in certain processes that bring materials together, such as bolts, rivets, nails and wire, are categorised under the Mechanically Applied (MA) subset of this glossary. The term 'Mechanically Applied' details the processes these things are involved in, irrespective of the larger artefactual whole they may also play a part in.

Figure 4.1. Possible mechanical joins that can be used to affix pieces of metal together (Copper Development Association, Inc, 2017).

4.3.3.1.10 Cast (Cst)

Metal that has been heated until it becomes completely liquid and able to flow freely and then poured evenly into a mould before cooling again and becoming solid (Untrach 1968, 319). This process can leave behind ridges on the surface of the metal object where the pieces of the mould came together. This ridge can be ground off and obscured in other ways. Cast copper and copper alloy bars can be used to create artefacts such as bracelets.

4.3.3.1.11 Manufactured from Bar Stock (MBS)

This term describes metal that has begun its life on the Northwest Coast as bar stock created from manufactured copper or copper alloys. This material includes bars and bolts that are rolled or drawn (Günter & Kundig 1999, 256-9).

4.3.3.1.12 Stamped (Sm)

The surface of the metal is marked with a specific, often decorative, shape by using a pre-formed tool that is applied with some force to the surface of the metal. Stamps can be applied from the back so that the design stands out in relief, or such that the stamped design is sunken into the surface of the metal. Stamping differs from hammering and shaping as the overall shape of the object is not affected by the application of stamps (Untracht 1968, 78).

4.3.3.1.13 Twisted/Coiled (T/Co)

The metal has been rotated around a stationary axis to create a twist in the material, or the metal is coiled into a continuous twist. For example, the metal of some bracelets is both twisted to create a spiralling appearance, as well as manipulated into a coil. The twist is facilitated by heating the metal and conducting the twist as one working event, otherwise the metal's surface may fracture (Untracht 1968, 282).

4.3.3.1.14 Soldered (Sd)

The metal has been affixed to another piece of metal through the fusion of heated alloys known as solders, which have a lower melting point than the metals being fixed together. The base metal is not fused, but the solder does diffuse into the base. Generally, it is possible to solder copper together using soldering alloys made of metal with which it is possible to alloy copper with. As such, silver and lead soldering alloys are popular and viable options, creating a hard and soft solder respectively. Generally hard solder melts at temperatures >800˚F, and soft solder at temperatures below that point. Any traces of solder that remain on the object once the solder has melted are known as a 'skull' or 'skeletal residue' (Untracht 1968, 159-66).

4.3.3.1.15 Glued (Gl)

Within this glossary this term is applied to metal that is attached to another object, either metallic or non-metallic, using an adhesive substance that is not considered solder. Glues can be adhesive substances such as pitch and sap.

4.3.3.1.16 Plated or Gilded (Pla)

The copper metal has been covered with another metallic substance, either chemically or through fusion. For example, a copper sheet could be fused with a thin sheet of silver, creating what is known as 'Old Sheffield Plate' (Hayden 1920, 43-68).

Alternatively, the plate could be applied by electrochemical means (Lechtman 1988, 19-20). Gilding can be applied by rubbing thin silver gilt or leaf on the body of the copper.

4.3.3.1.17 Inlayed (In)

Copper can be inlayed into a depression prepared to receive it. For example, the metal can be inlayed into the centre of a wooden labret, or into the features of a dance mask.

4.3.3.1.18 Mechanically Applied (MA)

Defined here as a portion of the metal that is attached to a non-metallic material by the use of its own material qualities. For example, rivets potentially used as decorative studs, are secured to wooden objects such as feast dishes and dance masks by mechanically applying the sharp end of the fastening to the surface of the wood. Copper can also be mechanically applied to fix non-metallic materials together, such as the bowl and handle of a mountain goat horn spoon (Untracht 1968, 212-223).

4.3.3.1.18.1 *Strung (St)*

The metal has been pierced or worked into a shape that has an aperture, through which another material such as leather or fabric is passed. The metal may be suspended in some way, such as in a necklace.

4.3.4 Style and Design in Artefact Biographies

To consider the material culture at the heart of this biographical study, the individual styles of production and use that are visible on the bodies of the objects are considered. The style and design of each assessed artefact is considered because their decorative styles is related to a wide range of things, such as social affiliations, the feelings, needs, and identity of groups and individuals, and the dominant aesthetic cultural preferences at the time of its creation (Hanson 2017, 3; Young 2006, 173; Keates 2002, 115-6). Specifically, stylistic choices can animate objects and give them an air of exuberance or provide a shroud that camouflages and eludes interpretation (Young 2006, 173). For example, specific shapes, colours, lustre, and designs related to each artefact can communicate such things as family lineages and rights, the power of a supernatural being, or the wealth and prestige of the object's owner. As such, these features are given as much consideration as an object's form (Merleau-Ponty 1964/2004, 180; Young 2006, 175; Keates 2002, 119; Saunders 1999, 245; Morphy 1992).

This avenue of investigation is valuable, as style, function, and design are enmeshed within, and are integral to, how people behave through their own culturally contingent social praxis (Morphy 1994, 664). In this study, 'styles' are thought of as 'ways of doing' (Hodder 1990), and indicators of how people made sense of their worlds (Conkey 2006, 359). As a result, treating patterns, variations, and exceptions in style seriously allows the researcher to consider the functions, values, and social relations of objects as "multivalent and variously realised" throughout their biographical lives (Conkey 2006, 366; MacKenzie 1991, 27; Wiessner 1989, 56).

Styles used in the creation of artefacts are socially and culturally contingent, and adaptive over time as desired in order to communicate specific messages and portray relative identity (Carr & Neitzel 1995, 6; Wiessner 1989, 57; Pfaffenberger 1992). While specific applications of design can be seen as individual acts of communication, these actions are also culturally contingent and are drawn or developed from a pool of known and contextual cultural attributes, such as already established mythological themes and economic strategies (Carr & Neitzel 1995, 10; Rosenthal 1995, 345). In fact, cultural contexts can constrain the style of object creation as much or more than the physical qualities of the materials used in construction (Rosenthal 1995, 351; Boast 1997, 190-91).

Furthermore, it is possible for contemporaneous actors living within the same cultural setting to find very different yet equally optimal solutions to the same questions. As Wobst argues, the use and meaning of something as apparently obvious as the sharp working edge of a knife or dagger, is instead caught up in social dynamics that could be controlled by any number of cultural structures (1999, 125-6). This complication becomes evident when analysing artefacts such as Northwest Coast daggers and spear points using historic records as an interpretive lens. Cook among the Nuu-chah-nulth in 1778 (Cook 1784, 329-30), and La Pérouse among the Tlingit in 1786 (la Pérouse 1798, 402-7), and Marchand among the Tlingit in 1791 (Fleurieu 1801, 190) all describe Indigenous people across the region frequently grinding and polishing metal artefacts. This practice has been related to a possible desire to maintain the metallic shine of the material, and not necessarily the sharp edge (after Shanks & Tilley 1992, 144). The colour, texture, and sharpness of the metal, and the processes used to achieve these features, are inextricably entangled, though it is potentially impossible to untangle the dynamic scales of importance assigned to features such as sharpness or lustre through the object's life.

The contingent nature of material culture has led to the critique of style, arguing that any interpretations are based on untestable tautologies founded in contemporary understandings of meaning, use, and value, forming a series of cultural filters between makers and users through time (Sackett 1985, 159; Carr & Neitzel 1995; Rosenthal 1995, 355). To mitigate these challenges, all aspects of the material culture considered in this study are given an equal voice in the reconceptualization of objects. Their images and forms, as social performance and practice, have links to cultural logics and social facts (Conkey 2006, 364; Ingold 1993). This strategy is also aimed at unravelling the implied Cartesian boundary between humans as agents, and things as passive objects (Gell 1998). However, while the agency of living and non-living things is given consideration, within this study agency is not considered equal or symmetrical, and always arising from amongst living agents (Barrett 2016).

4.3.4.1 Considering Colour

Aspects of the objects' aesthetic also communicate more subtle messages, tied to decoration techniques and the strategic use of colour (Mottram 2017, 488). Furthermore, the recurrent use of specific colour and design combinations through the assemblages of objects can indicate long-term historical practices that are vital to the reproduction of specific cultural views about the surrounding world (after Cobb & Drake 2008, 85). The blacks, whites, and reds of Northwest Coast formline art provide a strong example of this, combining artistic aesthetic and individual creativity with somewhat standardized rules, creating images such as family crests and supernatural beings that are striking in the present moment while also invoking the past (Holm 1965; Stewart 1979, 19). In fact, these design practices provide citations to the past, and more modern reproductions allow people to reproduce and reaffirm their past in the present. This means the re-use of certain design features allows for multi-scalar time to be experienced simultaneously by the objects' users (Cobb & Drake 2008, 86-91; Ingold 2000, 194).

Within biographies, colour and decoration strategy are considered elements within a 'genealogy' of deep imagined history (after Harding 2005; Cobb & Drake 2008, 86). Colour and decoration strategies are also bound by their cultural contexts and are able to communicate specific meanings within these boundaries (Whittle & Bayliss 2007, 24; Gage 1999; Young 2006). Colour, material, and decorative style can, due to these features, act as a 'significant lever of choice' (Mottram 2017, 481). As such, both exotic and general strategies of decoration and deliberate application of colour are included in this biographical study.

Colour and decoration are difficult things to study as they are unstable; surfaces and pigments can weather over time, preferred materials may have become un/available, and inconsistencies in colour perception and understanding can be found across a single community (DeBoer 2005, 85; Young 2006, 174). Additionally, it is the users of colour and decoration who provide the resources for how to understand it, and those who initially create an object may not share the same understanding of these features as those who use and view the objects in the future. Young discusses this phenomenon through the ways in which classical Greek statues have been valued in different contexts and timeframes. Specifically, these statues convey a much different message as austere white stone forms, often housed in private museums, than as highly coloured public objects (Young 2006, 174). An example of this manipulation of visual properties related to copper within the study area can be found in the accounts of Nuu-chah-nulth (Cook 1784, 329-30; Stewart 1987, 83-4) and Tlingit (la Pérouse 1798, 402-7) people repeatedly grinding and polishing the surfaces of copper artefacts, assumed to serve as a way to retain or restore the lustre and sharpness of the metal (Keates 2002, 111). Without maintenance, copper is susceptible to becoming dull, forming a patina or even a crust of corrosion in certain environments. As such, copper artefacts that are removed from every day use and held for example in museum collections may not convey the same vivid message of colour that was once intended. As a consequence, it may be more useful to think in hues and tonal structures, accept that people are users of colours, and that constraints or pressure on colour and design use may have been in place, but that these are all culturally defined (Gage 1999, 111; Cobb & Drake 2008, 87; Dedrick 2002, 63).

To study colour and decorative styles it is worth considering the people who choose to use them (Mottram 2017, 483). There is an argument that the predominant colours used by Indigenous groups are often tied to things in nature that are of import to that community (Cobb & Drake 2008, 87). This argument could be easily adopted, given the known Northwest Coast Indigenous connection between copper, salmon, cedar, blood, and sunlight (Goldman 1975, 82; Jopling 1989, 17; McIlwraith 1948, 688-90; Boas & Hunt 1906, 81-2; de Laguna & McClellan 1981, 645; King 1999, 160). However, such simplicity mutes' Indigenous voices regarding these connections, and places a colonising Westernised filter of presumption over how and why Northwest Coast communities valued and connected these things. It is more useful to think of colour and decorative design as a relational part of the social world. Instead of attempting to understand what people specifically perceived or thought in response to colours and decorations, the material culture is relied on to show what people actually did (Young 2006, 179; Saunders & van Brakel 1997; Saunders 2000). By focusing on changes in colour and decoration practice through periods of upheaval, such as the fur trade and colonial period discussed in this thesis, roles of certain style features, and their articulation within culture groups can be commented on (Young 2006, 179-181).

4.3.5 Chemical Characterisation

This material culture study includes the non-destructive chemical characterisation of the metals involved in the creation of each of the artefacts using a HHpXRF device. A selection of the artefacts are composite in nature, often composed of multiple pieces of metal as well as other materials such as wood or leather. As such, as many of the copper pieces of each object as possible were characterised. Each piece of metal sampled is assigned a unique number ('Analysis Unit Number' or AUN) in order to distinguish discrete characterisation results and see how they relate to each other across a single object.

Chemical characterisation is relevant within this analysis due to the distinguishable differences in the elemental composition of native metal procured on the Northwest Coast of North America, as compared to the copper metal and alloys manufactured around the world in the 17th, 18th, and 19th century. Specifically, there are sufficient identifiable differences in the concentrations of trace elements in native and manufactured metals that meaningful inferences regarding the types of metals used in artefact construction can be made (Craddock 1995; Dussubieux *et al.* 2008; Pernicka 1999). Furthermore, due to the nature of the Indigenous metallurgical practices employed on the Northwest Coast, which are unlikely to significantly alter the chemical composition of copper and copper alloys (Hancock *et al.* 1991; Maddin *et al.* 1980), the copper evaluated within each object will be chemically consistent with the material that was first introduced into Indigenous use. Thus, it is possible to comment on the types of metal used for specific purposes in specific places.

First the chemical differences and similarities between native copper and European, Russian, and American manufactured copper and copper alloys must be defined. Copper native to the Northwest Coast is typically composed of approximately 99 wt% copper, combined with trace elements that are common to the region. These elements include iron, vanadium, antimony and silver. Manganese, often in combination with iron, may also be found in native copper from this region (Mauk & Hancock 1998; Craddock 1995, 96; Wayman 1989d, 32; Tylecote 1987, 92; Rapp *et al.* 1984). Copper can be somewhat inhomogeneous, and discrete inclusions of silver are also sometimes found in native copper, as the element may accumulate at grain boundaries (Craddock 1995, 81). Multiple chemical determinations of each metal piece have been taken whenever possible to attenuate this possibility. However, Wayman *et al.* argues, that silver is likely to be found in higher concentrations in smelted/manufactured metal, following an analysis of native metal from the Copper Mine River and Victoria Island in the Canadian Arctic (Wayman *et al.* 1985, 372), suggesting a contextualised distinction could potentially be made.

In contrast, the chemical compositions of smelted copper and copper alloys, here referred to as manufactured metals, produced around the world in the 17^{th}, 18^{th}, and 19^{th} centuries, were much more mixed, often including trace elements that are not normally found within native copper from the Northwest Coast, such as lead, tin, zinc, bismuth, and arsenic. (Craddock 1995; Hancock *et al.* 1991; Pernicka 1999; Rapp *et al.* 1984; Wayman 1989d; Wayman *et al.* 1985). Manufactured copper from this time tends to contain low levels (~0-3 wt%) of these various elements, while specific alloys often contain recognisable levels of alloying elements. For example, Muntz Metal contains ~60 wt% copper and ~40 wt% zinc, while alpha brasses contain less than 37% zinc and are commonly found to contain closer to 30 wt% zinc (McCarthy 2005, 115; Flick 1975, 74-8; Vickers 1923, 425; see Appendix D for a discussion of the chemical composition of manufactured European copper alloys). The absence of any of these elements does not necessarily translate to a determination of native copper however. Additionally, modern manufactured copper can be identifiable for exactly the opposite, containing significantly lower detectable levels of As, Ag, Sb, and V than even the cleanest native copper (Craddock 1995, 79). Though native arsenical copper and native copper high in iron are available in eastern North America, this metal is not known to have been used by the Indigenous communities of the Northwest Coast and thus does not need to confuse this analysis (Hancock *et al.* 1991; Rapp *et al.* 1984, 73-4; Maddin *et al.* 1980, 213).

Though there are several ways to assess the chemical composition of metal such as laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) (Dussubieux *et al.* 2008), accelerator mass spectrometry (AMS) (Wilson *et al.* 1997), or atomic absorption spectroscopy (AAS) (Childs 1994), HHpXRF is deemed the best option for this study. Specifically, the HHpXRF is non-destructive and portable, meaning the device can be transported to the objects of study and multiple characterisations can be made without negatively impacting the bodies of even the most fragile artefacts. Additionally, the copper artefacts involved in this study commonly display a relatively good surface condition, free from corrosion or only exhibiting small areas which can generally be easily avoided, making this assemblage of objects a good candidate for HHpXRF analysis.

Positively identifying the specific geological source of a native copper sample, is extremely difficult if not impossible due to the possible heterogeneity of the metal. Analysis derived from the HHpXRF, that conducts spot surface analysis, can thus obscure precise correlations with any geographical or geological beginnings (Hill *et al.* 2016, 354; Hill 2012; Levine 2007). The copper and copper alloy materials arriving on the Northwest Coast from Europe and Russian were being produced across the world by the 18th century. The most likely origins for both the copper ore and the manufactured copper traded into the region at this time include Britain, Germany, Russia, Spain, Chile, Mexico, China, and eastern North America, although very little copper was produced in North America until the late 19th century (Stapp 1983, 1984; Cooper *et al.* 2015a, 147; Howay 1941). Additionally, countries, including Britain as the number one copper producer in the world at this time, were using combinations of domestic and foreign ores and metals in production processes that were not strictly controlled or documented (Jopling 1989; Day 1990; Angerstein 1755; Piggot 1858; Brannt 1896; Davy 1825; Hay 1863). This is complicated further by Russia, who had been purchasing European ores and copper to include in its own manufacturing processes since at least the early 17th century (Saul 2015, 364-5). From the late 18th century Russia also began purchasing metals and other goods from Europeans and Americans while on the Northwest Coast to reduce shipping costs in bringing the material across the Bering Strait (Gazenko 2000; Anichtchenko 2013, 38-44; Golder 1960, 137; Pierce 1990, 130; Litke 1834, 47). As such, while it is possible to compare and contrast the elemental composition of native and manufactured metals, it is impossible to discern the provenance of manufactured copper and copper alloys based on HHpXRF analysis alone.

It is known that vessel sheathing and other ship fixtures were traded in early encounters between European and Indigenous peoples, and by the late 18th century more copper sheathing than was necessary to maintain the ships was being transported to the region as a trade good (Hoskins 1941; Howay 1941, 187, 195; Gough 1992, 150; Colnett 1786-88; Dillon 1951, 155). As such, a selection of European manufactured copper and copper alloy objects used in maritime contexts contemporary with the metals traded on the Northwest Coast during the fur trade and colonial period have been targeted for chemical analysis using the HHpXRF and included in this research as reference data. These objects include vessel sheathing, bolts, and nails, and are housed at four museums located in the UK and Canada (see Appendix C). This investigation, though adjacent to the trajectory of the research within this thesis, has been conducted to provide a clearer understanding of the elemental composition and physical qualities of the material that found its way to the Indigenous peoples living on the Northwest Coast between the 17th and 20th century. The HHpXRF data, associated Filemaker Pro database, and reports detailing the material can be found in Appendix C and on the USB memory stick associated with this thesis.

4.3.5.1 Niton XL3t handheld XRF Analyzer Data Gathering and Management

A Niton XL3t handheld XRF Analyzer, owned and maintained by the University of Sheffield, was used to conduct all compositional analysis. For health and safety guidelines and conditions of practice see Appendix E. The HHpXRF is used in hand held mode. Analysis is conducted using the 'General metals' calibration setting for a total cycle time of 45 seconds; 30 seconds of sample time on the main filter and 15 seconds on the low filter.

The following elements are detected using the method outlined:

- Main Range Elements: Sb, Sn, Ag, Mo, Nb, Zr, Bi, As, Pb, W, Zn, Cu, Ni, Co, Fe Mn
- Low Range Elements: Cr, V

Care is taken to ensure that the instrument window is completely occluded by the sample when possible. When this was not possible, potentially due to the small size of the sample piece, care was taken that no other measurable materials were placed within 1 metre of the instrument window. Consideration is also given to the possible elemental compositions of such things as leaded paints and surface corrosion when sample locations are chosen; ideally sampled areas are free from patina or corrosion. Due to these challenges the amount of coverage of the sample window and the surface condition of each object is attributed a rating that is used as an index of 'confidence' when assessing the characterisation data (Figure 4.2), allowing for greater scrutiny to be exercised over analytical interpretations.

Confidence Scale

This scale reflects metal surface quality and condition, coupled with the amount of coverage achieve with the pXRF sampling window. This scale should read as 'metal quality/sample coverage'.

metal condition measurement

1 – The metal is generally clean and can have a light patina
2 – The metal has a strong patina
3 – Some corrosion on the object surface, with portions of metal still visible
4 – Corrosion product prevalent on the majority of the object
5 – Corrosion product present on the entire object, subject to flaking and friability

amount of sample coverage achieved

1 – 100% coverage
2 - 75% coverage
3 - 50% coverage
4 - 25% coverage

Figure 4.2. The confidence scale used within this study to judge each sample of metal characterised using the HHpXRF.

The artefacts included in the study are often composed of multiple pieces of copper metal and combined with non-metallic materials. Whenever possible, all the accessible metal pieces used to construct the object are sampled. Each piece of metal is sampled at least once. To combat the possible heterogeneity of manufactured copper the majority of the metal pieces are sampled twice, at different places across the body of the metal. Each HHpXRF sample is recorded as the detected concentrations of the major and minor elements in the metal out of 100 wt% (typically expressed as wt%). This information is exported from the device using Thermo Niton NDT 7.2.2 software into a Microsoft Excel format. Each raw measurement is then normalised to 100% using a scale factor (100/initial total(wt%) of the elements detected within the metal) multiplied by the initial readings of each detected element. In the case of metal pieces that have been sampled multiple times, the normalised readings are then averaged.

4.3.5.1.1 HHpXRF Performance

The performance of the HHpXRF is established in terms of accuracy and precision using the built in Fundamental Parameters (FP) algorithm. This analysis is used to compensate for potential issues caused by geometrically odd object shapes, x-ray absorption, and secondary and tertiary fluorescence effects (Thermo Scientific 2018, 95-99). The instrument bias is attenuated using the incorporated system check routine, run at the beginning and end of each session of use.

Accuracy=%error=%E $= \left\{\frac{M\ (measured) - A\ (certified)}{A\ (certified)}\right\} x\ 100$

Table 4.1. The reference materials showing certified and measured results.

		Sn	Zn	Pb	Ni	Fe	Cu
C50X20	*Certified*	8.80	0.41	10.90	0.51	0.10	79.01
	Measured	8.57	0.37	11.02	0.37	0.07	79.48
	Accuracy (%E)	-2.61	-9.76	1.10	-27.45	-30.00	0.59
C71X06	*Certified*	3.90	3.70	6.10	2.10	0.04	84.26
	Measured	3.84	3.81	5.94	2.41	0.05	83.92
	Accuracy (%E)	-1.54	2.97	-2.62	14.76	30.00	-0.40
C11X01	*Certified*	0.16	30.30	0.05	0.13	0.04	69.50
	Measured	0.12	29.47	0.07	0.08	0.04	69.81
	Accuracy (%E)	-25.00	-2.74	40.00	-38.46	18.92	0.45
31X B27	*Certified*	0.99	17.65	0.49	0.03	0.11	80.65
	Measured	1.12	17.96	0.35	0.02	0.13	80.29
	Accuracy (%E)	13.71	1.76	-29.88	-20.00	17.12	-0.45

Accuracy was determined across a range of compositions using MBH Analytical Ltd. Certified Reference Materials (C50X20, C71X06, C11X01,31XB27). These CRM's were chosen for their relation to heritage manufactured copper and copper alloys, as the main elements deemed useful for categorising alloys are Cu, Zn, Sn, Ni, As, and Pb. Arsenic was determined through an uncertified in-house prepared material that is measured at 7 wt% As. All replicates of the arsenic sample are within 10% CV.

Accuracy is expressed as %error and is dependent on element concentration. For the certified reference materials, achieved accuracy as %error is shown in Table 4.1. Error associated with tin (Sn) determinations ranged from 25% when present as a trace (>0.2%) to -2.6% error as a major element (8.8%). Error associate ed with zinc (Zn) ranged from -9.7% (>1%) to -2.7% as a major element (30.3%). Accuracy for lead (Pb) ranged from

40% at trace level to 1.1% at major levels (10.9%). Copper was present as the major element in all certified standards and was determined at better than 1% error.

Table 4.2. The Instrument and Methods precision results derived from the characterisation data gathered from a Kwakwaka'wakw brass bracelet housed at the Museum of Archaeology and Anthropology (Record No. 18, Accession No. E1910.34).

Sample No.	Instrument	Pb(wt%)	Zn(wt%)	Cu(wt%)	Fe(wt%)
MAA077	Average	0.541	33.395	66.011	0.062
	Standard Dev.	0.018	0.086	0.084	0.017
X 5	%CV	3.287	0.258	0.128	26.958
	Methods	**Pb(wt%)**	**Zn(wt%)**	**Cu(wt%)**	**Fe(wt%)**
MAA076	Average	0.534	34.961	64.423	0.069
	Standard Dev.	0.035	0.218	0.195	0.012
X 5	%CV	6.645	0.622	0.303	17.192

During each museum visit one artefact is chosen for a test to ascertain the accuracy of the instrument and the method. The accuracy of the machine is determined by sampling the same piece of metal five times consecutively while holding the HHpXRF device as steady as possible, in order to measure the machine's ability to replicate results. The accuracy of the method is determined by sampling a piece of metal five times consecutively and moving the device away from the surface each time in order to measure the accuracy and replicability of measurements between sampling events. In each instance the average, standard deviation, and coefficient of variance (%CV) is determined for the five readings related to the accuracy of the device and for the five readings related to the accuracy of the method. The instrument and methods accuracy, as determined on a Kwakwaka'wakw bracelet housed at the Museum of Archaeology and Anthropology, is presented in Table 4.2 as an example. This information is available in Appendix B, 'Methods and Instruments Precision Tests'. Overall. the elements most relevant for comparative analysis in this study are Sb, Sn, Pb, Zn, Ni, As and Bi (after Hancock *et al.* 1991; Hancock *et al.* 1993; Hancock *et al.* 1994; Dussubieux *et al.* 2008, 645).

Table 4.3. The %CV for batch and event determinations regarding precision.

		Sn(wt%)	Pb(wt%)	Cu(wt%)
Long Term Precision, multiple characterisations between 11/06/2015-27/07/2015	%CV	2.05	16.91	0.21
Single Event Precision, 10 characterisations	%CV	0.66	1.9	0.22

Precision is further monitored using an in-house bronze reference sample. This sample is characterised at the beginning and end of each data collection session and tracked for consistency. The %CV of a single event of 10 characterisations of this bronze reference piece is compared against multiple characterisation events of a different piece of metal (Table 4.3). This long-term sampling took place between 11 June 2015 and the 27th of July 2015. Comparison between the two lots of samples show a high level of continuity. For example, the %CV of copper sampled over the long term is closely comparable to that of a single analytical event. Sn shows more variability over the long term but remains respectable at ~2%. Variability for Pb is respectable at 1.9% for an analytical event but increases to ~16% over the long term. This significant increase is explained by two factors. Firstly, the heterogeneity of Pb in copper alloys means precision will always be quite high when the HHpXRF is relocated on a sample, as occurs in a long-term precision determination. Local variability is therefore significant in determining this figure. For this reason, most objects are analysed at several points wherever possible. Secondly, the sample used for long term precision was not high in Pb (~0.5%) and therefore higher variability is to be expected.

4.3.5.2 Establishing Metal Groups

Once the raw HHpXRF data is processed, material are identified where possible based on known historical copper and copper alloy compositions (Table 4.4). The element concentrations as determined by the HHpXRF are acknowledged at ≥1 wt%, although the presence of elements at lower concentrations is taken into consideration for further determinations regarding the materials potentially manufactured status. The potential for a wide variation in the concentration of alloying elements requires the broadening of the metal categories to include sub-groups. For example, 'Lo Zinc Copper' is identified separately but grouped into the 'Brass' category. Grouping these parsed categories in this manner allows for occurrences such as element depletion or surface enrichment in copper alloys exposed to corrosive conditions such as maritime environments and the soils local to the North Pacific Coast (Dussubieux & Walder 2015, 170; Moreau & Hancock 1999), while continuing to maintain the integrity of the sample group. Overall, these metal groups allow for comparisons between materials used in Indigenous artefact construction.

Table 4.4. The 14 copper and copper alloy metal groups identified within the HHpXRF sample data generated within this project.

Arsenic Bronze (+Fe)	Copper Metal (+Fe)
Brass (+Fe) • Admiralty Brass (+ Fe) • Lo Zn Copper (+Fe)	Leaded Brass (+Fe) • Leaded Admiralty Brass (+Fe) • Leaded Lo Zn Copper (+Fe)
Leaded Arsenic Brass (+Fe)	Leaded Arsenic Bronze (+Fe)
Leaded Copper (+Fe)	Leaded Gunmetal
Leaded Tin Bronze (+Fe)	Tin Bronze (+Fe)
Leaded Zinc Arsenic Bronze • Leaded Lo Zn Arsenic Bronze (+Fe)	Lo Zinc Arsenic Bronze (+Fe)
Hi Silver	Tombac

Alloy groups have been further divided based on the presence of lead at ~≥1 wt%. Lead and copper have very different melting points, and the solubility of lead in solid copper is generally extremely low at about 0.007 wt%. Thus, levels that exceed this should be understood as lead most likely accumulated discretely at the grain boundaries of the copper. Lead is also not distributed homogeneously through copper alloys, and concentrations can vary quite significantly across the body of an artefact (NIST 2013; Davis 2001, 34-5), further reinforcing the practice of conducting multiple characterisations on a single piece of metal. The addition of approximately 1-5 wt% lead to a copper alloy works to increase the metal's processing parameters and castability, but can cause the metal to crack when cold worked as element levels increase. In fact, the more lead that is added to the alloy, the weaker and more brittle the metal will become (Davis 2001, 46-51), which has implications for the hammering and annealing process used on the Northwest Coast.

4.3.5.2.1 Metal Groups Defined

4.3.5.2.1.1 Copper Metal (+Fe)

The term Copper describes a Cu metal that contains a detectable concentration of less than 1 wt% of any additional element. This metal is soft, malleable, ductile, corrosion resistant, and has a distinct colour (Copper Development Association 2018). On the Northwest Coast native copper may generally be characterised with <1 wt% trace elements of Ag, Fe, Mn, and V (Dussubieux *et al.* 2008; Pernicka 1999). The samples that are characterised at <1 wt% Sn, Pb, As, Bi, Zn, and Ni, suggest the use of Eurasian trade material as the elements are indicative of smelting, melting, and alloying (Craddock 1995; Hancock *et al.* 1991). Copper can be worked into a wide range of shapes using cold working hammering and annealing practices known to have been used by Indigenous metallurgists on the Northwest Coast (Wayman *et al.* 1992; Franklin *et al.* 1981).

4.3.5.2.1.2 Leaded Copper (+Fe)

Leaded Copper is an alloy that contains ≥1 wt% lead. The inclusion of lead provides the metal with greater machinability and is often used in the manufacture of bearings (Davis 2001, 46-51). As the concentration of lead increases above ~5 wt% the alloy weakens, becoming more brittle and prone to facture during cold working processes (Brannt 1896, 309).

4.3.5.2.1.3 Arsenic Bronze (+Fe)

The addition of a small amount of arsenic, up to approximately 3-4 wt%, produces an alloy that is stronger, can be extensively cold worked without fear of embrittlement, and has improved corrosion resistance in maritime environments (Lechtman 1996, 492-4). Arsenic also improves the metal's work-hardening qualities, thus producing objects with better cutting and chopping qualities (Charles 1967, 23). As the amount of arsenic within the alloy increases, so does the strength of the metal, meaning that an alloy of 6 wt% arsenic takes notably more effort and time to work (Lechtman 1996, 494). However, arsenic in amounts greater than 7-8 wt% create an alloy that is no longer favourable for cold work, and rapidly becomes brittle and prone to cracking. However, high arsenic bronze is favourable for hot working and may be considered superior to tin bronze (Lechtman 1996, 492).

4.3.5.2.1.4 Leaded Arsenic Bronze (+Fe)

Leaded Arsenic Bronze is an alloy that has an increased hardness as compared to copper, along with improving corrosion resistance, and enhancing machinability (Charles 1967, 23). The addition of lead to a copper alloy works to increase the metal's machinability and castability, however increasing amounts of lead will lead to the metal cracking (Davies 2001, 46-51).

4.3.5.2.1.5 Brass (+ Fe)

The term Brass broadly describes an alloy of copper and zinc, however there are multiple types of Brass that display very different physical qualities depending on the relative levels of alloying elements present in the mixture. As such the 'Brass' metal group encompasses Lo Zn Copper (1-5 wt% zinc), Alpha Brasses (5- 37 wt% zinc), and Alpha-Beta Brasses (37-45 wt% zinc), all of which display specific qualities. For example, a small amount of zinc added to copper improves the metal's malleability, ductility, and corrosion resistance in maritime environments (Brannt 1896; Davis 2001). Increasing the zinc content within the alloy mixture directly relates to the metal's qualities of hardness and workability, however corrosion resistance decreases as zinc amounts increase. Alpha Brass's, with zinc contents between 5 and 37 wt%, are increasingly strong and hard, but retain their cold working qualities. This category includes 'Yellow Brass', a mixture of 70 wt% copper and 30 wt% zinc, one of the most common Brass alloys (Callcut 1996, 35). Increasing the zinc content of Brass above 38 wt% produces an Alpha-Beta Brass, which is hard, affordable to manufacture, and favourable for working when hot but not cold. Muntz metal, with an optimum patented mixture of 60 wt% copper and 40 wt% zinc, is an example of a 19th century Alpha-Beta Brass popular for maritime vessel sheathing (Brannt 1896, 151; Flick 1975; Muntz 1832; Bingeman *et al.* 2000).

Additional elements are added to Brass mixtures to further enhance the alloy's qualities. For example, the inclusion of a small amount of tin helps to improve corrosion resistance by inhibiting dezincification of the metal. As such, Naval and Admiralty Brass, with a mixture of between 60-72 wt% copper, 28-39 wt% zinc, and 1 wt% tin, were and are widely used metals in marine environments (Callcut 1996, 18; Ashkenazi *et al.* 2011, 2413; Davis 2001, 7-8). Aich's Metal, also known as Sterro-Metal or Gedge's Alloy, is an Alpha-Beta Brass with up to 3 wt% iron, which is added to increase the metal's hardness even further and is sometimes equated with certain steels due to this quality (Brannt 1896, 153-4; Henley 1916; Hiorns 1912, 139, 158-60).

4.3.5.2.1.6 Leaded Brass (+ Fe)

Leaded Brass is similar to the unleaded Brass metal group; both alloys behave similarly with the addition of comparable amounts of zinc and other elements like tin (Callcut 1996; University of Florida 2013). The inclusion of lead provides the various Brasses with improved machinability. However, increasing amounts of lead cause the metal to become brittle, especially when cold worked (Davis 2001, 46-51).

4.3.5.2.1.7 Leaded Arsenic Brass (+Fe)

The Leaded Arsenic Brass metal group is considered a 'Brass' and not a 'Bronze' due to high levels of zinc in the alloy, measuring between 25 – 41 wt%, compared to arsenic levels, which are to fall between 1-6 wt%. The addition of a small amount of arsenic to Brass is beneficial to the metal as it works to both inhibit dezincification and provide the metal with greater work-hardening capabilities (Lechtman 1996, 494; Callcut 1996; Charles 1967, 23). The addition of lead into such an alloy works to improve machinability and hot working properties, and potentially avoid the brittleness caused by arsenic levels beyond 4 wt% (Davis 2001, 46-51).

4.3.5.2.1.8 Lo Zn Arsenic Bronze (+Fe)

The Lo Zinc Arsenic Bronze metal group is defined by the presence of ~≥1 wt% arsenic coupled with 1-5 wt% zinc. A small amount of Arsenic, between 1-4 wt% provides the metal with some improved strength and corrosion resistance including some potential protection from dezincification. Adding zinc to this alloy works to improve the metals ductility and malleability (Callcut 1996; Lechtman 1996, 492-4).

4.3.5.2.1.9 Leaded Zinc Arsenic Bronze (+Fe)

The Leaded Zinc Arsenic Bronze metal group is considered a Bronze, as zinc elements are detectable but remain below ~5 wt%. The arsenic provides the metal with increased strength, work hardening qualities, and resistance to corrosion (Lechtman 1996, 492-4; Charles 1967, 23). The addition of lead into such an alloy would work to improve the metals machinability, while the zinc provides increased malleability and ductility, and arsenic lends the material some corrosion and dezincification resistance (Brannt 1896; Davis 2001)

4.3.5.2.1.10 Tin Bronze (+Fe)

The addition of tin, up to 8 wt%, produces a metal that is stronger and harder, and has improved qualities of ductility and corrosion resistance. These alloy properties are directly tied to the amount of tin present within the alloy mixture (Lechtman 1996, 502). However, above 8 wt% tin the alloy begins to become brittle during both cold and hot work. This can be mitigated somewhat through repeated cycles of annealing during the working process (Northover 1989). Tin Bronze can be work-hardened to a higher degree than arsenic bronze. It is also much less toxic to produce tin alloys, and it is easier to control the amount of tin introduced into the alloying mixture (Charles 1979, 1980; Lechtman 1996; Budd & Ottaway 1991, 132).

4.3.5.2.1.11 Leaded Tin Bronze (+Fe)

Leaded Tin Bronze displays increased hardness, corrosion resistance, and work hardening qualities (Brannt 1896, 97). The addition of ~1-4 wt% lead to a copper alloy works to improve the metals' cold working properties; however, lead also decreases tensile strength and ductility of the material (Davis 2001, 46-51). Continuing to increase the lead in Leaded Tin Bronze alloys results in a brittle metal, although this is to a lesser extent than copper alloys with no tin additions (Schwartz 2002, 22-23).

4.3.5.2.1.12 Leaded Gunmetal

Leaded Gunmetal is a copper alloy that contains a mixture of tin, lead, and zinc. The inclusion of tin and zinc to the alloy enhances properties of strength, hardness, and toughness, while a small addition of lead improves the metal's cold working qualities (Davis 2001, 46-51). This alloy is reported as being 'tenacious, sufficiently hard and elastic to resist distortion, indifferent to the ordinary chemical influences, thinly liquid when melted, and capable of settling down solid in the moulds when cast" (Hiorns 1912, 239-40). Until superseded by steel, gunmetal was commonly used in production of ordinance such as cannon bodies and shell casings (Brannt 1896, 217-8).

4.3.5.2.1.13 Hi Silver

This metal group is comprised of metals that contains ~>2 wt% silver.

4.3.5.2.1.14 Tombac

Tombac is a term used to define copper alloys that contain a mixture of zinc, and some amount of tin, arsenic, and lead. However, this metal is prescribed in such broad terms as to create multiple alloys so widely different in compositions and physical properties that the term loses much significance as a defined metal (Brannt 1896, 141; Hiorns 1912, 151-2). Tombac, sometimes referred to as Prince's Metal or Mannheim Gold, was often used for gilding and creating relatively affordable buttons and accessories (Aikin & Aikin 1807, 347; Piggot 1858; Ure 1875).

4.3.5.2.2 Relating Characterisation Data to Metal Groups

A Microsoft Excel 'IF AND THEN' formula has been developed based on the definitions of copper and copper alloys provided above and applied to the HHpXRF characterisation data gathered in this study (Table 4.5). The composition data for each discrete piece of metal sampled is processed with the formula outlined below, and the groupings of metals identified can be used to further the discussion of material choices and artefact production.

Table 4.5. An IF AND THEN formula developed in Microsoft Office Excel is applied to all HHpXRF sample data to identify general metal groups. Note: all numerical amounts are measured in wt%.

```
=IF(AND(Zn>2,Pb>2,Sn>2,Ag<1),"Leaded Gunmetal",
IF(AND(Cu>94,Sn<1,As<1,Pb<1,Zn<1,Fe<1),"Copper",
IF(AND(Cu>94,Zn<5,Sn<1,As<1,Pb<1,Fe<1),"Lo Zn Copper",
IF(AND(Cu>90,Zn<1,Sn<1,As<1,Pb>1,Fe>1),"Leaded Copper + Fe",
IF(AND(Cu>94,Zn<2,Sn<1,As<1,Pb<1,Fe>1),"Copper + Fe",
IF(AND(Zn>2,Sn<1,Pb<1),"Brass",
IF(AND(Zn>2,Pb>1,Sn<1),"Leaded Brass",
IF(AND(Zn<1,Pb<1,Sn>1,As<1),"Tin Bronze",
IF(AND(Zn<1,Sn>1,Pb>1,As<1),"Leaded Tin Bronze",
IF(AND(Zn<1,Sn>1,Pb>1,As>1),"Arsenic Tin Bronze",
IF(AND(Zn<1,Sn<1,Pb>1,As>0.99,W<1,Ag<1),"Leaded Arsenic Bronze",
IF(AND(Zn<1,Sn<1,Pb<1,As>0.99,W<2,Ag<1),"Arsenic Bronze",
IF(AND(Ag>2),"Hi Silver",
IF(AND(Bi>1),"Hi Bismuth",
"Requires Attention"))))))))))))))
```

4.4 Bringing the Elements of Analysis Together

Altogether, this methodology seeks to apply a multifaceted approach to examine the changing Indigenous use of copper metal on the Northwest Coast between the 18th and 20th century, in order to gain insight on the impacts of the cultural entanglements and colonial impacts that were felt in the region during fur trade and settler periods. To achieve this, primary documents, ethnographic literature, archaeological research, and a detailed material culture study, all of which are focused on the Indigenous use of copper metal, are combined. Special attention is paid to the shifts and changes in the copper materials used by Indigenous communities, the artefacts made from specific materials, the ways specific objects were designed and used, and the culturally contingent meaning and value assigned to objects through their biographical lives (Gosden & Marshall 1999; Kopytoff 1986). The overall goal is to illuminate networks of interaction that the artefacts were caught up in with people (after Tilley 1999; Strathern 1990, 38-9). However, combining multiple lines and scales of evidence in any analysis requires clearly understood terminologies of meaning. Thus, within this chapter the definitions of analysis, the ways in which the analysis is conducted, and the rationale behind these choices are clearly described.

As Gosden and Marshall argue, "the notion of biography is one that leads us to think comparatively about the accumulation of meaning in objects and the changing effects these have on people and events" (Gosden & Marshall 1999, 177). As such, the primary results from this analysis are further examined through the lenses of commodity and network theories with the aim of assessing the broader impacts of colonialism on the Northwest Coast then and now (eg. Foster 2006; Croucher 2011; Knappett 2017). By studying the affordant properties of the objects, and the ways in which these affected and shaped the social relationships constructed around them in particular social spheres (Joy 2009, 552; Croucher 2011, 168; Knappett 2017), this methodology allows some access to the people who gave and give the objects meaning and value.

Chapter 5. Primary Results: Establishing the Groundwork

The biographical study at the heart of this thesis is focused on the Indigenous use of copper metal on the Northwest Coast between the 18th and 20th centuries. To conduct this study, 323 artefacts housed at 14 separate museums and government heritage facilities located in the UK, Canada and the United States of America were physically analysed and chemically characterised as described in Chapter 4. (Table 5.1; see Appendix A & B). It is important to note that many of the objects studied are composite in nature, and that several involve the use of multiple pieces of copper metal. For example, a wooden mask may have been created using multiple brass tacks as embellishments, a necklace may be strung with many copper beads, or a dagger blade may be secured to its handle with multiple copper rivets and embellished with copper sheet. As such, while 323 'artefacts' were studied, in total 721 individual pieces of copper, the primary focus of this thesis, were analysed (Figure 5.1; Figure 5.11).

Table 5.1. The artefacts analysed for this research are housed at several museums in the UK, Canada, and the United States.

Museum of Anthropology, Vancouver, BC, Canada	Museum of Vancouver, Vancouver, BC, Canada
Royal British Columbia Museum, Victoria, BC, Canada	National Waterfront Museum, Swansea, UK
Anchorage Museum, Anchorage, Alaska, USA	National Museum of Scotland, Edinburgh, UK
Vancouver Maritime Museum, Vancouver, BC, Canada	National Museum of the Royal Navy, Portsmouth, UK
British Museum, London, UK	Pitt Rivers Museum, Oxford, UK
Royal Museums Greenwich, London, UK	Liverpool World Museum, Liverpool, UK
Leeds City Museum, Leeds, UK	Museum of Archaeology and Anthropology, Cambridge, UK
Alaska Department of Natural Resources, Office of History & Archaeology, Anchorage, Alaska, USA	University of British Columbia Laboratory of Archaeology, Vancouver, BC, Canada

Figure 5.1. Right: A Kwikwasut'inuxw Kwakwaka'wakw bracelet, Record No. 61, made of multiple pieces of sheet metal that have been worked into cylindrical shapes and then twisted together (Photo by author, ©MOA). Left: A Northern Wakashan Heiltsuk rattle, Record No. 170. The head is composed of two separate pieces of sheet metal used to create either side, joined with rivets and fixed to the handle using multiple nails (Photo by author, ©RBCM).

Figure 5.2. Wuikinuxv metal mask, Record No. 98, composed of three separate pieces of copper sheet metal fixed together with multiple rivets, worked into shape, and painted (Photo by Author, ©MOA).

Within this biographical study, the focus lies specifically on the copper metal that is used in the making of each object, and not necessarily on the object as a whole. Instead, for example, a carved wooden dance mask or a labret, into which copper metal has been applied or inlaid, can be thought of as the substrate, providing insights and context to the social setting in which the copper inlay, decorative tacks, rivets, and/or nails, and so on were used. The copper and copper alloy pieces are closely analysed, considering material choice, processes of production and use, and what these qualities communicate about Indigenous copper use through the fur trade and colonial periods.

Table 5.2. The number of copper metal pieces analysed, and their relation to the Northwest Coast Indigenous artefacts they have been used to create.

Object Type	# Cu objects
Arrowhead	20
Awl/Spike	2
Bead	61
Bracelet	79
Buckle	2
Club	5
Copper (whole, fragments, fixed to a staff)	129
Dagger Blade	4
Embellishments & Inlay (horn spoon, mask, frontlet, dagger, bow, figurine)	130
Fish barb/Fish Hook/Harpoon point & toggle	8
Point/Knife Blade/Blank	4
Metal Mask	4
Nail (alone or used in the construction of a Copper, and a bentwood box and a dish)	9
Ornament/Blanket Hook	3
Pendant	15
Pipe Pin	1
Pull Ring/Swivel	2
Rattle	18
Ring	7
Rivets (arrow, club, Copper, dagger, fish barb, horn spoon, rattle)	92
Tack (carved wooden dish, horn spoon, mask)	72
Salt Spoon	3
Tinker (alone and strung: leggings, apron, wristlet)	19
Metal Vessel/Dish	6
Wire (bentwood box, feast dish, horn spoon, pipe)	7
Worked Metal Fragment	19
Total	721

5.1 Defining the Results

To deal with issues surrounding the inextricably entangled aspects of design and function for each artefact and its potentially numerous component parts, the specific objects included in each analysis are qualified for clarity (after Shanks and Tilley 1992; Pfaffenberger 1992). This makes it possible to consider the constituent copper pieces used to create an artefact, as well as the artefact as a whole. For example, the metal that makes up the body of an object such as a Copper or dagger, and any copper rivets and nails that may be involved in the artefact's construction, can be considered together or separately to gain insight into possible connections between such things as specific production practices, and preferences in style and material choice (after Gosden & Marshall 1999; Rosenthal 1995; Carr & Neitzel 1995; Van Oyen 2013).

Museum records and research documents regarding the analysed objects provide context such as provenance, culture group affiliations, who made and used the objects, and dates of sale and donation to museums. Some museum objects retain records regarding identification through primary accounts of acquisition, and others have been identified by people such as current Indigenous community members who collaborate with museums, museum curators, and academic researchers. In this research, culture group attributions were largely accepted, however in cases where this information is dubious or remains unknown the objects are provenanced more broadly to the 'Northwest Coast'. All visualisations of the data presented in this thesis that discuss specific ethnolinguistic groups can be read left to right on the X axis, begin with this generalised' Northwest Coast' group followed by each relevant group as they roughly reside on the Pacific Northwest geographically from north to south. Thirty of the artefacts analysed are provenanced to neighbouring regions and culture groups such as some Inuit communities, to contribute further context to Indigenous copper use in the study region. These objects were chosen for analysis based on the argument that assigned borders of cultural regions are often notional at best, and people can and do travel and interact with a wide range of different people, cultures, and materials (Donald 2003).

Each artefact included in this study is assigned an individual 'Record Number' which is correlated with the records for each artefact as they are logged in the Filemaker Pro Database located in Appendix A (see USB drive). As the objects can be composite in nature and involve multiple pieces of copper, each individual metal piece used in the making of an artefact is assigned a discrete Analysis Unit Number (AUN). In this way, the specific copper materials and processes of use can be considered individually, or as part of the whole. Within the Database, each record contains detailed photographs, object metrics, any additional known historical information, a comprehensive description, an analysis of production and use processes, the specific location on the copper pieces of each artefact where chemical characterisation sampling was conducted, and the metal types identified. The information regarding each piece of metal, including trace element measurements and processes of production and use, is correlated to the AUN number and presented as a spreadsheet in Appendix B.

In order to further contextualise the chemical characterisation, five native copper samples from western North America, specifically the St. Elias Mountain Range, Cape Prince of Wales Alaska, and mid Arizona are also included. These provide a reference for trace elements of antimony, silver, bismuth, cobalt, iron, and vanadium present in native copper nuggets from eastern North America and are consistent with values in the literature (Craddock 1995; Dussubieux *et al.* 2008; Pernicka 1999; Appendix B). A selection of maritime objects such as copper vessel sheathing and bolts contemporary with metal traded to Indigenous peoples on the Northwest Coast are also characterised as a reference collection (see Maritime Metals Comparison, pg. 216 of this Chapter; Appendix C)

5.2 Primary Data: The First Steps

Form, spatial distribution, cultural affiliations, and chronology are considered here as axes of variation used to distinguish past social actions at specific points in time and space (Carr & Neitzel 1995, 3; Wiessner 1989, 58). Attention is paid to the accumulated actions that make up a whole, following the "microdynamic processes behind stylistic variability, distribution, and change", as discussed by Carr and Neitzel (1995, 5). As style cannot be separated from technology (Conkey 2006, 361; Dietler & Herbich 1998, 244), this study begins by considering the technological characteristics of the copper and copper alloy metals. This includes the physical qualities of the materials chosen for the construction of specific artefacts, and ways in which the metal is worked, decorated, and used. Temporal sequences of creation and use are noted wherever possible, making visible the discrete and shared traits of Indigenous makers through time.

A broad assessment of production and use trends visible on the surfaces of the 721 pieces of copper metal is bolstered by a characterisation of the metal alloys used in construction of these artefacts. It is important to note that this sample set of metals will never be a comprehensive list of all the alloy types present in the area. The types and quantities of alloys identified within the sample set are described. The implications of an alloy's elemental composition, and associated mechanical properties, within the context of known Indigenous metallurgical practises used on the Pacific Northwest is also addressed. This data is further explored in Chapter 6 through targeted analysis of assemblages of artefacts, identifying stylistic traits across multiple classes of objects and the social processes of the people who made and used these artefacts (after Rosenthal 1995, 363; Van Oyen 2013; Gosden & Marshall 1999).

5.2.1 Physical Analysis

Using the idea of 'style' to link particular attributes to general processes can be quite ambiguous, therefore style must be interpreted rather than read as an indicator of past conditions (Hodder 1990, 46). As such, each of the copper and copper alloy pieces that make up the objects included in this study are inspected with specific attention paid to the sequences in which tool and wear marks accumulated on the bodies of each piece of metal. Traits such as cutting, grinding and polishing, specific shaping strategies, the types of seams used to fix multiple metal pieces together, decoration strategies and so on (defined in Chapter 4; Untracht 1968; Tushingham *et al*. 1979, Lechtman 1988, and Li *et al.* 2011), reveal decisions of past makers and users (Rosenthal 1995, 349).

These quantified processes have each been given an abbreviation, for example 'hammering and shaping' is abbreviated to 'H&S'. As artefacts are assessed, the production processes visible on the objects are recorded using these definitions. Additionally, these traits represent an ordered decision-making, and subsequent manufacturing process, that can be detected and interpreted (Rosenthal 1995, 349). Therefore, as artefacts are assessed, a temporal sequence of processes is assigned. For example, a copper bead made of sheet metal could be identified as having been cut from a larger piece of metal, hammered and shaped into a hollow cylinder, potentially with the help of a form, and then polished and combined with other materials to produce a necklace. This bead would be assigned the ordered sequence 'Cut, Hammered & Shaped/Circular or Cylindrical (in shape), Ground &/or Polished, Strung' (C,H&S/Cr,G/P,S). These sequences of construction and use are part of a strategy of object assessment used to compare production and consumption processes, both among objects typologically similar, and across assemblages of different objects in order to show a range of differing trends in Indigenous practice.

Given the contingent nature of material culture, the study of style is complicated by the uncertainty surrounding which elements are important indicators of socially driven choices, and at what scale each of these processes had an impact (Carr & Neitzel 1995, 7). Furthermore, stylistic variation within a sample set cannot necessarily be interpreted in a straightforward manner, as patterns change based on any number of social conditions (Wiessner 1989, 63; Lechtman 1977). Thus, a large sample set, contextualised with additional data gathered from other sources such as the literature analyses conducted in Chapters 2 and 3, allows the conclusions drawn from this material analysis to be cross-checked against other categories of evidence pertinent to Indigenous copper use on the Northwest Coast (Wiessner 1989, 63; Conkey 2006).

5.2.1.1 Production Processes Assessed

The frequency of production and use processes as they are detected among artefacts created and used by the Indigenous communities of the Northwest Coast have been considered spatially (Figure 5.3). The total number of production and consumption processes is included on the y-axis, and the total number of copper pieces provenanced to each ethnolinguistic culture group is included on the x-axis for more context. All judgments are tempered by the specific amounts and types of samples included. For example, among the 'Interior Salish' some very common processes such as grinding and polishing appear to be absent, however this culture group is only represented by a single copper bead excavated from a site at Vaseux Lake, British Columbia (Record 123). In order to deal with small sample sizes that can be misleading, only culture groups and production and consumption processes with a sample size larger than 10 are included.

There is an increased range of processes employed among certain culture groups across the Northwest Coast. Specifically, Tlingit, Haida, Kwakwaka'wakw, and Coast Salish makers appear to have applied a wider variety of copper manipulation techniques during artefact creation. This is likely influenced by the relatively large number of samples within these groups. Some processes such as cutting, grinding and polishing, shaping through percussive hammering, and mechanical application of copper metal onto other composite objects are consistently found across the region, suggesting the strategic tasks in this *chaîne opératoire* study show social linkages through maintained and repeated metallurgical practices through time across the region (Schlanger 2005, 27; Lemonnier 1992). The types and relative amounts of artefacts created by specific culture groups is shown in Figure 5.4, further supporting the range of objects that could be created by employing similar movements and technological strategies. .

Table 5.3. Terminology of Production Processes.

Process	Abbreviation	Process	Abbreviation
Cut	C	Split	Sp
Cast	Cst	Ground & Polished	G/P
Carved	Ca	Engraved	En
Perforated	Pf	Painted	Pt
Manufactured from Bar Stock	MBS	Stamped	Sm
Twisted/Coiled	T/Co	Soldered	Sd
Glued	Gl	Plated or Gilded	Pla
Inlay	In	Mechanically Applied	MA
Hammered & Shaped	H&S	Mechanically Joined	MJ
Repoussé	H&S/R	Fixed (rivets, staples, etc)	MJ/F
Chased	H&S/Ch	Twisted/Coiled	MJ/Co
Bent	H&S/B	Lap Seam	MJ/LS
Hemmed	H&S/H	Countersunk Lap Seam	MJ/CLS
Circular/cylindrical	H&S/Cr	Flat Lock Seam	MJ/FLS

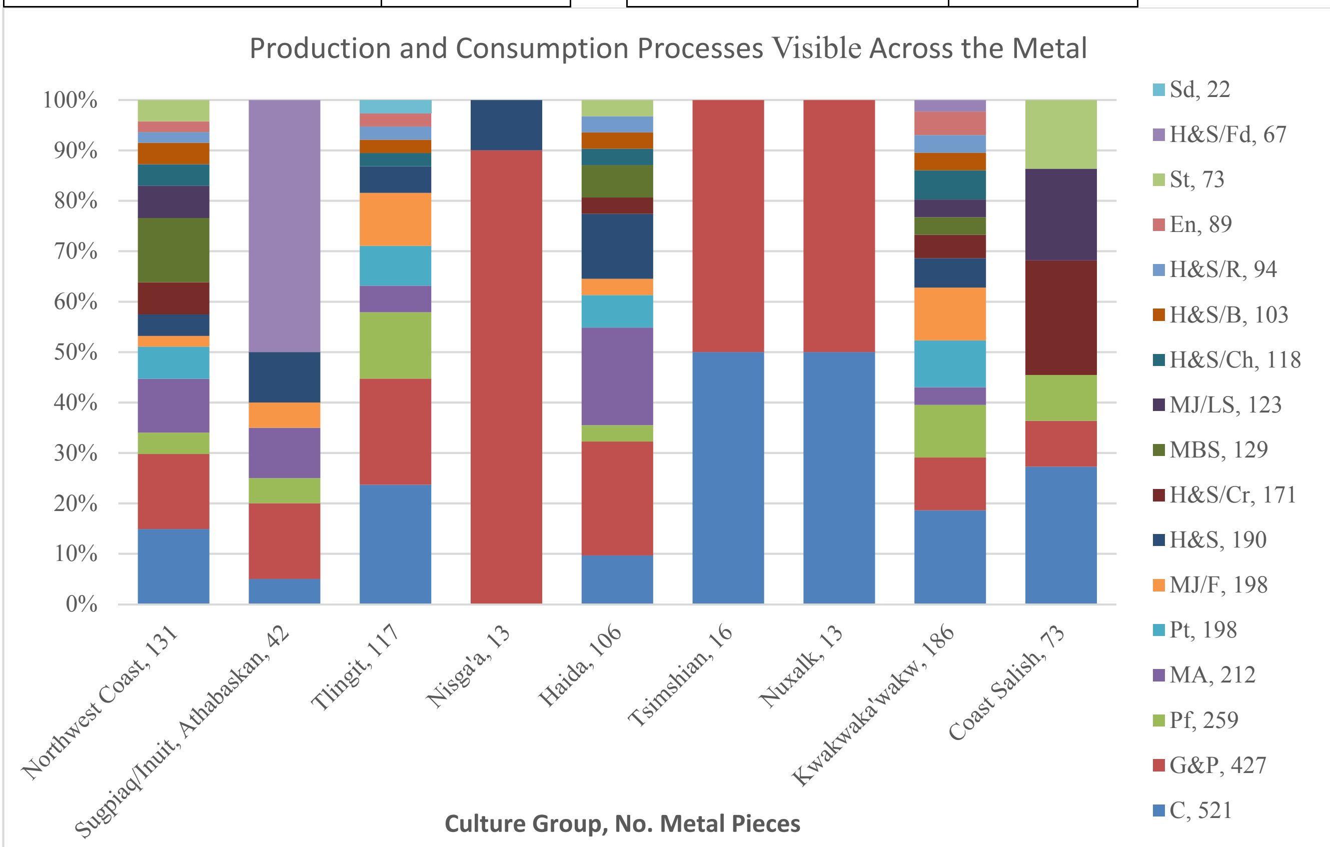


Figure 5.3. The frequency of production processes used in the creation of Indigenous copper artefacts on the Northwest Coast. The total number of copper pieces attributed to each culture group are included on the x-axis label, and the total number of physical processes identified on bodies of each object are included in the legend. Only culture groups and construction and production processes with a sample size ≥ 10 are included.

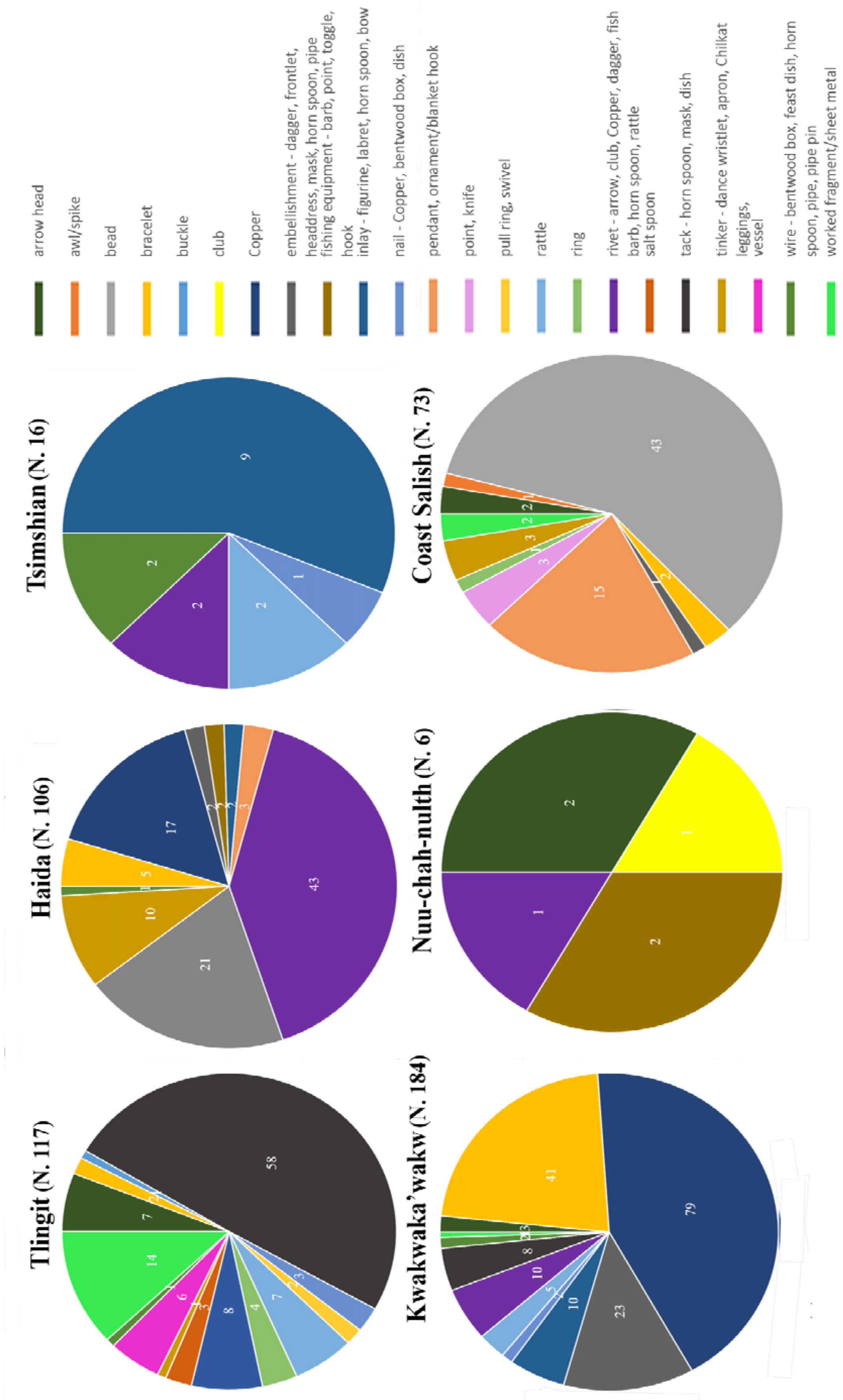


Figure 5.4. Pie graphs showing the types of artefacts created by a selection of the ethnolinguistic culture groups residing the Northwest Coast that have the widest range of copper production and use processes.

While some artefacts have been recovered from known pre-contact contexts such as a Stó:lō Coast Salish pendant excavated from the Qithyil (Scowlitz) Site (Record 212), and some are known to be from a more modern origin, such as a copper rattle created by Kwakwaka'wakw Chief Willie Seaweed who lived from 1873 to 1967 (Record 211), many objects are only known to have been created and used at some point between the 18th and 20th centuries. The spread of artefacts, as well as the persistence in similar metallurgical techniques throughout the region has significant implications for the interpretation of Indigenous metallurgical traditions in the region. Additionally, all the processes identified are compatible with the cold working techniques such as hammering or folding, with periodic annealing, as outlined by Franklin (*et al.* 1981) and Vernon (1990). These strategies appear to be consistent prior to and throughout the fur trade and colonial period, despite the uptake of a range of manufactured trade metals. This suggests that, although material procurement was changed over time due to a number of social and colonial pressures (Boyd 1999; Parezo & Fowler 2007; Pöhl 2008; Sewid-Smith 1991, 22-23), metallurgical practices of making were maintained (after Lemmonier 1992; Roux 2016; Schlanger 2005).

John Jewitt, as vessel metallurgist and Nuu-chah-nulth hostage in the early 19th century, provides further support for this argument (see Chapter 3). While he was kept alive and held captive in order to exploit his metallurgical skills, he was made to conform to Indigenous ways of making, including using Indigenous tools (Stewart 1987, 34-5). European, Russian, and American pyrometallurgical technologies were not unknown to the Nuu-chah-nulth, in fact Captains Gray and Kendrick established a forge on the shores of Nootka Sound in 1789 to more efficiently produce metal objects for trade (Howay 1941, 59-69). Therefore, these choices may be signalling particular social constraints instead of being solely founded in technical or manufacturing considerations (Rosenthal 1995, 345; Hodder 1982).

This persistence of traditional production methods does not suggest that the culture groups of the Pacific Northwest are static or rigid. People and cultures are always in a state of becoming, and evidence of innovation and flexibility among Indigenous communities through time is a hallmark of the historic record of the fur trade and colonial period on the Northwest Coast region. This ranges from the Nuu-chah-nulth Chief Maquinna, and his attempts to make the presence of fur traders with colonial interests in his territory a lucrative endeavour for himself and his people (Kirk 1986, 203), to the kitsch versions of important artefacts produced for sale to tourists interested in 'authentic' Indigenous souvenirs (Mullins & Paynter 2000; Cassel & Maureira 2017; McCormick 2013).

Overall, this broad assessment of the copper production and use processes detected across the Northwest Coast focuses on the micro-processes behind stylistic variability among and between groups of materials and objects (Carr & Neitzel 1995, 5). Style is compared across space and time while considering the social conditions of their biographical life. The aim is to reveal quantitatively and qualitatively measurable uses of style, in order to perceive what each discrete piece of metal, the marks of manufacture and use on them, and the overall object the metal is used to create, communicates to its audiences through time (after Wiessner 1989, 58; Rosenthal 1995, 346). This analysis is expanded upon in Chapter 6.

5.2.2 Material Characterisation of Copper Artefacts

The characterisation data has been processed into metal groups using the Excel formula defined in Chapter 4. The presence of iron is often identified, but this is not generally considered a major factor in defining the metal groups. It is unclear from this surface analysis whether the iron content is related to the specific alloy mixture, corrosion, or the iron rich soils in which certain artefacts rested. Iron is generally soluble in copper alloys in concentrations up to 4% (Scott 1991, 24). Iron can also potentially promote galvanic corrosion and accelerate dezincification in brasses however, a factor which is considered during analysis. It is worth noting that some European alloy producers operating through the 18th and 19th centuries understood that a small amount of iron (ca. 0.5-2.0 wt%) added to the mixture, along with an equal amount of nickel, enhanced corrosion resistance in maritime environments, indicating that at least some of the iron-enriched samples within this study may have been intentionally created (Davis 2001, 400-402; Craddock & Meeks 1987; Flick 1975; Muntz 1832).

The majority of the copper pieces used in the construction of each of the assessed artefacts have been characterised using a HHpXRF device. In some cases, all of the metal could not be characterised due to artefact-specific issues. These range from the inability to confidently reach the metal with the device due to its placement inside of a dance mask (Record 134), to the very large number of individual tacks applied to the surface of a dance mask which were impractical to sample in a timely manner (Record 304, Figure

5.11). However, consistencies and inconsistencies in physical appearance and perceived processes of production and use visible on metal pieces that have not been characterised are also noted.

Table 5.4. The 14 copper and copper alloy metal groups identified within the HHpXRF sample data generated within this project.

Metal Group	Total	Metal Group	Total
Arsenic Bronze (+Fe)	122	Copper Metal (+Fe)	397
Brass (+Fe) Lo Zn Copper (+Fe) Admiralty Brass (+ Fe) Alpha Beta Brass Alpha Brass	59	Leaded Brass (+Fe) Leaded Lo Zn Copper (+Fe) Leaded Admiralty Brass (+Fe) Leaded Alpha Beta Brass Leaded Alpha Brass	84
Leaded Arsenic Brass (+Fe)	7	Leaded Arsenic Bronze (+Fe)	14
Leaded Copper (+Fe)	14	Leaded Gun Metal	6
Leaded Tin Bronze (+Fe)	4	Tin Bronze (+Fe)	4
Leaded Zinc Arsenic Bronze Leaded Lo Zn Arsenic Bronze (+Fe)	7	Lo Zinc Arsenic Bronze (+Fe)	5
Hi Silver	2	Tombac	2

5.2.2.1 Arsenic Bronze (122 Samples)

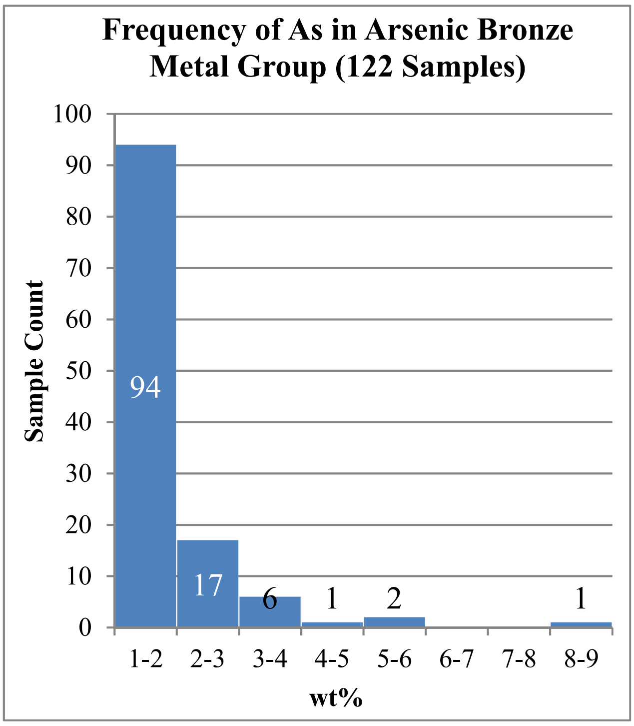


Figure 5.5. The frequency of As concentrations recorded within the Arsenic Bronze group in this data set.

Within this body of data, the majority (77%) of Arsenic Bronze samples contain between 1-2 wt% arsenic. Alloys containing more than 4 wt% arsenic would be increasingly difficult to cold work (Lechtman 1996, 492-4; Charles 1967, 23). As such only four samples exceed this level, and no samples containing >9 wt% arsenic were found (Figure 5.5). This suggests that the majority of the arsenic bronze metal chosen for use on the Northwest Coast was able to be readily manipulated using cold working techniques. In fact, 51% of the sampled artefacts created with this alloy are bracelets and beads, which benefit from metal that can withstand large amounts of plastic manipulation and cold working during production, as the metal is folded, twisted, and even coiled in some cases, without becoming brittle (Figure 5.1; Charles 1967, 23; Lechtman 1996, 492).

5.2.2.2 Copper Metal (392 Samples)

392 of the metal pieces associated with artefacts sampled are consistent with the Copper Metal group. This metal group is the largest sample set in the study, encompassing ca. 54% of the overall material culture study sample set. This is potentially due to a number of factors. For example, Northwest Coast communities began creating artefacts using native copper, which would be consistent with this categorisation, prior to the fur trade period (Cooper 2011; de Laguna 1972; Acheson 2003). Additionally, metal consistent with this group's compositional range, characterised as 99 wt% Cu and <1 wt% of any additional elements, was being manufactured across Europe and Asia by the late 18th century and would have been part of the trade materials arriving on the Northwest Coast (Goskar 2013; Percy 1861; Gore 1784).

The five native copper reference samples included in this study are consistent with Copper Metal (Records 40, 258, 270, 271, 272). The trace elements detected in the native copper samples, consisting of antimony, silver, bismuth, cobalt, iron, and vanadium allow for some informed interpretation of the samples within this group, and whether the metal is likely to be native or manufactured, However, it is important to remember that, as industrial technologies developed in the mid-20th century, manufacturers were able to more strictly control alloying elements and produce very pure copper metal (McCarthy 2005; Hay 1863). As such, copper that is very chemically pure, lacking sub 1% traces of silver, vanadium, and iron could also indicate metals manufactured from the mid-20th century onward.

Ca. 19% of the Copper Metal group, consisting of 74 discrete determinations of the 392 Copper Metal pieces sampled, contains no detectable traces of tin, zinc, arsenic, lead, or nickel, the trace elements most commonly found in manufactured copper and copper alloys in the 18th to 20th century, while retaining detectable amounts of antimony, silver, bismuth, iron, cobalt and vanadium indicative of native metal (Keddie 2004; Wayman *et al.* 1992; Bingeman *et al.* 2000; Cooper *et al.* 2016). As at least ca. 81% of the Copper Metal group is potentially manufactured in origin, and ca. 90% of the overall sample of all metals is consistent with manufactured alloys, this suggests that the majority of Indigenous copper artefacts created on the Northwest Coast from the fur trade period onward are created from manufactured trade metals.

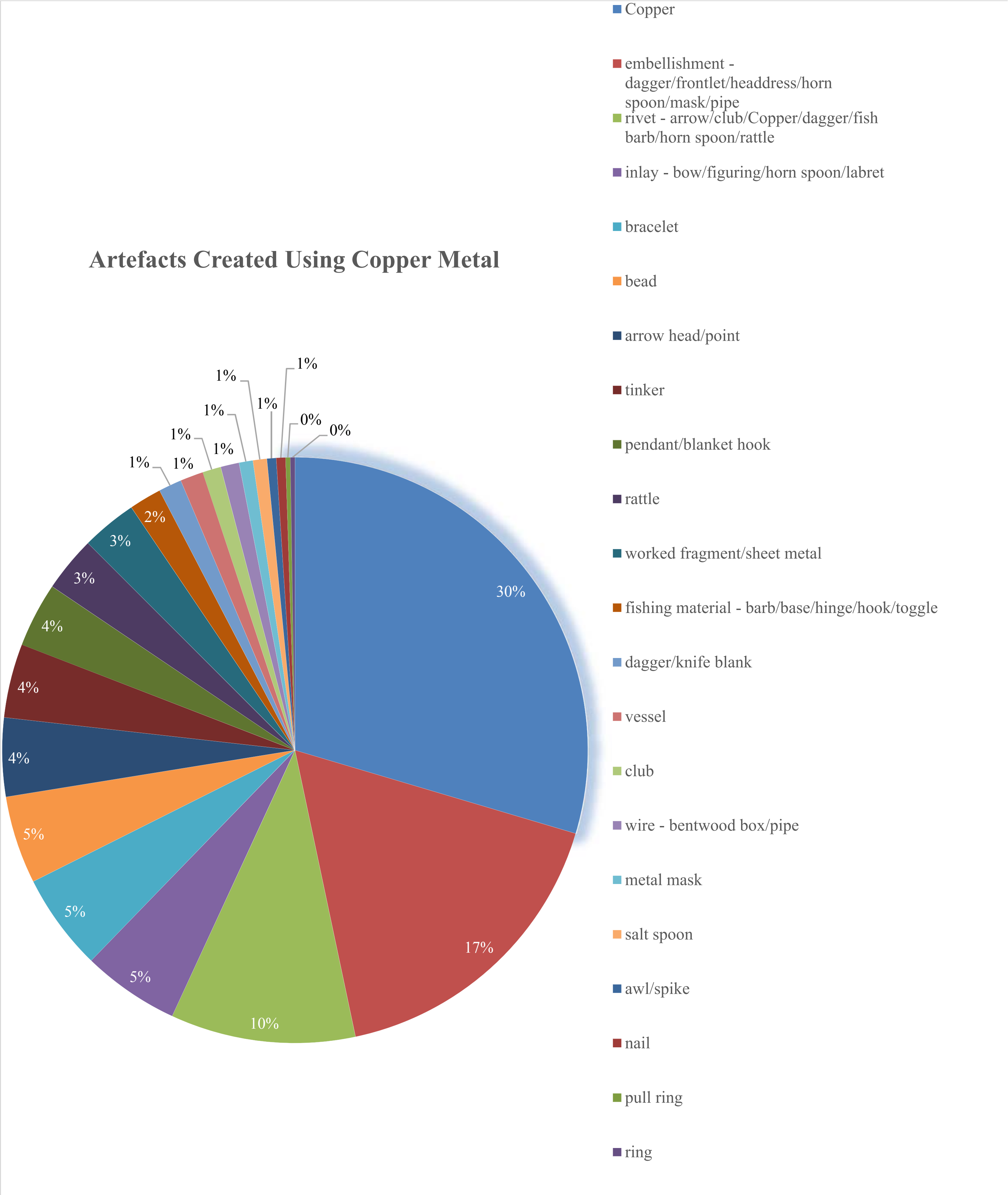


Figure 5.6. Percentage of artefacts created using metal characterised as Copper Metal.

Ca. 61% of all the artefacts analysed have been created, at least in part, using Copper Metal. Of these, ca. 30% are composite in nature and may involve either or both additional alloys in the artefact's construction or other material such as wood or animal horn. Manufactured tacks, which represent ca. 10% of the entire sample, are the only artefact type analysed that are not found in the Copper Metal group. Coppers, meaning the artefact type, are the most well represented artefact within this metal group. In fact, of the 57 Coppers analysed, ca. 90% of them are constructed, at least in part, using Copper Metal. However, only six of these 57 metal pieces could potentially be chemically consistent with native metals, and of these six at least four pieces are visually consistent with rolled copper sheet metal with a consistent thickness and smooth surface.

Artefacts provenanced to every ethnolinguistic group except the Haisla have been created using metal consistent with the Copper Metal group. This single inconsistency is likely due to the fact that only a single Haisla object is included in this study, a mountain goat horn spoon that has been mechanically joined using brass rivets (Record 208). Should a larger number of Haisla artefacts be included in this study, this outlier could be clarified.

5.2.2.3 Brass (59 Samples)

Lo Zn Copper (+Fe) – 9 Samples
Admiralty Brass (+ Fe) – 1 Sample
Alpha Brass – 46 Samples
Alpha-Beta Brass – 3 Samples

Fifty-nine of the metal pieces sampled are consistent with the Brass metal group, which is further divided into a number of sub-categories. Iron is detected in all but one of the samples within the Brass group, often in levels <1 wt%. Seven samples contain <1 wt% Fe, with two samples exhibiting notably high iron levels, though none exceed 7 wt%. One high-Fe sample represents the only example of Admiralty Brass within the sample set, while the other is categorised as Low-Zinc Copper. However, it is possible that the high Fe readings are related to deposits on the surfaces of the metal (Brannt 1896, 153-4; Henley 1916; Hiorns 1912, 139, 158-60).

Zinc has been characterised at levels between 1-5 wt% in nine of these samples, which are categorised as Low-Zinc Copper (Brannt 1896; Davis 2001). A trace amount of iron is determined in all of the Low-Zinc Copper samples, though only three samples exceed 1 wt%. Of the nine metal pieces, four contain <1 wt% As, and three contain <0.3 wt% Ni potentially indicating an attempt to improve the corrosion resistance of the metal.

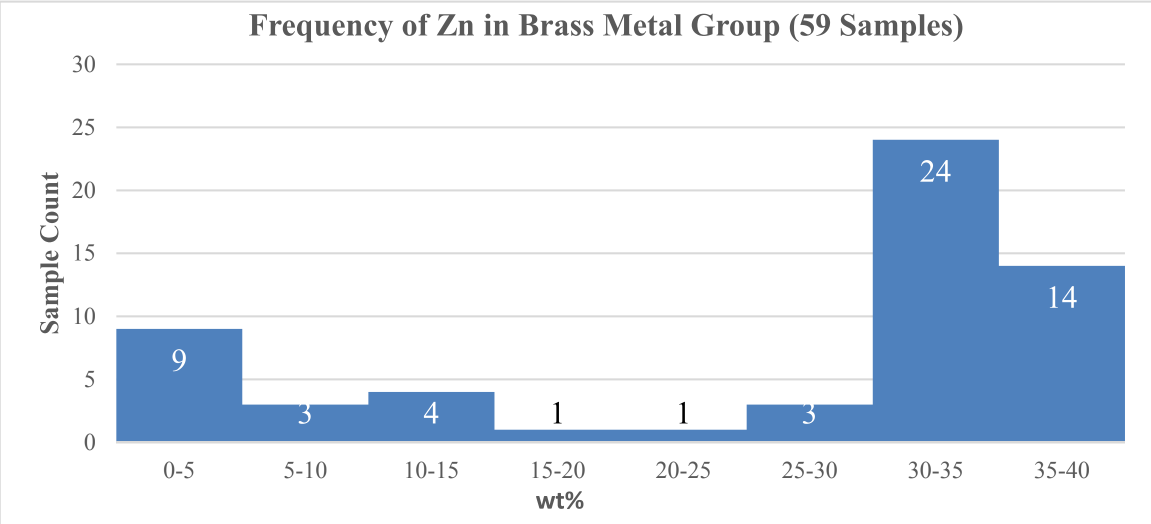


Figure 5.7. The frequency of zinc concentrations recorded within the Brass group.

Forty-six of the 60 Brass samples are characterised as Alpha Brasses, with detected Zn levels between 5-37.9 wt% and a much more yellow colour (Hosler 1994). Within the sub group of Alpha Brasses, 11 samples were found to contain between 5-30 wt% Zn, while 35 samples contained between 30-38 wt% Zn (Figure 5.7; Callcut 1996, 18; Ashkenazi *et al.* 2011, 2413; Davis 2001, 7-8). Three samples are determined to be Alpha-Beta Brasses, but none exceed 39 wt% Zn and all have been identified as a manufactured tack or rivet (Brannt 1896, 151; Flick 1975; Muntz 1832). The increased hardness and difficulty to cold work alpha-beta brasses could have contribute to the low number of characterisations within the sample set.

During physical analysis, 63% of the sample has been identified as originating from manufactured bar stock, with 70% of these represented by tacks or rivets (Figure 5.8). Based on the frequency of brass alloys used to create artefacts on the Northwest Coast, there appears to be a preference towards Alpha Brasses with higher zinc contents. It is possible that brass bar was chosen by Indigenous makers due to its physical qualities of workability and distinct yellow colour. However, it is also possible that a preference for high-zinc bar for trade originated in Eurasian settings, as it was cheaper than copper bar to produce (Knight 1973, 293; McCarthy 2005, 105) and a greater profit could be made if accepted by Indigenous peoples. This has implications for understanding shifts in the relative value of materials and objects as they move between Eurasian and

Indigenous spheres of use (Croucher 2011, 168; Knappett 2017; Foster 2006, 285; Tomlinson 1999, 2).

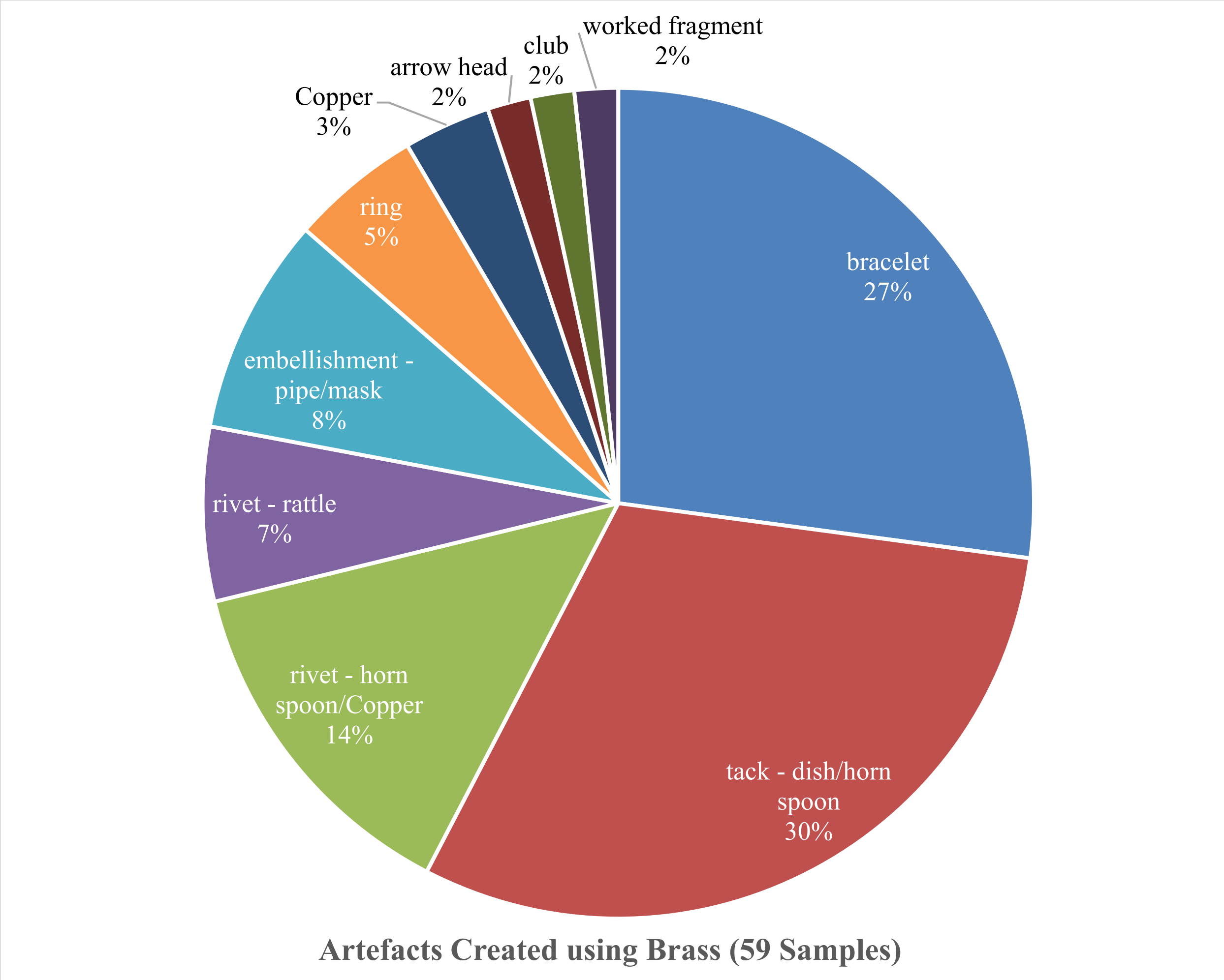


Figure 5.8. Percentage of artefacts created using metal characterised as Brass.

5.2.2.4 Leaded Brass (84 Samples)

Leaded Lo Zn Copper (+Fe) – 11 Samples
Leaded Admiralty Brass (+Fe) – 2 Samples
Leaded Alpha Brass – 56 Samples
Leaded Alpha-Beta Brass – 15 Samples

Eleven of the leaded brass samples are consistent with Leaded Low-Zinc Copper, and of these eleven samples nine are rivets. Fifty-six samples have been determined to be Leaded Alpha Brass, and of these samples 73% contain between 30 and 37.9 wt% Zn. 75% of the Leaded Alpha Brass sample is composed of tacks, rivets, and wire. Two examples of Leaded Admiralty Brass are identified in this study, both of which are tacks, and were chemically characterised at between 30-32 wt% Zn, ca. 1 wt% Sn, ca. 2 wt% Pb (Callcut 1996; University of Florida 2013; Figure 5.9). Fifteen of the overall sample group are consistent with Leaded Alpha-Beta Brass, with Zn levels between 39-55 wt%.

Twelve of the 15 Leaded Alpha-Beta Brass samples have been identified as tacks or rivets (Figure 5.10). Overall 71% of the entire leaded brass group has been identified as originating from manufactured bar stock, and of these, 80% are recognised as manufactured tacks or rivets.

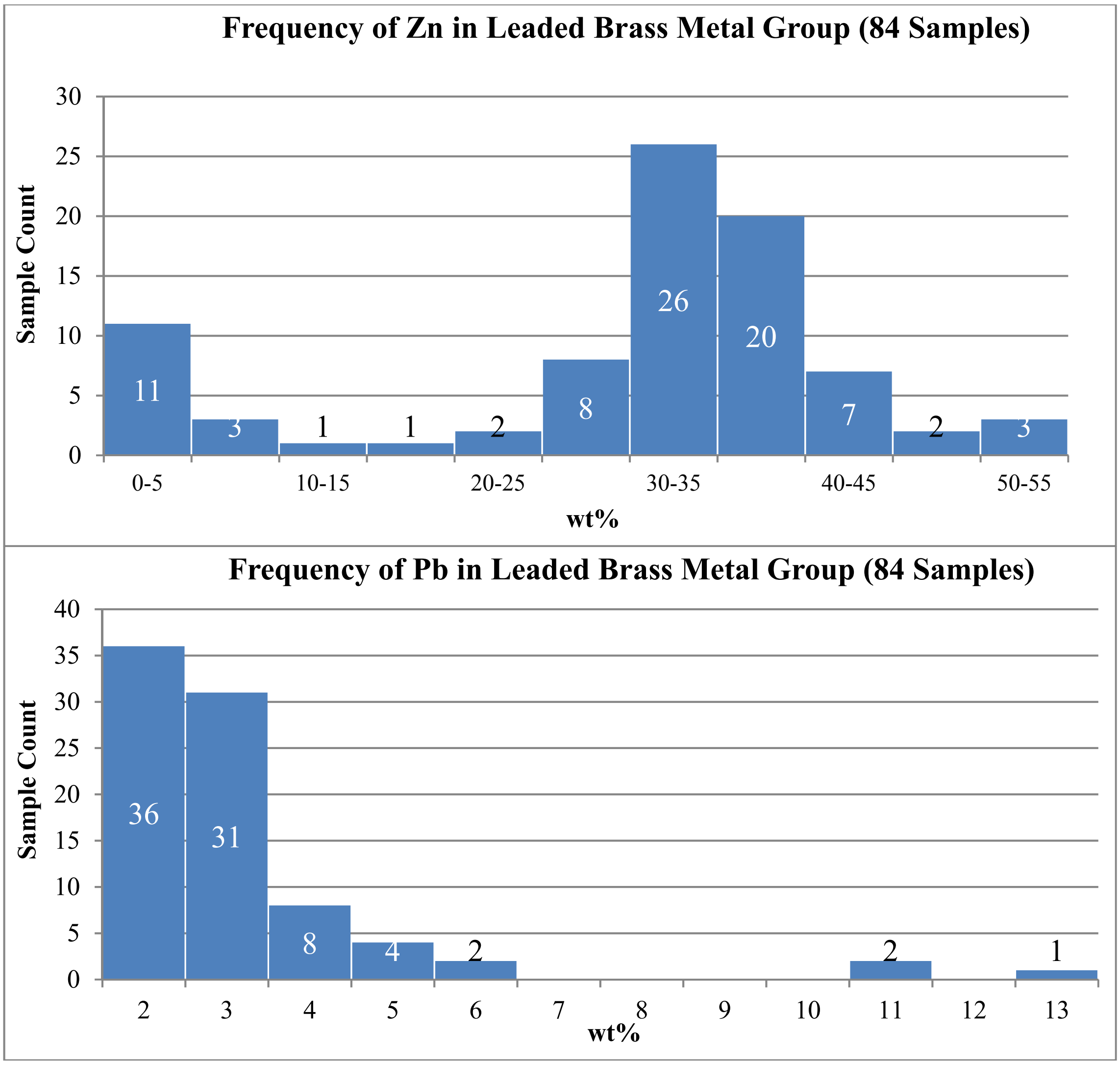


Figure 5.9. The frequency of zinc and lead concentrations recorded within the Leaded Brass group.

Lead may potentially have been added to the brass alloy to mitigate increasing hardness as Zn levels increase, however high lead levels cause copper alloys to become brittle when cold worked (Davis 2001, 46-51). Within this sample set 80% of the metal pieces have been characterised at between 1-3 wt% Pb. Additions in these concentrations would facilitate cold working of the metal. Fourteen samples contain between 3-5 wt% Pb, increasing the possibility of brittle fracture during cold working (Davis 2001, 46-51). Three samples contain between 10-13 wt% Pb and all three are manufactured tacks. It is possible that the high lead levels detected on these three tacks is related to deposits of the element on the surface.

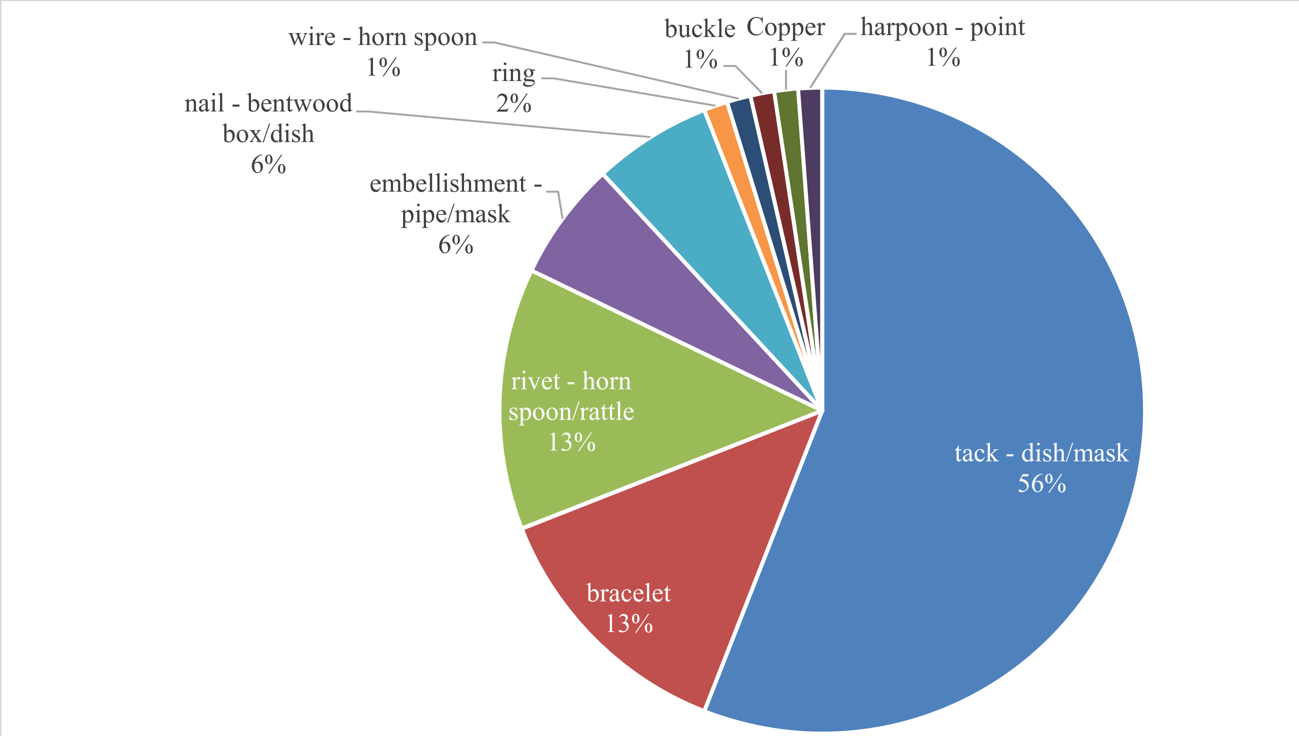


Figure 5.10. Percentage of artefacts created using metal characterised as Leaded Brass alloy.

5.2.2.5 Leaded Arsenic Brass (7 Samples)

Leaded Arsenic Alpha Brass – 5 Samples
Leaded Arsenic Alpha-Beta Brass – 2 Samples

Five of the seven samples within this metal group are determined at between 1-3 wt% As, while two samples contain between 5-6 wt% As. The zinc levels of five of the seven samples are consistent with an Alpha Brass, while two samples are an Apha-Beta brass and contain ca. 40 wt% Zn. The arsenic provides some dezincification protection, and lead additions may be present to retain ductility in the metal despite the increased hardness provided by the arsenic and zinc (Charles 1967, 23; Davis 2001, 46-51). There does not appear to be any correlation evident between the relative concentrations of zinc, arsenic, or lead in this metal group.

Table 5.5. The trace elements characterised in the Leaded Arsenic Brass metal group.

Record No.	AUN	Culture Group	Artefact Type	Pb	As	Zn	Sn	Bi	Ni
304	669	Haida	tack - mask	6.976	2.139	28.265	0.052	0.174	ND
304	673	Haida	tack - mask	13.742	1.769	26.796	ND	ND	ND
304	675	Haida	tack - mask	12.911	1.978	40.134	0.453	ND	ND
304	676	Haida	tack - mask	28.383	5.385	29.874	0.271	ND	0.205
304	680	Haida	tack - mask	5.622	1.219	40.164	ND	0.115	ND
304	682	Haida	tack - mask	22.705	2.482	29.440	ND	0.212	0.068
304	686	Haida	tack - mask	30.375	5.734	25.136	0.305	0.235	ND

Figure 5.11. Carved wooden dance mask, provenanced to the Haida (Record No. 304). This mask has been decorated with 132 separate manufactured tacks, 21 of which have been chemically characterised (Photo by author, ©Friends of the British Museum).

Lead levels recorded within this metal group are very high, with two samples determined between 5-7 wt%, while the five other samples were found to contain between 12 and 30 wt% Pb. All seven samples constitute manufactured tacks used to embellish a single dance mask (Record 304; Figure 5.11). Given the apparent consistency of form among these tacks, and the wide range of lead concentrations across the sampled selection, it is possible that this element is concentrated on the surface of these tacks. This could potentially have occurred if, for example, a leaded hammer was used to apply the tacks or if leaded pigments were used in the objects creation (Miller *et al.* 1990; Moffat *et al.* 1997, 44-45).

5.2.2.6 Leaded Arsenic Bronze (14 Samples)

Arsenic levels detected in the ten samples identified as Leaded Arsenic Bronze are below 3 wt% and none exceed 5 wt%. This means that, while the metal is harder than pure copper, it can be cold worked and annealed in cycles similar to the Arsenic Bronze group (Lechtman 1996, 492-4; Charles 1967, 23). The majority of lead concentrations detected within this metal group lie between 1-2 wt%, with only three samples exceeding this amount, and none with levels above 6 wt%. These amounts of lead would not have detrimentally affected cold working processes (Davis 2001, 46-51). Additionally, the single piece of metal characterised at greater than 5 wt% Pb is a rivet used to fix a mountain goat horn spoon handle and bowl together, along with eleven other rivets determined to be a mix of different alloys (Record No. 178, AUN325). Of these eleven rivets, four have very high detectable levels of lead (between 5 and 11 wt%), and seven of the eleven are considered 'leaded'. As such, it is possible that these rivets are showing lead segregation, or that there is some lead present on the surface of the metal. Surface accumulation of lead could potentially be caused by the use of a lead hammer or pigment for example (Moffatt *et al.* 1997).

Table 5.6. The trace elements characterised in the Leaded Arsenic Bronze metal group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb	As	Zn	Sn	Ni
102	175	Coast Salish: Stó:lō: Yale	bead	1.649	3.926	ND	ND	ND
103	176	Coast Salish: Stó:lō: Yale	bead	1.400	3.496	ND	ND	ND
108	181	Coast Salish: Stó:lō: Yale	bead	1.817	3.487	ND	ND	ND
112	185	Coast Salish: Stó:lō: Yale	bead	1.679	4.235	ND	ND	ND
114	187	Coast Salish: Stó:lō: Yale	bead	3.072	2.563	ND	ND	0.271
126	199	Coast Salish: Musqueam	point	1.755	1.644	ND	0.123	0.212
172	318	Haida	rivet - horn spoon	1.230	2.572	0.944	ND	ND
178	325	Haida	rivet - horn spoon	5.729	1.027	0.392	ND	ND
178	332	Haida	rivet - horn spoon	1.144	2.996	0.460	ND	ND
202	392	Coast Salish: Fraser Valley region	bead - strung	1.783	0.993	ND	ND	ND
202	394	Coast Salish: Fraser Valley region	bead - strung	1.149	1.550	ND	ND	0.147
214	431	Kwakwaka'wakw: Mamalilikala	rattle	2.671	1.287	0.087	ND	0.082
253	555	Haida	rivet - horn spoon	1.242	1.429	0.975	ND	ND
328	711	Russian, American, North American?	worked fragment/ sheet metal	1.493	2.724	ND	0.080	ND

5.2.2.7 Leaded Copper (14 Samples)

Fourteen of the metal pieces characterised are consistent with the Leaded Copper metal group. Lead levels in all but two of the samples remain below 5 wt%. This is consistent with the known physical qualities of leaded copper alloys, which become more brittle and difficult to cold work above this concentration. Of the two artefacts that exhibit elevated Pb levels, a Haida bracelet characterised at 13.7 wt% lead is heavily corroded (Record 296), which possibly contributes to this reading (Paige & Covino Jr, 1992). A

Leaded Copper pipe pin, presumed to clean the bowl of the carved wooden pipe it is tethered to, is characterised at ca. 7 wt% Pb. The pin is visibly uniform in its cylindrical shape and is presumed to have once been manufactured bar stock of some variety. Overall, Leaded Copper metal has been employed in the creation of a wide range of artefacts and used in a variety of ways. For example, nails and wire used to fix objects together, as well as pendants, beads, a bracelet, and inlay, have all been characterised as leaded copper.

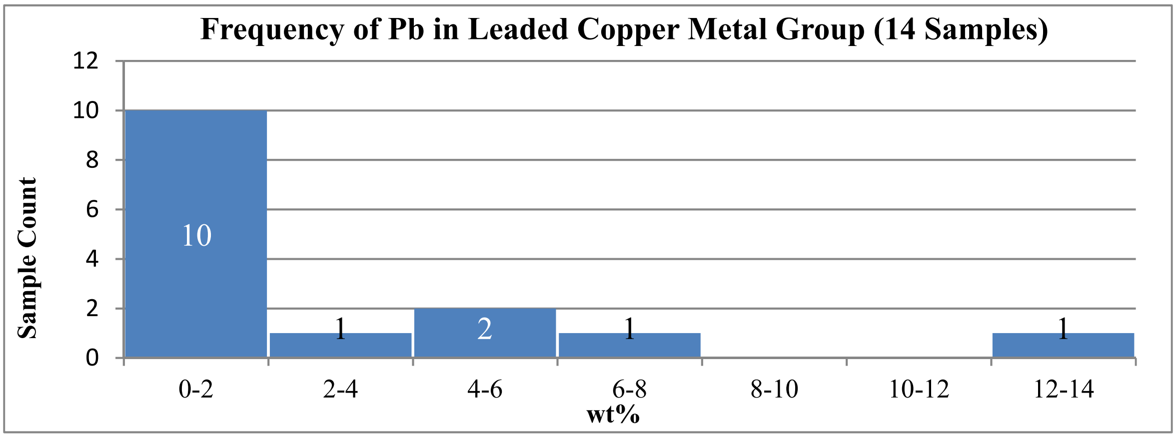


Figure 5.12. The frequency of Pb concentrations recorded within the Leaded Copper group in this data set.

Table 5.7. The trace elements characterised in the Leaded Copper metal group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb wt%	Zn wt%	As wt%	Sn wt%	Ag wt%
71	132	Northwest Coast	nail - Copper	1.828	ND	ND	ND	ND
94	161	Tsimshian	nail - bentwood box	1.673	0.669	ND	ND	ND
95	164	Kwakwaka'wakw: Gusgimukw	wire - feast dish	1.079	0.268	0.420	ND	ND
95	165	Kwakwaka'wakw: Gusgimukw	wire - feast dish	1.341	ND	0.457	ND	ND
186	358	Coast Salish: Fraser Valley region	pendant	1.064	ND	ND	ND	0.258
195	369	Coast Salish: Fraser Valley region	bead - strung	1.264	ND	ND	ND	ND
196	385	Coast Salish: Fraser Valley region	pendant	1.096	ND	ND	ND	0.234
202	391	Coast Salish: Fraser Valley region	bead - strung	2.548	ND	ND	ND	ND
268	581	Inuit	inlay - figurine	1.128	0.881	ND	ND	ND
279	607	Athabaskan: Koyukon	pipe - pin	7.408	ND	ND	ND	ND
284	614	Tlingit	embellishment - pipe	4.385	ND	ND	ND	ND
296	649	Haida	bracelet	13.713	0.172	ND	ND	ND
298	661	Kwakwaka'wakw	inlay - bow	1.136	ND	ND	ND	ND
337	720	Tlingit: Kiks.adi / Russian	worked frag/ sheet metal	1.076	ND	0.530	0.059	ND

5.2.2.8 Leaded Gunmetal (6 Samples)

Table 5.8. The trace elements characterised in the Leaded Gunmetal alloy group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb wt%	As wt%	Zn wt%	Sn wt%	Bi wt%
122	195	Coast Salish: Stó:lō: Yale	arrowhead	4.918	2.783	4.452	1.427	0.552
225	457	Kwakwaka'wakw: Kwagu'l	Copper	3.296	ND	3.600	4.870	ND
232	493	Kwakwaka'wakw: Tlawitsis	Copper	4.241	0.941	2.959	2.006	ND
305	689	Tlingit? Russian?	buckle	8.077	ND	9.210	7.218	0.245
310	695	Tlingit?	ring	5.627	ND	3.960	2.088	ND
340	723	Tlingit: Kiks.adi / Russian	worked fragment/sheet metal	3.518	1.601	2.548	5.676	0.480

The six pieces of metal characterised as Leaded Gunmetal contain between 1-8 wt% Sn, 3-9 wt% Pb, and 2-10% wt% Zn. This would suggest a metal that is both hard and tough (Davis 2001, 46-51; Hiorns 1912, 239-40). In five of the six samples, lead levels indicate a metal that can be successfully cold worked. A sample consistent with the highest observed levels of Sn (ca. 7 wt%), Pb (ca. 8 wt%), and Zn (ca. 9 wt%) in the sample set likely represents a brittle alloy, however the artefact has been identified as a cast buckle. This artefact is provenanced to Three Saints Harbour in Alaska, where both Tlingit and Russian colonists lived in the 18th and 19th centuries (Grinev 2005). Leaded Gunmetal appears to have been used to create a wide range of artefacts; in addition to the buckle, this metal group encompasses an arrowhead, a ring, and a worked fragment. Two samples, Records 225 & 232, are sheet metal pieces used in the creation of two separate composite Kwakwaka'wakw Coppers. Both Coppers are composed of multiple pieces of metal representing several different alloys. Two of these samples, the buckle and the worked fragment, contain high iron levels, potentially resulting from the high levels of corrosion noted on the surface of the artefacts. Due to the high levels of alloying elements, these samples also contain lower levels of copper, between 65 – 68 wt%, rendering this metal very hard and brittle. This metal would be extremely difficult to cold work (Hiorns 1912, 240).

5.2.2.9 Leaded Tin Bronze (4 Samples)

Four metal pieces sampled are consistent with the Leaded Tin Bronze metal group. Within this group, two samples contain <2 wt% Pb, one contains ca. 4 wt% Pb, and one ca. 7 wt% Pb. Tin levels within the sample set vary significantly, and the sample containing the highest level of tin, measured at ca. 33 wt%, also contains the highest levels of detected lead. This is identified as a cast modern swivel and does not appear to have been reworked after creation (Record 312). This artefact is provenanced to Three Saints Harbour in Alaska, where both Tlingit and Russian colonists lived in the 18th and 19th centuries (Grinev 2013, 2005). The high levels of tin and lead detected in the swivel are potentially due to surface corrosion (Hiorns 1912, 240). The amount of tin detected in the large Haida Copper (Record 244) suggests that this metal is hard and brittle (Lechtman 1996, 502, Northover 1989), although this effect will be mitigated somewhat by the lead introduced into the alloy (Schwartz 2002, 22-23). The elevated level of tin in the Haida Copper may also be affected by the pigment present on the surface of the artefact.

Table 5.9. The trace elements characterised in the Leaded Tin Bronze metal group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb wt%	As wt%	Zn wt%	Sn wt%	Ni wt%
230	471	Kwakwaka'wak: Kwikwasut'inuxw	Copper	1.101	0.606	0.596	4.064	ND
244	523	Haida: Kaigani	Copper	1.687	0.424	0.194	15.207	ND
264	575	Inuit	embellishment - pipe	4.093	ND	ND	1.524	0.043
312	697	Tlingit?	swivel	7.039	ND	0.238	33.441	0.232

5.2.2.10 Tin Bronze (4 Samples)

Table 5.10. The trace elements characterised in the Tin Bronze metal group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb wt%	As wt%	Zn wt%	Sn wt%	Ni wt%	Bi wt%
57	113	Northwest Coast	bracelet	0.096	0.388	0.981	8.856	0.031	0.151
135	216	Kwakwaka'wakw: Dzawada'enuxw	embellishment - mask	ND	ND	ND	1.194	ND	ND
259	563	Tlingit?	embellishment - dagger	ND	0.710	ND	3.369	ND	ND
318	701	Tlingit: Kiks.adi / Russian	vessel	0.155	ND	0.241	8.384	ND	ND

Four metal pieces are consistent with Tin Bronze. Tin levels in two of the samples are characterised at ca. 8 wt%, while the other two were found to contain ca. 3 wt% and 1 wt% Sn. This is consistent with the qualities of Tin Bronze, which becomes more brittle if amounts of tin exceed 8 wt% (Northover 1989; Lechtman 1996, 502). The two samples containing ca. 8 wt% Sn are more yellow in colour due to the effects of the element (Mödlinger *et al.* 2017, 22). Trace elements such as bismuth, lead, zinc, and nickel are also detected among the four samples recorded at <1 wt%. Presence of these elements at <1 wt% suggests that this metal is consistent with the manufactured materials produced in the 17th, 18th and 19th centuries across the world, which often contains small amounts of such elements (Craddock & Eckstein 2003; Pernicka 1999; Dussubieux *et al.* 2008). The four Tin Bronze samples are employed in a range of different contexts. Of the two samples high in tin, one represents a Northwest Coast bracelet likely created from manufactured bar (Record 57), and the other a metal dish crafted from a single piece of sheet metal and recovered from a Russian/Tlingit settlement site (Record 318). Tin bronze sheet metal characterised at ca. 3 wt% Sn is, along with three pieces of metal characterised as Copper Metal, wrapped around the shoulders of a Tlingit double pointed iron dagger (Record 259). Additionally, sheet metal characterised at ca. 1 wt% Sn has been used as embellishment in the creation of a Kwakwaka'wakw carved wooden mask, alongside five additional metal pieces characterised as copper metal (Record 135).

5.2.2.11 *Leaded Zinc Arsenic Bronze (7 Samples)*

Table 5.11. The trace elements characterised in the leaded Low Zinc Arsenic Bronze metal group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb wt%	As wt%	Zn wt%	Bi wt%
20	73	Tlingit?	rivet - horn spoon	33.470	12.004	8.802	ND
22	75	Tlingit?	rivet - horn spoon	15.026	4.981	2.337	ND
171	315	Haida	rivet - horn spoon	1.007	1.282	1.475	ND
178	331	Haida	rivet - horn spoon	1.373	3.695	1.078	ND
178	333	Haida	rivet - horn spoon	1.223	4.170	1.102	0.417
178	335	Haida	rivet - horn spoon	8.374	8.470	4.888	ND
253	551	Haida	rivet - horn spoon	3.029	2.301	2.754	ND

The Leaded Zinc Arsenic Bronze metal group within this study contains arsenic in levels ≥1 wt% and not exceeding 13 wt%. Five of these samples do not exceed 5% As, while the remaining two were measured at ca. 8 and 12 wt% As. Lead was detected at levels below 4 wt% in four of the samples but is notably higher at between 8-34 wt% in the other three. As these readings exceed the known solubility of both lead and arsenic in copper, it is possible that these increased levels of lead are the result of deposits on the metal's surface such as pigment, or the presence of corrosion (Moffatt *et al.* 1997). Zinc predominantly remains below ca. 5 wt%, however one sample exhibited 8.8 wt% Zn. The seven samples consistent with the Leaded Zinc Arsenic Bronze metal group are identified as rivets that have been used to mechanically join the handles and bowls of two Tlingit and three Haida horn spoons (Records 20,22,171,178,253). In each of the five horn spoons, the Leaded Zinc Arsenic Bronze rivets are used in combination with rivets characterised as different copper alloys, to create the object.

5.2.2.12 Low Zinc Arsenic Bronze (5 Samples)

Table 5.12. The trace elements characterised in the Low Zinc Arsenic Bronze metal group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb	As	Zn	Bi
178	327	Haida	rivet - horn spoon	ND	2.502	1.194	ND
178	328	Haida	rivet - horn spoon	0.428	2.226	1.033	ND
178	329	Haida	rivet - horn spoon	ND	1.050	1.031	ND
288	622	Haida	rivet - horn spoon	0.841	1.328	4.623	ND
288	623	Haida	rivet - horn spoon	0.632	1.285	4.549	0.332

Figure 5.13. Haida horn spoon held together with three rivets, two of which are consistent with Low Zinc Arsenic Bronze and circled in green (Record No. 288, Accession No AM.9850, photo by author ©Friends of the British Museum).

Five metal pieces sampled are consistent with the Low Zinc Arsenic Bronze metal group. Trace levels of As do not exceed 3 wt%, and Zn does not exceed 5 wt%. Arsenic may have been added to this alloy to inhibit dezincification (Lechtman 1996, 492-4). Together, this amount of arsenic and zinc work to increase the hardness of the material while still retaining the deformation qualities of copper when cold working (Callcut 1996; Lechtman 1996, 492-4). All five of these samples are identified as rivets that have been used to attach a mountain goat horn handle and bowl together in the creation of two separate Haida feast spoons. Two rivets are found together on one spoon, alongside a rivet identified as Tombac (Record 288), while three are found together alongside ten other rivets characterised as different metal groups (Record 178; Figure 5.14).

Figure 5.14. Haida horn spoon mechanically fixed together using twelve rivets, three of which are consistent with Low Zinc Arsenic Bronze and circled in green (Record No. 178, photo by author ©RBCM).

5.2.2.13 Hi Silver (2 Samples)

This metal group is comprised of samples from two singular artefacts exhibiting what appears to be silver plating, gilding or applique directly applied to a copper alloy metal surface. One of these artefacts is a Gwawa'enuxw Kwakwaka'wakw Copper that has been plated or gilded with a silver/gold combination (Record 206). The other is a copper ring, potentially Tlingit in origin, which has a small silver piece of metal applied to its surface. The silver applique has been interpreted as representing the pelt of an animal (Record 309; Figure 5.15). In both cases, these samples consider material that has been purposefully joined with copper, either mechanically or chemically.

Figure 5.15. A view of the Tlingit ring with silver applique, Record No. 309 (Photo by author, © Anchorage Museum).

5.2.2.14 Tombac (2 Samples)

Table 5.13. The trace elements characterised in the Tombac metal group.

Rec. No.	AUN	Culture Group	Artefact Type	Pb	As	Zn	Sn	Bi
280	608	Athabaskan: Koyukon	embellishment - pipe	2.388	ND	18.953	1.615	0.047
288	624	Haida	rivet - horn spoon	3.246	3.737	12.307	ND	ND

The two samples in this data are represented by two discrete alloy types used in the construction of two different artefacts, a rivet and pipe inlay (Table 5.13). The alloys described here could both be thought of as a harder and tougher alpha brass, which retains good cold working and corrosion resistant properties (Brannt 1896; Davis 2001; Callcut 1996). The rivet used to construct the horn spoon, is placed alongside two other rivets that are composed of Low Zinc Arsenic Bronze (Record 288).

5.2.3 Maritime Metals Comparison

136 maritime copper and copper alloy artefacts contemporary with those that were arriving on the Northwest Coast through the 18th to 20th century, have also been chemically characterised for this study. The maritime objects assessed include bolts, roves, nails, spikes, and vessel cladding. These would have been created at the same time, and in the same places, as materials used to build and clad ships that travelled to the Pacific Northwest and materials traded with Indigenous populations through the fur trade and colonial periods (Bingeman *et al.* 2000; Flick 1975; Muntz 1832; Fisher 1977). Contemporary metals recovered from identified shipwrecks such as the *HMS* Breadalbane (Maritime Database Record 99) and Bounty (Maritime Database Record 90-92, 114-115), as well as copper fragments recovered from John Franklin's last expedition (Maritime

Database Record 100, 109-111, 128-133) are included. Additionally, a selection of HMS Victory's vessel sheathing used throughout the ship's life, including nails and bolts, is characterise for this study. Some of these artefacts are composite in nature. For example, some sheathing has been repaired using another piece of metal mechanically joined with nails. Therefore, while 136 artefacts were analysed, 141 individual metal pieces were characterised.

Table 5.14. A list of the European maritime artefacts created and used through the 17th – 20th century that have been chemically characterised for this study.

Object Type	# Cu pieces
Maritime sheathing	47
Bolt/'copper dog', Nail, Spike	56
Rove	4
Copper fragments, panels	7
Swedish Cu money plate (Hist. Eng. 2015).	27
Total	141

The characterisation data is recorded in a spreadsheet located in Appendix C, alongside a separate Filemaker Pro artefact database for maritime metals. Four reports which detail the objects housed at each of the four museums visited for this study are also included in Appendix C.

Copper manufacturing had become more a refinement than a smelting process by the 18th and 19th century; a process that does not remove the trace elements of arsenic, lead, tin, and zinc that hint at the smelted industrial beginnings of the metal (Goskar 2013; Percy 1861; Gore 1784). By this time the international trade in copper had become quite extensive, and copper ingots from South America, Africa, Asia, and Europe could be found together in the same melting-pots during metal production. As such, twenty-seven Swedish copper money plates stamped with maker's marks and dates ranging from 1717 to 1749, which were in transit to the UK as bullion in the late 18th to early 19th century, are also included in this study. These plates did not arrive at their destination and went down with a merchant ship wrecked in the South Edinburgh Channel of the Thames Estuary between 1780 and 1815 (Table 5.14; Appendix C). However, achieving strict control of the amount and quality of alloying elements and subsequent metal produced when manufactured copper was difficult. As chemist William Hay discovered in the late

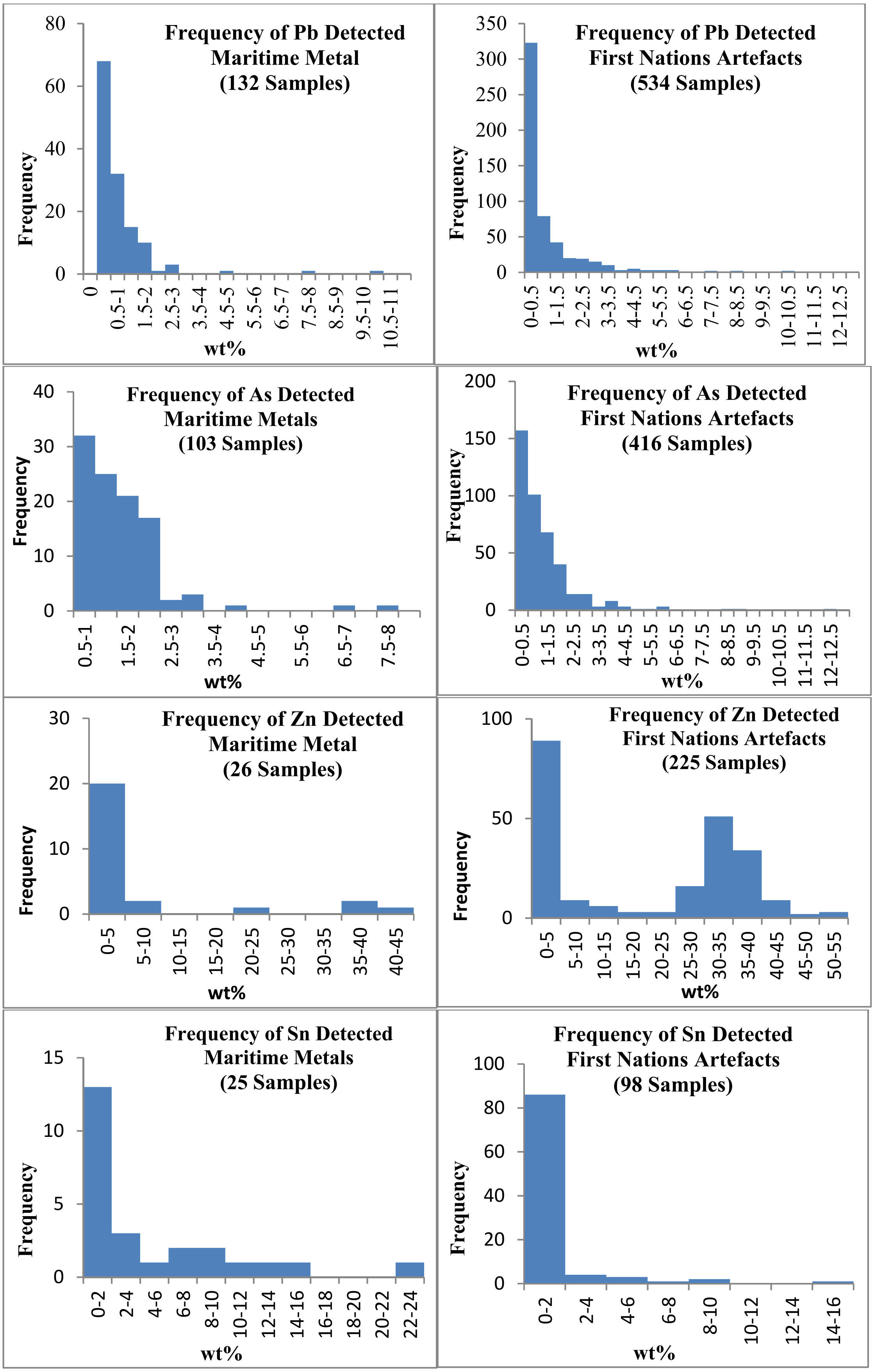


Figure 5.16. The frequency of Pb, As, Zn, and Sn detected in both the maritime metal reference data set (left), and the Indigenous artefact data set that is the focus of this thesis (right).

19th century there was little consistency in the manufacturing processes. This lack of control during production of copper and copper alloys lead the budding insurance industry of the late 19th century to declare that nothing could be guaranteed with any certainty in terms of the quality and composition of vessel sheathing (Hay 1863, 96; McCarthy 2005, 122).

Comparisons between the presence and frequency of certain amounts of trace elements, such as lead, arsenic, zinc, and tin, in the maritime metals sample and the metal used to create Indigenous artefacts show broad similarities. However, there are some noticeable differences in element concentrations between the two groups that may indicate Indigenous choices. For example, a much higher frequency of high zinc alloys containing 25-40 wt% Zn was detected among Indigenous repertoires. This trend in high zinc alloys could suggest an Indigenous interest in the aesthetic of the yellow metal that a zinc alloy creates. Metal containing increasing concentrations of tin are less prevalent among Indigenous contexts, potentially due to the alloys' increased hardness and brittleness which may have impacted Indigenous technological processes (Northover 1989; Lechtman 1996, 502). Alternatively, this could have simply been the type of metal offered for trade as alloys were more affordable to manufacture than a pure copper (Hosler 1994; Callcut 1996, 8).

One of the main tensions in this portion of the analysis is whether it is possible to determine whether the metal came into Indigenous use because of specific material choices or because it was the metal available. An article by Aldona Jonaitis published in the Winter 96/Spring 96 edition of the U'mista News describes the way in which the metal used to create a 'Copper' was tested to assess its worth among the Kwakwaka'wakw.

> "Whether or not it is actually the case, the owner usually told the people that he had bought the copper from a Northern Indian. However, he might have actually retrieved a copper discarded by a chief, or he might have manufactured it himself. Therefore, if the Copper was unknown to the tribe, it was necessary to test its authenticity as being of native metal.
>
> One individual in the tribe was qualified as a Copper tester, and he followed this procedure. He scraped the top corner of the copper

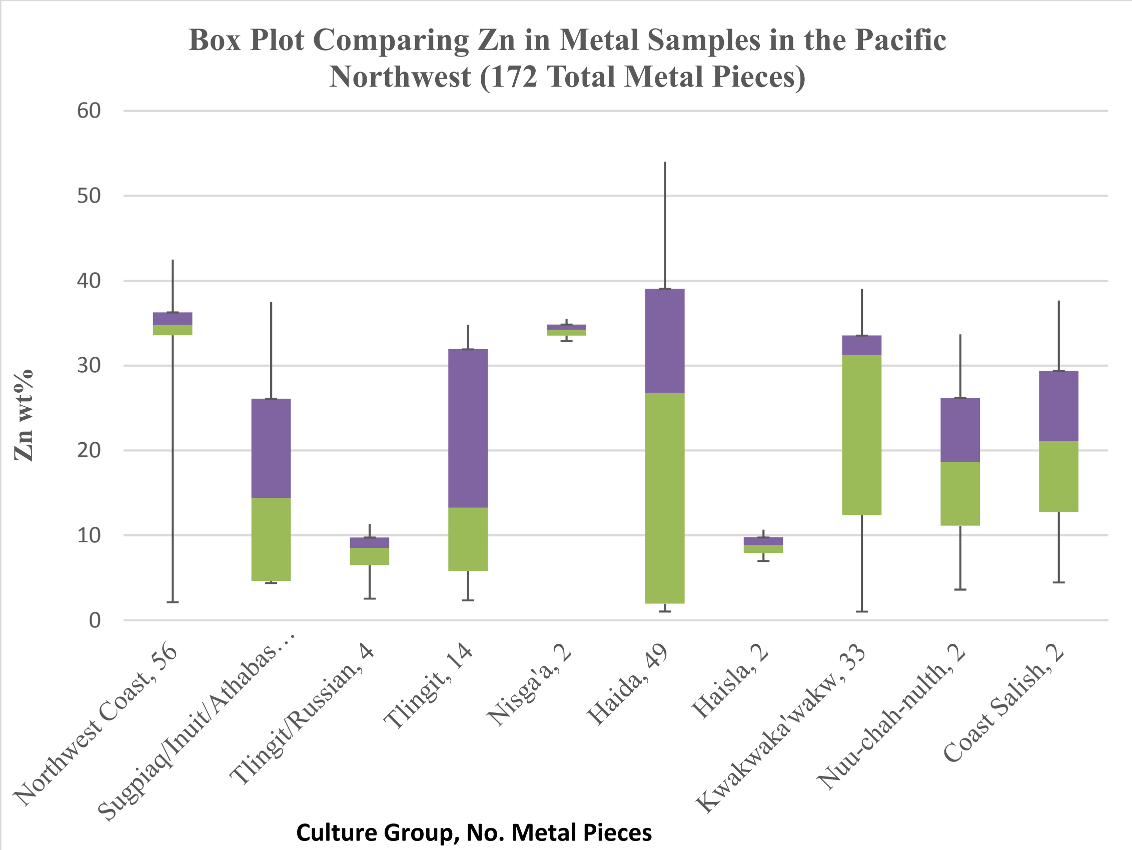


Figure 5.17. Box and Whisker plot showing the median and interquartile range of Zn in wt% detected among artefacts provenanced to specific ethnolinguistic groups of the Northwest Coast and surrounding area.

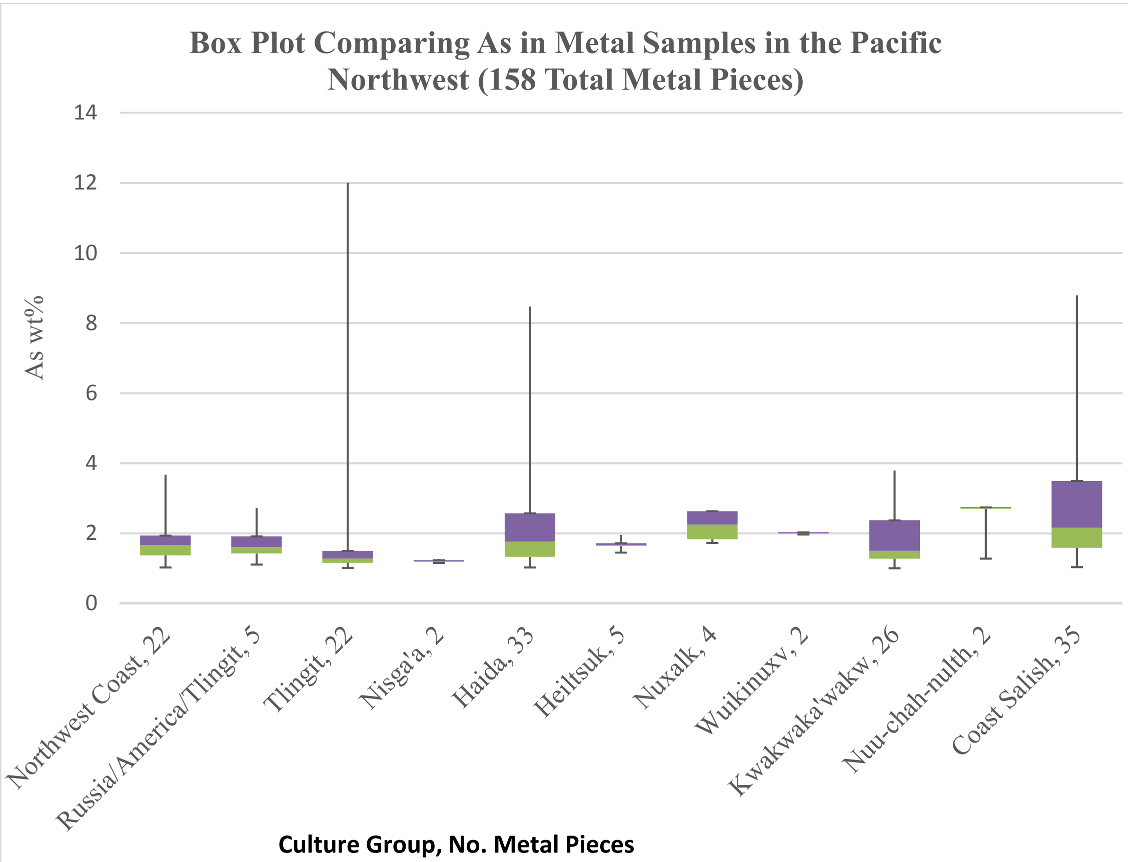


Figure 5.18. Box and Whisker plot showing the median and interquartile range of As in wt% detected among artefacts provenanced to specific ethnolinguistic groups of the Northwest Coast and surrounding area.

with his teeth, and if the material was soft enough to mark in this manner, this was an indication of true native copper (Lagake L'agwa). He then struck the Copper and if no ringing sound was produced, this was further evidence of its authenticity. The depth of the T-shaped groove was another characteristic inspected. A shallow groove was desirable.

If the groove of the T-shape seemed too deep, but the first two tests had indicated the copper to be of native metal, the Copper was given to a copper smith who hammered the T-shape to the right depth.

However, if the results of the first two tests were such that the Copper did not appear to be authentic, a deep groove served to compound the evidence that it was 'Smooth faced – White man's copper' and worthless in sale. …however they retained a constant exchange value of 100 blankets and often were used to compose part of the payment for another valuable Copper." (Jonaitis 1996, 10).

This account shows that at least some of the Indigenous communities on the Northwest Coast were interested in testing the physical qualities of the metal and understood how a preferred material would behave when worked. This gives some support to an argument for an Indigenous influence in material choice. It is more likely that the answer of choice vs availability is a patchwork of both realities. For example, traders arriving on Haida Gwaii found that at different times in 1778 and 1779 metal barrel hoops were either rejected as inferior or accepted as a viable trade good (Keddie 2006, 20; Riobo in Thornton 1918, 224). These discrete moments show a more complex tapestry of needs, wants, and power relations (Van Oyen 2013; Silliman 2010).

Comparing the frequency and presence of metal groups across the Northwest Coast shows that there are trends in the locations that the material is found. Copper Metal is spread across and beyond the region and represents the largest sample of metal detected among every culture group, excepting the Haisla and Heiltsuk. This disparity is likely due to the small overall number, N=8, of metal pieces sampled that are provenanced to these two culture groups (Figure 5.19). Brass and Leaded Brass together make up ca. 20% of the entire data set and are also found across the whole of the Northwest Coast and used in the making of a range of artefacts ranging from Coppers to bracelets, wire and

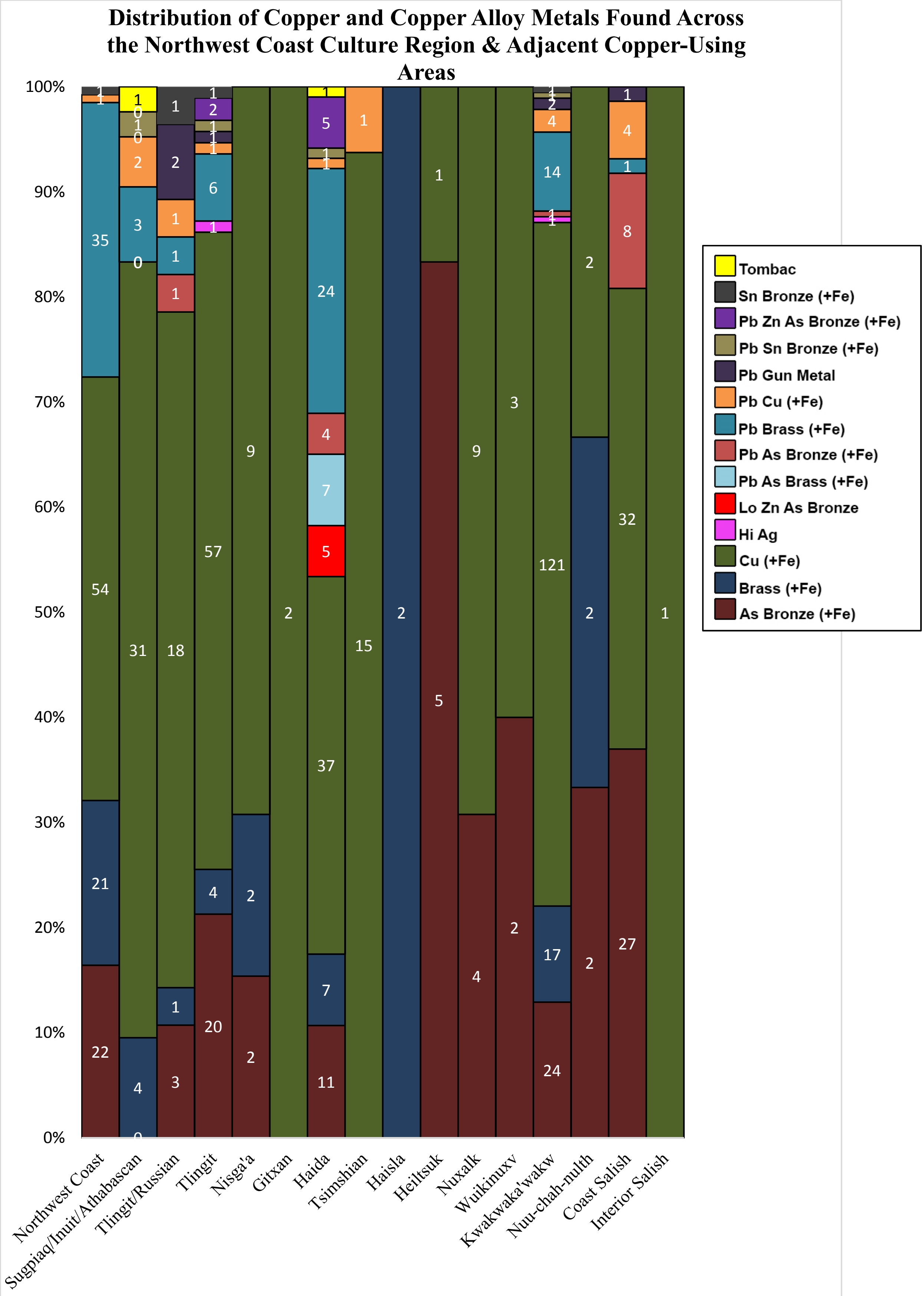


Figure 5.19. The distribution of copper and copper alloy metals used by Indigenous communities to create a wide range of artefacts across the Pacific Northwest.

rivets (Figure 5.17). Samples consistent with the Arsenic Bronze metal group are concentrated predominantly among communities that reside in the southern portions of the study region (Figure 5.19). Though these metals can all be worked using Indigenous techniques, this difference in metals could indicate discrete trading partners active across the region, or a certain preference for a specific material due to physical or aesthetic/chromatic reasons.

5.3 Concluding Thoughts

Within this chapter, primary analysis of the data gathered from the material culture study is presented. This includes a breakdown of the physical and chemical elements of the 721 individual pieces of copper used by Indigenous communities to make 323 artefacts within, and adjacent to, the Northwest Coast study region. These results, which consider the broader meanings and impacts of the copper and copper alloy metals as they are found across the Pacific Northwest, constitute the groundwork for further in-depth analysis considering assemblages of artefacts. This work can be found in Chapter 6. However, this primary analysis provides some insight into the Indigenous use of copper.

When considering the production and use processes visible on the surface of the metal, the deliberate and ordered choices of the people who made and used the material are highlighted (Rosenthal 1995, 349). Overlapping impressions, of actions such as bending, cutting, painting, and engraving, reveal a sequential process preconceived by the objects' makers and users. Trends in similarities and differences visible in these sequences of production and use begin to show a widespread metallurgical tradition in the region. Specifically, all of the production processes identified in this study are found in some creative combination among each culture group that is represented here by a large sample set such as the Tlingit, Haida, Tsimshian, Kwakwaka'wakw, Nuu-chah-nulth, and Coast Salish. Additionally, these culture groups are found living in the north, south, and middle of the study region. This research supports the argument that an established metallurgical tradition was in place prior to the arrival of Europeans and Russians (Franklin *et al.* 1981, 38; Acheson 2003, 216). Additionally, the cold working process of hammering, bending, and folding in-between cyclical rounds of annealing, that are understood as the metallurgical tradition in the region prior to the late 18th century (Franklin *et al.* 1981; Tushingham *et al.* 1979; de Laguna 1972), appears to have been continually practiced throughout the fur trade and colonial era and applied to the manufactured trade copper and copper alloy material introduced to the area. This is a topic that will be further explored in Chapter 6.

Ca. 35% of the 323 artefacts analysed in this study are composite in nature, composed of multiple pieces of metal. Of these composite objects, ca. 41% are made using multiple metal pieces consistent with more than one metal group. Composite objects created using both one and multiple types of copper alloy are found across the entire region. This suggests that metallurgists throughout the Northwest Coast may have stockpiled various metal pieces to use as needed. This has implications for the makers of these artefacts, as different alloys provided more options in material choice. The presence of silver gilding or plating on one Kwakwaka'wakw Copper (Record 206), and silver appliqué on one Tlingit ring (Record 309), further indicate flexibility and creativity in artefact design.

Considering the introduction of trade metal to the Northwest Coast in large quantities, the selection of this material began primarily among European producers and traders who chose the metals they transported to the region based on significantly different criteria than that applied by Indigenous traders. For example, brass and bronze alloys may have been cheaper than unalloyed copper sheet (Bingeman *et al.* 2000; Gibson 1992; Muntz 1832; Appendix D). Early European traders recorded the Indigenous preference for the metal in the region, as other items initially brought for trade such as glass beads, mirrors, and snuff-boxes were rejected and overlooked (Keddie 2006, 20; de Laguna 1972, 113; Bancroft *et al.* 1886, 196; Morison 1921, 56-7; Gough 1992, 150; Cutter 1969, 159-161; Hoskins 1941; Howay 1941, 187, 195). Additionally, the Indigenous use of copper to create a wide variety of objects greatly expanded with the arrival of trade metals. While some of the copper alloys such as a high zinc brass would have required some flexibility in Indigenous technological suites to deal with the new materials' hard and brittle qualities (Franklin *et al.* 1981; Vernon 1990; Wayman 1993; de Laguna 1971), it appears on the surface that almost all of the copper and copper alloys arriving in the region were amenable to Indigenous use. However, considering the entangled relationships of Indigenous populations of the Northwest Coast with Europeans, Russians, and Americans, it is possible that Indigenous feedback given to foreign traders worked to alter the way that the metal was valued and viewed by these visiting traders. The comparative consistency between the trace elements present in alloys used in Indigenous artefact creation, and alloys used for maritime purposes through the fur trade and colonial era, could certainly suggest an overlapping of material preference (Figure 5.16). However, this interpretation is complicated by the simultaneous uptake of items such as iron tools alongside manufactured copper and copper alloy that may otherwise have been difficult to work using a pre-contact Indigenous tool kit. Iron hammers, chisels, and shears, for example, could mitigate many of the difficulties posed by a hard and thick sheet of arsenic bronze.

The broad trends explored here establish the groundwork for an investigation of the biographies of specific artefacts and assemblages of objects, considering the practices of production and consumption employed by different communities to create and use them (Chapter 6). Combined, Chapters 5 and 6 provide a material framework with which to discuss the impacts of the fur trade and colonial era; the specific attributes of tool marks, use wear, and sequences of construction characterised on the material culture can inform on the particular ways that discrete communities residing on the Northwest coast created and re-created their worlds through a time of upheaval (Van Oyen 2013). This discussion can be found in Chapter 7.

Chapter 6 Biographies of Copper Material Culture on the Northwest Coast

The biographical approach followed in this study employs multiple avenues of investigation concerning copper and copper alloy metal used by Indigenous people on the Northwest Coast through the late 18th to early 20th centuries. Within this chapter the accumulated layers of data are combined, allowing for some interpretation of the nuances of change and continuity occurring among Indigenous communities through the fur trade and colonial periods. Building from the primary data presented in Chapter 5, this chapter seeks to include artefacts within the discussion of the metal, allowing the objects to provide meaning and context to the coppers' biography. This is important because objects do not just represent a single bounded thing but can be thought of as a series of materials and processes that can be organised in different specific ways to create a wide range of things (Herva & Nurmi 2009, 158). By regarding the object as a complete assembled thing and considering the processes of making and using in regard to the entire object (Cobb & Drake 2008), both individual artefacts and assemblages of artefacts can allow for a more in-depth look at how Indigenous people navigated a period of stress and change.

6.1. Artefact Biographies of Northwest Coast Copper

Within this study it is accepted that objects are capable of having many different meanings and uses throughout their lives. These meanings and uses can occur sometimes simultaneously and are not necessarily linked to the object's form, which is a social attribute (Gosden & Marshall 1999; Herva & Nurmi 2009, 160-1; Graves-Brown 1995, 14). Just because objects look the same, or have been made in the same way, does not mean that they are necessarily thought of and used in the same manner. To avoid making interpretations based on preconceived ideas of form and function, objects are instead assessed based on the latitudes of variation between and within the discrete *chaîne opératoir* of specific logics of making and markings of use detectable on each object (Latour 2005; Lemonnier 1992). This syntax can be compared between assemblages of similar and different artefacts, allowing the social markings on the bodies' of the objects to speak to the many meanings and uses the artefact and its constituent parts may have been part of throughout its biographical life (Van Oyen 2013, 97). The detectable trends of similarity and difference direct this investigation, as they indicate points where culturally contingent choices and entanglements may have occurred (Burström 2014, 67; Olsen 2010; Knappett & Malafouris 2008).

6.2. Artefacts & Assemblages of Artefacts, A Material Culture Study

To study objects biographically, first the *chaîne opératoir* of typologically similar collections of Indigenous objects made across the Northwest Coast are analysed. Specifically, Coppers, metal bracelets, metal beads, metal masks, and carved wooden masks designed with copper metal, are examined as separate assemblages. Layers of data concerning social organisation, material and object preferences, technological choices, and the human processes tied to them, are all considered. Following an analysis of typologically similar objects, the biographical approach is used to combine the individual studies of these various items. The similarities and differences of making and use patterns and related technological and social choices emerge across a diverse data set through this examination (Herva & Nurmi 2009, 179; Law 2004).

This study represents a restricted number of closely assessed assemblages of objects. This is due to the fact that, by using a biographical framework, there is a potentially limitless combination of features, contexts, and possibilities available for investigation; at some point overwhelming amounts of data can do more to obscure and complicate than clarify (Burström 2014, 71; Dannehl 2009, 125-126; Hodder 2012, 207; Van Oyen 2013, 86). Here the question of changing copper use through the fur trade and subsequent colonial period can be addressed holistically, and the material culture is allowed to represent itself.

6.2.1. Coppers of the Northwest Coast

A Copper is an artefact that is created and used specifically by the Indigenous people residing on the Northwest Coast of North America. As discussed in Chapter 2, while all culture groups residing in the region used copper material in some capacity, not all groups made and used Coppers. These artefacts are known to have been created by the Tlingit, Haida, Nisga'a, Tsimshian, Gitxan, Nuxalk, Haisla, Heiltsuk, Wuikinuxv, and Kwakwaka'wakw ethnolinguistic groups (Suttles 1990b). The Nuu-chah-nulth, Coast Salish, Quileute, and Makah chose to engage with the metal but are not known to have made these specific objects (Chapter 2). This generally understood demarcation of Copper creation and use in the region is consistent with the findings of this study.

Specifically, of the 65 individual Copper artefacts analysed, 22 Coppers are provenanced to the general Northwest Coast culture group, two to the Gitxsan, ten to the Haida, one to the Heiltsuk, and 30 to the Kwakwaka'wakw.

6.2.1.1. The Body of a Copper

To use the biographical approach to examine the fragmented biographies of these Coppers, some sort of 'base line' understanding of the form of a Copper needs to be established (Dannehl 2009, 128; Olsen *et al.* 2012, 143). In reality this is of course impossible, as no artefact can stand as an example for all artefacts, and something perceived as simple and straightforward to the researcher's eyes does not necessarily have any relation to the truth of the past (Young 2006, 174). That said, Coppers have a somewhat standard shape, often described as a shield that is divided into a top and bottom portion using bending and chasing forming techniques to create a central T-ridge (Figure 6.1; de Laguna 1972, 353; Dunn 1844, 288). The top portion of the Copper flares outwards from the 'waist' where the horizontal portion of the T-ridge is typically located. The bottom section of the artefact generally maintains the width of the waist section, or may flare in width slightly, with the vertical potion of the T-ridge central to this area (Figure 6.9).

Coppers range in length from a few centimetres to approximately a metre. In order to parse this sample set, the classification system of Copper sizes as described to de Laguna by a Tlingit community member and ethnographic informant has been adopted here (de Laguna 1972, 353-354; Jopling 1989, 1-7). Specifically, there are four Copper sizes, and their distribution across the region is demonstrated in Figure 6.6. These size terms are specifically used to discuss the metrics of the objects and are not meant to assign any specific meaning.

1) a miniature Copper measuring a few centimetres in length ca. 1-15cm;
2) a small Copper, which measures approximately a hand in length ca. 15-20cm;
3) a medium Copper that measures from forearm to elbows, ca. 20-60cm; and
4) a large Copper, which measures "from the fingers of the outstretched hand to the averted chin" ca. >60cm (de Laguna 1972, 353-354).

Figure 6.1. Top Left: a miniature sized Northwest Coast Copper, Record No. 70 (Photo by author, ©MOV). Top Right: a small sized Haida Copper, Record No. 66 (Photo by author, ©MOV). Bottom Left: a medium sized Northwest Coast Copper, Record No. 239 (Photo by author, ©MOA). Bottom Right: a large sized Northwest Coast Copper, Record No. 72 (Photo by author, ©MOV). Note, the sizes of Coppers discussed here conform to the 'miniature', 'small', 'medium', and 'large' categories for the artefact as described by de Laguna (1972, 353-4).

Variations in artefact design mean that Coppers can communicate diverse layers of different meanings (Herva & Nurmi 2009, 179). For example, Coppers that are used as adornments and have been affixed or strung to another object (Record 167) may convey the high social status of the overall artefact and person using or wearing the object. It is possible that this is similar to the associated status garnered by owning and displaying a large Copper, due to the underlying meaning of the shape and the understood value and power of the material (Duff 1981, 153-156; Hunt 1906, 70-77, 81-2; McIlwraith 1948, 317; de Laguna 1972, 899-900). Miniature Coppers are not known to have been used in social situations where a Copper is broken, such as social challenges or ceremonies (Suttles 1990b; Acheson 2003). A seeming contradiction is found in a single broken miniature Dzawada'enuxw Kwakwaka'wakw Copper included in this study. However, this artefact is affixed directly below five unbroken miniature Coppers on a carved wooden staff (Figure 6.2). Based on the miniature Copper's placement, it is possible that the staff as a whole is meant to communicate certain facts about the owner or user of the staff, related to their power, wealth, and participation in the economy of Coppers.

Figure 6.2. Dzawada'enuxw Kwakwaka'wakw carved wooden staff, designed with six miniature sized Coppers mechanically affixed (Record 238, Photo by author, ©MOA).

The central T-ridge is a common feature of the Copper, and in all but three of the artefacts included in this study this feature is bent and shaped to some degree into an inverted V or peak. One of these three notably different Coppers is a large Gwa'sala Kwakwaka'wakw Copper, in which the peaked vertical portion of the T-ridge worked into the lower half of the artefact flattens and becomes an engraved design at the typical point at which the horizontal top of the 'T' is located. The top of the 'T' is instead engraved across the midpoint of the top portion of the Copper (see Record 207). Though this artefact departs from traditional design, the essential characteristics of a 'Copper' are identifiable (Figure 6.28). A second Copper lacking a T-ridge, Record 69, gives the impression of an expedient creation with unfinished edges and is provenanced to the Northwest Coast. This Copper is considered 'small' in size, and what appears to be the eyes and mouth of an anthropomorphic design are engraved into the top portion of the artefact. The third, Record 229 (Figure 6.5), has a rounded 'T' and is discussed further below.

Although each Copper appears to conform to an understood overall shape, the sequence of crafting is of some question. Specifically, is the central T-ridge created prior to, or following the action of cutting the metal to shape? The making of each Copper appears to have been conducted using strategies suited to the individual maker and the materials and tools used, sometimes creating objects from one piece of metal and sometimes piecing multiple metal fragments together. It is possible that in some cases the artefacts were bent and chased into a peaked shape with the edges of the material subsequently cut or trimmed, and in other cases the metal was cut to shape and then bent and chased. Quantitative analysis of this sample is challenged by the fact that the *chaîne opératoir* has been obscured through processes such as grinding, polishing, and painting in many cases. The evidence available in this study suggests that the metal is cut into its intended shape prior to working the T-ridge into the artefact in multiple instances. Three separate Coppers are used to support this assertion.

Figure 6.3. Northwest Coast Copper, Record 303. Top: a potential fracture in the sheet metal from bending. Bottom: A view of the back of the Copper, and close up of the point at which the two pieces of metal that make up the artefact are joined as they transect the horizontal section of the T-ridge (Photo by author, ©Friends of the British Museum).

Considering a large Copper provenanced to the Northwest Coast, Record 303, there appears to be a fracture in the lateral edge of the sheet metal used to create the artefact at the point where the horizontal portion of the 'T' ridge is worked into the metal. This suggests a sequence of cutting the metal to shape followed by a process of hammering and chasing the metal into shape (Figure 6.3). This Copper is also composed of a large sheet of copper metal affixed to a smaller copper metal piece, the join of which transects the vertical portion of the T-ridge. The tool markings that transect the two pieces of metal suggest that these pieces were cut to shape individually, overlaid and mechanically joined with rivets while the metal sheet was flat, followed by a hammering and chasing process to form the vertical portion of the T-ridge (Figure 6.3).

Kwagu'l Kwakwaka'wakw Copper, Record 205, represents another example of cutting the artefact into shape prior to bending and chasing processes used to form its features. This Copper is composed of a single sheet of metal that appears to have been cut using a serrated tool. The striations from this activity appear more or less vertical along the flat edges of the sheet, and at the point where the metal has been bent and the T-ridge worked into the object, these striations reveal a sequence as they remain 90 degrees to the plane of the sheet regardless of its angle (Figure 6.4).

Figure 6.4. Kwagu'l Kwakwaka'wakw Copper, Record 205, showing a close view of the striations visible along the lateral edges of the artefact.

Large Haida Copper, Record 229, is the third Copper discussed here that appears to have been cut to shape prior to the 'T' ridge and other features being worked into the metal. The 'T' feature of this Copper is also unique as it has been carefully worked from the back using a chisel or punch tool into a domed or rounded shape (Record 229). This rounded T is consistent in width and design as it transects the Copper. The lateral edges of this artefact are relatively smooth. However, at the point where the 'T' design reaches the edges of the metal sheet, grinding and polishing marks are visible suggesting this process was used to remove burrs following the use of the chisel or punch tool. Altogether, this suggests that the artefact was cut prior to the creation of the 'T' feature, with subsequent grinding (Figure 6.5).

Figure 6.5. Haida Copper, Record 229, is formed with a uniquely rounded central T-ridge. Left: A view of the Copper and the tool marks visible on the surface of the metal. Right Top: A view of the side lateral edge of the Copper at the point of the T-ridge. Right Bottom: A close view of the surface of the T-ridge from the back of the artefact (Photo by author, ©RBCM).

6.2.1.2. Copper Sizes and Evidence of Breaking

Within this sample set 48 of the 65 Coppers are considered 'whole' or unbroken. This means that the entirety of the typical shield shape is present, and no portions have been subsequently removed (de Laguna 1972, 353-54; Boas 1887; Lisiansky 1814). Unbroken Coppers can be composed of one or many pieces of metal. Of the unbroken Coppers, 38 are composed of a single piece of metal. Of these, fifteen are provenanced to the broader Northwest Coast region, fourteen to the Kwakwaka'wakw, eight to the Haida, and one to the Heiltsuk. The distribution of miniature, small, medium, and large broken and unbroken Coppers is presented in Figure 6.6. The visible trends suggest that both the Haida and the Kwakwaka'wakw created Copper of all sizes, though larger specimens appear concentrated among northern communities, and the Kwakwaka'wakw appear to use Coppers more frequently in breaking ceremonies than the other culture groups represented in this study.

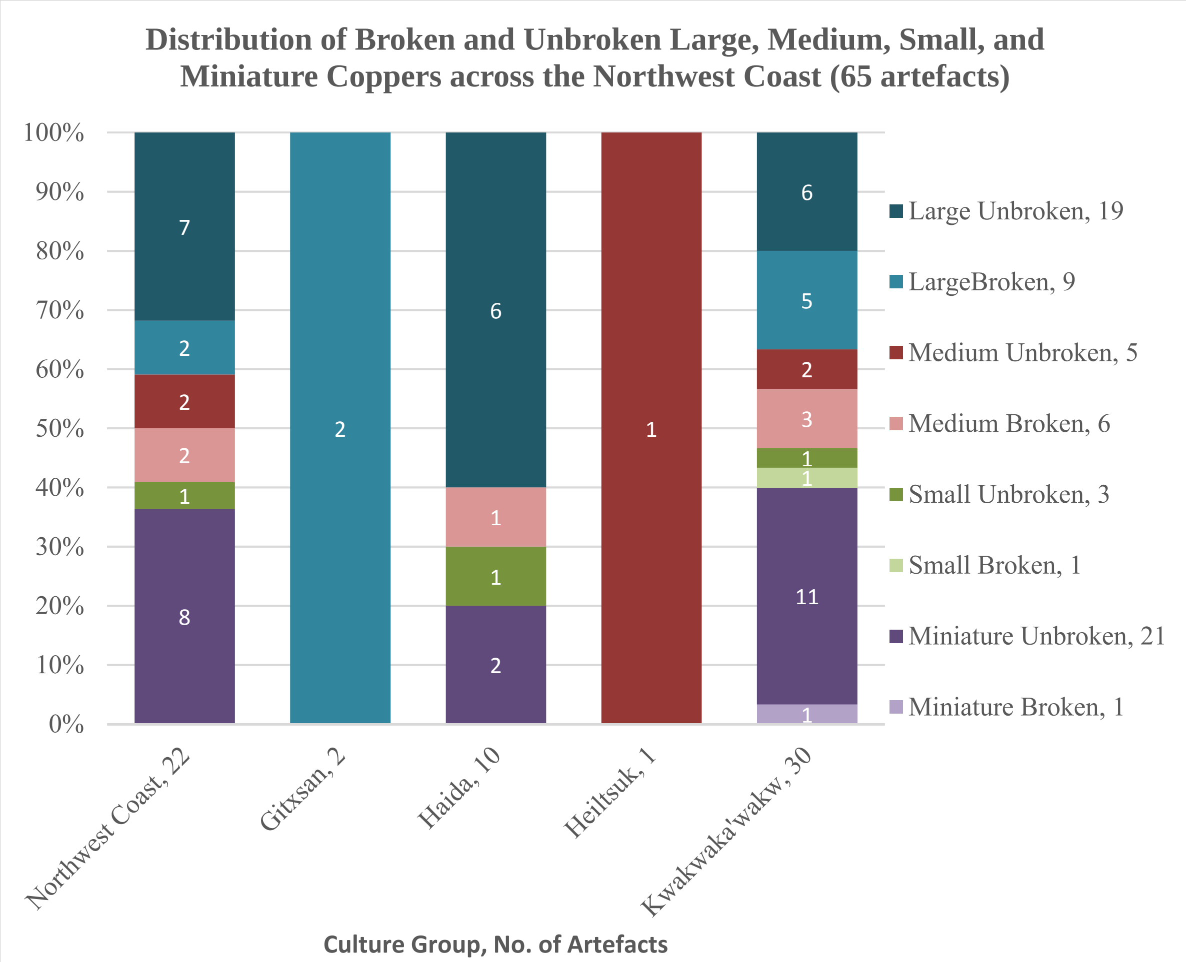


Figure 6.6. Distribution of large, medium, small, and miniature Coppers, both broken and unbroken, across the Northwest Coast.

Ten whole Coppers are composite in nature and of these six have been provenanced to the Kwakwaka'wakw, one to the Haida, and three to the Northwest Coast (Figure 6.7). 17 of the Coppers are identified as broken portions of a larger artefact. Nine of the broken Coppers are composed of a single piece of metal, three provenanced to the Northwest Coast, two to the Gitxsan, and four to the Kwakwaka'wakw. Eight of the broken Coppers are composed of multiple pieces of metal, one provenanced to the Northwest Coast, one to the Haida, and six to the Kwakwaka'wakw (Figure 6.7).

Coppers are broken in conspicuous social display for a range of reasons. For example, a Chief may break a Copper at a burial ceremony, memorial potlatch, naming ceremonies, or as a direct challenge to another Chief (Boas 1966, 95; Boas & Hunt 1906). These pieces can be disposed of, given as gifts, or even used to (re)create a Copper (Jopling 1989, 26; Drucker 1965, 125; Garfield 1939, 238). The artefacts are described in primary documents and oral histories as broken with a chisel or axe tool (Vaughan & Holm 1982, 63; Boas 1897; Hunt 1906, 114), which is supported within this sample set by the rough, erratic, and burred edges of the sheet metal where pieces have been removed or 'broken'.

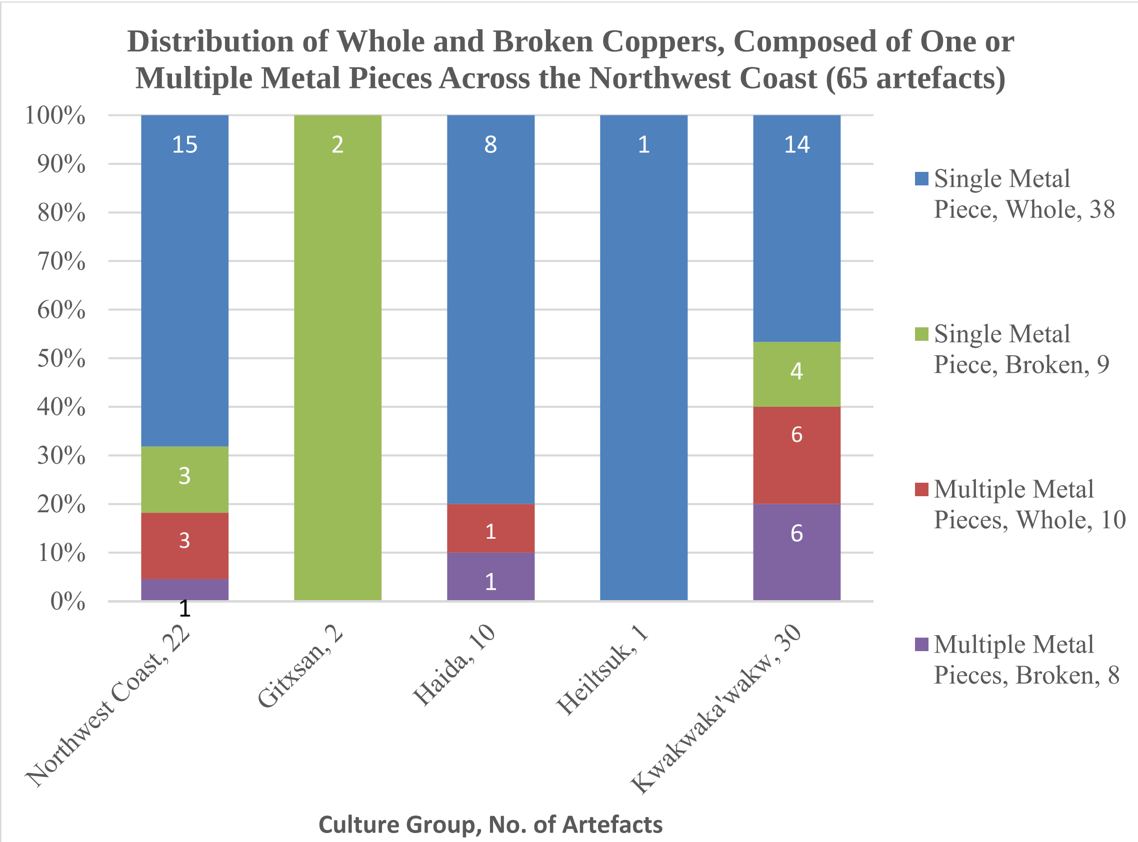


Figure 6.7. The distribution of whole and broken Coppers composed of single or multiple pieces of metal.

Boas argued in 1897 that Kwakwaka'wakw communities used Copper in challenges in specific ways, breaking them in a predetermined pattern, Specifically, the central portion of the Coppers themselves were generally retained, but instead pieces were cut from the artefact's top right, bottom left, top left, and bottom right in sequence.

> "in by far the greater number of cases where Coppers are broken the Copper is preserved. The owner breaks or cuts off one part after the other until finally only the T-shaped ridge remains. This is valued at two-thirds of the total value of the Copper and is the last part to be given away. The order in which the parts of the Copper are usually broken off (shown in diagram

> – top right, bottom left, top left, bottom right). The rival to whom the piece that has been broken off is given, breaks off a similar piece, and returns both to the owner. Thus, a Copper may be broken up in contexts with different rivals. Finally, somebody succeeds in buying up all the broken fragments, which are riveted together, and the Copper has attained an increased value." (Boas 1897, 354)

Within this study, two of the ten broken Kwakwaka'wakw Coppers could be said to support the claims made by Boas. Three additional artefacts are fragments removed from the top right corner of an object, and there is no way to know at what point in the Copper's life these pieces were removed (Records 220, 227, 228). One Copper (Record 245) has had pieces removed from all four quarters of its body, and another has had the entire top and bottom left section removed (record 74). In many cases the sequence of use through the object's life remains obscure, and in all cases discussed here the artefacts appear to have been involved in specific discrete moments of requirement that, while following cultural structures and norms, don't necessarily conform to rigid rules (see Harrison 2014; Silliman 2009; Mrozowski *et al.* 2015).

6.2.1.3. Styles of Coppers and their Decoration

The Coppers included in this study are crafted and decorated in a combination of ways. These processes include producing a repoussé-style top panel and wide flat border, the addition of pigment followed by engraving processes that reveal portions of the metal's surface, engraving and then painting over and/or around the design, completely covering the artefact in pigment, painting a design without any engraving, or leaving the Copper bare.

Considering their shape and size, Jopling conducted an analysis of 328 Northwest Coast Coppers in 1989 and identified stylistic groups that divide making strategies between northern communities such as the Tlingit, Haida, Tsimshian, and Gixan culture groups from the more southern Kwakwaka'wakw, Heiltsuk, and Nuxalk. She argues that the northern communities decorated their Coppers more often with formline designs of crest animals. Additionally, northern communities more often created a wide flattened border surrounding a repoussé style top panel (Jopling 1989, 7-10). Coppers from southern communities in the region, alternatively, are decorated with "crude designs of animal or human like figures…which are painted or scratched into the surface coating on both the upper and lower portions" of the artefact (Jopling 1989, 7).

A frequency distribution graph shows that wide borders and a repoussé style top panel occur at roughly the same rate among southern and northern communities within this sample set (Figure 6.8). The averaged distribution supports Jopling's argument for a larger occurrence of formline designs among northern communities (1989, 9). Non-formline designs are found almost exclusively among southern makers, though the formline design is not unknown to the Kwakwaka'wakw (Figure 6.8).

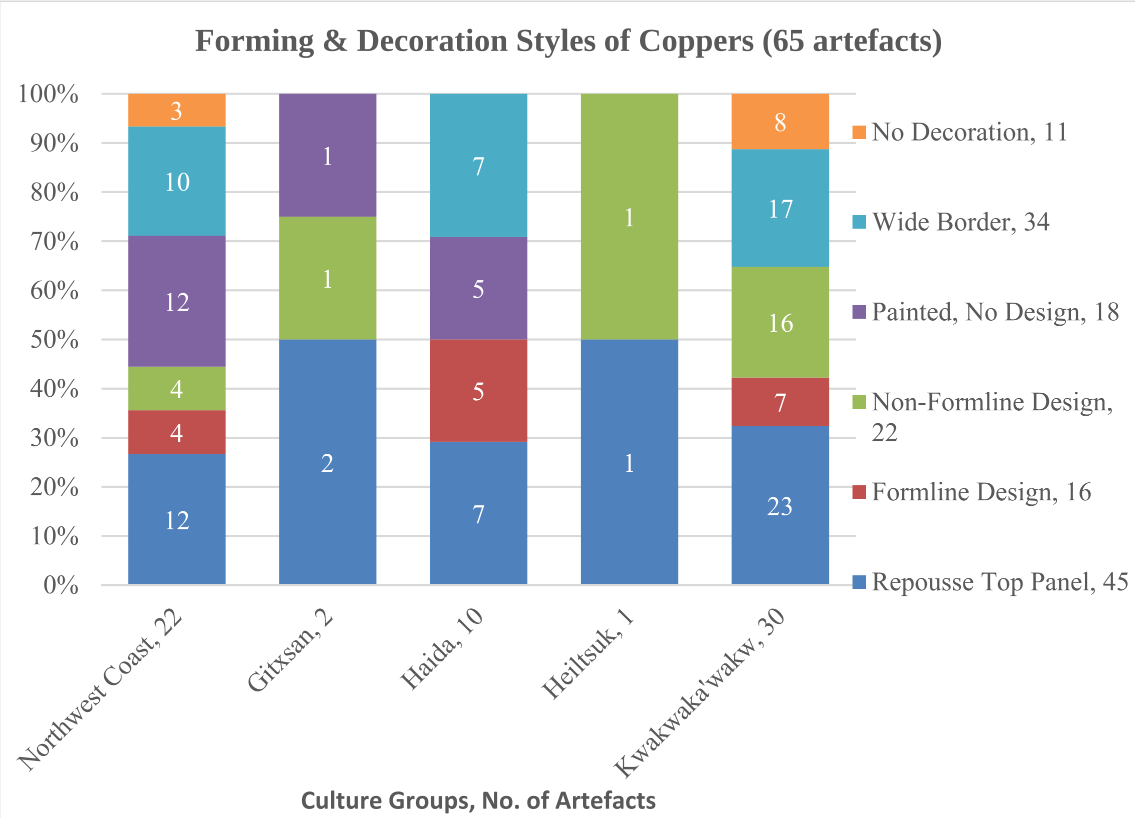


Figure 6.8. The frequency distribution of forming and decoration styles of Coppers. Note, the totals included for the forming and decoration techniques presented in the legend indicate the total number of occurrences of each technique found across the entire sample set of 65 artefacts.

Jopling's typological framework also differentiates northern and southern Coppers based on their specific width to length radio, arguing that southern Coppers were more likely to be narrower and smaller. Unfortunately, it is not clear if Jopling is referring to the width of the top, middle/waist, or bottom of the artefact (Jopling 1989, 5-6). Within this study there are a limited number of Coppers that retain both all three width measurements and an ethnolinguistic group association for comparison. Miniature Coppers that measure up to 15cm in length are excluded from this comparison as they were not included in Joplings analysis. There are seven Haida, one Heiltsuk, and nine

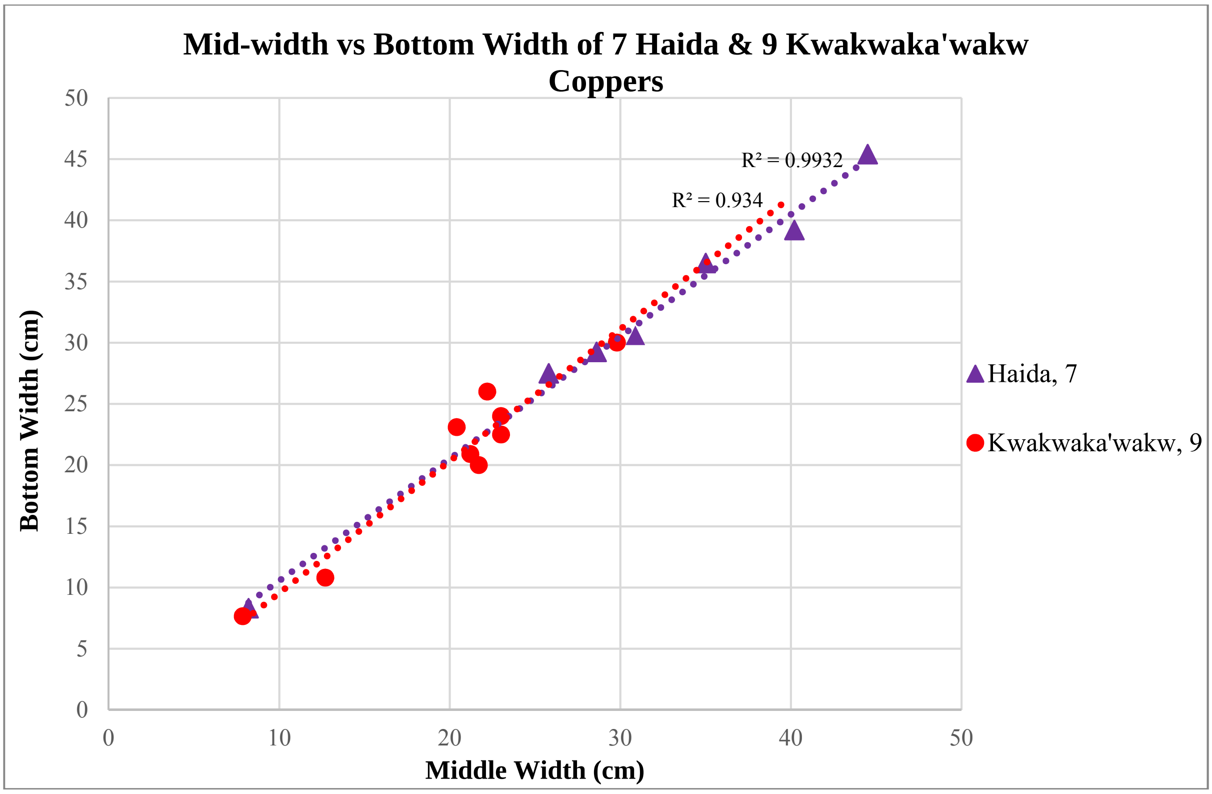


Figure 6.9. The mid-width vs bottom width of the seven Haida and nine Kwakwaka'wakw unbroken Coppers included in this study.

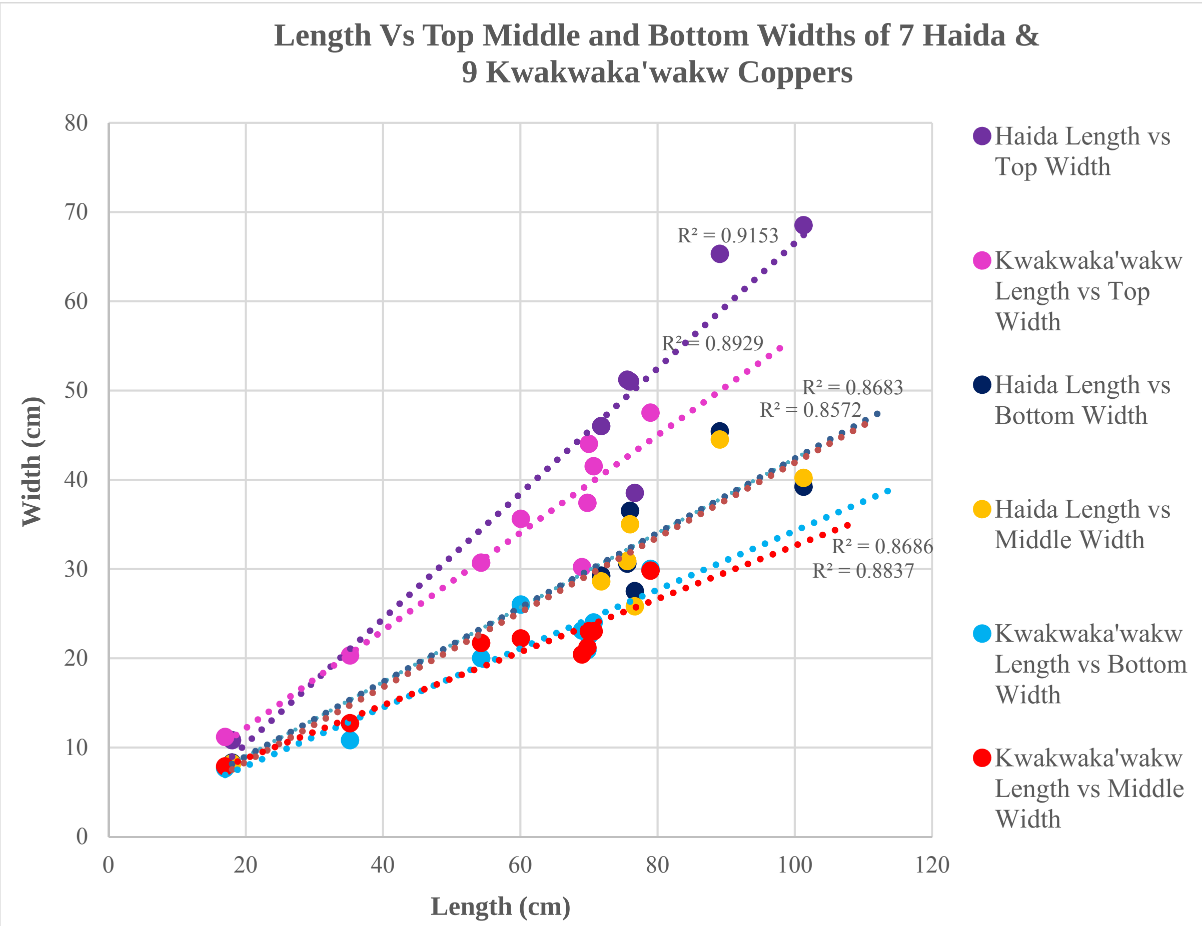


Figure 6.10. The top, middle, and bottom width vs length measurements of seven Haida and nine Kwakwaka'wakw Coppers.

Kwakwaka’wakw Coppers that meet these criteria. As such here the northern Haida artefacts are compared to the southern Kwakwaka’wakw artefacts in order to establish trends in proportionality expressed through object construction. Figure 6.9 suggests that the northern Coppers are closer in proportion while southern Coppers show more variation within the sample set. However, both styles of making largely follow the same trends, as suggested by their R^2 values, signifying similar practices. The length vs mid-width of Coppers in Figure 6.10 shows that Kwakwaka’wakw Coppers tend not to grow in width as they grow in length, suggesting that larger Kwakwaka’wakw Coppers are narrower in design while Haida Coppers proportionally grow in width and length.

Figure 6.11. A close view of the decorative processes visible on four separate Coppers that have been painted and then engraved. Record 233: 'Nakwaxda'xw Kwakwaka’wakw Copper (Photo by author, ©RBCM); Record 219: Dzawada’enuxw Kwakwaka’wakw Copper (Photo by author, ©MOA); Record 216: Gitxan Copper (photo by author, ©MOA); Record 230: Kwikwasut’inuxw Kwakwaka’wakw Copper (Photo by author, ©RBCM).

Copper decoration strategies include applying pigment before engraving through the dried coating to again reveal the metal beneath, engraving the metal and then applying pigment, painting a design onto the artefact without the use of engraving, or covering the Copper completely in pigment with no specific design. It is possible to identify the syntax of such processes of making by examining the surface of the artefacts and making note of the state of the metal and paint. In cases where a design is engraved following painting, the engraved edges of the pigment appear crazed and broken supporting the assertion that the pigment was dry at the time. The surface of the copper retains the markings of the tool used to scrape at its surface (Figure 6.11).

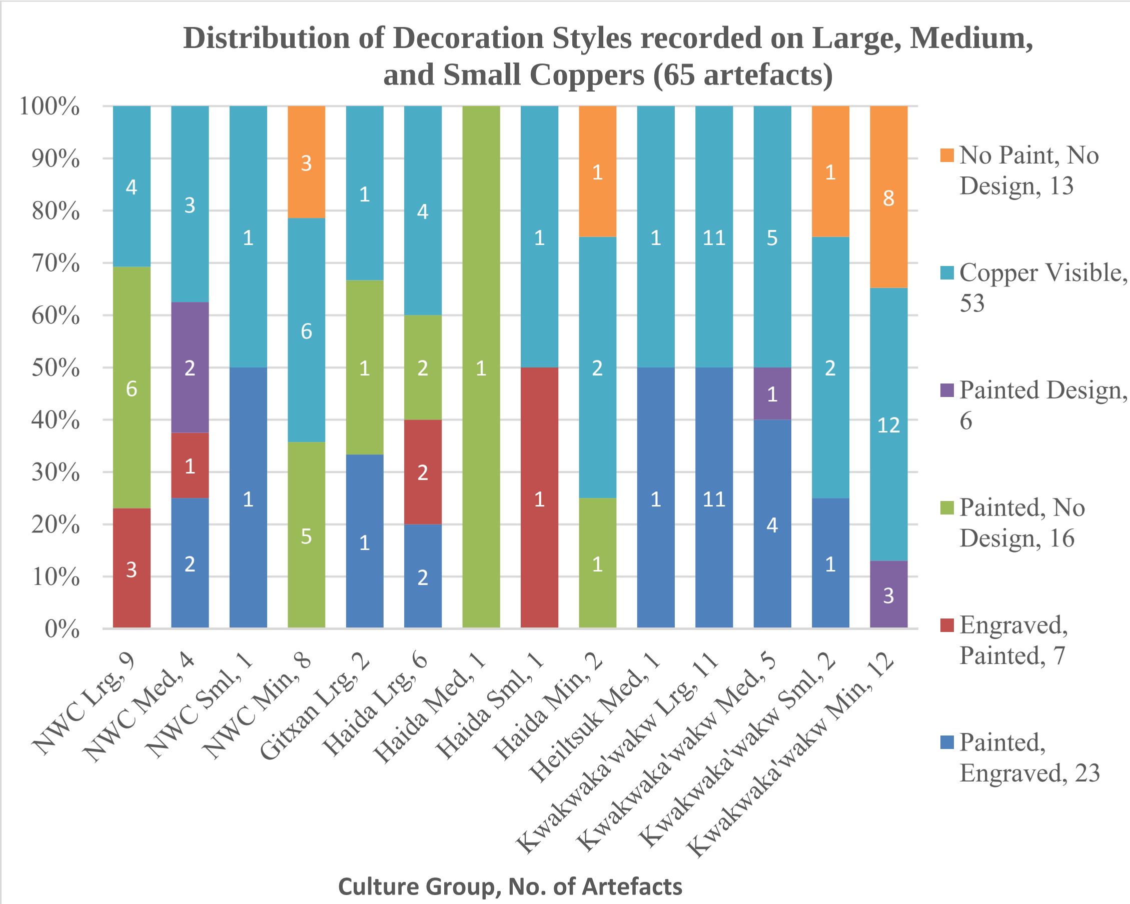


Figure 6.12. The frequency distribution of styles used to decorate Coppers across the Northwest Coast.

These decoration strategies have been assessed across the 65 Coppers in this study, revealing some trends in regional making practices. Specifically, only small and miniature Coppers are found unengraved or unpainted, and these objects appear more frequently in the south. However, the frequency distribution graph of decoration attributes suggests that undecorated small and miniature Coppers are being made across the Northwest Coast among the culture groups who create them (Figure 6.12). Each of the 23 Coppers that have been painted and engraved have also had areas of the pigment removed to show the metal, utilising the contrasting colours as part of the design. In fact, all Coppers that have been decorated using more processes than simply applying one solid colour to the object utilise the colour of the metal in the design. Additionally, painted designs that do not involve engraving are found only in the southern portion of the study area while engraving and then painting is found only in northern communities within this sample set.

6.2.1.3.1. Silver Plated

Figure 6.13. Gwawa'enuxw Kwakwaka'wakw Copper, Record 206, which has been gilded or plated with a silver alloy (Photo by author, ©MOA).

A single large Gwawa'enuxw Kwakwaka'wakw Copper, Record 206, housed at the Museum of Anthropology, represents the only Copper created using a silver-rich metal (Figure 6.13). The body of the artefact is composed of a thick sheet of copper metal, the front of which has been gilded or plated with a thin sheet of 3:2 silver to gold alloy. This layer is thick enough that no copper metal is detected when sampling its surface with the HHpXRF device. This coating is unlikely to be from depletion gilding processes as HHpXRF characterisation samples taken from the back of the artefact are consistent with copper metal containing <1% trace As and Fe (Lechtman 1988; Sáenz-Samper & Martinón-Torres 2017, 1254).

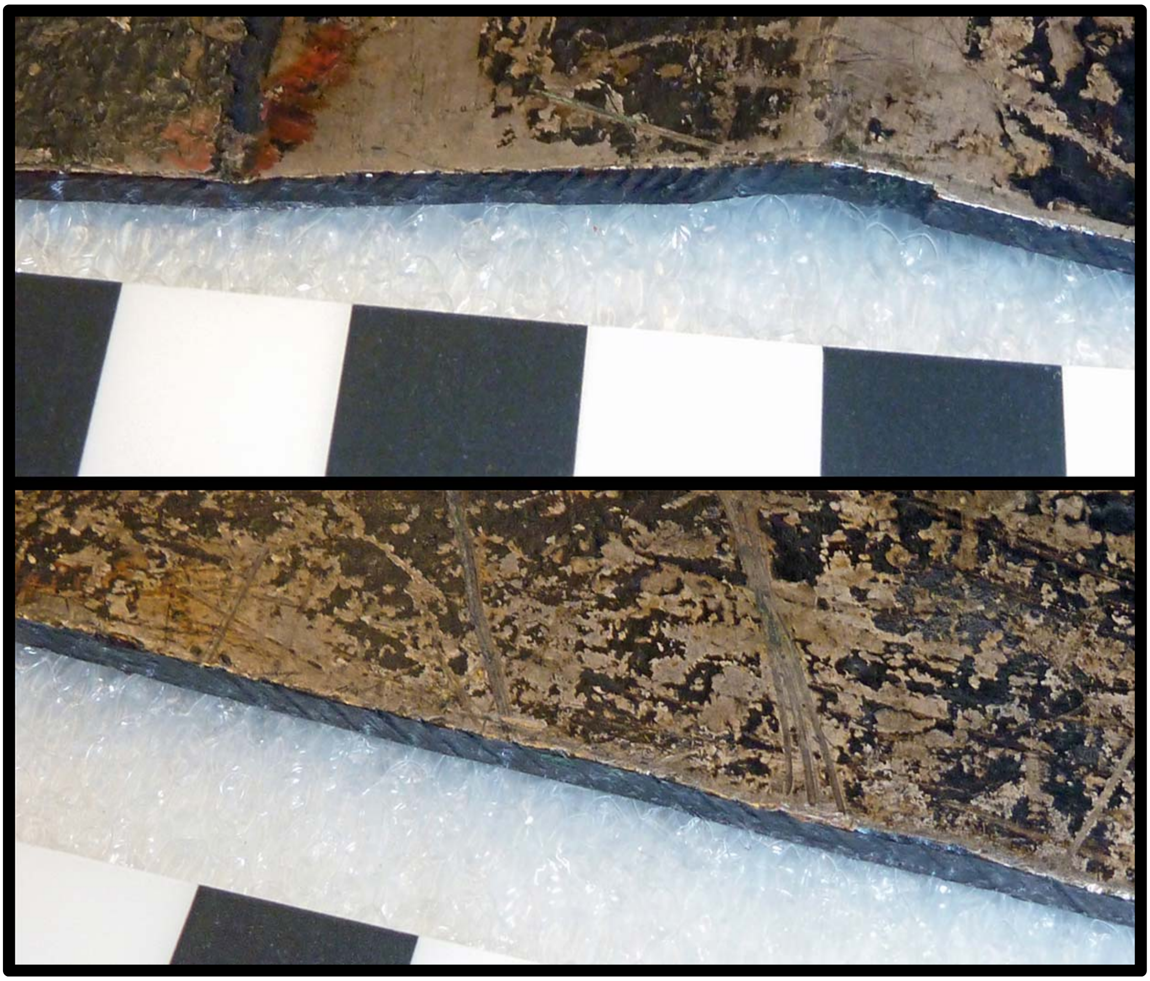


Figure 6.14. Gwawa'enuxw Kwakwaka'wakw Copper, Record 206, showing a view of the cut edges of the artefact and spalling of the gilding or plating. This suggests that the material was gilded or plated prior to cutting the metal into the shape of the Copper (Photo by author, ©MOA).

The coating appears to have undergone spalling at the edges of the metal sheet where it has been cut using a serrated tool. This suggests that the sheet was gilded or plated prior to this Copper being cut to shape from the material (Figure 6.14). The entire object has subsequently been painted black, obscuring the syntax of production. Thus, it is unclear if the repoussé top panel and central T-ridge were worked into the copper sheet prior to the gilding or plating process. An anthropomorphic design has been engraved into the surface of the metal utilising the black, silver, and copper colours. Markings from the inscribing tool used to engrave the object, removing layers of pigment and metal, are visible in the surface of the artefact (Figure 6.15).

Figure 6.15. Gwawa'enuxw Kwakwaka'wakw Copper, Record 206, showing a view of the engraving technique that reveals both the gilding or plating beneath the black pigment as well as the copper, making use of the broadened colour scheme in the design (Photo by author, ©MOA).

The bottom edge of the Copper is irregular in comparison to the neat, straight, potentially sawn edges of the rest of the artefact. This metal appears to have been cut using a different type of tool than that used for the rest of the artefact. Additionally, damage to the pigment on the surface of the Copper suggests this action occurred sometime after its application and drying. It is proposed here that the metal edges became burred during this process and that subsequent grinding and polishing has been undertaken to even out and remove these sharp protrusions, and that this action has caused the gilding or plating to appear smeared across the bottom edge of the artefact (Figure 6.16). It is possible that this Copper has been involved in a breaking and a portion of metal was removed. Alternatively, these features could be related to the production process in some way or to repair processes following a different type of damage unrelated to the object's conspicuous social uses.

Figure 6.16. Gwawa'enuxw Kwakwaka'wakw Copper, Record 206, showing the cut bottom edge from the top and bottom. The gilding or plating appears smeared over the edge of the artefact, potentially from grinding to remove burrs following a cutting process. From the rear, hammering and grinding marks are visible in the surface of the copper sheet (Photo by author, ©MOA).

6.2.1.4. Sheet Metal Thickness Assessment

The thickness of the Coppers can be broadly correlated to the size of the artefact, specifically ca. 75% of miniature Coppers are composed of sheet metal <1mm thick, while ca. 62% of medium and large Coppers measure >2mm in thickness (Figure 6.19). This is not altogether straightforward however, as two Kwakwaka'wakw and one Haida Coppers are composed of multiple thin sheets of metal that have been bent, mechanically joined, fixed, and painted in such a way that the Copper appears much thicker than the individual sheets used to create the object.

The Haida Copper is broken, with a significant portion of the lower half of the artefact removed (Figure 6.20). The damaged edge where the breaking occurs reveals an artefact composed of multiple pieces of thin metal sheet that have been laid atop each other in a laminar fashion, perforated, and mechanically joined using rivets. There are multiple empty rivet holes that do not overlap on the metal sheets, indicative of a previous use life for these individual pieces prior to being brought together to create this object. The Kwakwaka'wakw Coppers (Records 75, 230) are composed of several smaller pieces of metal that have been joined using lap seam and flat lock seam techniques (Figure 6.17; Figure 6.18).

Figure 6.17. This Kwaiwasut'inuxw Kwakwaka'wakw Copper, Record 230, is composed of multiple pieces of metal that have been mechanically joined and fixed together using lap seams, flat lock seams, solder, and rivets, prior to being painted and decorated (Photo by author, ©RBCM).

The laminar style of making used to create the Haida Copper is plainly visible along the edges of the artefact and differs from the Kwakwaka'wakw Coppers, where the composite nature of the artefacts appears purposefully obscured by skilful joining techniques and extensive use of pigment. While these artefacts are visually different in appearance the strategic tasks involved in the *chaîne opératoire* of production echo each other. These practices may indicate style preference and a commitment to creating large Coppers that appear thicker and more robust than they necessarily are. However, it is also possible that because thin sheet metal does not lend itself to large sturdy objects, this type of construction was simply a way to make the artefact more rigid and ready for public use in activities such as ceremonial dances without bending out of shape. It is further possible that the creation of a central T-ridge was originally developed not as a decorative feature but as a means to stiffen the metal.

Figure 6.18. This Kwakwaka'wakw Copper, Record 75, is composed of multiple pieces of metal that have been mechanically joined and fixed together using countersunk lap seams, flat lock seams, and rivets, prior to being painted and decorated (Photo by author, ©MOV).

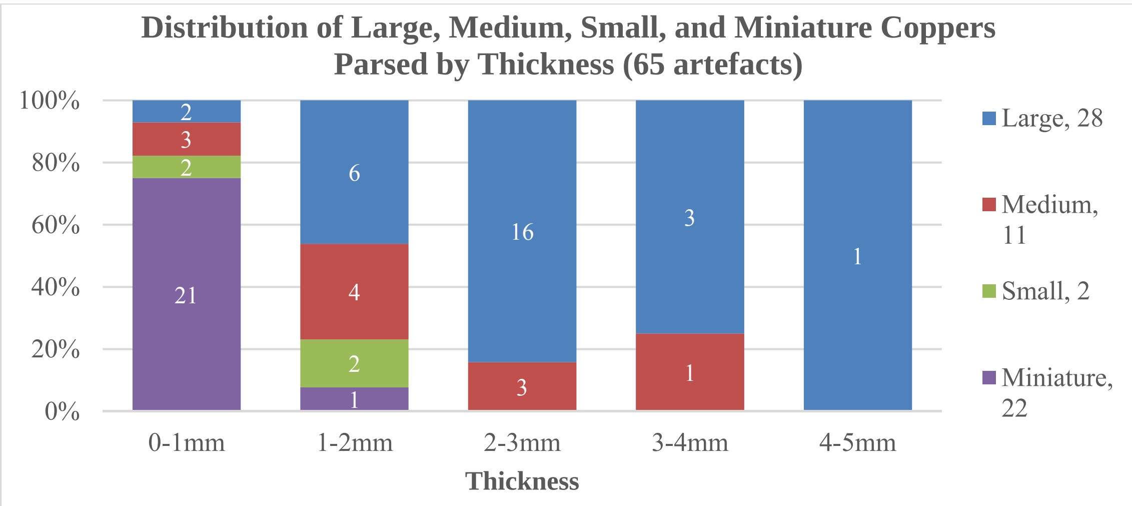


Figure 6.19. The distribution of large, medium, small, and miniature Coppers parsed by the thickness of the artefacts.

Figure 6.20. Haida Copper, Record 231, is constructed from multiple thin metal sheets overlaid in a laminar fashion. These sheets are perforated and fixed together using rivets, and then shaped and painted prior to being broken (Photo by author, ©RBCM).

6.2.1.5. Joining Techniques

Among the Coppers analysed, 18 of the artefacts are composite in nature and have been fitted and fixed together using specific metallurgical methods as outlined in Chapter 4. The mechanical methods of joining include lap seams, countersunk lap seams, flat lock seams, and the use of nails and rivets (Figure 6.17; Figure 6.18; Figure 6.20; Figure 6.21; Figure 6.22). Nearly all the composite Coppers have been created using a lap seam method, ca. 89%. However, one method of forming does not necessarily disallow another. As such, while other methods of joining are not identified so often, one Kwakwaka'wakw Copper (Record 75) has been created using both countersunk lap seams and flat lock seams, and another (Record 230) has been created using both flat lock seams and lap seams. In practice, distinguishing between lap seams and countersunk lap seams can be difficult, as the edges of these joins can be obscured. As such, it is possible that some countersunk lap seams have been misidentified as lap seams.

These methods of mechanical joining complement production processes utilised in the region, involving shaping techniques that can be achieved using cold working and annealing methods and an Indigenous tool kit. Four of the Coppers, one provenanced to the Northwest Coast, and three to the Kwakwaka'wakw, have also been made using solder or a similar looking adhesive in combination with a mechanical joining method (Figure

6.23). The presence of solder suggests a timeframe of creation later in the colonial period for these artefacts. The distribution of joining methods detected across the region further suggests that the Kwakwaka'wakw more frequently created composite Coppers, and perhaps were more frequently engaging in activities that required the deconstruction or reconstruction of the objects (see Vaughan & Holm 1982, 63; Hunt 1906; Kan 2016, 242).

Figure 6.21. Dzawada'enuxw Copper, Record 219, is a composite artefact composed of two pieces of metal. The majority of the body of the artefact is formed using a sheet of Copper Metal, while a small piece of Low Zinc Brass sheet is mechanically fixed to the bottom of the Copper using a flat lock seam and chemically fixed using solder. Following forming, black pigment has been added to the artefact and a design has been engraved through the pigment (Photo by Author, ©MOA).

Figure 6.22. A Northwest Coast Copper, Record No. 303, is an example of a countersunk lap seam, where the edges of the separate pieces of sheet metal have been prepared to receive each other, allowing the flat surface of the Copper to be maintained (Photo by author, © Friends of the British Museum).

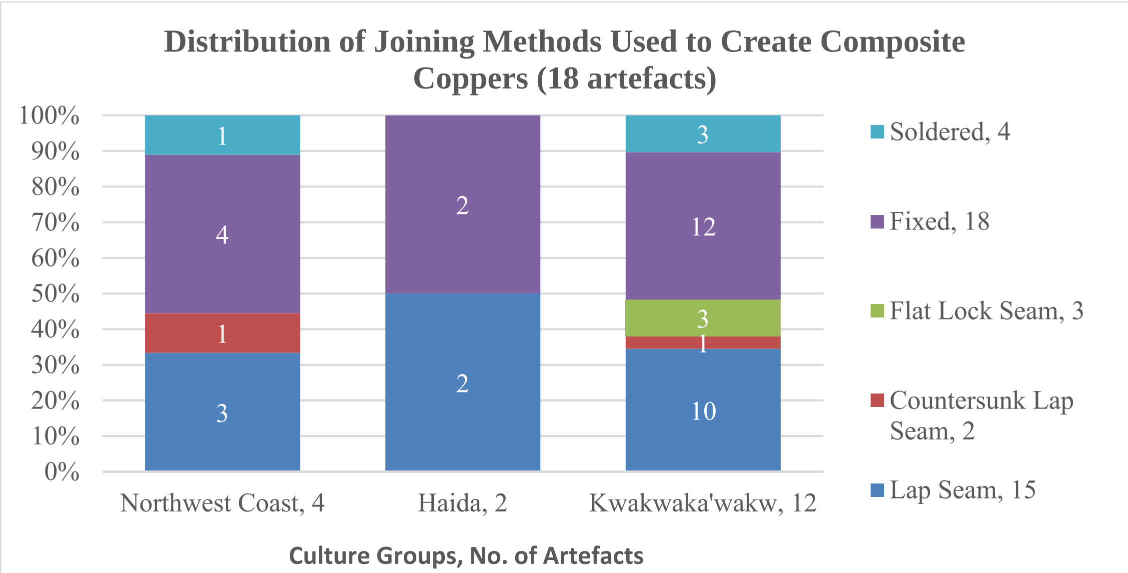


Figure 6.23. Distribution of joining methods used to create composite Coppers.

6.2.1.6. Copper Fragments

Among the broken Coppers, two Gitxsan and two Northwest Coast artefacts are composed of single fragments that have been removed from a larger artefact (Records 216, 217, 223, 224). Within the bounds of this project there is no way of confirming the placement of these particular fragments within the body of the past Coppers that they have been excised from. However, they are identifiable through the learned and embodied way of making that ties these pieces together, and to the broader 'Copper' typology (Van Oyen 2013, 96). Specifically, the flattened regular thickness of the metal is suggestive of manufactured sheet, a material commonly used to create the large Coppers found in this study. One Gitxsan fragment (Record 217; Figure 6.25) and one Northwest Coast fragment (Record 223; Figure 6.26) have been worked into a bulging form reminiscent of the top portion of a Copper created using a *repoussé* style.

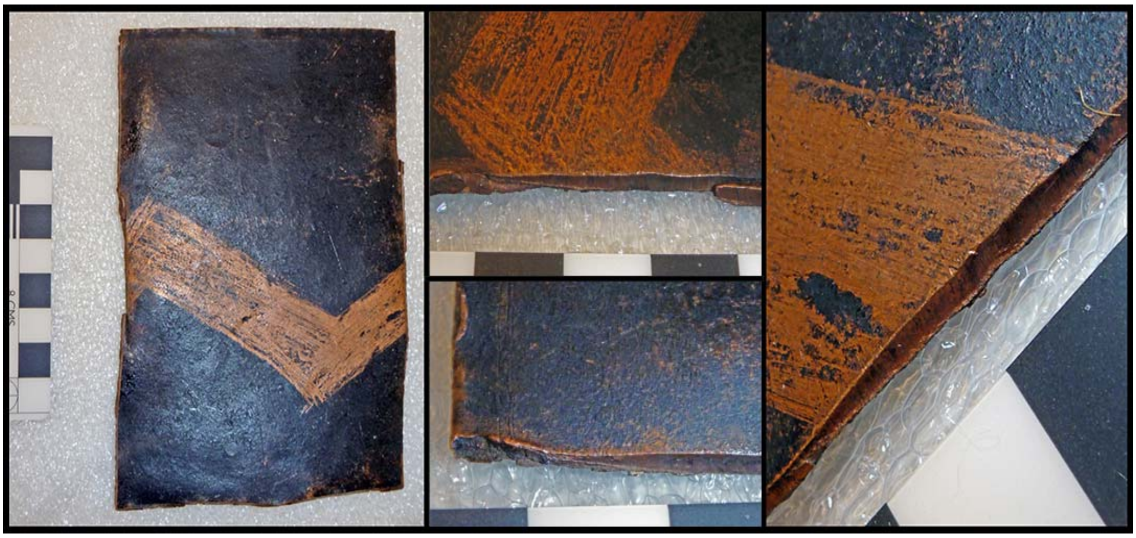


Figure 6.24. Record 216, a fragment of a large Gitxsan Copper with one dressed edge, and three roughly cut edges potentially due to a breaking (Photo by author, ©MOA).

Further decoration styles used to create Coppers are also present. Specifically, a Gitxsan fragment (Record 216; Figure 6.24) has been painted on the front and back with black pigment and a geometric design has been engraved, revealing the copper metal. Bernick has suggested that chevron shaped designs found across the region may have some tie to the designs found in basketry created from 2400-1500BP (Bernick 1998, 149). A Northwest Coast fragment (Record 223; Figure 6.26) is engraved with a formline design and painted. These artefacts also display some dressed edges that retain regular striations from the cutting and grinding or polishing processes that were potentially used to create the Coppers that these fragments were removed from. These dressed edges are found adjacent to edges that have been cut using a tool that appears to have split the metal in stages, leaving behind pinched, sharp edges, indicative of shears and chisels. The markings on the bodies of these fragments indicate a syntax that involves the construction, decoration, use and deconstruction of Copper artefacts.

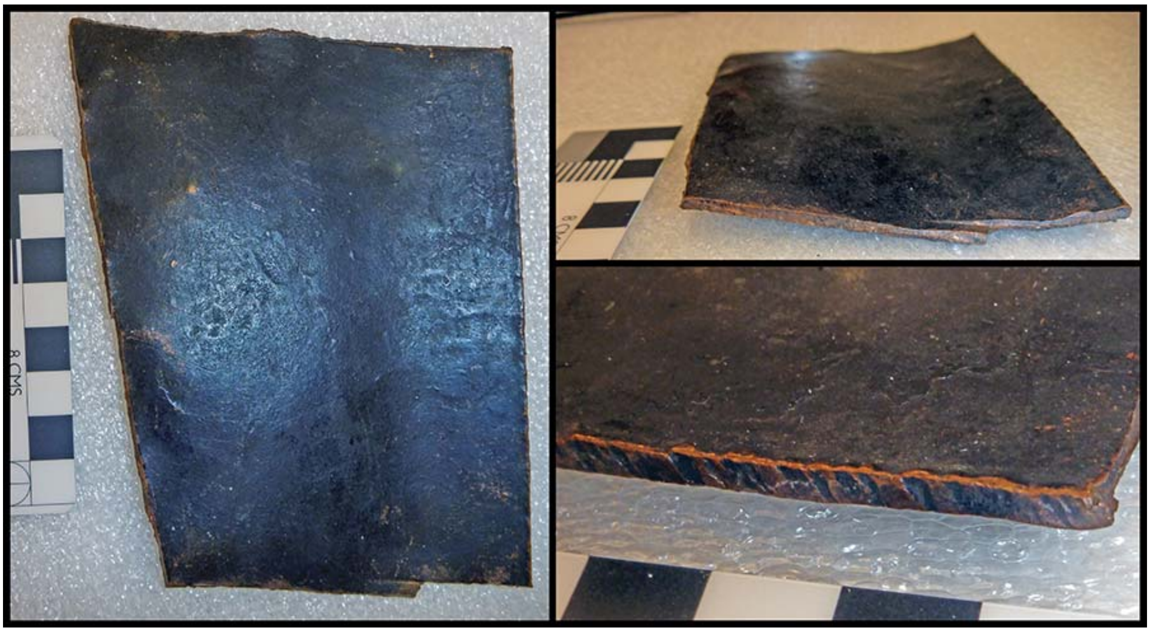


Figure 6.25. Record 217, a fragment of a large Gitxsan Copper with one dressed edge, and three roughly cut edges potentially caused during a breaking. The bend visible in the body of this metal fragment may represent a portion of the repoussé style top panel of a Copper (Photo by author, ©MOA).

Figure 6.26. Record 223, a fragment from a large Northwest Coast Copper. All four edges of this metal fragment have been roughly cut, potentially due to a breaking. This artefact was engraved and painted with a formline design prior to being cut (Photo by author, ©MOA).

6.2.1.7. Reconstructed Coppers

Coppers can be reconstructed as well as cut and broken, and there are six clear examples of this style of making included in this study. Five of these Coppers are provenanced to the Kwakwaka'wakw (Records 207, 225, 230, 233, 245), and one to the Northwest Coast (Record 239). The Northwest Coast specimen is created in a similar way to Kwakwaka'wakw Coppers with multiple pieces of metal, thick paint, and an anthropomorphic design, suggesting that it may have a similar provenance. Chief Mungo Martin's 'Ma'haynootsi' or 'Great Killer Whale' Copper provides a clearly documented example of this strategy of use and remaking (Record 233; Figure 6.27). The known origins of this Copper begin with Kwakwaka'wakw Chief's Peter Scow and Willie Seaweed who decided together to attach an older T-ridge from a broken Copper to a new sheet of metal. Willie Seaweed then painted and engraved the design visible today. Then Chief Martin, a Kwakwaka'wakw Chief of the Geeksem *Namaym* of the Kwakiutl and a distinguished carver, purchased the remade artefact from Chief's Scow and Seaweed. Martin paid approximately $2010 for the object in 1942 (Duff 1981, 157-74).

Martin used the artefact through his life. For example, the top left corner was broken by Chiefs invited to carry out this action by Martin at his son's initiation into the Hamatsa secret society, and the bottom was broken to neutralise a challenge from a rival chief over his son's Hamatsa rights. The bottom portion was thrown into the sea at the death of Martin's brother. The Copper was invoked again in December of 1953 at the opening ceremonies of the Mungo Martin house in Thunderbird Park Victoria, B.C., as part of a 'cradle ceremony' for his granddaughter. The final time the Copper was used in display was as the 'coffin' for Martin's son when he passed away. Following this, Martin stated that the Copper could go no further, and donated it to the B.C. Provincial Museum in 1960 (RBCM 9251; Duff 1981, 157-74). The specific biography of the old central T-ridge, prior to its rejuvenation as 'Ma'haynootsi' is not known, though its presence and use attests to the well-established practices surrounding Coppers among the Kwakwaka'wakw.

Specific stories for the five other Coppers that have been recreated are not known. Four of the Coppers appear to have been built up around a central T-ridge, reminiscent of 'Ma'haynootsi', however these objects are created using multiple fragments of metal sheet affixed to the edges of the T-ridge to complete the object, rather than affixing the T-ridge to a single sheet of metal (Records 225, 230, 239).

Figure 6.27. 'Ma'haynootsi' or 'Great Killer Whale' Copper, Record 233, owned and used by Chief Mungo Martin (Photo by author, ©RBCM).

Figure 6.28. Gwa'sala Kwakwaka'wakw Copper, Record 207, which has been broken and fit back together using brackets and rivets affixed to the back of the object. The central T-ridge is formed both as a peaked ridge and as an engraved design on the body of the artefact (Photo by author, ©MOA).

One Copper, provenanced to the Gwa'sala Kwakwaka'wakw, was once composed of a single sheet that has been cut or broken in half, and then these two halves have been reunited in the object's reconstruction (Record 207; Figure 6.28). Having been broken, the Copper was re-joined with rivets and brackets to create a rough butt joint, at its 'waist' where the horizontal portion of the central T-ridge normally resides. The peaked, vertical portion of the T-ridge is present on the bottom half of the artefact. However, the metal does not appear to have been bent to form the top of the T. Instead, following reconstruction, the metal has been engraved to apparently extend the vertical part of the T onto the top portion of the object, with the horizontal top of the T-ridge engraved some distance above the waist. This engraving overlays an older painted design that is faintly visible. Combined, this could suggest that the breaking, followed by the reconstruction and redesign of the object signifies a significant change for the artefact, potentially related to a new owner or an increase in value following past use (see Boas 1930; Emmons 1991; Kan 2016, 241-2). As ca. 28% (N=18) of the Coppers have been created from fragments of metal, and it is understood that fragments of a Copper could be used in the composition of another artefact (Duff 1981, 154), it is possible that some of these artefacts are composed, at least in part, of broken pieces of past Coppers. Unfortunately, this part of a *chaîne opératoire* is challenging to identify due to the extensive metal manipulation that has been an intrinsic part of each artefact's construction and use.

6.2.1.8. Copper and Copper Alloy Metals Used to Create Coppers

130 individual pieces of metal used in the construction of the 65 Coppers included in this study were chemically characterised using HHpXRF. 116 pieces of metal, or ca. 89% of the entire sample set, are consistent with the Copper Metal group. The remaining thirteen pieces of metal are consistent with a range of copper alloys. Additionally, one sample represents the Gwawa'enuxw Kwakwaka'wakw Copper (Record 206) that has been gilded or plated with an alloy of silver and gold (see Figure 6.13). One of the thirteen alloys identified within the sample set is a large Copper composed of a single sheet of Leaded Tin Bronze provenanced to the Kaigani Haida (Record 244). The remaining samples manufactured from other alloys are provenanced to Kwakwaka'wakw communities. Specifically, six are consistent with Arsenic Bronze, two with Low Zinc Brass, one with Leaded Low Zinc Brass, two with Leaded Gunmetal, and two with Leaded Tin Bronze (Figure 6.30).

Of the six metal characterisations consistent with Arsenic Bronze, four represent individual miniature 'Na̱mg̱is Kwakwaka'wakw Coppers strung together on a fibre cord (Record 167). One Arsenic Bronze sample is pieced together with two Copper Metal sheets to create the top right fragment of a large Mamalilikala Kwakwaka'wakw Copper (Record 228), while another is found alongside four additional copper metal pieces to create a medium Kwakwaka'wakw Copper.

Two pieces of metal are consistent with Low Zinc Brass. One is a strip of metal that is both mechanically joined with a flat lock seam and chemically joined with solder to the bottom of a small Dzawada'enuxw Kwakwaka'wakw Copper composed of Copper Metal (Record 219; Figure 6.21). The other is a piece of the vertical portion of a T-ridge that is involved in the composition of a reconstructed Kwagu'l Kwakwaka'wakw Copper (Record 225). This Copper is composed of at least nine metal sheets, and multiple rivets made from a variety of alloys. For example, the top of this Copper's T-ridge is consistent with a Leaded Low Zinc Brass, while the top half of the vertical portion of the T-ridge is consistent with Leaded Gunmetal, and one of the larger rivets used in the object's construction is consistent with Admiralty Brass (Figure 6.29; Callcut 1996, 18). The second piece of metal consistent with Leaded Gunmetal is found alongside at least eleven additional pieces of Copper Metal in the construction of a composite Tlowitsis Kwakwaka'wakw Copper, that appears to have been broken multiple times (Record 232). The second Leaded Tin Bronze sample is found alongside at least eight pieces of Copper Metal in the composition of a Kwikwasut'inuxw Kwakwaka'wakw Copper (Record 230).

Figure 6.29. A view of Kwagu'l Kwakwaka'wakw Copper (Record 225), which is composed of multiple pieces of metal. This artefact is a potential example of a Copper created using portions of a T ridge that was involved in the composition of a past artefact (Photo by author, ©MOA).

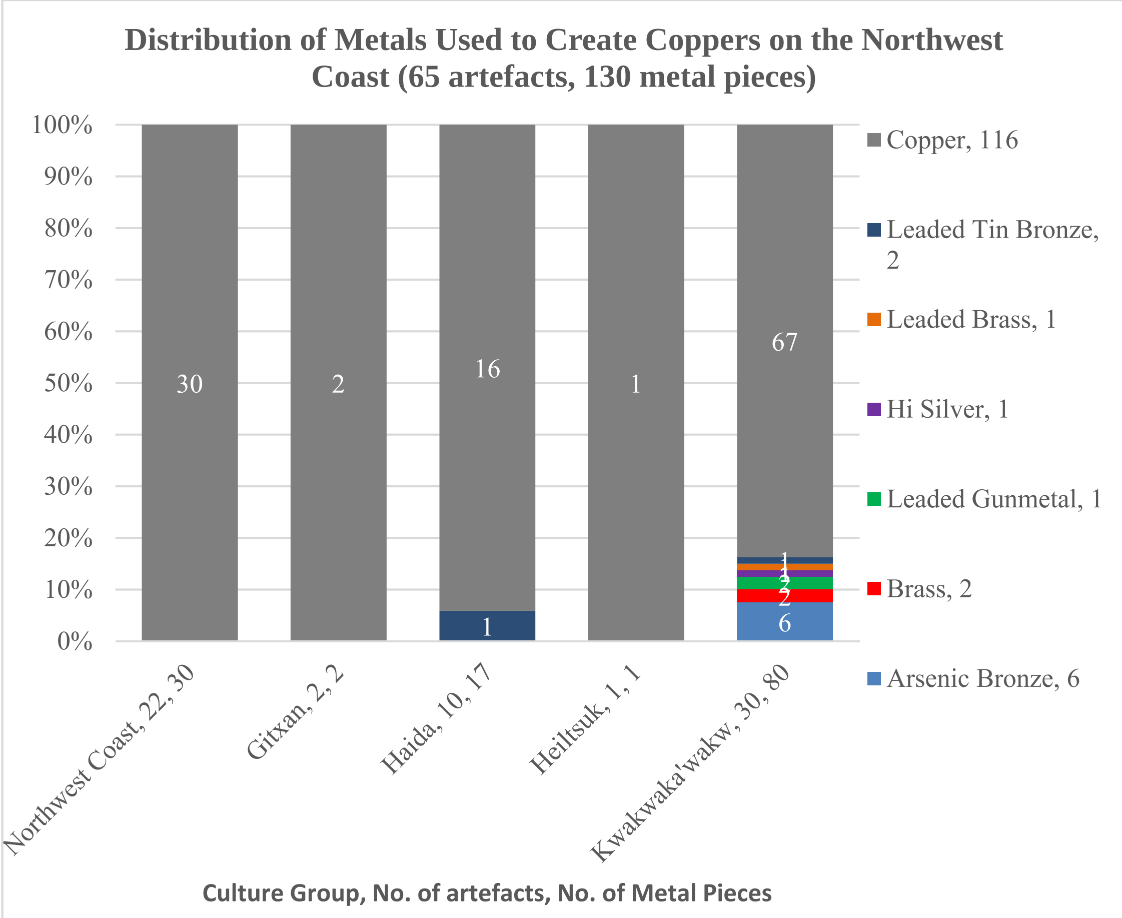


Figure 6.30. Distribution of metals used to create Coppers on the Northwest Coast.

6.2.1.8.1. Manufactured or Native Metal in the Construction of Coppers

The question of whether Coppers were made with native metal on the Northwest Coast has been persistent throughout the literature on the subject. To this end, numerous studies of the metal used to create Coppers have been conducted. Couture and Edwards (1963, 1962), and de Widerspach-Thor (1981) together examined more than 129 Coppers housed at museums across the United States and reported that all findings were consistent with manufactured metal. There is little additional information on this study. Jopling analysed two Northwest Coast, six Tlingit, three Haida, one Tsimshian, and three Kwakwaka'wakw Coppers using a combination of X-ray Fluorescence, neutron activation analysis, radiography, and microprobe analysis, and also determined that all artefacts were composed of manufactured metal (Jopling 1989, 79-98).

Wayman, King & Craddock conducted a study in 1992 that included three large and three miniature Coppers using atomic absorption spectroscopy and metallographic analysis. Two large and one miniature Copper assessed in the 1992 study are also included in this research. A comparison of chemical analyses supports a mutual assessment that miniature Northwest Coast Copper (Record 300), large Haida Copper (Record 301), and large Northwest Coast Copper (Record 303), are all consistent with manufactured metal (Wayman *et al.* 1992, 7-11). Hook & Craddock (1988), as well as Wayman *et al. (*1992) further propose that bismuth detected in the metal's composition could indicate a link to the bismuth rich Cornish ores used extensively in British copper production in the mid-18th and 19th centuries. They suggest that, should such a link exist, the materials used to make these Coppers could be tentatively dated to that timeframe. In this study 226 individual metal pieces, making up ~31% of the entire sample set, are characterised as containing detected trace amounts of bismuth. These metal pieces are found on all artefact types examined in this study, and among culture groups residing across the entire region. Of these, 32 metal pieces used in the making of 24 coppers provenanced to either the Kwakwaka'wakw, Haida, or Northwest Coast are characterised with trace amounts of bismuth. This suggest that this metal was widely traded in the study region, and that perhaps Cornish ores and the metal made from it was also traded among European, Russian, and/or American manufacturers for smelting and refinement prior to its arrival on the Northwest Coast.

Wayman *et al.* suggest that the chemical composition of miniature and small Coppers may be able to cast more light on the question of the use of native metal, arguing these smaller objects could be made with the native copper nuggets available across the Northwest Coast. They argue that these were potentially the first Coppers, and that miniature Coppers could be involved in any number of uses, such as decorations on dance aprons, earrings, a child's toy, or in gift giving ceremonies at a Potlatch (Wayman *et al.* 1992, 7). Alternatively, Wyatt argues that these small Coppers were also created to sell to tourists (Wyatt 1984, 32). All the miniature Coppers included in this case study have been identified as manufactured metal.

The majority of the metal characterised among Copper artefacts in this study is consistent with the Copper Metal group and contains trace amounts of elements such as arsenic, tin, zinc, lead, nickel, and bismuth. This indicates that the copper is derived smelting ores and melting and refining alloys. There are only five samples in this study that are free of any detectable trace elements. However, these five pieces of metal also do not contain detectable amounts of iron, vanadium, and potentially silver, which are often found in the native metal, suggesting that they are modern manufactured metals created in the mid-20th century (McCarthy 2005; Hay 1863). One of these samples is represented by the large sheet used to create 'Ma'haynootsi' or 'Great Killer Whale' (Record 233; Figure 6.27), which is known to have been recreated using a manufactured sheet of metal (Duff 1981, 153-4). Additionally, three of these 'clean' samples are represented by miniature Coppers affixed to a Dzawadaenuxw Kwakwaka'wakw carved wooden staff, along with three miniature Coppers that contain trace elements of lead (Record 238, Figure 6.2). All six of the Coppers affixed to the staff are composed of a consistently thin metal suggestive of manufactured sheet. Another of these five 'clean' samples is found alongside ten pieces of Copper Metal that contain trace amounts of arsenic and lead, and one piece of Leaded Gunmetal, in the composition of Tlowitsis Kwakwaka'wakw Copper, Record 232. The final 'clean sample' is found alongside a Low Zinc Brass alloy, a Leaded Low Zinc Brass alloy, a Leaded Gunmetal alloy, and five pieces of Copper Metal containing trace amounts of lead, arsenic, and bismuth, in the creation of a Kwagu'l Kwakwaka'wakw Copper (Record 225). Given these circumstances it is possible that all the Coppers included in this study are composed entirely from manufactured metals that date both prior to and after the development of technologies such as bessemerisation that made producing 'clean' copper much more achievable.

6.2.1.9. A Copper's Life, Before and After Colonial Contact

Here the individual logics of the making and use of Coppers are investigated to address the question of change through the fur trade and colonial period on the Northwest Coast (Van Oyen 2013, 87). Coppers are particularly interesting, as they are often described in oral traditions as ancient artefacts (de Laguna 1972, 231-247; Swanton 1909, 347-368; Korsun 2004; Acheson 2003, 219). McIlwraith for example, wrote that the Nuxalk produced large Coppers with native metal by heating it in a fire and beating it into shape (McIlwraith 1948, 253). Mackenzie wrote of seeing two small, apparently ancient, Haida Coppers created from native metal (Mackenzie 1891, 52). However, to date none of the Coppers chemically analysed are consistent with native metal, which would be potentially indicative of an artefact produced prior to the influences of Eurasian colonial entities and materials (Couture & Edward 1962, 1963; de Widerspach-Thor 1981; Cooper *et al.* 2015a, 145-7). Wayman *et al.* (1992, 7-11) have suggested that small and miniature Coppers are more likely candidates to have been made from native metal. However, the sale of small and miniature Coppers as curios for tourists in the late 19th and early 20th century has also been noted (Wyatt 1984, 32), which could make identifying an ancient Copper rather like the proverbial needle in a haystack. Additionally, it is possible that a sheet of manufactured copper recovered as drift metal was used to create one or many Coppers in the pre-contact period (see Gleeson 1981, 3, 53; Deur *et al.* 2014, 264). Chemical analysis is rendered moot in such an instance and, due to the sometimes-extensive re-use of the metal in the (re)creation of Coppers seen in this study (Duff 1981, 153-6), it is possible that metals from a much earlier time have been involved in the creation of what might be considered a more 'modern' artefact.

Possible antecedents of Coppers could have been made of different materials such wood, stone, or bone. However, any potential examples of Coppers composed of other constituents are quite sparse and do not retain dates of their creation. For example, small whalebone and slate amulets that resemble Coppers (de Laguna 1972, 1053, 1096) were collected early in the maritime fur trade period and may or may not have been created at a much earlier time.

The earliest known large metal Coppers are mentioned in primary documents by early explorers. Specifically, James Colnett wrote of seeing a Copper among the Haida in 1787 (Colnett 1786-88, 136) and Yuri Lisiansky wrote of seeing one among the Tlingit in 1804 (Lisiansky1814, 146). Neither seems to have understood what the purpose of the objects were, but in both instances the artefacts were involved in Indigenous affairs that did not include outsiders. Considering the interconnectedness of the Northwest Coast in terms of trade and other communications (Matson & Coupland 1995; Matson *et al.* 2003; Suttles 1990b), and the intervening years since the first known European and Russian arrivals to the region, it is possible that a widespread creation and use of large Coppers could coalesce across the region. However, these possibilities would suggest an extremely well-connected population by the 1870's and the arrival of maritime fur trade interests.

The data in this study indicates that the (re)making of Coppers may have been as important as their use, particularly among the Kwakwaka'wakw. This is suggested through the broader range of metal alloys used (Figure 6.30) and extensive use of multiple pieces of metal (Figure 6.7) to make and re-make objects in southern communities. The increase in fragmented Coppers may also indicate an increased use of Coppers in interactions that involve breakings and/or making in southern communities (see Hunt 1906).

Variations in the form, ways of making, and decoration of Coppers also appear to broadly be divided between the northern and southern culture groups who use the artefact in the region (Figure 6.8). The joining techniques used in the construction of Coppers appear slightly more involved among southern communities, for example using multiple lap seam and flat lock seam techniques within the making of a single artefact (Figure 6.23). However, this trend may be directly related to the fact that artefacts made of multiple pieces require multiple joins. A cross comparison in joining techniques across a range of artefacts provenanced to culture groups across the region could provide more context to this question.

As Lechtman argues, dealing with metallurgy in colour and design involves the study of surfaces. The colour of a metal object resides on its surface, and substances such as gilding or paint that are visually consumed may be entirely unrelated to the colours inside the material (Lechtman 1988, 371). The designs of Coppers appear to be somewhat divided between northern and southern communities in terms of the use of formline vs painted anthropomorphic designs. However, it is common across the region to incorporate the bare surface of the metal into the design using a combination of painting and engraving techniques (Figure 6.12). It is possible that, due to the significance of the metal on the Northwest Coast (Bird-David 1999; Cooper 2011; Gell 1998, 22), it was important for the material to be seen. This could also suggest that the colour of the metal was important and communicated specific meanings such as those tied to blood, cedar, and salmon (Mcllwraith 1948, 2 :688-90; de Laguna 1972, 899-900; Blackman 1990, 248). Alternatively, the strategy of revealing the metal again after painting the artefact could be related to artistic preferences and the ability to use a broader colour palette. The suggestion that using and revealing specific colours as meaningful messages is further reinforced by the recorded preferences of Indigenous populations for European pigments as they became available. Specifically, red, black, white, yellow, and green pigment were readily purchased from Europeans during the fur trade and colonial period while blue pigments not commonly used in Indigenous designs were less commonly purchased and applied to Indigenous artefacts (Miller *et al.* 1990; Wainwright *et al.* 2009).

The predominance of manufactured sheet metal consistent with Copper Metal within this study could suggest that there is a clear preference for this specific metal. However, as noted in Chapter 5, the various copper alloys used by Indigenous makers largely conformed to the same physical aesthetic and working qualities as the native metal available locally on the coast. Additionally, it is known that maritime fur trade era explorers and traders changed their trade goods from items such as glass beads and snuff boxes to copper sheet and iron chisels, in line with Indigenous desires (Morison 1921, 56-7). Therefore, though it is known that there was some testing of metal quality prior to trade (de Laguna 1972, 113; Cutter 1969, 159-161; Bancroft *et al*. 1886, 196; Keddie 2006, 20), and testing of Coppers to ascertain their legitimacy (see Jonaitis 1996, 9-10; U'Mista News 1996, 11-17), the preponderance of similar materials suggests that the interactions and feedback between foreign interests and Indigenous peoples resulted in a trade of objects and materials amenable to the different culture groups' requirements and wishes. Furthermore, the presence of multiple alloy types used to create Coppers could suggest that metallurgists were stockpiling metals of all types to use as needed, potentially due to a focus on making rather than material.

Coppers remained an important part of Indigenous material culture identity on the Northwest Coast throughout the fur trade and colonial periods. For example, once the activity became contentious in 1921 the objects continued to be made and used in Potlatch festivals in places that government officials could not easily reach (Cole 1985; Loo 1992, 128). In fact, in seeming defiance of the Potlatch Ban in 1927 artist Molly Wilson painted a large pictograph documenting Chief George Scow's 1927 Potlach, including multiple images of Coppers, on the rock face along the river at Petley Point in Kwakwaka'wakw Territory. This pictograph also included cows, showing a mix of old and new ways of living fit together in this representation (Williams 2001, 64). The material and the object have also continued to be considered powerful into the present day. For example, Chief Beau Dick of the Namgis Kwakwaka'wakw and other Canadian First Nations individuals broke a Copper on Parliament Hill in Ottawa in July of 2014 as a shaming ceremony, and a challenge for the Canadian government to do better (Guujaaw 2016; Troian 2014). As such, though the origins of the 'Copper' artefact remain vague, the creation and use of the artefact through the fur trade period and beyond suggests creativity, flexibility, and resilience within a loosely cohesive cultural strategy of communication that Coppers represent.

6.2.2. Bracelets

Copper bracelets were used in a variety of contexts on the Northwest Coast. For example, many accounts across the region describe bracelets and necklets worn in conspicuous displays of status and wealth (Hunt 2015, 56-61; Acheson 2003, 227; Colnett 1786-88, 136). Bracelets could also be involved in social activities such as marriages, as payment, at a Potlatch as a gift (Jopling 1989, 32; Boas 1897, 424), or included in a burial

(Cole 1985, 154). Through the fur trade and colonial period, a large number of copper bracelets and other artefacts were collected as the growing ethnographic interest in Indigenous populations incentivised foreign interests to create collections for display in venues such as museums. Bracelets were collected, for example, by Newcombe, Swan, Hunt, and Boas, either directly from Indigenous communities through negotiated purchases or from burial caves and other sites as available, to furnish museum and private collections (Pöhl 2008, 41-2; Whitehead 2010, 216; MacKenzie 1891; Newcombe 1902, 1912; Swan 1883). As such, bracelets included in this study can be thought of as communicating specific social messages related to wealth, the importance of the object and the metal, and its role in the reification of social structures, such as the reciprocal gift giving networks in the region and the object's continued importance within those structures.

6.2.2.1. Styles of Making

Figure 6.31. An example of a bracelet created from manufactured bar stock, Record 129 (Photo by author, ©LOA).

The 67 copper and copper alloy bracelets included in this study involve a variety of production strategies. These include working manufactured bar stock (Figure 6.31), hammering and folding flattened metal in on itself to create a solid bar with a laminar quality (Figure 6.32), or working sheet metal into cylindrical or square shaped 'bar', (Figure 6.35) which are then crafted into C-shaped bracelets (Figure 6.35). The bodies of some bracelets have an additional metal piece coiled around the bracelet (Figure 6.36). Other bracelets are composed of multiple strands of metal, again either of bar stock or crafted from sheet metal, that are twisted together creating a braided appearance (Figure 6.33).

Figure 6.32. An example of a Coast Salish bracelet created by folding sheet metal together in a laminar fashion, Record 117 (Photo by author, ©LOA).

Multiple primary accounts of early physical contact in the Northwest Coast written by European and Russian explorers include descriptions of copper bracelets and necklets worn by Indigenous individuals. These descriptions closely resemble the artefacts included in this study. For example, Captain Cook and his crewmembers wrote of seeing multiple copper and iron bracelets, necklets, and earrings among the Nuu-chah-nulth in 1778 (Cook 1967). Hoskins wrote of elliptical collars twisted from strands of metal like a rope and worn by chiefs as a 'badge of distinction' (Hoskins 1941, 235). In the late 18th century the Spanish observed highly polished bracelets and collars worn by the Tlingit, which they understood as being very valuable (Gunther 1972, 16). This may suggest that bracelets were also ground and polished in a similar fashion to the maintenance of spear points and daggers observed among the Tlingit at that time (la Pérouse 1798, 402-7).

Captain Dixon wrote of seeing copper necklets among the Haida in 1788 that he described as 'wreath like' (Dixon 1789, 237). Mackenzie, while examining Haida artefacts in the late 19th century, described what he thought might be the same or similar object as that written about by Dixon (1891, 51).

> "As a work of art by untutored savages with rude tools it is remarkable. Thought it has three strands it is all in one piece, twisted most systematically and tapering with precision from the centre to each end, all the strands being in perfect uniformity one with the other" (Mackenzie 1891, 51).

Though the descriptions of the twisted object are similar, it seems unlikely that the artefact is the same one, given nearly a century between these two accounts. However, these descriptions reflect several the bracelets included in this study and indicate a region wide use of copper bracelets created in a range of complementary styles.

Figure 6.33. Kwakwaka'wakw bracelet composed of three strands of sheet metal worked into cylindrical bars and twisted together, Record 56 (Photo by author, ©MOA).

6.2.2.2. Kwakwaka'wakw Bracelets

Thirty-nine bracelets are provenanced to the Kwakwaka'wakw. Fourteen of these have been crafted from manufactured bar. Five of the manufactured bar bracelets are Alpha Brasses, three of which have been engraved with a geometric design (Record 17, 18, 19). One of the bars is consistent with Leaded Brass, two with Arsenic Bronze, and five with Copper Metal all containing detectable trace amounts of arsenic, lead and/or nickel in <1% amounts, suggesting their manufactured origins (Craddock 1995; Hancock *et al.* 1991; Pernicka 1999). The material of one Kwakwaka'wakw bracelet (Record 142), consistent with Copper Metal, and has been hammered and folded onto itself to create a strip of material that resembles sheet metal. This bracelet too contains <1% detectable trace amounts of arsenic, lead, and zinc. Three bracelets are composed of Brass sheet that has been cut and worked into a C shaped bracelet that is convex and could resemble a thick bar when worn (Records 148, 156, 159; Figure 6.34).

Figure 6.34. A Kwakwaka'wakw bracelet, Record 159, composed of a strip of Brass sheet metal worked into a convex form ((Photo by author, ©LOA).

Twenty-two of the Kwakwaka'wakw bracelets are composed of sheet metal that has been worked into a cylinder so as to appear a solid bar of metal (Figure 6.35). Three of these (Records 55, 153, 154) appear roughly formed in such a way that their making is visible. Seven of these hollow bracelets are consistent with Copper Metal containing <1% trace levels of arsenic, lead, and nickel. Six bracelets are consistent with Arsenic Bronze, and three with Alpha Brass. Within this sample set bracelets of this design are only found among Kwakwaka'wakw communities. Three bracelets are composed of multiple strands of sheet metal that are worked into cylindrical tubes before being further twisted together (Record 56, 58, 61; Figure 6.33). One strand of one bracelet is consistent with Copper Metal containing <1% trace amounts of bismuth, arsenic, and lead (Record 56), while all other sampled metal is consistent with Arsenic Bronze. Two bracelets (Records 147 & 157) are composed of a single sheet of metal consistent with Arsenic Bronze formed into a cylinder and then further twisted, giving the body of the bracelet a spiralled appearance.

Figure 6.35. An example of a Kwakwaka'wakw bracelet created by working sheet metal in a cylindrical way, creating the effect of a solid bar of metal, Record 152 (Photo by author, ©LOA).

6.2.2.3. Unprovenanced 'Northwest Coast' Bracelets

Seventeen bracelets are provenanced to the broader Northwest Coast region. Twelve of these are composed of manufactured bar stock that is worked into a C shape. Of these, one is much smaller in diameter than all other bracelets made of manufactured bar and has been worked into a square shape in cross section. This bracelet is consistent with Brass and, considering its dimensions and composition, may have been created from drawn wire (Record 65). Ten of the 11 remaining bracelets created from manufactured bar are not engraved, nine of which are consistent with Leaded Brass (Records 81-83, 85-90), while one is consistent with the Brass group (Record 84). One bracelet (Record 57) is engraved with geometric designs that are visually similar to the three engraved Kwakwaka'wakw bracelets previously mentioned (Records 17, 18, 19) and is consistent with Tin Bronze.

One of the Northwest Coast bracelets is at least 200g heavier than any of the other bracelets included in this study. This bracelet is consistent with Copper Metal and contains <1% traces of arsenic and bismuth. This bracelet has been worked and folded in on itself to create a solid, thick, form, with seams from the folding process visible along the inner edge of the object (Record 54).

Three of the Northwest Coast bracelets are composed of an inner C shaped body that has had another piece of metal tightly coiled around it. Of these, one is composed of two pieces of manufactured bar stock consistent with Arsenic Bronze (Record 63), while one is composed of a thick piece of sheet metal consistent with Copper Metal worked into a cylindrical tube and formed into a C. This is then wrapped with a tightly coiled strip of manufactured bar consistent with Arsenic Bronze that is circular in cross section and is potentially drawn wire (Record 62). The third is composed of an inner body consistent with Arsenic Bronze, wrapped in a thin strip of Arsenic Bronze sheet metal (Record 1).

Figure 6.36. Northwest Coast bracelet, Record 62, composed of an inner body, consistent with manufactured copper metal, worked into a C shape and coiled with manufactured Arsenic Bronze bar (Photo by author, ©MOA).

6.2.2.4. Nuxalk Bracelets

Four of the bracelets are provenanced to the Nuxalk. Three of these bracelets are composed of three strands of sheet metal worked into cylindrical bars before being twisted around each other to create a braided appearance (Record 182, 183, 185), while one is composed of only two strands (Record 184). Two strands of each bracelet have been chemically characterised. Of the bracelets made with three strands, Record 185 contains two strands that are both consistent with Copper Metal containing <1% traces of arsenic and lead. The two characterised strands of Record 183 are also consistent with Copper Metal, though one contains <1% traces of arsenic and lead, and the other contains trace amounts of iron, ca. 0.11%. The metal containing only detectable amounts of iron could be consistent with native copper from the Northwest Coast or a 'clean' manufactured sheet copper that was readily produced from the mid-20th century (Craddock 1995, 79). All the characterised metals used to construct Record 182 and Record 184 are consistent with Arsenic Bronze.

6.2.2.5. Haida Bracelets

Three bracelets are provenanced to the Haida. Two are composed of three strands of metal that have been twisted together to create a braided effect. Of these, one is composed of three strands of manufactured bar of a yellow colour, two of which are consistent with Brass and Leaded Brass (Record 295). The second bracelet, composed of three twisted metal strands, is created from three bars crafted from sheet metal. Two of these metal strands are consistent with Leaded Copper and Arsenic Bronze (Record 296). The third bracelet is composed of a single undecorated manufactured bar of Low Zinc Brass bent into a C-shape (Record 2).

6.2.2.6. Coast Salish Bracelets

Two bracelets are provenanced to the Coast Salish (Record 117, 194). Both artefacts are thin and wide in appearance, created by working and folding copper metal together to create a C shape. Record 117 is damaged, revealing the laminar quality of the material and is consistent with Arsenic Bronze (Figure 6.32). Record 194 is consistent with Copper Metal, however <1% traces of arsenic are detected suggesting a manufactured origin (Dussubieux *et al.* 2008; Pernicka 1999).

6.2.2.7. Tlingit Bracelets

Two bracelets are provenanced to the Tlingit. One is composed of a manufactured bar that is undecorated and consistent with arsenic bronze (Record 4). The other bracelet is composed of Arsenic Bronze material that has been worked and folded onto itself to create a thickened, wide, C shaped bracelet (Record 51). The laminar nature of the metal is visible along the lateral edges of the artefact (Figure 6.38). This bracelet is the only example in this sample set that has been forged, chased, and engraved with a formline design across its body. The design depicts a killer whale with a human head (Figure 6.37).

Figure 6.37. Tlingit bracelet, Record 51, composed of metal consistent with Arsenic Bronze that is folded and worked into a broad C shape. The surface is further worked with a formline design and inlaid with a gold material (Photo by author, ©MOA).

Some portions of the design of Tlingit bracelet Record 51 contain an inlay consistent with gold that appears to be interference or friction fitted into prepared spaces where a material such as abalone may have previously resided, with no evidence of the use of any fasteners or adhesives (Figure 6.37; MOA RRN records). This is similar in style to a copper bracelet described by Mackenzie among the Haida (Mackenzie 1891, 51-2). The gold appearance of the inlay is potentially a veneer such as gilding, overlaying another material. This is suggested by what appears to be damage to the gold surface that reveals a grey or silver material beneath (Figure 6.38). Additionally, the black corrosion visible on the surfaces of multiple pieces of the inlay appears to be related to the quality of its interference fitting, with corrosion markers related to less well fit edges that expose the underlying metal to the environment (Figure 6.39). As such, it is possible this is a type of substrate corrosion that is galvanic in nature, and common substrates that could cause this type of corrosion are copper and silver (Selwyn 2015; Matsukawa et al. 2003; Tawara et al. 2003; Tian et al. 2014).

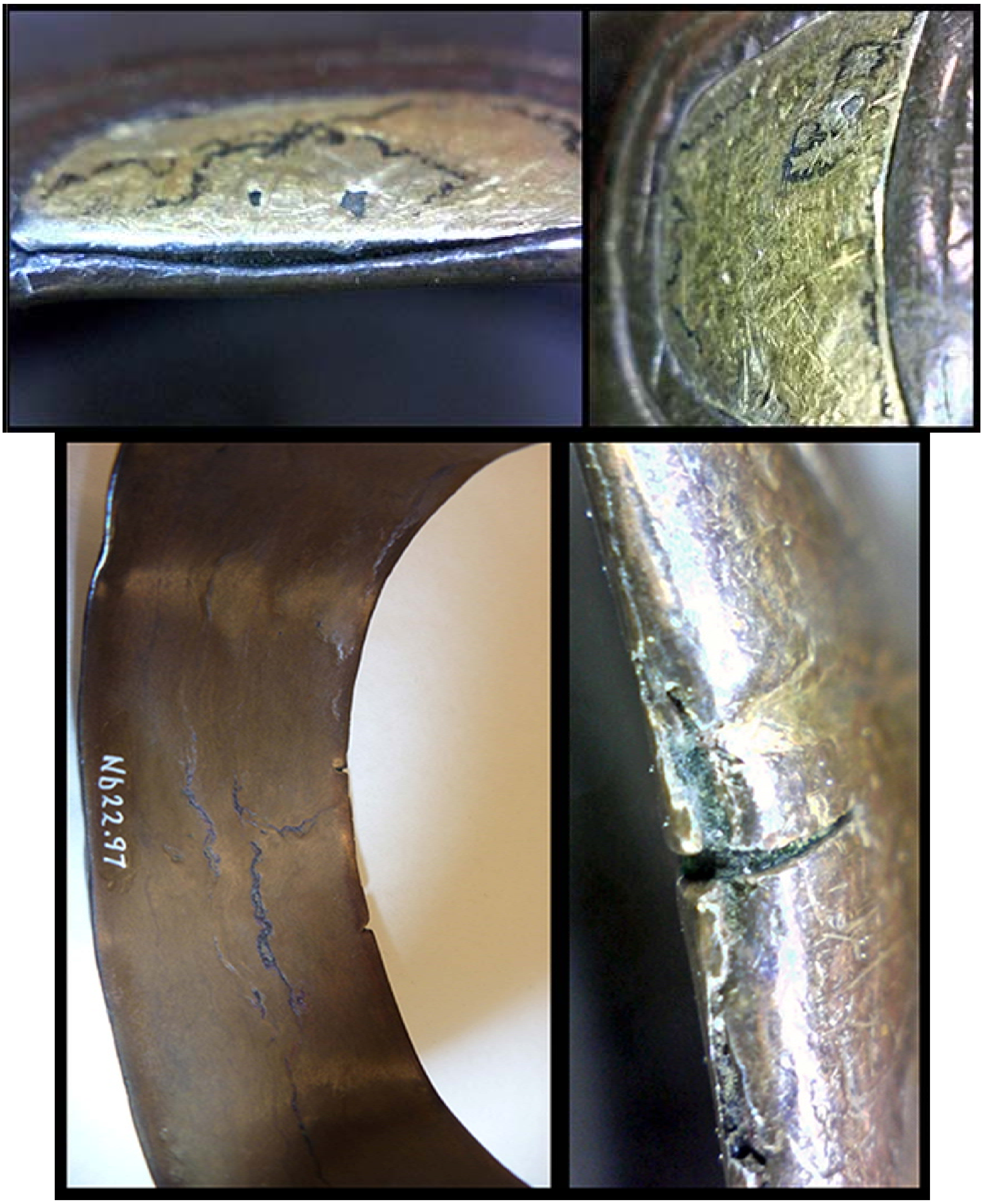


Figure 6.38. Top: a view of the inlaid gold material in Tlingit bracelet, Record 51, showing damage to the surface of the inlaid metal, and corrosion product visible on its surface. Bottom: a view of the inside and edge of Tlingit bracelet, Record 51 showing its laminar nature, indicating that the metal has been folded and worked to create its shape (Photo by author, ©MOA).

The known history of this bracelet is somewhat complicated. It was owned by Colette Morris of France, gifted by her Great Grand Uncle who collected it during his travels around the world with the French Navy in the 1880's. She did not know the specific provenance of the bracelet, and inquiries at the Louvre led her to think it might be from the African continent. However, after attending an exhibit at the Musée de l'Homme in Paris, she began to suspect the artefact was of Pacific Northwest origins. In 1990, while visiting Vancouver, Canada, she met with respected Haida artist Bill Reid who identified the bracelet's Northwest Coast origins. Mr Reid notified the Museum of Anthropology about the bracelet and it was subsequently purchased by the Museum so it could remain in British Columbia (Museum of Anthropology records). It is unknown at what point the gold inlay would have been added to the bracelet during its travels, though it is quite possible this occurred while outside of Indigenous ownership and possibly while on its journey beyond the Northwest coast region. That this object was collected as an 'exotic object' by a European visitor to the region, kept in personal collections around the world, and inlayed with materials considered precious within the European perspective, speaks to the power of the foreign and exotic to entrance and beguile (Mullins & Paynter 2000, 79-80). The addition of the gold leaf also hints to the colonial urge to occupy foreign spaces and make them familiar (Harris 2004, 175; Clayton 2003, 236).

Figure 6.39. Tlingit bracelet, Record 51, showing a close view of the surface of the bracelet including the interference fitted gold inlay (Photo by author, ©MOA).

6.2.2.8. Material Biographies of Bracelets

The bracelets in this study are predominantly represented by Kwakwaka'wakw artefacts, however both northern and southern culture groups from across the region are represented to some degree. By using the *chaîne opératoire* approach in the artefacts' analysis it is possible to compare the technical variants of the strategic tasks used to create the objects (Schlanger 2005, 27; Lemonnier 1992). Technological choices in making are seen in this study as social actions that are shared, taught, learned, and practiced (Roux 2016, 102), and the similarities and differences in the making of these bracelets allows for some comment on Indigenous use of copper and metallurgical techniques involved in the creation of such objects, in spite of uneven and small sample sizes.

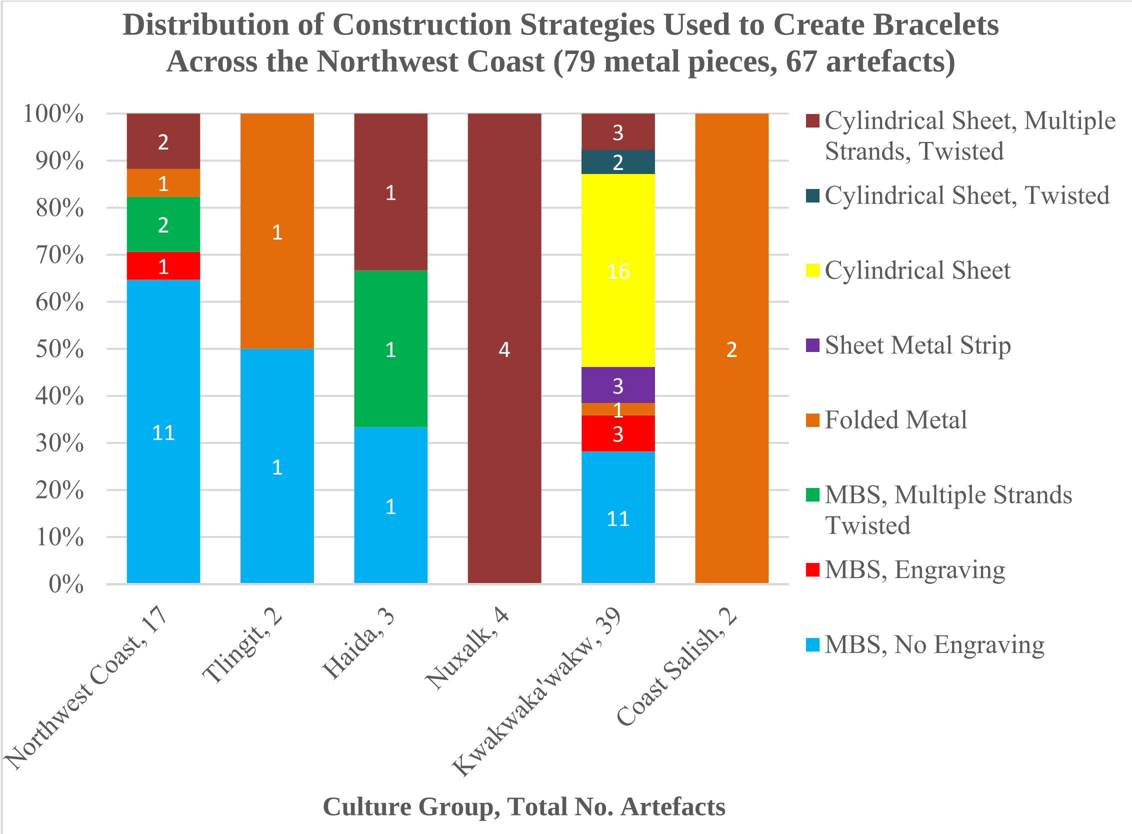


Figure 6.40. Distribution of construction strategies used to create bracelets across the Northwest Coast.

The sample set contains a roughly even split of bracelets created from sheet metal and those crafted from manufactured bar (Figure 6.40); sheet metal bracelets which can be folded together in a laminar way or worked into cylindrical bars, represent ca. 55% of the entire sample. Bar and sheet metal bracelets are crafted by all culture groups represented in this study. The consistent application of similar folding and forming techniques in a similar sequence to create sheet metal bracelets is found in both the north and south of the region. This suggests that the metallurgical skills applied in the manipulation of sheet metal have been shared or transmitted in some way. For example, these skills could have been actively taught and shared with others from separate ethno-linguistic groups, or artefacts could potentially be copied from procured examples created by others. Manufactured bar bracelets are often easily distinguishable as materials that began life outside of the Northwest Coast, and most can be assigned a timeframe for

Indigenous procurement and use that begins with the maritime fur trade. The bar has been used across the region to create bracelets that appear visually similar to those formed from sheet metal.

Ca. 46% of the sheet metal bracelets are consistent with Arsenic Bronze, which is used across the Northwest coast (Figure 6.41). The remaining sheet metal is a mix of material consistent with Copper Metal, Leaded Copper, and Brass. Ca. 45% of the bracelets are composed of manufactured bar. Ca. 63% of the manufactured bar in the sample set is consistent with Brass or Leaded Brass. It is possible that this choice is driven by a desire to expand Indigenous repertoires of colour (see Mottram 2017, 483), and the material is prevalent in the north and south of the study region. It is also possible that brass alloys were the predominant bar material available for trade at certain points. Regardless of why the choice to use copper and copper alloy bars was made, its presence demonstrates the flexibility of Indigenous metallurgists to incorporate new material types into traditional artefact production.

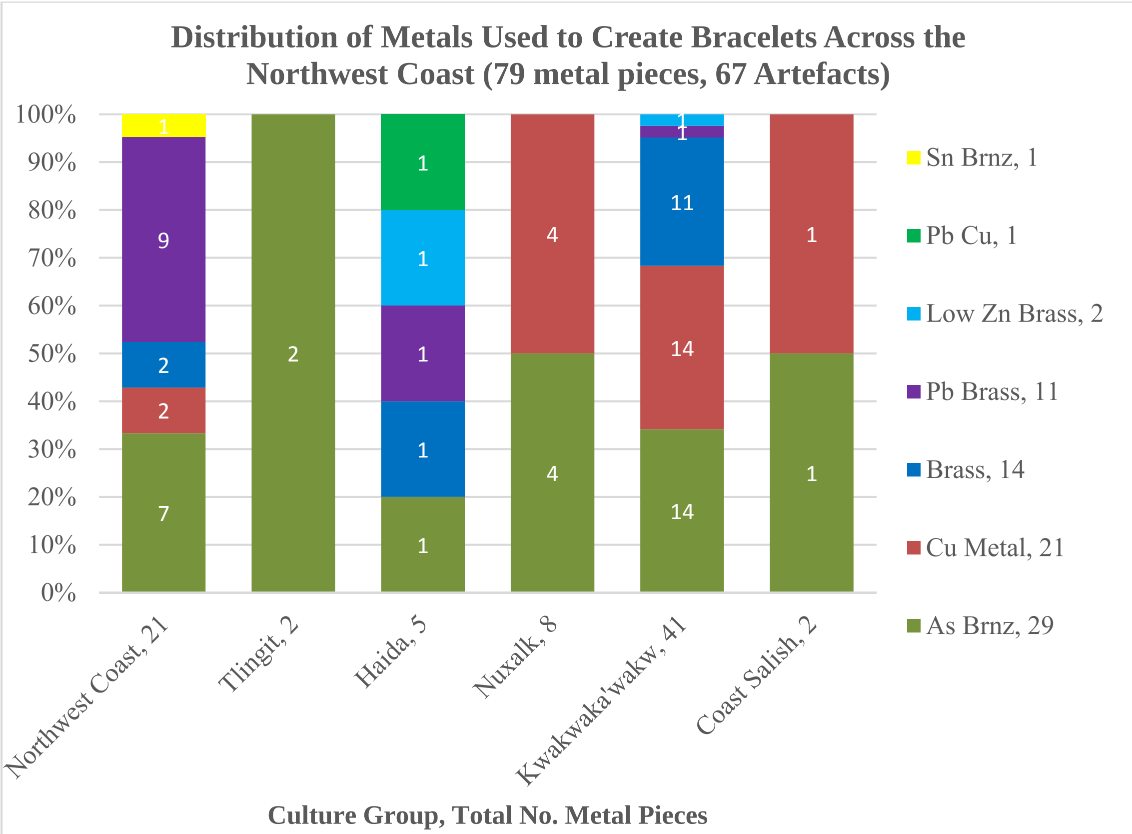


Figure 6.41. Distribution of metals used to create bracelets across the Northwest Coast.

Early written records of Indigenous metallurgical practices describe pounding native copper into flattened sheets as the first step in material manipulation and artefact creation (Rainey 1939; Franklin *et al.* 1981, 26). As such, it is possible that the sheet metal bracelets represent long-standing traditions developed over a long period of time, even though the bracelets in this sample set are crafted with European and Russian materials. If this is the case, then the widespread uptake of manufactured bar stock among Indigenous metallurgists (Figure 6.40) could potentially be tied to potential to craft the manufactured bars to appear similar to sheet metal designs. Though styles of engraving, decorating, and shaping related to discrete cultural preferences are visible within the sample set, the persistent syntax of making suggest regional connections and entanglements.

6.2.3. Beads

Beads composed of a wide range of materials including stone, bone and shell, have been created and used by people across the Northwest Coast for thousands of years (Coupland *et al.* 2016, 298; Ames *et al.* 2010, 45). Copper is also used to create tubular cylindrical beads, either from native metal worked into sheet or from rolled sheet metal procured from European and Russian trade sources. These artefacts are found in burial sites and other archaeological deposits across the region and further north. Descriptions of beads pepper both primary accounts from the late 18th and 19th centuries and excavation records from the late prehistoric and proto-historic phase across the region (Acheson 2003, 227; Ames 1995, 167; Deans 1885, 15-16; Wagner 1933, 109; Davis 1990, 200; Schulting 1994, 63; Hunt 2015, 56-61).

There are artefacts described in primary contact records that may be interpreted as 'beads' in the archaeological records. For example, Colnett describes seeing copper worked into thin sheet and wrapped around wooden sticks that were strung and worn by Nuu-chah-nulth children (Colnett 1786-88, 136). These objects could potentially be interpreted as beads, especially when recovered from an archaeological context with unfavourable preservation conditions for perishable materials (Acheson 2003, 227-8; Hurcombe 2008, 86-8). MacDonald describes copper-wrapped sticks in Prince Rupert Harbour, along with cylindrically formed beads, dating to 500BC. In this instance the copper tubes, or 'beads', were discovered aligned in double, parallel rows alongside a cache of slate daggers and clubs. This prompted MacDonald to suggest the copper tubes could be the remains of a suit of armour (Macdonald 1983, 105-6; Acheson 2003, 223; Ames 1981, 795). A further example of possible 'copper rod armour' has also been found in an infant burial, removed from the DkRi-63 site located in the Fraser Canyon B.C and donated to the Simon Fraser University Museum of Archaeology and Ethnology in 1978 (Schulting 1994, 59). This burial, relatively dated to between AD 1770-1860, consists of an infant's remains wrapped in a blanket and placed into a brass alloy trade pot, along with goods including 'decorative copper rod 'armour' consisting of tubular copper beads interspersed with dentalium shell beads strung on a twisted plant fibre cord' (Schulting 1994, 63). Examples of both smaller beads and longer cylindrical tubes are present in this study.

6.2.3.1. Coast and Interior Salish Beads

Of the 61 beads included in this study, ca. 56% are provenanced to sites located in the Fraser River Valley, within the traditional territory of the Stó:lō and Yale Coast Salish. Sixteen individual beads have been recovered from archaeological site DjRi-5 (Records 102-115, 118-9). Two of the artefacts, which are composed of eighteen and seven beads respectively, are provenanced to EbRj-Y (Records 195, 202), an Interior Salish site. One artefact, Record 254, composed of two beads, has a somewhat less firm provenance but was collected either in or near EbRj-Y. In addition to these 43 samples from sites along the Fraser River, one bead from Interior Salish archaeological site, DhQv-X is included, as well as a necklace composed of seventeen strung beads provenanced to the broader Northwest Coast region (Figure 6.42).

Of the beads provenanced to EbRj-Y, Record 195 is composed of eighteen beads that are strung in rows using fibrous thread, and have been separated and spaced using strips of leather material (Figure 6.43). Each bead is between six and seven cm in length and has been formed by working the metal into a cylindrical shape with a lap seam (Untracht 1968; Copper Development Association 2017). Broken fibre strands visible along the artefact suggest that some beads are missing, and the rows were intended to be at least four beads wide. This artefact has been described as a possible necklace or breastplate and is similar in description to the 'rod armour' described by Schulting that is provenanced to DkRi-63 (Figure 6.42; Schulting 1994, 63). Eleven of the 18 beads are consistent with Arsenic Bronze, one with Leaded Copper, and six with Copper Metal that contains <1% trace amounts of arsenic, lead, and/or zinc.

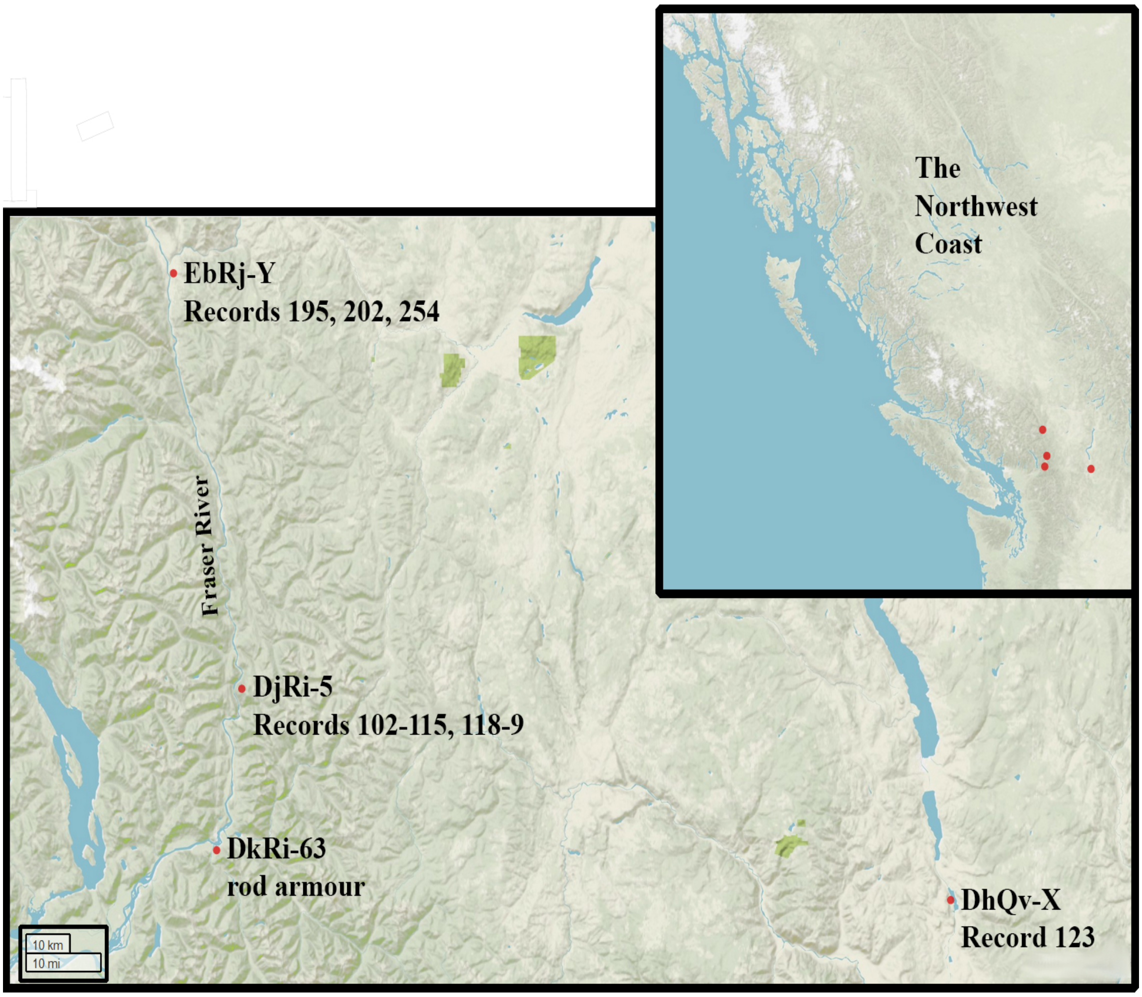


Figure 6.42. A map showing the locations of the three archaeological sites, EbRj-Y, DjRi-5, & DhQv-X, that the beads included in this study are provenanced to. An additional site, DkRi-63, where potential copper rod armour is provenanced to, is also included.

Record 202 consists of seven beads that range in length from 7cm to 16.7cm. These beads are also worked into a cylindrical form with a lap seam (Untracht 1968; Copper Development Association 2017; Figure 6.44). The beads have been strung in a tiered arrangement; the two shortest beads are strung through their bodies, while the remaining five are pierced with two holes through one end so that they hang down. It is unknown if these beads were always assembled in this arrangement or if they have been rearranged, as the string used to suspend the beads appears relatively modern in manufacture. Three of these beads are consistent with Arsenic Bronze, two with Leaded Arsenic Bronze, one with Leaded Copper, and one with Copper Metal that contains <1% trace amounts of arsenic and lead.

Figure 6.43. Coast Salish artefact provenanced to archaeological site EbRj-Y, composed of 18 long beads strung in rows of three or four on fibrous cord and separated by a leather strip, Record 195 (Photo by author, ©RBCM).

Figure 6.44. Coast Salish artefact provenanced to archaeological site EbRj-Y, consisting of seven copper beads or tubes, Record 202 (Photo by author, ©RBCM).

The two beads that make up Record 254, provenanced in or near EbRy-Y, are strung together with a leather strip that passes through their tubular bodies and is tied. The leather strip is also strung with beads, potentially of dentalium, and wrapped with a fibrous material. These beads are worked into cylindrical tubes that join with a lap seam (Untracht 1968; Copper Development Association 2017) and are both consistent with Arsenic Bronze.

The sixteen individual beads provenanced to archaeological site DjRi-5 included in this study range in length from 2.1cm to 9.9cm. Nine of the beads are consistent with Arsenic Bronze, five with Leaded Arsenic Bronze, and two with Copper Metal that contains <1% trace amounts of arsenic and lead. Fifteen of the beads have been formed into cylinders that join with a lap seam, while one bead has been formed such that the edges of the metal that create the seam of the beads body neatly meet rather than overlapping (Record 102; Figure 6.45). This style of forming requires a different preparation and forming strategy than beads created with lap seams. This difference in forming style in only one bead may suggest that this bead was created by a different metallurgist, or potentially the bead was created elsewhere and imported, or has been repurposed from a metal tube trade good of some description.

Figure 6.45. Coast Salish bead provenanced to archaeological site DjRi-5, formed into a cylindrical shape with no overlapping seam, Record 102 (Photo by author, ©LOA).

A single Interior Salish bead is included in this study. The artefact is provenanced to archaeological site DhQv-X. The bead is 9.4cm in length and formed into a cylinder that joins in a lap seam, with a similar identifiable syntax of construction to the Coast Salish beads of equivalent length in this study. The bead is consistent with Copper Metal and contains <1% trace amounts of arsenic, lead, and bismuth.

6.2.3.2. Northwest Coast Bead Necklace

A necklace composed of seventeen metal beads strung alongside dentalium shell on a fibrous cord is provenanced to the broader Northwest Coast (Record 14). The metal beads that make up the necklace range in length from 2.5cm to 3.5cm. Each bead is separated by between five and eleven short dentalium beads that make up sections of the necklace that measure between 0.8cm and 2.2cm in length. This necklace was first collected in the Pacific Northwest by Midshipman Spelman Swaine, sometime between 1791-95, while he was a crew member aboard Captain George Vancouver's boat, the HMS Discovery. Swaine and his family gave the small collection he had accumulated during this voyage to Wisbech Museum, which was later acquired by the Museum of

Archaeology and Anthropology, Cambridge, UK (MAA Records). This is the extent of the known history of this object; however, a biographical approach offers extended insight.

Figure 6.46. Northwest Coast necklace, Record 14, composed of seventeen copper or copper alloy beads and numerous dentalium beads, strung on a fibrous cord. The individual Analysis Unit Number assigned to each piece of metal characterised in this study is also included (Photo by author, ©MAA).

While the specifics surrounding this artefact's creation and use are unknown, the object is composed of two materials that are considered culturally important and used to create high status objects in the region. Furthermore, copper and dentalium shell travelled along the same trade routes (Ames 1994, 220; Blake 2004, 104; de Laguna 1990, 223; Fladmark, Ames & Sutherland 1990, 234). It is possible these materials were brought together to make a conspicuous statement about the wearer's status and wealth. Placing copper and dentalium shell together may also be intended to allow the high-status materials to reinforce each other's elevated stations, in their respective social networks of value and taste (Bourdieu 1984, 271, Woodward 2007, 120-2). As this necklace does not present the surficial corrosion products that are visible on all other beads included in this study a close examination of the bodies of these beads can reveal additional information regarding the object's construction and use.

Eight of the beads are consistent with Arsenic Bronze. The remaining nine beads are consistent with the Copper Metal group, and of these seven contain <1% trace amounts of arsenic and lead. One bead is characterised as 100% copper (AUN 61; Figure 6.46), while a second contains ca. 0.07% iron (AUN 60; Figure 6.46). As this necklace was collected in the late 18th century, prior to the ability to consistently produce manufactured copper with such a pure composition (Craddock 1995, 79), it is possible these beads are consistent with native copper.

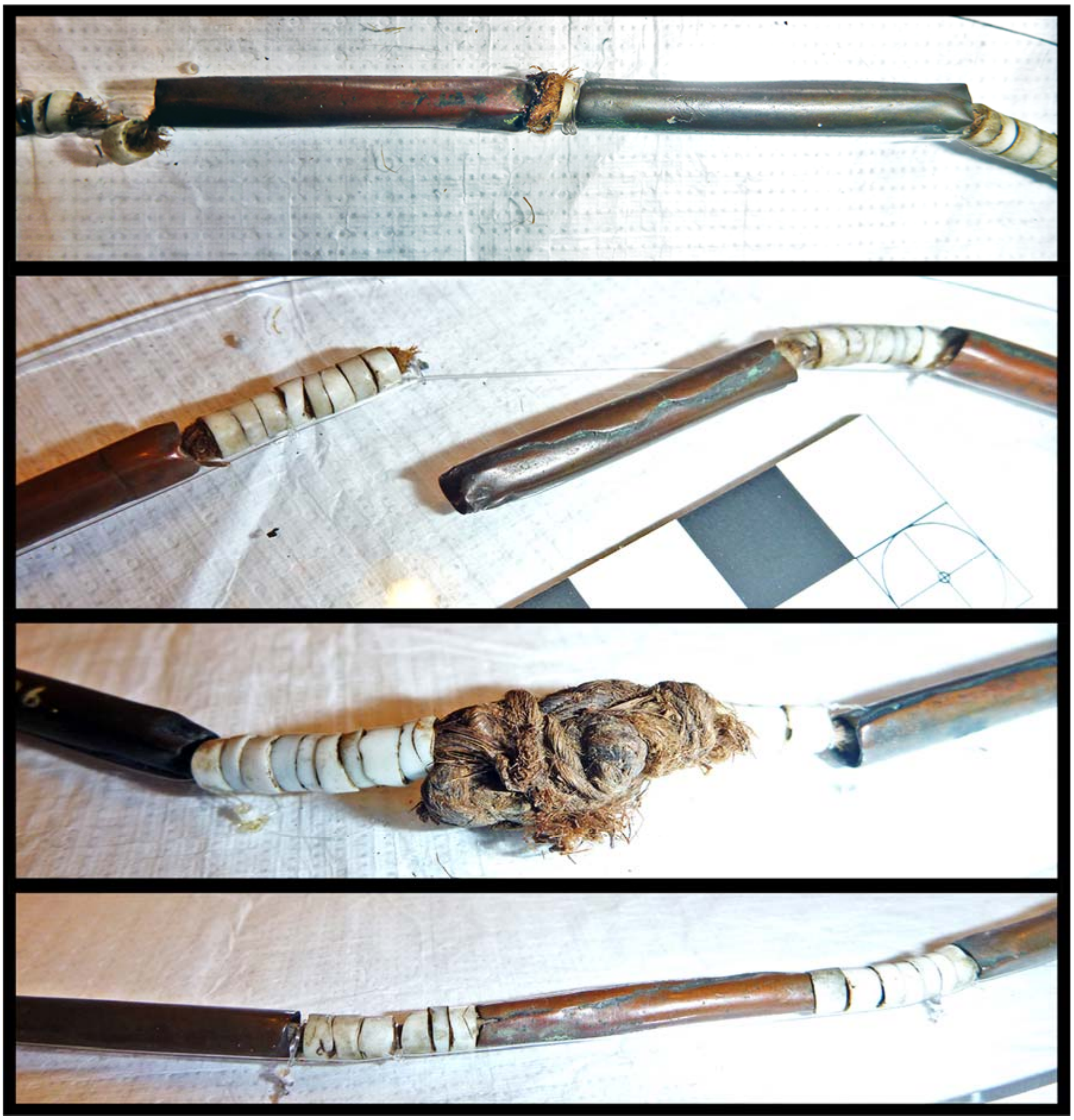


Figure 6.47. Northwest Coast necklace, Record 14, showing a detailed view of the copper beads. Note the colour differentiation between beads, the unevenly cut edges of the overlapping seams of the metal on the bodies of the beads, and the range of dentalium beads used create each section of shell beading (Photo by author, ©MAA).

Each of the beads has been worked into a cylindrical shape with a lap seam join (Untracht 1968; Copper Development Association 2017). One bead is scored with what may be a girdling mark, and the ends of all seventeen beads are slightly crimped (Figure 6.48). This could suggest that the beads began as part of longer metal cylinders that were girdled and cut into shorter lengths, causing the ends of the beads to bend inward slightly. Alternatively, the ends of the beads may have been bent inward to crimp the bead and secure it to the fibre cord. The analysis of the *chaîne opératoire* of these beads suggests that similar metallurgical forming practices were applied to each bead. As the beads are consistent with multiple metal types, it is possible that at points in the artefact's life some copper beads were replaced, or additional ones were added. If this is the case, then an argument can be made for an established inherited and taught metallurgical tradition in the region.

Figure 6.48. Northwest Coast necklace, Record 14, showing the crimped end of a bead and potential girdling mark visible on the metals surface (Photo by author, ©MAA).

Regarding the complete necklace, the metal beads are visibly different in colour relative to each other, a factor that may have influenced material choice (Mottram 2017, 481). For example, metallurgists may have retained stock of different materials in order to take advantage of such qualities. The presence of different materials may also indicate that this necklace has been repaired over time, re-strung with new beads, or potentially expanded to grow with its owner. The irregular spacings of dentalium beads between the metal beads may also support an argument for multiple stages of making, at times when more or less of the shell was available.

6.2.3.3. Combining the Biographies of Beads

Of the beads analysed in this study, only a limited number retain a more specific provenance than the 'Northwest Coast', somewhat restricting the identification of discrete preferences and choices within different communities. However, applying the *chaîne opératoire* approach to the physical study of each bead allows for some limited comment on copper use by Coast Salish communities and the region as a whole. For example, the process of making beads by working sheet metal with irregularly cut edges into a cylindrical shape with a lap seam appears to have been a common forming practice.

Furthermore, if Northwest Coast necklace, Record 14, has been repaired or expanded to add additional copper and dentalium beads, this maintenance reinforces an understood importance of the materials, and suggests established traditions related to both creation and use of the artefact. Furthermore, maritime exploration had not extended far inland in the late 18th century suggesting that the necklace, Record 14, was collected from coastal communities (Mackenzie 1801). However, inland communities traded and interacted with coastal communities regularly, meaning that the artefact may have been developed and worked on by people in multiple different communities throughout its life (Kirk 1986, 141; Mackenzie 1801, 133).

Four metal groups are detected among the beads included in this study, specifically Copper Metal, Leaded Copper, Arsenic Bronze, and Leaded Arsenic Bronze. However, no leaded samples exceed ca. 3.07% Pb, and ca. 78% of the leaded samples contain <2% Pb. As such, this amount of the lead alloy would not significantly alter the properties of copper or arsenic bronze under cold working conditions (Davis 2001, 46-51). Lead content notwithstanding, ca. 66% of the entire sample is composed of an arsenic bronze alloy (Figure 6.49).

The possibility that there are two beads composed of native copper included in the construction of Northwest Coast necklace, Record 14, is further supported by the comparable characterisation data recorded of the metal beads recovered from archaeological contexts (Macdonald 1983, 105-6; Acheson 2003, 223; Ames 1981, 795; Schulting 1994, 63). If this is the case, the presence of multiple types of copper alloy bead alongside potentially native copper could support an argument for long-term maintenance of the artefact and a sustained period of use, as well as an argument that Indigenous metallurgists stockpiled material for future use.

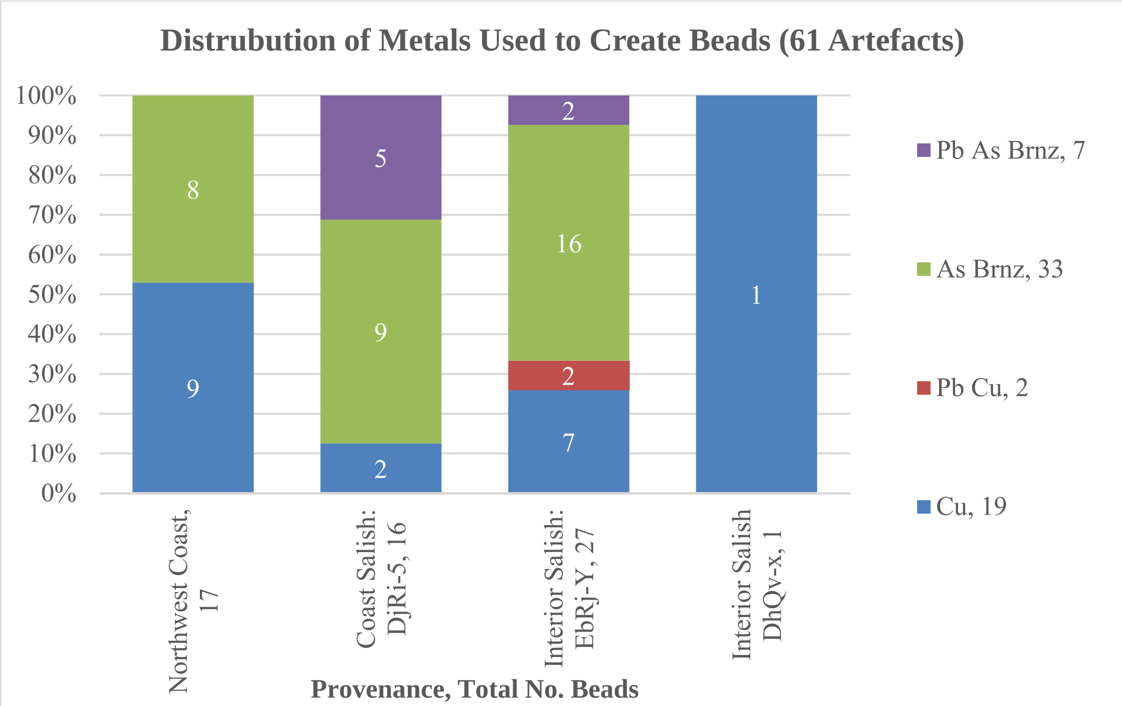


Figure 6.49. The distribution of metals used to create beads included in this study.

6.3. Copper Use in Composite Objects

Indigenous artefacts composed of copper on the Northwest Coast are not limited to objects such as Coppers, metal beads, and bracelets that are formed entirely from metal. Carved wooden masks, iron daggers, horn spoons, labrets, and feast dishes are examples of composite objects where the copper used in their making may not necessarily be the primary focus of the object. However, the metal, regardless of its presence alongside other materials, is entangled in a relationship with a cohort of materials that work together to communicate and interact with its surroundings (Burström 2014, 67; Hanson 2017, 3; Keates 2002, 115-6). The meaning and power of copper material, as it is understood within the ontological worldview of Northwest Coast Indigenous communities, also plays a role in artefact construction. As such, those understandings of the material can be brought with the metal and incorporated into the object that it is applied to (Mcllwraith 1948, 2 :688-90; Jonaitis 1996, 9-10; Guujaaw 2016). Thus, while composite copper objects created on the Northwest Coast can vary greatly, the use of copper and copper alloys to depict specific forms and communicate specific messages remains a consistent thread. Additionally, copper's place as part of a larger object does not imply that the metal is a simple and straightforward decoration chosen only for its aesthetic value, as both aesthetic and functional value and meaning are entirely culturally contingent (Herva & Nurmi 2009, 158; Campbell 1995, 115; Scarlett 2002).

Here, to explore diversity and continuity within broadly similar artefact "types", completely metal masks and composite carved wooden masks that incorporate the metal into its design are analysed together. The combined study of these strikingly varied artefacts united by common production and usage attributes, allows for examination of the ways in which copper and copper alloys were involved in communicating and interacting with the world. With this information it is possible to comment on issues surrounding the spread of materials, traditions, and technical knowledge.

6.3.1. Masks

The carved wooden masks created and used by the multiple culture groups of the Northwest Coast are diverse, interesting, complicated objects that were and are deeply embedded in Indigenous culture. Masks can represent families, clans, lineages, high-ranking persons, animals, or supernatural beings and can serve as crests that embody the spirits of the ancestors (Shearer 2000, 33). Rights to these crests, and by extension associated masks, are granted, asserted, and renewed through ceremonies that often involve presentations where the mask is danced or performed (Shearer 2000, 33; Stewart 1979, 36; Boas & Hunt 1906, 70-77, 317).

6.3.1.1. Mask Design

On the Northwest Coast, the most commonly carved wood was cedar, although spruce, pine, cypress, fir, hemlock, yew, maple, and alder were also used (Inverarity 1950, 9). In some instances, masks have been carved from a single piece of wood, while in others the masks are engineered from multiple pieces of wood with moving parts. For example, eyes may revolve to represent an open or closed state and mouths may swing open. Materials such as copper, abalone, and later silver and iron, are sometimes inlaid or applied to the surface of these artefacts to highlight features such as lips, teeth, nostrils, eyelids and eyebrows, along with pigments (Niblack 1890, 282-83, 317). Masks were often worn in combination with a costume or robe and were designed to take an active part in rituals. In some instances among the Nuu-chah-nulth and Kwakwaka'wakw, Drucker noted that a wooden bar was placed laterally inside of masks to form a bit that the wearer could hold in their teeth while dancing (Drucker 1951, 102-3).

The principle colours for painted designs are black, red, green, blue, blue-green, white, and sometimes yellow. In the pre-contact period, these colours came from locally available materials such as lignite and coal for black, hematite or ochre for red, and blue from copper sulphide (Shotridge 1929, 339). Black is considered a primary colour and red secondary, however red can be substituted for black and is often used to mark out tongues, cheeks, and eyes (Holm 1965, 30). While the fur trade and colonial era introduced new colours, Indigenous artists throughout the region appear to have largely chosen not to incorporate them, suggesting local choices were made to maintain style conventions. However, new pigment materials that produced more vibrant blacks, reds, blues and greens appear to have been used extensively from the early 19th century (Miller *et al.* 1990; Holm 1965, 26). As such, parallels can potentially be drawn between the uptake of these new pigments and the copper trade materials that were becoming more readily available across the region at the time, with the application of new resources apparently following traditional patterns of design and use.

Holm argues that the art of the Northwest Coast was predominantly a two-dimensional affair, and that the crest designs on three-dimensional objects, such as totem poles and the handles of horn spoons, can be 'unwrapped' to reveal the two-dimensional pattern (Holm 1965, 18). Additionally, flat areas of a form were often treated as a canvas for a two-dimensional design (Holm 1965, 23). Among all ethnolinguistic groups in the region significant features of the faces of masks such as eyebrows, eyes, nostrils, and lips are accentuated in some way. However, Holm has identified three decorative painting styles among anthropomorphic masks (1965, 23-30). Specifically, culture groups residing in the north such as the Tlingit, Haida, and Tsimshian predominantly decorate their masks in ways that are independent of the structure of the mask. Boas suggested that this style of mask decoration was akin to face painting he had observed in northern communities (Boas 1900, 13-24; Swanton 1908, xlvii-lvi). Culture groups residing in southern areas of the Northwest Coast, such as the Kwakwaka'wakw and Nuu-chah-nulth, created masks with painted designs that conform to the structure of the mask. While groups residing in the geographical middle of the region, such as the Nuxalk, painted designs in opposition to the structural form, using large areas of colour and asymmetric designs that traverse the object's surface (Holm 1965, 23). The crest designs involved in each object can be organised and re-organised as the maker desires and requires, and in some cases this extensive reorganisation can result in the initial image becoming subordinated to the message the artist is intending to convey (Holm 1965, 20). Holm and Boas further argue that the use of geometric designs is a step away from crests, and may even be purely decorative (Holm 1965, 20; Boas 1927, 354). Though there is definite variation in design styles between communities within an ethnolinguistic group, the findings of this study are consistent with the interpretations made by Holm. As Haeberlin argues, in each of these masks it is the 'total use of the given space' of the mask that helps define the style of the Northwest Coast (Haeberlin 1918, 261).

6.3.1.2. *Anthropological Collection and the Changing Value of Masks*

Masks are described in many primary accounts from the early maritime fur trade period as important Indigenous objects, and they quickly became a focus of European and Russian interest (Cole 1985, 1-8). As such, there are a large number of masks residing in museums and private collections in the present day (Cole 1985, 286-311; Malloy 2000). This also means that there are many European accounts of the masks, as well as their interpreted meaning and value, available around the world.

Considering the Nuu-chah-nulth, while accompanying Captain Cook in 1778, James Burney noted that the people residing in Nootka Sound would part willingly with zoomorphic masks but were much more reticent about trading anthropomorphic ones, and a much higher price was charged for the anthropomorphic variety. Burney describes the Nuu-chah-nulth as acting 'ashamed' to trade these specific objects (Burney 1819, 218). James King described Nuu-chah-nulth people bringing the masks, 'slyly', secretly, and carefully covered, to the Europeans for trade. King interpreted this as a sort of guilt on the part of the Indigenous traders for selling 'their gods' (Beaglehole 1967, 1414). Ensign Alexander Walker, also of Cook's crew, described an encounter with Chief Maquinna in 1786 where he made multiple attempts to purchase a mask. Only after Maquinna had performed the mask in private for Walker would he part with it for the 'high' price of two copper bracelets (Fisher & Bumstead 1982, 119-20). Walker took a cynical stance on these encounters and assumed that the Nuu-chah-nulth were exaggerating their deference to the masks in a bid to elevate their price (Cole 1985, 2-4). In 1881, Captain Johan Jacobsen and his brother Fillip similarly collected extensively from the Nuu-chah-nulth and Kwakwaka'wakw, often conducting transactions in the night under cover of darkness and outside of the village (Woldt 1884, 127-8). However, when Jacobsen returned the next year to the Kwakwaka'wakw at Fort Rupert, they refused to trade with him. Jacobsen wrote, "the Indians here will now sell me nothing more because they have had strife because of it. It is not permitted that they sell me their holy relics" (Woldt 1884, 127-8; Cole 1985, 302).

In the early 20th century Louis Situwuka Shotridge, a Tlingit man who became a collector of Indigenous art for American museums, recorded accounts across the region where people would not part with their objects due to their perceived intrinsic value. For example, Shotridge attempted to purchase a carved stone eagle from a Tsimshian man living on the Skeena River. When Shotridge made his standard collectors pitch, arguing that the object would be kept in a museum where it could teach the rest of the world about the people of the Northwest Coast, the Tsimshian man refused saying that though he liked the idea, this object was the only object the man had "to keep in mind the memories of my uncles and grandfathers" (Shotridge 1919, 131; Cole 1985, 301). Marious Barbeau also recorded masks and other artefacts among the Tsimshian in 1929 that were not for sale (McIlwraith 1929). This type of sentiment regarding the objects' "everlasting esteem" was also noted in the 20th century by Shotridge among the Tlingit, and by Newcombe among the Kaigani Haida, when family heirlooms were simply not for sale (Newcombe 1907; Cole 1985, 301). Due to his persistent experiences while attempting to collect Indigenous artefacts, Shotridge wrote that the Indigenous generations of his time were often keen to hold on to the old things as well as avoid social sanctions from their own communities from trading socially important objects (Cole 1985, 131; Newcombe 1937).

Among the Nuxalk, Newcombe wrote of masks that were intended for destruction after their owner, Jim Kimquish, had died. Instead, the masks were dropped secretly in the night through an Indian Agent's open house window instead of being destroyed. Payments were provided in much the same way to ensure the sellers' anonymity (Newcombe 1937). McIlwraith describes another situation among the Nuxalk that began in 1921, where a colonial trader, who he thought may have been Harlan I. Smith, had purchased a mask following a death but let members the Bella Coola and Carrier bands see this. As McIlwraith states:

> "This caused indignation throughout the community and news of it reached the Bella Bella, who concluded that the vendor would suffer disaster for allowing a secret object to be seen by the despised Indians of the interior. Within a year, his (the seller's) wife died. The Bella Bella believed that his

> sin had brought its own punishment, but the Bella Coola, who knew the details of the sale and did not consider the exposure of the article to have been the fault of the seller, attributed it to the power of the thoughts of the Bella Bella. They all expected that he would be punished; therefore he was punished; the expectation was stuffiness to effect its own fulfilment. This incident was too fresh in the minds of several men to allow them to sell ceremonial objects to the writer" (McIlwraith 1948, 697).

Among the Nuxalk, Chief Klallamen sold Fillip Jacobsen his Sissauch secret society masks for the World's Fair in Chicago in the late 1800's. Once his community learned of his deeds, it was decided he would die for his transactions at a specified time within the year. A medicine man became involved, and the Chief died at the appointed time in 1893 (Bland 1997, 34; Cole 1985, 302; Kennedy & Bouchard 1990a, 328).

Cole and Seip both suggest that the reason for extreme actions and reprisals in relation to the show of masks is related to the object's involvement in secret societies (Cole 1985, 4, 301; Seip 1999, 276). Typically, lay-people were unaware of the processes involved in making and wearing the masks, which were only understood as supernatural entities to those outside of the secret societies. The secrets surrounding them could be aggressively protected in order to protect the apotropaic qualities of the objects and societies (Bland 1997, 34). Thus, uncontextualized masks could endanger specific customs and belief structures (Seip 1999, 277). However, Seip goes further, and suggests that the increase in trade of Nuxalk masks that occurred in the 20th century was related to multiple impacts of colonialism. Specifically, extreme population loss from the smallpox epidemic of 1862-3 left many masks abandoned with no owner to claim or pass on the privileges attached to them (Duff 1965, 39; Boyd 1999). This is coupled with the arrival of missionaries who offered another faith alongside smallpox vaccines in the middle of extreme upheaval (Pierce 1933), and the potlatch ban which further complicated the use of the masks (Seip 1999, 278). Thus, while some masks were kept and used in secret, many were sold (Seip 1999, 279-80; Spencer 1906, 485-6).

Gosden and Marshall discussed a different trend in mask use and trade among the Kwakwaka'wakw. Again, they note that the masks are important, and efforts were made to avoid showing them during trade (Gosden & Marshall 1999, 175; Holm 1983, 29; Beaglehole 1967, 319-20, 1414), although they state that this activity is not tied to shame as many early traders assumed (Burney 1819, 218; Beaglehole 1967, 1414; Fisher & Bumstead 1982, 119-20; Woldt 1884, 127-8). They argue that cultural perceptions of value, meaning, and propriety are contingent, it is likely that past interpretations about shame are more informative of the author than the Indigenous people being commented on (Gillespie 2006). Instead, Gosden and Marshall argue that among the Kwakwaka'wakw and Nuu-chah-nulth possession of a specific mask was of little importance whereas showing and performing the mask was very meaningful and related to specific Indigenous rights and privileges. Therefore, as long as the mask was kept from Indigenous view during transactions, a new mask could be made to hold the rights and privileges of the Indigenous seller. In the eyes of Indigenous practitioners there was no risk of the Eurasian trade partner knowing or understanding the power of the masks they purchased.

The example that Gosden and Marshall use to show how an important cultural object can be relatively easily recreated is that of Willie Seaweed, who sold a mask to Newcombe in 1914. However, Willie Seaweed was both a Chief and well-known carver that had previously created significant social items for secret societies (Holm 1983; 29; Gosden & Marshall 1999, 175). Thus, it is possible that remaking a mask meant something different to Willie Seaweed as compared to an individual who was not an accomplished carver or had the social access of a Chief. As such, the social location of each seller, and the ease with which they may be able to create or commission new objects, may play a larger role in the Indigenous choice to trade such items. Indeed, the aforementioned fluctuating reticence of Indigenous people to sell their objects may be related to the specific circumstances of each sale and each seller.

6.3.1.3. Wooden Masks Included in This Study

Fifteen carved wooden objects described as masks, headdresses, frontlets, or breastplates have been included in this analysis, and represent 91 individual metal samples. In some instances, not all of the metal used in the composition of the artefact has been chemically characterised. When this is the case, it is either due to the metal being inaccessible to the HHpXRF device, for example where metal teeth placed inside a zoomorphic mask could not be reached with the device (eg. Record 93), or where the high number of metal pieces necessitated that only a sample of the material be assessed (eg

Figure 6.50. Anthropomorphic Tlingit mask, Record 10, designed using 38 individual pieces of copper and copper alloy (Photo by author, ©MAA).

Record 304). Two masks that are composed entirely of copper and copper alloy sheet metal are also included (Records 98, 299; Figure 6.54; Figure 6.55).

Of the masks included in this study, one is provenanced to the Northwest Coast (Record 100). This mask in anthropomorphic in nature and two pieces of metal define the eyebrows of the face. This material is consistent with Copper Metal, one contains ca. 0.019% trace amounts of tin, and both pieces are of a consistent thickness and smooth texture indicative of manufactured rolled sheet metal. The painted design of this mask conforms to the shape of the carved form of the face, thus Holm's artistic conventions (Holm 1965, 23) suggest that this mask was crafted in a southern community.

Three carved wooden masks are provenanced to the Tlingit. One of these is anthropomorphic in nature. It has been crafted with revolving eyes that can appear either open or closed, painted with red and blue pigment, and furnished with leather strips that at one point retained fur. This mask is also made with a lateral wooden bar on the inside of the mask to aid the wearer in holding the object and revolving the eyes (Figure 6.50). The overall painted design on the mask is largely unrelated to its sculpted form, consistent with Holm's categorisations (Holm 1965. 23). The mask is covered with 38 individual pieces of metal, 35 of which have been characterised (Record 10; Figure 6.50). All of the metal pieces used to decorate this mask have a smooth surface texture and a consistent thickness, indicative of manufactured rolled sheet metal. Fifteen of the 35 pieces of characterised metal are consistent with Arsenic Bronze, while twenty pieces are consistent with Copper Metal containing <1% trace amounts of arsenic, lead, and nickel.

The second Tlingit mask analysed is covered in brown fur and depicts a bear's face with abalone disk eyes. Two pieces of sheet metal, one consistent with Brass and one with Copper Metal containing trace amounts of lead, have been mechanically applied to either side of the bear's mouth and painted with a black pigment (Record 139). The third mask is referred to as a headdress and has been carved into the likeness of a sea lion and painted with blue, red, and black pigment (Record 242; MOA Museum Records). Two polished disks, consistent with Copper Metal containing traces of arsenic and nickel, have been mechanically applied to the eyes of the headdress, each with a single nail.

Two anthropomorphic masks provenanced to the Haida are included. One mask is painted with black, red, and blue design elements that do not conform to the form of the mask, consistent with Holm's style assessments (Record 97; Holm 1965, 23).

Museum records indicate that this mask is intended to depict a human/bird face (MOA, museum records). A highly polished piece of material, consistent with Copper Metal containing trace amounts of nickel, lead, arsenic, and tin, has been embedded in the mouth of this mask.

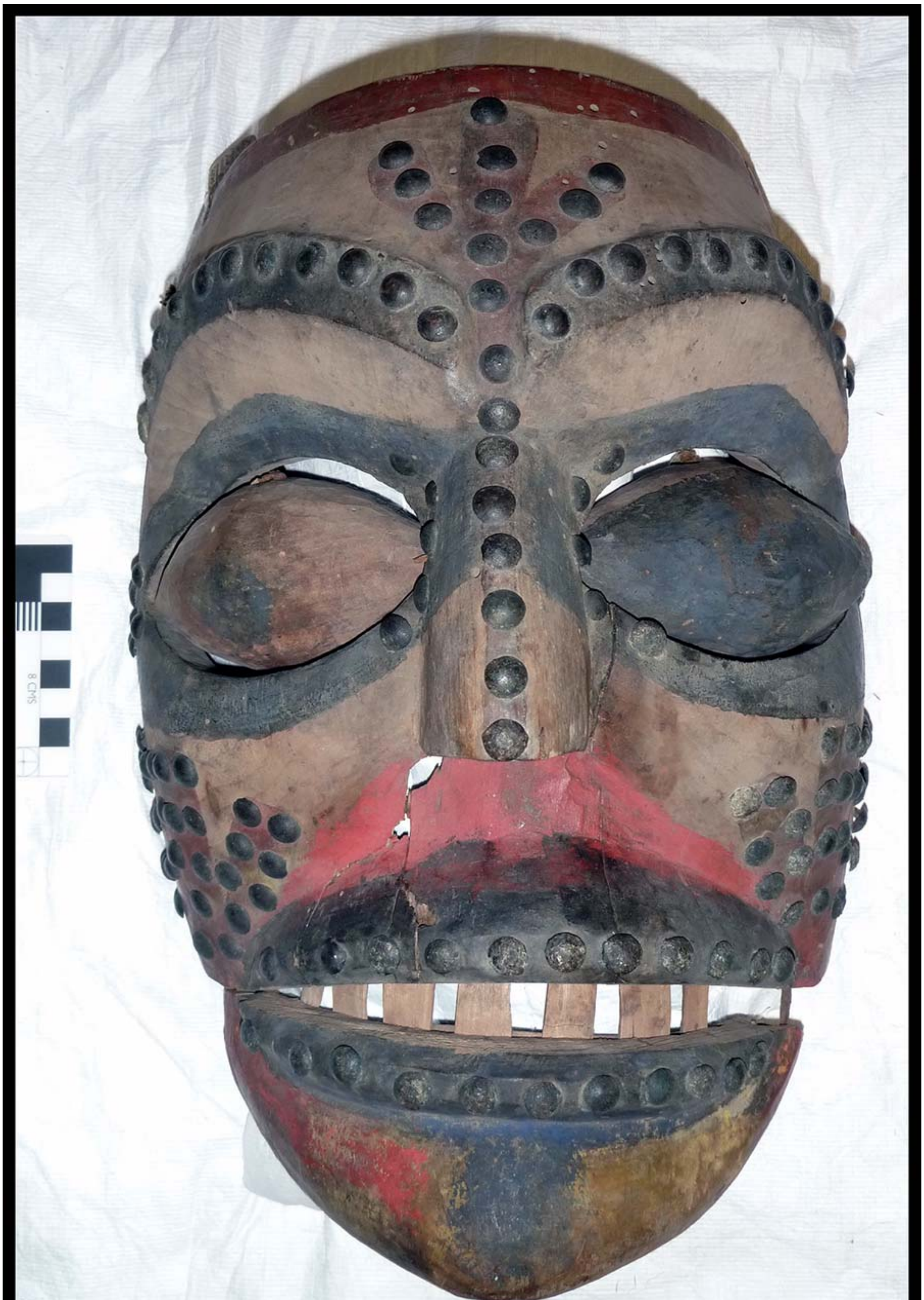


Figure 6.51. Haida mask, Record 304, designed using 132 brass alloy tacks (Photo by author, © Friends of the British Museum).

The second Haida mask has been formed from separate pieces of wood that create the upper portion of the face, and the lower jaw (Record 304;Figure 6.51). The eyes of this mask are also crafted to revolve, appearing either open or closed due to their painted design. Red, black, and blue pigment has been used to decorate the mask. A design using 132 individual manufactured tacks has been applied to the eyebrows, nose, cheeks, and mouth. The eyes, eyebrows, and mouth of the mask have been painted, however there is an element of geometric design in the placement of the tacks, suggesting a less formalised decoration strategy (Boas 1927, 354; Holm 1965, 20). Of the 21 tacks characterised, fourteen are consistent with Leaded Brass, and seven with Leaded Arsenic Brass.

Two Nuxalk artefacts categorised as a breastplate or headdress are included in this study alongside masks, as these objects are considered to have been involved in similar social activities of performance and dance (Shearer 2000, 33; Figure 6.52). These objects were typically worn on the chest or as a headdress while being displayed and danced (Drucker 1951, 102-3). Boas described seeing carved wooden headdresses among the Nuu-chah-nulth and Kwakwaka'wakw in the late 19th century (Boas 1896).

The anthropomorphic breastplate provenanced to the Nuxalk, Record 136, has been decorated with white, red, and black pigment. The painted design of this mask relies on large blank spaces of white, with a painted black design that only partially adheres to the form of the mask, consistent with Holm's assessment of the artistic styles of the region (Holm 1965, 23). Metal consistent with Copper Metal has been applied to the eyebrows of the mask and perforated metal discs have been applied to the eyes. Of these four metal pieces, the metal cladding the right eyebrow contains trace amounts of nickel. The three additional pieces of metal contain only <1% detectable trace amounts of iron and vanadium, a composition that could suggest the use of native metal. However, the physical appearance of the copper indicates that it is a manufactured metal. Specifically, both the smooth surface that is free of cleavages or signs of folding and its consistent thickness suggest this material was attained from European or Russian sources (Franklin *et al.* 1981, 20-24; Wayman *et al* 1992; Pernicka 1999).

The Nuxalk zoomorphic headdress or breastplate, Record 96, is decorated with multiple mediums, including red, blue, and black pigment, abalone shell, iron sheet metal, and material consistent with Copper Metal. The copper is again visually consistent with sheet metal. The iron and copper are present as two perforated disks, one adorning each eye. Given the presence of sheet iron, and the absence of any detected trace elements in the Copper Metal, it is thought that this metal was produced in the 20th century in line with developments in copper manufacturing (Craddock & Eckstein 2003; Pernicka 1999; Dussubieux *et al.* 2008). This suggests that this mask was used in the colonial period in the 20th century and gives some insight into its use life, however it is not known if the mask was produced at the time the metal pieces were applied or if this occurred later in the object's life.

Figure 6.52. Nuxalk zoomorphic breastplate or headdress, Record 96, with one iron and one Copper Metal disk inserted into the eyes (Photo by Author, ©MOA).

One mask is provenanced to the Wuikinuxv (Record 93). This mask is zoomorphic and appears wolf-like. Two erect wooden ears have been applied to the top of the mask in a composite fashion. Red and black pigment has been used to decorate the mask and abalone shell disks are applied to the eyes. Sheet metal consistent with Arsenic Bronze has been skilfully formed, using relief cuts to facilitate cladding of the curving nostrils of the mask (Untracht 1968). The mouth of the mask has been strung in such a way that it was once able to open, and what appear to be copper teeth cut from sheet metal have been mechanically applied to the inside of the mask. The metal used to create the teeth could not be characterised in this study as it was not reachable with the HHpXRF device.

Of the Kwakwaka’wakw masks, four have been provenanced to the Dzawada’enuxw band. Two of these are anthropomorphic and two are zoomorphic. Of the anthropomorphic masks, Record 135 has been decorated with blue and red pigment and metal has been applied to the eyebrows, cheeks, and upper lip of the face. Remnant pigment is visible on the surface of the metal. One metal piece is consistent with Tin Bronze while five are consistent with Copper Metal with detectable trace amounts of tin and nickel, indicative of their manufactured beginnings (Figure 6.56).

The second anthropomorphic Dzawada’enuxw Kwakwaka’wakw mask is painted with green, red, white, and black pigment. A metal piece has been applied to each cheek of the mask and a small fragment of metal remains mechanically joined with a nail to the right eyebrow area and has been painted black. This small fragment appears to be the damaged remains of what were once copper-clad eyebrows. The metal’s removal may have been intentional. The three pieces of metal remaining on this mask are consistent with Arsenic Bronze, Leaded Brass, and Copper Metal with trace amounts of arsenic and lead. The application of pigment and metal on both of these masks conform to and highlight the carved structure of the faces, consistent with Holm’s assessment of the artistic stylings of the mask created in the southern communities of the Northwest Coast (Holm 1965, 23).

Both of the zoomorphic Dzawada’enuxw Kwakwaka’wakw masks appear wolf- or dog-like. One of the masks (Record 236), which is painted with black, red, and green pigment, has been carved with a stationary open mouth and has fabric attached to its top, potentially to further obscure the wearer’s identity. The eyes of this mask have each been decorated with a disc of Copper Metal that contains trace amounts of arsenic and lead. The left eyebrow of the mask retains a single iron nail, and the wood of the right eyebrow has a hole where a nail may once have been. This suggests that material of some variety, potentially copper alloy, was used to clad the eyebrows of this mask at some point in its life.

The second zoomorphic mask is painted with black, red, green, and white pigment, and has been carved from multiple pieces of wood so that the mouth of the mask can open (Record 134; Figure 6.58). Remnants of fabric attached to nails along the top of the mask, suggest that the top of the artefact once had some type of covering. The mask retains one vertical ear that is crafted from a separate piece of wood and slotted into the top of the artefact. This mask is adorned with six separate pieces of sheet metal consistent with Copper Metal that contain trace amounts of arsenic. The copper-clad eyebrows of this mask support the suggestion that the eyebrows of Record 236 were also once clad with copper.

One zoomorphic mask is provenanced to the Lawit'sis Kwakwaka'wakw (Record 92; Figure 6.53). This mask is wolf-like in form and covered in black, red, and green pigment. The mask has separate pieces of wood fixed into the top of the artefact to create ears. A third piece of wood is used to create the bottom jaw, which is strung and joined so that it may open. Two pieces of material consistent with Copper Metal, which are visibly similar to cut manufactured sheet metal, have been fit inside the lower jaw to create teeth. Both pieces of metal contain trace amounts of lead, further suggesting the metal is manufactured (Pernicka 1999; Dussubieux *et al.* 2008).

Figure 6.53. A Lawit'sis Kwakwaka'wakw zoomorphic mask, Record 92, created with sheet metal teeth consistent with Copper Metal (Photo by author, ©MOA).

One anthropomorphic mask is provenanced to the 'Namgis Kwakwaka'wakw (Record 237). This mask is carved with a large wooden headpiece, and is painted with black, white, green, and red pigment. Two pieces of material consistent with Copper Metal have been used to clad the eyebrows of the mask. This metal has the consistent thickness and smooth surface texture indicative of manufactured sheet metal. However, the material also contains only trace amounts of iron, a quality of native metal and modern metals created from the early 20th century (Craddock 1995, 79). This mask is known to have been created prior to 1902 and thus prior to the easy production of very clean manufactured copper (MOA, Museum Records). Metallographic analysis would reveal more. Nonetheless, strong visual indicators regarding the physical quality of the metal, coupled with cut marks that indicate the use of shears suggest that manufactured sheet metal has been cut to shape and applied to the mask.

6.3.1.4. Metal Masks

Figure 6.54. Wuikinuxv copper mask, Record 98, composed of three pieces of material consistent with manufactured Copper Metal (Photo by author, ©MOA).

Two anthropomorphic masks created entirely from sheet copper are also included in this study. Masks created in this style are found across the region, and examples can be found in museums across the world. Specifically, seven of these metal masks, provenanced to the Tlingit and Haida, are housed at the Smithsonian National Museum of Natural History in Washington D.C., (Museum Identification No: E332801-0; E360366-0), the American Museum of Natural History in New York (Catalogue No's: E/2394; 16.1/242; 16/378), the Portland Art Museum (Museum Identification No. 48.3.395), and the Canadian Museum of History in Gatineau Quebec (Object No: VII-B-108). All of the metal masks mentioned here are anthropomorphic in nature, and in some cases have been further adorned with organic material such as fur. Emmons wrote of a small selection of metal masks that he collected among the Tlingit. He claimed that older masks were more crudely made from native copper nuggets, while ones made more recently were created from copper sheet metal worked into and over prepared forms (Emmons 1991, 378-9).

The two metal masks included in this study are also anthropomorphic. One has been provenanced to the Wuikinuxv, Record 98, while the other is more broadly identified as being created on the Northwest Coast, Record 299. The Wuikiniuxv mask is composed of three pieces of sheet metal that are consistent with Copper Metal; two larger panels make up the left and right of this mask face and have been joined using lap seams and rivets (Tushingham *et al.* 1979, 18-20; Untracht 1968). The third metal piece has been formed into a nose for the mask and applied to the centre of the artefact also using a lap seam and rivets to join the metal sheets. All three sheets contain <1% trace amounts of bismuth and arsenic, while the nose and right-hand sheet also contain <1% trace amounts of lead and tin. This composition, along with the consistent thickness and smooth surface, suggests the material has manufactured origins (Franklin *et al.* 1981, 20-24). The mask has been formed with a repoussé style and cut into a shape indicative of a sun with scalloped edges. The edges appear faceted and snipped suggesting that a tool similar to shears was used for this process (Untracht 1968, 69; Tushingham et al 1979, 10-11). There are remnants of a black pigment border surrounding the circumference of the face, and traces of red paint over the body of the mask consistent with Holm's analysis of colour use (Holm 1965, 23). Three pairs of perforations are visible on the outside top and lateral edge of the face suggesting that the mask was strung at some point (Figure 6.54).

Figure 6.55. Northwest coast copper mask, Record 299, composed of a single sheet of metal consistent with Arsenic Bronze (Photo by author, ©Friends of the British Museum).

The museum records regarding the anthropomorphic metal mask that is provenanced to the broad Northwest Coast region indicate the artefact was collected on Vancouver Island (Record 299; British Museum Records). As such, it is possible that this mask is associated with the Kwakwaka'wakw, Nuu-chah-Nulth, or Coast Salish. Furthermore, hash marks and formline designs engraved across the face of the mask appear to conform with the worked shape of the face, and with the painted artistic styles of the southern ethnolinguistic culture groups as defined by Holm (1965, 23). The mask is composed of a single sheet of metal consistent with Arsenic Bronze that is slightly repoussé in form, with a finely crafted protruding nose (Figure 6.55). The consistent thickness and smooth surface of the metal further suggests it is manufactured sheet metal (Franklin *et al.* 1981, 20-24).

6.3.1.5. Bringing Together the Elements of Masks

Within this study there is only one mask that has a design including the use of tacks, specifically Haida mask record 204 (Figure 6.51). These tacks are all consistent with some variation of a brass alloy and represent all but two metal samples consistent with brass used in the creation of these masks. It is currently thought that the use of tacks in mask design is somewhat rare, and no other examples are known to the author at the time of writing. As such, it is possible that the combination of new materials and less formalised geometric designs (previously discussed on page 288) suggests at least a discrete shift or expansion in traditional mask design techniques (Holm 1965, 20; Boas 1927, 354). Additionally, in this study brass tacks have been identified in the design of three other artefacts. Specifically, there is a Northwest Coast horn spoon (Record 3) made with five tacks, and a Northwest Coast wooden feast dish (Record 138) made with 38 tacks, and a Kwakwaka'wakw wooden dish (Record 292) that has eight tacks applied to its rim. In all these cases it is unclear when the tacks were applied, and each may be an example of metal added retrospectively for various reasons, as none are structurally integral to the object. Each of the four artefacts made using tacks in the design incorporate multiple tacks, ranging from 5 to 132 tacks on a single object. This suggests that the use of tacks in artefact design required large numbers of the objects, placing the Indigenous use of these tacks in a timeframe following the establishment of the maritime fur trade. This also may suggest that Indigenous metallurgists across the region maintained a collection of material types for use in specific pre-planned designs. That all the tacks are a type of brass or leaded brass alloy could be attributed to European tack manufacturing practices in the 18th and 19th century, which would limit the type of tacks available to Indigenous traders. However, the fact that Indigenous makers chose to incorporate the differently coloured pre-formed pieces of metal into their designs may also show individual choices to expand material and aesthetic repertoires at this time.

All other carved wooden masks included in this study, and the two completely metal masks, have been created using sheet metal that has been cut and formed. In all cases, except the metal mask composed of a single piece of material (Record 299; Figure 6.55), the copper and copper alloy materials are mechanically applied and fixed with nails and rivets, adhesive, or friction-fitting strategies. Regardless of the method of attachment, when sheet copper is applied to carved wooden masks the metal has been worked to conform to the carved shape, coating the eyebrows, lips, or nostrils like a second skin (Figure 6.58). These masks offer a small sample of the metallurgical forming techniques used by Indigenous makers, and when combined with the *chaîne opératoire* analysis of the other artefacts in this study these practices of making suggest a consistency in metallurgical traditions throughout the region. The copper working processes used in the creation of masks involve a mixture of cutting, forming, mechanically applying metal to another material, and mechanically joining sheet metal together using lap seam techniques (Untracht 1968, 212-223). These practices are found throughout this data set, applied across multiple artefact types. For example, the two completely metal masks are worked into repoussé forms, reminiscent of the top panels of Coppers. Additionally, the three Copper Metal sheets that make up Wuikinuxv metal mask, Record 98, have been mechanically joined together with rivets placed through lap seams, a process also found in the creation of Coppers.

Of the sixteen masks created using sheet metal, ca. 70% of the sample set is consistent with Copper Metal. 26% with Arsenic Bronze, and there is one example each of a Brass, Leaded Brass, and Tin Bronze material (Figure 6.57). Within this sample set the sheet metal alloys that may have been perceivably different in colour such as the tin bronze and brass samples have been obscured with a black pigment (Record 139, 135; Figure 6.56). This suggests that the use of copper metal in the design was important, but that makers were in full control of the aesthetics they wished to create and that they were not limited by such things as differences in copper alloy sheet metal appearance.

Figure 6.56. Dzawada’enuxw Kwakwaka’wakw anthropomorphic mask designed with sheet metal consistent with manufactured Copper Metal and Tin Bronze, Record 135 (Photo by author, ©MOA).

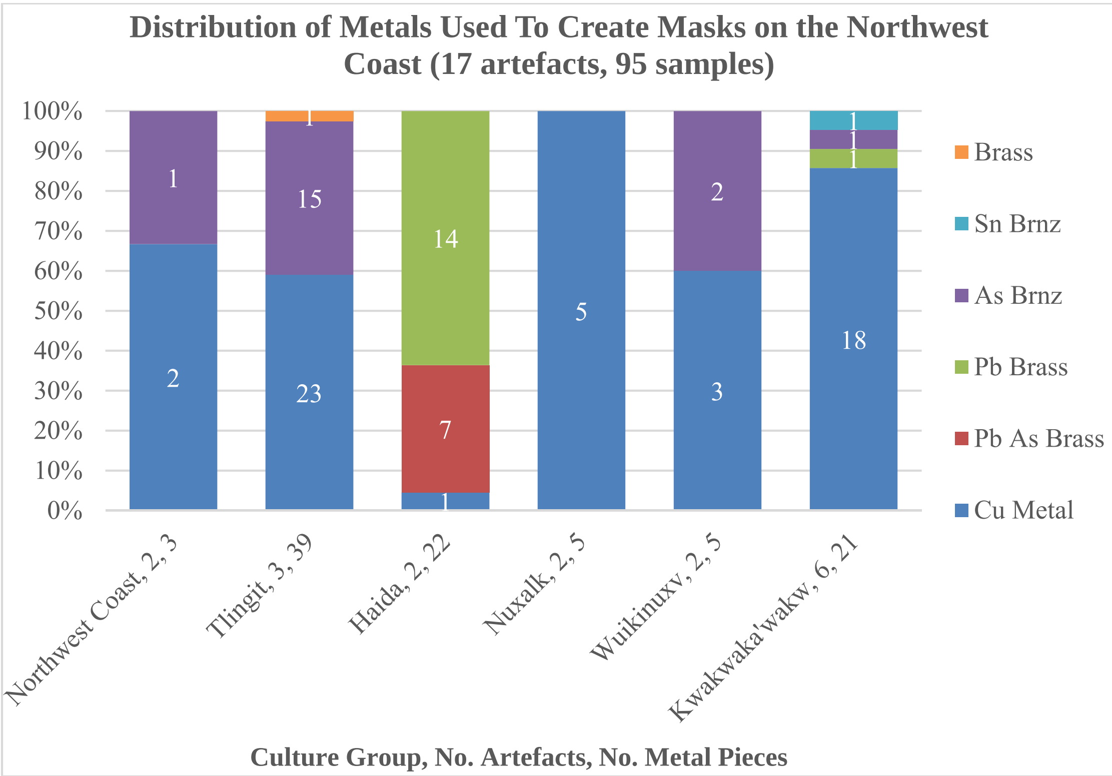


Figure 6.57. The distribution of metals used to create masks on the Northwest Coast.

There are ten anthropomorphic masks and seven zoomorphic masks included in this study. Considering the materials and colours used to create masks, there are a few notable patterns. For example, the colour pallet found on the masks in this study remains consistent with traditional colour choices made prior to the beginning of the maritime fur trade, when new pigment colours became more easily available (Holm 1965, 26-34). Though new hues were not chosen, Indigenous makers did readily incorporate new materials that could produce stronger traditional colours. For example, Mungo Martin told Bill Holm that he thought there was "no good red, only brown like iron rust" for the Kwakiutl, before the Hudson's Bay Company introduced "Chine red in paper packages" (Holm 1965, 26). Emmons also wrote of the Tlingit readily taking up Chinese vermillion pigment for painted designs (Emmons 1916, 16-7). As it is likely that all or most of the metal used in the design of these masks was attained following the development of the fur trade, the consistency in traditional design practices over a prolonged period often defined by disruption and change reveals a repetition of practice, and suggests inheritability of traditional Indigenous practices that were maintained by choice (Martinón-Torres 2002, 35; Dobres 1999, 128).

Figure 6.58. A zoomorphic Dzawada'enuxw Kwakwaka'wakw masks, Record 134. Manufactured Copper Metal is affixed to the nostrils, eyebrows, and eyes of the mask (Photo by author, © MOA).

Though design strategies differ somewhat between masks, there is also consistency in the locations that metal pieces are placed. The metal is most often found embellishing notable features such as the eyes, mouths, cheeks and noses of these masks (Holm 1965; Stewart 1979). This practice is found throughout the region and suggests some shared understanding or perception of how powerful and supernatural beings should be depicted (after Herva & Nurmi 2009, 158; Cobb & Drake 2008). It is possible that copper was used in some cases due to its red colour, however it is not uncommon for the metal to have been covered in pigment. This suggests again that Indigenous makers were in control of the design they wished to create, including colour pallet and overall messages they wishes to communicate. Additionally, obscuring the nature of copper with thick pigment further suggests that the metal is valuable and meaningful regardless of its provenance as trade material, and that its presence within the body of the object is more important that the audience's immediate awareness of it.

On the Northwest Coast, masks could be used by secret societies and worn by members who would perform the mask, bringing to life and telling the stories of supernatural beings or other socially important figures. These objects were to be understood by the lay-public as powerful, alive, dangerous things, and not as just a carved wooden mask (Seip 1999, 278; Bland 1997). As such, the names of makers are often not known, as this information was not recorded on purpose to maintain anonymity (Cole 1985, 302). Furthermore, should such secrets be exposed, for example by a dancer dropping his mask, the punishment could be as extreme as death (Bland 1997, 34). This poses some interesting questions surrounding the role of the Indigenous metallurgist. For example, were they able to exist in both worlds, creating objects for secret societies while remaining uninitiated? Additionally, if makers were required to be part of the secret societies, could they conduct work for many societies or did each society require its own metal smith? These questions raise significant possibilities concerning how Indigenous people communicated with each other and organised their communities around copper metal in the past.

6.4. Bringing Together Assemblages of Artefacts: A Material Discussion

This combined biographical analysis of Indigenous copper use on the Northwest Coast focuses first on the individual metal pieces, considering aspects such as their meanings and value, material characterisation data, tool markings, and placement within an object's design. The study then expands to include the overall artefact the metal has been used in the composition of, and the associated meanings and contexts that these forms bring with them. From this point consistencies and differences in the *chaîne opératoire* or syntax of making of different copper artefacts is assessed. In this way, this approach is used to compare overlaps and divergences in metallurgical practice across the region between different objects and different communities (Gosden & Marshall 1999; Latour 2005).

The majority of the objects assessed in this study are created using sheet metal. For example, in this study Coppers, beads, all but one of the masks, 55% of the bracelets, all of the tinkers and pendants, along with composite objects such as iron daggers, iron and wood pipes, and horn spoons that are partially clad with copper in some fashion all involve sheet metal. The relevance of the seeming preference for sheet metal is suggested by primary accounts that describe the first priority of an Indigenous metallurgist who receives a piece of copper as to prepare the metal by working it flat (Deur *et al.* 2014, 264; de Laguna *et al.* 1964, 10; Wagner & Newcombe 1938, 203). This suggests a preference for using prepared sheets of the metal in the creation of artefact; an assertion that is consistent with the understood Indigenous metallurgical practice of cold working, folding, and annealing metal that was conducted prior to any known arrival of Europeans or the establishment of the maritime fur trade (Wayman 1989a, 32; Franklin *et al.* 1981, 24-6; Acheson 2003, 218; Whitthoft & Eyman 1969; Fisher 1977). Furthermore, multiple primary accounts of trade interactions describe Indigenous traders as discerning regarding the quality of material that was deemed acceptable (Keddie 2006, 20; de Laguna 1972, 113; Bancroft *et al.* 1886, 196; Martínez 1989; Crespí 1969; Pérez 1989), indicating that the material must meet a certain quality standard. As such, similarities between manufactured trade sheet copper and prepared native copper sheet metal may have played a part in the establishment of early fruitful trade relationships.

That Indigenous makers incorporated large amounts of manufactured sheet copper and copper alloys into the construction of Indigenous artefacts while continuing to apply traditional metallurgical techniques and forming practices to the material, further demonstrates Indigenous choices. While increased Indigenous interest in European trade may have been linked to a loss of access to old procurement sites and trading partners as the fur trade and colonial period wore on (Boyd 1999), this data set shows that manufactured copper was accepted and used by Indigenous communities to make culturally significant objects from at least the 1770's and earlier if drift metal is taken into account (Gleeson 1981, 3, 53; Callaghan 2003; Keddie 2004). This is not a simple or binary example of Indigenous reactions to colonial cultural oppression or an example of acculturation. Instead it is clear that Indigenous people and communities had their own discrete social norms, goals, and strategies in mind regarding the acquisition and use of foreign trade copper and other materials, just as their European and Russian trade partners did (Oliver 2013, 103; Ortner 2001; Robb 2010). Here it appears that copper and copper alloy sheet metal fit into established traditions surrounding the materials' use, something that appears to be echoed in the Indigenous uptake and use of certain specific trade pigments (Holm 1965, 20; Boas 1927, 354). This apparent ease of use of foreign metals may be related to the fact that extensive Indigenous trade practices and established trade routes already existed by the late 18th century which allowed copper and other important materials and objects to move around the region. As such, the intrinsic power and meaning of the metal may not have been significantly altered just because it was attained from European, Russian, or American trading partners instead of Indigenous ones.

Within this data set, much of the copper used to make the artefacts retains some evidence of having been painted, and in a number of cases the metal appears to have been entirely obscured by pigment. It is true that the designs of a number of Coppers involve etching through a layer of pigment to expose the metal beneath, potentially to increase the available colour pallet or to reveal the truth of the object's internal material. However, the use of pigment to alter the colour of the metal suggests that the copper's inclusion within the artefact may be related more to the intrinsic power and importance of the metal and the makers' knowledge of its presence within the artefact, rather than to the visual consumers who see the object in use. This suggests that, with regards to copper, it may have been as much or more about the performative act of making or using the metal generally, than the initial or finished product.

Using a *chaîne opératoire* approach to study the production and consumption strategies that have left marks on the bodies of each object allows for life histories of diverse objects to intersect and reveal social, technical, and symbolic things about copper, the objects made from it, and the people who made them (Schlanger 2005, 27; Lemonnier 1992). Specifically, the similar folding, forming, and joining techniques that are visible across the bodies of diverse objects in this study, that have been created at different points in time and by different people across a large region, suggest a technique that has been actively practiced, taught, and inherited (Figure 6.7; Figure 6.40; Figure 6.48; Figure 6.54). Changes in these technological traditions act as windows onto the specific factors affecting specific people at specific times that may cause this change (Roux 2016, 103; Shennan 2013).

This sample set suggests that metallurgical traditions were in place in the study region prior to the physical arrival of Europeans or Russians, but that with the arrival of these foreigners came an influx of a large amount of trade copper and other goods. This has implications for the origins of very large metal artefacts such as large Coppers (see Colnet 1786-88, 136, Lisiansky 1814, 146), because if these artefacts could or did not exist prior to the arrival of large processed pieces of sheet metal how did this artefact and the practice of its making become so quickly widespread? It is possible that the antecedents of large Coppers were made from wood, leather, bone, or some other material, an argument that is consistent with the practice of covering metal with pigment and obscuring its true nature. Perhaps the form and design of Coppers were in place prior to their production in metallic forms.

When considering the locus of Indigenous metallurgical attention, if this was focused on the (re)production of specific processes across socially important objects that became involved in multiple and varied contexts, then it is possible that the act of making in itself was as important as the completed object (Lechtman 1988, 369). However, in at least some instances Indigenous metallurgists were creating artefacts that were involved in secret societies, and that the comparatively banal production processes of these significant objects were to be kept a secret (McIlwraith 1948, 697; Cole 1985, 301-2; Seip 1999, 276-7). This poses further interesting questions regarding Indigenous metallurgists. Specifically, if the act of making is important, and at least some of the objects were created in secret (Bland 1997, 34), then for whom is this performance of craft intended?

With regards to the idea of consistent metallurgical practices in the region, it is possible that these techniques were not in any way quickly developed. As Martinón-Torres argues, no act or experience occurs independently from the society in which it is embedded (Martinón-Torres 2002, 35). Individual agency is not overlooked or downplayed, but actions contribute unconsciously to the reproduction and consolidation of both social and mental constructions, which can give rise to further developments along similar lines in both technological practice and the artefacts produced (Lechtman 1988, 275; Wiessner 1989, 58; Rosenthal 1995, 346). This makes the similarities between metallurgical practices and other pyrotechnical fabrications strategies quite interesting. For example, the processes of hammering and annealing are akin to pyrotechnological practices applied during lithic heat treatment to alter a material's mechanical qualities and enhance its manipulatable properties (Whittaker 1994, 73; Domanski &Webb 1994, 1992). This process had been part of lithic technology in the region for thousands of years prior to the fur trade period (Ames *et al.* 2008, 9-11; Austin 2007), and may have inspired or at least informed Indigenous metallurgists in the region. Furthermore, the lap seam joining technique identified in the construction of Coppers, bracelets, beads, and masks, can potentially be recognised in the ways that kerf-bent wooden boxes are constructed using rabbet joints and wooden dowels, quite similar to the countersunk lap seams and rivets used in metal working (Ames 2003, 27; Davidson 1980).

Within this chapter the biographies of copper and copper alloy metal used in the composition of a wide range of objects reveal a material that is involved in meaningful social discourse, accumulating history and value through time as the metal is used (Herva & Nurmi 2009, 162; Knappett 2017; Croucher 2011). From this point, the final chapter will explore these entanglements and how they developed through the maritime fur trade and subsequent colonial period. In this way the shifting perceptions of 'us' and 'them', and the over simple perceived binary tensions between colonisers and the colonised will be addressed and deconstructed through the lens of a culturally important material.

Chapter 7 A Discussion of Cultural Entanglements Through a Lens of Indigenous Copper Use

The research in this thesis is conducted with the aim of analysing the societal shifts and changes that occurred among the Indigenous communities that make up the region known as the Northwest Coast through the late 18th to mid-20th century. This was a time characterised by the arrival of European and Russian interests, the development of the maritime and land-based fur trade, and later the colonial period (Fisher 1977; Acheson & Delgado 2004). Here a material culture study that focusses on copper metal, a material understood to be important to the different ethnolinguistic Indigenous groups in the region (Boas & Hunt 1906, 80-113; Goldman 1975, 82; Jopling 1989; King 1999; Suttles 1990b; Boas 1916, 301-5; McIlwraith 1948, 253-4), is used to identify consistencies and differences in material usage through time. This is done through the application of a biographical approach that incorporates a detailed *chaîne opératoire* analysis and chemical characterisation of over 300 Indigenous artefacts composed of over 700 individual copper metal pieces, combined with published academic analysis, historic literature, primary documents, and recorded Indigenous histories that provide context to the objects and their use.

7.1 Defining the Discussion

When carrying out social studies such as this one, where the intention is to assess trends in Indigenous material culture practices, it is easy to fall into the trap of assuming that the ‘default condition of humanity’ is one of change (Martinon-Torres & Killick 2015, 11). Assumption of constant social change, or the constant desire to change, simplifies and flattens the agency of people in the past and can overlook choices of consistency and tradition. Here it is argued that choices to change and remain the same can be made in active and passive ways, and that considering the context in which these actions were taken provides needed insight into the specifics of why and how. As such, this chapter focusses on the detected fluctuations and consistencies of copper metal use identified through material analysis and contextualises them against a backdrop of the changing social landscape of the fur trade and colonial period with an extensive literature review (See Chapter 2, 3). Combined, these documents reveal discrete shifts and changes in social and political power structures in the region over time, and make it possible to ask questions such as why societies adopt or reject certain materials and technologies, and how these choices subsequently influence shifts and changes in societal and technological systems (Lemonnier 1992, 2).

It is possible to ask these questions without presuming a direct linear relationship between technology and society (Lemonnier 1992, 13-16). For example, the Indigenous acceptance and use of trade metals in the late 18th and early 19th century is not presumed to have a direct causal link to the colonial experiences of Indigenous people living in the late 19th century and beyond. Rather, copper is seen as a means of following the patchwork of individual stories of the people who used the material through time. It is also possible to ask these questions without assuming mutual exclusivity between form and function (after Shanks & Tilley 1992, 144, 171). Among other things, this means that it is possible to explore potential antecedents to artefacts such as Coppers, and avoid suggesting that these objects appeared instantaneously as fully formed artefacts that were integrated into developed traditions involved in defining the social status and wealth of Indigenous people, with no prior history. Instead, form and function are considered culturally contingent, and the value and meaning of objects are thought of as being continually (re)negotiated in an ever-changing world throughout their biographical lives (Burström 2014, 77-80; Van Oyen 2013, 97). In this way, objects work to mediate the social consciousness with which they are entangled and recreate social realities in material forms unendingly (Shanks & Tilley 1992, 171; Holtorf 2002 54-55; Holtorf 2008, 421-423).

7.1.1 An Overview of this Discussion

Within this chapter the biographical approach allows the study to follow copper and the objects made from it by the Indigenous populations of the Northwest Coast through the fur trade and colonial periods, revealing strategies used over time to negotiate periods of uncertainty and change. First, the early development and possible spread of Indigenous metallurgy is explored alongside questions pertaining to the potential when(s) and why(s) of copper becoming a specific focus. Additionally, the seeming quick adoption of European copper in the making of socially significant Indigenous artefacts is addressed, alongside the maintenance of traditional practices and the implications of consistencies and differences in these actions when considering contemporary interpretations. Observations related to specific artefact types are then explored. Concerning Coppers, questions regarding when these specific objects became a social focus, and how their use can provide insight into past Indigenous choices regarding trading practices, traditions, values, technological practices, and ontologies in a changing world, are explored. Here it is possible to comment on the expansion of the Potlatch ceremony in the mid-19th century, and the ways in which the use of Coppers at these events both facilitated social negotiations and worked to reinforce Indigenous traditions as the colonial period truly began (Fisher 1977; Hunt 1906; Grumet 1975, 297; Codere 1990, 369; Harmon 1998, 74; Cole and Darling 1990, 132).

Issues concerning the trade of conspicuous Indigenous artefacts to European, American, and Russian traders and colonists through time are then discussed. A particular focus is placed on the differences between the power balances of relationships established in the fur trade and those in the colonial period (Fisher 1977; Gosden & Marshall 1999). Museum collections and the colonial practice of artefact collection are then explored, addressing the patchwork of reasons why Indigenous people chose to engage or not with ethnographic collectors, and the impacts these actions still have on the world today.

The discussion is then turned to the types of shifting social pressure that arrived with the colonial period in the later 19th century. The relationships that developed between Indigenous communities and colonial institutions such as missionaries and the new colonial government show that Indigenous communities chose a wide array of actions in order to secure their own future, with varying outcomes and levels of success. Overall, this study highlights the diverse ways in which people on the Northwest Coast attempted to solve their own problems and achieve their desired lives through a time period that touched everyone who came to reside on the Northwest Coast as well as the wider world.

7.2 Copper as a Matter of Choice

Indigenous communities across the study region have been procuring, trading, and using copper to make artefacts for hundreds of years by the late 18th century (Ames 1994, 220; Ames *et la.* 2008, 9-11; Acheson 2003). Copper artefacts such as pendants, beads, and bracelets have been found in archaeological contexts across the region that predate the physical arrival of Europeans and Russians (Smith 1899, 1900; Lepofsky *et al.* 2000; Hunt 2015, 61-72; Grey *et al.* 2010). Geological research has shown that, though there are multiple sources of native copper in the Pacific Northwest, this material was available at different times in different areas. For example, ice coverage in northern areas did not recede and open up the valleys and river drainages where the metal accumulates until approximately 1500 BP, meaning sources were available in the south at an earlier time

(Ames 1994, 220; Calkins *et al.* 2001; Barclay *et al.* 2001; Dixon *et al.* 2005). Discrepancies in timing between the material's availability in different portions of the Northwest Coast, and the widespread use of the material in the region prior to the fur trade, suggest that long distance trade relationships established in the region were moving copper around much earlier than the late 18th century.

A long-standing tradition of copper trade would go some way to explaining why Indigenous communities came to develop similar metallurgical traditions, focused specifically on copper, across quite a large area (after Franklin *et al.* 1981, Wayman *et al.* 1992, 3-4; Cooper 2011; 2007). It is possible that similar metallurgical practices were developed at different times and by different groups of people due to shared ontological world views that drew people to make similar choices (after Leroi-Gourhan 1943, 27; Lemonnier 1992, 75). Though, with a sufficient depth of time, contributing factors such as itinerant Indigenous metallurgists who could potentially transfer specific skills, and the trade of objects that may then be copied, can promote the spread of metallurgical practices. This research, which reveals a region of deep entanglements, suggests that a combination of ontology, innovation, taught skills, and copied artefacts played a role in the development of a seemingly related traditional metallurgical practice on the Northwest Coast.

The Indigenous choice to specifically use copper metal in the creation of culturally significant objects is not straightforward. Simple arguments that copper was an available material that could be manipulated using Indigenous techniques is made moot by the presence of native gold and silver in the region, which could also be worked by hammering and annealing processes (Brannt 1896; Dawson 1880, 1879; Leaming 1973). This suggests that copper was chosen for different culturally contingent reasons. Links between copper and other things important within Indigenous communities have been discussed in multiple Indigenous oral histories, anthropological and ethnological studies, and primary accounts. As well as being linked to the supernatural world and considered a powerful material in its' own right, copper was linked to the colour red, sunlight, salmon, blood, and cedar trees, all of which also played important roles in Indigenous practices, value structures, and ontological perspectives (Boas & Hunt 1906, 80-113; Goldman 1975, 82; Jopling 1989; King 1999; Suttles 1990b). A number of primary accounts of early interactions during the maritime fur trade period describe Indigenous craftspeople maintaining copper objects such as spear points by grinding and polishing the surface of the metal, a process that improved the metals lustre (Stewart 1987, 83-6; la Pérouse 1798, 402-7; Cook 1784, 329-30). European assumptions about Indigenous reasonings for specific actions are far from a reliable source. However, whether improving or maintaining the lustre and colour of the metal was the primary goal of grinding the metals surface, this aesthetic is still achieved through these actions. As such, the physical qualities of copper related to its colour, texture, weight and other traits may have contributed to the Indigenous preference for the material.

7.2.1 Copper Metal: Traditions and Preferences

The *chaîne opératoire* analysis conducted for this research reveals that a specific set of metallurgical working techniques are visible across the study region. Specifically, the metal is hammered and then annealed in fire, a process that is applied in rounds as the metal is worked into desired shapes (Franklin *et al.* 1981, 24-6; Rainey 1939; Vernon 1990; Wayman 1989a, 32). Flattening metal that is not already in sheet format appears to have been a common beginning for many metal pieces. The majority of known copper items that have been recovered from contexts dated prior to the beginning of Indigenous trade with Europeans and Russians are composed of material that is worked into a sheet of metal and then cut, rolled, perforated, or folded in specific ways to create different objects (McIlwraith 1948, 253-4; Fisher & Bumstead 1982, 40, 108-9). Within this study pendants, perforated metal disks, beads, and rings recovered from archaeological contexts support this argument.

A recognisable syntax of technical actions is detectable across the bodies of a range of different objects created using copper on the Northwest Coast. This syntax of metallurgical practice is also found applied to all other metals in the region, including iron (Wayman *et al.* 1992; Gleeson 1981, 3, 53; de Laguna *et al.* 1964, 10; Deur *et al.* 2015, 264). While the Indigenous communities of the Northwest Coast may not have known of metallurgical smelting and melting techniques prior to the arrival of European and Russian metallurgists in the late 18th century (Wayman *et al.* 1992, 2; Howay 1941, 59-82), knowledge of the practice was not kept a secret. In fact, it became a recommended European practice to keep a metallurgist among the crew during the fur trade period as they would be able to quickly forge metal objects in local indigenous styles that would help encourage trade (Howay 1941, 59- 82; Ingraham 1971, 105). Additionally, as John Jewitt found during his time held captive by the Nuu-chah-nulth (Stewart 1987, 34-5), and as the *chaîne opératoire* study included in this research shows, there appears to have been little interest in adopting new metallurgical techniques. This further supports an argument for a long-standing tradition of making in the region that was actively chosen and passed on prior to the fur trade.

As well as being able to comment on the continuity in technological choices in the region, this information has broader implications for Indigenous traditions of making. For example, similar mechanical processes of attachment that involve folding techniques, rivets, and nails are found across the study region, used to fix metal together or some other material such as wood or horn. These processes are widespread, and one does not have to look far to find echoes of Indigenous metallurgical practices in the manipulation of other materials. For example, the practice of heating a material in a fire to alter its physical qualities and make them more favourable for percussive production techniques is found in lithic technology in the region. Heat treatment also alters the surface colour of copper as well as many lithics subjected to the process (Whittaker 1994, 73; Domanski &Webb 1994, 1992). The combined approach of using a lap seam and copper rivet to fix metal pieces together is also reminiscent of the rabbet joints and wooden dowels used in woodworking practices to make a wide variety of objects such as feast dishes and dance masks (Ames 2003, 27; Davidson 1980).

Proposed similarities in technological styles across different materials and objects and among different ethnolinguistic groups could suggest that Indigenous choices to use copper were related to more than the metal's visual traits or supernatural connections. Perhaps the favourable way that copper behaved when worked using established traditional techniques also influenced the choices of Indigenous makers who initially incorporated the metal into use. Continuity in these seemingly different technical traditions across the region, and through a depth of time, suggests that people shared similar or related ontological views of the world around them, and that these ties brought people to take similar actions to achieve comparable goals (Lemonnier 1992, 75; Leroi-Gourhan 1943, 27). Furthermore, the recognisable patterns of metal manipulation and use seen in identified *chaîne opératoire* sequences across a range of different objects within this study, suggest that the mastery of these techniques corresponds with learned and inherited practices and shared perspectives concerning the social place and value of the metal (Roux 2016, 12; Lemonnier 1992, 63). This continuity also suggests that these practices had been a part of Indigenous life for some time by the late 18th century.

7.2.2 Indigenous Use of Trade Metals

The majority of known Indigenous copper artefacts made and used on the Northwest Coast are composed of European, Russian, or American manufactured metals. The material characterisation portion of this study supports this assertion, along with the findings of multiple past researchers (Wayman *et al.* 1992; Jopling 1989, 79-97; de Widerspach-Thor 1981, 125; Duff 1981, 153). As copper, its alloys, and its ores were shipped widely around the world and used to make a wide range of new materials and objects by the late 18th century, it is impossible to identify where the manufactured trade metal found on the Pacific Northwest was initially made, or from whom it was traded, based on elemental data alone. However, it is possible through an informed analysis of the chemical and physical qualities of the metal to distinguish whether the metal is consistent with manufactured foreign materials or native copper collected in the Pacific Northwest, and whether the metal could have been subjected to Indigenous metallurgical techniques (Craddock 1995; Dussubieux & Walder 2015; Pernicka 1999).

It is important to note that manufactured alloys were arriving in the region and being used by Indigenous metallurgists earlier than the time of the fur trade (Gleeson 1981, 3, 53; Callaghan 2003, 92; Keddie 2004; 1990, 2-4). For example, trade copper had found its way from Siberia to the Indigenous peoples residing in the Bering Strait by the mid-18th century (Cooper & Bowen 2013, 12; Davis *et al.* 1997, 247). As the metal made its way across the arctic it became integrated into a larger Indigenous trade network that could facilitate the materials movement towards the Northwest Coast, potentially passing through many hands on the way (de Laguna 1972; Copper *et al.* 2016; Cooper & Bowen 2013, 12). Additionally, metal and other materials were recovered by Indigenous peoples from shipwrecks that washed onto the shores of the region, an occurrence that increased in frequency with the beginning of the Japanese Edict period in the 17th century (Callaghan 2003, 76; Webber 1984, 66). This means that large copper and copper alloy sheet could have been in Indigenous use from at least the mid-17th century. This information, coupled with the fact that copper could be re-worked and reused in the creation of multiple objects throughout its biographical life, means that the presence of the trade material does not provide a straightforward dating method for these objects. This also suggests that Indigenous metallurgists were not necessarily unfamiliar with the rolled sheet copper and brass tacks known to have been preferred in trade in the 18th and 19th

centuries, and the material may have already had some established place with Indigenous value structures prior to this time.

Manufactured trade metals were seemingly widely accepted and even sought after by Indigenous communities across the region from the beginning of trade with Europeans in the 1770's (Cook 1784, 279; Beaglehole 1967, 303-322). Primary Eurasian documents describe a large number of copper adornments in the form of objects such as pendants, beads, bracelets, tinkers, labrets, and large daggers (Wagner & Newcombe 1938, 206; McClellan 1975b, 31; Menzies 1923, 82). Combining the fact the material was already in the region and likely known to a number of metallurgists at this time, with the wide range of artefacts created by Indigenous makers, further supports an argument for an established metallurgical tradition before the time of the fur trade. Should this be the case, the fact that both native and manufactured metal sources were variably available across the region at different times (Franklin *et al.* 1981, 5-6; McClellan 1981; de Laguna & McClellan 1981, 662) means that a widespread and established use of copper would require long distance coordinated trade between Indigenous communities (Colnett 1790, 133; Donald 2003, 316; Carlson 1994, 338-345; Ames 2008, 142). This could further suggest that, regardless of the metal's origin, it was most often attained through trade interactions.

Suggesting that the primary Indigenous experience of attaining copper, outside of ceremonial situations, was through trade has implications for interpretations of the perceived value of copper. Specifically, native and manufactured copper and copper alloys can look and behave the same way when worked and could potentially be mistaken for each other over time as the metal is used and reused (Craddock 1995). Additionally, the transactions carried out during the fur trade between foreign interests and Indigenous people occurred in an atmosphere of relatively equal power relations (Oliver 2014, 78-102; Foster 2006, 286; Fisher 1977; Jordan 2009, 33). Therefore, it is possible that attaining copper from European, American, and Russian traders was seen in a similar light to trade interactions with any other ethnolinguistically different culture group, and that this did not overly affect the value of the metal. This means that the Indigenous value of copper may not have been heavily related to its origins as a native metal. The quality of an object's workmanship, or the number and type of traditional ceremonies the object has taken part in, may play a more important role.

7.2.3 Conspicuous Artefacts: Coppers

Changes in practices of making and application of stylistic features can be interpreted as expressions of cultural histories. Detected shifts in these practices direct attention towards the specific factors that influenced these choices, providing chronological markers of change (Shennan 2013). The Coppers of the Northwest Coast offer a useful vehicle to discuss this type of change. Oral histories refer to the objects as powerful and valuable and suggest that the objects held an established place within Indigenous ontologies prior to the fur trade (Boas & Hunt 1906, 80-113; Goldman 1975, 82; King 1999). An Ahtna and Tlingit oral history describes the purchase of territory at Yakutat Bay from Athabascan peoples using a 'Copper' around approximately 1400 AD (Crowell 2018). In the recorded history the object is understood to be made of metal. The earliest known European account of a Copper is made by James Colnett, who sees a large metal shield shaped object among the Haida in 1787 while trading on Haida Gwaii (Colnett 1786-88, 136). Later in 1814 Yuri Lisiansky, a commanding officer of the Russian American company describes an artefact consistent with a Copper. This object was removed from a Tlingit house in a village that had recently been destroyed by Russians who were seeking to establish control of the area (Lisiansky 1814, 150). Neither Colnett nor Lisiansky appear to have understood the meaning or use of the Coppers they describe. In both cases the objects were not specifically made available for a foreign audience and were completely involved in Indigenous spheres of use, appearing to have been entrenched in traditional practices by the beginning of the fur trade in a metallic form.

The appearance of a long-established tradition surrounding Coppers is challenged by every material characterisation study that has been conducted on the objects, including this thesis (Jopling 1989, 79-97; de Widerspach-Thor 1981, 125; Duff 1981, 153; Wayman *et al.* 1992). To date there are no known Coppers that have been crafted using native metal. As the majority of native copper procured and worked by Indigenous metallurgists is understood to have been relatively small in size, Wayman *et al.* has argued that there is a higher possibility of identifying native metal among the smaller representations of the object (Wayman *et al.* 1992, 7). However, the Coppers described by Colnett and Lisiansky are large and imposing objects.

The *chaîne opératoire* approach applied here is a flexible framework that allows for movement through heuristic fields. It is possible to consider the potential for different materials to be used in the making of a significant object, while also following the continuity of the object's meaning and use; very simply, form does not imply function, things that hold the same meaning do not necessarily have to be made of the same thing or even look similar, and repurposed objects and materials do not necessarily have to be linked to previous form (after Martinón-Torres 2002, 38-9; Ingold 2000, 77-88, 339-361; Knappett 2004, 45-47; Silliman 2009, 211). This means that it is possible that important objects representing similar meanings can potentially be created from a wide range of materials, although in terms of antecedents to Coppers made of other materials, there are no truly convincing examples. Small whalebone and slate amulets carved into the shape of a Copper have been described among the Tlingit, though these objects were observed after the fur trade had begun, and it is not known when precisely they were created (de Laguna 1972, 1053, 1096). However, the existence of items that are composed of other material, but which resemble Coppers, is significant as it suggests the possibility that representations of these shield shaped objects could be crafted from other materials such as wood, stone, bone, or hardened leather, prior to an increased availability of large pieces of sheet metal. An argument for an object that stood in the social space that Coppers occupy, prior to the fur trade, is made due to the seeming widespread shared understanding and use of the objects by the late 18th century, which suggests that the artefacts were already entangled in established traditions in some format. Additionally, in this thesis the argument is made that the thick paint observed on the bodies of many of the Coppers was applied as much to obscure aspects of the artefact as to highlight others and decorate its surface. If this is the case, this strategy may have been applied to other objects to obscure the internal makeup (after Lechtman 1977, 1988, 372; Holm 1965, 20). It is possible that large Coppers created from shipwreck material were in play much earlier than the fur trade. Though, if these objects existed, they would have been rare and likely chemically indistinguishable from copper and copper alloys produced in the 18th and 19th centuries. Thus, it is possible that prior to the arrival of a large amount of trade metal with the fur trade, the objects now known as 'Coppers' were made from a number of different materials, including metal and stone or wood or bone.

In the fur trade and colonial periods, Coppers became entangled in an array of biographies that highlight the diverse ways that different Indigenous communities were managing their specific situations. For example, by the 1830's the Potlatch ceremony had expanded and become more elaborate and frequent, particularly among Tsimshian, Kwakwaka'wakw and Coast Salish communities (Grumet 1975, 297; Codere 1990, 369; Harmon 1998, 74). This increased frequency has been linked to a number of stressful events that may have required a Potlatch to mediate the situation. At this time villages began to consolidate, often near to Hudson's Bay Company forts (Acheson & Delgado 2004, 60). This was in part due to a desire to trade or gain employment in the developing cash economy, however villages also consolidated because of population loss from disease and growing colonial pressure to live in specific European ways (Alfred 2009, 44; Codere 1990, 369; Schreiber & Newell 2006, 226). It has been argued that at a time when Indigenous people were dealing with significant upheaval, the increase in Potlatch ceremonies, and by extension the use of Coppers, was a way to maintain Indigenous social structures. Specifically, Potlatch ceremonies, and Coppers specifically, offered a way to 'battle' and resolve issues bloodlessly in a time of often unpredictable and unprecedented change (Grumet 1975, 296-7; Codere 1990, 369; Harmon 1998, 73-6; Hunt 1906). This argument is supported by the Coppers in this study that were created and used through this time. These objects are often composed of multiple pieces of metal, some of which appear to retain traces of the past objects they were a part of and show signs of 'breaking' and other wear and tear from cultural use.

Coppers also provide insight into the entangled relationships Indigenous people on the Northwest Coast had with colonial trade entities such as the Hudson's Bay Company (HBC). As the company began establishing itself on the Pacific Northwest in the fur trade period, its forts provided focused loci where trade could take place. The forts offered access to large amounts of material that could be used in Potlatch ceremonies and other activities (Mackie 1993, 182; Fisher 1977, 44). The company also used ideas such as 'store credit' to tie Indigenous people, their goods, and their labour to its expanding business (Mackie 1993, 167; Crowell 1997a; Jordan 2009, 36). As the fur trade was coming to a close, the HBC became caught up with colonial management of the area and one of its top field agents, James Douglas, took up the post as governor of the colony of Vancouver Island in 1849 (Fisher 1977, 49; Harris 2004, 169-170). Though it might be assumed that colonial trade companies would collaborate with colonial governments in lock step, the HBC's use of Coppers reveals a more complicated relationship in the region. Specifically, by the 1880's the colonial government was seeking to limit or stop traditional Indigenous activities, including the Potlatch and use of Indigenous objects such as dance masks and Coppers in the pursuit of an assimilation mandate (Loo 1992, 133; Wells 1987, 103; Williams 1983, 68). However, at the same time HBC traders spotted a chance to capitalise on this developing relationship and created imitation Coppers that could be used instead of money in their transactions. This action was lucrative for the HBC, but also worked to undermine both colonial laws and potentially the Indigenous traditions surrounding Coppers (Jacobson 1977, 20).

Shifting traditional practices do not imply the loss of culture and tradition, and in the case of the Coppers there is evidence to suggest that illegitimate artefacts, such as those created by the HBC, were accommodated within Indigenous ontologies in productive ways. For example, Jonaitis describes the work of a ‘Copper Tester’ among Kwakwaka’wakw communities, whose job it is to assess the legitimacy of the artefact (Jonaitis 1996, 10; see Chapter 2, pg 68). The physical qualities of the metal pertaining to its softness, colour, and the sound it produces when struck are assessed alongside workmanship. Jonaitis writes that there was the possibility to salvage a questionable Copper by having its form refined by an Indigenous metallurgist, however illegitimate artefacts were not simply removed from Indigenous social spheres. Instead the object received a label of ‘smooth faced’ or ‘white man’s Copper’ and assigned a consistent value of 100 blankets that did not fluctuate with exchange (Jonaitis 1996, 10). This effectively removed the illegitimate artefact from important interactions, such as representing the history and crests of a specific family, while retaining its use in the Indigenous system essentially as a form of simple currency.

7.2.4 Indigenous Artefacts as Collectable Trade Items and Exhibits

The Indigenous objects created using copper, and their biographical movements through the fur trade and colonial period, show that these objects and their associated meanings and values were not stationary, and that they did not necessarily hold the same meaning for everyone. Thus, just as the introduction of European, Russian, and American manufactured metal into the region has implications for Indigenous perceptions and use of copper, the trade of Indigenous objects to foreign interests reveals another facet of the diverse ways local communities on the Northwest Coast managed, suffered, and sometimes profited from foreign relationships. This is brought into focus when considering such things as the Indigenous trade of ceremonial masks to foreign collectors, and the ethnographic collection of artefacts for museums and world’s fair displays.

7.2.4.1 Ceremonial Items and Reasons to Trade Them

Gosden and Marshall have argued that among the Kwakwaka'wakw and Tsimshian at the time of Captain Cooks arrival in the area, there was a desire to trade socially significant artefacts for economic gain, and as long as the trade did not involve showing off or performing objects such as masks, there was no Indigenous social friction to the trade. It is argued that this was because a new similar mask could be created to take the place that the traded mask had formerly occupied (Gosden & Marshall 1999, 175; Beaglehole 1967, 319-20), and that it was the rights to display the object that were jealously guarded (Holm 1983, 29). To support this argument Gosden and Marshall use the example of two masks, one crafted by Willie Seaweed and the other by Mungo Martin. Both of these masks were considered remarkable pieces, and yet they were sold to Dr. Charles Newcombe, who was in the region collecting artefacts for the British Columbia Provincial Museum in 1914, with the understanding that replacements could be made (Holm 1983, 29; Gosden & Marshall 1999, 175). It is certainly significant that socially conspicuous items were being traded for alternative economic gain in the fur trade period. However, there are examples of primary European and American accounts that describe being required to participate in Indigenous performative ceremonies before an object could be purchased, which suggests the possibility that sometimes these traded artefacts were performed prior to exchange (Kirk 1986, 203). Additionally, the political power balance experienced by Indigenous people and explorers during the fur trade period was significantly more equal in nature than that experienced by Willie Seaweed and Mungo Martin, who were operating in a system of established colonial laws designed to actively prevent the use of these ceremonial items (Fisher 1977, 27; Acheson & Delgado 2004; Oliver 2010). Silliman argues that conflating and flattening time periods that encompass long-term entanglements risks downplaying the severity of certain interactions, as well as the fundamentally different levels of political power that structured those relationships (Silliman 2005, 56). Moreover, Willie Seaweed and Mungo Martin themselves further complicate the argument that trade with collectors was facilitated by the Indigenous knowledge that a replica could be made again, as these two individuals were both highly respected Kwakwaka'wakw Chiefs, artists and wood carvers (Duff 1981, 157-74). As such these two individuals had access to the knowledge, skill, and privileges that were required to create these objects, an advantageous position that may not have been shared by all those who chose to trade these objects through the fur trade and colonial period. This means that there may have been significant differences between the motivations and perspectives of the people creating and trading masks to Captain Cook and his crew and those doing so in the early 20th century. Here a further avenue of investigation is identified, as recognising the distinction between political power structures operating on the Northwest Coast during the fur trade and colonial periods leads to a more nuanced understanding of specific patterns of choices made in vastly different social environments.

Indigenous material culture, either purchased or in some way acquired by early explorers and traders, appears to have contributed to the growth of the Europeans' and Americans' fascination with Indigenous objects in the early colonial period. There are multiple primary accounts of sailors attaining 'exotic' items for personal collections (Fisher 1977, 7; Pérez 1989; Griffin 1891, 203; Cook 1784, 329-332) and in the latter half of the 19th century as colonial governing structures began to crystallise in the region, a number of ethnographic collectors working for museums and universities could be found on the Northwest Coast (Freed *et al.* 1988, 8-9; White 1963, 8-11; Swan 1883; Cole 1985, 43; Low 1982, 39). The rationale behind this collection was often framed in terms of salvage work as the Indigenous populations were expected to either perish or be assimilated completely in the near future (Shotridge 1919, 131; Cole 1985, 301). With this in mind, overtures to purchase objects from Indigenous people were often presented as an opportunity for the objects to go to museums and teach the rest of the world about the Northwest Coast (Shotridge 1919, 131; Cole 1985, 301).

These interactions were received in a variety of ways. For example, Louis Shotridge (1919, 131), Marious Barbeau (McIlwraith 1929), and Charles Newcombe (1907; Cole 1985, 301) are rebuffed by some people among the Tsimshian , Tlingit and Haida while collecting goods, based on a specific object's importance to the person, their family, or their community. While people among the Nuxalk took an opportunity to attain alternative wealth from the sale of masks that had lost their cultural connections due to large population losses caused by the smallpox epidemic of 1862-3. This disease outbreak left many objects with no inheritors to the histories, privileges, and titles they represented (Seip 1999, 277; Duff 1965, 39; Boyd 1999). As showing Nuxalk masks outside of specific ceremonial contexts was strictly forbidden, these sales were often undertaken in a clandestine way so-as to protect the seller's identity against reprisals (Cole 1985, 4, 301; Seip 1999, 276). These various actions suggest that Indigenous people were both attempting to observe traditional customs surrounding their objects as well as finding a way to manage their current unprecedented situations. Ultimately the unintended consequences of this patchwork of artefact acquisition, which was led by the desires of colonial museums, the aesthetic judgements of different collectors over time, and the various willingness of Indigenous people to trade, means that the museum and research collections that represent the history of the Northwest Coast today are composed of a selection of items that may misrepresent the actions and intentions of people in the past.

7.2.4.2 The Implications of Collection and Display

As the desire for Indigenous objects for public displays grew, so too did the 'western' curiosity in Indigenous peoples around the world. It was not enough to see exotic objects and hear tales of adventure from far-flung colonies. Thus, the world's fairs of the late 19th and early 20th centuries included human exhibitions (Raibmon 2000, 198; Pöhl 2008). A similar type of pitch was made to Indigenous people regarding their attendance in human exhibits as was made regarding the choice to sell Indigenous objects. Specifically, Indigenous people were offered the chance to play some part in educating people around the world about their existence in a time of colonial pressure (Cole 1999, 210; Pöhl 2008, 45; Harper 2000). Several Indigenous people travelled with their belongings to these fairs with aims of public acknowledgement and education (Cole 1985, 124; Pöhl 2008, 43), and by allowing themselves to be put on display they could potentially subvert the colonial system somewhat by asserting their legitimacy and heritage (Raibmon 2000, 183-4). However, arrangements of human exhibits at these fairs were often engineered to establish and reinforce stereotypes of race, authenticity, and the superiority of modern civilization (Freed *et al.* 1988, 9; Pöhl 2008, 42-4; Raibmon 2000, 159; Parezo & Fowler 2007, 88-90).

The tensions between acts of exhibition that include people and things as culturally reaffirming educational spaces, and as crystallised colonial stereotypes of a less advanced culture, can be found in many aspects of material life on the Northwest Coast, and copper provides a useful example. Specifically, interpretations of Indigenous copper artefacts made through time, by early explorers during the fur trade, colonists and attendees of world's fairs in the latter 19th century, and academic researchers today, have all been coloured by the perceptions of Indigenous people that were formed in the past and perpetuated today (Silliman 2015, 220). For example, primary accounts written during the fur trade ascribe the masterfully made copper objects observed among Indigenous communities to the European metallurgists aboard the many vessels that were arriving in the area, assuming Indigenous metallurgists could not have created these pieces unaided (Petitot (1893; Cooper *et al.* 2015b, 3; Acheson 2003, 228). The misinformed perception of the metal's restricted temporality of use in the region, and assumed lack of Indigenous technological knowledge, has permeated academic interpretations of the Northwest Coast to such an extent that copper artefacts recovered from archaeological contexts have been assigned to the fur trade and colonial period with little question (Acheson 2003, 227-8). Though this issue is addressed in a more informed fashion in current archaeological excavations (see Cooper *et al.* 2015a; Hunt 2015), crucial portions of the archaeological record may have been lost based on these misinterpretations.

7.2.5 Social Pressures in the Colonial Period

Social pressures on the Northwest Coast during the colonial period have often been investigated in terms of the oppressive and uneven relationships established between Indigenous communities and colonists (Oliver 2010, Fisher 1977). However, recent research has argued for a more complicated model, involving the individual agencies of Indigenous people and colonists as they tried to make the best choices for themselves (Oliver 2014). This thesis supports an argument for this complicated relationship, echoing analysis of Indigenous relationships with missions in the region. For example, a simple interpretation of religious conversion and assimilation ignores the numerous examples of Indigenous people choosing this 'new' path for personal gain within Indigenous spheres (Silliman 2005, 67). For example, Oliver describes Halkomelem community members seeking conversion to Christianity in order to gain access to a European education which would provide things such as a more powerful Indigenous voice in ongoing negotiations with colonial governments over property rights. As Halkomelem status was based upon the possession of particular bodies of knowledge, incorporating European knowledge of the English language and cash economy into their repertoire would have coincided with traditional Halkomelem world views and practices (Oliver 2014, 39). The Tsimshian had a practice of adopting new and innovative practices that were useful to them but could be aligned with their own traditional world view (Neylan 2000, 79). As such there are multiple examples of Tsimshian converts residing at Metlakata who continued to practice Indigenous traditions and maintain their social status in the community in a somewhat covert way, while presenting an outward appearance of conversion and assimilation. This allowed Indigenous community members to benefit from both worlds and facilitated the maintenance of this colonial relationship (Neylan 2000). This serves as a clear example of the flexible behaviour community groups exercised while navigating periods of change, revealing personal and group choices that undermine claims of acculturation.

This is not to imply that the colonial and missionary relationships with Indigenous communities were experienced as an even power balance. At a time when some Indigenous communities were choosing or being pushed to participate in apparent religious conversion, colonial governing bodies were exerting increasing pressure on Indigenous communities (Fisher 1977, 178; Tennant 1990, 45; Powell 1874). As such, the use of traditional objects in ceremonies had become contentious in the latter half of the 19th century. Colonial entities sought to assimilate Indigenous populations and put an end to life-ways that were considered unproductive from a European perspective (Loo 1992, 133). In a clear attempt to control Indigenous traditions the 'Indian Act', which was put in place by the Canadian government in 1876 to define how colonial governing structures would interact with Indigenous populations, was amended in 1884 to ban the Potlatch (Wells 1987, 103; Williams 1983, 68; U'mista News 1996). These pressures were affecting Indigenous populations through a time also impacted by issues such as massive population loss, a new and growing settler population, restricted access to previously available resources, and pressure to convert to new colonial religions and live in a colonial style (Boyd 1999; Neylan 2000; Wells 1987, 103). However, the use of Coppers and traditional items in Indigenous ceremonies did not end with the declaration of new colonial laws in the region. Communities petitioned the government against restrictive policies, but also continued with traditional practices, holding ceremonies in remote locations or under the guise of accepted actives such as Christmas gift giving celebrations (Cole 1985, 253; DIA 1914; Boas 1896; AADBC 1932; Cole & Chaikin 1990, 138; Loo 1992, 128).

Instead of acculturation, Indigenous communities found ways to live in a changing world, accommodating and utilising colonial actions and materials as suited them best. This flexibility is highlighted in the 1927 pictograph created by artist Molly Wilson on a cliff face at Petley Point in Kwakwaka'wakw Territory. The image documents Chief George Scow's Potlatch held in 1927 and is created using a traditional ochre pigment mix. The image shows a line-up of multiple Coppers alongside other items of value including cows (Williams 2001, 64). Here shifts in Kwakwaka'wakw perceptions of what was valuable are visible and, more meaningfully, this pictograph suggests that Coppers and the traditions that kept the objects 'alive', though flexible, were as deeply entrenched as ever in Indigenous ontologies in the late 19th century.

7.3 Concluding Thoughts and a View to the Future

The biographical approach applied in this study is a useful and flexible tool to consider varied material culture sample sets, complex relationships, and periods of significant change. Here it has provided the framework to critically examine Indigenous copper material culture created and used in the Pacific Northwest. Specifically, it is possible to comment on the detected shifts and changes in the metal's use through time and why these changes may have occurred as groups of people established entangled relationships by combining many facets of analysis (after Jordan 2009, 32). Additionally, this approach offers a way to examine diverse sets of past material culture by highlighting the value of combining physical analysis with available associated Indigenous histories, ethnographic accounts, archaeological excavations, and other academic research to bring these relationships to the foreground.

By placing the material culture at the centre of the study, objects are promoted as network partners and agents within the process of negotiating histories, and are seen not just as a reflection of culture but as active participants in the development of culture (Gaitán Ammann 2005, 75-76; Burström 2014, 68; Silliman 2005, 68). This research includes a wide range of artefact types provenanced to locations across the region, and a *chaîne opératoire* analysis not only contextualises the biographies of an artefact type, but also identifies specific technological practices that transcend the crafting of a single object and reveals patterns and traditions surrounding copper that were developed through daily life and echoed across the region (Miller 2007, 17; Kew & Miller 1999). Here it is argued that shared ontological world views draw people to make similar choices and seek similar outcomes (after Leroi-Gourhan 1943, 27; Lemonnier 1992, 75), and that mastering certain techniques corresponds with inherited practices and shared perspectives (Roux 2016, 12; Lemonnier 1992, 63). As such, the patterns identified in this study suggest that Indigenous people in the region shared broadly similar beliefs and outlooks, and consistently manipulated incoming foreign materials in ways that fit with or expanded upon their already established cultural logics (Oliver 2013, 101). Essentially, copper artefacts represent objects made and used by individuals in the process of making their way in the world, through new and old social entanglements and in times of both stability or stress and social change (Silliman 2005, 68; Knappett 2017, 29; Jennings 2011, 2). This is an altogether different argument than acculturation or an unstoppable process moving from a core to a periphery (Foster 2006, 286; Jackson 1999, 97; Croucher 2011, 186).

Consistencies in social practices such as material use and technological strategies suggest that the Indigenous people on the Northwest coast had long- established traditions that were flexible and persistent. This does not imply a static Indigenous culture prior to the arrival of Europeans, Russians, and Americans; entanglements occur in many ways that are non-direct and do not suggest that people never altered from established practices, or that the colonial period in the region was a forgone conclusion of the maritime fur trade. However, a mutual influence is unavoidable between any interacting parties, whether the power balance is defined unevenly or remains ambiguous (Jordan 2009, 32; Alexander 1998, 485). In the case of the Northwest Coast, the shared histories that developed through the fur trade and colonial period are not unified and cannot be homogenised into a simple statement regarding the impacts that occurred in the region between the 18th and 20th centuries (Harrison 2004; Murray 2004; Hill 1998, 149). Instead, this research shows that, regardless of similar ontologies and practices, a wide variety of nuanced choices that reveal discrete diversities were taken by self-interested people with divergent, yet entangled, options and goals (Hodos 2017, 4; Jackson 1999, 97; Knappett 2017, 30).

This research further supports the argument that the colonial period that began in the mid-19th century is part of an unending process that ties the past to the present (Silliman 2005, 62; Wilson 1999, 6). Furthermire, given the situation in the modern day it is possible to argue that the colonial period discussed in this research has not come to an end. For example, processes of negotiation regarding Indigenous rights to self-governance and control over traditional territories have been underway since the mid-19th century in American and Canada, and in many cases have not been yet been resolved (Valverde 2011; King *et al.* 2018). Within this contentious landscape copper metal continues to be considered important, and as recently as July of 2014 Chief Beau Dick of the Namgis Kwakwaka'wakw along with other Canadian First Nations individuals, broke a Copper on Parliament Hill in Ottawa in a shaming ceremony, and a challenge for the Canadian government to do better by the Indigenous people residing in the country (Guujaaw 2016; Troian 2014).

The interpretations of the past are particularly meaningful, as the information that is associated with archaeological and ethnographic objects held in research and museum collections is used to teach both people today, and future generations, about our individual and shared past. The agendas of different social entities on the Northwest Coast have played a fundamental and formative role in the ways that the entanglements of the fur trade and colonial period were experienced in the region, and are understood today (Jordan 2009, 36). These agendas were and are wide-ranging and have had different impacts on people's actions through space and time. Thus, by negating things such as the Indigenous use of copper in earlier contexts than the fur trade and colonial period, Indigenous links to the landscape and to their unique cultural histories are denied, further validating the colonial appropriation of history in the modern day.

As well as exploring the Indigenous use of copper through time and its implications, this research works to demonstrate the further potential for biographical material culture studies in the region to clarify the discrete entanglements and choices that have brought us to the current day. This research can be used to pinpoint specific entanglements on the Northwest Coast that can be investigated from other perspectives, and through other material culture studies, to shed more light on past interactions. The expansion of the Potlatch and the implications of the continuation of Indigenous ceremonial traditions into the 20th century and beyond, represent just a few examples. However, studies surrounding colonial relationships can be in danger of colonising those that fall under examination, and it is even possible to unintentionally reinforce nationalistic settler narratives which further homogenise, objectify, and exotify Indigenous histories and material culture (Hayes & Cipolla 2015, 5; Mrozowksi *et al.* 2015, 122; Cassel & Maureira 2017, 7-10). This is important as the interpretations of our past can profoundly affect the lives of people today (Miller 2007, 6; Jordan 2009, 43). For example, the descendants of those whose histories are found on the plaques of museums, and some of whom are discussed in this research, are currently engaged in legal cases surrounding their Indigenous rights (eg. Frost 2019). These are important issues of decolonisation that can only be constructively addressed through collaborative research conducted with people and communities whose ancestors made and used the objects. Future material culture research should seek to give an equal footing to academic and indigenous perspectives in its interpretations and avoid, as much as possible, the application of presupposed frameworks of understanding rooted in colonialism (Todd 2016).

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Appendix D European Maritime Metal, A Brief History

This appendix provides information on the history of European copper and copper alloy development and use, particularly in maritime settings, in the 18th, 19th, and early 20th century. This is relevant to the broader thesis as it provides context to the copper and copper alloy materials, such as copper vessel sheathing (Acheson & Delgado 2004), that were initially introduced for trade in the Pacific Northwest during the early contact period. This literature review focuses particularly on the United Kingdom as one of the largest copper producers in the world during the 18th and 19th century (Day 1990). The known and patented compositions of copper alloys created and used throughout the colonial period are also included. This information further contextualises the major and minor elements detected in the metals that are chemically characterised in the material culture study within the thesis.

Manufactured European copper metal: A timeline of creation and use

Entrepreneurs and inventors in Europe had begun considering copper sheathing material early in the 18th century, though 'coppering' a complete hull did not become widespread until the British Royal Navy actively began pursuing the practice in the mid-18th century (Bingeman *et al*. 2000, 220; Rodgers 1994, 296). At that time, it was decided that pure copper metal was too expensive, and the idea was dismissed (Knight 1976, 293). Attempts to make a more affordable metal were not forsaken however, and in 1723 the Bristol brass maker Nehemiah Champion patented a process using granulated copper, combined with calamine ore, to produce brass. The granulated copper's increased surface area allowed for improved zinc uptake, from 28.6% to 33.3%, meaning that 40 lbs of copper yielded 60 lbs of brass instead of 56 lbs (Pollard & Heron 2008, 204; Day 1990; Table 1). Though the Royal Navy rejected Champion's alloy following trials, this did not deter continued experimentation. For example, a few years later in 1728, Benjamin Robinson and Francis Hauksbee patented a method for sheathing ships using rolled copper, brass, tin, iron, tinned plates, or any composite of these materials (The Commissioner of Patents 1862, 12; Table 1).

The mid-18th century brought internal reorganisation to the Royal Navy, and copper sheathing was again considered as an alternative to wood and lead. The Portsmouth Dockyard was likely applying copper sheeting to vessels using copper nails by 1753. Additionally, the *HMS Invincible* had its false keel coppered in 1757, and by

1759 the Naval Board had ordered Portsmouth Dockyard to copper multiple vessels (Bingeman *et al.* 2000, 221). The *HMS Panther* and *HMS Norfolk* had pure copper added to their false keels for a trial period in 1759. Good performance in the trials led to the decision to copper the entire hull of the thirty-two-gun frigate, *HMS Alarm,* in 1761 (Bethencourt 2008/9, 3; Jones 2004b, 93; Bingeman *et al*. 2000, 221). The hull was reassessed in 1763, and positive results spurred on the coppering of a number of vessels, including the *Dolphin, Tamar, Tartar, Swallow, Aurora,* and *Stag* (Staniforth 1985, 24).

Galvanic reactions between iron nails and copper sheet meant that copper and copper alloy fixings such as nails and tacks were soon incorporated into vessel construction. For example, in 1753 the Portsmouth Dockyard was actively changing iron bolts for copper (Bingeman *et al*. 2000, 221; PRO 1759; McCarthy 2005, 103). However, in 1764 only the *HMS Dolphin* received copper bolts, while multiple others such as the *HMS Tartar and HMS Tamar* were coppered with iron bolts (Bingeman *et al*. 2000, 221). The subsequent large-scale corrosion and resulting sheathing failures brought the practice into question again, and all copper sheathing was removed until the problems could be resolved (Gardiner 1992; Knight 1973).

Figure D.1. Copper sheathing that has been removed from the HMS Victory after use (Photo by author, ©NMRN).

Economic competition and a growing number of patented copper sheathing materials attracted the attention of insurance companies in the mid-18th century, and standards began to develop, despite continued challenges to produce materials exactly to specification. As early as 1760, 'Lloyd's Register of British and Foreign Shipping' was recording vessel builds, repairs, and materials (McCarthy 2005, 122). The new insurance criteria denoted build quality and insurable worth, leading naval contractors and inventors to agree to stamping and marking their products (Barlow 1999, 80-1; Figure D.1; Figure

D.2; Figure D.3; Figure D.4). This identification system allowed purchasers such as the Royal Navy to keep track of specific use, wastage, and repair costs, and intensified the investment that entrepreneurs and inventors put in to the materials they were developing.

Figure D.2. A close-up of a stamp from 'William, Foster and Company' visible on copper sheathing removed from the hull of HMS Victory. WF & Co was a major manufacturer of non-ferrous metals between 1829 and 1924, operating out of a number of factories predominantly located in the Swansea area. This sheathing is found on multiple vessels throughout the 19th century, including the HMS Victory, and HMS Trincomalee (Bingman *et al.* 2000, Photo by author, ©NWM & NMRN).

Figure D.3. Examples of an 'OCT 1888' Admiralty date stamp present on copper sheathing removed from the hull of HMS Victory (Photo by author, ©NMRN).

Work evaluating galvanic corrosion was undertaken in 1770 with the *HMS Hawke,* and all iron bolts were covered with lead. This trial was considered a great success, renewing the Navy's interest in the viability of copper sheathing (Staniforth 1985, 24). This time the process became well established within the Royal Navy, and by 1779 there are standing orders on record outlining the type and amount of sheathing naval shipwrights required. Specifically, 32-ounce sheet was to be used on the bow, 28-ounce on the sides and 22-ounce on the bottoms of vessels (PRO 1779). By 1780, 46 vessels had been sheathed, although most still suffered from the galvanic corrosion that resulted in the foundering of the vessels *Ramillies, Centeur, Ville De Paris* and *Glorieux,* off the coast of Newfoundland in September of 1782 (Staniforth 1985, 25; Knight 1973). Due to these continued difficulties the Royal navy suffered from indecision, and copper sheathing was nearly abandoned once again (McCarthy 2005, 106).

Inventors and entrepreneurs recognised the potential in developing more affordable and effective materials. One of the predominant copper sheathing problems identified was that, despite initial gains in speed and manoeuvrability, the copper metal was very soft. This meant the sheathing could easily be bent, distorted, or even stripped from the hull, and was not suitable for use as nails or bolts (Harris 1966, 555; McCarthy 2005, 104). A harder metal was needed, and copper-zinc alloys known as brasses seemed a viable possibility. However, as the proportion of zinc increases in the alloy, the metal moves from a 'red brass' to a 'yellow brass', becoming increasingly hard and difficult to work (McCarthy 2005, 105).

James Keir, experimenting with copper alloys in collaboration with Matthew Boulton, created 'Keir's metal' in 1779 (Knight 1973, 306; Vickers 1923, 424; Harris 1966, 555; The Commissioner of Patents 1862, 25). This alloy mixture resulted in a metal with a composition ranging from 50-63% of copper to 37-50% of zinc, often with a ratio of 54 parts copper to 40.5 parts zinc to 5 parts iron or a mixture of 100:75:9 (Table 1). Keir's metal can be forged or wrought red-hot or cold (Harris 1966, 556). Unfortunately, this mixture was deemed too brittle and insufficiently malleable, and was abandoned by the Royal Navy after initial tests (Harris 1966, 556). Despite this drawback Keir persisted, and attempted to partner with William Forbes in order to carry on developing his copper alloy material.

In July of 1783 Forbes, on his own, applied for a patent outlining a copper sheathing material comprised of copper and spelter (an alloy with zinc), zinc, or lapis calaminaris (Table 1). This mixture yielded a brass strong enough to replace the iron bolts on vessels, avoiding galvanic corrosion (Harris 1966, 558; McCarthy 2005, 105; Staniforth 1985, 25;). The patent that Forbes attained allowed him to create his alloys in a mixture of 100 parts copper to any ratio of zinc up to a maximum of 60 parts, meaning that he could choose the level of hardness he required for the alloyed objects, depending on intended use (The Commissioner of Patents 1862, 27).

Figure D.4. Knee bolts from the *HMS Victory*. One is in situ on the vessel and one is held in the National Museum of the Royal Navy stores (Photo by author, ©NMRN).

Forbes also produced an alloy known as ‘mixed metal’, a term which has been used to describe a variety of copper alloys (McCarthy 2005, 104). For example, the Royal Navy had the pintles and braces of the HM frigate *Pandora* manufactured in ‘mixed metal’. Upon later archaeological excavation and assessment, the fittings were found to carry the 'FORBES' stamp and have a composition of 87.3% copper, 6.9% tin, 0.24% lead, and 0.04% zinc, with traces of iron, arsenic and antimony (McCarthy 2005, 104). However, later accounts of the metal's composition state four parts copper to one part tin with a small amount of zinc added occasionally. Forbes also refers to mixed metal as a mixture of 100 parts copper to anywhere between one and sixty parts zinc (Knowles 1822; McCarthy 2005, 105). Ultimately however, 'mixed metal' was found by the Royal Navy to be too brittle, and although it resisted oxidation well it was discontinued (Knowles 1822).

In 1783 Thomas Williams, a manager of the Parys Mines Company who rose to dominate the copper industry in England and is sometimes known today as 'The Copper King' (Bingeman *et al.* 2000, 222; Harris 1964), realised that the Royal Navy could decide against the use of copper sheathing at any time. Economically driven, he began to encourage and collaborate with individuals such as William Collins and John Westwood. In 1783 Collins obtained a patent for work hardening both iron and copper bolts, claiming they would not be as susceptible to decay as their predecessors. For this process the purest copper available was required (Harris 1966, 558; The Commissioner of Patents 1862, 27-8; Table 1). Westwood obtained a similar patent also concerning hard working copper that is as pure as possible (Harris 1966, 558). Williams' investment paid off and the Parys Mine Company began advertising 'Westwood and Collins Patent Copper Ship Bolts' in January of 1784 (Gore 1784), and Naval contractors began using these bolts (McCarthy 2005, 106). In fact, the *HMS Victory* was found to have clench bolts with a 'Westwood Patent – Collins PH & co' stamp (Barlow 1999, 80-1).

Fortunately for Williams and others invested in the copper trade, in August of 1783 the Royal Navy decided to employ copper alloy fittings on vessels of 44 guns and below. The original order specified 'mixed metal', but this was quickly changed to pure copper (McCarthy 2005, 106). These trials continued to yield positive results, and the final order to clad all new ships in the Royal Navy came in 1786. This order did however specify that alloy was only to be used for braces and tacks, and pure copper was to be used for sheathing (Knight 1973, 307).

Experimentation in alloy creation and use continued, and in 1785 the Parys Mine Company, keen to maintain their foothold in the copper market, had created new uses for their metal. New fittings included forged and rolled bolts and nails which were used by all the dockyards (Harris 1966, 563). Thomas Williams also continued to trade his materials throughout Europe, only hindered by the American Revolution and continued French upheaval (Harris 1966, 563; McCarthy 2005, 208-9).

William Collins likewise continued his research and obtained several patents while attempting to improve the viability of copper sheathing. In 1783 he patented a method for the improved manufacture of bolts, employing cold rolling to work harden the metal. These bolts were to be comprised of pure copper, or iron plated in sheet copper affixed with brass, tin, or lead (The Commissioner of Patents 1862, 27-8; Table 1). This was followed quickly by another patent in 1792 for sheathing comprised of cake copper refined and annealed, rolled, and pickled until made as clean as possible, then cold rolled to finish (The Commissioner of Patents 1862, 36; Table 1). In 1800, Collins obtained a third patent that outlined three separate types of sheathing known as red, yellow, and white metal. Red metal consists of 8 parts copper to one part zinc, cold rolled to finish, while yellow metal is comprised of 100 parts copper to 80 parts zinc worked at a low red heat. The properties of white copper, 16 parts tin to 16 parts zinc to 1 part copper, necessitated casting of the metal into plates (The Commissioner of Patents 1862, 44; Table 1). Finally, in 1817 he obtained a patent involving bronze sheathing of 80 parts copper to 20 parts tin (The Commissioner of Patents 1862, 93-4).

In 1830 John Revere patented an alloy consisting of 95 parts zinc to 5 parts copper (Table 1), claiming improved corrosion resistance (The Commissioner of Patents 1862, 85). In the same year Matthew Uzielli patented a production method for an alloy of copper and tin with no zinc or lead, which was to be heated and cooled gradually and finished by cold rolling in a single direction. Uzielli claimed this process would produce a malleable and ductile material (The Commissioner of Patents 1862, 86; Table 1).

George Frederick Muntz discovered the well-known ‘Muntz metal’ in 1832 when a workman mixed copper and tin contrary to the standing order (McCarthy 2005, 115; Flick 1975, 74-8). Upon examination of the alloy Muntz found that, although the material was difficult to work cold (Chadwick & Hashemi 1978), it could easily be rolled when red-hot. As a result, Muntz was able to cut production time and energy to only a quarter of that required to produced pure copper sheathing. Additionally, the metal oxidised sufficiently to prevent fouling and subsequently corroded at a slower rate than pure copper (Flick 1975, 74-8). Encouraged by his findings, he patented sheathing and fastenings of a mixture between 55-63% copper to 50-37% zinc within the year (Table 1). The preferred mixture of Muntz metal is a 60% copper to 40% zinc combination, creating a much more affordable sheathing material than pure copper (The Commissioner of Patents 1862, 92-3; Vickers 1923, 425; McCarthy 2005, 115). Although it took Muntz approximately five more years to establish the value of the material, fifty ships were sheathed in Muntz metal by 1837, over a hundred a year later, and over 400 by 1844 (Flick 1975, 78). Muntz eventually expanded beyond his own rolling mills in Birmingham and partnered with Pascoe Grenfell and Sons in Swansea to create 'Muntz's Patent Metal Company (McCarthy 2005, 116; Figure 1). Together they decided to price Muntz metal at £18 per ton lower than the current market price for pure copper sheathing (Flick 1975, 78; McCarthy 2005, 116), thus establishing an affordable and efficient product within a growing market (Bingeman *et al.* 2000, 220).

Once Muntz's first patent expired in 1846, old partners such as Pascoe Grenfell and Sons, along with other competitors, began to make and sell 'Muntz metal' in the 60% copper 40% zinc mixture. To stay competitive Muntz obtained another patent in 1846 for an alloy with an optimal mixture of 56 parts copper, 40.75 parts zinc, and 3.25 parts lead (The Commissioner of Patents 1862, 148; Table 1). Unfortunately, Muntz did not manage to re-establish his control of the sheathing market (McCarthy 2005, 117-118). However, this second patented alloy was even more cost efficient to produce than the original material and seems to have performed to the same standard. Interestingly, tests conducted in 1863 found that this new Muntz metal had the same approximate tensile strength as bar iron (Adams *et al.* 1990).

Concurrent with the development of Muntz metal, other alloy and sheathing experimentation continued throughout the mid-19th century. For example, Jacob Tilton Slade obtained a patent for sheathing comprised of composite copper and lead plates in 1834 (The Commissioner of Patents 1862, 96; Table 1). In 1846 John Lionel Hood also patented a mixture of up to 50% copper, combined with zinc, lead and a small portion of antimony as desired (The Commissioner of Patents 1862, 127; Table 1). This metal was to be suitable for cold rolling, and more affordable than currently available material. Also, in 1846 Baron Charles Wetterstedt obtained a patent describing multiple copper based products. Wetterstedt's copper sheathing was comprised of 96-7 parts copper, 1 part antimony, and 2-3 parts calcined soda. A second alloy, combining 1 part copper to

4-5 parts yellow metal, meant to be suitable for casting in wrought iron moulds, is also specified (The Commissioner of Patents 1862, 148; Table 1).

Dr. John Percy of the Government School of Mines was also experimenting at this time, and in 1848 suggested the inclusion of sulphur and phosphorus in copper alloy mixtures. Upon undertaking trials based on Percy's suggestions, phosphorus was found to increase the durability of the metal (Hay 1863, 92-3). Continued research such as this, concerning the chemical and physical qualities of copper alloys, brought about greater understanding of the metal's capabilities in different environments. Thus, material choice was, at least to some extent, becoming more refined. For example, by 1851 though Sweden had its own copper manufacturing facilities the country was sheathing vessels using metals produced in English based on the qualities of the material being produced at that time (Hay 1863, 92).

By the late 19th century, the Royal Navy was looking to optimise its copper sheathing, and consulted with chemists such as William Hay. The conclusions that Hay drew were unfortunately frustrating, stating that as of 1863 there was little chemical supervision in metal production, and thus 'nothing definite can be ensured; and chance and irregularity would continue' (Hay 1863, 96). Hay argued that due to the chemical inconsistencies of copper sources, combined with the practice of skimming the 'cream' off the manufactured copper for other products, sheathing could not be easily standardised (Hay 1863). This did not slow copper sheathing production however, and the later 19th century saw the creation of Naval and Admiralty Brass, with copper, zinc, and tin in ratios of between approximately 62:37:1 and 69:30:1 respectively (ASM International 1990, 1-11; Callcut 1996, 18; Table 1). The addition of tin provided the alloy with some protection from dezincification in the maritime environment, and the resulting sheathing products could withstand twice the rate of water flow as other contemporary options (Ashkeland *et al.* 1994; Bolton 1998; Rao & Nair 1998).

The era of copper sheathing wound to a close with the introduction of iron-hulled and -framed composite ships. New construction methods and materials where introduced in the mid-19th century and became widespread by the early 20th century (Bingeman *et al.* 2000, 224; McCarthy 2005, 118). Brass sheet, however, did continue to be used into the early 20th century on a selection of Europe's last wooden vessels, predominantly those that fished off the Grand Banks of Newfoundland, Canada (Le Bot 1977). It is also worth noting that Muntz metal, Naval brass and Admiralty brass have all continued to be used in ship fittings through to today. However, these modern alloys differ somewhat, as the introduction of silicon, aluminium, iron, and manganese improved the metal's functional capacity as technology advanced (McCarthy 2005, 118).

Table of Copper Alloys

A table of copper alloy types manufactured during the early 18th to early 20th century, including the inventor and patent number when available. These alloy types have been used to create a wide range of objects that could have potentially found their way to the Northwest Coast of North America. It is important to note that this is not an exhaustive list.

Date of Creation & Patent No	**Who & What**	**Mixture**	**Specific Information & Use**
1724 Patent No. 454	Nehemiah Champion of Bristol (Bristol Brass)	66.7% Cu; 33.3% Zn Subsequently annealed.	Granulated copper mixed with calamine zinc ore. The increased surface area of the copper improves zinc uptake in the alloy, from 28.6% to 33.3%. Found to be brittle and rejected after trials conducted by the Royal Navy. (Raistrick 1950)
09/05/1728 Patent No 497	Benjamine Robinson and Francis Hauksbee	Cu; brass; Sn; Fe; tinned plate (of unspecified quantity) Subsequently rolled.	Composite alloy developed for ship sheathing (Clowes 1845, 155).
10/12/1779 Patent No. 1240	James Kier (Kiers Metal)	50-63% Cu; 37-50% Zn Preferably: 54.3% Cu; 40.7% Zn; 5% Fe Subsequently rolled.	The large percentage of zinc allowed material to be forged/wrought red hot or cold. Found to be brittle and rejected after trials conducted by the Royal Navy. (McCarthy 2005, 105; Harris 1966, 556)
29/07 1783 Patent No. 1381	William Forbes	100 parts Cu; 1-60 parts spelter Zn or lapis calaminaris. Subsequently cold rolled. Note: **HM frigate *Pandora*: FORBES stamped sheathing composition: 87.3% Cu; 6.9% Sn: 0.24% Pb; 0.04% Zn, traces of Fe; As; Sb	An alloy for bolts and sheathing. In production zinc levels are adjusted for desired hardness. In cases where hardness is not a factor, the purest copper possible is to be used. (McCarthy 2005, 104-106; Harris 1966, 558-9)

02/10 1783 Patent No. 1388	William Collins	pure Cu, cold rolled. Iron bolts: plated with sheet copper, affixed with brass; Sn; Pb - alone or as a mixture.	A process for making and repairing bolts. (Harris 1966, 560-62; McCarthy 2005, 108)
20/12 1792 Patent No. 1926	William Collins	Cake copper, refined, annealed, rolled, and pickled several times until made as clean as possible. Subsequently cold rolled.	A composite alloy developed for ship sheathing. (McCarthy 2005, 108)
23/04 1800 Patent No. 2390	William Collins	Red brass: 88.9% Cu; 11.1% Zn Subsequently cold rolled Yellow brass: 55.6% Cu; 44.4% Zn Worked at a low red heat White brass: 48.5% Sn; 48.5% Zn; 3% Cu Cast into plates or fittings.	Composite alloy developed for ship sheathing, fittings, and other applications. (Harris 1996, 558-9; McCarthy 2005, 108)
06/05 1817 Patent No. 4115	William Collins	80% Cu; 20% Sn	A mixed metal alloy with improved corrosion resistance, to be used as vessel sheathing. (Harris 1996, 558-9; McCarthy 2005, 108)
28/02 1830 Patent No. 5892	John Revere	95% Zn; 5% Cu	An alloy with increased corrosion resistance. (Commissioner of Patents 1861, 68-69)
06/07 1830 Patent No. 5952	Matthew Uzielli	93.5-95.2% Cu; 4.8-6.5% Sn Free of Zn or Pb. Cast in thin sheets by heating and cooling the material gradually. Subsequently gently cold rolled, always in the same direction.	Composite alloy developed for ship sheathing, designed to be hard but malleable and less susceptible to oxidation than pure copper. (The Commissioner of Patents 1861, 66)
22/10 1832 Patent No. 6325 17/12/1832 Patent No. 6347	George Frederick Muntz (Muntz Metal)	50-63% Cu; 37-50% Zn Preferable mixture: 60% Cu; 40% Zn Subsequently rolled red hot.	A metal composed of 'best selected copper' and 'foreign zinc' melted together, subsequently rolled red hot. (Commissioner of Patents 1861, 92-93).
25/11 1834 Patent No. 6724	Jacob Tilton Slade	Plates of Cu and Pb united to comprise a single sheet	Composite alloy developed for ship sheathing. To be copper on one side and lead on the opposite. (Commissioner of Patents 1861, 96).
17/02 1844 Patent No. 10,056	John Lionel Hood	1-50% Cu combined with Zn & Pb, optional	Composite alloy developed for ship sheathing, bolts, nails, and other fittings.

		small portion of Sb, Sn, or Fe	Addition of tin to brass allows the metal to be easily rolled, affordable, and still able to oxidize in a marine environment to deter shipworm and fouling. (Commissioner of Patents 1861, 124-5)
15/10 1846 Patent No. 11,410	George Fredrick Muntz	56% Cu; 40.75% Zn; 3.25% Pb Cast in ingots, rolled red hot, and annealed	Composite alloy developed for more affordable ship sheathing (Brannt 1896, 151-2; Commissioner of Patents 1861, 144-5).
03/11 1846 Patent No. 11,434	Baron Charles Wetterstedt	Copper sheets: 98.5% Cu; 0.5% Sb; 1% calcined soda Cast metal: 80-83.3% Yellow Brass/Muntz metal; 16.7-20% Cu Both subsequently rolled	Composite alloy developed for ship sheathing and fittings. (Brannt 1896, 151-2; Commissioner of Patents 1861, 145-6).
1860	J. Aich (Aich's Metal, Sterro-Metal, Gedge's Alloy)	60% Cu; 38.2% Zn; 1.8% Fe *Note, the amounts presented are for the best mixture and there is considerable variation. Fe should not exceed 3%.	Alloy with increased hardness, sometimes this alloy is equated with certain kinds of steel due to the hardness gained from the addition of iron (Brannt 1896, 153-4; Henley 1916)
1880-85	Naval Brass	60% Cu; 39% Zn; 1% Sn (Callcut 1996, 18) 60% Cu; 39.25% Zn; 0.75% Sn (Untracht 1968, 18) 62% Cu; 37% Zn; 1% Sn (Ashkenazi *et al.* 2011, 2413; ASM International 1990) 60% Cu; 39.25% Zn; 0.75% Sn (Davis 2001, 8)	The addition of tin prevents dezincification, and creates a metal that can withstand twice the rate of water flow as contemporary sheathing. Developed originally for maritime service and continues to be used in this environment. (Callcut 1996, 18,37; Ashkenazi *et al.* 2011, 2413; ASM International 1990; Untracht 1968; Davis 2001, 8)
1876 First Known Use	Admiralty Brass	69% Cu; 30% Zn; 1% Sn (Ashkenazi *et al.* 2011, 2413; Callcut 1996, 18) 71% Cu; 28% Zn; 1% Sn (Davis 2001, 7)	The addition of tin helps inhibits dezincification. Developed originally for seawater service, with Sn added for corrosion resistance. Admiralty Brass continues to be used in fresh water environments. Late 20th and 21st century Admiralty Brass is more likely to contain Aluminium (Ashkenazi *et al.* 2011, 2413; Callcut 1996, 18,37; Davis 2001, 7).

*Patents may also specify other aspects of maritime development that are not referred to within this table.

A table of copper alloy types manufactured during the early 18th to early 20th century. Specific origins of these metals is unclear and/or contradictory, thus inventor and patent information is not included. These alloy types have been used to create a wide range of objects that could have potentially found their way to the Northwest Coast throughout the colonial period.

Copper Alloy	Suggested Element Composition	Composition Outcomes
Gilding Metal	80-90% Cu; 10-20% Zn (Callcut 1996)	Known for having a colour that closely matches gold, this metal was used to make decorative metal wear such as enamelled badges, jewellery, bullet jackets, and artillery shells. The metal was also used by silversmiths as a low cost training metal. (Callcut 1996, 35-36; Hiorns 1912, 152-3)
Cap Copper	95% Cu; 5% Zn	This metal is considered to have good ductility and corrosion resistance, and was used extensively to create the caps for ammunition. (Callcut 1996, 35-36)
Tombac (Tombak)	Gilting Tombac: 82% Cu; 18% Zn; 1.5-3% Pb; 0.2 - 3% Sn French Tombac: 82% Cu; 18% Zn; 3% Pb; 1% Sn Yellow Tombac: 85% Cu; 15% Zn; trace Sn Hanover Tombac: 85.3% Cu; 14.7% Zn Red Tomback: 90-97.8% Cu; 2.2-7.9% Zn; 0-1.5% Pb	The name is derived from 'tembaga', an Indonesian and Malasian word of Javanese origin meaning 'copper'. The term entered Dutch usage during their colonisation of Indonesia. Tombac is a cheap, malleable alloy, often used to make ornaments, metals, decorations, buttons, and munitions. (Aikin & Aikin 1807, 347; Hiorns 1912, 151-2; Ure 1875)
Yellow Brass/ Cartridge Brass	70% Cu, 30% Zn	One of the most commonly used brasses, used to make a wide variety of objects ranging from plumbing infrastructure to antennas, radiators, keys and ammunition cartridges. Yellow Brass is common due to its relative low cost and good corrosion resistance. (Callcut 1996, 5, 16, 36; Brannt 1896, 147-152)
Gunmetal/Red Brass	83-88% Copper; 2-16% Zn; up to 10% Sn; up to 5% Pb	An alloy that can be considered a brass and a bronze, with a copper, zinc, tin mixture. This metal is commonly used for castings, valves, pipe fittings. This metal offers corrosion resistance with good machinability and casting properties. (Brannt 1896, 204; Callcut 1996, 53; Hiorns 1912, 239-40)

Arsenical Bronze -earliest known use in 5th millennium BCE	Cu with > 1% As	This alloy is a strong metal with good casting qualities. It's earliest known use can be traced to the 5th Millennium BCE at Tell Yahya, Iran. Arsenic copper has improved ductility and cold working qualities. It can be extensively work-hardened without fear of embrittlement. However, this alloy needs to be work-hardened to take advantage of increased strength the alloy can offer. Additionally, arsenic acts as a de-oxidiser, improving cast quality. (Lechtman 1996; Charles 1967; Rapp 1988)
Tin Bronze	87% Cu; 8-13% Sn; occasional 2-4% Zn; up to 1% Ni; up to 1% Pb	This alloy has improved casting qualities and strength similar to Arsenical Bronze, but does not require cold-working to achieve the strength. (Aikin & Aikin 1807, 348; Brannt 1896, 199-201)
Manheim Gold	67-80% Cu; 20-33% Zn	This alloy is harder than copper, and is often used to make inexpensive jewellery (Hiorns 1912, 151; Brannt 1896, 180)
Pinchbeck	88.8% Cu; 11.2% Zn	This alloy is gold in colour, very ductile, and can be worked into very thin plate that does not readily oxidize in the air. This alloy is used to create cheap articles of jewellery, buttons, fixtures and fittings (Brannt 1896, 181)
Tournay's Alloy	82.5% Cu; 17.5% Zn	Manufactured in order to produce cheap jewellery, buttons, and bronze looking ornaments. (Hiorns 1912, 151)
Prince Rupert's Metal (Bristol Brass)	75% Cu; 25% Zn	This metal is named for its inventor Prince Rupert of the Rhine, and used to make jewellery. (Brannt 1896, 150)
Bell Metal	78% Cu; 22% Sn	A form of bronze that has a higher tin content that increases the rigidity of the metal. This alloy is often used to make bells, (Brannt 1896, 224-7)
Ordnance or Cannon Metal	88-90% Cu; 10-12% Sn Note: the smallest quantities of sulphur, lead, iron or arsenic would impair the alloy potentially to the point of rendering the cannon useless.	This alloy is a tough, strong metal used to create canons and other ordinance. Note, the smallest quantities of sulphur, lead, iron, or arsenic in the alloy mixture could cause problems with ductility, brittleness etc, and potentially render the cannon useless (Brannt 1896, 207).

Appendix E

Copper Material Experimentation

In order to conduct a biographical study of copper artefacts for this thesis it is important to consider the resources, organisation, and effort required to work the metal as it was in the Pacific Northwest in the 18th through 20th century (King 1999, 160). As such, a series of experimental studies were undertaken between 2014 and 2017 in which sheet copper, thick copper bar, and native copper nuggets were worked using stone and iron tools, employing a hammering and annealing technique consistent with the practices of Northwest Coast communities in the study region. The aim of this work is to gain some understanding of the sequence of processes behind copper metal working and to further contextualise the processes that created the witness marks visible on artefacts analysed in the broader research of this thesis (after Schlanger 2005, 28). For a detailed discussion of the Northwest Coast Indigenous metallurgical practices see Chapter 2, 2.2.5

Copper is a polycrystalline metal that is composed of randomly oriented unsymmetrical grains. These grains are organised in a face-centred cubic structure characterised by four planes that the grain can slip on when the metal is plastically manipulated (Vernon 1990, 500-501). The grains gain a specific microstructure from deformation work as the metal sheers along these slip planes which are visible in the metals microstructure. Grain slippage during work is aided by dislocations or imperfections in the homogeneity of the metal (Scott 1991; Craddock 1995, 95). These dislocations hinder the metal grains from easily slipping past each other, ultimately causing the ‘work hardening’ which is interpreted as stiff less malleable metal during the working process (Scott 1991, 1). Heating the copper to approximately 200-225 degrees Celsius in a process known as annealing, allows the grains to recrystallise and reorganise along their planes, effectively softening the metal and allowing it to become malleable once again (Vernon 1990, 501; Wayman 1989a, 32). Should the copper be left to anneal for a long period of time, the recrystallised grains are allowed to grow large and leave the metal soft and structurally weak (Scott 1991, 6-7). Though this experimentation does not include subsequent microstructure studies, understanding how the process works allows for a more informed program of work to be undertaken.

One copper bar, two manufactured copper sheets, and one native copper nugget were worked using granite, basalt and sandstone stone tools procured in the gravelly riverbeds of Northwest England and Northwest Wales. These stones range in size from cobbles that can be easily held in the hand, to an ovoid slab approximately 25cm in length and 8cm in thickness. A selection of modern and colonial era ball peen, cross peen, blocking, and lump hammers obtained from local tool and antique shops in Sheffield, UK are part of the tool kit, along with a steel saw blade, shears, punch tool, chisel, tongs, a moderate amount of firewood, and a quench bucket (Figure E.1). The metal samples were worked in rounds of hammering, folding, grinding, and annealing with a selection of the tools. The physical behaviour of the material throughout this process was documented.

Copper Objects:

- 24cm x 10cm x 0.7cm, 2.5kg, bar of modern manufactured copper
- 25cm x 25cm x 0.13cm, 680g, sheet of modern manufactured copper
- 25cm x 25cm x 0.07cm; 576 g, sheet of modern manufactured copper
- 4.2cm x 2.4cm x 1.8cm; 40.3g, placer nugget of native copper

Figure E.1. Experiments were conducted working various types of copper metal. The material was annealed in an open fire, quenched with water, and worked with a wide selection of tools similar to those available to Indigenous people of the Northwest Coast throughout the contact period (Photo by author).

The Work Station

For each experiment a low open fire was built in a bowl hearth, and a bucket of water for quenching was kept directly adjacent to the fire along with a pair of tongs. Both the stone and iron anvils were dug into the earth slightly, to mitigate both movement of the anvil during hammering, and percussion and reverberation issues related to hammering and human joints. A small amount of firewood is kept on hand to keep the flames up. A roaring fire was not used for this process. Whether and to what degree metal was quenched by Indigenous metallurgists is not known, however quenching solid copper in water after heated in an open fire at relatively low temperatures will leave the metal softened, in the same state as if it was left to air cool (Scott 1991, 1).

Thick Copper Bar

A thick piece of modern manufactured pure copper bar was first worked manually with only unhafted hand-held basalt and granite stone tools (Figure E.2). A sandstone anvil was initially chosen in an attempt to dampen vibrations felt in the hand. However, the soft anvil also worked to dampen the outcome of each blow and broke into pieces approximately 15 minutes into the experimental process. Following this, a harder stone or an iron anvil was used to work the copper bar as they offer the same qualities of resistance to pieces of thick copper metal.

Figure E.2. The copper bar worked with stone and iron hammers and annealed in an open fire (Photo by author).

Following annealing, the bar is initially softened. The stone tools leave stippled indentations in the surface of the bar, the iron hammers leave clear imprints, and deformation of the material can be felt through the workpiece. Following hammering for between five and 15 minutes (depending on the frequency and strength of the hammering technique) the surface of the metal no longer indents or is marked significantly. The sound of the copper when struck also increases in pitch. This process was noticeably speeded by the use of large iron hammers, where more force could be applied due to the hardness and mass of the iron, coupled with the leverage of the handle. It should be noted that appropriately hafted stone tools were not assessed and cannot be commented on. Though Indigenous stone hammers and chisels crafted on the Northwest Coast were finely crafted (Stewart 1994, 30), and therefore may be difficult to distinguish. Based on archaeological samples of metal working on the Northwest Coast, Arctic, and Subarctic regions (Franklin *et al.* 1982; Cooper 2007), it appears that Indigenous metallurgists were able to use their individual repertoire of tools with skilled precision.

Figure E.3. Thick copper bar was worked with stone tools and a selection of iron hammers, including a ball peen, claw, and lump hammer (Photo by author).

Annealing the bar involved placing the bar directly into the fire and waiting until it had become a salmon pink colour (King 1999, 160), suggesting the crystal structure of the copper had relaxed and the bar was workable (Scott 1991; Wayman 1989c). Tongs were used to remove the bar from the fire and quench it in water. This left the bar in a softened state once again, and stone tools again left stippled indentations in the surface.

The direct exposure to a wood fire left the metal covered in black carbon that could be removed through washing or polishing.

Over time as the copper bar was hammered, the periphery began to burr over, forming a lip of metal overhanging the edge of the bar. Both the overhanging metal and shape of the tool marks indicate the directionality and intensity of the working (Fregni 2016; Figure E.3). The thickness of the bar was not significantly reduced through three separate 6hr day sessions.

Copper Sheet Metal

Two sheets of copper, 0.7mm and 1.3mm in thickness, were worked with a combination of basalt and granite stone and iron tools. Both thicknesses of sheet metal were readily marked with the stamped indentations of the tools used upon them. Stone tools left rounded stippled indentations, and hammers left smooth-faced sharp-edged circular or square stamps, much as Franklin (*et al.* 1981, 35*)* discovered while undertaking experimental work on native copper nuggets. A granite stone and modern steel anvil were used to work the copper. Both hard anvils provided the same outcome while working the soft copper sheet, however the precise corners of the anvil provided a useful surface to shape the metal, rolling the sheet into tubes, folding edges over, or creating ridges (Figure E.7). A block of wood was also used as a form to work the metal over, and in these instances the impression of the tools used was much more vague and difficult to distinguish.

The sheet metal could be hammered and bent for a prolonged period of time before work hardening made the process too difficult. This is potentially related the thinness of the sheet, which meant the copper could be manually worked until it became too brittle and split from stress (Franklin *et al.* 1981, 21-25). However, the metal was annealed often once the sheet had become firm and stiff in order to avoid embrittlement that would cause the surface of the metal to split (Wayman 1989c; Tylecote 1992). Annealing involved placing the sheet metal in the open fire until its surface was visually observed to turn a salmon pink colour (King 1999, 160). The sheet was removed with tongs, quenched in water, and then hammered again.

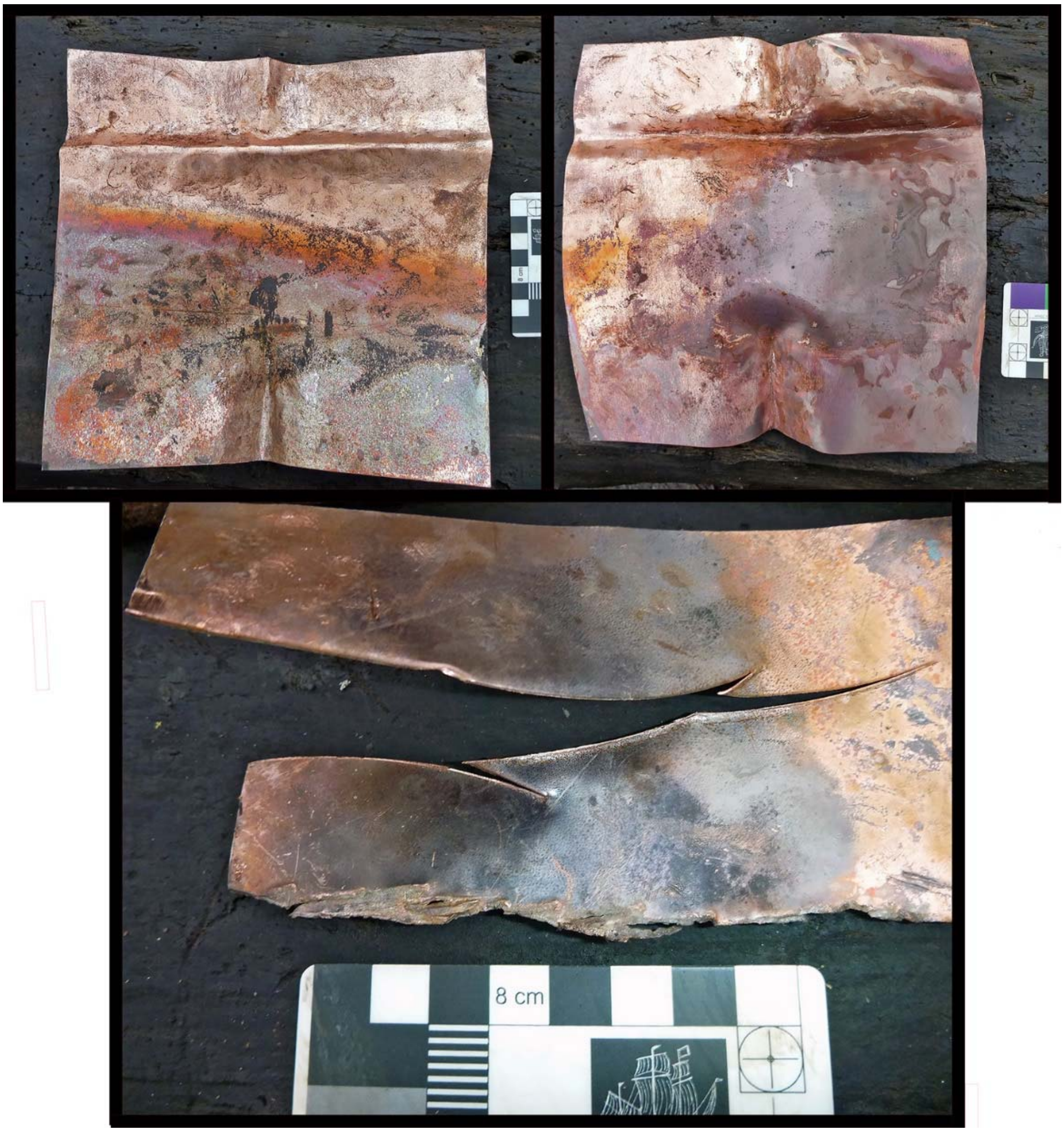


Figure E.4. TOP: The 1.3mm and 0.7mm thick copper sheets were worked using a selection of stone and iron tools. The edges of an iron anvil and a split wooden log were used to create ridges in the sheet metal. Bottom: The body of the copper sheet has been cut with shears, that leave a scalloped sharp edge, and by a hammer and chisel leaving a ragged burred edge (Photo by author).

An iron chisel was used to inscribe the surface of the softer copper with ease, and the directionality of the work could be detected by the striations in the markings. Shears were used to cut the sheet metal, which produced a scalloped pattern (Figure E.4). The shears pulled the metal outward as they cut, producing a thin razor-sharp edge that was easily removed with an iron file or an abrasive granite stone. A chisel and hammer were also used to cut a section of the metal. This process left a ragged brittle edge, with fragments of tool markings still visible in the surface of the copper (Figure E.4).

Figure E.5. A copper bead from Coast Salish archaeological site DjRi-5 with edges that line up neatly, Record No 102, Accession No. DjRi-5:1085. (Photo by author, ©LOA).

Both thicknesses of metal were rolled into tubes by bending the edge of the sheet up and then working it in towards the main body of the material. This deformation was achieved easily, however matching the edges of the metal to each other neatly, in the manner of some Northwest Coast Indigenous copper beads, requires considerable skill (Figure E.5; Figure E.6). A wooden branch was also used as a form to shape the sheet metal around, as wood has been observed within the rolled metal of some Indigenous bracelets ethnographically (Colnett 1786-88, 136). Using the wooden form allowed the metal to be rolled into a cylinder however a precise diameter is difficult to maintain.

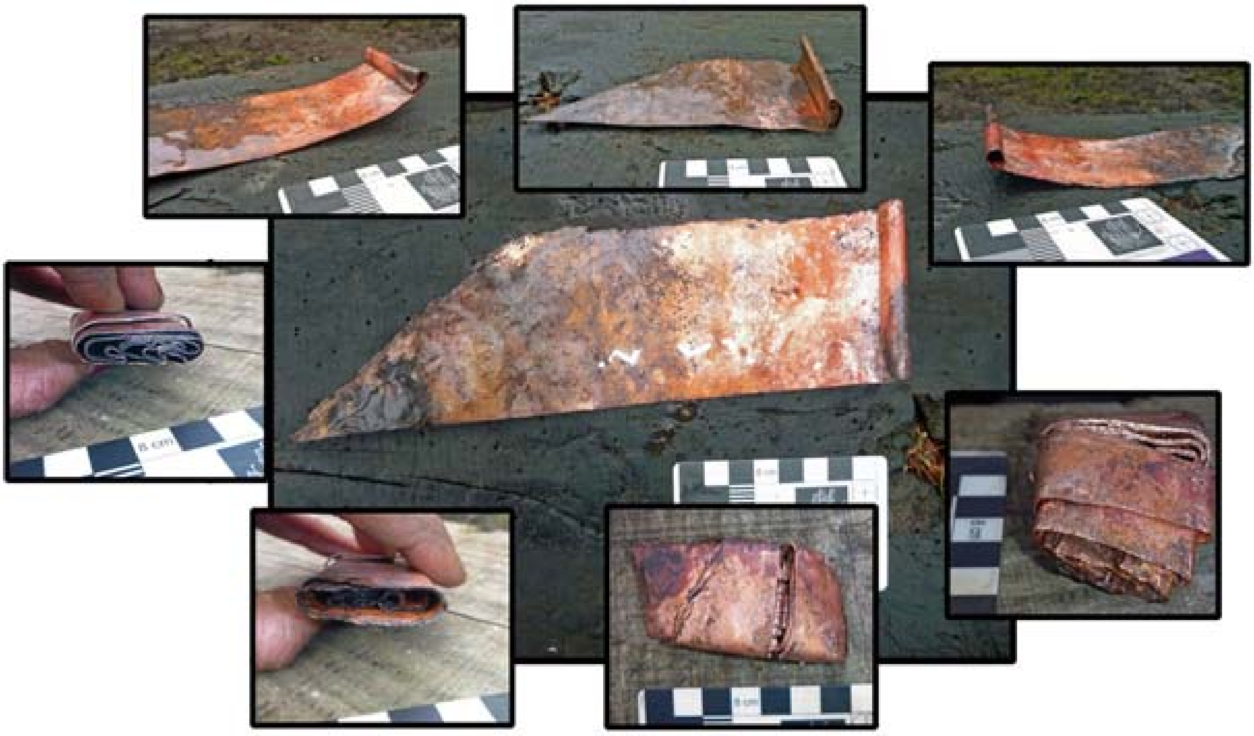


Figure E.6. Both copper sheets were rolled into hollow tubes and folded into a consolidated short bar that has been hammered flat similar to some working techniques observed among Northwest Coast Indigenous copper artefacts (Photo by author).

Figure E.7. Copper sheet metal folded over onto itself using an iron hammer and anvil (Photo by author).

The copper sheet was folded over upon itself and hammered flat a number of times in an attempt to build up material as described by Franklin *et al* (1981,24;Figure E.6; Figure E.7;), and as appears to have been done in the construction of some artefacts such as Indigenous arrow heads (Figure E.8). Attempting to forge-weld sheets of copper metal together with the heat of an open fire proved difficult. Hard wood and simple bellows could be used to achieve a higher temperature (Horne 1982), though it is unknown if these practices were part of Indigenous metallurgical traditions. In these experiments the sheet metal slid over each other, refusing to consolidate, and the surface of the metal began to become brittle from the working and break apart, despite repeated rounds of annealing. Some attempt was made to hot hammer sheet metal that was being folded together but high enough temperatures were not attained to truly unite the metal. A steel saw blade was used to cut the lump of metal that had been created, confirming the layered internal structure. The steel saw blade easily cut the metal, creating a small amount of copper shavings and dust from the work and leaving striations in the edges of the sheet metal (Figure E.9).

Figure E.8. The laminar quality of copper consolidated during the working process is visible on the surface of Coast Salish arrow head, Record No. 36, Accession No. A2172 (Photo by author, ©MOA).

Figure E.9. A steel saw blade was used to cut copper sheet metal that had been folded over onto itself a number of times (Photo by author).

Native Copper Nuggets

Figure E.10. The dorsal and ventral view of a native copper nugget from the Copper River region of the Wrangel St. Elias Mountain range following exposure to fire but pre-hammering work (Photo by author).

One native copper nugget, procured from a geology shop in Anchorage Alaska, USA, and provenance to the Copper River area of the Wrangell St. Elias Mountain range, was included in this experimentation (Figure E.10). The nugget was hammered against both stone and iron anvils, with stone tools and iron hammers until it was between 1 -

2mm in thickness. Ethnographic accounts of Indigenous metallurgical practices describe native copper nuggets hammered until 'thin enough to break with one's fingers' and then folded to consolidate the metal and built up the shape of the intended artefact (Rainey 1939).

Figure E.11. Native copper nugget hammered with stone and iron tools. The nugget has flattened and spread in width (Photo by author).

The copper nugget immediately responded to the hammering process and began flattening and spreading out in width. The stone tools left stippled indentations in the copper, and the hammers left clear imprints of the hammer head. The uneven shape of the nugget translated into small fissures in the surface of the flattened metal. The edges of the copper nugget began to splay and separate with stress as the nugget was reduced in thickness, becoming increasingly friable (Franklin *et al.* 1981, 21-2; Figure E.11). These edges were hammered back in towards the central mass of the nugget to retain material. Consolidating the metal proved difficult and any folded metal remained laminar in nature.

Thin flakes of copper began to peel up from the surface of the nugget as it was worked. As such, the nugget was annealed often in an attempt to prevent the loss of material through brittle fracture. The metal was placed directly in the open fire and allowed to become a salmon pink in colour, then removed with tongs and quenched in water. The nugget was only cold worked. The nugget was significantly reduced in thickness to between 1 and 2 mm within half an hour (Figure E.12). However, further work to thin and fold the metal together was frustrated as the metal became unmanageably brittle and friable.

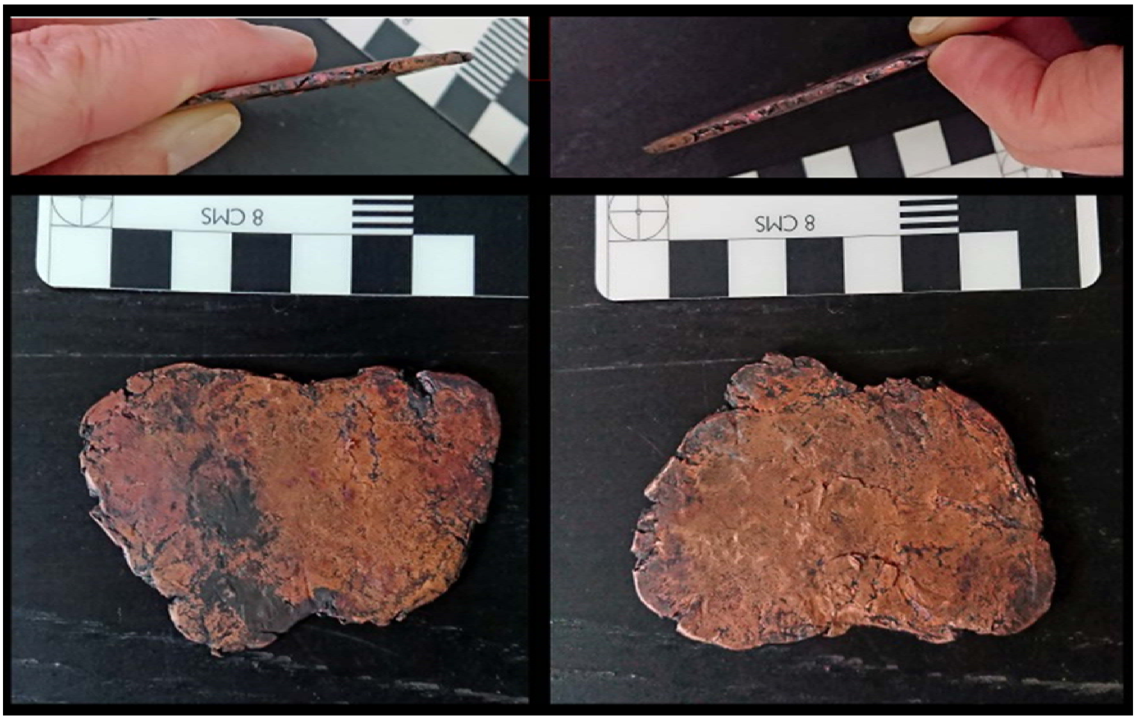


Figure E.12. The native copper nugget was reduced in thickness to between 1 and 2 mm, however the surface of the metal is peeling up in thin flakes and the copper has become quite brittle to fold (Photo by author).

Bringing the Elements Together

This analysis has been conducted to gain some hands-on understanding of the behaviour of copper metal when worked, aiming to further contextualise the manufacturing and use processes visible on copper objects created by Indigenous communities on the Northwest Coast. This work coincides with the knowledge gained regarding Indigenous copper metal working as described by Franklin *et al.* (1981), and Vernon 1990. Different thicknesses and qualities of copper were worked with a range of stone and iron tools, and observations were made regarding the physical behaviour of the metal throughout the process. For example, it became quickly clear that the metal should be annealed often to avoid the metal fracturing. Working the thick copper bar consumed a lot of time and energy, and multiple days of work did not yield significant results. However, the copper nugget, which was much thicker but of a smaller overall size, was reduced in thickness significantly more quickly. This supports the argument that large copper artefacts are predominantly found once the fur trade had begun when materials such as large manufactured metal sheets become much more available (Jopling 1989, de

Laguna 1972). This experimentation also demonstrates that a large amount of forethought, planning, and skill is involved in the production of delicate copper artefact fabricated using a hammering and annealing process (Lemonnier 1992; Schlanger 2005; Roux 2016; Martinón-Torres 2002).

Based on this study, additional observations were made regarding the Indigenous metallurgists' workspace. For example, placing the fabrication area near to the fire saves on time and energy during the production process. Metallurgical stone tools could also potentially be identified from surficial scratches left from activities such as smoothing sharp edges (Franklin *et al.* 1981, 24; Fregni 2016). Furthermore, the flakes and burrs of copper that are removed and lost from the metal during the working process can accumulate in the soil and could potentially be used as a means of identifying Indigenous metallurgical spaces, similar to hammer scale (Dungworth & Wilkes 2009).

This experimentation is ultimately one small facet of the biographical study of the Indigenous use of copper on the Northwest Coast during the contact period. However, the insight gained through this work enriches the material culture analysis conducted as part of this research. It has become clear that distinct impressions from the faces of stone and iron hammer tools, striations from a saw and shears used to cut, and a chisel used to engrave, allow for some interpretation of the tools used, directionality of the force applied, sequences of actions, and other strategies of making.

Appendix F HHpXRF Conditions of Practice – Health and Safety

All chemical analysis in this material culture study conducted with the Niton XL3t handheld XRF Analyzer followed the Local Rules set out by the University of Sheffield. Additionally, material analysis conducted in Canada followed the Federal regulations set by Natural Resources Canada (NRCAN), and an NRCAN accredited x-ray fluorescence (XRF) analyzer operator qualification has been attained (Government of Canada, 2017).

University of Sheffield Department of Archaeology

LOCAL RULES ISSUED UNDER IRR99 FOR USE OF HAND HELD NITRON XL3T XRF EQUIPMENT IN G22 and FIELD SITES

1. INTRODUCTION

These Local Rules are produced in accordance with the requirements of the Ionising Radiations Regulations1999.

This document must be read in conjunction with work certificate x/136, the supplier's user manual (Ref. 1) and operators of the unit must be in possession of copies of all these documents. Users should also watch the video on the Thermo Scientific web site for guidance (Ref 2). All users shall be required to sign to the effect that they have read and understood the contents of the local rules prior to their initial use of the XRF unit.

2. RADIATION PROTECTION SUPERVISOR (RPS)

The Radiation Protection Supervisor appointed in accordance with IRR99 is

Gareth Perry………………Tel 0114 2222928………….

Any matters relating to radiation safety should, in the first instance, be referred to the RPS.

The duties of the RPS, with respect to the XRF unit are as follows:-

The supervision of the day-to-day adherence with these local rules.
In the event of an emergency, to supervise the implementation of the Contingency Plans in Section 9 of these rules.
To act as a co-ordinator for contacts with the Radiation Protection Adviser.
To check the location of the XRF equipment and to confirm that the location record for the equipment is being properly completed.
To ensure that monthly checks are carried out to:

Confirm no X-ray leakage from the test stand using the Mini Monitor (5.42) report to Health and Safety if a count rate greater than 50 is detected

Examine the general condition of the X-ray unit.

Ensure that all interlocks and warning lights are functioning correctly

Take any remedial action required and keep a record of the inspection and any action taken.
To ensure that users check around the outside of the test stand, with the Mini Monitor (5.42), after it has been moved. Test results should be recorded
To carry checks of dose rates at the boundaries of the controlled area (*in the event that the XRF is being used outside of the test stand*)
2.6 To ensure that operators wear personal dosimetry and ensure that the dosimeters are returned on time to Health and Safety (*only required if the XRF is being used outside the test stand*)
2.7 To undertake an investigation if the recorded dose from personal dose records exceeds 0.5 mSv.
2.8 To keep a training record of users and record issue of the Local Rules to users.

3. DESIGNATED AREAS

During use of the XRF device within the test stand the work may be carried out in a 'Non Designated Area' and the correct signage should be displayed near to the instrument.
If the XRF is used 'hand-held' then a controlled area shall be set up such that the dose rates at the boundary of the controlled area are < 7.5 $\mu Svhr^{-1}$ and Controlled Area sign(s) shall be displayed. Extent of controlled area will not exceed 1m to either side or up to 5m in front with no shielding (ref 3)

Access to a controlled area shall be restricted to classified radiation workers or non-classified workers working under these rules.

On no occasion shall anyone enter the area in front of the analyser, or within 1m to either side, whilst it is in use in 'hand-held' mode. In the lab this can best be achieved by doing the work next to a solid wall which will act as a backstop.

4 AUTHORISED USERS

4.1 Only trained authorised persons working under these rules may use the unit.
4.2 Use of the equipment should be password protected to guard against unauthorised use.

5. USE OF THE XRF UNIT IN Lab G22

5.1 The supplier's operating instructions shall be adhered to when using the XRF equipment.

5.2 When used in the laboratory the XRF unit should be mounted in the workstation which will provide complete protection for the user and any bystanders.
5.3 Use of instrument in hand-held mode only to be carried out with permission of a qualified Instructor and NB: *controlled area to be set up and monitoring of operator and area required.*

5.4 If used in hand-held mode the unit should either be used horizontally against a suitable backstop, or vertically downwards with the sample on the floor or at arms length pointing slightly away from the operator. Operators must be vigilant when the unit is placed horizontally against a sample. The unit must **NEVER** be pointed at or held up against any person. KEEP YOUR FINGERS OR ANY PART OF YOUR BODY WELL AWAY FROM THE PROBE UNIT WHILST THE UNIT IS BEING USED. The dose rates close up to the opening on the base of the probe unit with the shutter open can be very high (up to 1.09 Sv/h).

5.5 In the handheld mode care should be taken in analysing irregular shaped samples ,small samples that don't cover the primary beam and low density samples (such as plastics) as these factors can increase the backscatter and affect the attenuation of the primary beam. In this situation Health and Safety should be contacted to determine if additional shielding is required.

5.5 X-ray leakage can be tested with a Mini Instruments 5.42 monitor (see Ref 4.) and a Mini Instruments 5.42 monitor should be switched on and placed near the operator throughout the period of the unit being used in hand-held mode.

6. USE OF THE XRF UNIT ON SITE (outside Lab G22)

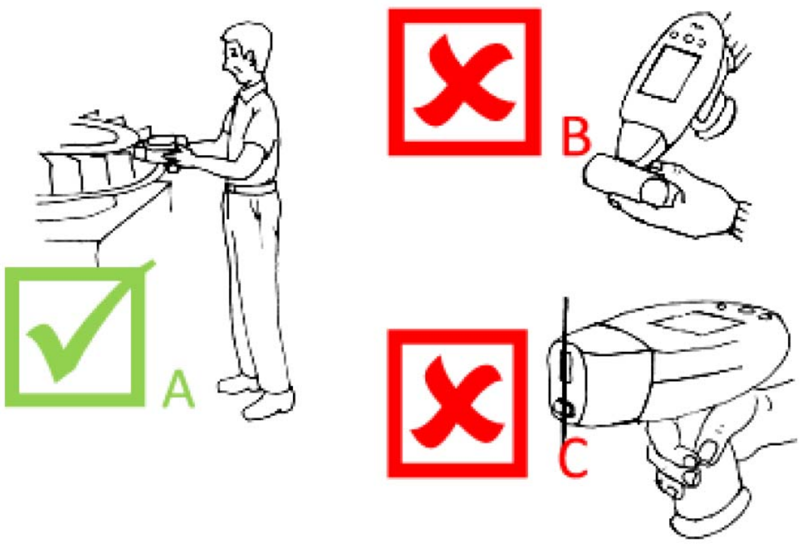
6.1 The supplier's operating instructions shall be adhered to when using the XRF equipment hand-held.

6.2 When out of its carrying case, care must be taken to avoid impact on the unit. If dropped the unit containing the x-ray tube may be damaged, resulting in a radiological hazard.

6.3 When practical, a Mini Instruments 42 monitor should be switched on and placed near the operator throughout the period of the unit being used.

6.4 The radiation controlled area must be under constant visual supervision by the operator. If any unauthorised persons enter the controlled area, the operator should stop the measurement and ensure that x-rays have been terminated.

6.5 The unit must **NEVER** be pointed at or held up against any person. KEEP YOUR FINGERS OR ANY PART OF YOUR BODY WELL AWAY FROM THE PROBE UNIT WHILST THE UNIT IS BEING USED. The dose rates close up to the opening on the base of the probe unit with the shutter open can be very high (see user manual).



7. STORAGE AND TRANSPORT OF THE XRF INSTRUMENT

7.1 When not in use the unit shall be stored safely and securely.

7.2 The person removing the XRF unit to use either in the laboratory or on site must sign and date the log book to that effect, giving details of where the unit is to be taken. A second entry shall be made by the person returning the XRF unit to the store.

7.3 It is extremely important to avoid the possibility of theft of the XRF unit or of a vehicle containing it. Please keep in the storage compartment of the vehicle. The vehicle should never be left unattended or out of sight except for short periods in cases of genuine necessity in which case the driver must check that all doors are locked and windows shut.

7.4 The XRF unit is robust and is unlikely to be damaged if reasonable care is taken during handling. However if there is any reason to suspect that the unit has been damaged the emergency procedures in Section 9 must be implemented.

8 MAINTENANCE OF THE XRF UNIT.

Apart from user replacement of a damaged measurement window, maintenance should be carried out by a Thermo Scientific qualified engineer.

9. CONTINGENCY PLANS FOR ACCIDENTS OR INCIDENTS INVOLING THE XRF UNIT

The following procedures must be initiated by the **unit operator** in the event of the following accidents:

Exposure not terminating
Should the x-rays not turn off (as indicated by warning light, audible alarm and/or Mini 42 monitor) then remove the battery pack immediately. If this is not possible, place the unit on the stand within a suitable shielded container. Restrict access to the area and consult the Radiation Protection Adviser immediately.

Theft Or Loss Of The Equipment
The Radiation Protection Supervisor must be consulted as soon as it is suspected that the unit has been lost or stolen and an immediate search must be started. The Radiation Protection Adviser should also be informed.

Any Damage To The Equipment, Including Fire Or Mechanical Damage
In the event of mechanical damage to the XRF instrument, x-rays maybe emitted through the case of the unit. Place the unit in the case and remove the battery pack. Ensure the device is clearly labelled as faulty and not to be used. Ensure unit is serviced/repaired by a suitably qualified engineer.

If it is suspected or known that an employee has received an overexposure to ionising radiation, then they must immediately inform the RPS who will carry out an investigation to ascertain whether an overexposure has occurred, the RPS will make a detailed record of that investigation and should contact the Radiation Protection Adviser for further advice. The Radiation Protection Adviser will be responsible for notifying the HSE if necessary.

10. RISK ASSESSMENT

A generalised risk assessment for a mobile XRF unit, incorporating an x-ray generator operated at up to 50 kV 40μA (2 watt maximum) power is given below:

Application
Mobile XRF unit containing an x-ray generator.

Hazard
External dose rate hazard when power is supplied to the x-ray tube and unit is used outside of protective workstation

Persons at Risk
Users of the units
Nearby persons
Service engineer

Precautions
Unit is password protected
Unit is shielded so x-rays are emitted from window only
Unit has a proximity switch for sample detection
The unit will automatically switch off if no backscatter radiation is detected during operation.
For lab use unit has screened workstation to cut out radiation when analysing small samples
Warning lights and audible signals in use
Local rules are provided with the unit
Users must be trained
Users are able to obtain advice from their RPS and RPA
Radiation monitors are used to ensure exposure has terminated

Risk evaluation and Conclusions
In normal operation, dose rate experienced by operator (whole body and hand) is < 1.0 μSv hr^{-1} (<0.003uSv/ 10 sec exposure on higher density sample)
Misuse of the detector could result in localised exposures at doses rates of up to 1.09 Sv hr^{-1} immediately in front of x-ray port.

11 REFERENCES

Thermo Fisher Scientific Nitron XL3t Analyzer quick start guide
NITON XL3 video http://www.niton.com/en/portable-xrf-technology/xl3-video
Guidance on the safe use of handheld XRF analysers . The Society for radiological Protection September 2012
4. Measuring dose-rates with a Mini 42 probe.

Radiation Protection Supervisor, Dept Archaeology
University of Sheffield
Certified Yearly